YHP Young Hikers Program

Activity Resource Kit for Grades K - 12











TD Friends of the Environment Foundation

hike ontario
experience it...one step at a time

Ontario

All children deserve contact with nature as part of their heritage….
the more our children see and know of the natural world around them,
the better equipped they will be to face the basic realities of life and realize the noble potential of existence this planet has to offer.

ANSEL ADAMS, 1902-84

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Introduction to Hike Ontario

Throughout the years Hike Ontario has had one goal – to encourage walking, hiking and trail development in Ontario.

Established in 1974, Hike Ontario is a non-profit, charitable organization governed and operated by volunteers. We are the sole provider of province-wide hiking information and services. Hike Ontario is also unique amongst Canada's provinces and territories in many of the services it provides to this province's hiking associations and citizens. Eighty-five percent of Canadians walk for leisure and recreation. Thus, Hike Ontario acts as the voice for over 10 million hikers and walkers in Ontario.

Hike Ontario recognizes and supports trails throughout Ontario and appreciates that every trail is unique. Every trail can't be all things to all people but all trails can play beneficial roles. Trails play roles in the economy, play roles in the environment and perhaps most importantly, play roles in our health.

While Hike Ontario recognizes the diversity of trails and trail uses, our focus is on the representation and promotion of pedestrian based trails and their benefits, focusing specifically on connectivity, economics, education, environmental, health, heritage, recreation and transportation.

Hike Ontario does not make or maintain trails, nor does it offer organized hiking/walking events, except through its member associations. Hike Ontario is the umbrella organization that provides these province-wide associations with resources and services to build on these long-established local and regional initiatives in a way in which complements and enhances them.

Our core objectives:

- To encourage walking for recreation, transportation and health
- To encourage and facilitate trail development for walking and hiking throughout Ontario
- To encourage good trail maintenance and hiking practices and the enhancement and quality of the
- walking experience
- To encourage and facilitate the development of trail building hiking clubs in Ontario
- To act as an advocate for a club or clubs when requested or when an initiative is deemed necessary
- To encourage education and research into the health benefits and other aspects of recreational
- walking
- To encourage conservation and appreciation of the natural environment
- To maintain and disseminate information on hiking and hiking trails

Our core programs:

- Advocacy and Government Relations
- Ambassador Program
- Annual Hike Ontario Summit
- Best Practices for Increasing Trail Usage by Hikers and Walkers
- Hike Leader Certification Program
- Insurance Provision and Risk Management
- Long Distance Awards Program
- Partnerships and Linkages
- Safe Hikers Program
- Sponsor of Ontario Hiking Week
- Young Hikers Project

Program Descriptions:

Advocacy and Government Relations: Hike Ontario is an active voice and resource to our government partners in the Ontario trails community. We play a lead role in promoting, educating about and advocating pedestrian trail experiences through an active presence at local, regional, provincial and national trail events. We do this through strategic planning processes, active communications, conference and workshop participation, information distribution, special events and educational campaigns.

Ambassador Program: Hike Ontario Ambassadors provide information on hiking and hiking trails across Ontario by promoting Hike Ontario and our member clubs to new and novice hikers across the province. As the number one source of province-wide information and resources about hiking, walking and pedestrian based trail development and management in Ontario, our Ambassadors provide this resource by doing presentations to clubs and community groups, training individuals and providing materials.

Annual Hike Ontario Summit: Held annually in late Autumn, our Summit is a weekend long event that features timely workshops, presentations, award presentations, guest speakers, and a full schedule of invigorating hikes.

Best Practices for Increasing Trail Usage by Hikers and Walkers: Hike Ontario engaged in researching and collecting data on the strategies, methods and opportunities for increasing use of trails by walkers and hikers and was able to then publish a comprehensive manual of Best Practices. This manual is most useful for Hiking and Walking organizations, Parks and Recreation staff, Conservation Area & Parks staff, Municipalities and a broad range of Special Interest groups (Health Units, Resorts, private landowners, trail builders etc.)

Hike Leader Certification Program: Hike Ontario has developed standards and training programs for Hike Leaders that are used by our member clubs, community colleges, universities, activity clubs and outdoor training organizations for course delivery. Currently, Hike Ontario offers Safe Hiker Program, Certified Hike Leader and Wilderness Hike Leader certification courses.

Insurance Provision and Risk Management: Hike Ontario works diligently with its trail partners and insurance providers to provide the best possible policy conditions to suit the needs of its trail clubs. This in turn is working towards managing for safe and sustainable trails systems throughout Ontario for the pleasure of walkers and hikers. Hike Ontario plays a key role in risk management through our dedication to pursuing best practices, sound advice and proactively engaging in and encouraging safe practices and education.

Long Distance Awards Program: Hike Ontario has a mandate to encourage hiking for all ages and all athletic levels throughout Ontario. The Long Distance Hiker Awards celebrate dedicated hikers who have logged long distances on multiple Ontario trails. Hike Ontario offers three long distance hiking awards; the Red Pine Award for 550 kms, the Trillium Award for 900 kms and the Tamarack Award for 1500 kms.

Partnerships and Linkages: Hike Ontario has formed and sustains strong ties with both government and non-governmental partners related to pedestrian trails. We strive to represent the interests of all hikers and walkers, trail clubs and all pedestrian based trail interests throughout Ontario. Hike Ontario represents the interests of hikers and walkers on the Ontario Trails Council (OTC) Board of Directors and the through a nominated representative to the Hike Canada / En Marche Board of Directors.

Safe Hiker Program: This one-day certification course introduces the new or novice hiker to the joys and benefits of hiking and walking and to the trails of Ontario. Special focus is placed on safety, sustainability and enjoyment. Upon completion, participants are armed with the knowledge necessary to keep themselves safe while hiking and how to ensure their hikes are environmentally and socially sustainable and will help them develop the confidence necessary to join hiking groups and/or go on their own hikes.

Sponsor of Ontario Hiking Week: Every year from October 1-7, Hike Ontario sponsors Ontario Hiking Week, encouraging people of all ages to get out and hike the many trails of this beautiful province. Ontario Hiking Week demonstrates the many faces of hiking and walking - as a recreational activity that's low impact, affordable to all, and that promotes environmental sustainability and ecological awareness.

Young Hikers Project: The Young Hikers Project aspires to introduce youth to the joys and benefits of hiking, through online resources and the Activity Resource Kit.

About the Young Hikers Project

To protect, preserve and increase the number of hiking trails in Ontario, we need citizens who care for them and are able to effect positive change.

Our Young Hikers Project was created to foster the appreciation of Ontario's hiking and walking opportunities amongst young Ontarians and to inspire young people to take action in the protection, preservation and growth of Ontario's footpaths.

Our goal is to foster and cultivate this appreciation through a variety of mediums. From curriculum focused lessons for educators, to on the trail activities for families and youth, we offer a broad range of experiential opportunities. All have one goal in mind - to get youth outside and on the beautiful trails of Ontario.

The Young Hikers Project will introduce youth to the joys and benefits of hiking through:

- Young Hikers Project Lessons and Activity Booklet for educators & youth workers
- Safe Hiking Program
- Hike Leader Certification Training
- Online Resources

The Young Hikers Project promotes hiking as a way of improving health, gaining valuable leadership experience, fulfilling school academic requirements, and earning fulfilling awards.

Why is there a Need for Such a Program?

Recently, news reports have declared that Ontario's children are in trouble. Child obesity in Ontario is on the rise and leads to other fundamental concerns including the increasing cost of health care and the decrease of healthy child development (physical and mental). Compounded with this discovery are the recent announcements of recreation facility closures in Ontario including swimming pools, rinks, and outdoor education centres. The onus for child recreation falls on the family in the after-school hours; hours that continue to dwindle as work demands increase.

Many families cannot afford potentially expensive organized sports such as hockey, soccer and martial arts. Physical activity and recreation which was once a healthy part of a child's school day, is becoming less and less a priority in Ontario schools. The time for non-profit organizations to assist the youth in Ontario is now. Programs, such as the Young Hiker Project, offer a community solution to dwindling budgets and the lack of services for Ontario's youth.

Statistics indicate that:

- Over half of children and youth aged 5-17 are not active enough for optimal growth and development. *Canadian Fitness and Lifestyle Research Institute.*
- Physical activity improves self-esteem, enhances psychological well-being, overcomes boredom and provides positive leisure pursuits. *Canadian Fitness and Lifestyle Research Institute.*
- 64% of Canadians are not active enough to reap the health benefits of a physical lifestyle. *Canadian Medical Association Journal 163(11).*
- $2.1 billion, or about 2.5% of the total direct health care costs, can be attributed to physical inactivity. *Canadian Medical Association Journal 163(11).*
- Almost half of all schools (46%) do not have a policy to provide daily physical education classes to students. *Canadian Fitness and Lifestyle Institute 2001.*

<u>It's not just about hiking for the health of it.</u>

The Young Hikers Project isn't just about increasing activity levels and fighting obesity. It's also about getting more young Ontarians to embrace the provinces largest classroom – the great outdoors.

The more opportunities children have to explore the natural world, the more inclined they will be as they mature, to preserve, protect and respect the environment.

Mounting evidence indicates that more and more children are disconnected from the natural world. Nature Deficit Disorder, a term coined by Richard Louv in his 2005 book *Last Child in the Woods,* refers to the alleged trend that children are spending less time outdoors, resulting in a wide range of behavioural problems. Problems that can be resolved by simply taking a child outside.

By providing the resources and tools that will help foster a love for hiking, walking and trails, our Young Hikers Project is cultivating the *hike leaders* of tomorrow, today.

> ***"Nature— the sublime, the harsh, and the beautiful— offers something that the street or gated community or computer game cannot. Nature presents the young with something so much greater than they are; it offers an environment where they can easily contemplate infinity and eternity."*** **—Richard Louv**

About the Young Hikers Project, Activity Resource Kit

Our Activity Resource Kit is designed as a tool for teachers to utilize to introduce students to hiking and walking. The recurring themes of our lessons, activities and games are:

Health & Recreation: The recreational values of trails are often their foremost attraction. In addition to the entertainment values of recreation, there is a significant health and fitness benefit as most recreation activities on trails involve exercise. Hiking is an incredible activity for improving both physical and mental health. Hiking and walking have proven to: assist with weight loss; prevent heart disease; decrease high blood pressure; improve and maintain mental health; slow the aging process; prevent osteoporosis; prevent and control diabetes; improves arthritis; relieve back pain.

Natural & Cultural Heritage: Trails and greenways have the power to connect us to our heritage by providing access to historic places and naturally significant areas. They can give people a sense of place and an understanding of the enormity of past events. Examples of natural features and areas include: wetlands, fish habitat, woodlands, habitat of endangered species and threatened species, and areas of natural and scientific interest. Other trails preserve our cultural heritage by providing access to Ontario Heritage landmarks or by means of a trail along a historic rail corridor, allowing a glance at the importance of this mode of transportation.

Environmental Education: Trails present a unique opportunity for education. People of all ages can learn more about nature, culture or history along trails. Of particular importance, trails provide firsthand experiences that educate users about the importance of the natural environment and respect for nature by leading us into a natural classroom. Enhanced, active education along trails is achieved through the use of comprehensive trail guides and signage to encourage awareness of the natural, cultural, and historical attributes of the trail. Hiking also instills a commitment to responsible recreation in the outdoors that promotes a respect for nature and the green spaces on which we play.

Responsible & Safe Hiking: A safe hike is a successful hike. To ensure success it is important that hikers know how to choose a route, pack a day pack, dress appropriately, navigate their surroundings and have an awareness of risks due to weather and terrain. Our goal is to prepare hikers to enjoy their time in the woods and to follow the rules of low-impact hiking: leave only footprints and take only memories.

Section A
Academic Lessons



Our academic activities are intended to raise the student's awareness of and appreciation for the natural environments in which hiking and walking trails are found.

Addressing Harmful Environmental Behaviours

Grade level: 5-6
Provincial curriculum links: Ontario
Subject: Science and Technology; The Arts
Reference: Adapted from lesson by Magge Dirling, University of Pittsburgh

SPECIFIC LESSON GOALS

- ☆ The nature of science as an inquiry field
- ☆ That clear communication is an essential part of doing science
- ☆ The role of modern technology in scientific research and information gathering
- ☆ To recognize their human place in the organic world
- ☆ Access and process information from readings, investigations, and/or oral communications
- ☆ Analyze data to identify trends and form conclusions
- ☆ Interpret and communicate findings (i.e., speaking, writing, and drawing) in a form suited to the purpose and audience, using developmentally appropriate methods including technology tools and telecommunications
- ☆ Modify ideas based on new information from developmentally appropriate readings, data, and the ideas of others
- ☆ Describe to others how scientific information was used
- ☆ Explain that technology extends the ability of people to change the world. (e.g., to cut, shape, or put together materials, to move things from one place to another, and to reach farther with their hands, voices, senses, and minds)

DESCRIPTION

Students will brainstorm activities that they have observed people doing in the natural world around them that seem to harm the natural environment. While working cooperatively in groups, the students will create pictures and write short paragraphs illustrating and describing the behaviour and ways to accomplish the same behaviour without harming the environment.

PREPARATION

Length of lesson: 50 mins

RESOURCES REQUIRED:

- Art supplies (ex. crayons, scissors, glue, construction paper)
- Magazines from various topics for real-life "photos"
- Pencils
- Post-Activity Handout

PROCEDURE

- Students will become aware of the harmful behaviours of people in the natural environment.
- Students will generate, in cooperative groups, ideas about what they think maybe harmful to the environment, create visual representations of these destructive practices to be shared with the entire class, and brainstorm ideas to combat such pollutant activities.
- Individually, students will complete the Post-Activity Handout and submit it to the teacher.
- After placing the students in cooperative groups, ask the students to help make a list of activities people do that seem harmful to the native plants and animals of the environment.
- As responses are given, record them down on the blackboard or overhead transparency for the whole class to view.
- Students will use cut out photos from magazines and/or draw pictures to illustrate the stated harmful behaviours visually. Each group's cards will be collected and redistributed so that each group gets another group's pictures. [Author's Note: The number of cards each group makes is dependent on: 1) the number of children in the class, thus 2) the number of student groups, and 3) the number of responses voiced on the board.
- Obviously, as with any practical lesson plan execution, the teacher would need to divide the total class as evenly as possible and fill in some ideas of her/his own if the class, as a whole, was unable to generate an adequate number of responses.
- Ask the group to analyze each of the cards they've received, directing them to discuss such things as:,
    - What is happening?
    - Does it harm wildlife? How?
    - Does it seem to be appropriate or inappropriate behaviour? Why?
    - Is the person doing it having fun?
    - What are alternative forms of the same behaviour that would be less harmful to the environment?
- Each group will report to the rest of the class, displaying the picture card and discussing their feeling concerning the harmful activity, and their possible recommendation(s) for less harmful behaviours.
- After each group has had a turn to lead the discussion, the illustrative cards could be posted in the classroom science center as a reminder of the harmful way(s) people could behave in the environment.
- The groups will split up, and each will be asked to complete the post-activity handout within 15-20 minutes, as it will be collected at the end of the class session

STUDENT/ PARTICIPANT EVALUATION

Following the activity, review the students' responses to the Post-Activity Handout so that individual (as opposed to group) comprehension can be assessed

ENRICHMENT AND EXTENSION ACTIVITIES

After seeing the multiple ways in which humans are harmful to the environment, students could create handbooks illustrating the harmful behaviour and outline alternative ways that would be less harmful to their environment. Each student could make their own handbook to take home and share with their family. To enhance this lesson for an upper grade level, students could be asked, based on the harmful behaviours they're now aware of, to compose a personal code of environmental ethics, incorporating, in thematic paragraph form, all of the behaviours discussed in class

POST ACTIVITY HANDOUT

Name:_____

Directions: Complete the following questions based on the Environmentally Harmful Behaviors we learned in class today.

1. Make a list of five things which people do that harm wildlife:

1._____
2._____
3._____
4._____
5._____

2. For each of the five things listed above, describe what you can do about it.

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

3. Make a list of ten things which people can do to help the natural wildlife.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Adopt a Tree

Grade level: 3-6
Provincial curriculum links: Ontario
Subject: Science and Technology
Strand: Plants, Habitats and Communities, Diversity of Living Things
Keywords: Shrub, Tree, Grow, Measure, Ecology, Seasons
Reference: Based on an activity from Project Learning Tree (www.plt.org) By Drew Monkman

SPECIFIC LESSON GOALS

Grade 3
- ☆ Describe, using their observations, the effects of the seasons on plants
- ☆ Identify the major parts of the plants
- ☆ Record relevant observations, findings and measurements
- ☆ Identify some functions of different plants

Grade 4
- ☆ Describe structural adaptations of plants that demonstrate a response to their environment
- ☆ Recognize that plants live in specific habitats because they are dependent on those habitats

Grade 6
- ☆ Identify various kinds of plants and animals
- ☆ Compile data gathered through observations in order to record and present results

DESCRIPTION

The student/participants will learn the parts of a tree, seasonal changes, how to identify trees and certain ecological functions

PREPARATION

Preparation Time: 30mins

Length of lesson: First lesson requires 45mins and subsequent outings will be shorter for recording changes in the trees

RESOURCES REQUIRED:

- Observation Sheet [App. 1]
- Clipboards
- Measuring Tapes for class
- Coloured Pencils
- Regular Pencils

PROCEDURE

1. Teacher/leader decides ahead of time which shrubs or trees, preferably deciduous, the student/participants can choose from. The advantage with shrubs is that they usually produce flowers, whereas young trees do not.

2. Student/participants may choose to work alone or with a partner.

3. In class, go over what the student/ participants will be doing outside. Depending on the time of the year and how elaborate the teacher/ leader wishes to make this activity, the children may be:

    - choosing a tree or shrub they wish to "adopt" for the year
    - giving the tree an appropriate nickname (e.g. Woody)
    - recording the species (older children may be able to do this based on leaf characteristics)
    - estimating or directly measuring the height of the tree
    - measuring the circumference at the base
    - making a bark rubbing and gluing it in their notebook or journal
    - making an accurate colour drawing of the entire tree
    - making an accurate colour drawing of the leaf
    - measuring the length and width of an average leaf
    - recording whether the leaves are opposite or alternate, simple or compound
    - taking a leaf, pressing it in the pages of a book and allowing it to dry; covering with Mactac, putting it in a notebook or on a bulletin board
    - photographing the tree with children standing in front (may be done several times during the year)

- in the late winter, choosing a specific bud to observe over the spring. Place a piece of masking tape adjacent to the bud so as to remember which it is. Record, measure, draw the growth (leaf, stem, flower) that comes from the bud
- recording signs of insect activity in the tree
- recording other changes such as fall colour, leaf-fall dates, leaf-out dates in spring, flowering dates etc.
- making a class bulletin board of the adopted trees
- taking a cutting from the tree in late winter, putting it in water in a bright window and seeing if it will leaf out

DISCUSSION AND QUESTIONS

- At the beginning of the year, whole group discussions are best. Children share their observations orally.

- Charts and graphs can be made on topics such as comparing tree height, leaf size, leaf-drop dates, etc. N.B. The trees can be visited just before or after recess on a regular basis in order not to miss any changes.

STUDENT/ PARTICIPANT EVALUATION

- Observation sheets can be evaluated on the ability to provide oral or written description of the tree or shrub.

- Student/participants can be observed and assessed on their cooperation and independent work skills while outdoors.

ENRICHMENT AND EXTENSION ACTIVITIES

Student/ participants could be encouraged to go further in their observations, drawings, recording method, use of graphs, etc. For example, they could make detailed drawings of the trees' flowers and label the parts. They may also wish to make a list of all the trees on the school grounds that they can identify.

Student/ participants should be encouraged to make sure their tree is healthy and is getting enough water. They may wish to take on some of these responsibilities themselves.

EDUCATOR NOTES

The bulletin board with pictures of the kids standing in front of their trees can be left up all year long. Parents love it. You will find that they children become quite attached to their tree and remember its nickname years later.

References

Most tree guides have information on how to identify trees based on characteristics of the leaves.

- National Audubon Society - First Field Guide to Trees, by Brian Cassie (Scholastic Inc.)
- Introducing Trees, by Pamela Hickman (Federation of Ontario Naturalists)

[APPENDIX 1]

SAMPLE OBSERVATION SHEET

Season	Estimated Height	Observations	Sketch of Tree, Leaves etc.

The Beauty of Nature - A Sensory Experience

Grade level: K-3
Provincial curriculum links: Ontario
Subject: Science and Technology
Reference: Adapted from lesson by Richard Oakes Peters, Augusta State University

SPECIFIC LESSON GOALS

- ☆ Appreciate the qualities of natural phenomena
- ☆ Understand the types of flora and fauna to be found in selected natural environments
- ☆ Value the character of natural environments as exhibited in various art forms
- ☆ Understand the interaction/interdependence of living organisms in selected ecosystems

DESCRIPTION

Students investigate the flora, fauna, and landscapes of natural areas/regions and places using their senses. Students will:

1. define selected vocabulary (e.g., ecosystem(s), environment(s), flora, fauna, nature) and incorporate them into conversations and writings
2. walk through selected natural sites and experience the surroundings using the senses,
3. collect site-based materials which will be studied in the classroom
4. view/discuss art work that depicts scenes of nature
5. listen to music that depicts scenes of nature and discuss it
6. create original artwork using materials collected at field-based sites
7. read about nature's landscapes, flora, fauna (etc)
8. view audiovisual presentations that depict nature and its phenomena
9. listen to guest speakers read/talk about nature
10. listen to community resource people at field-based sites talk about nature
11. create displays (types of leaves, rocks/minerals, tree bark, flowers (if appropriate), soil types)
12. talk about the things seen/heard while touring natural sites
13. taste a variety of food that can be collected at natural sites
14. write stories about their site adventures -- what they saw/heard and liked best
15. create bulletin boards.

PREPARATION

Length of lesson: Throughout the school year

RESOURCES REQUIRED:

- Audiovisual presentations (films, filmstrips, slides, videos)
- Construction paper-paint-glue-scissors-clay-tape, etc)
- Print resources (books, magazines)
- Maps
- Music
- Photographs
- Artwork
- Items collected at the field-based site(s)
- 8mm/16mm motion picture cameras, still photography cameras, and videotape equipment and film/videos
- Audiotape recorders and tapes

PROCEDURE

Students are introduced to the flora, fauna, and landscapes of nature and experience it through their senses.

1) Nature walks and field trips to selected sites - to observe phenomena, to listen to the sounds of nature, to become aware of the aroma of the natural setting (etc) -- community resource people act as chaperones and guides
2) the teacher/students read selected stories that emphasize nature, natural areas, flora, fauna, landscapes (etc).
3) students listen to music/songs that depict the character of nature
4) students view artwork that depicts natural landscapes, flora, fauna (etc)
5) guest speakers demonstrate art/music skills and discuss the character of nature
6) students view audiovisual presentations that depict nature's landscape, flora, fauna
7) students create original artwork that depict aspects of nature's character
8) community resource people bring animals to the classroom and discuss their lifestyles in nature as well as their habitats, shelter, food
9) with the help of the teacher(s) and resource people, students collect data on film and/or video tape and audiotape.

STUDENT/ PARTICIPANT EVALUATION

Students demonstrate knowledge and abilities by:

1) drawing pictures of what they saw/liked best at natural sites
2) writing about the things they saw/liked best at natural sites
3) talking about the things they saw/liked best at natural sites
4) writing about the sounds they heard at the natural sites
5) talking about the sounds they heard at the natural sites
6) creating original artwork
7) reading stories about nature and its flora, fauna, landscapes (etc)
8) asking questions of guest speakers and site resource guides
9) making bulletin boards
10) talking/writing about the colors of nature
11) singing songs about things in nature
12) displaying types of rocks, flora, tree bark (etc)
13) talking/writing about the aromas of nature.

Bug Study

Grade level: K-1
Provincial curriculum links: Ontario
Subject: Science
Topics: Characteristics and needs of Living Things; Daily and Seasonal Cycles
Keywords: Insects, bugs, animals, nature, habitat.
Reference: Adapted from Lesson by Maggie Linton

SPECIFIC LESSON GOALS

- ☆ Describe the different ways in which animals move through the garden to meet their needs
- ☆ Classify characteristics of animals and critters by using the senses

DESCRIPTION

Student/ participants will conduct a study on bugs and animals living in the naturalized area around their school

PREPARATION

Preparation time: 3 hours
Length of lesson: 1.5 hours

RESOURCES REQUIRED:

- Markers (i.e. hoops)
- Magnifying glasses
- Observation chart that includes criteria for classification (see below) (e.g. size, colour, method of movement) to record sightings as well as a section for drawing what they noticed. (I saw, I listened, I heard, I smelled)

PROCEDURE

Part I

1. Preplanning: Send a letter home asking parents to dress student/ participants in suitable clothing
2. Student/ participants should be put into groups before venturing into naturalized area
3. Assign specific areas for each group
4. Remind student/ participants to respect the naturalized area and its inhabitants

Part II

1. In order to become aware of the various forms of life that can be found in a naturalized area, student/ participants will visit the naturalized area to discover what types of animal life exist and will record their findings.
2. By placing the hoops on the ground the student/ participants will use magnifiers to observe existing animal life only within their hoops and fill in their checklist.
3. In the classroom they will enter their findings on a graph and order them in classifications that have been previously outlined.

Sample Observation Chart

Date	Animal/ Insect	I Saw (size, colour, drawing)	I Heard	I Smelled

Discussion and questions

Through discussion and brainstorming the student/ participants will predict what kind of animals they might find in the naturalized area and how this information might be classified.

Student/ participant evaluation

- Listening and following directions
- Cooperative group skills
- Proper use of tools and equipment
- Application of knowledge and classification skills

ENRICHMENT AND EXTENSION ACTIVITIES

This activity could be part of a larger unit on the basic needs of living things and lead to in-depth sensitization of the need to consider and respect our habitat.

EDUCATOR NOTES

This lesson can be used as an introductory lesson to teaching and learning in the naturalized area. Its format is especially appropriate for establishing these routines and basic sensitivities.

References

- "Science Everywhere 1" Harcourt Canada
- "The Icky Bug Alphabet Book" by Gerry Pallotta
- "The Best Bug Parade" by Stuart J. Murphy
- "Spiders" by Gail Gibbons
- "The Grouchy Ladybug" and "The Quiet Cricket" by Eric Carle
- http://www.ecoschools.com

Can You Dig It?

Grade level: K-6
Provincial curriculum links: Ontario
Subject: Science and Technology

SPECIFIC LESSON GOALS

- ☆ Students will be able to identify interrelationships between daily activities which require energy and the renewable and non-renewable resources which are used to provide the energy.

DESCRIPTION

Students will be able to identify interrelationships between daily activities which require energy and the renewable and non-renewable resources which are used to provide the energy.

PREPARATION

Prep Time: 15mins
Length of lesson: 60mins

RESOURCES REQUIRED:

- Paper
- Glue
- drawing materials
- magazines

PROCEDURE

The students will brainstorm a group list of things they do each day which require energy, for example, watching television, driving a car with their parents, burning a fire in a fireplace, cooking dinner on a stove. Encouraging variety, the students should pick one or more activities from the list and do research to find out where the energy comes from that make the activity possible. For example, the electricity used to operate a television set might be derived from hydroelectric turbines powered by water and stored behind a dam.

Students should be provided with drawing materials and/or magazines from which they might cut photos. Each student will draw, or cut from a magazine, two pictures -- one representing the

activity requiring energy they chose to research, and the other showing the major natural resource which is used to provide the energy for the activity.

Students will discuss the terms "renewable resource" and "non-renewable resource." They will group their pictures, displaying them under one or the other of these categories. Then questions such as the following should be discussed:

Which activities depend on renewable natural resources for their major energy source? Which on non-renewable natural resources? Are there ways each of us might change our daily habits to use energy more appropriately?

ENRICHMENT AND EXTENSION ACTIVITIES

Older students might find out about the environmental and monetary costs related to providing energy from each source. Discuss which common uses of energy seem most appropriate for which sources

Colour your World with Changes
The Camouflage Game

Grade level: 6-8
Provincial curriculum links: Ontario
Subject: Science and Technology; the Arts; Mathematics
Strand: Life Systems; Visual Arts; Data Management and Probability

SPECIFIC LESSON GOALS

- ☆ Investigate ways in which natural communities within ecosystems (school gardens) can change, and explain how such changes can affect animal and plant populations.
- ☆ Communicate the procedures and results of investigations for specific purposes and to specific audiences using media works, oral presentations, written notes and descriptions, charts, graphs and drawings.
- ☆ Produce a two-dimensional work of art that communicates a range of experiences for a specific purpose.
- ☆ Display data on bar graphs, pictographs and circle graphs, with and without the help of technology

DESCRIPTION

Students predict the dominant colours found in their habitat or garden area. They visit their habitat site on a monthly basis, searching for coloured toothpicks which have been scattered throughout the garden area. Students gather the toothpicks and graph their results, determining the dominant colours for the month or season. Students use these dominant colours to develop a piece of visual art.

PREPARATION

Preparation Time: 30mins
Length of lesson: 90 minutes - split into two parts

RESOURCES REQUIRED:

- Large variety of coloured toothpicks
- Stop watch or timer
- Graph paper
- Drawing paper
- Coloured pencils or markers or paint

PROCEDURE

Part 1

1. Use permanent magic markers to colour toothpicks - about 20 of each primary and secondary colours plus 20 uncoloured.
2. Hide the toothpicks in easy and hard to find places within the habitat area. Place them so that some toothpicks match the background while others contrast with the background.
3. Ask students to predict how many of each colour will be found.
4. Students search the area for 5-10 minutes, gathering up any toothpicks they can find.
5. Record student colour totals. Discuss the results. Which colours were most easily found? Which colours were difficult to find?
6. Students return to the area to look again. Record any new toothpicks which are found. Count how many of each colour of toothpick were not found, and record the information.
7. Students graph their results on a bar graph to be kept and compared on a monthly or seasonal basis.

Part 2

1. Using the three most popular colours, students choose pencil crayons, watercolours, or pastels to create a two-dimensional work of art. The piece will illustrate the colours of the month or season.
2. Students will repeat this exercise on a regular basis (monthly or seasonally) to create a colour calendar for their art portfolio.

Discussion and Questions

Part 1

- Discuss which toothpicks were easy or hard to find. Why?
- Was it easier to find toothpicks the second time we searched? Why or why not?
- Why were all of the toothpicks not found?
- Was it difficult to find certain colours? Why?
- Would the results be the same if the experiment were attempted at a different time of day or night? Why?
- Would the results be the same if the experiment were attempted a month later? Why? What predictions can we make about a change in colour next month?
- What are the benefits of the colours changing every month/season?
- Does the predominance of one or two colours influence the types of animal life which can be found in and around the habitat? Why?
- Make connections to animal camouflage techniques and discuss how predators overcome the problems of finding camouflaged prey (i.e. they use other senses such as smell or they wait patiently until the prey moves).

Part 2

- Can we communicate the change of the season in our art by using three of the most predominant colours and shades of these colours to produce a piece of art?
- If we repeat this activity on a monthly basis, can we develop a calendar of colour changes in our habitat?

Student Evaluation

Develop a rating scale for students to determine how well they have completed the goals of the lesson.

ENRICHMENT/ EXTENSION ACTIVITIES

- This activity can be used to report upon the changing patterns of colour within the school's habitat area. Student graphs and art samples may be displayed within the school.
- Discussions and activities which help to illustrate the subtle changes which occur and their impact upon the animals and plants of the habitat are encouraged.
- Repeat the activity using a paved area. Compare the results with those obtained from the schoolyard habitat area and predict the types of animal and plant life that would be able to survive in each area.

Connections to the Outdoor Environment

Questions to ask:

- Would the colour changes be the same in a rural community as within an urban community?
- Do the colour changes affect the ability of various insects and small mammals and birds to find shelter within a specific habitat?
- If specific habitat requirements are lacking, what will happen to various insect and animals populations?

EDUCATOR NOTES

This lesson can be used to assist in the identification of some factors which contribute to the survival of populations within an ecosystem. This lesson plan can also be used to introduce the concept of change within a natural community. It could also be an opportunity in which an intermediate class is partnered with a Grade 2 class, examining change throughout the seasons. See the partner lesson plan "Where's My Lunch? Using the Colours of the Seasons to Find your Dinner".

Cougar and the Deer

Grade level: 3-5
Provincial curriculum links: Ontario
Subject: Health and Physical Education
Reference: Adapted from an activity in **Rediscovery**, by Thom Henley

SPECIFIC LESSON GOALS

☆ Students learn about the importance of stealth and good listening skills in this enjoyable outdoor activity

DESCRIPTION

A veritable horde of cougars try to stalk and "kill" a blindfolded deer, whose weapon is a formidable one: their sense of hearing, augmented by their "deer ears" Will all the cougar starve before they reach the deer? It depends on how sure-footed they are...

PREPARATION

Length of lesson: 30-45 mins

RESOURCES REQUIRED:

- A blindfold
- A long strip of flagging tape
- Natural area

PROCEDURE

1. Take your students to an outdoor area, where there is a certain amount of naturally occurring litter (grass, leaves, etc.,) on the ground. A forested area is best but is not essential.

2. Tell students about one of the adaptations of a deer - specifically, tell them about deer ears, which are shaped to pick up the slightest noise from the surrounding area. Have students cup their hands in front of them, so that if you were to pour water into their hands they would be able to hold some - and then have them put their cupped hands

behind their ears to listen to naturally occurring noises. Deer ears work wonderfully well with lower frequency noises such as running water, wind in the treetops, or even traffic on a road!

3. Choose a student who will play the part of the deer. Ask him/her to tuck the flagging tape into their pocket or waistband so that it dangles nearly to the ground.

4. Tell all the remaining students that they will act as cougars in this activity, and that all they have to do to kill the deer is to get close enough to the deer to snatch the flagging tape away from them, in the same manner as a player stops another in the game of flag football. But the deer has a defence: if the deer hears the cougar, it can kill it by simply pointing directly at the cougar and yelling" "Starve!" A correct hit means that the cougar dies of starvation (as might perhaps happen to a young and clumsy cougar); the student involved simply sits down and remains silent throughout the remainder of the activity. Your role is to act as referee: when the deer shouts "Starve!" it is up to you to say "Freeze" to halt cougars in their stalking, judge if the deer is pointing in the right direction, tell the cougar either to sit down or to keep playing, and say "Game on" so cougars can resume their stalk.

5. Have all cougars start their stalking of the deer at least 10 metres away from the blindfolded deer. Encourage the deer to use their deer ears to better listen to the rustling of leaves under careless feet! If a cougar manages to kill the deer, let that cougar become the deer for the next round.

Tips for a more effective game:

- Once students have played this game so they understand the rules, divide them into two groups, and have another adult (or a responsible student) be the referee for that group.

- Give the deer a limited number of "Starves" - if you have 15 stalking cougar, try giving the deer only twenty chances to say 'starve'.

- Please note that cougars do not actually hunt in packs like this! But they do rely on a quiet stalk in order to catch their prey, and occasionally a young and inexperienced animal may starve to death because of their lack of stalking skill.

Don't Leaf Without Me!

Grade level: 3-5
Provincial curriculum links: Ontario
Subject: Science and Technology; English Language
Strand: Life Systems; Oral and Written Communication
Topics: Growth and Changes in planets
Reference: This exercise is adapted from: Journey North Web Site.

SPECIFIC LESSON GOALS

- ☆ Student/ participants will observe a select tree in their neighbourhood, gathering and recording data on a regular basis throughout the early spring.
- ☆ Student/ participants will contact Journey North and provide updates of their observations, keeping track of the arrival of spring in North America on maps which are available through the Journey North Web site.
- ☆ Student/ participants will share their work with the school and community

DESCRIPTION

Student/ participants observe a chosen tree throughout the spring, watching for signs of "leaf-out" - the time when new leaves reach the size of a quarter. Reports are sent to "Journey North" a web-site for student/ participants which track migration patterns and the arrival of spring in North America.

PREPARATION

Preparation time: 1 hour to visit the Journey North web site and become familiarized with the material which can be found there.

Length of lesson: 40 minutes and regular observations during the spring

RESOURCES REQUIRED

1. Maple tree or trembling aspen (poplar) tree near the school that student/ participants can visit on a regular basis
2. Pencils
3. Digital camera
4. Internet connection to Journey North
5. Paper

PROCEDURE

1. Visit the Journey North website (http://www.learner.org/jnorth) and find the Leaf-Out page. The website introduces student/ participants to a global study of seasonal change and migration patterns. Each spring, one of the signs of spring that has been identified is the leafing out of several tree species. In Ontario, student/ participants can adopt either a sugar maple tree or a trembling aspen (poplar) tree.

2. Student/participants visit their adopted tree on a regular basis. Student/ participants may wish to measure their tree - circumference, height, bark rubbing, etc.

3. Student/participants watch for signs that the new leaves are beginning to open. When the leaves reach the size of a quarter, student/ participants send a message to Journey North indicating their tree has leafed out. This sign of spring will be recorded on the official Journey North map, which is updated on a regular basis.

4. Student/participants make a map of North America and follow the arrival of spring using the data provided by Journey North.

5. Student/participants prepare a media release for the local newspaper when their tree has leafed out, and invite the media to attend for an "official" spring photo shoot.

DISCUSSION AND QUESTIONS

- What are some local factors that might affect the leafing out of your tree? (i.e. close to a building; growing on a hill; winter snow and temperature)
- What other signs of spring can you find to report upon to Journey North?

STUDENT/ PARTICIPANT EVALUATION

With the student/participants, develop a rating scale for student/ participant participation. Use the rating scale as a self-evaluation tool.

ENRICHMENT AND EXTENSION ACTIVITIES

- Journey North schools throughout North America track several signs of spring. Choose one or more of the following and report to Journey North - ice out on your local lake, river, or pond; first frog singing; return of red-winged blackbirds; red emperor tulips blooming; maple syrup run. Check out the web site and send in your data.

Connections to the outdoor environment

- Searching for signs of spring can only be done outside - being outside helps us become more in tune with our surroundings. Raising our awareness of seasonal changes helps us become more connected with those changes and more intent in keeping our environment healthy.

EDUCATOR NOTES

There are many activity adventures available on the Journey North website, which will interest student/participants from Kindergarten to Grade 12. All adventures are geared to outdoor explorations.

Food Chain Game

Grade level: 4-8
Provincial curriculum links: Ontario
Subject: Science and Technology
Strand: Life Systems

SPECIFIC LESSON GOALS

☆ Learn about food webs and chains

DESCRIPTION

There are probably dozens of variants of the Animal Game - this version may be one of the simpler versions. In this experiential outdoor game, students assume the role of producers, consumer, or decomposers, learn about food webs and chains, and find out that it truly is a jungle out there!

PREPARATION

Length of lesson: 70 to 80 minutes

RESOURCES REQUIRED

- Laminated character cards on coloured paper, (see below for numbers).

PROCEDURE

Tell students that you are going outdoors to play the Animal Game. A flurry of enthusiasm may ensue! Outdoors, walk students around the game boundaries, pointing out any hazards in the area. Then have students sit and ask them to listen to all of the instructions before beginning the game (due to student excitement level, you may wish to answer questions only at the end).

- Introduce the following characters one at a time. Refer to Table 1 as you describe the goals of each organism (character) and who they chase and are chased by in the game.

- Show each of the four cards types to the group, and emphasize that they must collect as many cards as possible to survive. Photocopy masters for these four card types are contained on the next page.

- After you've described the roles, hand out character cards (table 2 suggests the numbers of different cards you should make). As in most ecosystems, there area far more producers than herbivores, far more herbivores than carnivores, etc. You may wish to punch a hole in each card and insert a stout elastic band; thereby allowing cards to be worn on students' arms (have them attach it above their elbow).

- As teacher/ leader you will play the role of sun - 'the giver of all life' (!) Rather than having a steadily growing pile of dead students, you can give these students a second lease on life by issuing them another card. You may even experiment with the ecosystem by increasing the number of carnivores and decomposers!
- Answer any questions, tell students approximately how long the game will last (try 10-20 minutes, depending on the age group), tell students to listen for your signal that will end the game, and begin! Give the producers a 10 second head start, followed by herbivores, etc.

Discussion

To begin, ask students to count the cards that they have. You may wish to establish a cutoff point (i.e. any surviving herbivores with less than 5 producer cards is deemed to have died of starvation).

This activity is very rich in that many ecological concepts can be explored with students!

Some sample questions to promote discussion are listed below:

1. What did you feel when you played the game. Is this how a wild animal might feel?
2. What strategies did you use to avoid being caught? Do plants or animals use these strategies?
3. What strategies did you use to catch other students? Do plants or animals use these strategies?
4. If humans were introduced to this game, what rules would you give them? What about disease? What about famine?

ENRICHMENT/ EXTENSION ACTIVITIES

Have students write about their experience. What would life be like as an herbivore, etc.?

Table 1: Ecosystems 'characters' and what they do in the game

Character type	goal is to...	chases...	collects...	chased by...
producer (print on green paper)	survive!	no-one	nothing	herbivores and decomposers
herbivore (print on tan paper)	catch producers, avoid carnivores and decomposers	producers	as many producer cards as possible	carnivores and decomposers
carnivore (print on red paper)	catch herbivores, avoid decomposers	herbivores	as many producer possible & herbivore cards as possible	decomposers
decomposer (print on white paper)	catch and 'kill' (decompose) all other characters	all	as many producer, consumer, & decomposer cards as possible	no-one

Table 2: How many game cards should I make?

Character type	% of total cards	for a group of 20, make this many cards:	group of 25 students	group of 30 students
producer (green paper)	70%	12 + 11 = 23	16 + 10 = 26 **	20 + 15 = 35
herbivore (tan paper)	20%	4 + 3 = 7	5 + 4 = 9	6 + 5 = 11
carnivore (red paper)	5%	2 + 1 = 3	2 + 2 = 4	2 + 2 = 4
decomposer (white paper)	5%	2	2	2

** Note: what does 16 + 10 = 24 mean? The first number (16) refers to cards given out to students before game begins; second number refers to the extra cards you can distribute to 'dead' students (10). The total (26) refers to the number of cards you should photocopy.



CARNIVORE



CARNIVORE



DECOMPOSER



DECOMPOSER



HERBIVORE



HERBIVORE



HERBIVORE



HERBIVORE



PRODUCER



PRODUCER



PRODUCER



PRODUCER

Leaf Magic

Grade level: 2-3
Provincial curriculum links: Ontario
Subject: Science and Technology; the Arts
Strand: Life Systems; Visual Arts
Keywords: leaf, colour
Reference: This exercise is adapted from: Ontario Forestry Association. *Hidden Colours of Leaves* in Focus On Forests. The Ontario Forestry Association, 1990, 76 pages.

SPECIFIC LESSON GOALS

☆ Students will describe, using their observations, the effects of the seasons on plants (e.g. leaves turn colour in the fall).

DESCRIPTION

Students adopt a deciduous tree in September, and begin regular observations of their tree. In October, one leaf is chosen daily to illustrate leaf colour. Students create a timeline to show how leaves change colour. Students also conduct a science experiment to illustrate colour change

PREPARATION

Preparation: 30mins

Length of lesson: 45mins for adopting a tree; 5mins daily in Oct for gathering leaves and recording data; two 30mins lessons for the experiment

RESOURCES REQUIRED:

- Maple tree(s) in schoolyard area or within walking distance of the class
- Measuring tapes or 2-3m length of string or yarn (one for each group)
- Metre stick for each group
- Dark coloured crayons
- Writing paper and pencils
- Nine green maple leaves (three each from three different trees)
- Rubbing alcohol
- Three small glass baby food jars
- Coffee filter paper (cut into three strips)
- Metal spoon
- 3 pencils

PROCEDURE

Part 1

1. Early in the fall, take a walk in the schoolyard and identify the deciduous trees in the area. Assign groups of students to each hardwood tree. The groups "adopt" the tree for the year.

2. Provide each group with a measuring tape, metre stick, dark coloured crayon and several sheets of paper (blank and lined) and pencils.

3. The students visit their tree - measure the circumference using the measuring tape and the metre stick - the tape should be placed one meter above the ground. If the trees are too large, use a piece of string and then measure the string later.

4. Students use the crayon to make a bark rubbing of their tree - place a sheet of paper against the tree bark and rub the length of the crayon gently over the paper, creating a rubbing of the bark underneath.

5. Students gather a sample of green leaves from their tree. The samples may be preserved by ironing them between sheets of waxed paper. Each student will need a sample of the tree leaves.

6. Students sit beneath their tree and write a letter to the tree, introducing themselves. They will also thank the tree for the gifts which the tree gives them - oxygen, shade, etc.

Part 2

Experiment - What Colours are Hiding in the Leaves?

1. Collect three green leaves from three different trees. Tear the leaves from each tree separately and place them into a glass baby food jar. Label each jar with the type of leaf which has been collected.

2. Add enough rubbing alcohol to just cover the leaves. Stir up the mixture with a metal spoon.

3. Wait 10 minutes. Cut a coffee filter into three strips. Dangle each strip into a jar so that it just touches the liquid. The liquid will begin to be absorbed by the filter paper.

4. When the liquid has moved half way up the strips, remove the strips and let them dry. Record your observations.

5. Students should see one or more bands of green (chlorophyll) and yellow or orange bands of colour (leaf pigments). Explain to the class that yellow or orange colours are always present in the leaf but that they are usually hidden under the green chlorophyll. In autumn, the chlorophyll is drawn back into the tree, and the true colours appear.

Part 3

1. In October, each group of students gathers one leaf from their tree every day. The leaf should represent the colours visible on the tree on that day. The leaf is pressed or preserved in wax paper, and the date recorded.

2. Students continue to collect one leaf per day, recording the date, for as long as the leaves keep falling from the tree.

3. Students examine the leaves carefully to see how they have changed in colour. Students make a colour timeline to show how the colours have changed.

4. Students may summarize the changes in a written or artistic form.

Discussion and questions

These questions may be posed to the tree groups, or provided as a worksheet for individual student response.

- What kind of tree have you adopted for the year?
- When do you predict all the leaves will have turned colour?
- What factors might be involved in how quickly the leaves turn?
- Whose tree lost all of its leaves first? What species of tree was it?
- Whose tree lost all of its leaves last? What species of tree was it?
- What advantage might a tree have if its leaves fall quickly?
- What advantage might a tree have if its leaves open quickly in the spring?

Student evaluation

Develop a rating scale for students to determine how well they have completed the goals of the lesson.

ENRICHMENT AND EXTENSION ACTIVITIES

- Try the experiment with leaves that have already turned colour. Are the results the same? What is missing from the coffee filter paper? Why?
- Use the internet to find out more information about Ontario's tree species.

References

Tree Canada Foundation http://www.treecanada.ca/treefacts/.
Greengrounds http://www.greengrounds.org/guide.html.
University of Minnesota http://www.ncfes.umn.edu.

Let's Plant Some Garbage

Grade level: 3-5
Provincial curriculum links: Ontario
Subject: Science; Language Arts
Keywords: Garbage, gardening, garden, plant, biodegradability, recycling, reuse, environment, pollution, litter
Reference: Adapted from Lesson Plan by Jeff Reading

SPECIFIC LESSON GOALS

- ☆ Identify and classify wastes that result from human activity
- ☆ Distinguish between wastes that are and are not biodegradable
- ☆ Identify kinds of waste that are toxic to the environment

DESCRIPTION

Students will be experimenting first hand the biodegradability rates of various materials in their own schoolyard. They will be planting various types of materials in an experimental garden, leaving them there for a few months, and returning in the spring to discover what course of action has taken place. Results will then be analyzed.

PREPARATION

Preparation time: 5 hours (Includes preparing garden beds, or suitable spot in schoolyard)

Length of lesson: 1.5 hours to plant plus time throughout the year for observation



RESOURCES REQUIRED

- Two or three experimental beds (approximately 2 ft by 5 ft or 10 square foot) in which to plant the garbage
- Shovels
- Popsicle sticks to label the areas where the garbage has been planted for future reference when the various materials are dug up and analyzed.
- A hose or a pail for watering

Suggested material for planting:

- An apple core
- A piece of material (100% cotton)
- A nail
- A small glass jar (baby food jar is the perfect size)
- Pieces of lettuce
- Newspaper
- Styrofoam
- A plastic bag
- Yarn
- Aluminum foil
- Empty pop can (crushed)
- Egg shells

PROCEDURE

1. Dig holes (approx. 10 cm deep) for each item to be planted
2. Pour a bit of water in hole before placing your item. Place soil on top of the hole.
3. Place a popsicle stick in each hole, indicating what item has been planted in each location (for future reference)
4. Water the garden on a regular basis.
5. A few months later, remove all items from your experimental garden. Analyze the results. Which items have undergone change? How have they changed?

Discussion and Questions

Questions can be answered in large group discussions or in their Science Observation Logs.

Prior to planting:

- What does biodegradable mean?
- What is the connection between these two terms: decomposition and biodegradability? Why?
- Which types of things are biodegradable? Why?
- What happens to materials when they biodegrade?
- From our Garbage Garden, which materials do you think will biodegrade? Which will not? Why?
- How will you know the material has decomposed?
- What can we do to identify where each item is buried if the popsicle sticks are moved or removed?

After digging up planted garbage:

- Which materials biodegraded?
- Were you surprised by any of the results?
- Were any of your predictions correct?
- What happened to material that biodegraded?
- What did we learn from this experiment?
- What is the impact of throwing away non-biodegradable materials in the garbage and sending them to the landfill site? What are the effects on our environment?
- What actions can you take to prevent this from happening?

Student Evaluation

Students may be evaluated after this activity on whether or not they are able to recognize which types of materials are biodegradable and which are not.

ENRICHMENT/ EXTENSION ACTIVITIES

Encourage the students to bring other materials they wish to experiment with. Have the students draw visual maps of where they have planted each item for future reference when all of the garbage will be dug up. Connection to the outdoor classroom: this activity primarily takes place in the Naturalized Area (outdoors), and examines the impact of waste on our immediate environment.

EDUCATOR NOTES

Having the students work in small groups (3-4) is preferable for this activity. Reviewing expectations with the students and procedures of how to go about planting the various items prior to going outside is also strongly recommended. Planting the garbage towards the beginning of the school year (September-October) is recommended because of appropriate weather conditions for the outdoor activity. Leaving the Garbage Garden a few months before analyzing the results in the spring yields fascinating information and is exciting for the students.

Natural Figures

Grade level: K-2
Provincial curriculum links: Ontario
Subject: Science and Technology
Topics: Characteristics and Needs of Living Things; Everyday Structures
Stand: Life Systems; Structures and Mechanisms
Keywords: Form, Function

SPECIFIC LESSON GOALS

- ☆ Classify characteristics of animals and plants by using the senses.
- ☆ Describe patterns that they have observed in living things.
- ☆ Use appropriate vocabulary in describing their investigations, explorations, and observations.
- ☆ Record observations, findings, and measurements, using written language, drawings, and charts.
- ☆ Identify a familiar animal or plant from seeing only a part of it
- ☆ Identify ways in which various structures are similar to and different from others in form and function.
- ☆ Classify various structures in their environment according to specific features and functions.
- ☆ Identify geometric shapes in ordinary structures.
- ☆ Describe patterns produced by the repetition of specific shapes or motifs in various materials and objects.
- ☆ Use appropriate vocabulary in describing their investigations, explorations, and observations.
- ☆ Record relevant observations, findings, and measurements, using written language, drawings, charts, and concrete materials

DESCRIPTION

Students look for geometrical shapes in nature to help them appreciate the diversity of the natural environment.

PREPARATION

Length of lesson: 1 hour

RESOURCES REQUIRED:

- Shape Sheet [Appendix A]

PROCEDURE

Prior to going outside have the students brainstorm examples of shapes that can be found in nature. Provide each student with a shape sheet and explain that they are to find corresponding shapes (i.e. triangle) in nature to match those on the sheet. Explain each shape and descriptive picture on the sheet so that the students have a complete understanding of what they are looking for.

Take the students out to the playground and have them search for objects that are similar to the shapes that appear on their sheet. Once they have found an object that matches the description, instruct them to draw a picture of the object in the area provided. Once the children have finished drawing at least one natural object in relation to each shape (more if time permits), have the students gather together as a group and discuss the shapes that they have found.

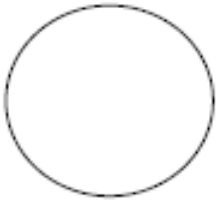
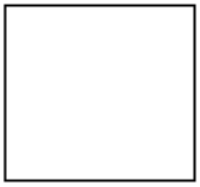
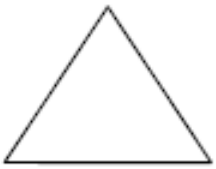
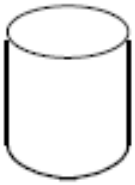
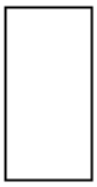
Student evaluation

Students can be rated on group participation and co-operation.

References:

This exercise is adapted from: Waterloo Region District School Board. *Let The Sun Shine In* --- *Using the Environment as a Context for Learning.* Waterloo Region District School Board, 2000, 27 pages**.** Dennis Wendland.

Natural Figures Shape Sheet

Can you find this shape?	Draw nature's shapes.		
			
			
			
			
			

PLACES IN OUR SCHOOL YARD - An "I Spy" Book

Grade level: K - Grade 1
Subject: Language and the Arts.
Provincial curriculum links: Oral and Visual Communication; Reading; Creative Activity;
Keywords: Observation
Reference: This exercise is adapted from: Drew, David. I Spy Irwin Publishing. 1994

SPECIFIC LESSON GOALS

☆ Share reading of big book; identify a variety of art tools, materials and techniques, and demonstrate understanding of their proper and safe use.

DESCRIPTION

Create a class big book using the "I Spy" game format and adding 3 clues to help readers guess the areas of naturalization.

PREPARATION

Length of lesson:

- 1 hour - Outdoors
- 1 hour (approx.) - Indoors. Cut and paste for illustrations.
- 2 hours - Follow-up for teacher/ leader to write it up as a big book and laminate it.

RESOURCES REQUIRED

- The book, I Spy by David Drew (Irwin Publishing, 1994)
- Scissors
- Pencils
- Construction paper (a variety of colours)
- Pencil crayons and crayons

PROCEDURE

1. Choose which 4 or 5 areas of your project that you wish to look at with your children.

2. Take the class outdoors, walk to the first area (e.g. sandbox) and have children sit together facing you in the sandbox. Ask the children to complete the sentence "I spy with my little eye something that is _____ (colour)". Teacher/ leader records.
3. Have kids create 3 more clues referring to the sandbox. e.g., I am made of grains. I am a place to dig and I am a place to build. Teacher/ leader record the kid's ideas. Note - you may want to have more than 3 but choose the best 3 for the book.

4. Follow steps 2 and 3 for several more areas in naturalized areas of your school yard e.g., logs, rocks, field.

5. Return to class and decide with the children which clues best describe your area and each one will end with "What am I"?

6. Divide children into groups so that each child helps to make a portion of a single illustration reflecting an area of the naturalized school yard (e.g. for the sandbox, one child cuts paper strips for the outside of the sandbox, another draws and colours the sand and cuts out people, another does sand pails and someone glues all the pieces in place.

7. The teacher/ leader writes text in big print around the shape of a human eye. Do this for the page about the colour clue and also for the page about the extra clue ending in "What am I"? This provides a peek though to the answer or illustration.

Student evaluation

Students can be rated on group participation and co-operation.

EDUCATOR NOTES

This is an excellent activity in which to demonstrate the spirit of helping.

Seeing Eye Buddies

Grade Level: 2-4
Provincial curriculum links: Ontario
Subject: Language Arts
Strand: Oral and Visual Communication
Reference: This exercise is adapted from: Lott, Steven. Patterns, Plants and Playgrounds, Educational Activities for School Grounds, Intermediate Grades 4 to 7. Evergreen, 2000

SPECIFIC LESSON GOALS

- ☆ Students will observe a natural phenomenon in their schoolyard habitat, describing it in accurate and interesting detail so that a partner can sketch the scene without seeing it.
- ☆ Students will compose a digital photo of their chosen phenomenon to present to the class with their sketch. Students will share their work with the class

DESCRIPTION

Students observe a variety of sights which can be observed within their schoolyard habitat by sitting quietly back-to-back with a partner and describing something unusual. The partner will sketch the observations. Students will then change places and repeat the observation and sketching.

PREPARATION

Preparation time: 10mins
Length of lesson: 40mins

RESOURCES REQUIRED

- Outdoor habitat locations where students can sit undisturbed for a short period of time
- Clip boards
- Postcard-sized sheets of paper
- Pencils
- Pencil crayons
- Digital camera

PROCEDURE

1. To encourage students to describe similarities and differences seen in an outdoor environment and to provide an opportunity for students to practice the skill of direct observation, be prepared to also deliver the activity "Sound Portraits". This activity encourages participants to "look" in a broad sense of the word - seeing, touching, listening, and smelling.

2. Now, divide the class into groups of two. Each group will need pencils, paper, a clip board and access to the school's digital camera or a regular camera. Students will compose a "postcard" of a piece of their habitat.

3. Select a portion of the schoolyard habitat area that has trees or other interesting items to look at. Students are instructed to look for something unusual which they have not noticed before, such as the shape of a branch, a collection of plants, or the shape of a flower that they can describe to their partner. This will become their "postcard".

4. Partners sit back to back. One partner chooses their postcard view and proceeds to describe it in great detail while the other partner begins to sketch it without being able to see it (no peeking permitted!).

5. After five minutes, partners exchange roles. The sketching partner now becomes the observer, choosing a different view for a "postcard".

6. After five minutes, the two partners share their drawings and find their "postcards" in the schoolyard habitat.

7. Students use the digital camera to record their postcard to share with the class.

Discussion and Questions

- What did you communicate best to your partner?
- Were you able to describe your postcard adequately?
- Why might it be important to develop your skills of actively "looking"?

Student Evaluation

With the students, develop a rating scale for student participation. Use the rating scale as a self-evaluation tool.

ENRICHMENT/ EXTENSION ACTIVITIES

- Visit an aquatic area and use you new observation skills to create a postcard which will describe what you see. Write the description on one side of the postcard, and illustrate the front of the card.
- Use the digital photos to develop a slide show of the schoolyard habitat area. Combine the slide show with appropriate sound (see "Sound Portraits" lesson plan) to produce a multi-media show.

Connections to the Outdoor Environment

Questions to ask:

- How important is it for us to be able to "see" the sights of nature, even if we live in the middle of the city?
- How can we help to prevent eye pollution in our homes, neighbourhoods, and schools? Sensing more in our surroundings can help up detect changes in our environment, and to become more curious and better aware of these changes. Awareness leads to better decisions being made.

Snow Fossils

Grade level: 3-5
Provincial curriculum links: Ontario
Subject: Science and Technology
Topic: Winter Ecology

SPECIFIC LESSON GOALS

☆ Expand observation skills, classification skills, use of scientific equipment in an outdoor activity

DESCRIPTION

This is an engaging activity that provides an opportunity to collect and classify snow crystals

PREPARATION

Preparation time: Preparation time varies, as time is required to gather glass microscope slides and clear spray lacquer and store them in a cold place in anticipation of a snowy day.

Length of lesson:

- 20-30 minutes to collect snow fossils.
- 24 hours to dry in the cold.
- 20-30 minutes to view and classify using a microscope

RESOURCES REQUIRED

1. Snow-catchers made with black paper and a flat stick
2. Glass microscope slides
3. Clear spray lacquer
4. Microscopes
5. Falling snow

PROCEDURE

1. Prepare for the activity by placing some glass microscope slides and a can of clear spray lacquer into a refrigerator.

2. When it is snowing take the class out to the naturalization area.

3. Give each student a "snow catcher". This could be something as simple as a black piece of paper taped to a flat stick. Ask them to catch falling snowflakes on the black surface and take a close look at them.

4. While the students are catching snowflakes, in a place protected from falling snow, carefully spray 1 glass slide per student with a layer of clear lacquer. Ensure everything is cold.

5. Distribute one lacquered glass slide to each student and ask them to collect snowflakes that are falling, before they hit the ground, in the wet lacquer.

6. Collect as many snowflakes per slide as possible without overlapping the snowflakes.

7. Leave the slides outside to dry in a place where no more snowflakes can land on them. They will melt if brought indoors.

8. Once they are dry view them under the microscope.

Discussion and Questions

- Discussion can occur in both a whole class and small group format. Focus on the main concepts and principles and formulate questions that will generate discussions.

Student Evaluation

With the students, develop a rating scale for student participation. Use the rating scale as a self-evaluation tool.

ENRICHMENT/ EXTENSION ACTIVITIES

Distribute a list of snowflake classification groups and see if the students can classify the snowflakes they collected.

EDUCATOR NOTES

This activity requires being prepared for when it does snow. Ensure all equipment is cold when used or snow will melt. Allow slides to dry outdoors so snow does not melt.

Soils and their Water Retention Capabilities

Grade level: 4-5
Provincial curriculum links: Ontario
Subject: Science and Technology; Language Arts
Keywords: Soil, water, earth, compost, clay, sand, dirt, experiment
Reference: Adapted from lesson by Anna-Maria Nicolov, EVERGREEN

SPECIFIC LESSON GOALS

- ☆ Students will be able to identify different kinds of earth, and be able to describe the differences with a richer vocabulary.
- ☆ This fits in well with lessons in life-long learning, an integral part of the curriculum reform in Quebec

DESCRIPTION

Students will work in groups and look at four different kinds of soil (garden soil, clay, sand and compost). They will need to describe each kind, and then add water to observe what occurs

PREPARATION

Preparation time: 30 min.
Length of lesson: 45 min

RESOURCES REQUIRED

- 8 small containers (1/2 cup) with lids
- Measuring cups
- Adequate amounts of sand, garden soil, compost and clay to fit into two containers each
- Science write-up sheet (See example in Procedure - Part 2)
- Pencils

PROCEDURE

Part I

1. Divide the class into 5-8 groups. It is important that each group has at least one of the containers of soil and that each student be able to touch each sample.
2. On the board, list the four types of soil.
3. Each group describes the physical characteristics of each soil type and records their observations on the write-up sheet. They then make their educated guesses as to which soil is in each container.
4. Each group has a minimum of eight minutes to work on each soil sample until each group has seen all four samples.

Part II

1. Observe what happens when 1/4 cup of water is poured into each soil sample.
2. Students describe their findings in groups and will follow-up with an individual science write-up.
3. Allow about five minutes for each group to discuss their findings
4. An appointed chairperson for the group reports to the class what his/her group observed with the sample of soil.

Science Write-up Sheet should look something like this:

Container Number	Observations	Our Guess of Soil Type	What Happened When We Added Water	Our Discoveries
1				
2				
3				
4				

Discussion and Questions

After Part I:

Discuss as a class:

1. Can you guess which soil sample is which? How did you come to that conclusion?
2. What new vocabulary did you learn from this lesson?

Student Evaluation

- Group observation, participation and co-operation
- Individual write-up sheet

ENRICHMENT/ EXTENSION ACTIVITIES

If the soil proves to be a problem in terms of water retention, mixing the soil with some of the other soils may be beneficial. The samples can be mixed with small amounts of soil of the group's choice (i.e. Clay with sand, or clay with compost) to see if the result is a more loamy soil.

Sound Portraits

Grade level: Grade 1 - 5
Subject: Language
Provincial curriculum links: Oral and Visual Communication; Visual Arts
Keywords: Sound.
Reference: Adapted from Russell, Helen Ross 10-Minute Field Trips - Using The School Grounds For Environmental Studies. National Science Teacher's Association - Washington, DC, 1990

SPECIFIC LESSON GOALS

- ☆ Students will investigate the sounds around them within their schoolyard habitat.
- ☆ Students will communicate the results of their investigation by sketching the sounds they have heard. Some students may choose to record the sounds on cassette or camcorder.
- ☆ Students will share their work within a small group.

DESCRIPTION

Students observe a variety of sounds, which can be heard within their schoolyard habitat by sitting quietly by themselves for five minutes, listening, and then recording the sounds around them by drawing them.

PREPARATION

Preparation time: 10 minutes
Length of lesson: 40 minutes

Resources required:

- Outdoor habitat locations where students can sit undisturbed for a short period of time
- Clip boards
- Paper
- Pencils
- Pencil crayons
- Camcorder or cassette recorder (optional)

PROCEDURE

Part 1

- Present the class with a cassette or CD from Dan Gibson's Nature Series (or similar nature sounds). Play selections from the cassette for the class. Encourage discussion regarding the various sounds, which have been recorded.

- The students will be going outside to find a comfortable spot within the schoolyard habitat area. Students will sit far enough apart from their peers so as not to be disrupted; however, all students must remain within hearing distance of the teacher/ leader.

- Students will close their eyes for two minutes to give their ears time to adjust and to become more acute. Students will then open their eyes and begin to record the sounds they hear during the next five minutes. The students are encouraged to be creative in their sketching. Older students may be permitted to record the sounds at their location. Students are also encouraged to make "animal ears" (by cupping their hands behind their ears and turning to face a sound they want to hear) for better identification of soft sounds. Have the student's practice making "animal ears" before they go outside- emphasize turning the head to face the sound.

- Following their investigation, the students will gather together in a central location to share their drawings and to respond to directed questions from the teacher/ leader.

- Take the students outside and perform the investigation.

Discussion and questions

- What did you hear and draw first?
- Why did you hear more things with your eyes closed?
- Could you tell the direction from which the sound was coming? Could you tell if the sound maker was moving?
- What sounds came to you only after you had been listening for awhile?
- Was there any improvement when you used "animal ears"? Explain your response.
- If you repeated this investigation in a rural area, what differences in sound might you experience? Explain.
- If you repeated this investigation during a different time of day or night, what differences in sound might you expect to experience? Explain.
- Is there anything that can be done to buffer the sounds of "noise pollution" which sometimes fill our lives?

Student evaluation

Develop a rating scale for students to determine how well they have completed the goals of the lesson.

ENRICHMENT AND EXTENSION ACTIVITIES

- Use a cassette recorder and experiment with recording under a tree, against or under a bush, besides a building, at a corner of a building, into the wind, etc., to see how the transmission of sound differs depending upon the local conditions.

- To determine how sound travels, divide the class in half, providing noise makers or rhythm band instruments to some. Ask the "band" to begin playing on one side of the school while the rest of the class stand on the other side of the building to listen for sound (the building is between the two groups). Can the second half hear the first half? If both groups move beyond the building but remain at the same distance from each other, can the "band" be heard? Reverse the experiment, and ask the new "band" members to turn their backs to the class and to play. Can they be heard? What conclusions can the class make about the way in which sounds travel?

- Create a sound production using suitable music and nature sounds from the schoolyard habitat to share with the class, or the school community.

Connections to the outdoor environment

- How important is it for us to be able to hear the sounds of nature, even if we live in the middle of the city?
- How can we help to prevent noise pollution in our homes, neighbourhoods, and schools?

Succession and Soil Compaction

Grade level: K-5
Provincial curriculum links: Ontario
Subject: Science and Technology

SPECIFIC LESSON GOALS

- ☆ Learning to count and classify objects
- ☆ Comparing and interpreting scientific data
- ☆ Developing measurement skills

DESCRIPTION

Students will examine the influence of soil compaction on plant and animal habitat and on water infiltration

PREPARATION

Length of lesson: 45mins

RESOURCES REQUIRED:

- Ice pick
- Tin cans
- Fencing materials
- Paper and pencil
- Digital camera or camera and film

PROCEDURE

1. Students will select two sites where students congregate and two other sites where student traffic is light or nonexistent. Mark off study plots, each 5'x5'(2m x 2m) on each site.

2. Students should work in small groups to count and classify the natural cover and litter (living and dead plants, dead leaves, and insects) on each study area.

3. The students should measure the soil's compaction by recording the average depth to which an ice pick penetrates the soil when dropped several times from a height of 3 - 4 feet (1 -1.5 metres). For safety, the instructor should drop the pick.

4. The students will measure the water infiltration rate. This may be done by placing a No. 10 tin can, with both ends cut out, into the soil, filling it with a known quantity of water, and recording the length of time necessary for all of the water to penetrate into the soil.

5. Fence off one of each type of plot to serve as experimental areas. Students should record with photographs or sketches the appearance of each of the four study sites on the date it is marked off and at various intervals as the fenced sites recover and grow back. As the sites recover, each group should re-measure infiltration, soil compaction, and the amount and nature of the latter on each of the four study areas.

6. Students will then compare the data obtained from the two experimental and control plots and discuss effects, relationships, and minimization.

The Sensitive Scavenger

Grade level: 4-5
Provincial curriculum links: Ontario
Subject: Science and Technology – Habitat and Communities; Life Systems
English Language -- Oral and Visual Communications

SPECIFIC LESSON GOALS

- ☆ Students will communicate various types of observations on a worksheet that they have designed
- ☆ The observations will involve the use of the five senses and will be used to introduce the Life Systems strand of study to the class. Students will discover some elements of habitat and community as they actively investigate their schoolyard

DESCRIPTION

Students will create a multi-sensory scavenger hunt worksheet to be used on a scavenger hunt throughout the schoolyard habitat area. This activity could be used to introduce the concepts of biodiversity and interdependence within a habitat

PREPARATION

Length of lesson: 30 – 45 minutes

RESOURCES REQUIRED

- Large sheets of paper
- Pencils
- Crayons
- Markers

PROCEDURE

1. Provide each student with a large sheet of paper (45 x 60 cm) and a pencil. Ask students to follow directions carefully as they prepare the following worksheet.

2. Draw a large outline of a head including eyes, ears, nose, mouth and blank spaces that will be used for recording items of touch. Leave as much blank space for filling in sketches of items found in the schoolyard habitat area.

3. Provide each student with a short scavenger hunt sheet which may look similar to the following:

    - Find three sounds that you enjoy, and three sounds that aren't so pleasant. Record them on your sheet. Label them.
    - Record the smells of the following: grass, air, soil, water, your skin, a plant, and two other objects of your choice. Label each.
    - Find something that feels: rough, smooth, squishy, hard, fuzzy, cold, wet, and warm. Label each.
    - Find things that look good to eat (but don't eat them!). Draw and label them.
    - Record how being in this spot makes you feel (happy, sad, excited, bored, curious, etc.).

4. Take the students to the outdoor area and assist them in finding a quiet spot where they can observe their surroundings and complete their scavenger hunt of the senses.

5. After about 25 minutes, call the group back together to share their discoveries.

Discussion and Questions

- Describe the place you chose to use for your hunt.
- Did you have difficulty finding any of the items? Which ones? Why? Did anyone else have similar problems?
- If you visited the area during a different season of the year, which items would be harder to find? Which ones would be easier?

Student Evaluation

Develop a rating scale for students to determine how well they have completed the goals of the lesson.

ENRICHMENT/ EXTENSION ACTIVITIES

- Students use a meter of string and five skewers or toothpicks to plan their own mini-nature walk. Students choose a section of the habitat area and design a sensory nature walk; each skewer or toothpick is placed to indicate one of the senses which is being highlighted. Students act as tour guides to lead their peers along their sensory nature trail.

References: The Ontario Forestry Association *Sensory Experiences from Focus On Forests.* The Ontario Forestry Association, 1998, p. 110

Where's My Lunch?

Using the colours of the season to find your dinner

Grade level: K-3
Provincial curriculum links: Ontario
Subject: Science, Mathematics
Strand: Life Systems; Measurement
Keywords: Compost, Garden, Gardening, Plants, Soil, Dirt, Growth
Reference: Adapted from Lesson by Steven Lott

SPECIFIC LESSON GOALS

☆ To determine whether organic compost affects the growth of plants in an Environmental Garden

DESCRIPTION

Students will add organic compost to one group of plants and compare their growth with similar plants that are growing in regular soil, over a period of time. They will record their findings in a science journal and measure and graph their results.

PREPARATION

Preparation Time: 1 hour
Length of lesson: 40min introduction and 15 min of tracking a week

RESOURCES REQUIRED

- Compost
- Plants
- Science journals
- Trowels
- Books
- Website (see references)

PROCEDURE

1. Gather students in garden
2. Observe and discuss plants and how they are growing
3. Discuss what they need to grow (sun, soil, water, nutrients)
4. Discuss ideas for ways we can help them to grow even better
5. Lead discussion towards recycling in the garden (leaves, mulch etc.) and how we recycle in the kitchen
6. Will our recycled organic matter help the plants grow?
7. Let's find out - explain experiment
8. Students will plant a control group of plants with no compost. Two plants for each group of four students.
9. Students will also plant two plants with compost in the hole and mixed with the dirt. The heights of all the plants should be recorded for comparison later.
10. Students will water their plants and watch them grow. At the end of the test period students will record how much their plants have grown.

DISCUSSION AND QUESTIONS

- What do plants need to grow?
- What do they get from nature?
- Can people help them? How?
- What makes compost such a good fertilizer?

STUDENT EVALUATION

- Science Journal - observations written and drawn
- Accuracy and neatness of measurement graph
- Oral understanding when presenting findings to another class

ENRICHMENT AND EXTENSION ACTIVITIES

Use this lesson as a starting point for setting up a school-wide composting program. Students can present findings to other classes, distribute compost buckets, and collect compost into outdoor compost bins. Students can make posters that incorporate the growth charts of their plants or flowers to convince their peers.

References

1. Composting for Kids: http://agglehorticulture.tamu.edu/sustainable/s/ildesets/kidscompost/cover.htm
2. The Compost Resource Page: http://www.oldgrowth.org/compost

Books

1. Pee Wee and the Magic Compost Heap by Lorraine Roulston (Recycling Council of Ontario)
2. Growing Gardens from Your Garbage by Linda Glaser
3. All About Compost - Recycling Household and Garden Waste by Pauline Pears

Where's My Lunch? Part II

Grade level: K-3
Provincial curriculum links: Ontario
Subject: Science and Technology; the Arts; Mathematics
Strand: Life Systems; Visual Arts; Data Management and Probability
Topics: Growth and change in plants
Keywords: Colours
Reference: Adapted from Lesson by Steven Lott

SPECIFIC LESSON GOALS

- ☆ Describe ways in which animals respond and adapt to their environment.
- ☆ Communicate the procedures and results of investigations for specific purposes using drawings, demonstrations, and oral and written descriptions
- ☆ Produce two- and three-dimensional works of art that communicate their thoughts and feelings on familiar topics
- ☆ Construct and label simple concrete graphs, bar graphs and pictographs using one-to-one correspondence

DESCRIPTION

Students examine their schoolyard habitat or garden area throughout the year on a seasonal basis, searching for colours which predominate and colours which are camouflaged. Students will graph their findings and create a piece of visual art using either the dominant colours or camouflage colours for each season.

PREPARATION

Preparation: 30mins
Length of lesson: Outdoor Experience 20mins; 30mins graphing activity; 30mins visual arts activity

RESOURCES REQUIRED:

- One ball of several colours of yarn to represent the spectrum, plus black, white, and grey
- Graph paper or chart paper
- Drawing paper or prepared quilt pattern or design
- Crayons
- Paint
- Pencil crayons

PROCEDURE

Part 1

1. Cut 20 segments from each ball of yarn (10-15cm each). These will become "wormettes". The students will be birds searching for a meal.
2. Hide the yarn in both easy and difficult locations throughout the schoolyard habitat area. Place them so that some colours match the background, while others contrast.
3. Show the students the balls of yarn, and have them predict how many "wormettes" of each colour they will be able to find. Record their predictions on a worksheet.
4. Students proceed outdoors to search their habitat area for 5 to 10 minutes, gathering up as many "wormettes" as they can find.
5. Record student colour totals. Discuss the results. Which colours were most easily found? Which colours were difficult to find?
6. At the end of the sampling time, students put their "wormettes" together and total up each colour. Discuss the results. Which colours were most easily found? Which colours were difficult to find?
7. Students return to the area to look again. Record any new findings. Total up the "wormettes" which have been found.
8. Return to the classroom. Use a large sheet of chart paper to prepare a graph of the "wormettes" colours which were found. At this time, point out how many "wormettes" of each colour were not found, and discuss reasons why it was difficult to find some colours. Use the discussion questions for PART ONE with the class.
9. Students prepare a tally graph and a bar graph to illustrate their investigation. The graphs should be kept for comparison purposes during the investigation of winter, spring, and summer colours.

Part 2

1. Present the class with a selection of Canadian landscape pieces by the Group of Seven and discuss the colours which are dominant in each painting. Search for examples of the dominant and camouflage "wormette" colours which the students found in their schoolyard habitat area.
2. Using the three most commonly found colours of "wormettes" (dominant), or the three most rarely found colours (camouflage), students choose pencil crayons, water colour paints, or crayon to create a two-dimensional work of art. Another option would be to provide students with a simple quilt pattern and ask them to colour the pattern using either the three dominant or three camouflaged colours for the season.
3. Repeat this investigation in the winter, during the spring, and at the beginning of summer. Make enough new "wormettes" to have 20 of each colour for each season. Keep student art samples and graphs to compare changes throughout the seasons.

DISCUSSION AND QUESTIONS

Part 1

- Discuss which "wormettes" were easy or hard to find. Why?
- Was it is easier to find "wormettes" the second time we searched? Why or why not?
- Were all of the "wormettes" found? Why or why not?
- Was it difficult to find certain colours? Why?
- Would the results be the same if we looked at a different time of the day or if we looked at night? Do all birds look for food at all times throughout the day and night?
- Would the results be the same if we attempted this investigation next month?
- What predictions can we make about a change in colour next month?
- If you were a "wormette" what would be the benefits of having the habitat colours change every season?
- If you were really a bird, what difficulties might you have finding food at different seasons of the year if you had a preference for a certain colour of "wormette"?
- Does the changing of the colours influence the types of animals who can live within our habitat? How?
- Make connections to animal camouflage techniques and discuss how predators overcome the problems of finding camouflaged prey (i.e. they use other senses such as smell or they wait patiently until the prey moves).

Part 2

- How have the Group of Seven communicated the dominant colours of the seasons in their landscapes?
- Can we communicate the changes of the seasons in our art by using three of the most dominant colours to produce a piece of art, or to complete a pattern page?
- If we repeat this activity on a monthly or a seasonal basis, can we develop a calendar of colour changes in our schoolyard habitat?

STUDENT EVALUATION

Develop a rating scale for students to determine how well they have completed the goals of the lesson.

ENRICHMENT AND EXTENSION ACTIVITIES

- This activity can be used to report upon the changing patterns of colour within the schoolyard habitat area. Student graphs and art samples may be displayed within the school
- The information gathered can be shared among schools from other parts of Ontario and Canada to compare and contrast colour patterns.
- Discussions and activities which help to illustrate the subtle changes which occur and their impact upon the animals and plants of the habitat are encouraged.

EDUCATOR NOTES

This lesson can be used to assist in the identification of some factors which contribute to the survival of populations within an ecosystem. This lesson plan can also be used to introduce the concept of change within a natural community. It could also be an opportunity for an intermediate class to be partnered with a Grade 2 class, examining change throughout the seasons. See the partner lesson "Colours of the Seasons"

References

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Creating a Cooperative Living Habitat

A community service participatory citizenship project

Grade level: 9
Provincial curriculum links: Ontario
Subject: Science and Technology
Source: Adapted from lesson by Dr. Richard Oakes Peters, Augusta State University

SPECIFIC LESSON GOALS

- ☆ Interact with community resource people
- ☆ Interact with a selected natural environment site
- ☆ Read about conservation/stewardship/management practices and programs
- ☆ Map the natural environment site
- ☆ Collect (on film and video tape) data
- ☆ Analyze data
- ☆ Evaluate alternative strategies re: site management
- ☆ Select a preferred site management strategy, and
- ☆ Design/implement a detailed site management plan

DESCRIPTION

Students are engaged in a process of creating a model COOPERATIVE LIVING HABITAT in the local community. As a result of their direct involvement in a school year-long service project, students will be able to:

1) explain the concept: COOPERATIVE LIVING HABITAT
2) identify the characteristics of a COOPERATIVE LIVING HABITAT
3) engage in the process of creating a COOPERATIVE LIVING HABITAT
4) become aware of the process of maintaining a COOPERATIVE LIVING HABITAT

PREPARATION

Length of lesson: 10 months

RESOURCES REQUIRED:

- Community resource people
- A natural environment site
- Sketch pads/pencils
- Compasses
- Soil testing kits
- Reference materials (print/non-print and software)
- Still/motion picture cameras and video tape equipment (for data collection purposes)
- Water testing kits

PROCEDURE

Working with their social studies and science teachers, students are introduced to the concept: COOPERATIVE LIVING HABITAT. A 'CLH' is a given area in which MAN and NATURE coexist and mutually prosper -- as a result of human efforts to

1) create a quality life space
2) protect natural phenomena/processes
3) protect the health and well-being of humans
4) balance the interests of MAN and NATURE.

Students are introduced to a selected natural environment site in the local community/region. The site is 'adopted' by the student -- becoming their community service project for the school year.
Working with community resource people, e.g., soil conservation/wildlife management/forestry department/water management personnel, students learn about site management strategies.

A management plan is designed/implemented, by the students, to:

1) improve/eliminate environmentally-destructive conditions
2) remove natural debris (if beneficial to do so)
3) remove human-caused litter
4) conduct an environmental impact study
5) design a nature trail system -- to be used by K-12 students as a field-based learning laboratory
6) create/maintain a COOPERATIVE LIVING HABITAT at the selected natural environment site.

STUDENT/ PARTICIPANT EVALUATION

Students will demonstrate the ability to:

1. explain the concept: COOPERATIVE LIVING HABITAT
2. discuss concepts, e.g., conservation, stewardship, resource management
3. draw maps
4. use compasses
5. collect data at field-based sites
6. analyze data
7. make decisions
8. create audiovisual presentations
9. participate in the creation/maintenance of a COOPERATIVE LIVING HABITAT at a selected natural environment site
10. write essays about field-based experiences
11. correctly answer 90% of matching, multiple choice, and completion (supply) test items
12. test water samples
13. test soil samples
14. analyze rock samples, write science lab reports.

Creating Built Environments

Grade level: 9
Provincial curriculum links: Ontario
Subject: Science and Technology
Source: Adapted from lesson by Richard Oakes Peters, Augusta State University

SPECIFIC LESSON GOALS

- ☆ Students will read and write about built environments which create cooperative living habitats.
- ☆ Students will view audiovisual presentations that focus on built environments which create cooperative living habitats.
- ☆ Students will meet with community resource people to discuss characteristics of built environments which create cooperative living habitats.
- ☆ Students will meet with community resource people to discuss land use planning strategies.
- ☆ Students will tour the local community and/or communities in the region to study characteristics of built environments and land use planning schemes.
- ☆ Students will create visual displays and tabletop dioramas (models) of built environments.
- ☆ Students will make reports and presentations to the class.

DESCRIPTION

Students learn about land use planning, built environments, and cooperative living habitats. As a result of this community design activity, students will understand the following: the concepts of land use planning and cooperative living habitats, the process of creating a built environment, and the characteristics of built environments which meet the needs of Man and Nature

RESOURCES REQUIRED:

- ▫ Community resource people as guest speakers in classrooms, and as site guides
- ▫ Community-at-large and specific resource sites in the community
- ▫ Reference materials (print/non-print and software)
- ▫ Audiovisual presentations (films, filmstrips, slides, videos)
- ▫ Motion picture/still photography cameras and video tape equipment used to collect field-based data
- ▫ Internet sites
- ▫ Butcher paper or large sheets of construction paper on which students will draw maps of the local community
- ▫ Tourism brochures from several communities, domestic and foreign, which relate to land use planning and resources management
- ▫ Atlases, maps, and globes

PREPARATION

Length of lesson: Five 50 min sessions

PROCEDURE

Engaged in designing built (human-made) environments which promote the creation and maintenance of cooperative living habitats (geographical contexts within which Man and Nature mutually coexist and mutually benefit from their associations), students use the Internet to collect and read relevant news articles from www.cbc.ca , www.cnn.com , www.foxnews.com , www.abcnews.com (etc.)

View a variety of audiovisual presentations (films, filmstrips, videos) that depict human-made environments (cities, manufacturing facilities, highway systems, etc.) and their impact upon the surrounding natural environments; meet with community resource people at selected sites to observe and learn about Man's impact upon Nature in the local community/area

Display their knowledge of built environments by creating visual displays (bulletin boards, tabletop dioramas, slide/tape presentations, PowerPoint presentations) and presenting oral reports -- the basis for whole-class discussion and debate.

STUDENT/ PARTICIPANT EVALUATION

In addition to writing reflective essays, term papers, poetry, and short stories, students will exhibit their understandings, perceptions, and value systems (as related to cooperative living habitats) by engaging in a series of meetings with elected and appointed community leaders to discuss the positive and negative impact of human-made environments upon Nature -- nearby/close to home, by creating and presenting a community-awareness campaign to local/regional inhabitants (articles to the editor of local/area newspapers, posters, a rally, a community 'clean-up' day -- involving public school students/church groups/social clubs & organizations, a student-made audiovisual presentation), and by proposing a site adoption activity -- involving students in an effort to create and maintain a model cooperative living habitat area in the local community for all to see and learn from, re: the maintenance of a life space environment that benefits Man and Nature.

Environmental Determinism

Grade level: 10-12
Provincial curriculum links: Ontario
Subject: Science and Technology
Source: Adapted from lesson by Dr. Richard Oakes Peters, Global Horizons: Port Charlotte, FL

SPECIFIC LESSON GOALS

- ☆ Read about the characteristics of selected natural environments
- ☆ Write about the characteristics of selected natural environments
- ☆ Use globes and maps to locate the geographical position of selected natural environments (polar regions, Amazon River Basin, deserts of the Middle East, etc)
- ☆ Collect data at selected natural sites in the community/region
- ☆ Write/present oral-written-visual reports
- ☆ List five ways the physical attributes of selected geographical locations have determined human actions-human cultures-human life styles-human settlements
- ☆ Create bulletin board displays.

DESCRIPTION

Students investigate the notion that the physical attributes of geographical locations (places) determine the human actions that occur within those places. As a result of studying examples of *Environmental Determinism* , students will demonstrate and understanding of the impact that environments have (have had) upon: 1) man's cultural development, 2) man's life styles, 3) the character of man's built environments, and 4) man's relationships with nature

PREPARATION

Length of lesson: Five 50 min classes

RESOURCES REQUIRED:

- 8mm/16mm motion picture cameras and film
- Videotape equipment and tapes
- Globes and maps
- Print materials (books, magazines, newspapers, etc)
- Internet data (web sites)
- Audiovisual materials (films, filmstrips, slides, still photographs, video tapes, etc)
- Compasses-microscopes-magnifying glasses-soil/water testing kits, etc)

PROCEDURE

Learning is rooted in perceived experience. There is an immediate and subconscious attempt to reconcile new information with previously acquired information. Because of varied experiences, knowledge acquisition and skills development in diverse contexts (settings), some students are *advantaged* while others, having been denied similar experiences and learning opportunities, are *disadvantaged*. In this lesson, students will:

1) be introduced to selected built environments,
2) be introduced to selected natural environments,
3) interact with community resource people in classrooms/at field-based sites,
4) utilize the total life space environment as a learning laboratory,
5) utilize a variety of print/non-print and Internet resources,
6) be engaged in discovery/inquiry-oriented learning activities,
7) conduct research/data collection activities at field-based sites,
8) develop oral-written-visual reports.

STUDENT/ PARTICIPANT EVALUATION

Students will demonstrate their ability to:

1) 'read' print resource materials (books, magazines, newspapers, atlases, charts & graphs)
2) write complete/correct sentences and paragraphs
3) conduct field-based research
4) create research reports
5) present oral-written-visual reports
6) use globes and maps
7) work cooperatively in the classroom and at field-based sites
8) collect data from a variety of print sources

Exploring Plant Reproduction & Seed Dispersal

Grade level: 9
Provincial curriculum links: Ontario
Subject: Science
Strand: Biology
Keywords: plant, reproduction, seeds, seed production, seed dispersal, pollination, adaptation, angiosperm, gymnosperm
Source: Adapted from Lesson Plan by Sandra McKewan, EVERGREEN

SPECIFIC LESSON GOALS

- Describe and give examples of types of sexual reproduction that occurs in plants;
- Describe various types of asexual reproduction that occur in plant species and various methods for the asexual propagation of plants.
- Distinguish between sexual and asexual reproduction in representative organisms

DESCRIPTION

In this field study, students will compare a variety of plants and their methods of sexual and asexual reproduction and seed dispersal. The concept of adaptation - a hereditary alteration in an organism that facilitates its survival and reproduction - will be introduced and investigated through this hands-on activity

PREPARATION

Preparation time: Approximately 30 minutes to investigate school ground plants, prepare student worksheets, read educator notes (provided) and review references/resources (as noted below), plus time to find a fern specimen, if desired.

Length of lesson: Approximately 180 minutes for class discussions and field trip

RESOURCES REQUIRED

1. Hand lens

PROCEDURE

1. Introduce the activity by displaying a representative plant and guide the students through the worksheet questions using this plant. This can be done either inside or outside. You may want to introduce the discussion questions at this point, so that students have them in mind as they conduct the activity. Also, remember to highlight any new vocabulary (e.g., angiosperm, gymnosperm, adaptation etc.)

2. Depending on the abundance, diversity and location plants on the school grounds, you may wish to identify the specific flowering and non-flowering plants to be studied. Alternatively, allow the students to select their own plant specimens.

3. Organize the students into groups of 2 to 4 members. Assign specific tasks (e.g. group leader, equipment manager, data collector).

4. Identify the boundary lines for the exercise. Remind students to minimize habitat disturbance and avoid picking flowers during the exercise.

5. Circulate among the groups as they conduct the activity. Students will need to take field notes, which can then be written up as an assignment.

6. Provide time to conduct a class discussion on the follow-up questions.

Discussion and Questions

Conduct a whole-class discussion around the results and the following questions:

1. Why have seed plants become so widely distributed throughout the world?
2. Describe two ways flowering plants (angiosperms) differ from conifers (gymnosperms) with reference to their reproductive parts.
3. Why are ferns, mosses and liverworts uncommon on most school grounds?
4. What are the characteristics of plants adapted for wind pollination? Insect pollination? Bird pollination?
   (a) Explain how each of these characteristics assists pollinators.
5. Explain why cross-pollination is better for a species than self-pollination.
6. List three ways self-pollination can be prevented by plants.
7. Why is it necessary for pines to produce large amounts of pollen?
8. (a) What are the advantages of sexual reproduction in plants?
   (b) What are the advantages of asexual reproduction in plants?
9. What factors are contributing to the decline of pollinator populations? What effect will this have on the food crop industries and native plant species?

Student Evaluation

- Completion of worksheets and quality of observations
- Observation during activity
- Peer and self-evaluation

ENRICHMENT/ EXTENSION ACTIVITIES

- Grow geranium plants from stem cuttings. In what ways are they similar? In what ways are they different?
- Grow African Violets asexually from a leaf.
- Examine pollen grains of several plant species under the microscope to see how they are adapted to make pollination more successful.
- Examine the ovules inside the ovary of several simple flower species.
- Examine the gametophyte and sporophyte of a moss.
- Self-pollinate and cross-pollinate plants manually in the classroom and observe the results.
- Establish a wildflower garden by collecting and planting seeds.
- Wear an old wool sock over a shoe (or drag an old scarf) and walk through a fall field or forest to collect hitch-hiking seeds.
- Collect as many kinds of seeds as possible. Make a display by gluing the seeds to a sheet, a bristol board and label them.
- Gather winged seeds and parachute seeds. Release them and measure the distance traveled, time aloft, or angle of sliding to the ground.
- Research the tissue culture technique for commercially producing plants.
- Research the decline of pollinator populations in North America. Report on the causes of the decline, impact on the food crop industry and ways to address the issue.

Connections to the Outdoor Environment

Where possible, relate the discussion questions back to the students' own school ground. What sorts of plants would have reproductive adaptations to suit the school grounds? Which species would be most likely to survive on the school grounds, and which would not? How could the school grounds be made more hospitable to a wider variety of plants?

EDUCATOR NOTES

- Students should have prior knowledge of the following terms and processes: sexual reproduction in angiosperms, gymnosperms and spore-bearing plants; asexual reproduction in plants (from roots, stems and leaves); flower parts and functions (receptacle, corolla, petals, calyx, sepals, stamen, anther, filament, pistil, stigma, style, and ovary); adaptations for plant reproduction and seed dispersal.

- Angiosperms are flowering plants that contain both the female reproductive organ (pistil) and the male reproductive organ (stamen). The seeds form inside the flower and become enclosed in a case when mature.

- Gymnosperms do not produce flowers. Most produce seeds inside cones. The seeds have a protective coat but they are not enclosed in a case (e.g. conifers such as pine and spruce).

- Mosses, liverworts and ferns reproduce sexually through spores.

- Asexual reproduction, or vegetative propagation, involves forming new plants from pieces of root (e.g. poplar trees), stem (e.g. strawberry) or leaf (e.g. Bryophyllum).

- The colour, shape and size of flowers is related to how they are pollinated. Insect-pollinated flowers usually have very showy, large colourful corollas that attract insects visually and act as landing platforms. They are usually scented and often contain nectar. Flowers pollinated by butterflies are frequently red. Those pollinated by moths are often white.

- Flowers that attract birds and bats often need to have large petals for landing.

- Wind-pollinated flowers are designed differently. They are often missing the calyx and corolla and have no nectar. Their stigmas are frequently large and feathery. They produce large amounts of pollen. Maple trees produce their flowers in clusters at the tips of branches in early spring.

- There are many mechanisms for seed dispersal:

    - Wind - helicopter blades of maple seeds; silky white tufts of dandelion and milkweed seeds act like parachutes.
    - Animals - spines, hooks and barbs help some seeds to hitch hike on fur, feathers and clothes (e.g. burdock burr); some seeds have sticky substances that cling to passing animals; seeds may be dispersed through bird and mammal droppings; uneaten buried caches of seeds and nuts made by mice, squirrels and some birds develop into plants.
    - Water - floating coconuts, water lilies and purple loosestrife use water to disperse seeds.
    - Tossed by Plants - touch-me-not (jewel weed) and pea plant toss their seeds when the pods explode.

- Conifers reproduce by seeds that are formed in cones. A cone is made of scales. Scales are modified leaves. Cones are produced by the sporophyte, usually in the spring. A sporophyte is a life-cycle phase of plants which have diploid nuclei; during this phase, spores are produced. The wind transfers pollen from male cones to female cones that display open scales.

- The pine tree produces soft male cones in clusters at the base of the new spring shoots. These cones last only one or two weeks. Each of their scales produces haploid male spores by meiosis. These spores are called pollen grains. Before a pollen grain is shed, the cell inside divides to form the male gametophyte. This gametophyte is protected by a thick wall around the pollen grains. In pine, part of the wall bulges to form two wings.
- The female cones, (or seed cones), of conifers are much larger and harder than the male cones. In many species, they become quite woody as they mature. The typical "pine cone" that one might collect on a forest floor is a woody female cone.

- Once some pollen reaches the female cones, the scales close up. The pollen grains germinate inside the cone.

- Scout the school ground for flowering shrubs, deciduous trees, conifers, forbs (broad-leafed plants) and grass. Additional plant specimens can be collected off site for examination in the classroom. If your school grounds don't include many natural elements, you may want to take students to a more natural green space, where you're likely to find a greater variety of plants. This is a great excuse to initiate a discussion of school ground greening.

- Due to the complexity of composite flowers, direct students to study simple flowers.

- It is not always necessary for students to be able to name a plant, but making field guides available will help them identify at least a few of the plants they're studying. If possible, assemble several field guides to wildflowers, weeds, trees and shrubs.

- It is recommended that this investigation be conducted in the spring when many trees, shrubs and plants are flowering.

- SAFETY NOTE: Consult your school board's policy regarding safety precautions for outdoor excursions and plan your trip accordingly. Be aware of any students with allergies to insect bites and plants and ensure they carry the required medications. Students should wash their hands after handling soil, plants and equipment. Encourage students to wear sunscreen and appropriate clothing (e.g. hat, long-sleeved shirt) to minimize the damaging effects of sun exposure.

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STUDENT WORKSHEET

Date: _____

Group Members: _____

In this investigation you will explore how different plant species reproduce and disperse their seeds and spores.

Part A: Surveying Sexual Reproduction in Plants

1. Locate two different angiosperms to study. Use the hand lens to examine their reproductive parts.

2. Complete the following table for each plant:

Plant Name:_____ (use the latin name, if possible)

Labeled Sketch of Flower's Reproductive Parts	**Adaptations For Pollination**	**Agent of Pollination**
Odour: Yes or No		

Plant Name:_____

Labeled Sketch of Flower's Reproductive Parts	Adaptations For Pollination	Agent of Pollination
Odour: Yes or No		

3. Locate one gymnosperm to study.

    a. Identify the tree (use the Latin name, if possible).
    b. Try to locate an open female or seed cone on the tree or ground. Female cones are much larger and harder than the male cones. Why are the scales open?
    c. Remove one scale. Locate on its upper surface two raised masses called "sporangia" or ovules. Speculate on the function of the ovules.
    d. What is the function of the scale?
    e. Draw the scale.
    f. Why is the scale shaped the way it is?

4. Locate a male or pollen cone on the tree or ground. Male cones are smaller than and not as hard as the female cones.

    a. Remove one scale and examine with the hand lens.
    b. Draw the scale.
    c. What is the agent of pollination?

5. Locate a fern. Your teacher will provide you with a fern if one is not growing on site.

    a. Use the hand lens to examine the spore cases.
    b. Where are the spore cases located?
    c. How are the spore cases arranged?
    d. What is the colour of the spore cases?
    e. How are spores adapted for dispersal?

6. Examine additional seed producing plants. Some clues to look for are spines, hooks, burrs, tufts of hair, a sticky covering, thin membranous wings and exploding pods. Create a table to summarize the methods and adaptations of seed dispersal that you observe. The table should have a column for the plant name (e.g., Maple Tree or *Acer saccharum*), a column for the seed-dispersal mechanism (e.g., helicopter-winged keys spin through air), and a column for the structural adaptation of the seed (e.g., wing-shaped; thin and light).

Part B: Surveying Asexual Reproduction in Plants

1. Locate and identify asexual reproducing plants growing on site. Research how new plants are made.
2. How can you distinguish between an asexual reproducing plant and a sexual reproducing plant?

Lets Rock Around the Town

Grade level: 11-12
Provincial curriculum links: Ontario
Subject: Science
Strands: Earth and Space Systems
Keywords: Earth Materials, rock, earth science, stone, quarry, mineral
Source: Adapted from Lesson Plan by Sandra McEwan and Peter Russell

SPECIFIC LESSON GOALS

- ☆ Describe the uses and evaluate the economic importance of minerals, rocks and metallic resources;
- ☆ Describe the use of dimension stone (e.g. in buildings and cemeteries) and explain how the development of new technologies has influenced the type of stone used in the local area (e.g. relate advances in the technology for quarrying and cutting stone to changes in the type of stone used)
- ☆ Compile and display evidence and information by hand or computer, in a variety of formats, including diagrams, flowcharts, tables, graphs and scatter plots
- ☆ Classify rocks according to their structure, chemical composition and method of formation.

DESCRIPTION

In this activity, students will explore their village, town or city to find out what natural stone was used to construct the buildings, monuments and sculptures. Students will prepare a "rock walk" field guide of their local community with an accompanying map and pictures

PREPARATION

Length of lesson: 3-4hrs**;** 30 minutes to assemble rock specimens, prepare handouts, read educator notes (provided) and review references/resources (as noted below), plus extra time to locate potential study sites.

RESOURCES REQUIRED

1. Digital camera(s)
2. Road maps
3. Rock and mineral identification books
4. Lesson worksheets

PROCEDURE

1. Introduce the lesson by accessing one of the web sites in the references to find a city rock walk. "Walk" the class through the digital tour.

2. Tour the outside and inside of the school and identify where natural stone has been used in its construction (e.g. granite/ terrazzo hallway (floors) and steps). Identify the rocks or minerals used and whether it is local or transported material.

3. Brainstorm with the class examples of buildings and structures in the community they are aware of that are constructed of natural stone. Present any information obtained from your local historical society on historic stone constructed buildings. Discuss the types of rocks and minerals used for construction over the centuries. Display representative rock and mineral specimens.

4. Discuss the assignment requirements. Organize the students into groups of four members. Each group will prepare a 45-minute self-guided rock walk tour of their community. You may want to consider assigning each group a different neighbourhood or section of the community. They should explore the inside and outside of buildings, take a photograph and describe each location's features that are constructed of natural stone. This information is to be summarized in a field guide that can be prepared either as a pamphlet, or a digital web site tour.

5. Discuss which areas would be suitable for a rock walk. Their walk could include an existing community historical building walk. Ideally, modern buildings would not be covered by this tour, but should be added on the map. Downtown parks, monuments and sculptures should also be included.

6. Review safety precautions and behaviour expectations. All group members must remain together at all times. They must show respect for visitor guidelines and private property.

7. Assign specific tasks as follows:

Role	**Task**
Group Leader	Responsible for overall performance of the group.
Data Collector	Ensures all data is recorded.
Photographer	Takes digital pictures.
Safety Officer and Time Keeper	Ensures the group stays together, they follow class behaviour guidelines and keeps a careful watch on the time.

8. After the field trip, provide time to complete any follow-up research and assembly of the field guide.

Discussion and questions

- Groups can present a summary of their rock walk tours to their peers.
- Discuss which rock or stone types were used the most frequently and why. Which were of local origin? Which were gathered from further away or from other countries?
- Student Evaluation
- Completion of the rock walk field guide.
- Peer and self-evaluation.

ENRICHMENT/ EXTENSION ACTIVITIES

- Identify objects at home that are made of rocks and minerals. Use the library or internet to help identify the type of rock or mineral used and its place of origin.

- Examine the home kitchen counter tops and identify the construction material. Some students will have "granite" countertops. Is it really granite or should it properly be called a syenite (no quartz present)? How does the stone stand up to its "wear and tear" in the kitchen? Does the stone become scratched by knives or do acids from food discolour or etch it? Is granite a good surface for preparing foods? At about $800 per ton, granite table used for tabletops is quite a costly material. Why is granite such an expensive material to build with?

- Historically, red bricks were a sign of a "quality" building. This was even more notable in areas where the local clay produced tan colour bricks (the tan colour signifies that the clay is calcium-rich). Sometimes, the bricks were painted red to give them the "quality" look. Examine red bricks on one or more buildings to determine if they were painted or dyed red. Modern brick can by dyed red too, or iron oxide may be added to the clay mixture to produce red bricks, if the clay does not turn red on firing.

- Examine and identify the rock types of old farm barn foundations. Local fieldstones were typically used in earlier buildings. Glacial erratics from many kilometres away were incorporated into these buildings. Cobbles (large, round stones) from the local riverbed or gravel pit are sometimes used in a decorative manner.

- If there's a quarry in your community, consider scheduling a field trip.

- Ask your local municipality or a road repair company about recycling of asphalt. In some municipalities, the road material is ripped up and remixed with new materials before being re-used.

EDUCATOR NOTES

- Students should have the following prior knowledge and skills: identify and classify selected hand samples of unknown minerals on the basis of their physical properties (e.g. sort by hardness, colour, streak); apply a series of tests to identify common igneous, sedimentary and metamorphic rocks and classify each according to its origin, texture and composition; and describe the many uses of rocks and minerals in manufacturing and construction.

- Buildings in our communities were built of local and imported stone. These stones were often transported at great expense to produce attractive looking buildings. Historically, banks and insurance companies were built with grand materials to give an appearance of a long lasting, quality institution that would be relied upon to take care of the public's money.

- Contact the local historical society for information on historical buildings in your community. They may offer an historic "building walk" that your class can use as an example in the development of their rock walk field guide.

- Rocks commonly used in building construction are: granite, gneiss, syenite, limestone, fossiliferous limestone, Indiana limestone, Tyndall Stone, marble, slate, travertine, serpentine, marble and sandstone.

- Terrazzo is made of pieces of coloured marble mixed with cement. Some marble tiles are made of broken marble pieces cemented with dyed cement and cut into tiles. Materials may also be made to look like stone, using sand, a binding material coloured to match natural stone (see the Arriscraft reference).

- Local fieldstone and occasionally cobbles from gravel in glacial and river gravel deposits are used to make attractive buildings.

- Scout the local area for representative buildings, monuments and sculptures constructed of natural stone.

- SAFETY NOTE: Consult your school board's policy regarding safety precautions for outdoor excursions and plan your trip accordingly. Be aware of any students with allergies to insect bites and plants and ensure they carry the required medications. Students should wash their hands after handling soil, plants and equipment. Encourage students to wear sunscreen and appropriate clothing (e.g. hat, long-sleeved shirt) to minimize the damaging effects of sun exposure.

References

1. The Geological Association of Canada has produced articles in the publication Geoscience Canada on building stones used in parliament buildings in Ottawa and provincial capitals. You can access these at your local university library.
2. The Geological Association of Canada also has recently published the following book: Mustard, Peter, Z. D. (Danny) Hora, and Cindy Hansen. Geology Tours of Vancouver's Buildings and Monuments. Available from GAC Bookstore for $20. Visit this web site to order: http://www.esd.mun.ca/~gac/bookstore/index.html
3. For information on Rocks and Minerals Everywhere, visit: http://www.nps.gov/brca/Geodetect/Rocks%20&%20Minerals/Modern%20min%20use.htm
4. For information on bricks, their use and history, visit: http://irc.nrc-cnrc.gc.ca/cbd/cbd169e.html
5. For information on stone, paving and interlock industry in Canada, visit: www.stonework.ca or http://www.uppercanadastone.com/products/precast/
6. For information on natural stone, visit: http://www.natural-stone.com/index1.html
7. For information on Manitoba's Tyndall Stone, visit: http://www.science.uwaterloo.ca/earth/waton/watons99.html
8. For information on the building stones of Kitchener Waterloo, visit: http://www.science.uwaterloo.ca/earth/waton/watons98.html
9. For information on learning geology from buildings in downtown Toronto, visit: http://www.science.uwaterloo.ca/earth/waton/waton5.html#waton5
10. For information on a rock walk through downtown Edmonton, visit: www.ags.gov.ab.ca/publications/ pdf_downloads/rockwalk.pdf
11. For information on building stones and monuments of Canada's National Capital region, visit: http://www.carleton.ca/~jadonald/fieldtrips.html
12. For information on a "rock around Lincoln" (Lincoln, England), visit: http://www.raundstownfc.co.uk/emiougs/lincoln1.htm
13. For information on Larvikite, visit: http://www.cst.cmich.edu/users/dietr1rv/larvikite.htm
14. For information on natural stone for building, visit: http://www.ansiindia.com/about-us.html
15. For information on Ontario building styles (usefully when describing your local buildings), visit: http://www.ontarioarchitecture.com
16. For information on cobblestone architecture, visit: http://www.heritagecanada.org/eng/featured/current.html#cobblestone
17. For information on Arriscraft (produces manufactured products which look like stone), visit: http://www.arriscraft.com/archContent/index.html

STUDENT WORKSHEET

Date : _____

Group Members : _____ _____

_____ _____

_____ _____

In this activity, you will explore your local community to identify the types of natural stone used to construct older buildings, monuments, and sculptures. You will use this information to assemble a self-guided, 45-minute, historic "rock walk" field guide with accompanying maps and photos.

1. Decide if you will:
    a. begin your tour with the historic building walk produced by the local historical society and then proceed from there, OR
    b. design the entire route yourself

2. Decide which streets you will investigate.

3. If possible, take a picture of each structure. Record the following details for each building's rock structure, monument, and sculpture that might be featured in your rock walk tour:
    a. Location (address, inside or outside building)
    b. Structure examined
    c. Description and name of rock type
    d. Approximate year built

4. Draw a map of the route. Label the street names. Name and number (in order) the buildings and structures to be visited. Use arrows to show the directions to walk. Add any additional landmarks (e.g. parks, ponds, modern buildings) that might be helpful, even though they are not on the walking tour.

5. Prepare an attractive, organized, informative "rock walk" field guide. Include an easy-to-follow route map and a photo for each featured rock structure. This guide may be prepared either as a pamphlet or a digital walking tour web site.

Mapping My Community

Grade level: 9
Provincial curriculum links: Ontario
Subject: Geography; Methods of Geographic Inquiry
Keywords: Waypoint, route, multipath, GPS, urban land use, land-use planning

SPECIFIC LESSON GOALS

- ☆ Demonstrate an understanding of the technologies used in geographic inquiry (e.g., Geographic Information Systems (GIS), hypermedia).
- ☆ Select and use appropriate methods for displaying geographic data;
- ☆ Demonstrate an understanding of the methods used to collect, organize, manipulate, and interpret geographic data;
- ☆ Select and use appropriate technology (e.g., computer-generated maps, graphs, photos, digital maps) to present geographic information;
- ☆ Map existing transportation, communication, and energy networks in order to plan and make decisions concerning a regional community.

DESCRIPTION

This lesson is designed to introduce students to GPS technology as they investigate urban land use in their community and learn about the role an urban planner plays the development of a town or city. Students will travel around every street in a specific corner of their community and identify and map all forms of land use in that area. Back in the classroom, students will create a digital map of their community from the data they collected during their fieldwork.

PREPARATION

Prior to Lesson: 20 minutes to prepare student worksheets, read educator notes (provided) and review references/resources (as noted below)

Length of lesson: 120 minutes, (this depends on length of "GPS walk"), for class discussions and field trip.

RESOURCES REQUIRED

- ▫ GPS receivers
- ▫ Map of neighbourhood (optional)
- ▫ Lesson worksheet [Appendix 1]

PROCEDURE

1. With your class, examine the role of urban planners in the city. What is an urban planner responsible for? Possible answers include:

    - Economic development
    - Park and green space development
    - Zoning
    - Assess problems surrounding traffic congestion
    - Location of landfills, new houses, schools, public buildings
    - Infrastructure updates (e.g. changes in road names, creation of new subway lines)
    - Timelines for implementation (including milestones at 5, 10, 15 years)
    - Regularly update their data (as city grows and changes, old maps must be updated).

2. What challenges do planners face within a city?

3. Brainstorm with students to find the best way to map the selected area in their community. How should the workload be divided among each group? For example, one group can map one side of a street, while another maps the opposite side. Keep in mind that the digital routes created by each group will be joined at the end of the exercise, therefore, try to eliminate overlap.

4. How are urban areas planned? Ask students which major features define an urban area. For example, major landmarks in Toronto are the CN Tower or the SkyDome. For the GPS exercise, try to select an urban area that contains a good mixture of major urban land uses such as parks, places of worship, government buildings, restaurants, city landmarks, residential dwellings, cemeteries, universities, etc.

5. Review the importance of proper care for the GPS receivers. They are expensive pieces of equipment and are costly to repair or replace.

6. Set up the GPS Receivers:

    - Students should ensure that their position format is in hddd°mm.mmm'.
    - Map datum should be set to WGS 84. Distance/Speed is Metric. Elevation in Metres. Vertical speed in metres/minute and depth set to metric.
    - The heading should be set to display Cardinal Letters and North Reference should be set to "True North".
    - Make sure that the GPS mode for the receiver is set to "on". If the students are getting poor satellite reception, they should ensure that WAAS (Wide-Area Augmentation System) is enabled.
    - Before departing, ask each group to ensure that their GPS receiver has adequate battery power.

7. Divide students into groups. Student groups should consist of no more than 6 members. Each student should be given a particular role in the group such as: group leader, equipment manager, data collector, identification coordinator and safety officer. You may wish to provide the group leader with a simple map of the area.

Special Task	Function
Group Leader	Responsible for overall performance of the group.
Equipment Manager	Prepares a list of the equipment, instructs others in its use and ensures that it is all returned undamaged.
Data Collector	Ensure that all data are recorded on the worksheets.
Navigator	Responsible for operation and proper usage of GPS receiver.
Safety Officer	Ensures that the group stays together and that safety regulations are followed.

8. Students are to locate and identify all areas of urban land use. As they walk through their assigned area (lot by lot), they are to take at least 5 waypoints for each building, recreational area, etc. The more waypoints, the higher the accuracy of the measurement. Remind students to hold the GPS receiver vertically, (antenna facing upward) to minimize the possibility of multipath errors. When taking waypoints, try to keep the GPS as still as possible to ensure greater accuracy. Name each point location as either residential, industrial, commercial, institutional, or open space. If possible, record the actual name of the location (i.e. name the waypoint). For example: High Park, McDonald's, The Bay, TD Bank.

9. While students are taking point information, they should also be mapping their route with the GPS. When taking points, stop navigating on the GPS. Once all the waypoints are recorded, continue navigating. When the group has completely surveyed their assigned area, they should save the route they created and give the route a meaningful name. For example: "King St - west side" or "Route_Group1".

10. After returning to the classroom, ask each group to calculate the percentage of buildings which were:

    1. Residential
    2. Industrial
    3. Commercial
    4. Institutional
    5. Open space/recreational.

11. Upload the information from the receiver to a computer and view the routes using GIS software such as ArcView or MapInfo. Join each group route to form one map of the community. AutoCAD is also a useful program to view and manipulate the data.

12. Ask students who would find this digital information useful. For example:

    6. Trucking company
    7. Public Transportation
    8. Taxi Services
    9. Retail chain managers (to find ideal location for next chain store such as a Starbucks)

13. If time permits, have a class discussion on the benefits of using GPS to map a community.

Discussion and Questions

1. What are some challenges that city planners face when expanding a city?
2. Was there an obvious pattern in the location buildings? Do students think there was a particular strategy behind the location of commercial buildings in their study area?
3. Examine the distribution of urban land uses: which of the five categories was the most prevalent land use? Which was the smallest?
4. What are the benefits of using GPS when hiking and camping in wilderness areas?

Student Evaluation

- Completion of worksheets and quality of observations
- Observation
- Peer and self-evaluation

ENRICHMENT/ EXTENSION ACTIVITIES

- You may modify this lesson for an applied geography class by removing the GPS applications.
- Ask students to investigate how they could use GPS to find the optimal location for a retail chain store, such as Starbucks or HMV. What types of urban and demographic factors would they have to consider before selecting a location for their commercial building?
- Research delivery companies in your city. How many of them are using GPS technology? Investigate if there are certain types of delivery services which use GPS to track their vehicles. Why did they begin using GPS technology?
- Superimpose the class map on a digital plan of the city. Create a choropleth map showing the types of land use within the city.

- Using GPS and GIS technology, create a map that tourists can use when visiting your city. Highlight all the major points of interest, such as: historical sites, parks/gardens, stadiums/arenas, museums, art galleries, restaurants. As the owner of a touring company, create a route on which to take your tourists can take when visiting the city.
- Visit the city planning department.

EDUCATOR NOTES

- GPS stands for "global positioning system". This is a satellite navigation system which provides precise locational information based on data transmitted from a constellation of 24 satellites orbiting the earth. It provides specially coded satellite signals that can be processed in a GPS receiver, enabling the receiver to compute position, velocity and time.

- GPS was developed by the American military and was originally intended for military use only. The GPS system is still controlled by the United States Department of Defense.

- GPS signals are free to all. This means that no-cost locational/ navigational data is available to anyone with a receiver. GPS availability is worldwide, 24-hours per day, 365 days per year. Additionally, low entry cost means that user equipment can be relatively inexpensive, depending on how accurate the user requires their measurements to be.

- Uses for GPS are abundant. This technology can be used for recreational activities such as fishing, hiking, and geocaching as well as complex tasks such as navigation, surveying, mapping and vehicle tracking. Users of GPS technology can utilize any point as a reference to navigate to another point.

Setting up the GPS Receiver

- Students should ensure that their position format is in hddd°mm.mmm'

- Map datum should be set to WGS 84. Distance/Speed is metric. Elevation is in metres. Vertical speed is in metres/minute and depth is set to metric.

- The heading should be set to display Cardinal Letters and North Reference should be set to "True North"

- Make sure that the GPS mode for the receiver is set to "on". If the students are getting poor satellite reception, they should ensure that WAAS (Wide-Area Augmentation System) is enabled.

- The location of each point to which students will navigate are stored in the GPS receiver. The teacher/ leader may enter the points in each receiver ahead of time, however, it may be beneficial for students to enter the points themselves.

- GPS terminology students should be aware of are listed below:

    - Waypoints - points that are stored in the receiver.
    - Route - path created by traveling from one waypoint to another.
    - Coordinate - longitude/latitude values of each point.

- WAAS - Wide-Area Augmentation System. It is a system of satellites and ground stations that provide GPS signal corrections to allow for better position accuracy. Enabling WAAS on a receiver improves accuracy by approximately 5 times (e.g. from an accuracy of 15 m to an accuracy of less than 3 m).
- Multipath - caused when the GPS signal is reflected by some object or surface before being detected by the antenna on the receiver. The surface most prone to multipath is water, while sandy soil is the least. Multipath errors are common in densely wooded areas (due to the number of trees reflecting the satellite signal) and in cities (due to the number of buildings reflecting the satellite signal).
- ZULU time - used in the military, navigation and computing generally as a term for Coordinated Universal Time (UTC), and often called (incorrectly) Greenwich Mean Time (GMT). In the strictest sense, ZULU time is NOT the same as GMT, because it is an ATOMIC time-scale, while GMT is tied to the rotation of the Earth (i.e. 'mean Sun' time). Traditionally, ship and aviation navigation is conducted using Zulu time. Zulu time is usually expressed in terms of a 24-hour clock using the Gregorian time divisions of hours and minutes. Note: For those that are not time professionals, using GMT is close enough for daily work.

- To select an appropriate area for study, travel around your local urban community and locate an area that has a diverse mixture of land uses (residential, commercial, industrial, etc).

- There are 6 main categories of urban land use: residential, transportation, industrial, institutional, commercial and open spaces/recreational. Within residential land use, there are 5 types of dwellings:

    - **Single family home** - residential building for one family: lowest density.
    - **Semi-detached** - dwellings share common wall.
    - **Duplex** - a two-family house.
    - **Townhouse** - a series of single-family houses which are connected by common walls to form a continuous group.
    - **Apartment buildings** - multiple dwellings within one building: highest density.

- This investigation can be conducted at any time during the school year. Given the fact that students will be outdoors for the duration of the investigation, it is preferable to do the fieldwork on warmer days before or after the snow melts.

- SAFETY NOTE: Consult your school board's policy regarding safety precautions for outdoor excursions and plan your trip accordingly. Be aware of any students with allergies to insect bites and plants and ensure they carry the required medications. Students should wash their hands after handling soil, plants and equipment. Encourage students to wear sunscreen and appropriate clothing (e.g. hat, long-sleeved shirt) to minimize the damaging effects of sun exposure.

References

- For the Trimble home page (an innovator of GPS technology) featuring a thorough description of GPS technology, tutorials, GPS equipment for sale and a GPS glossary, visit: www.trimble.com

- For information on about urban planning and the role of planners, visit: http://www.fact-index.com/u/ur/urban_planning.html, or the Canadian Institute of Planners web site at www.cip-icu.ca

- For urban sprawl and health problems, visit: http://www.msnbc.msn.com/id/3076958/

[Appendix 1]
Student Worksheet

Date: _____

Group Members:_____

Route Boundaries:_____

GPS Accuracy (in metres):_____

Exact coordinates of my school (in latitude/longitude):_____

In this activity, you will use a GPS receiver to record the different types of land use, lot by lot, in an urbanized setting. Pay attention to how the buildings are grouped; this may give you some insight as to how city planners originally intended the area to be used. Every time you arrive at a new lot, record the type of land use on the tally chart. If the land use is residential, record which type of residential dwelling in the second chart.

Remember to take at least 5 waypoints for each location on your route. The more waypoints you collect, the better the accuracy of your position.

Table 1: Urban Land Uses in Study Area

Urban Land Use Category	**Number of Occurrences** ***(use tallies as you walk)***	**Category Total**
Residential:		
Industrial:		
Institutional:		
Commercial:		
Open Space/Recreational:		
Unknown:		

TOTAL Lots Visited:	
Satellites in view today (write each satellite number):	
Total distance (m) traveled today:	

Table 2: Residential Dwelling Types in Study Area

Residential Dwelling	Number of Occurrences (*use tallies as you walk*)	Category Total
Single family home (*low density*) :		
Semi-detached (*low density*) :		
Duplex (*medium density*) :		
Townhouse (*medium to high density*) :		
Apartment (*high density*) :		

1. Fill out the tables by placing a tally for each type of land use (Table 1) or residential dwelling type (Table 2) in your assigned area. Once you have completed your tally charts, use the results to create a picture of the distribution of urban land use in the section of the city you visited. Draw a circle pie chart. Create a legend by selecting one colour for each category and include the percentage of land use for each.
2. Do you think the current type of land use in the area you investigated has changed from what was originally planned by urban planners? For example, you may notice that some buildings were originally houses but are now used for commercial purposes, or you may notice that some buildings were meant for industrial/commercial purposes, but are now converted into lofts. Justify your answer.
3. Look at the map that was compiled by the class. How do the results obtained by your group compare to the results of other groups? Is there an obvious pattern in the distribution of land use?
4. Check to see if any satellites are currently experiencing problems at the following web site: www.navcen.uscg.gov. These "problems" are called NANUS (notice advisory to navstar users). NAVCEN, (the United States Coast Guard's Navigation Center of Excellence), controls 78 DGPS sites and 24 LORAN stations across the United States. Apart from its many functions, NAVCEN is primarily responsible for the continued development of navigation technology. Click on "Active NANUs" and list the following:
    1. The number of satellites that are set to "unusable".
    2. The dates AND times during which the satellites are unusable.
    3. The NANU type (check here for a definition of the NANU codes: http://www.navcen.uscg.gov/ADO/GpsActiveNanu.asp)
    4. ZULU time is measured on an atomic time scale and is also known as Coordinated Universal Time (UTC). Convert the ZULU time listed on the NAVCEN website into your own time zone. Use the following web site to help you: http://www.csgnetwork.com/timezncvt.html. What is the time difference in hours?

The date and time the web page was last updated.

Nice Niche!

Grade level: 9
Provincial curriculum links: Ontario
Subject: Science and Technology; English; French
Strand: Biology Academic; English Academic;
Topics: Sustainability of ecosystems; Writing; Speaking;
Keywords: Ecological Niche; Sustainability of Ecosystems
Source: Adapted from Cornell, J. Sharing Nature with Children. Dawn Publications, 1979

SPECIFIC LESSON GOALS

Research Skills

- ☆ Collect and integrate information from various sources (personal observation, print, electronic) to prepare written work
- ☆ Choose an appropriate media form to present ideas

Science/ Language Skills

- ☆ Revise and edit written work to conform to standard Canadian English (or French)
- ☆ Accurately use the appropriate scientific vocabulary and critically evaluate and summarize data used in preparing a position promoting the advantages/benefits of an organism's niche (see terms/concepts in the Student Worksheet)
- ☆ Concisely describe the significant factors affecting an organism's ecology to instruct and convince others using the organism's voice
- ☆ Perform micro hike activity independently with minimal supervision
- ☆ Observe and record information accurately in the field
- ☆ Manage time effectively to accomplish all tasks

Oral Communication

- ☆ Create media work to present written script
- ☆ Practice and execute performance with dexterity and confidence, using appropriate facial and body gestures to enhance the performance
- ☆ Willingly participate and become involved in the lifestyle of their organism (develop a deep ecology through the organism)
- ☆ Show concern for the organism and its niche, generating theories about its possible view of itself and its place in the ecosystem supporting the organism's behaviour in terms of its needs to survive and reproduce
- ☆ On behalf of an organism of their choice, advocate for the validity of that organism's niche in the ecosystem using and justifying appropriate media production approaches
- ☆ Justify presentation form choice with respect to range and purposes of media forms and be able to critically assess the effectiveness of their own and others' work

DESCRIPTION

Students will be going on a micro-hike to explore the ecology of their school/other site. They will choose one specific organism to focus on and learn to recognize and appreciate that organism's habitat, lifestyle and ecology. They will present a case for the survival of this organism and its niche through a media presentation (e.g. Radio advertisement, video, electronic ad, print ad/presentation, etc.)

PREPARATION

Teacher/ leader preparation time: 2 hours

Student preparation time: 4 hours

Length of lesson: This lesson could be run over several days. Allow 4 hours for the micro hike, exploration of and research into organism; 4 hours for the media presentation preparation; and 20 minutes for each media presentation to the class

Safety

As the students will be outside, allergies are a primary concern. Teacher/ leaders should be aware of possible anaphylactic reactions (i.e. bees, wasps), as well as asthma and hay fever, or other plant allergies. In non-schoolyard sites, it will be especially important to be aware of the locations of any poison ivy/oak/sumac in the area. Select micro hike locations far from these locations. It may be advisable to train the students to identify these plants immediately prior to the exercise. Inspect the area for other natural or human-made hazards such as animals' burrows, wasp or ant nests, feces, broken glass, or sharp metal.

Group Management Strategies

Individuals' locations will be directed and limited through the use of the numbered stakes, tags, and the 2 metre limit. This is intended to minimize wandering and inter-individual interference. Stakes should be at least 4 metres apart to insure this. Stake placement should facilitate the teacher/ leaders' ability to supervise the students and keep the students away from poisonous plants or other hazards.

Background Information and Skills

Students will need exposure to all of the terms listed on the student worksheet (below) as well as the following skills:

- taking field notes
- using field guides and/or identification keys
- internet and library research

- media interpretation

RESOURCES REQUIRED:

- Numbered tags and corresponding numbered stakes (one of each per student)
- Students' science logs
- Magnifying glasses (not essential)
- Library and Internet access

PROCEDURE

Introduction

For many professions, it is essential to know both the "product" and the audience. This is true for manufacturers, real estate agents, scientists, and even teacher/ leaders! But could you "sell" a lifestyle? In this activity, you will examine the ecology of an organism of your choice in nature and via written and/or electronic information sources. With these specifics of the organism's ecology, you will design a script or promotional material to advocate that lifestyle as a valid and worthwhile part of the ecosystem.

1. Take a micro hike! You will be given a numbered tag that corresponds to a numbered stake in the schoolyard. Find your stake and take a 5-minute micro hike: explore the area around the stake as if you were an explorer the size of an ant. Do not go farther than 2 metres from your stake. There will be a 2-metre long string attached to the stake to guide you.

Keep a brief log of your explorations. What plants and animals did you encounter? What else did you see? What sounds did you hear? Did you smell anything?

2. At the end of your 5 minute hike, go back to a plant or animal that you discovered and make a special study of it. Use the available field guides to try to identify your organism if you do not know what it is. How does it live? Who are its neighbours? What is its food? Does anything eat it? Where does it fit in the nutrient cycle? Does it compete with other species or other members of the same species? How is it different or special? Refer to the list of terms and concepts below as a guide.

3. Back in the school, you will have time to do some additional research on your organism with field guides, other books, or on the Internet. Keep research notes in your explorations log, and reference your information sources.

4. Create a script or a design for a media work to promote your niche. Include information that you gathered in the field and from other sources. Your media work can take the form of a pamphlet, announcement, poster, video, or any other form that you consider appropriate, but have our teacher/ leader authorize it first.

5. Explain your choice of media and presentation style (e.g. Why did you use - or not use - humour? Why did you present certain data but not others?)

Key Terms and Concepts

Your work should correctly use at least 12 of the following ecological terms or concepts:

biomass, consumer, detritivore, food chain, niche, predator, survival, biotic, biome, decomposer, ecology, food web, organism, prey, trophic level, abiotic, community, density, ecosystem, habitat, population, producer, herbivore, carrying capacity, denisty-dependent factors, density-independent factors, impact (in terms of human impact), interspecific competition, intraspecific competition, carnivore.

Discussion and Questions

Once scripts are written, students can produce their media work with appropriate sound and graphics. Depending on the available time and level of complexity expected by the teacher/ leader, these can be done independently or in small groups.

Groups can be created by the students based on preference for organism or group members or can be assigned by the teacher/ leader based on trophic level of the original choice of organism. The media works can be assessed and evaluated by students, teacher/ leader(s) and used as a portfolio component as appropriate for Science, English, French, or other appropriate course (Native Language, International Language, and The Arts).

Students can collect and interpret examples of using nature to advertise particular products or services. The appropriateness or ethics of using natural images and people's reactions to these images can be debated. (i.e., how would the Grand Canyon feel about being used as a backdrop for advertising high polluting SUV's or cancer-causing cigarettes?)

ENRICHMENT AND EXTENSION ACTIVITIES

This activity will provide an opportunity for students to explore, observe and research the organisms and habitats that surround the school. Thus, an outdoor classroom will be created.

School Ground Naturalization Project

Grade level: 7-9
Provincial curriculum links: Ontario
Subject: Science and Environmental Science
Keywords: School naturalization, Plant plan.
Source: Adapted from lesson by Diana Wang and Josh Martin

SPECIFIC LESSON GOALS

Topic: Life Systems: Interactions Within Ecosystems (Grade 7)
Strand: Science and Technology
Specific Lesson Goals: Understanding Basic Concepts

- ☆ Identify living (biotic) and non-living (abiotic) elements in an ecosystem
- ☆ Identify populations of organisms within an ecosystem and the factors that contribute to their survival in that ecosystem
- ☆ Investigate ways in which natural communities within ecosystems can change, and explain how such changes can affect animal and plant populations

Developing Skills of Inquiry, Design, and Communication

- ☆ Formulate questions about and identify the needs of various living things in an ecosystem, and explore possible answers to these questions and ways of meeting these needs (e.g., research the population levels of a species over time and predict its future levels on the basis of past trends and present conditions; determine how the structure of specific plants helps them withstand high winds, live on the surface of water, or compete for sunlight);
- ☆ Plan investigations for some of these answers and solutions, identifying variables that need to be held constant to ensure a fair test and identifying criteria for assessing solutions;
- ☆ Compile qualitative and quantitative data gathered through investigation in order to record and present results, using diagrams, flow charts, frequency tables, bar graphs, line graphs, and stem-and-leaf plots produced by hand or with a computer (e.g., use a chart to record the number of producers and consumers in a particular habitat);

Relating Science and Technology to the World Outside the School

- ☆ Describe the conditions in an ecosystem that are essential to the growth and reproduction of plants and micro-organisms, and show the connection between these conditions and various aspects of the food supply for humans;
- ☆ Explain the long-term effects of the loss of natural habitats and the extinction of species (e.g., loss of diversity of genetic material, both plant and animal);
- ☆ Identify and explain economic, environmental and social factors that should be considered in the management and preservation of habitats

Topic: Cells, Tissues, Organs, and Systems (Grade 8)
Strand: Science and Technology
Specific Lesson Goals: Understanding Basic Concepts

- ☆ Describe, using their observations, differences in structure between plant and animal cells;
- ☆ Explain how the structure of the roots, stem, and leaves of a plant permit the movement of food, water, and gases;
- ☆ Compare the structure of different plants (e.g., cactus, coniferous tree, moss) and show how their structure enables them to live in specific conditions;

Developing Skills of Inquiry, Design, and Communication

- ☆ Plan investigations for some of these answers and solutions, identifying variables that need to be held constant to ensure a fair test and identifying criteria for assessing solutions;
- ☆ Compile qualitative and quantitative data gathered through investigation in order to record and present results, using diagrams, flow charts, frequency tables, graphs, and stem-and-leaf plots produced by hand or with a computer (e.g., use a diagram to present an estimate of the number of cells in a petri dish);
- ☆ Communicate the procedures and results of investigations for specific purposes and to specific audiences, using media works, oral presentations, written notes and descriptions, charts, graphs, and drawings (e.g., create a simulation illustrating movement of water and nutrients between cells and through various organs and systems).

Topic: Chemistry (Grade 9)
Strand: Science
Specific Lesson Goals: Understanding Basic Concepts

- ☆ Recognize compounds as pure substances which may be broken down into elements by chemical means;
- ☆ Describe, through observations, the evidence for chemical changes (e.g., changes in colour, production of a gas, formation of a precipitate, production or absorption of heat, production of light);

Developing Skills of Inquiry, Design, and Communication

- ☆ Select and integrate information from various sources, including electronic and print resources, community resources, and personally collected data, to answer the questions chosen;
- ☆ Gather and record qualitative and quantitative data using an appropriate format, and analyze the data to explain how the evidence gathered supports or refutes an initial hypothesis
- ☆ Communicate scientific ideas, procedures, results, and conclusions using appropriate SI units, language, and formats, and evaluate the processes used in planning, problem solving, decision making, and completing the task

DESCRIPTION

The purpose of this project is to involve the students in choosing the best location for a potential naturalized project and developing a plant plan for a school ground naturalization project.

PREPARATION

Preparation time:

If possible, allot 1-2 class periods to introduce the concepts of a school ground naturalization project as well as the project requirements. In addition 2-3 class periods will be required for students to work on the assignments for each of the following sections: microclimates, soil information and current vegetation. The teacher should allow students to work outside at the site that is to be naturalized to allow the students to become familiar with the site. Each group should determine the best potential naturalized project area and be prepared to back up their choices. The teacher should encourage students to gather the background research/resource information ahead of time and to bring the resources with them for outside work at the site.

Length of Lesson: 6 hours (approximate)

Background Information/Skills

All students should be familiar with the Environment Canada website and the steps required to obtain weather related information from the site.

Grade 9 students should understand fundamental acid/base concepts and salinity concept (i.e.: the effects of salt levels on plant and soil, the origins of salt found on certain sites)

All students should know how to correctly use the thermometer

All students should have some background knowledge on the use of pesticides

Grades 8 and 9 students should have some knowledge on the different parts of a plant and different soil types.

Safety Concerns

Remind students to:

- stay within assigned boundaries
- dress suitably for weather conditions when working outdoors (i.e.: wear hats and sunscreen)

Teachers must carry Epi-pens if students have severe bee/wasp/plant allergies

RESOURCES REQUIRED

1. Thermometer
2. La Motte Soil Testing Kit
3. Magnifying glass

PROCEDURE

1. Teacher should divide the class into 3 groups.
2. The first 2 classroom sessions should be background research into the project and should focus on microclimate and research on native plants to the area and their specific soil requirements.
3. The outdoor component will focus on evaluating current vegetation on-site and evaluating the soil based on the variables listed on the work sheet, determining microclimates and ultimately choosing the best potential garden area.

See Appendix A for a detailed list of tasks.

Group Management Strategies

- When assigning groups, teacher should group students who are academically stronger with students who are academically weaker.
- Teachers should try to avoid grouping students from the same friendship groups together. This will allow students to get to know other students who may not be in their 'circle of friends'.
- For a mixed grade grouping each group should consist of 2 grade 7 students, 2 grade 8 students and 3 grade 9 students. The purpose of grouping students from different grade levels is for older students to help and teach the younger students while the younger students learn from the older students.

Discussion and Questions

Initially, for the background research, discussion will take place within small groups. The small groups will then present their ideas for a school ground naturalization plan to the larger group for discussion. Groups should focus on the main concepts and principles and formulate questions that will generate discussions within the class.

Student Evaluation

How well did the students understand the lesson? Students can be rated.

Follow up Activities

`When all assignments have been submitted and graded, teachers should display all the work in the school cafeteria. Teachers, students and community members can then look at the display and vote for the best/favourite ideas to use for the naturalization project (i.e., type of plants to use, type of soil to use, the store to purchase the soil from, the choice of letters to mail out)

Students can do the soil tests when the project has completed and compare the before/after results.

Students can compare the types of wildlife found in the area before and after the project.

What connections can be made to school ground naturalization project? How can concepts be reinforced in a practical way? What are the connections to the outdoor classroom?

[APPENDIX A]

SCHOOL YARD NATURALIZATION

Group # that I belong to: _____

Names of my group members: _____

_____

_____

Science/Environmental Science

Collect and research for the data requested below and write or type out the information on separate sheets of paper.

Microclimate

Find the average temperature of the area for each month of the year (use Environment Canada web site as a resource)

Find the average rainfall of the area for each month of the year (use Environment Canada web site as a resource)

Find the average wind speed of the area for each month of the year (use Environment Canada web site as a resource)

Soil Information

Dig up a bit of soil from the ground and compare the soil with the different sample types and determine the type of soil it is.

Use the soil pH kit to determine the pH of the soil.

Use the La Motte Soil Testing Kit to determine the Nitrogen, Phosphorous and Potassium content of the soil.

Dig a small but deep hole in the ground and insert the thermometer to determine the temperature of the soil. Do the test in the morning, midday and in the afternoon and record results, time of test and dates of test.

Use a magnifying glass and find any small insects that live in the area.

Previous and current vegetation and pesticide

Determine type of grass currently planted (whether it is native species, where the species came from)

Find out from school administrators or custodians the type of pesticides previously and/or currently used (before the start of the project) on the grass area. Write a 1 page report on the effects of the pesticides and the danger of the pesticide on plants, animals and human.

Types of plants to be used

Using all the information gathered on climate and soil, determine the possible types of plant that would grow in the soil.

Choose 5 possible plants and for each plant, write a 100-200 words information about the plant.

- ✓ physical description of plant
- ✓ types of wildlife that plant attracts and repel
- ✓ the plant's optimal growing temperature and climate
- ✓ possible cost to purchase the plant (cost of seed, cost of seedlings, cost of grown plant)

Study of a Rotting Log

Grade level: 10-11
Provincial curriculum links: Ontario
Subject: Science
Strands: Biology, Environmental Science
Keywords: Micro-community, ecosystem, trophic (feeding) levels, producers, consumers, scavengers, saprophytes and decomposers, classification of organisms, interrelationships, taxonomy
Source: Adapted from lesson by Sandra McEwan

SPECIFIC LESSON GOALS

- ☆ Analyze interactions within and between populations.
- ☆ Analyze the impact of external factors on an ecosystem.
- ☆ Demonstrate understanding of fundamental principles of taxonomy by classifying organisms
- ☆ Examine the factors (natural/ external) affecting survival and equilibrium of populations in an ecosystem
- ☆ Explain the ecological role of representative organisms from each of the kingdoms of life (including Eubacteria and Archeabacteria)
- ☆ Use organisms found in a local/ regional ecosystem to demonstrate understanding of fundamental principles of taxonomy.
- ☆ Compile and organize data using appropriate formats and data treatments to facilitate interpretation of data

DESCRIPTION

In this activity, students will explore the many ecological features of a rotting log. They will identify the host plants and animals and the interrelationships among those organisms. They will also develop an appreciation of the ecological value of a rotting log as a living and changing micro-community

PREPARATION

Preparation time: Approximately 20 minutes to collect materials, print and copy student worksheets, read educator notes (provided) and review references/resources (as noted below), plus time to locate a rotting log.

Length of lesson: Approximately 150 minutes for class discussions and field trip.

RESOURCES REQUIRED

- Rotting log
- Hand lens
- Identification guides for plants, fungi and insects
- Lesson worksheets

PROCEDURE

1. As a class, brainstorm examples of living organisms that may live on or in a rotting log at different stages of decomposition. Discuss their ecological niches (e.g. producers, primary consumers, secondary consumers, scavengers, saphrophytes, decomposers) and classify them into the five kingdoms and main phyla of plants and animals. Review the complete metamorphosis life cycle of insects.

2. Discuss the objectives and procedures for the investigation. Have the students examine various sections of the log. Remind students to gently examine the log and avoid breaking it apart.

3. Back in the classroom, complete the worksheet and follow-up questions. Discuss the successive stages of decomposition of a log.

Discussion and Questions

Conduct a whole-class discussion around the results and the following questions:

- How does this log help new plants grow in this micro-community?

- What effects do plants, fungi and animals have on the log?

- What will this log eventually become?

- As a log decays, it passes through a number of stages (referred to as succession) before it decays completely. Each stage in this succession has a special community of living things. These organisms use up their food or otherwise change their environment. Once this occurs, the organisms can no longer use the log as a niche and they eventually leave. These organisms are succeeded by other organisms that can live in the changed environment. Some inhabitants may stay for one or more stages of their life cycle. From your field observations and research, create labelled diagrams to illustrate how a community in a log changes as it decays.

- Based on your observations, explain why fallen trees are important in the ecosystem of a forest or woodlot.

- What do you think is the most important niche in a fallen log micro-community? Explain why.

Student Evaluation

- Completion of worksheets and quality of observations
- Observation
- Peer and self-evaluation

ENRICHMENT/ EXTENSION ACTIVITIES

- Research insect and fungal pests and diseases that weaken and kill trees. Describe the appearance and life cycle of the pest, the method of attack, tree species at risk, symptoms and damage, management, range of infestation and why the concern. Some possible insects to investigate are: Asian Long-Horned Beetle, Emerald Ash Borer, Pine Shoot Beetle, and Eastern Spruce Budworm. Possible diseases to investigate are: Beech Bark Disease, Butternut Canker, Dutch Elm Disease, White Pine Blister Rust.

- Compare the succession of living things in logs or stumps at different stages of decomposition for the same tree species.

- Compare the kinds of organisms living on or in logs of different tree species at similar and different stages of decay.

EDUCATOR NOTES

- Rotting logs are an important part of a living community. In each stage of its decay, a rotting log hosts a multitude of plants and animals that either consume it or each other. In so doing, they alter the structure of the log and gradually create a habitat no longer suitable for themselves.

- The first stage of decomposition begins while the tree is still standing. Insects invade the tree either by boring into it or by entering an opening in the bark that may have been created by animals, injury caused by humans, disease, weather or fire. As beetles burrow under the bark, their tunnels permit air, moisture and fungal spores to enter the tree. Fungal hyphae penetrate the wood cells and live off the stored starch. In turn, the fungi provide food for some bacteria, slugs and insect larvae. Invading carpenter ants attract woodpeckers. Eventually, the weakened tree falls.

- Increased moisture levels from the damp ground speed up the rate of decay of the bark. The moist conditions in turn attract salamanders, centipedes and various scavengers and support the growth of mosses, ferns and other plants. Wood-boring insects inhabit the dryer portions of the log. As the log collapses, earthworms, fungi and bacteria carry out the remaining

decay. It can take up to 10 years to transform a dead tree into soil. The rate of decay is influenced by the temperature, the amount of moisture, the length of the seasons and the succession of organisms living on or in the rotting log.

- Examples of animal life in or on a rotting log:

  PRIMARY CONSUMERS

  - Bark beetles
  - Click beetles
  - Wood borers
  - Termites
  - Carpenter Ants
  - Fungi
  - Bacteria

  SECONDARY CONSUMERS

  - Centipedes
  - Mites
  - Ants (some species)
  - Salamanders
  - Spiders
  - Woodpeckers

  SCAVENGERS

  - Earthworms
  - Millipedes
  - Pill Bugs, sow bugs, wood lice
  - Snails
  - Mites
  - Slugs

- Students should have prior knowledge of the following ecological terms and concepts: habitat and niche; population, micro-community and ecosystem; trophic (feeding) levels - producers, consumers, scavengers, saprophytes and decomposers; classification of organisms into the five kingdoms and main phyla of plants and animals; life-cycle of insects, including complete metamorphosis (egg - larva - pupa - adult) and incomplete metamorphosis (egg - nymph - adult).

- Assemble identification guides for plants, fungi and insects.

- If there is no rotting log on the school grounds, and if a field trip to a nearby natural area is not possible, a rotting stump or log sections may be brought onto the school grounds - or even into the classroom.

- Inculcate in your students a respect-for-life ethic. Handle the rotting log and organisms with sensitivity.

- Try to minimize habitat disturbance during the study.

- It is recommended that this investigation be conducted in the late spring or early fall when life forms are flourishing.

- SAFETY NOTE: Consult your school board's policy regarding safety precautions for outdoor excursions and plan your trip accordingly. Be aware of any students with allergies to insect bites and plants and ensure they carry the required medications. Students should wash their hands after handling soil, plants and equipment. Encourage students to wear sunscreen and appropriate clothing (e.g. hat, long-sleeved shirt) to minimize the damaging effects of sun exposure.

References

- Borror, D. J. A Field Guide to the Insects of America, North of Mexico - The Peterson Field Guide Series. Boston: Houghton Mifflin Company. 1970.

- Ritter, B. et al. Science 10. Toronto: Nelson Thomson Learning. 2001.

- Sadler, Doug. Reading Nature's Clues - A Guide to the Wild. Peterborough: Broadview Press Limited. 1987.

Student Worksheet

Date: _____

Name: _____

1. If the log is in a forest, identify the species of tree. Look at the bark, wood structure and surrounding trees.

2. Can you tell how the tree died? What evidence is there to support your statement?

3. Approximately how long ago was the tree felled?

4. If possible, locate a cross-section of the log. Before it decomposes, a stump or cross-section can offer clues about the tree's past. Every year, a tree adds a growth ring to the wood. When the tree is cut down, the rings are seen as concentric circles on the stump. Rings vary in size depending on many environmental factors. If you can, count the rings from the centre out. How old was the tree when it fell?

5. List all signs of decay.

6. Name and briefly discuss four abiotic factors and three biotic factors that affect the decaying process of the log.

7. Examine the outer surface for mosses, lichens, herbaceous plants and fungi. Look for evidence of animals (e.g. holes, tunnels, insect larvae and eggs, organisms on the exterior and underside of the bark, nesting sites and food cashes). To avoid tearing the log apart, gently roll the log over to observe underneath. Return the log to its original position. Record your observations in the tables provided.

Table 1: Living Plants Growing In or On the Log

Plant Name	Main Phyla	Location	Seed Source	Effect on Log
e.g. Woodfern *(Dryopteris)*	Mosses and liverworts	Surface of decaying bark	Windblown	Extract nutrients

Table 2: Living Fungi Growing In or On the Log

Fungus Name	Main Phyla	Location	Effect on Log
e.g. Mushroom (Schizophylum commune)	Club fungi	Surface of rotting wood	Decomposition

Table 3: Evidence of Animals Living In, On, or Underneath the Log

Animal Name	Main Phyla	Location	Evidence	Trophic Level/Niche
e.g. Bark Beetle (Scolufus)	Crustacean	Under bark	Tunnels	Primary consumer

Describe any ecological interactions which you observed:

Using a Dichotomous Key

Grade level: 10-12
Provincial curriculum links: Ontario
Subject: Science
Strand: Biology
Source: Adapted from lesson by Judy Olacke and based on lessons originally found in: Ministry of Natural Resources. *Focus On Forests*. Toronto: Ontario Ministry of Natural Resources. 1989

SPECIFIC LESSON GOALS

- ☆ Classify specimens by applying the principles of taxonomy
- ☆ Use a dichotomous key as part of the data collection to describe and evaluate an ecosystem

DESCRIPTION

Using a dichotomous key and observation skills, students will classify various specimens of trees.

PREPARATION

Preparation Time: 1 hour

- Copy, laminate and assemble the tree key "wheels"
- Copy and laminate cards with pictures of leaf characteristics
- Put out numbered stakes beside the trees to be identified. There should be at least 5 different types of trees.

Length of lesson: 2 hours. One hour for the introductory lesson on the role of taxonomy as well as constructing and using simple dichotomous keys. One hour for learning the terms used for leaf characteristics

RESOURCES REQUIRED

- Cards with pictures showing the terms used on keys to describe leaf characteristics (pp 27 & 28, Focus on Forests - see Resource Required below)
  - Leaf Types (compound, simple, scale-like, needle-like, in bundles or singly on twigs)
  - Arrangement on Twig (opposite, whorled, alternate)
  - Leaf Margins (smooth, toothed, wavy)
  - Leaf Shapes (linear, oval, reversed oval, chordate, connate, heart-shaped)
- Copies of a few varieties of dichotomous keys (insects, whales, flowers) (see Gr. 11 Biology texts - any publisher)
- One coniferous tree "wheel" key per student (pp 32, 33 Focus on Forests)
- Numbered stakes for indicating the trees to be identified
- Ruler (cm)
- Pencil and record sheet

PROCEDURE

Part I (1 hour)

1. In class, introduce the students to the importance and purpose of classifying things (telephone book, CD collection, etc). Relate classifying things to the role of a taxonomist and the "tools" they use.
2. Construct a dichotomous key using 8 of the students' shoes.
3. Give the students an opportunity to use a variety of dichotomous keys for different species.

Part II (1 hour)

1. As a whole group activity, have the students observe and describe leaf characteristics using common scientific terms. Distribute leaf cards that show examples of each characteristic. (See resources)
2. Write the leaf characteristic terms on the chalkboard. Have students stick their leaf card under the appropriate term and discuss.
3. Students can then write the leaf characteristics in notebooks and sketch an example of each.
4. Outside, distribute tree wheels. Walk through how to identify a tree with all students.
5. Individually, students will then use the tree key and identify each of the designated trees. Students will record their results in their science notebooks.

Discussion and Questions

- Discuss identifications. What characteristics were difficult to decide between?
- What were some easy characteristics to decide between? Are there other characteristics that could have been used in the key?
- Would all groups of species in an ecosystem be as easy to identify (e.g. insects)?
- What job or careers would involve the use of dichotomous keys? For what purposes?
- Why is it important to know what species exist in an ecosystem? What human interactions can have an impact on the variety of species (diversity) and the population of individual species in an ecosystem?

Student Evaluation

Rubric or rating scale for students to determine how well they completed the goals of the lesson

ENRICHMENT/ EXTENSION ACTIVITIES

Students could classify and identify other species in the naturalized area (e.g. Flowers, shrubs, deciduous trees or insects). Students could also extend their dichotomous keys to other areas of interest such as music, or video games.

EDUCATOR NOTES

This lesson plan should be used after teaching the binomial naming system and the Classification Levels and species. This will develop a greater understanding of the need for taxonomy and its related career opportunities. Other keys may be used if there are not a wide variety of coniferous trees in the outdoor area (e.g. shrubs, flowers).

References

- Focus on Forests: A Resource Manual for Intermediate and Senior Teachers on Forest and Forest Management. Minister of Supply and Services, Canada. 1989. Ministry of Natural Resources. http://www.oforest.on.ca/programs/Focus/indexM.html

Section B
Field Trips



This collection of Field Trip ideas is best suited for Grade 6 students. However, with a little creativity, the lessons can be modified for younger and older students.

Be a Tree

DESCRIPTION

In this dramatic activity students pretend to become trees as, through guided imagery, they become an aspen tree and go through an entire set of seasons.



PREPARATION

Time required 20 - 30 minutes

Materials required

- Guided imagery reading
- background instrumental music, such as Vivaldi's, The Four Seasons (optional)

PROCEDURE

- Before leading the activity practice reading the story aloud, adding pauses where appropriate. This activity works best under a group of deciduous trees.

- Ask students to lie or sit on the ground near the trees and close their eyes as you slowly read the passage on the next page. Trees are essential to life on Earth. They produce about half of the oxygen that animals need to breathe. Tree roots hold soil. They provide food and shelter for billions of animals. Trees provide moisture and warmth to the immediate environment in the winter. In the summer, trees provide cooling shade. Trees are beautiful, strong, and flexible.

EXTENSION

- This activity can be adapted to build empathy with any living thing. Be sure that the story you tell is rich with smells, sounds, sights, textures and feelings. The more familiar you are with the text of the imagery, the more successful this activity will be.

- After participating in the guided imagery activity, provide pencils, coloured crayons and paper. Students then draw or write their favourite thing about each season in their life as a tree.

Text for 'Be a Tree'

"Imagine you are in the middle of a forest with big, leafy trees. (pause) You are in the middle of a sunny clearing. Look at the sun and feel its warmth. Imagine you are becoming one of the trees.

Imagine you are standing with your feet shoulder-width apart and feel your huge roots growing down from your hips. Feel your roots growing down and out from your thighs to your knees and your ankles...down through the soles of your feet into the earth. Your roots work down through the soft topsoil into the dense, grey clay. Just beneath the soil surface, your feeder roots go out in all directions. Your roots spread out everywhere, some more than ten meters from the trunk. (pause)

A gentle breeze sways you back and forth. Swishhhhh. Feel how firmly you are rooted in the earth. (pause) Feel your big, round trunk. Feel your bark, your skin. Your grey bark feels dry.

Look at where your trunk comes out of the earth. Follow it up, way up, to where the biggest branches divide. Follow these branches as they divide into smaller and smaller branches spreading into the sky. Look at the blue sky through your branches. The sun feels warm. It is summer. The days are long. (pause)

Feel your bright green leaves tremble in the breeze. Feel your leaves absorb the sun's energy. Use the air and the water you've pumped up with your roots to turn the sun's energy into food. Send the sugary sap you have made in your leaves down from your branches and your trunk to your roots. Store the food in your roots. Summer is the time to store food. (pause)

Deep in the earth, feel your tiniest roots. Their hairs spread out and touch nearly every speck of soil surrounding you. Feel the root hairs suck up moisture. Feel the moisture rise through your roots first as a trickle, then as a stream and finally as a river as it moves up your trunk. As the water moves upward, it picks up speed. When the water reaches your leaves, it is moving as fast as a car on a highway. The water evaporates from your leaves. The air around you is moist. Feel the refreshing breeze. (pause)

As fall approaches, the days become shorter and the sun is less intense. You stop making food. As it gets colder, the sap in your leaves flows down. Sap flows down out of your branches, into your trunk, down to your roots. Your leaves are turning yellow and will soon die and fall off. You have stored enough energy in the leaf buds at the tips of your branches to make next year's leaves and flowers. Feel the waxy coating and scales you grew around your buds to protect them from the winter cold. Watch as your leaves turn gold, orange, or red. Fall is the time to drop your leaves and rest. You are preparing for the cold of winter.

Feel the November storms blow through your branches. You sway and creak as wind rattles your branches. A large, dead branch cracks and crashes to the ground. During a tremendous gust, you feel your entire body hesitate as you almost blow over - but your deep roots keep you anchored and upright. Snow and icy rain pound at your naked branches and splash against your trunk. Below, the forest floor is covered with brightly-coloured leaves. The air smells rich and sweet. You are soaked. Feel the water drip from branch to branch.

The temperature drops and snow begins to fall. Feel the snow piling up on your branches. The chickadees fly into the safety of nearby evergreen trees, but most of the other birds and insects and birds are gone from the forest for the winter. In your body, almost everything is at a standstill. Only about 1% of your thin, inner bark is active. Like you, the forest is still and quiet on long winter nights.

In the spring, the days become longer and warmer. Slowly you begin to pump the sap from deep in your roots up through your trunk and branches into your many buds. Feel your buds open and reveal bright green leaflets. Feel the sun's energy as each leaf grows bigger and bigger. Send sugary sap to the rest of the tree. Feel your sucker roots move through the soil to send out new saplings, identical to yourself.

Your roots grow and reach deeper into the earth. Feel the tips of your branches growing. Feel your trunk getting wider. Spring is the time of growth. Feel the sun and its power. You are alive and active and the rest of the forest has returned to life too. Feel a robin nesting on your branch. Hear a red squirrel chatter up your bark. Wild flowers push up from the soil near your trunk. Deer rest under your shade. You are part of the whole forest. Feel what you share together in the forest."

This lesson was adapted from 'Five minute Field Trips'—Canadian Parks and Wilderness Society and from Sharing the Joy of Nature, by Joseph Cornell (page 98).

Bugs "R" Us

DESCRIPTION

This activity epitomizes the very best of enquiry science, as students excitedly discover some of the 'mini-beasts' they share their schoolyard with, and practice important process skills along the way. This activity is best done on a warm day between May and October.

PREPARATION



Time required: 45 minutes

Materials required

- 5-6 white sheets
- Blank paper
- Pencils
- Journals
- Magnifying glasses.
- Optional: magnifying boxes, Petri dishes (with a top that can be closed), nets, margarine containers, etc

PROCEDURE

- Take students outdoors to an area of low shrubs and short trees. Ask them if they think there might be any animals hiding in the shrubbery. Tell students that today's activity will focus on trying to catch some of these animals - AND to release them back unharmed at the end of the day.

- Lay a white sheet below the bushes and have students rustle the bush so that anything clinging to the branches or leaves will fall out. If you find anything, carefully capture the minibeast, show how items like magnifying glasses can be used, and briefly model the observation skills you would like students to use. You may wish to start a drawing, showing students the level of detail you expect from them, and modelling how to draw things bigger than they actually are.

EXTENSION

Insects and other bugs can also be caught in long grass with a large-mouthed net. Swishing the net energetically in grass or shrubs will frequently turn up something interesting.

Adapted from 'Five minute Field Trips'—Canadian Parks and Wilderness Society

Crows and Cranes

DESCRIPTION

This activity can be used as an informal means of measuring student understanding, both before and after a unit of study.



PREPARATION

Time required: 30 minutes

Materials required

- Six Pylons
- List of Questions

PROCEDURE

- Take students outdoors or to the gym, and use the pylons to form a rectangular shape ~20 m by 10 m.

- Divide the group into two equal groups and have them face each other along a line in the middle of the rectangular game area. Designate one side as 'True" and the other as "False." Tell students that if they can cross the line behind them then this is a safe zone.

- Read out a statement. If the statement is True, the 'True' side chases the 'False' side 10 metres to the end of the rectangle. If the answer is false, then vice versa. If a student is tagged, then that counts as one point. For example, you read the statement: "At least four kinds of living organism are found in our schoolyard." This is a true statement, so the 'True' students chase the 'False' students. If four 'True' students tags a 'False' student before they can make it into the safe zone, the 'True' side gets four points.

- If you ensure that there are an equal number of true and false questions, then the two teams can be compared at the end of the activity. Remember to NOT alternate questions, otherwise students will learn the pattern!

Variation: Students get better at this game the more they play it. Eventually students can write their own questions and conduct the game themselves.

Adapted from 'Five minute Field Trips'—Canadian Parks and Wilderness Society

Defending Nature

DESCRIPTION

"The idea of wilderness needs no defence. It just needs more defenders." - Ed Abbey

Someone once said that the pen is mightier than the sword. Throughout Canada and the world, nature is under attack – we owe it to our students to help them understand this threat, and to give them letter-writing skills they can use to defend their natural heritage. In the process they learn about citizenship!

PREPARATION

Time required: will vary

Materials required

- Up-to-date resource material from environmental group

PROCEDURE

1. To help protect natural ecosystems, have students learn about - and then act on – an environmental land use issue, in which natural areas are under threat from development by writing a compelling letter.

2. Research the appropriate recipient of their letters.

3. Provide each student (group) with "Tips for Effective Writing".

4. Have them create an effective editing procedure.

5. Keep a file of letters sent and responses received.

6. Try to identify what solicited the most replies and the most positive results.

7. Try to identify ways to elicit responses from recipients who did not respond.

Adapted from 'Five minute Field Trips'—Canadian Parks and Wilderness Society

TIPS FOR WRITING EFFECTIVE LETTERS

Keep the following tips in mind as you write your letter

1. **State your purpose for writing**
2. **Make a very specific request**
3. **Tell them about what you've been studying, mention any outdoor field trips, and state how you feel about the issue if you have made any commitments to lessen your environmental impact, consider mentioning them**
4. **Check to make sure that the person you're sending the letter to is the right person. Ask yourself if the letter should be copied to anyone else.**
5. **If possible type your letter, using a business letter format - however a neatly handwritten letter can be just as effective.**
6. **Be honest: include only necessary and truthful facts**
7. **Be concise, brief, and organized. It would be nice if your letter fits onto one page**
8. **Be courteous: there is no harm in being polite**
9. **Ask for a reply**
10. **Check your letter before sending it: edit, revise, check for spelling and grammar**
11. **Keep a copy for your records**

Environmental Factors Hunt

DESCRIPTION

How many natural detectives do you have in the class? This activity is designed to get students looking closer at one site, to discover the different microclimates. Challenge your students to locate the outer edge, the most extreme places in their schoolyard.

PREPARATION



Time required: 30 minutes

Materials required

- Student-created base maps of natural site
- Thermometers
- Magnifying glasses, measuring tapes, light meters (optional)
- Pencils, journals

PROCEDURE

- Ask the students to guess where the warmest and the coolest places are in the schoolyard.

- Ask what else, besides temperature, might be important to living things. List the responses on the board under the title, Environmental Factors'. The list should include: moisture, sunlight, wind, cover, slope, aspect, human activity, leaf litter, etc.

- Write the words 'wet' and 'dry', next to moisture. Ask the students to find a synonym and antonym for each environmental factor.

- In pairs, students should locate and record on the base map three locations of each environmental factor, such as: three sunniest and three shadiest spots, and so on.

- When they've sleuthed out the various hot, cold, sunny, wet spots, etc., they should compare their data with other groups.

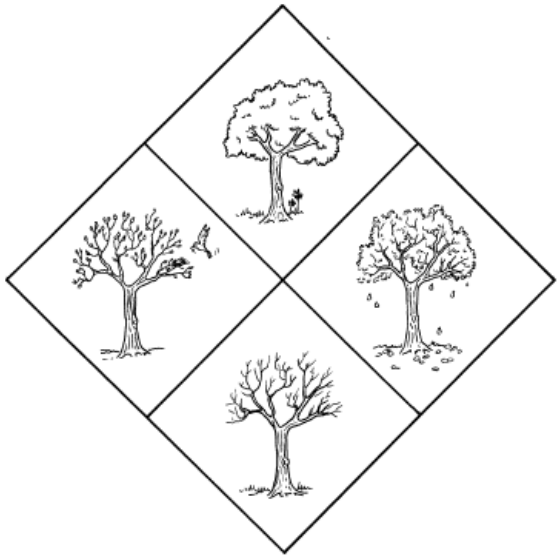
- Discuss why environmental factors are significant to living things. Ask: Can all plants live everywhere? Why or why not?

Adapted from 'Five minute Field Trips'—Canadian Parks and Wilderness Society

Four Seasons of a Tree

DESCRIPTION

Adopting a tree teaches students to observe, measure and record as they develop an understanding and empathy with the plant kingdom. Comments from teachers who use this activity often describe the long-term relationships students build with the tree they have chosen, with students returning years later to visit 'their' tree.



PREPARATION

Time required: at least half an hour each month

Materials required

- Journals, pencils
- Measuring tapes

PROCEDURE

- Each student chooses one tree or plant or plant species for the school year. They then complete and record activities with their adopted plant, spending at least a half hour every month getting to know their plant in as many ways as possible. Students should record the following observations for each visit:

    1. date
    2. estimate of the number of leaves or needles (this can be done by counting the leaves or needles on the lower branches, then count the number of branches, and multiply
    3. the colours of the leaves
    4. obvious changes since last visit

- After collecting the base data for each visit, any series of activities can be drawn together around the specific plant. For instance, students might observe, sketch, identify and research the plant. Next, they can grow and photograph its life cycle, or develop a model of its seed. Or students can experiment with different kinds of seed preparations, such as scarifying or soaking to determine optimal germination conditions. If the plant faces threats, such as pollution or loss of habitat, students can develop a recovery plan. The sky's the limit for ideas on how one student and one plant can relate.

- Students' observations and work should be compiled in an ongoing 'Plant Discovery' book, with new information added annually. After each visit, the student should ask: How will my plant change by the next time I visit in a month?

Adapted from 'Five minute Field Trips'—Canadian Parks and Wilderness Society

Make A Park

DESCRIPTION

In this activity students learn about different types of parks as they create a mini-park in a natural area. As they do so they practice their descriptive skills and become more aware of the natural world.

PREPARATION



Time required: One hour

Materials required

- 3 m lengths of ribbon (or string or rope) for each pair of students
- An area that has some natural diversity in it – the more 'natural' the better.

PROCEDURE

- Before this activity, ask students to define the word 'park.' Ask them if they feel that they are in a park area. Ask them to tell you if this 'park area' is more to protect plants and animals, or more to allow recreation and play areas for students.

Tell students that parks have been created for different reasons over time:

1. Initially, parks were created to protect unique and special natural features (e.g. Banff National Park was originally created to protect the hot springs found there).
2. Next, parks were created to protect the natural heritage found within representative areas 'to remind us of what used to be here.'
3. The emphasis these days is to create parks that protect biodiversity or the variety of plants and animals that still remain.

- Of course, smaller municipal parks also exist, mainly for people to walk their dogs and breathe fresh air. Tell students that, in pairs, their job is to create a mini-park somewhere in the natural area. Each pair will receive a ribbon, which will represent the park boundary.

- Students can design their park for any one of the three reasons listed above. You may wish to model this for students: e.g. a ribbon surrounding an interesting and unique stump is a good example of #1, while a ribbon surrounding an area crammed full of different plant species is an example of #3.

- Tell students that, once they have agreed on a park and had a close look at what it contains, they will write a short, descriptive paragraph about their park (perhaps in the style of a travel brochure, commenting on the wonders of nature contained in the park!)

- Then students will leave their descriptions beside their park, and travel to another park, reading the descriptions of their peers and trying to find the features that are referred to.

Discussion:

- Ask students why we should create parks.
- If their park were a real park, is there a limit to how many visitors could go there before the park were damaged somehow?
- Were some of the parks better suited to recreation or protection?
- How would students feel if part of a nearby park area were to be developed for homes for humans?

EXTENSIONS/ VARIATIONS

1. In lieu of writing, students can simply leave a 'park interpreter' in charge of interpreting the park to visiting students
2. To assist this student, have the group insert toothpicks or other biodegradable objects into the soil – these will be 'interpretive signs' that will prompt an explanation from the interpreter.
3. Students may work in groups of four if your natural area is small.

Adapted from 'Five minute Field Trips'—Canadian Parks and Wilderness Society

Make A Tree

DESCRIPTION

This is a fun way to introduce trees in a role-play that teaches all about tree biology. Students act out the various parts of a tree, from its big tap root and shallow lateral roots to its heartwood and xylem, phloem and outer bark.



PREPARATION

Time required: 30 minutes

Materials required

- At least 12 students
- A large, dry, open play space
- Cue cards with script for different parts of tree

PROCEDURE

Make cue cards out of the text that is written in bold.

Heartwood: Pick the two tallest students to be the heartwood and have them stand back to back. Hand one of them the heartwood cue card to read aloud, with gusto!

Taproots: Next choose four or five students to be the taproots and have them sit at the base of the heartwood facing out. Hand out the tap root cue card and ask them to read aloud, with pride!

Lateral roots: For lateral roots, try to choose students with long hair. They'll have to lie on the ground. Ask these lateral roots to lie on their backs with their feet against the trunk and their bodies extending away from the tree. Students should try to spread their hair out behind them, and spread their arms out above their heads. Hand out the lateral root cue card asking one of the roots to read. Say to the students, "When I say, 'Suck it up!,' you taproots and lateral roots all make a loud slurping sound, like this. (Make a loud slurp sound.) "Suck it up!"

Xylem: For the xylem, choose enough students to form a complete circle around the heartwood. Ask them to form the circle facing inward and holding hands. Be sure they do not step on the lateral roots. Ask a student to read the card. Say to the students, "When I say, 'Bring the water up!' the xylem throws its arms up in air, saying Wheeeee!'. Let's practice, with the roots drawing the water into the tree, and the xylem pumping it up. "Suck it up!" (Slurpppppppp!) "Bring the water up!" (Wheeeee!)

Phloem: For the phloem, arrange another group of students in a circle around the xylem, also facing inward and holding hands. Ask one of them to read. Help the students playing phloem to stretch their arms upward and outward, so that they intersect each others arms at the wrists and forearms, leaving their hands to flutter like leaves. Say, "When I say, Let's make food', raise your arms and flutter your leaves. Absorb the energy from the sun to make food. And when I say, Bring the food down!', you say, "Whooooooo!", and bend at the knees, dropping your arms and body towards the ground. Let's practice.

Go through the sounds and motions with all of the parts in this order: Suck it up! Let's make food! Bring the water up! Bring the food down!

Outer bark: The remaining students are the outer bark. They should circle around the tree, facing outward. Hand the cue card, and have someone read. Tell the outer bark to protect the tree, like football blockers, with both elbows out, and both fists close to their chests. Tell them that you will play the role of a hungry insect trying to bore into the tree. The bark should try to fend you off.

Practice the whole role play a few times:
Heartwood, stand tall and strong! Get tough bark! Suck it up! Let's make food! Bring the water up! Bring the food down! Before you disperse, help the roots up off the ground, and have a big group Whoooooop! for being such a flourishing tree.

Adapted from 'Five minute Field Trips'—Canadian Parks and Wilderness Society
This activity has been adapted from Sharing the Joy of Nature, by Joseph Cornell.

Cue Card Text

HEARTWOOD

We are the inner core of the tree, the heartwood. (Flex arm muscles.) Heartwood is strong enough to hold the trunk and branches up so each leaf can get the sun's energy. Heartwood is the oldest part of the tree, so old, it's... DEAD. When the tree was young, the heartwood was alive.

TAP ROOT

We are the tap root. We are planted deep in the soil, up to ten meters down. We hold the tree in place during fierce winds, and suck up the water from deep within the ground. Not all trees have a tap root, some just have lateral roots.

LATERAL ROOTS

We are the lateral roots, and their are hundreds and hundreds of us. We grow outward all around the tree in the ground. At our tips we have thousands of root hairs covering just about every particle of soil around. When the root hairs sense water is nearby, their cells grow towards the water so they can suck it up.

XYLEM

We are the xylem, or water tubes. We draw water up from the roots, lifting it to each of the tree's branches. We lift hundreds of litres a day, at speeds of over 150 kilometres an hour! After the roots draw the water into the tree, the job of xylem is to bring the water up the tree.

PHLOEM

We are the phloem, or food tubes. We are the part of the tree that carries the food made by leaves to every part of the tree. These are our leaves.

OUTER BARK

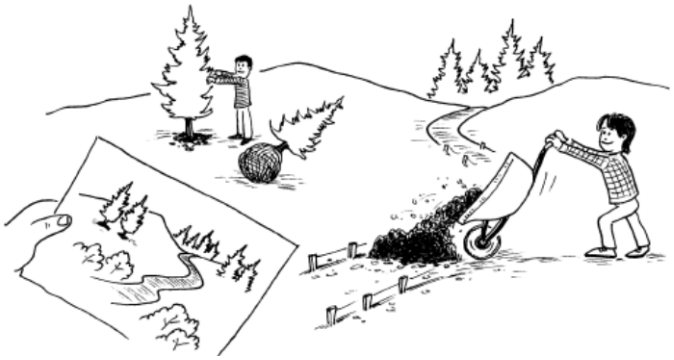
We are the outer bark. We protect the tree from fire, insects, extreme temperature changes and people who want to scratch us with knives.

Naturalize Your School Yard

DESCRIPTION

Wouldn't it be awesome to have a natural site right on your school site? Go for it! There is a ton of community support for naturalization projects, no matter what the scale, and curricular goals can be met through every step of the project.

PROCEDURE



From project vision and site inventory to design, fund-raising, ordering plants and media support, there are a number of interrelated tasks to complete.

The following process should create a successful enhancement project:

1. Inventory and map the whole site.
2. Record the main natural and human features.
3. Research the site's human and natural history.
4. Describe the site in as much detail, and as many ways as possible.
5. Describe how the site is currently used by all stakeholders.
6. The educators need to brainstorm the potential curricular links for each subject area, through the various stages of the project.
7. Develop and distribute community surveys.
8. What does the community want and need?
9. Who can help with the project? Based on your research, native flora and fauna will the site support? What does wildlife require?
10. Refine and record your group's overall vision for the site. Record the project goals and objectives.
11. List the resources necessary to complete the project.

12. Recruit volunteers for each stage of the project.

13. Develop a plan and a time line. What are the priorities? Who will do what, how and by when? Remember to include all key participants.

14. Build long-term project maintenance into the plan from the beginning.

15. Determine where resources will come from. How will funds be obtained ~ by grants, donations or fund-raising?

16. Plan for how the community and media will participate throughout the project.

17. Document, monitor, evaluate - and celebrate! - Each stage.



Adapted from 'Five minute Field Trips'—Canadian Parks and Wilderness Society

Nature Charades

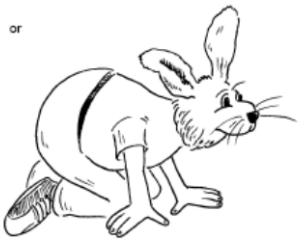
DESCRIPTION

Students find out about the characteristics of living things as they choose a favourite living thing found in one of Ontario's Natural Regions - and then apply what they have learned in the enjoyable and well-known game of Charades

PREPARATION



or



Time required
One hour (not including research time)

Materials required

- Posters or information on animals

PROCEDURE

- Tell students that they will be playing nature charades, a game in which they have to act out something found in nature. Have students choose a plant or animal found in one of the Natural Regions of Ontario and begin by finding out some 'Biofacts' about their choice: i.e. where it lives, what it eats, its family structure, etc. This could be done in poster form with a drawing and recording of Biofacts.

- Next, have students do charades, and have other students wait at least 15 seconds before they attempt to guess the plant or animal. When students have guessed, have the acting student show their poster and tell one or two Biofacts.

EXTENSIONS

- This can also be done using communities instead of individuals:]

    - a rotten log, a pond, the humus layer, or the treetop canopies are all examples of communities. Introduce these communities to students and then have groups of students (with one narrator) act out he community.

- Another variation of the above activity is to divide the class into two groups and challenge each group to come up with a “Frozen Drama” in which each member of the ecosystem demonstrates their interactions with others. The tree might be standing with its arms outstretched; the cougar is preparing to pounce on a browsing deer, etc. One of the members of the group will be the only one who can talk; their job is to narrate the frozen drama to the “spectator” half of the class.



Adapted from ‘Five minute Field Trips’—Canadian Parks and Wilderness Society

Nature Scavenger Hunt

DESCRIPTION

Students will find this activity very exciting and satisfactory – and you will too, as students use language, verbal, visual and kinesthetic skills to explore the diversity of nature. Try to get lots of parent volunteers for this activity!

PREPARATION



Time required: 30 minutes

Materials required

- Checklists

PROCEDURE

1. In this activity students are divided into groups and each group has to find (and tick off) as many of the objects on the following list as possible.

2. Every student in the group must observe and feel the object before they can move on to the next object. Note that two different checklists may be used, depending on your groups' abilities. You may wish to discuss the more difficult checklist as a group before asking them to explore the area.

3. In a normal scavenger hunt, you're supposed to collect items. This is NOT the case in this activity: tell students that object certainly must be seen, touched, and felt, but not picked up (unless they are lying loose, like a pine cone). Objects are definitely not to be collected. Tell students that the Nature Scavenger Hunt is not a race! During the hunt they are to be calm, relaxed, and observant. Ask them not to run and to stay with their groups.

You may wish to invite parents to join you for this activity to give you a parent/student ratio of 1:6 or better. Alternatively, older students with adequate reading skills can work in small groups by themselves.

Nature Scavenger Hunt

Tell your students that the items below are just to touch and to see - but NOT to collect. Check off the following things that you have found:

Basic Checklist

Find...

- ❑ a rock
- ❑ soil
- ❑ something prickly
- ❑ something furry
- ❑ something smooth and cold
- ❑ something bumpy
- ❑ something scratchy
- ❑ a berry
- ❑ a red leaf
- ❑ a brown leaf
- ❑ a yellow leaf
- ❑ a green leaf
- ❑ moss
- ❑ a pine cone
- ❑ a pine cone that has been pulled apart by a squirrel
- ❑ something wet
- ❑ something sticky
- ❑ something made by humans (this is litter - pick it up!)

Advanced Checklist

Find...

- ❑ something alive
- ❑ something dead
- ❑ something that has a happy look
- ❑ something that has a fierce look
- ❑ a plant growing on a non-living thing
- ❑ a plant that is shaded by a plant
- ❑ a plant that is shaded by a plant that is shaded by a plant!
- ❑ something that is changing back into soil
- ❑ an example of erosion
- ❑ food that would be good for a sparrow
- ❑ a tree with flat needles
- ❑ a plant that smells nice
- ❑ a leaf that has been chewed by an insect
- ❑ a dead branch on a living tree
- ❑ something that you think is really interesting
- ❑ something that you dislike
- ❑ something that helps a robin

Adapted from 'Five minute Field Trips'—Canadian Parks and Wilderness Society

Nature Trust Walk

DESCRIPTION

This exercise shows students just how much they rely on the sense of sight, that a lot of information may be conveyed by the other senses - and that it is important in this life to be both trusting and trustworthy!

PREPARATION



Time required: One hour

Materials required:

- Blindfolds (one per pair of students)

PROCEDURE

- Before this activity, tell students that during this activity that they will be blindfolded; not only will they have to trust the person who will be leading them in the trust walk, but the sighted person has to be **trustworthy**.

- Divide students into pairs. Have one of the pair blindfold their partner, and have the "sighted" partner slowly lead their "blind" partner to a unique feature in the area: an old stump, perhaps, or an interesting patch of moss, explaining to them what it is they are touching and smelling. The blindfolded partner, after being brought back to the starting area by a roundabout route, is then challenged to find the feature that they just explored through their senses. Next, have the two students switch roles.

Important: natural areas contain many hazards for unsighted students. Caution students to remain trustworthy, and don't hesitate to have any unruly students sit this activity out if they can't show their "trustworthiness."

Discussion: The importance of trust and of effective communication can also be introduced into the discussion.

EXTENSIONS/ VARIATIONS

Variations: If you are studying trees, this activity can serve as a valuable sensory tour of different species of trees and shrubs.

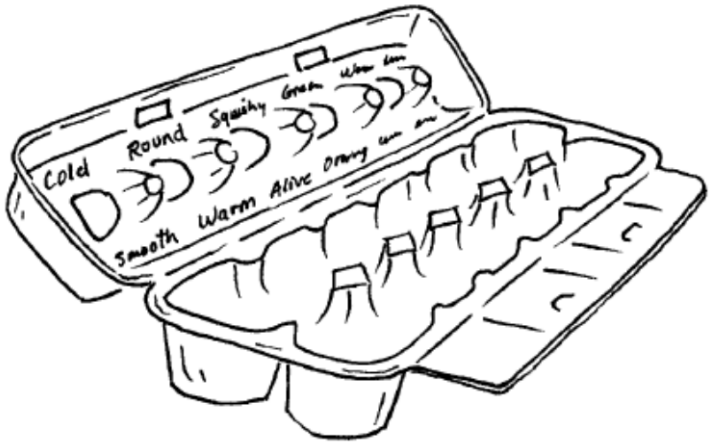
Adapted from 'Five minute Field Trips'—Canadian Parks and Wilderness Society

Nature Words

DESCRIPTION

What's the one best way to describe something? After observing natural items, the students explore the power of description.

PREPARATION



Time required: 15 - 30 minutes

Materials required

- Rock
- Chalk or white board
- Chalk or dry erase markers
- Empty egg cartons, set of egg carton lids
- Ballpoint pens, journals

PROCEDURE

- Use the chalk board to record as many different adjectives your group can list until you have a full sheet. Hold up a rock, ask: What's the one word here to best describe this?

- Give everyone an egg carton, and a spare egg carton lid. Tell everyone to secretly write 12 different adjectives on the flat lid of the egg carton, in the spot corresponding to each egg's space.

- Briefly review collecting guidelines: only use natural items from the leaf litter. If the item is abundant, such as grass, they may pick a blade; otherwise collecting live material is not permitted. Walk with the group around the boundaries for the activity.

- Tell students to look for any natural item, the size of their baby fingernail or smaller, to represent each of the adjectives on their lid. Give them ten minutes to find the items. After ten minutes, ask each student to cover the written adjectives with the spare lid, and then find a partner. Leaving the words covered, the goal is for each partner to guess each other's correct adjectives, just by observing or touching the natural items. The partner 'in the know' can give hints. How many can each partner guess?

Adapted from 'Five minute Field Trips'—Canadian Parks and Wilderness Society.
This activity has been adapted from Monsters and Mini-Beasts, by Dan Stoker.

Noah's Ark

DESCRIPTION

In this game, students imitate animal sounds and movements. Blindfolded, everyone wanders, making only the sounds of an animal. The trick, amid all of the mayhem, is for everyone to find their mate

PREPARATION



Time required 15 - 30 minutes

Materials required

- Class set of blindfolds

PROCEDURE

- Before this activity, brainstorm a list of local animals and their behaviours.
- Practice each animal's sound and movements.
- Help everyone put on blindfolds. Whisper the name of the same animal to two players, until each player has an animal - i.e.: two players are wolf, and two players are Canada goose, and so on. If there is an uneven number, give three students the same animal.
- At the given signal, everyone begins walking around making his or her animal call. When the same animals find each other, they should stand next to each other and remove their blindfolds.

Extensions/ Variations

- For younger players, remove the blind folds and combine the imitating animal sounds with the imitating of movements for the first round of the game.
- For this variation on the game, you need a class set of paired index cards with the same native animal's picture and a bit of basic information about the animal.

- Pass out the index cards and tell everyone to keep their identity a secret. This time, in order to find their mates, the students act out the activities or movements of their animals. No sounds are allowed. Animals should attract each other by their behaviour only.

Adapted from 'Five minute Field Trips'—Canadian Parks and Wilderness Society
This activity has been adapted from Sharing Nature With Children, by Joseph Cornell, page 81.

Observation Games

DESCRIPTION

Being outdoors can be overwhelming, and students commonly have trouble focusing on specifics. Here are three favourite observation games that help students 'separate the forest from the trees.'

Students observe and record as much detail as possible in a short time.

PROCEDURE



Choose an area with interesting plants, rocks and other natural features. Ask everyone to choose one natural item and to write a descriptive paragraph about what was observed, without naming the exact item. When complete, students exchange paragraphs to see if they can locate the item described.

KIT'S GAME

In Kit's Game, students see how much detail they can note in a two minute period. This is fun to use as an introduction to a new theme.

Time Required: 15 minutes

Materials Required
- 15 - 20 natural items
- Old sheet
- Journals

Instructions
Secretly, place 20 natural items on a flat surface and cover them with a sheet. Have the group silently take a seat on the floor in front of the items. After much fanfare, give students just two minutes to silently observe as much detail as possible about the items they see. When time is up, cover the items again. Go around in a circle, asking each student to describe one item in detail. Finally, students make a list in their journals of the natural items, listing three details about each.

FINDING SHAPES & SKETCHING

In this activity students observe natural forms, reproducing them with a sketch.

Time Required: 30 minutes

Materials Required:
- Portable chalk or white board
- Chalk or dry erase pens, pencils
- Sketch books or white paper
- Clip boards

Instructions: In a natural area with a variety of trees and plants ask the group to choose one view to observe. What geometric shapes can the students see? Sketch the scene on the board, replacing actual forms with geometric representations.

Ask the class to choose another view and do it again. Finally, everyone should choose just one tree or plant, and sketch it with as much realism and detail as possible.

EXTENSIONS/ VARIATIONS

Variations:

One mind-bending way of training the eye to look for detail is to actually draw upside down. Distribute line-drawings of trees or actual pressed plant specimens. Turn the pictures upside down and observe the detail. Try to draw the upside down specimen. When complete, turn both pictures over to check for accuracy.

Switch pictures with others and practice again. Next, try it outside. For two minutes, just observe a tree or plant. In your mind, turn the image upside down. Try sketching it exactly as it appears upside down!

Adapted from 'Five minute Field Trips'—Canadian Parks and Wilderness Society

Schoolyard Mapping

DESCRIPTION

Developing a sense of place is critical for building relationships with natural places. In these fun activities, students estimate, measure and problem solve as they find and record the data they need to compile a schoolyard map and inventory. These products will come in useful if you proceed to a schoolyard naturalization project.

PREPARATION

Time required: Several One Hour Periods

Materials required

- 20 metre lengths of string,
- 5 trundle wheels
- 5 tape measures
- Rulers
- Graph paper
- Journals
- Base map (optional)

PROCEDURE

- Tell students that you will be making a map of the schoolyard and adding on to this map to show natural areas, play areas, etc. For this activity it might be useful to start with an outline map showing the shape and dimensions of the school. This is usually available within the school and forms a 'base map'. Show students this base map ask them how they would add to this map: What would they show? How would they measure distances?

- Next take students outdoors and guide an initial exploration of the schoolyard, having students look at places they use a lot of find interesting (see below). Have students make notes and a rough map in their journals as they walk.

- As you explore, ask students to estimate distances along school walls, from window to ground, from end to end in the field, from one tree to another, etc. Ask students how they will obtain and record data. Demonstrate how to hold tape measures to get distances, how to measure with a trundle wheel, and so on.

- Ask the students how accurate their guesses were. Place the students in groups to efficiently calculate and record the perimeter and area of the schoolyard. Discuss methods of finding

the area of irregular shapes, such as: laying out string along the edges and measuring the string; marking the boundaries with bone meal and measuring distance with a trundle wheel, and so on.

perimeter = side + side
area = length x width
volume = length x width x height

- Next, distribute large sheets of paper that will act as base maps. You may wish to include the school on this map to get students started, and use the simple scale of 1:100 - 1 centimetre (on the map) = 1 metre (on the ground).

- Divide students into groups and have them include the following on their maps: a north arrow, a legend, a scale, a date, and a border. The choice of what to add to the map is yours! Here are three possibilities:

1. Areas that are useful for plants or animals

2. The different types of play that occurs. (Have students watch and map different grades and sexes)

3. Noisy areas and quiet areas

Discussion: ask students if they feel the natural areas on their map are large enough. If this school were to create a naturalized area by planting trees, shrubs, or grasses, where would be the best place be? What about a school garden - where would it go? Calculate the dimensions of the proposed naturalized site.

Variations: the mapping exercise could be extended to other areas in your neighbourhood. Have students evaluate the habitat potential of the residential yards that border the school, looking at such things as the amount of pesticide that might be used and the amount of hiding cover, trees, and composting facilities. If available, show students large scale maps of local features. Display a variety of maps in the class. Have students research web sites, such as <www.evergreen.ca> and <www.calgaryzoo.ab.ca> for links to maps and
plans of local naturalization projects. Challenge the students to draw a map of their neighbourhood, or a map from their house to the school.

Adapted from 'Five minute Field Trips'—Canadian Parks and Wilderness Society

Shelter Shuffle

DESCRIPTION

In this fun, active game, students will discover that changes in the availability of natural resources such as water, food, and shelter result in changes in the size of an animal population, and that populations are subject to limiting factors.

PREPARATION



Time required: 45 minutes

Materials required

- Four markers to establish boundary lines
- Open space for playing the game

PROCEDURE

- Ask students to name some of the things that all living things need to survive. Whittle the list down to three fundamentals: food, water, and shelter (things like oxygen are also necessary, but for this game, we will assume there is enough to go around!).

- Tell the students that their homes contain the food, water, and shelter that they need to survive - and that the same holds true for all living things. Ask the students to decide which animal each of them would like to be during this game. Tell them to choose an animal that might live in your park, schoolyard, or nearby natural area (remind them that insects are animals too!).

- Tell students that the word for an animal's home is **habitat**.

- Take students to a large open space, preferably outside. Have students count off in fours. All the number ones should form a line shoulder to shoulder. All the others should form a similar line facing the ones. The two lines should be about 2 metres apart. The number ones are animals; the number twos, threes, and fours are components of the habitat: food, water, and shelter.

- At the beginning of each round, each animal will decide whether it needs water, food, or shelter for that round:

1. if they decide they need food, they should place their hands over their stomachs
2. if they need water, they should place their hands over the mouths
3. if they need shelter, they should place their hands together over their heads.

- Once the animals decide what they want, they cannot change their minds during the round. If an animal survives the round, it can change what it is looking for in the next round. The number twos, threes, and fours will decide which of the habitat components (food, water, or shelter) they will be during that round. They too will make a sign according to the habitat component they choose.

- As with the animals, these players cannot change their minds during that round. They can, however, choose a new component for the next round. The game should consist of at least a dozen rounds, but the first round is a trial round.

- Have both lines of students turn their backs to the other students. Ask the animals to make a sign for what they need, and habitat students to make a sign for what they are for that round. When the students have made their signs, count "1-2-3, turn around".

- The two lines should turn and face each other. Animals can then calmly walk (holding their sign, i.e. with their hands in front of their stomach) to the habitat component with the same sign, tag the students, and take the habitat component back to where it started from, effectively increasing the number of animals: this demonstrates to students that when an animal is successful and is able to meet its needs, then it can reproduce.
- An animal that doesn't meet its needs dies; therefore, an animal that cannot tag its habitat requirement must (after expiring noisily on the ground!) join the habitat line and become part of the habitat (food, water, or shelter).

- Habitat components stand still in their line until an animal takes them. If no animal needs the habitat component, it stays as part of the habitat.

- Next, tell students that this is not a walking game, it is a running game, and that animals will have to run (holding their signs) in order to tag fellow 'habitat' students (who do not move from the spot!). Have all the #1 students move to a line 30-40 metre away

- Play 12 rounds, keeping the pace brisk.

Discussion:

Ask students:

- "Did anyone find that they were an animal more than once?" (Probably--This game illustrates the concept of cycles: the molecules that make up an animal's body may spend some time (after the animal dies) as a piece of habitat, but may later on become part of an animal again.

- "Did the number of animals go up after the first round of the game?" (Yes - The animals were able to meet their needs and to repopulate. During the first few rounds the number of animals went up.)

- "Recall the round when there were more animals than there was habitat. What happened after this round?' (The habitat was depleted and there was not sufficient food, water, and shelter for all the animals. Lots of animals died after this round and returned to the habitat, thus restoring the balance of nature. Have the students show with a simple teeter-totter action of their hands how nature establishes a balance).

Ask students what things could make a habitat endangered. Students should realize that both natural and human-caused things can endanger a habitat.

Human-caused effects might include land development (roads, buildings, golf courses, farming), development around water (building of dams causing flooding, draining of wetlands, etc.), acid rain, greenhouse warming of the earth, oil spills, forestry, cutting down the forest for trees or to grow crops, pollution, etc. Natural things that could make a space endangered might include forest fires, natural calamities such as rockslides, volcanoes, natural climatic warming or cooling, etc.

EXTENSION

Back in the classroom, graph what happened to the animal population as the game progressed. (This could be done in the game area using poster board.) This is a visual reminder of what the students have learned in the game. Your chart should show years (rounds) and number of animals, as shown in the example below. Discuss how graphs such as this might be used to help manage wildlife areas.

Note to the teacher:

1. Beware of over-eager animals! Stress to students that a light tag is all that is needed, and that a too-violent tag of the habitat student will result in that animal becoming penalized by having to watch the game from the sidelines.

2. As the game continues, students may confer with each other and decide to make the same sign. This is okay, but don't encourage students to do this. If they all make the food sign, it would mean there was no water and shelter that year (drought, fire, logging of trees).

Adapted from 'Five minute Field Trips'—Canadian Parks and Wilderness Society
Based on concepts in the game 'Oh Deer' (Project Wild Elementary Activity Guide).

Simile Stroll

DESCRIPTION

We express relationships with similes and metaphors. After reviewing how to compare things using similes or metaphors, it's fun to go into a natural setting and try it out.

PREPARATION



Time required: 15 - 30 minutes

Materials required

- Pencils, journals

PROCEDURE

Introduce the concept of the metaphor and similes as figures of speech.

Metaphor: a figure of speech in which a word denoting one subject or idea is used in place of another to suggest a likeness between them (as in, the root of the problem').

Simile: a figure of speech in which two unlike things are compared by the use of ' like' or 'as' (as in, 'His face is like an open book'). In pairs, challenge the students to complete the following similes in record time:

as tall as....;
as green as....;
sweet like ....;
as rough as ....

Now each person writes five beginnings for his or her partner to complete. Next, lead an exploration of the nearby natural area, seeking as many descriptions as possible. Finally, partners work together to write a short, descriptive, natural story to perform for the group.

Sample metaphors:	**Sample similes:**
the root of a problem	slow like molasses
a carpet of grass	as sweet as honey
a blanket of snow	as fresh as a daisy
sheets of rain	quick like a bunny

Adapted from 'Five minute Field Trips'—Canadian Parks and Wilderness Society

Sound Map

DESCRIPTION

As humans, we perceive much of our world through our sense of sight. In this creative activity, however, students focus on the sounds of nature, and try to draw what they hear.

PREPARATION



Time required 15 minutes

Materials required
- Pencils and journals

PROCEDURE

- Lead a silent walk in a natural area, such as a large, wooded park. Every time a student hears a natural sound she raises one of her fingers, counting up to ten.

- When a student hears ten different sounds, he or she stops. When everyone has stopped, they get out their journals. Students should write their name in the middle of a new double page, and draw light lines dividing the two pages into quarters.

- Tell the students that instead of drawing a regular map they will be drawing a **sound map**.

- In a bottom corner they should draw the map's key. Each new sound heard will be represented with a symbol and recorded in the key. Ask students to also draw an X and their name in the centre of the map. As each new sound is heard, the symbol is recorded on the map at the where it was heard relative to the X on the map.

Have fun making as zany a map as ever was seen!

Discussion:

What happens to the map if you move the 'centre of hearing' (you) to one of the corners of the map? Try drawing it.

- How many people had similar symbols? Why?
- How did you feel about the human sounds you heard? Why?

Adapted from 'Five minute Field Trips'—Canadian Parks and Wilderness Society

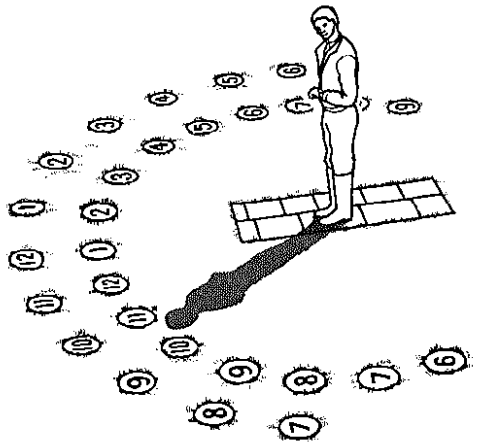
Student Sundial

DESCRIPTION

Seasonal change has so much impact on everyday events. This activity helps to make the concept of directions more concrete, and helps students visualize the earth's relation to the sun. This activity has a twenty minute break in the middle, when another activity such as a tree observation or scavenger hunt could take place.

PREPARATION

Time required:
30 minutes, with a twenty minute break in the middle



Materials required

- A sunny day
- One pointed stick about a metre in length and one metre stick per pair of students
- Compasses
- 50 large nails with flagging tape tied on the ends
- Journals, pencils
- Coloured chalk

PROCEDURE

- On a sunny day, give each pair of students a pointed stick and a meter stick. Ask the students to find a spot in the grass where they can push the pointed stick into the ground, so it stands upright. Tell them to use chalk to mark the tip of the stick's shadow.

- Have the students return twenty minutes later, marking the tip of the shadow with a different colour. Tell them to use the meter stick to form a line on the ground connecting the two chalk marks.

- Ask: Why does this line represent an east-west direction? Ask the students how to determine the north-south line. (The north-south line will be perpendicular to the east-west line.)

- Then ask the groups to draw a second line, crossing the first at a right angle. Verify their findings with a compass. Ask the students how they would use this activity if they were ever lost.

- Back in class, research the history of the sundial. By allowing pairs of students to record in chalk the shadow of a stationary object each hour, on the hour, they make a simple sundial on their school yard.

- The next sunny day, compare their dial's accuracy with a clock. Ask: "How does the length of the object's shadow change over the course of the day? Why?"

Adapted from 'Five minute Field Trips'—Canadian Parks and Wilderness Society

Tree: Guided Exploration

DESCRIPTION

In this activity, students explore the structure and function of the various parts of a tree.



PREPARATION

Time required: 45 minutes

Materials required

- A site with about 15 different trees
- Journals
- Pencils, chalk or crayons
- Loose white paper
- Stethoscope

PROCEDURE

- In pairs, ask the students to choose a live tree for the exploration. If possible, ask them to hold hands around the tree and look from the bottom of the trunk up to the top of the branches. Ask: What do you see on the tree?

- Have them move around their tree to get different views. Ask them to draw the general silhouette shape of the tree. Ask the students to locate any roots that might be visible at the tree's base. Ask: Why does a tree need roots? (food and water transport, support)

- Tell the students to close their eyes. Have them feel the bark and describe how it feels; smell the tree and describe the scent; and listen to the sounds made by the tree. In the spring, it is easy to hear the phloem or sap running through a tree by placing a stethoscope on the trunk. Demonstrate this, and have the students try too.

- Ask the students to open their eyes and describe the colours on the bark. Demonstrate how to get a bark rubbing by hold a loose sheet of paper on the trunk and lightly rubbing a crayon or chalk along the sheet. Ask students to get three bark rubbings from the tree: one from the base, one from a spot near knee height, and one from as high as they can reach.

- Ask the students to compare the bark to the skin on their own hands. Ask: Is the bark rougher or smoother; warmer or colder; wetter or drier; darker or lighter than your skin? If the tree is

coniferous, ask the students to search for some sap or resin and describe its texture and scent. Tell them to rub a bit of the resin next to the bark rubbing in their journal. Ask: Why do you think the resin is sticky?

- Ask the students to draw the branching pattern of the tree. How do the branches come out of the main trunk? Have the students describe the colour and shape of the leaves or needles. Ask: Why does a tree need leaves? (Leaves photosynthesize, or produce food, with the help of sunlight, air and water.)

- Ask the students to sketch or trace a leaf. Ask: How do the leaves or needles come off the branch? Are they in opposite pairs; or alternating around the branch; or do they come off in a whorl, like a shirt collar? Ask them to describe the edge of the leaf.

- Tell the students to look for and sketch any seeds, cones or flowers. Ask the students to look for small holes in the tree, or other places where animals, or other plants might be living. Ask: What animals live in or use this tree?

- Back in class; provide tree identification keys or posters so the students can identify their tree. Ask the students to work together to write a paragraph about their tree. Their description should be so specific that a stranger could locate their exact tree with just this information.

Adapted from 'Five minute Field Trips'—Canadian Parks and Wilderness Society

Un-Nature Trail

DESCRIPTION

A brief and enjoyable activity in which students walk quietly down a trail, looking for objects not found in nature. Useful for developing observation skills and for discussing camouflage and the problem of litter.



PREPARATION

Time required: 30 minutes

Materials required

- A bag containing 15-20 objects collected from the schoolroom. Colours should range from neutral or green (e.g. crayon) to brightly fluorescent (e.g. highlighter), and from small (eraser) to large (e.g. exercise book).

PROCEDURE

1. You'll need to identify a well-defined path that students will be able to follow. Before the students arrive in the area count the number of objects in the bag, then walk the path and 'litter' the area with your objects. For added fun you can suspend them from branches (we humans rarely look up!), insert pencils partially into the ground, etc.

2. Next, gather your students at the beginning of the trail, and tell them that there are some unnatural objects spread along the trail. The students' challenge is to find as many of them as they can. Ask students to walk slowly, look actively, and not point out items to other students (as this is a friendly competition). They can use their fingers to keep count of the objects they see.

3. Then lead the way on the trail. Walk very slowly and model quiet observation for your students. Gather students at the end of the trail, and ask them "If you saw more than three objects, put up your hand". Next ask them if they saw 5, then 7, etc. until you exceed the number of items on the trail! Ask them "If you saw the pink flamingo, put up your hand" (If you didn't actually put out a flamingo, this will tell you which students are being overly imaginative!).

4. Ask students if they saw specific, hard-to-see items. Were some items harder to see than others? (Yes - because they are camouflaged. If necessary, define this word for students). Is it easy to tell the human items that don't belong in nature? (YES! It's best not to litter - for environmental and aesthetic reasons).

5. Encourage students to walk the trail again and look for items they missed the first time.

Adapted from 'Five minute Field Trips'—Canadian Parks and Wilderness Society

More Ideas for Action

Offer Guided Hikes
Take your neighbours for a guided adventure into a local natural area. Now that you're reconnected, spread the joy.

Garbage-free Lunches
Challenge your students to completing a day, then a week, then a month of garbage-free lunches.

Poster Displays in Public Spaces
Don't keep all your discoveries to yourself! Share them in poster format with others. Ask permission to put these posters up. Consider transit tunnels, supermarkets, churches, etc.

Letter Writing Campaigns
Does a nearby natural area need protecting? Does your group object to the use of herbicides and pesticides in the local park? Writing letters to governmental officials and to the editors of local papers is one way to make sure your voice is heard. Here's a creative twist – instead of writing about the problem, try writing about a local positive initiative! Write about someone in the community who has provided backyard habitat. Take photos for the article. Hope to inspire others.

Attract Wildlife
Research the native plants most revered by local wildlife, especially birds and insects. Plant native plants in a local garden. Construct and fill bird feeders. Monitor the populations frequently.

Green Mapping
Through research, surveys and physical scouting, seek out the green in your community. Look for things like: green businesses, eco-friendly transportation, compost piles, recycling centre, organic gardens and natural areas in your community. Compile the information on a large, bright map and display it where many people will see it. Get global. Register with the Green Map System (GMS) to discover what other communities around the world are doing to make their communities greener. Their e-mail is <greenmap.com>.

After compiling a master map of current community land uses, consider the community's future. Consider things like: provisions for population increase; transportation systems; efficiency of energy use; balance of nature; balance of environmental, social and economic health. Ask half the class to draw a map of your community showing its probable future in 50 years. Ask the other half of the class to draw a map of your community showing its preferable future in 50 years. Compare the maps and discuss the differences. Discuss how to make the preferable future, the probable one.

Adapted from 'Five minute Field Trips'—Canadian Parks and Wilderness Society

More School Yard Activities. Exploring Schoolyard Nature.

Ant Antics
Investigate ant behaviour; start and maintain an ant farm for observations.

Flower Power
Observe and identify native flowers. Make artificial bees and models of plants to investigate pollination. Monitor pollinator populations in natural area.

Leap in Leaves
Collect and sort leaf samples to determine the plants growing in the natural area. Use the wind to race leaves along a line. Classify leaf shapes according to maximum speed.

Critters in the Litter
Search for and investigate the creatures living in the mulch layer of the soil.

What Gall!
Search for and investigate galls on plants to see who lives where.

Schoolyard Eco-calendar
What happens when in your schoolyard? After a year of collecting data, you can custom design a calendar to highlight the natural events in your very own schoolyard. Your calendar could include: average temperature; bloom dates of flowers such as dandelions; moon phases; expected date of returning birds and insects...The sky is truly the limit!

Special Places
Once a month, spend half an hour at each student's special spot. Encourage students to express what they have observed or felt at this spot by writing in their journal, drawing or composing music.

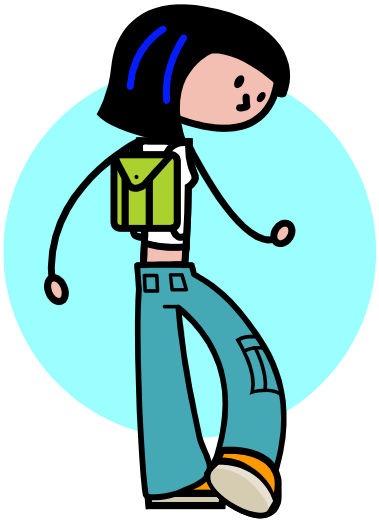
Power Plants!
Ethnobotany is the study of how plants have been used by various people and cultures around the world, both in the past and present. Aspirin, mint flavouring and Novocain all come from native plants. Seek local examples of plants that were traditionally used for food, beverages, and medicinal remedies.

Dye It
Use the colours extracted from the roots or leaves of plants in your natural area to dye cotton tee-shirts. For starters, dandelion roots make a yellow dye. Experiment with other plants.

Sort Seeds
In September, put wool socks over your shoes, and walk through a natural area, collecting seeds. Sort, identify, and try to grow the different seeds.

Adapted from 'Five minute Field Trips'—Canadian Parks and Wilderness Society

Section C
Hiking and Backpacking Activities



Gearing Up

Grade level: 4-8
Provincial curriculum links: Healthy Living; Active Participation
Subject: Health & Physical Education
Reference: Developed by James Winkler, 4-H Youth Development Agent, UW-Extension, Oneida County

SPECIFIC LESSON GOALS

- ☆ Decision making
- ☆ Identify and select equipment for healthy and safe hiking

DESCRIPTION

Proper gear is important for a successful hiking trip. The length of a trip will have a bearing on the size or type of pack you use and your choice of gear. Backpacks are used for long day or overnight hikes. Fanny packs, or day packs, are used for shorter hikes. Choosing supplies and equipment to fit your trip can save lives. Packing your gear in a logical manner can save precious time if you need to reach supplies in an emergency.

PREPARATION

Length of lesson: 45-60mins

RESOURCES REQUIRED:

- Outdoor hiking gear (2 sets)
- Paper
- Pencils
- Backpack
- Fanny pack (day pack)
- Situation cards
    - Started to rain
    - Lost my way
    - Cut my finger
    - Separated from group
    - I'm thirsty
- Label the equipment. Sort gear into two similar piles. Practice packing equipment into the two types of packs (backpack and fanny pack) so you have an idea where things should go.
- Purchase or borrow the necessary equipment.
- Common hiking gear items are:
    - bandana, binoculars, camera, cell phone
    - clothes (extra), cooking gear, duct tape
    - first aid kit, flashlight and batteries
    - food, map and compass
    - matches and fire starter, mirror
    - pocket knife, rain gear, rope
    - sun protection, toilet paper, trowel
    - Water and whistle.
    - You might also choose items from the handout, "Backpack Gear Insurance Policy," which focuses on items to make a "survival kit."

- Make the situation cards
- "Backpack Gear Insurance Policy" handout [*Appendix 1]*
- Evaluation

PROCEDURE

I. Activity: Choices of Gear

- Divide the gear that you have gathered into two sets. Break the group into smaller teams. Have each team figure out how they would sort the gear into each of the packs (backpack and fanny pack according to what is 1) Essential, 2) Helpful, or 3) Not needed.
- Each team should come to a consensus on the three categories. Then each team is to report to the entire group and be ready to discuss or defend their choices.

Reflect:
- How did you decide which items to pack? What was essential, helpful, or not needed?
- Are there other items you might choose for your packs?
- How could your decisions impact the success of a day hike?

Apply:
- If you were going on an overnight hiking trip, how would your selection of gear change?
- Name some other situations where it is important to make the "right" choices or decisions? Explain

Do Ahead:
- Purchase or borrow the necessary equipment. Common hiking gear items are: bandana, binoculars, camera, cell phone, clothes (extra), cooking gear, duct tape, first aid kit, flashlight and batteries, food, map and compass, matches and fire starter, mirror, pocket knife, rain gear, rope, sun protection, toilet paper, trowel, water, and whistle. You might also choose items

II. Activity: Packing Your Gear

- Discuss the two different types of packs. Show how they are worn. Demonstrate how to pack items so it is easy to reach what you need when you need it. Divide the group into two smaller teams. Have each group practice packing gear into one of the packs.

- Once their packs are ready, have each team select a "Situation Card." They should note and report back to the group how quickly and efficiently they got to the items needed to deal with their situation. Have the group discuss how they might pack items differently next time

to better deal with the situation. Have the teams select other statements and deal with all the situations, if time allows.

- Next, hand out and discuss the "Backpack Gear Insurance Policy." This lists and describes the items that hikers and backpackers can use to make a handy "survival kit." If there is time and you have the items, have the group create a survival kit.

- Finally, discuss the "Rules of Three," which describe how long a person can survive without an essential element:
    - Three minutes without air
    - Three hours without shelter
    - Three weeks without food
    - Three months without love

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Reflect:

- What items did you first choose for your packs to take on a day hiking trip? Did you make any changes? Why?
- How did you make your decisions about where items should go in your packs?
- Why were your choices of the pack, the gear, and the placement of gear in the pack important?

Apply:

- What could happen if you didn't have the right pack and gear for a trip?
- What can happen if you're not prepared for other situations?

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ENRICHMENT/ EXTENSION ACTIVITIES

Enhance for Older Children:

- Have youth develop a list of equipment needed for an overnight hike.
- Demonstrate how tents or other shelters can keep participants warm and safe on a hike.

Simplify for Younger Children:

- Limit your hikes to short day trips with a limited amount of gear.
- Use a water bottle and a few items in a small fanny pack to demonstrate what is most essential to our survival.

[APPENDIX 1]

Back Pack Gear Insurance Policy

For just a few dollars, you can build a survival kit that will get you out of all kinds of trouble. Fold everything neatly, pack efficiently, and the whole 3-pound, 14-ounce kit and caboodle will fit inside a standard fanny pack. The survival kit is intended to supplement the regular contents of a hiker's pack. It should be worn at all times and separate from the backpack. Don't leave camp without it!

Here's what you'll need:

- ☐ One each of gallon- and quart-size zip-lock bags for collecting, distilling, or holding water. The bags should have wide mouths so you can skim for water and reach into crevices.
- ☐ Tincture of iodine to disinfect water. Use five drops per quart.
- ☐ Plastic drinking tube (3 feet long) for drinking from crevices or hard to reach places.
- ☐ Orange flagging tape to mark your route or write a message.
- ☐ Dental floss (100 feet). It's a tough string with many uses.
- ☐ Duct tape (3 feet). Get the strongest variety available.
- ☐ Mini flashlight with an extra bulb.
- ☐ Extra flashlight batteries with date marked. Replace the batteries every 12 months.
- ☐ Magnesium block with striking insert. Carry a minimum of three as a means of starting a fire.
- ☐ Cigarette lighter. Get a bright color so there is less chance that you'll lose it.
- ☐ Strike-anywhere matches dipped in paraffin.
- ☐ Fire starters. Cotton balls saturated with petroleum jelly and stuffed in a film container pack the smallest, but you can also use chips or other dry, fatty foods or even dryer lint coated with paraffin.
- ☐ Magnifying glass for signaling and fire starting.
- ☐ Glass signal mirror with sighting hole and a whistle.
- ☐ Light space blanket for shelter and signaling.
- ☐ Heavy-duty space blanket with grommets and a reflective side for shelter and signaling.
- ☐ Three heavy-duty, plastic leaf bags. Use as rain suits, shelter, tube tent, tarp, or rainwater collector.
- ☐ Military parachute cord (50 feet), 550-pound test.
- ☐ Extra knife. It should be an all-purpose knife with a fixed, double-edged, carbon-steel blade that can throw a spark.
- ☐ Brightly colored bandanna, which can double as a pot holder, hat, or water filter.
- ☐ Basic first-aid kit with wound dressing, moleskin, antibiotic ointment, and other items.
- ☐ Topographic map and compass.

Other items for hiking:

- ☐ Dried fruit or nuts for snacking.
- ☐ Water bottle filled with water. This is an *essential* item!

Leave No Trace

Grade level: 4-7
Provincial curriculum links: Earth and Space Systems
Subject: Science and Technology
Reference: Created by Jessica Jens, 4-H Youth Development Agent, UW-Extension, Sauk County

SPECIFIC LESSON GOALS

- ☆ Learn the seven principles of Leave No Trace (LNT)
- ☆ Develop a skit that demonstrates LNT principles
- ☆ Self-responsibility

DESCRIPTION

The mission of Leave No Trace is to promote and inspire responsible outdoor recreation through education, research, and partnerships. This lesson strives to educate student/ participants about the nature of their recreational impacts as well as techniques to prevent and minimize such impacts.

PREPARATION

Length of lesson: 30-45mins

RESOURCES REQUIRED:

- ▫ Box of props, such as different clothing, bandanas, pots, garbage, trash bags, sticks, stuffed animals, bones, feathers, headphones, blue tarp, random camping gear, magnifying glass, and field guides
- ▫ 7 LNT principle cards in the shape of footprints (laminated) **[App 1]**
- ▫ 7 LNT principle "cheat sheets" (laminated) **[App 2]**
- ▫ LNT "beach ball"
- ▫ Paper and pen (for observer to record evaluation data)
- ▫ Evaluation **[App 3]**

PROCEDURE

Activity: Seven LNT Principles

Ask participants if they have ever been hiking in nature with their families, or even walking through a park together. All of us use the world's resources and it's important that we "tread lightly" in nature.

One way that we can "tread lightly" is to follow the principles of Leave No Trace (LNT). LNT is information and skills that help people protect themselves and the areas that they visit (state parks, campgrounds, etc.). LNT is about making good decisions to protect the world around you – the world we all enjoy.

There are seven principles of LNT. Lay out the LNT principle cards upside down on the ground. Ask a volunteer to flip over one card and read the principle on that card. As each card is read, ask participants to name one example of how we can follow that principle. After all the cards are read, continue to the next activity.

Activity: Leave No Trace Skits

Divide the participants into four groups. Three groups should be assigned two LNT principles; the fourth group should be assigned one LNT principle. Hand out the appropriate LNT principle "cheat sheets" to each group.

It is each group's responsibility to create a skit that illustrates the main concepts of their assigned principle(s). Allow the groups 10-15 minutes to develop their skits.
Each group then presents its skit. At the end of each presentation, it is the audience's job to decide which of the seven LNT principles was presented in the skit. Review the principles with the group and answer any questions. Repeat for all four groups.

Activity: Leave No Trace Beach Ball

Before you start this activity, create a "Leave No Trace" beach ball. Inflate a medium to large beach ball; divide the beach ball into sections by drawing lines with a permanent marker. In each section, write a summary question or statement:

1. Why is it important to respect wildlife?
2. How many feet from a water source should you discard waste water or go to the bathroom?
3. What should you do with cold ashes from a campfire?
4. Name two items that should not be burned in a campfire
5. What is the largest sized stick that should be burned in a campfire?
6. Before you go on a trip or hike, list one thing you should do.

7. Name one durable surface.
8. Name one way you can be considerate of other visitors.
9. Name three items that you should never "leave behind."
10. Name one non-durable surface.
11. Give one example of a "water source."
12. Why is it important to plan ahead and prepare?
13. List three of the seven principles of Leave No Trace

Now ask the group to form a circle. Ask the group to "bump" the beach ball from person to person. After the third bump, the person with the ball should catch it and hold on to it. Whatever question the receiver's right thumb is on is the question that they need to read and answer. Participants can feel free to "phone a friend" to get help from the group

TALK IT OVER

Reflect:
1. What are the seven principles of Leave No Trace?
2. How did your group decide what to do in the skit?
3. What information from this activity can you share with your family and friends?
4. Why is it important to "tread lightly" in nature?

Apply:
1. What negative impact can humans have on the environment?
2. What positive impacts can humans have on the environment?
3. What will you do differently the next time you go on a hike?

ENHANCE/SIMPLIFY

Laminated cards with the seven principles of Leave No Trace can be ordered on the Leave No Trace web site. If funding allows, these cards are a good take-home gift for each participant.

[APPENDIX 1]


Respect Wildlife
Plan Ahead & Prepare
Travel & Camp on Durable Surfaces


Leave What You Find
Minimize Campfire Impact
Dispose of Waste Properly


Be Considerate
of Other Visitors

[APPENDIX 2]

LNT Principle #1

Plan Ahead and Prepare

- Know the regulations and special concerns for the area you'll visit.
- Prepare for extreme weather, hazards, and emergencies.
- Schedule your trip to avoid times of high use.
- Visit in small groups. Split larger parties into groups of 4-6.
- Repackage food to minimize waste.
- Use a map and compass to eliminate the use of marking paint, rock cairns, or flagging.

LNT Principle #2

Travel and Camp on Durable Surfaces

- Durable surfaces include established trails and campsites, rock, gravel, dry grasses, or snow.
- Protect riparian areas by camping at least 200 feet from lakes and streams.
- Good campsites are found, not made. Altering a site is not necessary.

In popular areas:

- Concentrate use on existing trails and campsites.
- Walk single file in the middle of the trail, even when wet or muddy.
- Keep campsites small. Focus activity in areas where vegetation is absent.

In pristine areas:

- Disperse use to prevent the creation of campsites and trails.
- Avoid places where impacts are just beginning.

LNT Principle #3

Dispose of Waste Properly

- Pack it in, pack it out. Inspect your campsite and rest areas for trash or spilled foods. Pack out all trash, leftover food, and litter. Deposit solid human waste in catholes dug 6 to 8 inches deep at least 200 feet from water, camp, and trails. Cover and disguise the cathole when finished.
- Pack out toilet paper and hygiene products.
- To wash yourself or your dishes, carry water 200 feet away from streams or lakes and use small amounts of biodegradable soap. Scatter strained dishwater.

LNT Principle #4

Leave What You Find

- Preserve the past: examine, but do not touch, cultural or historic structures and artifacts.
- Leave rocks, plants, and other natural objects as you find them.
- Avoid introducing or transporting non-native species.
- Do not build structures, furniture, or dig trenches.

LNT Principle #5

Minimize Campfire Impacts

- Campfires can cause lasting impacts to the backcountry. Use a light-weight stove for cooking and enjoy a candle lantern for light.
- Where fires are permitted, use established fire rings, fire pans, or mound fires.
- Keep fires small. Only use sticks from the ground that can be broken by hand.
- Burn all wood and coals to ash, put out campfires completely, and then scatter cool ashes.

LNT Principle #6

Respect Wildlife

- Observe wildlife from a distance. Do not follow or approach them.
- Never feed animals. Feeding wildlife damages their health, alters natural behaviors, and exposes them to predators and other dangers.
- Protect wildlife and your food by storing rations and trash securely.
- Control pets at all times, or leave them at home.
- Avoid wildlife during sensitive times: mating, nesting, raising young, or winter.

LNT Principle #7

Be Considerate of Other Visitors

- Respect other visitors and protect the quality of their experience.
- Be courteous. Yield to other users on the trail.
- Step to the downhill side of the trail when encountering pack stock.
- Take breaks and camp away from trails and other visitors.
- Let nature's sounds prevail. Avoid loud voices and noises.

[APPENDIX 3]

Evaluation: Leave No Trace

Please circle the number that shows your level of understanding or learning in this session.

	A little		Some		A lot
1. I now understand the Leave No Trace Behind principles:	1	2	3	4	5
2. I know how to use the Leave No Trace principles the next time I go on a hike:	1	2	3	4	5

Final comments:

The Leave No Trace Educator's Kit

The lesson plans are formatted for a day trip and an overnight trip, where the emphasis would be on Leave No Trace. The day trip is designed for an introductory outdoor Ed class. The overnight trip plan includes discussions on ethics that may be more appropriate for an older age group. Both plans, however, provide skills and activities that can be used and adapted by any program from Grades 7-12.

Some of the activities and information is more appropriate to introduce before the trip, in a classroom environment. A separate in-class lesson plan has not been included, but a brief read of the lesson plans should clarify what is a pre-trip exercise and what is more appropriate for in the field.

The day trip is designed to act as a precursor to the overnight trip. If only one trip is planned, or if instructors are only using portions of the lesson plans, it is advisable to consult both the day plan and the overnight plan for complete information and activities for each principle.

Orienteering: Indoors

Grade level: 5-8
Provincial curriculum links: Ontario
Subject: Physical Education/ Outdoor Education

SPECIFIC LESSON GOALS

☆ To teach navigation skills when a compass is unavailable

PREPARATION

Length of lesson: 120mins

As preparation, the students should have first learned the "compass rose" and know the Cardinal and Intercardinal points on a compass. The "compass rose" is the fairly common picture of a compass. It looks kind of like a star. Cardinal points are N, S, E & W and Intercardinal points are those in between, such as NE, SE, SW and NW

RESOURCES REQUIRED

- Traffic cones
- Floor spots (assorted colors)
- Recording sheet for each student or team (prepared by instructor)
- Numbered 3 X 5 cards placed on each cone (cones placed and numbered randomly)
- Writing utensils (crayons or pencils)
- Stop watch

PROCEDURE

- Students are timed as they move quickly through a predetermined arrangement of numbered traffic cones (no sequence required).
- One student or team is positioned at each cone.
- A whistle begins the activity.
- At the cone, students are to straddle over the cone and read the bearing found on the record sheet (prepared by the instructor), which coincides with the numbered cone they are standing over (e.g., cone # 1 has a bearing on the record sheet of NE, the student then rotates until they have positioned themselves into the bearing they believe represents NE).

- Assorted coloured floor spots have been placed around the space, the student or team is to record the color of the first floor spot they see on this bearing (teacher/ leaders can make it as challenging as they want by placing several spots in close proximity to the correct choice).

- The student/team then moves to the next cone (a cone that is not occupied by someone else, find an open cone to save time).

- Students repeat the procedure at each cone (read the bearing from the sheet, position themselves, record the color of the first floor spot on this bearing).

- After completing each station, the student or team brings the record sheet to the instructor, who makes note of the elapsed time it took to complete the course.

- After all teams have completed the course, the correct colors are given to the class, for self-correction.

ENRICHMENT/ EXTENSION ACTIVITIES

Variations

Other teaching ideas are to have both the cardinal/intercardinal points listed along with bearings, or one could put just bearings down to reinforce that 0 degrees = North, or 45 deg = NE. Good idea that could be tweaked to lead up to compass use, or to reinforce directions and bearings without a compass.

This same activity can be used with a compass, the teacher/ leader prerecords exact compass bearings and the students practice their compass skills.

If using this as a game competition, penalty time (e.g., 20 secs. per missed color) is added to the course time and recorded on the record sheet.

ASSESSMENT IDEAS

Students who correctly record the appropriate colors have demonstrated that they can find the correct bearings without using the compass.

TEACHING SUGGESTIONS

The teacher/ leader should have prerecorded all the colors at each cone and holds the master sheet.

There should be 1 or 2 more stations than there are students or teams.

Orienteering: Map Skills

Grade level: Kindergarten, 1, 2, 3, 4
Provincial curriculum links: Ontario
Subject: Physical Education/Outdoor Education

SPECIFIC LESSON GOALS

- ☆ Use a map to locate six specific landmarks in a given area.
- ☆ Individually, and as a group, write a list of how maps and landmarks can help us.
- ☆ Write an explanation of how to get from point A to point B to someone unfamiliar to the area.

DESCRIPTION

The purpose of this activity is to involve students in map skills in an every day situation, making the use of maps more real to them. Orienteering is a sport popular in Australia and Sweden and is used as a training activity in the service. It teaches the participants how to read and use a map. The activity can be adjusted according to grade level by the difficulty of the course and even the use of a compass. It is an excellent activity for field trips.

PREPARATION

Length of lesson: 60mins

RESOURCES REQUIRED

- A selected course that has been mapped
- specific landmarks color coded with crayons or small self-stick circles
- Courses may be either familiar or unfamiliar to students depending on the level of difficulty needed to meet student needs. A few possible suggestions may be: the playground, a city park, a wooded area near the school, or a specific rural area the class make take a field trip to.

PROCEDURE

1. Maps are distributed in classroom and a discussion follows concerning north, south, east, and west and pictures of landmarks. If a compass is used, prior discussion of its use is needed.

2. Explain procedure for completing the orienteering activity. Look for six small circles near specific landmarks on your map. When you locate one of the indicated landmarks on the course, you will find a crayon on a string at that spot. Without removing the crayon from the string, fill in the appropriate circle on your map. Complete all six circles in this manner. If you finish the map correctly, each circle will be a different color that will correspond to the map I have already completed.

3. You will work with a partner to discuss problems and the completion of the course. You are responsible for your partner's safe return to the starting position.

4. If you hear three blows on the whistle, return to the starting point. Students are reminded of safety precautions and to return to the starting point when they have finished the course.

5. Pairs of students are sent out in different directions and at different intervals so as not to follow one another or clump together.

Tying it All Together:

1. Check maps with key.
2. Brainstorm an individual list and then make a list on the board of how maps and the use of landmarks can help us.
3. Write a paragraph describing how to get from the red circle to the yellow circle assuming no one else is familiar to the area.

Planning Your Trek

Grade level: 4-7
Provincial curriculum links: Ontario
Subject: Physical Education
Reference: Created by Lucinda LaPorte, former 4-H Youth Development Agent, UW-Extension, Rusk County

SPECIFIC LESSON GOALS

- ☆ Plan and organize a day hike
- ☆ Make choices based on the safety of self and others
- ☆ Decision making

DESCRIPTION

Hiking is an exciting experience in the natural outdoors which can promote a healthy lifestyle that will last throughout a lifetime. The chance to be out and commune with nature is a treat that challenges you to go over "one more hill" to see what's on the other side.

PREPARATION

Length of lesson: 45-60 minutes

- Find out what types of hiking trails are available in your area and collect brochures.
- Try out the trails so you know what level of ease they are.

RESOURCES REQUIRED

- Maps
- Brochures of hiking trails
- Large pieces of paper
- Pencils or markers
- Coloured dots
- Walking stick
- "Warm-up and Cool-down exercises" handout **[App. 1]**
- "Brainstorming Session" handout Evaluation **[App. 2]**

PROCEDURE

Discuss with youth the benefits of hiking in the outdoors. You may write these on a board or a piece of paper and hang it on the wall. Point out or choose which ones would be most beneficial. Discuss leadership needed in planning and implementing the hike. As an introductory activity do the "leadership walk."

Activity: "Leadership Walk"

Arrange everyone in a line to play follow the leader. Appoint someone to start leading the group on a walk around the room doing various actions, movements, etc. Reverse the line so the person on the end is now the leader. Cut the line in two and have someone else be leader.

TALK IT OVER

Reflect:

1. How did you feel being a leader? (Ask those who were in the leader position.)
2. How did you feel being a follower?
3. What are the responsibilities of the leader?

Apply:

What does a leader need to do to make sure the rest of the group is following?
How can you use these guidelines in other areas of your life?

Activity: Brainstorm Session

Discuss why one should plan a hiking trip. Divide a large group into four smaller groups. Be sure to mix older youth with the younger youth to act as leaders. Give each group a large piece of paper and a pencil or marker. Using the "Brainstorming Session" sheet, conduct a brainstorm session to plan a day hike. The plan should answer these questions:

1. What to see?
2. Where to go?
3. How far?
4. How hard?
5. What activities to do?

TALK IT OVER

Reflect:

1. Would someone explain which plan has evolved?
2. Why did you make those choices?

Apply:

1. How will this plan lead to a safe and healthy hike?
2. How would you be able to use this process in your everyday walks or hikes?
3. How will the ability to plan and organize help you in other ways?

Activity: "The Walk"

Demonstrate to the youth how to do "the walk," showing correct posture and pacing. Keep your back straight and stretch your backbone upwards. Keep your chin up to see where you are going. Then walk, pointing your toes straight ahead and leading with your thighs. Have youth practice the walk. Then have youth take turns leading others in the walk.

Next, demonstrate how a walking stick can be used for balance on hills. Have youth practice with the walking stick. Give youth a chance to lead others while walking up hills – if not today, then at future sessions.

Use the "Warm-up and Cool-down Exercises" handout to discuss and demonstrate exercises that will be helpful in preventing soreness in muscles *after* a hike. (Research has proven that stretching after a walk is more beneficial than before.)

TALK IT OVER

Reflect:

1. Were you able to do "the walk"?
2. What is the importance of how you walk?
3. Are the exercises easy for you to do anywhere?

Apply:

1. How will a walking stick help you along the trail?
2. How could you use "the walk" and these exercises at other times?

ENRICHMENT/ EXTENSION ACTIVITIES

Enhance for Older Children:

1. Plan a hike on a local trail with disability needs in mind. Maybe they know someone in a wheelchair who wants to get out and see more natural surroundings.
2. Plan hikes that have a specific purpose: photography, tree/plant identification, etc. Make it a treasure hunt of finding things.
3. Plan a day hike to local hiking trails

Simplify for Younger Children:

1. For younger youth, plan a short trip in a park or the neighborhood.
2. Give younger children a chance to lead the “follow the leader” activity and “the walk” activity – with and without the walking stick.

HELPFUL HINTS

1. Check out local trails so that you know of any obstacles that could be encountered and the difficulty for your group.
2. See if there is a local Trails Association that would give you some insight into the trails available.
3. Have youth check out web sites for trails.
4. Obtain some pedometers to give to the youth to keep track of their walking distances.

[APPENDIX 1] WARM-UP AND COOL-DOWN EXERCISES

EXERCISES TO DO WHILE STANDING

Neck Stretch: With knees bent and feet shoulder-width apart, rotate your head to the right as you try to look over your right shoulder. Repeat this motion to the left, trying to look over your left shoulder.

Side Stretch: With knees bent and feet placed shoulder-width apart, reach with one arm up and over your head to one side. Hold for 20 seconds. Repeat on the other side.

Triceps Stretch: With knees bent and feet positioned shoulder-width apart, place one hand between your shoulder blades. Then, with your other hand, pull your elbow behind your head and hold it there for 20 seconds. Repeat with the other side.

Shoulder Stretch: With knees bent and feet positioned shoulder-width apart, place your left hand on your right shoulder. With your right hand, push your left elbow across the front of your body to the right. Then repeat on the other side.

Calf Stretch: While facing a wall, place both hands on the wall at shoulder height with one foot placed ahead of the other. With the front knee bent and the back knee straight, lean forward until you feel the stretch in the rear leg. Repeat with feet in reverse positions.

Bent-Over Shoulder Stretch With your knees bent and your feet at shoulder-width apart, bend over and clasp both hands behind your back. Pull your arms up and hold them in place for two seconds while maintaining abdominal muscle contractions.

Side Groin Stretch With your right leg extended to the side and your left leg straight, position your right hand on your right hip. Then bend your left knee while moving your body toward your left leg, and hold your position. Repeat with your left leg extended and your right leg straight.

EXERCISES TO DO WHILE LYING DOWN OR SEATED ON A MAT

Back Stretch While lying on your back on an exercise mat, bring your bent knees toward your chest. Reach out and grasp your knees, pulling them closer to your chest until you feel the stretch affecting your lower back. Repeat three times.

Seated Hamstring Stretch Seated on an exercise mat, straighten one leg out with your toes pointed upward. Bend the other leg with the foot toward the extended leg, and then lean forward and reach with both hands for your toes. Hold this position for 20 seconds. Repeat with the other leg extended.

Groin Stretch Seated on an exercise mat, join the soles of your feet together and grasp both ankles with your hands. Pull your ankles toward your body, with your elbows resting on your knees. Hold this position for 20 seconds.

[APPENDIX 2]

Brainstorming Session

Organization of the group:

- Divide into four groups of youth. Have each group sit around a table with a large sheet of paper and pencil or marker.
- Key points to keep in mind and explain to the group:
    - There are no right or wrong answers or ideas – everything will be written down.
    - It is OK to piggyback on other ideas and add to them.
    - No criticism of another's ideas is allowed.

Give each group one of the following points to ponder: (You may write these at the tops of large sheets of paper and explain each before you start the activity.)

- *What to see?* Hints: think of natural resources, animals, views, time of year, etc.
- *Where to go?* Hints: look at brochures or maps of local trails; think of other local places not on the maps; think of limiting factors, such as difficulty of terrain and transportation needs.
- *How hard? How far?* Hints: do any participants have disabilities that might limit what they could do or where they could go?
- *What activities to do?* Hints: take pictures with a camera or draw pictures with paper and pencil; have a nature "treasure hunt"; look at historical sites or other sites.

Process for brainstorming:

- Five minutes for each "stop" (see below). Encourage youth to take their time.
- Rotate tables in between each process.
- Process:
    - First stop: Brainstorm and write down your ideas relating to the topic.
    - Second stop: Cross out what you don't like or doesn't fit. You may add new ideas.
    - Third stop: (Give everyone three colored dots.) Place a dot on the three ideas you like best.
    - Fourth stop: Look at which ideas have the most dots. Prioritize these in the order you think is the most important.

Coming to a consensus:

- Have the youth put their sheets of paper on the wall.
- Review the priorities on each sheet. The whole group determines what is to be the top idea for each topic.
- When you have picked the top idea for each topic, your plan will be made for your hike!

Survival Skills

Grade level: 4-7
Provincial curriculum links: Ontario
Subject: Science and Technology
Reference: Adapted from lesson by Jessica Jens, 4-H Youth Development Agent, UW-Extension

SPECIFIC LESSON GOALS

- ☆ Teamwork
- ☆ Learn the seven basic survival needs of our bodies
- ☆ Discover what materials will help us meet these needs to survive emergency situations
- ☆ Understand the consequences of decisions affecting personal health and safety.

DESCRIPTION

Learning how to survive in an emergency situation is important for everyone. Although wilderness-based survival situations are most common, survival situations can occur in urban and rural environments, too. The following activities will help participants learn about the definition of a survival situation, what basic needs must be met to ensure survival, and creative solutions for survival situations.

The three mini-activities in this lesson will work well for school conservation days, in class presentations, after school activity, Boys and Girls Clubs, camp nature session, and many other learning situations

PREPARATION

Length of lesson: 30-60mins

Do Ahead:

- Cut out and laminate the " Basic Needs" and " Length of Time" signs
- Assemble a survival kit (optional)

RESOURCES REQUIRED:

- Writing utensils and paper (1 per group)
- "Basic Needs" signs
- "Length of Time" signs
- "Essentials to Put in Your Daypack" handout
- "The Seven Basic Survival Needs" handout
- Complete survival kit (optional)
- Evaluation

PROCEDURE

Activity: Introduction to Survival Skills

Bring the group together and facilitate a discussion about their current ideas on the topic of "survival skills." Ask them to name a "survival situation." Typically, they will identify situations like a plane crash or hurricane that has a remote chance of happening to them. Then ask them to describe an event that *could* happen to them. What events could quickly turn into survival situations? Some possibilities include:

- Car crash, particularly in the winter time
- Getting lost in the woods
- Hunting accidents
- Boating accidents
- Severe local weather incidents, such as thunderstorms or tornadoes

Explain that the group will work together to learn about survival skills in everyday situations and decide what basic needs our bodies need to survive and what items can help us meet these needs.

Activity: Seven Basic Needs

For this activity you can keep the group together or divide into smaller groups. First, ask participants to identify the seven basic needs their bodies need to survive. When a youth or small group correctly names one of these needs, hand them the sign for that need and have them stand in front, holding the sign so everyone can see it.

As each need is listed, briefly define this need for the group and highlight why it is important. Ask the youth to give examples of when they have gone without each need for any extended period of time. For example, "Has anyone ever gone 24 hours without sleeping? What did you feel like? How did your body behave?" Continue until all the "needs" are up in front.

Now, ask the group to arrange the needs from "most" to "least" important. The need that we can live without for the least amount of time should be first and the need we can live without for the most amount of time should be last. Allow the group several opportunities to get the order

correct. After each attempt, tell them which needs are in the right spot and which are still wrong. Once they have the correct order, ask them to also guess how long a person can go without that need.

As they correctly come up with the answers, give the "needs" their corresponding "length of time" sign. When all of this is done, ask if there are any questions and clarify any points that the participants do not understand. Emphasize that they will need to know and use this information in the next activity.

Activity: Gilligan's Island

Divide the group into small groups of 3-4 participants. Each group should have a piece of paper and a writing utensil.

Present the following scenario to the groups: You have been ship wrecked on an island that is exactly like where you are right now. It has the same climate, vegetation, and weather. You must survive on this island for seven days. Unfortunately, the wreckage of the airplane has disappeared. You only had time to take three things out of the airplane to help you survive. Your group may take any three items you can think of, *but* all of the items must fit into a small backpack. Tell them that electronic devices used to contact others for help do not work on this island. What three items did you take?
Give the group about 10 minutes to discuss which three items they would have taken from the airplane to help them survive. When the groups are done with their discussions, each group will present their three items to everyone. The groups should list their three items and give reasons why they choose each item. Other groups are welcome to ask them questions. Discuss the merits of each group's answers and the pro and cons of their selections.

Activity: Top Ten Survival Items

This final activity assists the youth in applying this information to an imaginary survival situation. When all the groups are finished, present the "Top 10 Survival Items" that the experts believe are important in a survival situation. The three items each group decided on may or may not be on this list. By presenting the "Top Ten" list, it gives the youth a chance to analyze the decision of survival skills "experts." After the list is presented, you may want to give the youth time to talk about the list and if they agree or disagree with the items and their importance.

If possible, it is nice to collect the ten items (or pictures of the items) in advance and place them in a bag. As you discuss an item, pull it out of the bag and show it to the group.

TALK IT OVER

Reflect:

- What is the most important thing to remember in a survival situation?
- What piece of information will you most likely remember?
- If your group was really stranded on an island, what would have been the most helpful thing to remember?
- How did your small team perform during this activity? Were you an effective team?

Apply:

- What from this activity could you apply to your life?
- What are some ways that you could be a more effective team member in the future?
- What new teamwork behaviors did you learn during these activities? Where else could you use them in your life?

HELPFUL HINTS

You may switch the order of the activities by facilitating the "Gilligan Island" activity first. In this method, the youth would be involved in a hands-on activity at the start of the lesson. By facilitating the lesson in the order presented (Gilligan Island activity after the Seven Basic Needs activity), the youth have an opportunity to use the knowledge they learned about basic needs and apply that to their group decision in "Gilligan Island." The order of activities is left up to the individual facilitator.

Because this lesson is meant to encourage the development of teambuilding skills and youth/adult partnerships in its participants, it's a good idea to keep the following ideas in mind:

- Youth who have pre-existing knowledge or experience in the area of survival skills can be recruited to co-facilitate some of the activities or give examples of their personal experiences in survival or semi-survival situations. These youth can also serve as team leaders or "resources" for the groups during the Gilligan Island activity.
- If possible, know your group ahead of time; have an idea of what size small groups will facilitate effective teamwork. Sometimes groups of three work well, other times groups of five may work better. Split the entire group into the optimum-sized small groups for the Gilligan's Island activity.

- Front-load the lesson and individual activities with tips for good teamwork. For example, before the Gilligan's Island activity, you can highlight traits of effective teamwork: listening to each other, using all the team members' skills, using a group decision-making process, and engaging all team members in the discussion.

- If desired, you can break the entire group into small groups for the Seven Basic Needs activity. Each small group may be asked to come up with a basic need as a group and then present their answer to the entire class. When the youth are working in small teams, walk around and facilitate effective teamwork through questions and short discussions. Ask the entire team to present their answers, not just one spokesperson.

The Top Ten Survival Items

Many outdoor enthusiasts love to agonize over what belongs in their survival kit. Here are the supplies that we think belong in a small pack for quick trips into the wilderness. Of course, a GPS unit and a satellite phone would be handy, but this collection is meant to be a cheap backup for times when those items are damaged or inaccessible.

1. Knife

Never leave home without one. A sturdy blade is essential for building shelters, preparing food, making campfires and countless other tasks

2. Butane Lighter and Tinder

Starting fires with a flint in a dry climate is easy, but in wet weather, you may need a cigarette lighter and some flammable helpers to get your fire going. Cotton balls covered in wax, solid backpacking stove tablets, or a flask of Bacardi 151 are all viable options.

3. Metal Cup or Can

Staying hydrated is far more important than finding food. With a metal container, you have the option of boiling the water to kill nasty microbes.

4. First-Aid Kit

Medical emergencies are an even bigger deal than being lost. Your kit should contain items to deal with serious injuries — not just cuts and scrapes. Pack some Quick Clot or Celox to deal with serious bleeding, tweezers, a needle and thread, antibiotic cream, a bit of sun block, and any special medications that you may need.

5. Plastic Trash Bag

Thin and light, they are worth their weight in gold and have a plethora of uses. Use them to catch rain, cut three holes to improvise a rain poncho, or windproof your shelter. Bring several of them. Trash compactor bags are the sturdiest.

6. Water Purification Supplies

Drinking brackish water can do more harm than good. By properly filtering and decontaminating your beverages, you can avoid getting in even more trouble.

7. Backpacker Hammock

In extremely hot or cold environments, protecting yourself from the elements is half the battle. You can always disassemble it to construct a more elaborate shelter.

8. Whistle

When you are lost in the woods, signaling for help should be a high priority. Blowing a whistle periodically requires much less energy than yelling and the high pitch sound may travel further.

9. Flashlight

Flashlights can be seen by search and rescue teams from a great distance. They are a great way to attract attention to yourself and could come in handy if you have trouble making a fire.

10. High-Calorie Protein Bars

Hunting and fishing may be more trouble than they are worth. You may burn more calories in search of prey than you would gain from eating their flesh. Save yourself from some agony by packing a few snacks.

Source: http://www.wired.com/wiredscience/2008/03/top-10-survival/

The Seven Basic Survival Needs

In any survival situation, the following seven basic needs must be met.

1. **PMA** (Postive Mental Attitude, or "Don't lose your head!"): The most important thing in any survival situation is not to panic. Your brain is your best tool for inventorying what resources you have and for coming up with a plan to provide for your needs. Panic can lead to making irrational, counter-productive decisions that actually make the situation worse, not better.
   How long? 3 seconds. If your car breaks through the ice on a frozen lake and you panic, you may waste time pounding against the windows when you should be rolling them down. People have saved themselves by popping the trunk, pulling down the back seats and swimming out.
2. **AIR** (oxygen): Although we take air for granted, in a drowning, choking, or toxic fume situation it becomes critical to maintain an adequate supply of oxygen to the brain.
   How Long? 3 minutes. After that, brain cells begin to die.
3. **SHELTER**: A shelter is used to conserve the heat your body already has. Clothing is considered shelter because it traps a layer of warm air and holds it next to your body. Shelters do *not* add heat. Fires or electric blankets may add heat. Would you be warmer standing outside in winter in a swimsuit next to a fire, or in a parka and snowpants with no fire? The best way to keep warm is to keep from losing heat.
   How long? 3 hours. If you are wet and exposed to wind and/or cold temperatures, failure to seek shelter can lead to fatal hypothermia. Keeping yourself *dry* and out of the *wind* are the two most important assets of any shelter.
4. **WARMTH**: If you are in an extended survival situation that may last for days, shelter alone may not be enough to prevent frostbite and/or hypothermia. Warmth can be added through building a fire or drinking hot liquids. Physical activity of any kind will increase blood flow and raise body temperature. The body heat from a warm person can be used to add heat to a cold person.
   How long? 3 hours-3 days: The length of time varies, depending upon conditions.
5. **REST** (sleep): Any physical activity will burn calories – energy that cannot be used later. Resting will conserve calories so that they may be burned slowly for warmth over time. Before any activity, make sure to weigh the benefits and costs, especially if you have no food to give yourself more energy.
   How long? 1-3 days: Variable, depending upon conditions. About 24 hours without sleep or rest will lead to fuzzy thinking and bad decision making for most people.
6. **WATER:** It is possible to survive a full three days without water, but as the body dehydrates it begins to function less efficiently. Water loss can occur through breathing, sweating, and evaporation.
   How long? 3 days: Especially in winter, people forget to drink because they are not hot. Drink even *before* you are thirsty! Thirst is a warning signal telling you that you are already dehydrated. If snow is the only source of water, melt it first so you do not cool your body temperature by eating snow.
7. **FOOD:** In most survival situations, food is not a top priority. However, food helps your body stay warm by adding calories to burn and raising body temperature by activating your metabolism.
   How long? 3 weeks: Without food, your body will burn fat reserves as fuel. After fat reserves are used up, the body will begin to metabolize protein, burning muscle as a food source.

Positive Mental Attitude

3 Seconds

Air

3 Minutes


Shelter
3 Hours


Warmth
3 Hours -
3 Days


Rest
1-3 Days


Water
3 Days


Food
3 Weeks

Evaluation: Survival Skills

Please circle the number that shows your level of understanding or learning in this session.

	A little		Some		A lot
1. I understand the basic needs for survival:	1	2	3	4	5
2. I feel confident that I will be able to use the safety guidelines:	1	2	3	4	5
3. I feel confident that I adequately understand the need for safety in order to survive:	1	2	3	4	5

Final comments:

Evaluation: Planning Your Trek

Please circle the number that shows your level of understanding or learning in this session.

	A little		Some		A lot
1. I learned something new about leadership:	1	2	3	4	5
2. I know "this much" about planning a hike:					
Before lesson:	1	2	3	4	5
After lesson:	1	2	3	4	5
3. I feel that the brainstorm activity helped me learn how to plan a hike:	1	2	3	4	5
4. The walking activity helped me learn how to walk during a hike:	1	2	3	4	5

I have learned: (list)

Final comments:

LEAVE NO TRACE PRINCIPLES



DAY TRIP

PRINCIPLE 1: Plan to Leave No Trace

Planning of the daytrip should be a class exercise. It will get student/ participant thinking about preparation, rather than leaving all the details to adults.

1. Determine where you are going. Provide resources such as:

- topographic or orienteering maps
- hiking guides
- brochures or information on the area

Questions to ask:

- What does the area look like (plants, hills, lakes, trails)?
- What activities will the class be doing (eating? canoeing? hiking? biking? plant ID?)
- How long does it take to get there?
- How will we get there?
- How long are we staying?

Goal: to give every student/ participant a good idea of where they are going and for how long.

2. Discuss ways to prepare so impact is minimized. Discuss packaging and garbage with student/ participant.

Questions to ask:

- What do you consider to be litter? A grain of rice? Sandwich crumbs? Apple cores?
- What types of food attract wildlife especially bears?
- What happens when bears get human food?

Goal: to get student/ participants thinking about food choices before heading into the backcountry.

3. Planning not to have a fire and preparing in case of emergency.

Discuss with student/ participants the pros and cons of planning to have a fire. Also discuss what impact groups create if they are unprepared for bad weather, unexpected overnights or a group member getting injured.

ACTIVITY

Student/ participants can work in groups to plot out their itinerary. Provide questions, and have them consider the answers. Focus on the planning aspect of where they are going and how they are getting there.

ACTIVITY

Have student/ participant s prepare a zero garbage lunch. Groups of student/ participants can prepare a lunch menu and snacks that will result in no garbage.

PRINCIPLE 2: Camp and Travel on Durable Surfaces

Since the daytrip will not involve camping, concentrate on the travelling portion of this principle.

1. What is a durable surface? Provide a definition and create recognition of what is durable and what is sensitive. Teach student/ participants to make choices about where to step in the wilderness.

Questions to ask:

- What will a footprint do to different surfaces (vegetation, ant hills, moss, dry slopes, and trails)?
- How can we keep from widening trails?
- What happens when big groups travel through an area (on-trail? off-trail?)
- What sort of places makes good, No Trace rest stops?
- What happens when travellers make shortcuts on the trail?
- Is snow a durable surface?

Goal: student/ participants will learn the range of surfaces, from durable to sensitive. Knowing what surfaces are better to walk on allows student/ participant s to make a choice to not damage fragile ground.

2. Footwear makes a difference! Discuss the benefits of water-resistant boots, and the drawbacks of clunky, heavy boots on soft ground. Link this back to Planning Ahead.

Questions to ask:

- Why should you stay in the middle of the trail, even if it is muddy or wet?
- What are disadvantages and advantages of heavy boots? Light boots?

Goal: student/ participants will gain awareness of the impacts of footwear on different ground, and they will learn to plan ahead.

ACTIVITY

Pick a spot with several types of surface. Have student/ participant groups try a “footprint test”. Each group can share with the others what impacts their footprints had on different surfaces. Reach a conclusion as a class about the best surfaces to travel on.

ACTIVITY

A student/ participant group can prepare a demonstration to the class about back-country travel. Student/ participants can demonstrate the impacts of extra trails, shortcuts, trampled flowers, trail widening, etc. What trace is left for the next person?

PRINCIPLE 3: Pack in, Pack out

This principle relates to planning ahead and creating a minimum of garbage. On a daytrip near town, however, student/ participants should think about other peoples' messes, not just cleaning up after themselves. Not littering is a common ethic to teach youth. Stewardship, or personal responsibility for leaving the land cleaner than it was found, adds another dimension to this principle.

1. Leave the wilderness as clean, or cleaner than you found it. Discuss what is considered to be garbage. Many student/ participant s will not think of apple cores, food scraps or toilet paper as garbage.

Questions to ask:

- What is/is not garbage?
- For apple cores, banana peels, etc...Does it grow in the backcountry?
- If something is biodegradable, is it OK to leave it behind? Why or why not?
- What do you think if you find someone's toilet paper in the bushes?
- What are your thoughts about the wildness of an area when you find garbage?
- What are some ways to plan ahead for your garbage, and other peoples' garbage in the backcountry?
- Is it your responsibility to clean up after other people? What makes you want to or not want to?

Goal: student/ participants should consider their own choices about what they leave behind in the backcountry, and how they react to other peoples' messes when in the wilds.

2. To burn or not to burn...If the class is having a campfire, discuss what garbage totally burns, partially burns and what should not be burned at all.

Questions to ask:

- What would you burn in your campfire? Explain.

Goal: student/ participants see firsthand what does not burn completely, like tinfoil, cans and bottles.

ACTIVITY

How long will it last?
Have an aluminum can, toilet paper, fruit peels, bread, a twist tie, etc. available. Lead a discussion about how long it would take for these things to degrade.
An extension is to discuss the impact on animals during the time it takes to degrade.

ACTIVITY

Reclaim a fire pit. Concentrate mainly on the garbage aspect, or combine this activity with a discussion on campfires in relation to Principle 5.

Have the class pack out the garbage they find.

PRINCIPLE 4: Properly dispose of what you can't pack out

Waste water, waste food and human waste can be unsightly, a health hazard and have a negative impact on wildlife. For daytrips, washing dishes is generally not an issue. All food scraps should be packed out by student/ participants. Human waste should be planned for; however, and student/ participants should know what is expected of them. A straightforward approach works best for this topic.

Catholes: a demonstration

1. Student/ participants should learn **3** main points for human waste:

1. minimize the chance of water pollution
2. minimize the chance of anything or anyone finding the waste
3. maximize the rate of decomposition

How? By making a cathole.

2. Demonstrate for the class by digging a sample cathole, using a pinecone as your poop. Link all aspects of the demonstration back to the 3 main points. Include the following additional information in the demonstration:

- pick a spot away from trails or areas in use
- south-facing slopes are a good place for high rates of decomposition and lovely views
- at least 60 metres from water and camp
- use a shovel or trowel to dig the hole: 15cm deep and 10cm wide
- keep your soil, preferably in one piece
- recover the hole and make it look as natural as possible
- pack out all toilet paper, tampons and pads: toilet paper does not burn well unless in a hot fire (waste paper products can be burned by trip leaders on overnight trips)

Questions to ask:

- What are some of the problems associated with human waste?
- Why are catholes a good way to dispose of human waste?
- Can we make a commitment as a class to all dispose properly of human waste?

Goals: encourage student/ participant s to agree as a group to take waste disposal seriously. Foster a strong consciousness within the group regarding the importance of catholes in keeping the wilderness wild.

ACTIVITY

The only activity for this is to have student/ participants put catholes into practice. Make catholes the expectation and the rule on all camping trips where toilets are unavailable. Trowels, toilet paper and a brown paper bag for waste paper should be available at a central yet private area.

PRINCIPLE 5: Leave what you find

This principle teaches an ethic of respecting the land, the animals, and the history of the area student/ participants travel through. One of the most important aspects of this principle for daytrip travels is that the size of the group magnifies the impact each individual has on the land: if one student/ participant decide to cut a branch, twenty other student/ participants will also have that choice. What is somewhat acceptable for a lone traveller becomes quite destructive when carried out by an entire group. The activities for this principle are listed at the bottom. It is recommended that they are read and planned ahead of time, as some adaptation may be desired.

1. Resisting the temptation. As with many other aspects of camping, many student/ participants will not see the problem with picking flowers, breaking or cutting branches, or carving trees. Facilitate a group discussion about the potential impacts of these activities. Student/ participants may debate about what they were taught versus the information provided by you and other classmates.

Questions to ask:

- On a Leave No Trace scale of one to ten (one being a No Trace activity) what level of impact do you think cutting off a tree branch has?
- Does cutting branches have a bigger impact if it is a larger group? Why or why not?
- What about if you cut branches or pick flowers in an area many people will visit?
- What impacts do you think these activities have on the plants themselves?

Goal: student/ participant s will consider their activities in relation to who they are with, where they are, and what impact those activities may have on the environment and other travelers.

2. Wildlife. Bears are the most obvious concern when travelling in the backcountry. However, bear awareness is worth a separate discussion and can sometimes overshadow human behaviours toward other animals. All animals need to be treated with respect and viewed at a distance.

Questions to ask:

- What are some problems with feeding animals, even squirrels?
- How close is too close when you are watching a moose, sheep, coyote, etc?
- What may happen if you get between a mother animal and her young?

Goal: student/ participant s will understand the need to keep animals wild and to avoid frightening them.

3. Artifacts. Leaving artifacts undisturbed goes beyond a principle. Discuss with student/ participants the reasons behind laws that protect archeology and First Nations heritage. Ask student/ participants for any stories or information they may have about the area and link their history to the history of the region.

PRINCIPLE 6: Use stoves and small campfires

Campfires and marshmallow roasting go hand in hand as two of the most time-honoured camping traditions. They are also two of the hardest traditions to break. For daytrips especially, campfires are unnecessary. Explaining and providing rationale for not having a fire is essential to student/ participants developing an understanding of this principle. Further practice and lesson guides on no-trace fires are included in the section on overnight LNT trips.

1. Choosing not to have a fire. Make fire a choice, not a requirement to your trip. This means planning ahead for adequate clothing and food. If a fire is a luxury, not a necessity due to poor planning, groups can plan for a better, safer, and smaller No Trace fire.

Questions to ask:

- What are some of the reasons people build fires?
- When can fires be dangerous or undesirable?
- What are other options, besides building a fire?
- When might we need a fire?
- How can we plan ahead so we can avoid needing a fire?

Goal: student/ participants will explore their reasons for enjoying fires, rather than simply making a fire without a conscious decision.

2. Having a small campfire. If a fire is planned on your daytrip, planning the fire as a group will help limit the size of the fire and increase the amount of fuel that becomes ash, rather than charcoal when it is time to leave. Discuss the ideal size of easy-burning firewood. Ideally, however, do not build fires on daytrips and discuss the reasons not to with the class.

Questions to ask:

- How long will we need the fire for?
- Is it for warmth or cooking?
- How will I keep the fire from leaving a trace?

Goal: student/ participants will learn to plan fires ahead of time, rather than piling wood on and seeing what size the fire becomes. Student/ participants will consider the trace a fire leaves.

ACTIVITY

Brainstorm different nighttime activities that take away the need for a fire. Discuss with student/ participants why they enjoy having a fire and explore our cultural leaning toward nighttime campfires. Have student/ participants come up with reasons for and against campfires.

ACTIVITY

Tree I.D. Lead the student/ participants on a tour of a trail or forest, in pretend-search of ideal firewood. Identify the types of trees and discuss the uses of each tree. This can be strongly or loosely linked to their ability to burn, depending on your focus. This can also be a student/ participant group presentation and can include the sizes of wood that are best for burning.

PRINCIPLE 7: Be considerate

Just as Principle 1, **Plan ahead and Prepare**, encompasses portions of all other LNT principles, so does Principle 7. Showing consideration for other wilderness users is a part of what each ethic is all about. The act of Leaving No Trace is a consideration in itself. Beyond the first six principles, however, being considerate involves the amount of noise a group makes and the behaviour they demonstrate around others.

1. Enjoy the silence. Many youth are not tuned to enjoy the silence of nature. Getting out of the classroom, having space to run in and the company of friends all contribute to loud enthusiasm during outdoor Ed trips. Obviously no student/ participant is going to sit still and be silent for days at a time, but a ten minute meditation is possible - as long as the mosquitoes are not too bad!

Questions to ask:

- What sounds can we hear around us?
- What effect can loud noises have on other travelers and wildlife?
- Would you be disturbed by bright clothing worn by other travelers? Why or why not?

Goals: student/ participants will consider their impact on other travelers and wildlife. By visualizing the interconnectedness of the area, student/ participant s gain an appreciation of their contact with the natural world.

2. Leave No Trace = Consideration. Consideration needs to be taken for both other travelers and those who still use the land for food and other traditional purposes. Sound, intrusion and damage to trapper's cabins, fish camps, hunting camps etc. are all things that can detract from the experience of those who subsist on the land. Discuss with student/ participants the importance of treating other wilderness users with respect.

Goal: student/ participants will learn to recognize how their behaviour can affect others. Student/ participants will understand they have the choice to respect other users' enjoyment of the wilderness.

ACTIVITY

Have the class (or smaller group) sit in contact with some part of the natural world (i.e. a stream, tree, plants, piece of bark). Provide a quiet dialog on visualizing the item interrelating with the rest of the area. Water flows and nourishes plants, tree roots tap into the soil and connect with other roots and water sources, etc.

LEAVE NO TRACE PRINCIPLES



OVERNIGHT TRIP

PRINCIPLE 1: Plan to Leave No Trace

Planning the overnight trip should be a class exercise. It will get student/ participant thinking about preparation, rather than leaving all the details to adults. Refer to daytrip lesson plan for logistics planning ideas.

1. No Trace menu planning. Planning meals to use the least amount of pots necessary is a good start for LNT cooking. Using fewer pots does not mean sacrificing nutrition or taste, but it does involve planning ahead. Refer to Soft Paths (NOLS) for one-pot cooking ideas.

Questions to ask:

- Are we cooking as a class or in smaller groups?
- How many people are we cooking for?
- How will we store our food?
- How long will food stay fresh?
- How are we carrying the food (backpack, canoe)?
- Can we prepackage anything so there's less waste?

Goal: to provide basic planning skills, including menu planning. By preparing ahead of time, student/ participant have the opportunity to familiarize themselves with some aspects of wilderness cooking.

2. Packing for the seasons. On overnight trips being prepared for the weather is especially important. Although packing light is great in theory, being ready for the weather makes a happier, less impacting experience for youth.

Questions to ask:

- What temperature ranges can we expect?
- Do you have a packing list to follow beforehand?
- Has a buddy checked your equipment before leaving on the trip?

Goal: to create understanding about the greater impact caused by not being properly prepared.

ACTIVITY

One-pot wonders. As a class or in groups, prepare a menu plan that involves the least amount of pots for each meal. Create some type of reward for creativity in meal planning. Make this a pre-trip activity, so student/ participant can try their creations at home.

ACTIVITY

Student/ participant should work in groups to double-check each other's equipment before heading out on the trip. Tie the importance of this to both personal safety and No Trace principles.

PRINCIPLE 2: Camp and Travel on Durable Surfaces

Travelling on durable surfaces is covered in the daytrip lesson plan component.

1. What is a durable surface? Provide a definition and create recognition of what is durable and what is sensitive. Discuss the options of where to pitch tents and create kitchen areas in the wilderness.

Questions to ask:

- What is the most comfortable ground to sleep on?
- Does that make it the best choice for a sleeping area? Why or why not?
- What choices can we make to reduce the impact we have on the ground?
- What equipment helps to make comfortable nights on more durable ground?

Goal: student/ participant will learn the range of surfaces, from durable to sensitive. Knowing what surfaces are better to sleep on allows student/ participant to make a choice to not damage fragile ground and vegetation.

2. Planning a kitchen in the wilderness. Your cooking area becomes one of the most heavily used spots, especially if staying in the same camp for several days. Discuss kitchen site choices, including soil durability, proximity to sleeping areas, wind, fire use, trail access, etc.

Questions to ask:

- How far away should we have the kitchen from the sleeping area?
- Are there established trails between the kitchen and the sleeping area? If not, how should we avoid creating them?
- Is access to water relatively easy or will we be making a large impact gathering water?

Goal: student/ participant will gain awareness of the impacts on heavily used parts of the campsite (kitchens, tenting areas).

ACTIVITY

Choosing a tent site. Lead the group on a tour of potential tent site in the camp area. Discuss the pros and cons of each site. Do not discount comfort as one of the necessities, but make student/ participant aware of other factors. As an extension, plant identification and discussion of plants, lichens and mosses can be included.

ACTIVITY

Leaving no trace in the kitchen. Make student/ participant aware that you are expecting to leave the kitchen just as clean as you found it (or cleaner). Have student/ participant detail their impressions of the site before setting up the camp. Reflect on any impacts at the end of the stay.

PRINCIPLE 3: Pack in, Pack out

This principle relates strongly to Planning Ahead. Discuss the relationship between planning ahead and decreasing the amount of garbage generated.

1. Repackaging for less waste. Before the trip, discuss with student/ participant the need to repackage some items to create less waste. As with Planning Ahead, review the planned menu and have student/ participant find ways to produce less waste.

Questions to ask:

- Why can leftover food be a problem on trips?

Goal: student/ participant will gain awareness of portion sizes and estimating quantities of food needed for group cooking.

2. Campfires for waste disposal. Discuss with the group what garbage should and should not be burned in a fire. Work towards consensus on when garbage will be allowed in the fire, where it will be put until it is burned, etc.

Questions to ask:

- What would you burn in your campfire? Explain.
- What would you not burn in your campfire?
- When is an appropriate time to burn garbage in the fire (i.e. after meals)?

Goal: student/ participant gain consideration for what does and doesn't burn, as well as when to burn garbage.

ACTIVITY

Have student/ participant determine the amounts of food each individual will consume on an overnight trip. This gives student/ participant practice in measuring meal quantities, planning for group cooking and creating less excess food. Take extra food on the trip but try to cook the portion sizes the student/ participant thought they would need.

ACTIVITY

Before the trip, create a camp waste management plan. Just as municipalities plan waste disposal, so can the class. Working in groups, have the class develop a plan for pack-out trash, burnables, items like cans that can be burned to remove odours, and food scraps. An extension is to include human waste management in the plan. Have groups present to the class and reach a consensus on the waste management plan the class will follow.

PRINCIPLE 4: Properly dispose of what you can't pack out

Waste water, waste food and human waste can be unsightly, a health hazard and have a negative impact on wildlife. Human waste should be planned for before the trip. Student/ participant should know what is expected of them. Catholes are covered in greater depth in the daytrip lesson plan.

1. Grey water. On student/ participant trips, the amount of dishwater generated can be substantial. Discuss the need to dispose of the water in a predetermined spot, in relation to LNT and bear awareness. Make student/ participant aware of your expectations regarding food scraps in the dish water.

Questions to ask:

- What are the benefits of straining grey water and properly disposing of greywater in the field?
- Are there any other methods of grey water disposal that may also work (i.e. flinging water into moving water)?

Goal: to encourage student/ participants to handle food wastes properly and to dispose of grey water in a No Trace manner.

2. Review human waste disposal and adopt a plan for the trip. A brown bag should be set up for disposal of paper products, which can then be burned. Review the following points to ensure minimum impact and maximum decomposition. Have a student/ participant group demonstrate cathole use for the class.

- pick a spot away from trails or areas in use
- south-facing slopes are a good place for high rates of decomposition and lovely views
- at least 60 metres from water and camp
- use a shovel or trowel to dig the hole: 15cm deep and 10cm wide
- keep your soil, preferably in one piece
- recover the hole and make it look as natural as possible
- pack out all toilet paper, tampons and pads: toilet paper does not burn well unless in a hot fire (waste paper products can be burned by trip leaders on overnight trips)

Questions to ask:

- What are some of the problems associated with human waste?
- Why are catholes a good way to dispose of human waste?
- Can we make a commitment as a class to all dispose properly of human waste?

Goals: encourage student/ participant s to agree as a group to take waste disposal seriously. Foster a strong consciousness within the group regarding the importance of catholes in keeping the wilderness wild.

ACTIVITY

When in the field, have student/ participants determine a good place for a grey water hole. Have a strainer handy at the hole site and have student/ participant s collect all the food scraps. Aim for zero-food particles in the hole. At the end of the trip, examine the site as a class to see what sort of trace was left.

PRINCIPLE 5: Leave what you find

This principle teaches an ethic of respecting the land, the animals, and the history of the area student/ participants travel through. Ethics of not cutting live trees, not picking flowers, etc. should be introduced and discussed with the group. This principle lends itself to a development of personal ethics and student/ participant examination of their personal experiences and beliefs with regard to wilderness travel.

1. Wildlife. Discuss the role animal sightings play in each student/ participant's appreciation of the wilderness. Discuss photography as a low-impact wilderness activity.

Questions to ask:

- Do student/ participants feel better just knowing the animals are out there, or do they feel they need to actually see wildlife?
- How would student/ participants feel if they knew a particular animal was missing from the area?

2. Heritage. Relate the timeline of human habitation to what constitutes an artifact and what is simply junk. Discuss First Nations' culture and reasons why it is important to respect and preserve First Nations' historical artifacts.

Questions to ask:

- What First Nation had this area as traditional territory?
- What do you do if you find a First Nations artifact while travelling in the wilderness?
- What is an artifact and what is garbage?
- Is old mining equipment an artifact? Why or why not?
- Does evidence of human activity change your experience in the woods?

Goals: Use the idea of leaving what you find to encourage student/ participant development of wilderness ethics. Student/ participants will examine their own beliefs and philosophies, as well as gain understanding from hearing other perspectives.

ACTIVITY

Wildlife photographer. Have student/ participant s bring and/or share cameras, with the intention of photographing wildlife. Discuss with student/ participants the appropriate distance to keep between themselves and wildlife. As a wrap-up, have a group discussion about what they discovered about animal behaviour, distances, setting up a picture, etc.

ACTIVITY

Create hypothetical situations, such as finding a hunting camp, a mining camp, abandoned canoes, campfire remains, carved trees or an old trapping cabin. What are student/ participant s' reactions to each? Discuss with student/ participants why they appreciate some evidence but are disturbed by other signs of human activity.

PRINCIPLE 6: Use stoves and small campfires

Providing student/ participants with the idea of fire as a choice, not a necessity is a key goal of an overnight LNT trip. Student/ participant s learn about cooking and equipment maintenance when using camp stoves as opposed to fire for cooking.

1. Choosing not to have a fire. Make fire a choice, not a requirement to your trip. Plan ahead for adequate clothing and food. If no fire is planned, camp stove maintenance becomes one of the priorities for a pleasant camping experience.

Goal: student/ participants will gain the skills necessary to have reliable, clean camp stoves on the trip.

2. The LNT fire. Discuss various forms of LNT fires (mound fire, firepan). Discuss the effects of fire on the soil, vegetation, rocks and aesthetics of an area.

Questions to ask:

- What sorts of household items would work as firepans (i.e. garbage can lid, oil change pan, large cookie sheet, etc.)?
- What surface makes the best LNT fire?
- What other factors should be considered with an LNT fire (wind, weather, exposure)?

Goal: student/ participants will learn how to make an LNT fire, and how to clean up when breaking camp.

3. Winter considerations. Discuss with student/ participants the effects of a fire in winter. Consider factors such as snow cover, the vegetation underneath and the use of a fire pan for protection. Though not evident during winter, the effect of fires on vegetation can be significant once summer comes.

ACTIVITY

Camp stove maintenance. Whether student/ participants use individual stoves or two-burner Colemans, maintaining and understanding camp stoves is key. In small groups, lead student/ participants through a cleaning and maintenance check of a camp stove. Demonstrate proper cleaning and starting methods for the type of stove the class will be using on the trip.

ACTIVITY

LNT fire. Either demonstrate or have a student/ participant group research and demonstrate how to build an LNT fire. Things to consider are location, wind, exposure, etc. Build both a mound fire and a firepan fire. Discuss which is easier for various forms of travel. When breaking camp, clean up the fire pit.

PRINCIPLE 7: Be considerate

Just as Principle 1, **Plan ahead and Prepare**, encompasses portions of all other LNT principles, so does Principle 7. Showing consideration for other wilderness users is a part of what each ethic is all about. The act of Leaving No Trace is a consideration in itself. Beyond the first six principles, however, being considerate involves the amount of noise a group makes and the behaviour they demonstrate around others.

1. Discuss the good and bad effects of noise in the woods (i.e. bear deterrent vs. intrusiveness).

Questions to ask:

- What effect can loud noises have on other travelers and wildlife?
- Would you be disturbed by bright clothing worn by other travelers? Why or why not?

Goals: student/ participant s will consider their impact on other travelers and wildlife.

2. Leave No Trace = Consideration. Consideration needs to be taken for both other travelers and those who still use the land for food and other traditional purposes. Discuss with student/ participants the importance of treating other wilderness users with respect. Talk with student/ participants about subsistence lifestyles. Use the questions below to link the entire concept of LNT to the concept of showing consideration for others.

Questions to ask:

- What sorts of things could travelers do that would bother someone with a cabin? (i.e. sound, poking around a fish camp, leaving garbage, fires in wrong spots)
- Why should we show respect and consideration for other users of the land, especially those gathering food or using the land for traditional purposes?
- How does following each LNT principle lead to principle 7? In other words, what is the connection between being considerate of other wilderness users and the rest of LNT?

Goal: student/ participants will learn to recognize how their behaviour can affect others. Student/ participants will understand they impact other users' time in the wilderness, both during their trip and with what they leave behind.

ACTIVITY

Ten minutes of silence. Have the class sit quietly for ten minutes, reflecting either on their planned activities, or on what they have done that day. At the end, facilitate a discussion about what sorts of things they thought of, and what they think about keeping still and silent. If enjoyed, suggest that the class start each day with a silent time.

Basic Wilderness Survival Skills

The advances in the development of outdoor clothing, equipment, emergency food and techniques have been growing rapidly in recent years. For those beginners interested in using the outdoors there is unlimited information on wilderness survival skills and equipment available. However, experience is the best teacher in any outdoor situation and your reaction in a wilderness survival situation depends on your education. Always keep in mind that it can happen to you. Those who are mentally and physically prepared to survive are more likely to do so. To deal with an emergency situation one must be able to make decisions, improvise and remain calm.

Fear - For anyone faced with a wilderness emergency survival situation, fear is a normal reaction. Unless an emergency situation has been anticipated, fear is generally followed by panic then pain, cold, thirst, hunger, fatigue, boredom and loneliness. It is extremely important to calmly assess the situation and not allow these seven enemies to interfere with your survival.

Pain - Pain may often be ignored in a panic situation. Remember to deal with injuries immediately before they become even more serious.

Cold - Cold lowers the ability to think, numbing the body and reducing the will to survive. Never allow yourself to stop moving or to fall asleep unless adequately sheltered.

Thirst - Dehydration is a common enemy in an emergency situation and must not be ignored. It can dull your mind, causing you to overlook important survival information.

Hunger - Hunger is dangerous but seldom deadly. It may reduce your ability to think logically and increase your susceptibility to the effects of cold, pain and fear.

Fatigue - Fatigue is unavoidable in any situation so it is best to keep in mind that it can and will lower your mental ability. Remember that in an emergency situation this is often the body's way of escaping a difficult situation.

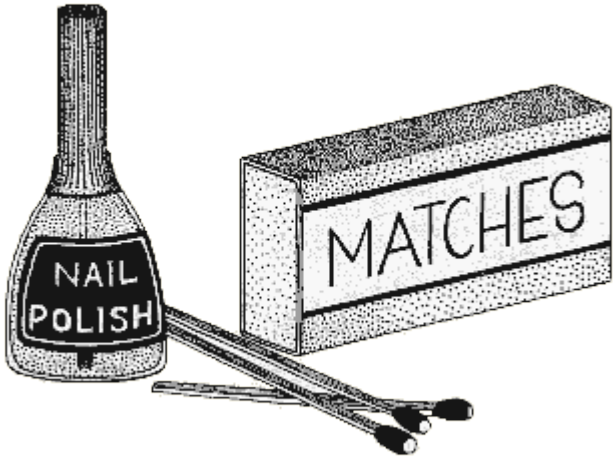
Boredom & Loneliness - These enemies are quite often unanticipated and may lower the mind's ability to deal with the situation.

HOW TO:

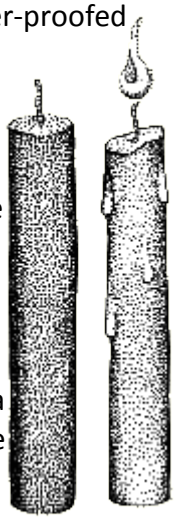
Build a Fire

Building a fire is the most important task when dealing with survival in the wilderness. Be sure to build yours in a sandy or rocky area or near a supply of sand and water as to avoid forest fires. The most common mistakes made by those attempting to build a fire are: choosing poor tinder, failing to shield precious matches from the wind and smothering the flames with too large pieces of fuel. The four most important factors when starting a fire are spark - tinder - fuel - oxygen.

The most common ways to create spark are:



1. Waterproof, strike-anywhere matches are your best bet. Matches may be water-proofed by dipping them in nail polish. Store your matches in a waterproof container.



2. A cigarette lighter is also a good way to produce a spark, with or without fuel.

3. The flint and steel method is one of the oldest and most reliable methods in fire starting. Aim the sparks at a pile of dry tinder to produce a fire.

4. The electric spark produced from a battery will ignite a gasoline dampened rag.

5. Remove half of the powder from a bullet and pour it into the tinder. Next place a rag in the cartridge case of the gun and fire. The rag should ignite and then may be placed into the tinder.

6. Allow the suns rays to pass through a magnifying glass onto the tinder.

Dry grass, paper or cloth lint, gasoline-soaked rags and dry bark are all forms of tinder. Place your tinder in a small pile resembling a tepee with the driest pieces at the bottom. Use a fire starter or strip of pitch if it is available.

It is important to keep in mind that smaller pieces of kindling such as, twigs, bark, shavings and gasoline, are necessary when trying to ignite larger pieces of fuel. Gather fuel before attempting to start your fire. Obviously dry wood burns better and wet or pitchy wood will create more smoke. Dense, dry wood will burn slow and hot. A well ventilated fire will burn best.

Build a Shelter

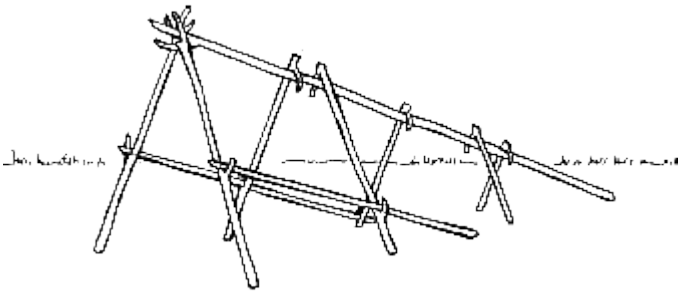
A small shelter which is insulated from the bottom, protected from wind and snow and contains a fire is extremely important in wilderness survival. Before building your shelter be sure that the surrounding area provides the materials needed to build a good fire, a good water source and shelter from the wind.

Wilderness shelters may include:

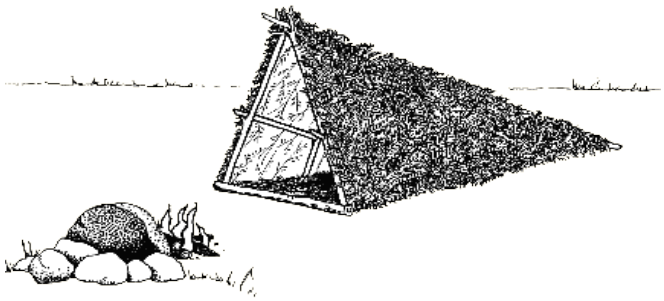
1. Natural shelters such as caves and overhanging cliffs. When exploring a possible shelter tie a piece of string to the outer mouth of the cave to ensure you will be able to find your way out. Keep in mind that these caves may already be occupied. If you do use a cave for shelter, build your fire near its mouth to prevent animals from entering.

2. Enlarge the natural pit under a fallen tree and line it with bark or tree boughs.

3. Near a rocky coastal area, build a rock shelter in the shape of a U, covering the roof with driftwood and a tarp or even seaweed for protection.



4. A lean-to made with poles or fallen trees and a covering of plastic, boughs, thick grasses or bark is effective to shelter you from wind, rain and snow.



5. A wigwam may be constructed using three long poles. Tie the tops of the poles together and upright them in an appropriate spot. Cover the sides with a tarp, boughs, raingear or other suitable materials. Build a fire in the center of the wigwam, making a draft channel in the wall and a small hole in the top to allow smoke to escape.

6. If you find yourself in open terrain, a snow cave will provide good shelter. Find a drift and burrow a tunnel into the side for about 60 cm (24 in) then build your chamber. The entrance of the tunnel should lead to the lowest level of you chamber where the cooking and storage of equipment will be. A minimum of two ventilating holes are necessary, preferably one in the roof and one in the door.

CLOTHING AND EQUIPMENT

Clothing
Clothing must provide warmth and offer protection from the elements. Layers of light, natural fibers are best. Hats are a must, as they offer protection from both the heat and cold. Water proof outer layers are necessary.

Equipment
Equipment must be easily manageable and promote survival in any situation. Items to carry in your pockets may include a fire starter, waterproof matches and/or lighter, a pocket knife, goggles, compass, small first-aid kit and some sort of trail food.

Survival Kit
Items for your survival kit should be packed in a waterproof container that can double as a cooking pot and water receptacle and be attached to your belt.

Backpack
In addition to a survival kit, a good, comfortable backpack is mandatory. Loads of about 18 kg (40 lb.) are average. Items to include are; flashlight, extra jacket, socks and mittens, a pocket saw, gas camp stove, first aid kit, emergency food, and a tent and fly.



CHECK LIST

Useful items to include on your hike are:

1. A map and compass.

2. A large, bright plastic bag will be useful as a shelter, signaling device or in lieu of raingear.

3. A flashlight with extra batteries.

4. Extra water and food.

5. Extra clothing such as raingear, a toque and gloves, a sweater and pants.

6. Sun protection such as sunglasses, sunscreen, a hat and long sleeved clothing.

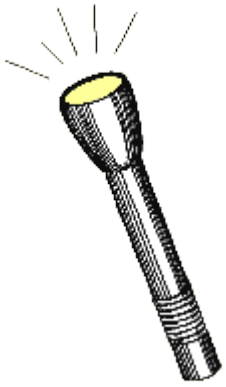
7. A sharp pocket knife.

8. Waterproof matches, a lighter and/or a flint.

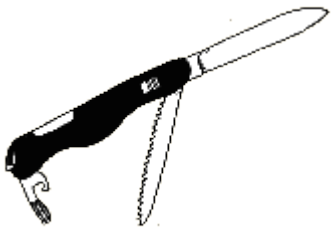
9. Candles and fire starter.

10. A first aid kit.

11. A whistle, flares, a tarp.







Wilderness Survival: First Aid & Health

When journeying into the wilderness it is important to carry a complete first aid kit and book. It is also wise to take a first aid course. A good diet, cleanliness and appropriate clothing will lower the risk of harmful situations.



Disease, infection and often, insect bites can be avoided when maintaining a proper diet. It is important to bathe daily but if this is not possible be sure to wash your hands frequently. Soap can be made using ashes and animal fat or by boiling the inner bark of a pine tree. Construct a toothbrush by mashing the end of a green twig. When setting out for your journey remember to pack a wide range of clothing and extra footwear.

FIRST AID

If an accident occurs in the wilderness it will be your responsibility to deal with the situation. The specific sequence of actions when dealing with this situation is:

1. Remain calm, providing your patient with quiet, efficient first aid treatment.
2. Keep the patient warm and lying down. Do not move this injured person until you have discovered the extent of the injuries.
3. Start mouth-to-mouth artificial respiration immediately if the injured person is not breathing.
4. Stop any bleeding.
5. Give your patient reassurance. Watch carefully for signs of shock.
6. Check for cuts, fractures, breaks and injuries to the head, neck or spine.
7. Do not allow people to crowd the injured person.
8. Do not remove clothing unless it is imperative.
9. Decide if your patient can be moved to a proper medical facility. If this is not possible, prepare a suitable living area in which shelter, heat and food are provided.

SHOCK

Shock is a depression of all of the body processes and may follow any injury regardless of how minor. Factors such as hemorrhage, cold and pain will intensify shock. When experiencing shock the patient will feel weak and may faint. The skin becomes cold and clammy and the pulse, weak and rapid. Shock can be more serious than the injury itself.

Use the following method to prevent and control shock:

1. When treating injuries:
i. restore breathing
ii. stop bleeding
iii. treat breaks and fractures
2. If there are no head or chest injuries place the patient on his/her back with the head and chest lower than the legs. This will help the blood circulate to the brain, heart, lungs and other major organs.
3. If severe head and chest injuries are present elevate the upper body. If chest injuries are present, elevate the injured side to assist in the functioning of the uninjured lung.
4. If the injured person becomes unconscious, place him/her in a face down position to prevent choking on blood, vomit or the tongue.
5. Keep your patient warm and under shelter.

STOPPED BREATHING

If breathing has stopped, begin mouth-to-mouth resuscitation. Place the patient on his/her back and follow these steps:

1. To open the airway lift the patient's neck and tilt the head back.
2. Keeping the neck elevated, pinch the nostrils to prevent air leakage.
3. Place your mouth completely around the victim's mouth and blow, watching for chest expansion.
4. After removing your mouth, listen for air leaving the patient's lungs and watch for the chest to fall. Check for an airway blockage if the chest does not rise.

Repeat these steps approximately 12 to 15 times per minute. If treating a child, cover the nose and mouth with you mouth. Use smaller puffs of air and repeat this method 20 to 25 times per minute.

BLEEDING

To control bleeding, elevate the wounded area above the heart and apply pressure using either gauze, clean cloth, dried seaweed or sphagnum moss. Use pressure at the pulse point between the injured area and the heart if bleeding fails to stop. If bleeding still persists, use a tourniquet between the injury and the heart. This method should only be used in extreme situations. After bleeding has been controlled, wash the wounded area with disinfectant and apply a dressing and bandages.

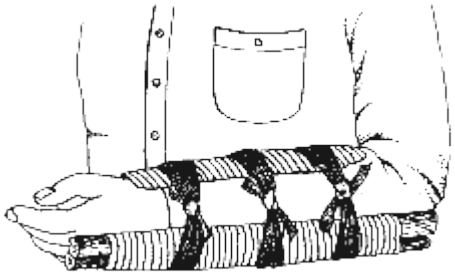
FRACTURES

A fracture is classified as either a simple (closed) or compound (open). Signs that a fracture is present include:

1. Pain at the affected area.
2. The area may or may not be deformed.
3. The victim is unable to place weight on the area without experiencing pain.
4. A grating sensation or sound may be present during any motion of the injured area.

Treatment is as follows:

1. If in doubt, treat the injury as a fracture.
Splint the joints above and below the fracture.
the fracture may penetrate the skin, it could be necessary to apply traction to straighten the deformity.
Be sure to pad your splints.
Check the splint ties frequently to be sure they do not hinder circulation.
Cover all open wound with a clean dressing before splinting.



2.
3. If
4.
5.
6.

DISLOCATION

Dislocation happens when the ligaments near a joint tear, allowing the movement of the bone from its socket. It is unwise to treat a dislocation unless you are a trained professional as permanent damage may occur. The affected extremity should be supported using a sling or other device and pain controlled with aspirin or other suitable drugs.

SPRAINS

Treat sprains by applying cold to the area for the first 24 hours then once the swelling has subsided, let the sprain sit for a day. Apply heat the following day to aid in the healing process. The sprain should be splinted and rendered immobile until the pain has completely disappeared.

CONCUSSIONS

Concussions or other head injuries are often accompanied by a leakage of watery blood from the nose or ears. Other symptoms may include convulsions, an unresponsiveness of the pupils or headache and vomiting. Keep the injured party warm, dispense a pain killer regularly and allow time for the body to rest and repair.

HEAT EXHAUSTION

Heat exhaustion is not uncommon when water is not sufficient. The body becomes dehydrated and salt-depleted, resulting in nausea, faintness, a weak, rapid pulse and/or cold and clammy skin. Treatment includes plenty of rest, liquid and salt tablets.

SUNSTROKE

Sunstroke may occur when the body is exposed to excessive sun. The body becomes overheated and provides too much blood to the circulatory system resulting in a flushed, hot face, rapid pulse, headache and/or dizziness. Treat sunstroke by resting in a cool area and applying and consuming cold liquid. Prevent sunstroke by wearing proper headgear.

MUSCLE CRAMPS

Muscle cramps occur when the muscle accumulates excessive lactid acid or a loss of salt through perspiration. Treatment includes resting, deep breathing and stretching. Restore the salt balance immediately.

BURNS

Burns are most commonly followed by shock. Administer a pain reliever immediately, apply gauze covered in Vaseline to the affected area and bandage. The patient should consume more water than usual.

SNOWBLINDNESS

Symptoms of snow blindness include scratchy or burning eyes, excessive tearing, sensitivity to light, headache, halos around light and temporary loss of vision. Bandage the victim's eyes and use cold compresses and a painkiller to control the pain. Vision will generally be restored after 18 hours without the help of a doctor. Always wear snow goggles or sunglasses in snowy areas to prevent snow blindness.

FROSTBITE

Frostbite occurs when the tissue of an area, most commonly the toes, fingers or face, is frozen either from direct exposure to the elements or high wind. First degree frostbite turns the area cold, white and numb. When heated the area becomes red and can be compared to a first degree burn. A blister will form after warming with second degree frostbite. Dark skin, gangrene, and a loss of some skin and tissues is common in third degree. Fourth degree frostbite causes irreparable damage. The affected area will remain cold and lifeless and generally a part of the area is lost. With adequate clothing frostbite can easily be avoided. Superficial frostbite may be treated by cupping one's hands and blowing on the affected area, warming from another warm hand or, with fingers, placing them in your armpits. For more severe cases, medical aid should be sought.

BLISTERS

Blisters are the painful, and common, result of ill-fitting footwear. At the first sign of discomfort, remove boots and socks and place a piece of adhesive tape over the affected area. If it is absolutely necessary, open a blister by first washing the area thoroughly then inserting a sterilized needle into the side of the blister. Apply disinfectant and a bandage.

HEADACHES

Headaches are often experienced in the mountains due to inadequate eye protection, tension in the neck, constipation or "water intoxication", a swelling of the brain tissue which happens when the hiker has sweated excessively over a period of days and consumed large quantities of water without taking salt tablets. Aspirin may be used to alleviate the pain but one should find the source of headache to prevent further discomfort.

SNAKE BITES

Snake bites are not overly common in British Columbia. One species of venomous snake, a rattlesnake is found in the dry belt of the southern interior. If you come across a snake slowly ease back. A snake bite rarely causes death; victims may be left untreated for up to eight hours.

After an attack occurs:

1. Keep the person calm, reassuring them that bites can be effectively treated in an emergency room. Restrict movement, and keep the affected area just below heart level to reduce the flow of venom.
2. Remove any rings or constricting items because the affected area may swell. Create a loose splint to help restrict movement of the area.
3. If the area of the bite begins to swell and change color, the snake was probably poisonous.
4. Monitor the person's vital signs -- temperature, pulse, rate of breathing, blood pressure. If there are signs of shock (such as paleness), lay the victim flat, raise the feet about a foot, and cover the victim with a blanket.
5. Get medical help immediately.

BEE STINGS

Bee stings are common and harmless unless you are allergic. Remove the stinger then apply disinfectant and clod water to reduce the swelling.

A change of diet, dirty cooking utensils or the consumption of tainted water may result in diarrhea which in turn will cause a loss of nutrients and precious body fluids. Take extra care in cleanliness and boil water for an additional three to five minutes to avoid diarrhea.

HYPOTHERMIA

When the temperature of your body falls to a level at which your vital organs can no longer function you are experiencing hypothermia or exposure sickness. Hypothermia will develop rapidly and is caused by cold, wet and/or windy weather that chills the body at a speed faster than it can produce heat. A lack of energy-producing food and proper clothing will heighten the speed at which hypothermia will affect you. Always remember to bring extra clothing. It is important to hike at the speed of the slowest member of your party. Take frequent breaks and keep a close watch for members experiencing signs of fatigue. Exposure sickness generally occurs in temperatures of less than 10 C (50 F).

Symptoms are easily recognizable:

1. Feeling cold and constantly exercising to keep warm.
2. Uncontrollable shivering and numbness.
3. Violent shivers. Your mind becomes slow and starts to wander.
4. Violent shivering ceases and muscles begin to stiffen and become un-coordinated. Exposed skin becomes blue and thoughts are foggy. Victim usually lacks the capability of realizing how serious the situation is.
5. Pulse and respiration slows.
6. Victim will not respond and becomes unconscious.
7. The section of the brain controlling the heart and lungs ceases functioning.

Treatment must be quick and efficient:

1. Move the victim to a sheltered area, out of the elements.
2. Remove wet clothing and replace with dry clothes and if possible, a sleeping bag.
3. Wrap warm rocks and place them near the patient.
4. Do not let the victim fall unconscious.
5. Give the victim a warm, non-alcoholic drink.
6. Allow another person in the sleeping bag to share body heat.
7. Exhale warm air near the vicinity of the patient's mouth and nose.

HYPERTHERMIA

Hyperthermia is a result of the body being overheated due to increased air temperature, solar or reflected radiation, poorly ventilated clothing, a low fitness level or excess bulk.

Symptoms include:

1. Heat cramps may occur and should be treated by moving the victim to a shady area and supplying water and salt tablets.
2. Heat exhaustion is a mild form of hyperthermia and includes symptoms such as headache, dizziness, fainting, clammy skin, blurred vision, nausea and vomiting. Treatment is the same as heat cramps.
3. Heat stroke is the most serious degree of hyperthermia. The victim will have little or no perspiration, a hot and flushed face, full pulse, and become either apathetic or aggressive. Cool the victim as quickly as possible paying extra attention to the head, neck and chest. If the body's temperature continues to rise, unconsciousness, delirium, convulsions and ultimately death may occur.



To avoid hyperthermia, avoid strenuous activity on hot days, wear loose clothing and a hat, drink plenty of fluids and take salt tablets.

Wilderness Survival: Travel In the Woods

If you do become lost, stay where you are. Build a fire and carefully assess the situation. Do not use precious energy by wandering aimlessly.

During the winter months use game trails which will help you avoid walking in the deep snow. Frozen streams and rivers are also easy to follow but watch for weak ice.

MEASURING DISTANCE

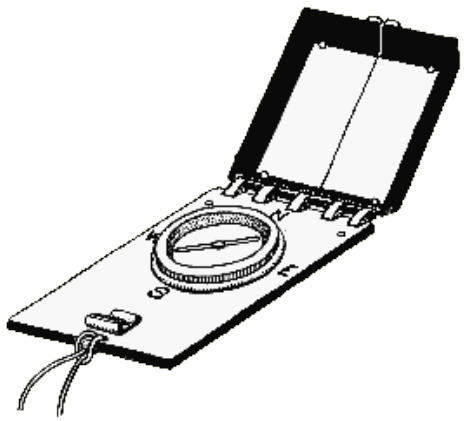
When measuring distance the most effective method is the tally and pace system:

1 pace = 75 cm (29.25 in)
1 double pace = 150 cm or 1.5 m (58.5 in)
66 double paces = 99 m (107.9 yards) = 1 tally (tie a knot in a string for each tally)
10 tallies = 1000 m or 1 km (0.62 mi)

FINDING DIRECTION

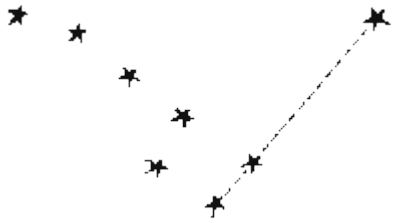
Using a Compass
(Note: When using a compass in coastal British Columbia, it will read 22 degrees east of true north. More time must be allowed to read a bearing during the winter months as it takes longer for the needle to finish swinging.)

A magnetic-Sylva type compass is a lost hiker's best friend. First, decide which direction you want to follow then aim over the centre of your compass to the bearing you want to follow and find a landmark on this sighting. After arriving at this landmark repeat the process. Using this pattern you will follow a relatively straight line.



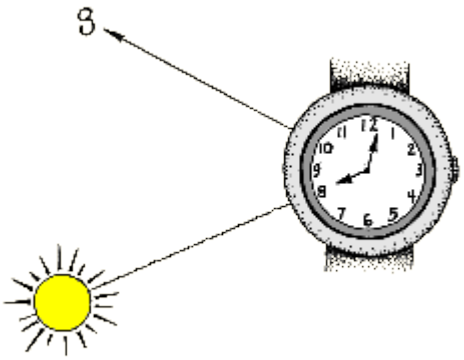
Using the Stars

For those unfortunate enough to not have a compass, using the pole star for direction will suffice. Simply located the pole star and you will be facing north. To find this star use the Big Dipper constellation. The pole star will be located off of the top of the "dipper", on the opposite side of the handle.



Using the Sun

You may also use your watch and the sun to determine direction. Point the hour hand directly at the sun and then bisect the angle between the hour hand and twelve o'clock. This imaginary line will run north/south.



METHODS OF NAVIGATION

There are three common methods of navigation:

1. Map reading is a common method used, particularly in developed areas. Maps and aerial photos may be used when landmarks are clear.

2. Using a compass in conjunction with maps and aerial photos is wise in areas without good landmarks.

3. Navigation by dead reckoning is common in areas where landmarks are non-existent or inadequate. This method combines plotting and recording of a series of courses, measured by distance and direction from a starting point.

** It is important to stay alert and observe all unusual landmarks.*

Difficulties in navigation may occur for several reasons. Some of these include

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WHEN YOU'RE LOST IN THE WOODS

The most important thing to remember if you find yourself in this situation is not to panic. First, treat any injuries within your party. Next, establish that your basic needs are met. These include heat, shelter, water and food. Then consult your map and compass and try to recognize or remember landmarks you may have passed.

To determine how many hours of daylight are left, face the sun and extend your arm towards it. Bend your wrist inwards and place your fingers just below the sun. Disregarding your thumb, count how many fingers separate the sun from the horizon. Each finger will represent fifteen minutes.

If it is nearing dark, build a shelter and fire that is on high ground and out of the wind. Have a snack and a hot drink and get some rest. Don't waste precious energy by trying to find your way in the dark.

During daylight hours it is important to find a way to signal to others. A fire is best. Be sure to find a means with which to carry water. If you must move be sure to leave markers that searchers can follow.

SIGNALS

A fire is the safest method to use when signaling for help. The smoke is easily spotted during the day and the flames by night. Three signal fires laid 30 m (98 feet) apart and lit when an aircraft passes is a good way to indicate your distress. The Morse Code emergency signal is S...O...S... and may be sent with a flashlight and consists of three dots followed by three dashes followed by three dots. The dashes should be twice as long as the dots. Messages or signal letters may be drawn in the snow. A signal mirror is also a very effective method used. Flash the mirror along the horizon regardless of whether a plane is in view.

Wilderness Survival: Food & Water

FINDING FOOD & WATER

In a wilderness survival situation, it is possible to live for extended periods of time on little or no food. Research shows that a healthy individual can survive on 500 calories a day with no side effects and with plenty of water and a comfortable resting place can live approximately three weeks without food. During cold weather or periods of heightened activity more food is required to maintain a normal body temperature.

Water is much more important. Two to three cups of water are required each day to stay healthy. It is wise to conserve the water in your body by reducing activities that may promote water loss.



Finding water during the summer months is quite easy. Running water such as springs or streams in isolated areas is generally safe for consumption but be aware that water in stagnant areas such as sloughs and ponds may carry disease and should either be boiled for a minimum of three minutes, or iodine (nine drops per quart) or halazone tablets added.

It is wise to carry a water purification pump with you. This allows the hiker to make use of stagnant water in any situation and it is not necessary to carry water with you. In areas where no surface water is available, dig into damp soil and allow this muddy water to settle and become clear. Water may also be found on the dew of plants, by collecting rainwater or in fish juices.



During the winter months it is wise to look for water under ice. Melting ice as opposed to snow is more fuel efficient. Remember that hard-packed snow will yield more water than light, fluffy snow. Do not eat snow as it tends to dehydrate the body.

Finding food in the wilderness may prove slightly more difficult but by no means impossible. Try and sustain with natural foods before using your emergency survival kit rations.

If water is not readily available try to limit your food consumption to carbohydrates, as proteins use more water to digest. Keep in mind that all fur-bearing animals and grass seeds are edible and that there is more food value in the roots of plants than the greens.

Extra care should be taken when consuming seafood. Try to avoid mussels during the summer months as they contain certain toxins which are not present during the winter. Sea urchins, a prickly purple or green sea creature, may be consumed by breaking them open and eating the

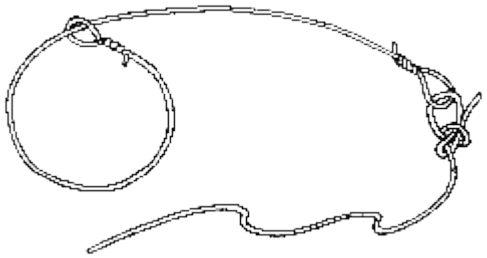
red or yellow eggs inside. Steam snails, clams and limpets. Frogs, snakes, lizards and birds are also edible. Remove the head, entrails and skin before adding them to the pot.

POISONOUS PLANTS

Care should be taken when consuming any unknown plant in the wilderness. Avoid red and white berries, and plants resembling beans, melons and cucumber as they are often poisonous. There are a large variety of mushroom species, most are edible but some are extremely dangerous and should be avoided unless you can positively identify them. Water hemlock is a particularly poisonous plant which is found in swampy areas of British Columbia. It grows up to two metres, with hollow roots and small white flowers. The dangerous baneberry plant grows up to one meter tall and produces small white flowers and white or red berries.

FISHING & HUNTING

Setting snares, traps, nets and set lines will assist you in finding food to help with your survival. Trails are excellent places to set snares. Animal tracks offer information pertaining to the type of animal, its size and the direction it was headed. Following these tracks will often lead to water-holes and feeding grounds where you may use your traps or snares.



Orienteering Scavenger Hunt

Grade level: 10-12
Provincial curriculum links: Ontario
Subject: Physical Education/ Outdoor Education
Keywords: Travelling, directions such as north, south, east, and west

SPECIFIC LESSON GOALS

- ☆ Reading a Compass
- ☆ Learning directional navigation to reach checkpoints

DESCRIPTION

The students will take a reading with a compass and use the compass to reach multiple checkpoints

RESOURCES REQUIRED:

- Compasses (one for every student)
- one demonstration compass (either large one or overhead)
- balloons
- poly spots
- direction cards

PREPARATION

Length of lesson: 120mins

Begin class by telling the students that orienteering is a race to find different control markers hidden in back country using only a map and compass. The first thing they need to learn before orienteering is how to use a compass.

Demonstrate use of a compass with a large demonstration compass or an overhead projector. The students should be able to identify the following compass parts;

- Compass base is the rectangular bottom part of the compass.
- Compass needle or magnetic needle is the red and white arrow that moves. The red part of the needle always points north.

- Compass housing or dial is the turnable dial on the compass. The numbers on the dial refer to degrees of azimuth, or also called a bearing.
- Direction of travel arrow or sighting line is the arrow on the compass base. This is the point where you want to go.

To use the compass, hold the compass level so the magnetic needle turns freely. Rotate the compass dial to a desired bearing (so the sighting line falls directly on a bearing such as 90 degrees which is east). Hold the compass so that the back of the compass (part of the compass base opposite the direction of travel arrow) is at your belly button. Keeping the back of the compass at your belly button, turn in a circle until the red end of the magnetic needle lines up with zero degrees (north) on the compass dial. The direction of travel arrow now points to the bearing set on your compass. For more information on using a compass, go to www.learn-orienteering.org/.

Walk the students through the cues and repeat the steps to face different directions and bearings. Practice travelling at specific bearings by setting the compass to a bearing, picking a spot on the gym wall that the directional arrow points to, and walking towards that spot.

After the students have grasped the reading of a compass then you can start them on a Scavenger Hunt. If they need more time learning how to read the compass then you may want to come back the next day to do the Scavenger Hunt.

PROCEDURE

Orienteering Scavenger Hunt

Set up the scavenger hunt by spreading poly spots on the floor of the activity area. Write the following directions on different scraps of paper so that each course is on a different piece of paper:

Course 1
120°-10 Steps
240°-10 Steps
0°-10 Steps

Course 2
300°-8 Steps
60°-8 Steps
180°-8 Steps

Course 3
90°-12 Steps
180°-12 Steps

270°-12 Steps
0°-12 Steps

Course 4
90°-6 Steps
180°-8 Steps
330°-10 Steps

Course 5
130°-3 Steps
220°-4 Steps
310°-6 Steps
100°-5 Steps

Course 6
110°-6 Steps
200°-8 Steps
290°-12 Steps
80°-10 Steps

Fold the paper and put one of these in each balloon. Blow up the balloons and spread them around outside of general space. Putting the course directions in the balloon is optional.

Begin the activity by having students spilt up into pairs. Stress the fact that they never travel alone! They may be in a team of three if you have an odd number of students in class. One partner goes to a poly spot on the floor and the other partner gets a balloon and meets their partner at the spot. They pop the balloon and get the directions out of it. Make sure they pick the balloon up after they pop it. Each student uses their own compass, but they travel as a team according to the directions. The directions on the sheet of paper will lead them back to where they began--the poly spot.

ENRICHMENT/ EXTENSION ACTIVITIES

Variations: The balloon idea is optional.

Use a penny or a small marker that is more difficult to see instead of the polyspots.

I got pictures of lots of cool parks all over the world and used these and told the students that this is the area that they were travelling in.

ASSESSMENT IDEAS

Have students write how many steps away from their poly spot they ended up.

TEACHING SUGGESTIONS

The compass will not be accurate if used next to metal objects such as watches, belt buckles, and metal poles.

Make sure students pick a reference point on the wall when walking, rather than always watching their compass.

Have everyone practice facing different directions/bearings before travelling.

Section D
GPS Activities



Degrees, Minutes, Seconds

There are several ways to measure the size of an angle. One way is to use units of degrees. (Radian measure is another way.)

In a complete circle there are three hundred and sixty degrees.

An angle could have a measurement of 35.75 degrees. That is, the size of the angle in this case would be thirty-five full degrees plus seventy-five hundredths, or three fourths, of an additional degree. Notice that here we are expressing the measurement as a decimal number. Using decimal numbers like this one can express angles to any precision - to hundredths of a degree, to thousandths of a degree, and so on.

There is another way to state the size of an angle, one that subdivides a degree using a system different than the decimal number example given above. The degree is divided into sixty parts called minutes. These minutes are further divided into sixty parts called seconds. The words minute and second used in this context have no immediate connection to how those words are usually used as amounts of time.

In a full circle there are 360 degrees.
Each degree is split up into 60 parts, each part being 1/60 of a degree. These parts are called minutes.
Each minute is split up into 60 parts, each part being 1/60 of a minute. These parts are called seconds.

The size of an angle could be stated this way: 40 degrees, 20 minutes, 50 seconds.

There are symbols that are used when stating angles using degrees, minutes, and seconds. Those symbols are show in the following table.

Symbol for degree:
Symbol for minute:
Symbol for second:

So, the angle of 40 degrees, 20 minutes, 50 seconds is usually written this way:

40, 20’,50”

GPS Field Exercises & Games

Instructor Guide

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The following are a series of hands-on learning exercises that can be used with GPS/land navigation classes. Generally, they are designed to be used after a period of instruction and demonstration on the particular topic. The exercises can be used with small groups that must share GPS units and other equipment. The terms and features relate to using Garmin receivers, but can be easily adapted to other brands. Actual receiver operations are indicated as bold italicized instructions.

Be sure that all of the GPS receivers are set to the same coordinate system (usually either UTM/UPS or Lat-Long) and to the correct map datum to match your topographic maps (usually NAD27-CONUS).

Unless you are fortunate enough to have a GPS receiver for each student, divide the participants into teams according to the number of receivers available. Hopefully, you would have enough so that the each team is no larger than 4 or 5 students. If some students already have a basic familiarity with GPS, try to spread them among the teams as helpers. Even if you have enough receivers for everyone, some of the exercises are best done in the team format.

GETTING TO KNOW YOUR GPS RECEIVER

This basic field exercise is designed to teach students the fundamentals of operating a GPS receiver. It is similar to the "getting started" section found in most GPS owner manuals. Each team needs a GPS receiver and a magnetic compass.

1. Each team should mark (and name) the starting location and then freely roam the designated site as a group with their GPS receiver.

2. Each participant should operate the GPS unit on at least one leg of the trip:

- scroll through the pages to observe their functions (speed, track, distance, etc.).
- practice marking waypoints
- use compass to check GPS directional accuracy when stopped and at walking speeds.
- demonstrate trackback at least once during the trip
- use the go to function to return to the starting location.

3. All teams gather back together. Review any problems or questions that arose during the field exercise.

TREASURE HUNT

This is another basic field exercise that can be used in the early stages of your GPS class since it is simply a series of go to operations. Depending on the terrain you select, a Treasure Hunt can be as easy or as challenging as you wish to make it.

1. Prior to your class, stash small "treasure chests" (containers of popcorn, granola bars, etc.) in scattered locations. Make the same number of treasure stashes as your number of teams. Mark the waypoint of each treasure chest on each of the GPS receivers. (Variation: for an advanced class, you may prefer to provide the set of waypoint coordinates for the students to enter into their GPS receivers).

2. Form the class into teams of "treasure hunters". Explain that xxx number of treasure chests await them, the location of each one marked as a waypoint in their GPS receivers. Their challenge is to race against the other teams to find the hidden treasure ... or the teams may choose to collaborate instead, assigning a different treasure to each team, since there is enough to go around.

3. Give them a specific time to return (with or without their treasure), then turn 'em loose.

4. When completed, gather all teams back together. Review any problems or questions that arose during the field exercise. Eat any remaining treasure.

GPS AND TOPOGRAPHIC MAPS

This field exercise develops basic skills in using GPS receivers in combination with topographic maps. Each team will need a topographic map of the area with UTM or Lat/Long gridlines (which they can draw prior to the field exercise), a GPS receiver set to the matching coordinate system and map datum, grid cards or ruler, and a magnetic compass.

1. Each team should roam to several sites with distinct topographical features that would show up on the map (junction of 2 creeks, hilltop, road fork, etc.). Mark each of these locations in the GPS receiver. Then plot each of the marked GPS waypoints on the map, using the grid card or ruler. If everything was done correctly, the plotted locations should closely match the on-the-ground landmarks.

2. To practice the reverse procedure, team members should view the map and measure the coordinates of selected distinct landmarks (using grid card or ruler). Enter the coordinates as waypoints in the GPS receiver. The team should then use the GPS unit to go to these waypoints to see if they end up at the expected locations.

3. Gather teams back together. Review any problems or questions that arose during the field exercise.

If you have access to a digital mapping program and a PC connector, transfer the waypoints from the GPS receiver to the computer. Have the team members observe the process and check the results for accuracy according to their field observations.

NAVIGATION TRAIL

This exercise tests skills in GPS operation, topo mapping, compass, and pacing. The route is a circular, multiple-leg trail. Each team will need a topographic map covering the field exercise area, a magnetic compass, and a GPS receiver. Prior to your class, set up a series of waypoint stations, each with posted instructions for navigating to the next station. The following is a sample of the type of navigation instructions you might post. Depending on terrain you select, number of stations, and complexity of the navigation instructions, a Navigation Trail can be as easy or as challenging as you wish to make it.

Station 1 (start): "Using your GPS receiver, mark and name your starting location and then go to (provide Station 2 coordinates) to locate Station # 2."

Station 2 "Using magnetic compass and pacing, go (xxx yards) on a bearing of (xxx degrees) to locate and mark Station # 3."

Station 3 "Using your topographic map, go to intersection of xxx creek and xxx road to locate and mark Station # 4."

Station 4 "To find and mark Station #5, walk upstream from the bridge along xxx creek to a point located on a bearing of (xxx degrees) from Station 2."

Station 5 "Using your GPS receiver, go to Station # 1 to complete the navigation trail.

Follow-up Exercises

1. Plot the path of Navigation Trail on the topographic map.

2. Measure the distance walked for each leg and the total trail.

3. Compare to the distances measured by the GPS receiver.

4. Estimate the acreage enclosed by the Navigation Trail.

5. If you have a digital topographic mapping program, transfer the marked waypoint stations and tracks from the GPS receiver to the computer's map. Then use the mapping

program to estimate the distances and acreage. Compare the results to your earlier measurements.

Variation: For an advanced class, have each team design a Navigation Trail themselves. Then have another team try out the newly created trail.

GPS NATURE TRAIL

The trouble with most nature trails is that you actually need a trail. Often, existing trails are not located near the most notable biological and geological features in a given area. With a "GPS Nature Trail" however, this is not a concern (as long as the terrain is not too rugged). Each nature trail station is a marked waypoint along a cross-country GPS route that links all the stations/waypoints. To enable people to follow your trail, you provide a list of the coordinates for each station along with a description of the natural feature(s) at that location. (Or you could provide them with a GPS receiver in which you have already entered the nature trail route). You may also wish to provide a topographic map with the station locations marked.

Creating a GPS Nature Trail is a great 4-H club or class project. The young people search the designated area for notable geological, botanical, or zoological features. They mark the coordinates and flag each station, and then plot the stations on a topo map. The group researches information about the natural features and decides which ones should be included on their nature trail. Then they create written descriptions of the selected sites. The final product is a "GPS Nature Trail Guide" booklet with coordinates and natural history information for each station.

GPS SEARCH AND RESCUE

GPS Search and Rescue is an exciting field exercise in which teams of "Wilderness Rescue Rangers" (or whatever you want to call your students!) race to the rescue of "Bubba", an injured hunter /hiker/etc. Each team will need a topographic map of the area, a magnetic compass, and a GPS receiver. Portable two-way radios are also highly recommended.

Site selection is very important. Match the size and scale of field terrain to the age and experience level of your students. You want to challenge the rescue teams ... but keep it safe! For adults and older teens, you might want to set up a scenario over several square kilomeres in which the teams might select from a variety of transportation modes (cars, canoes, horseback, hiking) to complete the rescue.

1. First you will need a somewhat life-sized rescue dummy (our "Bubba" is a scare-crow with a blaze orange hat). Choose a lightweight model, since you'll need to haul it to the rescue location. (Or you could use a real live person to serve as "Bubba").

2. Select a good location to place "Bubba", secluded but not hidden, then mark and record his coordinates.

3. Back at headquarters, gather your teams of "Wilderness Rescue Rangers". Explain the scenario and provide the coordinates. Here's an example:

"Our dispatcher just received a radio distress call from an injured hunter in the State Forest. Said his name was Bubba. He fell out of a tree and broke his leg. Fortunately, he didn't break his GPS receiver or his two-way radio. He reported his coordinates as xxx before he passed out. First team to save him gets a free summer vacation week at Holiday Lake 4-H Center.

Go get him!"

4. After entering the coordinates in their GPS receiver(s), each team should take time to plot Bubba's location on the topo map and then devise a rescue plan ... what route, transportation mode(s), equipment needed, etc. Time spent in planning usually results in time and energy savings on the trail.

5. The first team on the scene brings Bubba back to headquarters, dead or alive. Before leaving the rescue site however, they should either wait for the other teams to arrive or leave a message that have retrieved Bubba ... you wouldn't want rescue teams wandering around for hours searching for him.

If two-way radios are available, they would valuable for communication among the teams and for contacting headquarters.

Variations: GPS Search and Rescue lends itself to all sorts of challenging variations. One suggestion, taking an idea from hunter education training, is to have Bubba crawl away from his reported location, leaving a blood trail (red food color and glycerin in squeeze bottle) for rescuers to follow.

Another idea is expand on the rescue part of GPS Search and Rescue. Using a real human Bubba, have the team simulate the first aid treatment for the designated injury and then figure how to actually transport Bubba back to headquarters (the simulated "emergency room"). Other variations are limited only by our imaginations ... and risk management guidelines.

Teaching Triangulation

GPS uses the concept of Triangulation to determine locations on the earth. According to WordNet (http://wordnet.princeton.edu) triangulation is "a trigonometric method of determining the position of a fixed point from the angles to it from two fixed points a known distance apart, useful in navigation".

Because understanding triangulation is critical to understanding how GPS works, it is important that youth who attend GPS workshops learn what it is and how it works. Instead of trying to explain the math concepts behind triangulation, try using one of the following object lessons.

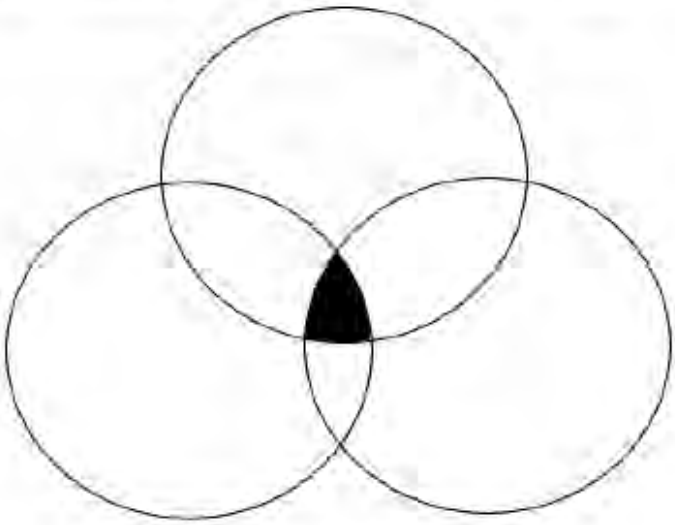
Hula Hoops

Equipment required: 3 hula hoops

Description of object lesson:

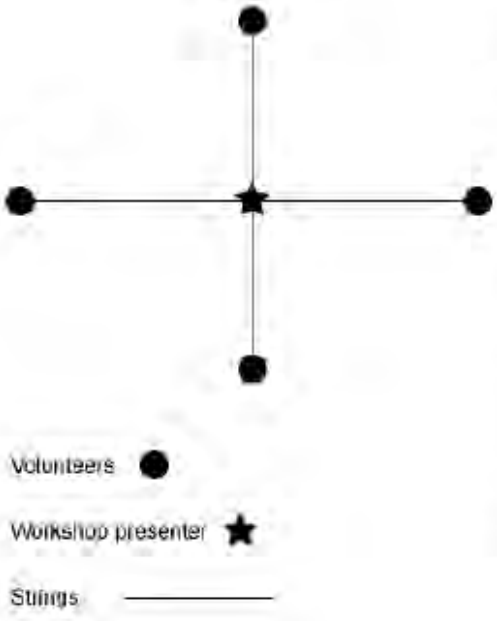
Lay the hula hoops on the ground so that all three of them overlap and create an area in the center. Explain that the way GPS works is like putting three hula hoops on the ground and standing in the area where all three of the hoops overlap.

Note: This would probably work better with a smaller group, as it may be hard for everyone to see something laying on the ground



The shaded area represents your position

String



Equipment required: 3 pieces of string

Description of object lesson:

Start out by asking for 2 volunteers. Have them each take hold of one end of a piece of string and hold it tight between them, representing satellites. You will then take hold of middle of the string and walk back and forth, showing that with only two satellites you can move and the strings are still tight.

Then ask for two more volunteers and have them each hold a piece of string and you will take the other end of the string. Now move back and forth and show how you can only hold all four strings tight when you are in one spot, if you move one or more of the strings will no longer be tight.

Explain that this shows that it requires at least 3 satellites to get a position, but 4 for accuracy.

GPS Trail

Life Skill

- Decision Making

Materials for each team of 2-3

- Marked waypoints
- A "unique" item for the last waypoint (one for each team)
- GPS receivers
- A large outdoor area where the waypoints can be located

Doing the Activity

1. Separate the participants into teams of 2 – 3, depending on how many GPS units available and number of participants!

2. Give participants a starting waypoint to begin.

3. Once they have reached the waypoint they should locate a piece of paper there with the next waypoint coordinates. (For more advanced participants the coordinates could be entered in and the GO TO function could be used.)

4. Step 2 can be repeated as many times as necessary. The participants should switch between waypoints so that each team member has the opportunity to use the GPS unit during the activity.

5. If the team is successful locating the last waypoint they are to find a unique item to bring back to headquarters. (Unique meaning something that couldn't just be picked up along the way – to show that they have really completed the trail).

Note to Leaders

Depending on the level of GPS abilities among the participants this activity can be adapted in length and difficulty.

1. Increasing the number of waypoints used would certainly lengthen the trail.
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2. Increase the difficulty of the activity by having participants enter each of the waypoints into their GPS receiver in order to complete the activity.

3. Each team could have a unique trail they are to complete (not just tracing steps of previous teams).

4. Each team could be required to find a certain item at each of the waypoints rather than just the last.

5. This could also be adapted to go along with another lesson – for example the waypoints could be located where there are special types of plants or habitats. (They could use a digital camera to take pictures of the waypoint instead of picking the plant, etc…)

Reflect

- What is the problem that you were given to solve?
- What are some decisions your team had to make in order to locate a waypoint?
- What information is needed to make a decision?
- What is your opinion of this activity?

Apply

- What are some recreational uses of a GPS unit?
- How could GPS units be used in emergency situations?
- How could GPS be used in your daily life?
- How are golf courses using GPS technology?

Source: Iowa State University Extension-Science, Engineering, and Technology Youth Initiative (E-SET) 30

Hiding Your First Geocache

Hiding Your First Geocache – www.geocaching.com

Step 1 - Research a cache location

Geocaching is just like real estate - location, location, location! When thinking about where to place a cache, keep these things in mind:

- Will it be easy to get to? - If it is only a couple hundred feet from the highway, there's a strong chance someone may plunder it. Try to find a place that will take a bit of time to get to, preferably on foot.

- Will it be easy to find? - If it is too visible, or too close to busy roads, trails, etc. there's a good chance someone may stumble upon it. Several of the original caches were discovered this way, but the people who found it were nice enough to leave them there (or participate). But don't make it too difficult! If you hide it well, give hints on geocaching.com as to the location.

- Will it be on private or public land? - If you place it on private land, please ask permission before putting it there! If you place the cache on public lands you need to contact the managing agency to find out about their rules. You will be in violation of federal regulation by placing a cache in any area administered by the National Park Service (US). The National Park regulations are intended to protect the fragile environment, and historical and cultural areas found in the parks.

- Does it meet requirements to be listed on the site? - Make sure to review the guidelines for listing a geocache on this web site during your research.

You are ultimately responsible for the cache so make sure you know the rules for the area where your cache is being placed.

Ultimately you'll want to place a cache in a place that is unique in some way. The big reward for geocachers, other than finding the cache itself, is the location. A prime camping spot, great viewpoint, unusual location, etc. are all good places to hide a cache.

Note: Please be respectful of the areas you are thinking about placing the cache. For example, if it's the location of the spotted owl, or off-trail with delicate ground cover, keep in mind that others will be walking in these areas.

Please do not place caches on archaeological or historical sites. In most cases these areas are highly sensitive to the extra traffic that would be caused by vehicles and humans. If you find a cache in one of these areas please remove it and replace it a safe enough distance from the site to ensure that the site will not be impacted by people searching for the cache and unknowingly traveling over or through a site.

Step 2 - Preparing Your Cache

First, you need a container. Anything water resistant, snow resistant, etc (depending on your climate), will do, but geocachers have had good success with plastic buckets, tupperware (or rubbermaid) containers, ammo boxes, or unused sewer pipes (really!). You'll also want to invest in some zip-loc baggies to put the items into in case your container leaks.

Whatever the container, make sure to mark your cache so that someone who doesn't play can figure out what it is. Most folks mark the container with Geocaching.com, the name of the cache, and any contact information they feel is necessary. More info is better than less.

Next, you'll need a logbook and a pen. A small spiral notebook does the trick. Make sure to put a pen in the cache as well! The author always forgets to bring one when searching for a cache. (If you are in an area where the temperature dips below freezing, make sure to bring a soft lead pencil to place in the cache. Pens tend to freeze and are rendered useless :)

It's also recommended to have a note to welcome the cache finder and let them know what it is all about (if they accidentally found the cache). We have a letter you can use in both Microsoft Word format and Text format.

Lastly, you can put goodies in the cache. It's recommended, but not necessary! Some ideas of items to give as gifts:

- Disposable camera - Put one in and ask everyone to take a picture of themselves and then put it back in the cache. Later you can develop the photos and place them online.
- Inexpensive toys - play-doh, silly putty, action figures, etc.
- CDs, VGA Cards, gift certificates, dollar bills, gold bars, etc.
- It's up to you what you want to put in your cache, budget permitting. If you are a Dot com millionaire, I would hope you would pony up a bit of cache (err cash), but most of us can spend less than $10 to place a decent cache.

Do not put food in a cache! Critters have better noses than we do, and will bite, nibble or swallow your cache in an attempt to get to the goodies. Bottled water is a good alternative (and refreshing to geocachers).

Please! No alcohol, tobacco, firearms, prescription or illicit drugs. Let's keep this safe and legal.

Step 3 - Placing Your Cache

When you reach the location to place your cache, the hardest part (depending on the model of your GPS unit, the terrain, etc), is getting exact coordinates from your GPS unit. It all depends on how visible your cache is, but you'll need to get the coordinates as close as possible to the cache. Some GPS units have the ability to do averaging, but if yours can't, the best suggestion is to take a waypoint, walk away from the location, then return and take another waypoint. Do this around 7-10 times, then pick the best waypoint (I've done this with a Garmin eTrex on a cache)

Once you have your waypoint, write it in permanent marker on the container, the log book, and make sure you have a copy to bring back with you. Write a few notes in the log book if you like, place it in a zip-loc baggie, and place it in the container. Make sure to secure the container with a rock, etc, to decrease the chance of it blowing, floating, or being carried away.

Please do not bury the container unless you have express permission of the landowner or manager. If the cache is far enough away from trafficked areas, your cache should be fine. An exception would be covering the cache with dead branches, bark, etc. to conceal the container.

Step 4 - Report the Cache

Fill out the online form at geocache.com

Step 5 - Maintain the cache

Once you place the cache, it is your responsibility to maintain the cache and the area around it. You'll need to return as often as you can to ensure that your cache is not impacting the area, and ensure that the cache is in good repair.

Once people have visited the cache, inquire about the cache and their opinion of the location.

Does the area look disturbed? Are visitors disrupting the landscape in any way? If you have concerns about the location, feel free to move or remove it from the area.

Happy geocaching!

GPS Games

There are lots of great games that can be played using GPS units. The games described here could be used to host a tournament, or they could be used in a smaller setting with a 4-H club. Feel free to adapt these games to fit your needs, some of these games could be easily modified to include teaching stations.

For each game there is a suggested number of players, but that can be adjusted as needed. When adjusting the number of players, realize that it will probably require more flags or caches as well as more time for the games.

To keep it fair, it is often best to have some way of verifying that players have visited the caches. Be creative and use something that goes along with the theme of the 4-H club project or event where the game is being played.

Ideas for verifying that youth have visited the caches

- Have the youth collect a code or password at each cache which will allow them to find a prize at the end of the game
- Provide the players with a "passport" that they must "stamp" at each station. The stamp could be a sticker, a rubber stamp with an ink pad, or a hole puncher.
- Have a simple activity at each cache for the youth to create and bring back to the base with them

Safety first

- Have a first aid kit on hand
- Use the buddy system
- Be familiar with the area before the players arrive
- Ensure that all players know how to use their GPS units before arriving
- Mark your base as a waypoint in all of the GPS units
- Give all players a written copy of the base coordinates
- Choose terrain appropriate for the age and ability of players
- Give each player or team a two-way radio when possible

Equipment needed

- Flags or caches to hide
- Air horn or some other way to signal the beginning and end of games
- Two way radios to keep in touch with teams and the base (optional, but very useful)

SEEKER
2-4 players

One team places multiple flags or caches into the search area and returns to base. Upon returning to the base the other team hunts for them.

When using flags either:

- ✯ Give coordinates of all flags to the seekers
- ✯ Write the coordinates to another flag on each flag placed

When using caches:

- ✯ Each cache should contain the coordinates of another cache
- ✯ All caches must be referenced from at least one other cache
- ✯ Only one waypoint given the seeker at base camp

If played with three people in a round-robin fashion, there will always be one person out hiding flags or caches, one seeker, and one waiting their turn; which promotes fast games.

CACHE RACE
2-8 players

Setup

- ✯ Choose beginning and end locations and record their coordinates using your GPS unit Create two separate paths from the staring point to the end and place caches along the way
- ✯ Place coordinates for the next stop on the path in each cache

Gameplay

- ✯ Divide players into two teams
- ✯ Explain that their goal is to reach the end point before the other team
- ✯ Give each team the coordinates to their first stop on the way to the end point
- ✯ Each team then heads to their first waypoint where they will find coordinates to the next

CAPTURE THE CACHE
2 or 4 players

Two teams start on opposite ends of the designated playing area. At the sounding of the horn, both teams rush to the cache of the opposing team and obtain the coordinates to the winning waypoint.

The winning waypoint should be marked low to the ground with a flag and may be located anywhere roughly centered between the caches.

RELAY
2 players

Two players navigate from waypoint to waypoint in one direction. Upon reaching the end of their respective route, each player will follow the alternate route taken by the other player back to base.

Whoever makes it back to base first wins.

CACHE MASTER
2-3 players

This game is best played with a very small number of people.

- One person is designated the CacheMaster The CacheMaster scouts ahead 5 minutes armed with 12 small caches and a radio.
- At 5 minute intervals the CacheMaster hides a new cache and radios the position to the players also carrying radios.

After hiding the final cache the CacheMaster is to return to base. Players take turns acting as the CacheMaster.

DOMINATION
2-8 players

- Divide players into two teams
- One member from each team draws a random waypoint and navigates to the waypoint
- When a player reaches a waypoint, they are to retrieve the flag and return to base
- When the player returns to base, another team member draws a waypoint and retrieves the next flag

Note: An even number of flags should be used for this game.
The game ends when a team first returns with their half of the total number of flags.

TAG RACE
4-6 players

Each player on a team successively retrieves one of two flags at each waypoint.

The first player retrieves the flag from the first waypoint, player two from the second waypoint, etc. The first team to retrieve the final flag and return to the base wins.

ALL OUT WAR
2 or 4 players

Setup

- ✯ Take the coordinates for two bases and a middle point
- ✯ Give each team one of the base locations and the middle point
- ✯ Each team places flags for the other team to find
- ✯ Teams swap coordinates and go to their bases

Note: This game should only be played with an odd number of flags.

Gameplay

- ✯ Once both teams are at their bases, signal the start of the round by sounding the horn
- ✯ Both teams try to collect as many flags as possible in the allotted time
- ✯ Sound the horn to signal the end of the round
- ✯ Both teams meet at the middle point with their flags for scoring

AROUND THE WORLD
2-4 players

Setup

- ✯ Mark several waypoints in a circular shape

Gameplay

- ✯ One team will navigate to every point going clockwise, and the other counter clockwise
- ✯ The first team to have every member of the team navigate to all of the points and return to the base is the winner

These games adapted from http://gamefreaks.net/defrag/personal/gps.htm

The Great GPS Scavenger Hunt

Grade level: 9
Provincial curriculum links: Ontario
Subject: Geography; Geography of Canada; Methods of Geographic Inquiry
Keywords: Waypoint, route, multipath, weathering, mass wasting, sediment transportation, creep, slides, debris flow, geomorphology, geology.

SPECIFIC LESSON GOALS

- ☆ Demonstrate an understanding of the technologies used in geographic inquiry (e.g., Geographic Information Systems (GIS), hypermedia);
- ☆ Select and use appropriate methods for displaying geographic data

DESCRIPTION

This lesson requires students to learn to use a GPS receiver as they learn about physical geography. Students will use GPS receivers to survey an open area (natural or disturbed ecosystems) and investigate the different species of plant populations, rock and land formations, and soil types either in the school grounds or in recreational areas in the local community. Students will examine the geologic and geomorphic formations and describe how water and wind erosion have shaped the landscape and helped further plant and animal succession

PREPARATION

Preparation time: Time varies depending on the number of waypoints the teacher/ leader wishes to use in this investigation. (Teacher/ leader must locate each site, obtain latitude/longitude coordinates for each, then create a small marker or give students a clue to identify their first site).
Length of lesson: 180 minutes for class discussions and field trip

RESOURCES REQUIRED

- ▫ GPS receiver
- ▫ Sturdy footwear
- ▫ Field guides for the identification of plants
- ▫ Student worksheet [Appendix 1]

PROCEDURE

Before you begin the fieldwork, make sure you have completed the following tasks:

1. All your latitude and longitude coordinates are correct for each chosen location.

2. Include one letter of a "secret word" at each location. The secret word should pertain to this lesson, e.g.: "erosion", or "landscape", or "mapping", etc.

3. All your hidden coordinates are in good condition (i.e. dry and undamaged).

4. Each GPS receiver is set to your exact specifications.

5. Brainstorm with the class examples of geologic structures (pertinent to present unit), stream characteristics, soil types and vegetation found in a natural environment. Examples include: a meadow; a naturally regenerated woodlot/forest, an undisturbed ditch, the natural shoreline of a pond, lake or stream.

6. Define and discuss weathering. How does weathering affect the landscape and vegetation? Brainstorm with the class different types of weathering and their causes.

7. Physical weathering - the fragmentation of a larger rock into smaller pieces by mechanical processes. These processes include:

    - abrasion (erosion of a rock due to the impact of grains carried by wind, water, or ice)
    - fragmentation during downslope movement via rockfalls, landslides, etc.
    - frost wedging via the freeze/thaw cycle. thermal expansion
    - contraction via heating and cooling
    - Chemical weathering - breakdown of rock or mineral through reactions between rocks/minerals and atmospheric constituents such as water, oxygen, and carbon dioxide. The most common reactions include:

        - Solution - molecules and elements in rocks and minerals dissolve directly into water
        - Oxidation and hydration - reaction between oxygen, water, and iron-bearing minerals that helps to break down minerals
        - Hydrolysis - a complex weathering reaction that forms clays, the primary constituent of soils.

8. Explain mass wasting (the downhill movement of soil and rock under the influence of gravity) and two of its key gravity-driven erosional processes: water and wind. Discuss with students the effects of water and wind on the landscape. These processes can occur quickly, such as a landslide, or slowly, such as the down slope movement induced by freeze/thaw cycles.

9. Review the importance of proper care for the GPS receivers. They are expensive pieces of equipment and are costly to repair or replace.

10. Divide students into small groups and distribute: a GPS receiver, a list of coordinates with clues, student worksheets.

11. Student groups should consist of no more than 6 members. Each student should be given a particular role in the group such as: group leader, equipment manager, data collector, identification coordinator, safety officer.

Special Task	Function
Group Leader	Responsible for overall performance of the group.
Equipment Manager	Prepares a list of the equipment, instructs others in its use and ensures that it is all returned undamaged.
Data Collector	Ensure that all data are recorded or drawn on the worksheets. Keeps track of scrambled letters.
Identification Coordinator	Maintains the "library" of identification materials and ensures that landforms, plant life, soil structure, etc, are properly identified.
Safety Officer	Ensures that the group stays together and that safety regulations are followed.

12. When students arrive at the site, each group will use their GPS receiver to navigate to each waypoint. The teacher/ leader will distribute the first waypoint to each group, as well as a "clue" to help students figure out what to draw and how to locate the second hidden waypoint. Ensure that the initial waypoints are all different to prevent more than one group traveling to a single location.

13. After reaching the first waypoint, students will quickly sketch the landform, indicate the vegetation in the immediate area and list all possible types of weathering they can see (e.g. cracks in rock caused by freeze-thaw; plants may be growing from seeds deposited in cracks by the wind).

14. Since the coordinates to reach each waypoint are hidden, the teacher/ leader must prepare them ahead of time. Waypoints can be hidden anywhere at the coordinate. For example, they can be placed in an envelope wrapped in a plastic baggie placed in a stone cairn; in a marked film canister; written on a thin piece of wood which is then attached to a tree (be careful not to damage the natural environment when hiding the coordinates). When hiding the waypoints, make sure the package is waterproof to eliminate the possibility of the clue being damaged or illegible. Students must search for the new waypoint, enter the

latitude/longitude coordinates into their receiver and begin navigating to the second location. They also must record the "secret" letter to form the scrambled word at the end of the investigation. The letters from each of the waypoints will form a secret word of the day.

15. Before students leave a location, they MUST make sure that the coordinates are replaced EXACTLY as they were found to allow the remaining groups to complete the exercise.
16. A cache consisting of various "goodies" will be located at the teacher/ leader's position (the final latitude/longitude distributed to students). Once the students have completed the exercise, they must unscramble the code word. To collect the cache, students travel to the last waypoint and show the teacher/ leader their completed sheets and their unscrambled word.

Discussion and Questions

1. Which waypoint demonstrated the most marked example of weathering? What process was responsible for the weathering?
2. How is GPS useful in assessing environmental damage?
3. What are the difficulties of operation GPS equipment under large tree canopies or in large, high-density cities?
4. Each group may share their results with the class. Use whole-class discussions to summarize the effect of weathering on the landscape and highlight how the land has been shaped by different types of weathering. How can the effects of weathering be reduced?
5. After examining the day's findings, students will write a short report on a current issue surrounding the unscrambled code-word while incorporating the experiences of the day into the report.

Student Evaluation

- Completion of worksheets and quality of observations
- Observation
- Peer and self-evaluation

ENRICHMENT/ EXTENSION ACTIVITIES

- Create a map of the school boundaries using the GPS receiver. Once the route is created, download the information using GPS software such as Pathfinder. This route can be opened up in GIS (Geographic Information System) software such as ArcInfo or ArcView for further analysis (e.g. investigate the effects of weathering on the school building and around the school grounds).
- Study the usefulness of GPS in our society today. Making reference to technology, the flexibility of GIS, write a paper to illustrate how GIS and related technology can be used to assess the state of an ecosystem.

- Present findings to principal or school board as evidence to support the enhancement of GIS technology in schools.
- Routes created by students can be superimposed on an aerial photograph and incorporated into lessons focused on: urban geography or demography (if investigation was conducted in an urban landscape); the sustainability of forests/silviculture or agriculture (if investigation was conducted in a rural area).
- Geocaching has become a popular activity among GIS enthusiasts. Set up a Geocaching account and have students plant caches to be found by other GPS users. Ensure that the caches are NOT placed on private property.

If the investigation was conducted on school property, students can explore a recreational area or a natural area to compare and contrast the different land formations, different tree/animal species and different types and effects of erosion on the landscape.

EDUCATOR NOTES

- GPS stands for "global positioning system". This is a satellite navigation system which provides precise locational information based on data transmitted from a constellation of 24 satellites orbiting the earth. It provides specially coded satellite signals that can be processed in a GPS receiver, enabling the receiver to compute position, velocity and time.
- GPS was developed by the American military and was originally intended for military use only. The GPS system is still controlled by the United States Department of Defense.
- GPS signals are free to all. This means that no cost locational/navigational data is available to anyone with a receiver. GPS availability is worldwide, 24-hours per day, 365 days per year. Additionally, low entry cost means that user equipment can be relatively inexpensive, depending on how accurate the user requires their measurements to be.
- Uses for GPS are abundant. This technology can be used for recreational activities such as fishing, hiking, and geocaching as well as complex tasks such as navigation, surveying, mapping and vehicle tracking. Users of GPS technology can utilize any point as a reference to navigate to another point.

Setting Up the GPS Receiver

- Students should ensure that their position format is in hddd°mm.mmm'
- Map datum should be set to WGS 84. Distance/Speed is metric. Elevation is in metres. Vertical speed is in metres/minute and depth is set to metric.
- The heading should be set to display Cardinal Letters and North Reference should be set to "True North"
- Make sure that the GPS mode for the receiver is set to "on". If the students are getting poor satellite reception, they should ensure that WAAS (Wide-Area Augmentation System) is enabled.
- Thoroughly investigate the school grounds/recreational space before the investigation to locate specific features/plant or animal species and obtain coordinates for each location. The number of locations and the distance between them depend on where the

investigation is taking place. Spread the locations well apart to avoid groups interfering with each other.

- The total number of coordinates should be such that it will take students at least 2 hours to complete the worksheets. Ensure that the coordinates are skillfully "hidden" at each location. This adds to the fun of the day and prevents tampering.
- The location of each point to which students will navigate are stored in the GPS receiver. The teacher/ leader may enter the points in each receiver ahead of time; however, it may be beneficial for students to enter the points themselves. The GPS terminology students should be aware of are listed below:
    - **Waypoints** - points that are stored in the receiver.
    - **Route** - path created by traveling from one waypoint to another.
    - **Coordinate** - longitude/latitude values of each point.
    - **WAAS** - Wide-Area Augmentation System. It is a system of satellites and ground stations that provide GPS signal corrections to allow for better position accuracy. Enabling WAAS on a receiver improves accuracy by approximately 5 times (e.g. from an accuracy of 15 m to an accuracy of less than 3 m).
    - **Multipath** - caused when the GPS signal is reflected by some object or surface before being detected by the antenna on the receiver. The surface most prone to multipath is water, whereas sandy soil is the least. Multipath errors are more common in densely wooded areas due to the number of trees reflecting the satellite signal.
- Students should have prior knowledge of the following terms: composition of soil (minerals, organic substances, water, air), types of soil particles (silt, clay, sand, pebbles), types of streams or rivers (straight, braided, meandering), types of rocks (igneous, sedimentary, metamorphic), geologic formations (ridge), and major types of erosion (water, wind, chemical).
- If it is not possible to visit a park or large recreational area, a great place to conduct this investigation would be on a large college or university campus.
- This investigation can be conducted at any time during the school year. Given the fact that students will be outdoors for the duration of the investigation, it is preferable to do the fieldwork on warmer days before or after the snow melts.
- SAFETY NOTE: Consult your school board's policy regarding safety precautions for outdoor excursions and plan your trip accordingly. Be aware of any students with allergies to insect bites and plants and ensure they carry the required medications. Students should wash their hands after handling soil, plants and equipment. Encourage students to wear sunscreen and appropriate clothing (e.g. hat, long-sleeved shirt) to minimize the damaging effects of sun exposure. Appropriate footwear is also necessary, particularly if the investigation is to be conducted in areas outside school property such as parks, wildlife preserves, woodlots, etc.

References

- *Investigating Terrestrial Ecosystems.* Scarborough: Prentice Hall Canada, 1986.
- For information on the operation of GPS equipment, visit: www.trimble.com

[APPENDIX 1] STUDENT WORKSHEET

Date: _____

Group Members: _____

In this activity, you will use the GPS receiver to survey an open area and investigate the different types of weathering and study how they affect species of plant populations, rock and land formations and soil types. At each location, you will find a new coordinate and a secret letter. The new coordinate will lead you to your next location. Keep track of the secret letters: they form the "secret word" of the day, once they are unscrambled.

Your **FIRST** waypoint is: _____.

This is your starting location.

Your **FINAL** waypoint is: _____. Navigate to this location *AFTER* your worksheets are completed and you unscramble the "secret word".

Create a chart like this for each location you visit:

Coordinate #___		**Sketch of Area**
Secret Letter:		
Description of Weathering:		

THE SECRET WORD IS: _____

Section E
Crafts



This collection of craft ideas is best suited for Grade 6 students. However, with a little creativity, the lessons can be modified for younger and older students.

Finger Weave Water Bottle Holder

DESCRIPTION

Great camp craft! Make a water bottle holder from weaving loops to hook onto your backpack or belt loop.

YOU NEED

1. 18 Weaving Loops
2. Bottle Holder Hardware
3. Sheet of Craft Foam
4. Sticky Foamie Letters
5. Under-the-Sea Foamie Stickers
6. Glue Dots, Low Temp Glue Gun, or Tacky Glue



Adapted from www.makingfriends.com

INSTRUCTIONS

Finger weave 18 loops by following the directions below



1. Wrap the first loop around your pinky. Twist it one half turn and loop it around your ring finger.



2. Twist it another half loop and loop it around your middle finger. Another half twist and then around your index finger.



3. Repeat with the second loop.



4. Stretch out the bottom loop from your pinky, Lift it over the top loop and stretch it over to the back of your pinky.



5. Do the same with your the loops on the other three fingers. Continue weaving until you have 18 loops.



6. If you need to take a break, slide a pencil or pen through the working loops as you remove them from your fingers. To finish, slide loops off your fingers and double knot the last row.

Slide the woven loops through the opening of the metal swivel clip. Double knot one end to each slot of the plastic holder piece pulling securely to tighten.

If desired make a personalized label for your water bottle using craft foam. Peel and stick your name and decorate with sea life foamies.

First Aid Booklet

Quick, easy and economical, this first aid project is a must for every scout, every camper, every babysitter... everyone!

YOU NEED

1. First Aid Cards
2. Plastic Clips
3. 1/8" Hole Punch

INSTRUCTIONS

From a basic First Aid Manual, have students create a series of First Aid Flash Cards that will provide simple, easy to read instructions for common emergencies such as choking, burns, cuts, broken bones etc.

Punch each card at marked circle. Hold the ring on the plastic clip open and slide the cards around the clip.



Adapted from www.makingfriends.com

First Aid Pouches

DESCRIPTION

Take along this first aid pouch on all your hikes and camp outs.

You need:

1. Clip-On Pouches or Starter First Aid Kits
2. 2 Coiless Safety Pins - 1½" Gold
3. Number 1 Bead and Letter Beads: ST AID

INSTRUCTIONS

Open up a coiless pin, string on the number "1" bead followed by the "S" and "T" bead. Open up the second coiless pin and string on the letters "AID". Pin them to the pouch. Fill it with first aid supplies and clip it to your belt loop or back pack.



Adapted from www.makingfriends.com

Fly Swatter

Here's a fun swatter to make you smile.

YOU NEED

1. Plastic Canvas
2. Plastic Flies
3. Pipe Cleaner
4. Safety Pin
5. Ultimate Craft Glue
6. Scissors

INSTRUCTIONS

Cut plastic canvas to swatter shape. Weave pipe cleaner through the shape to make a handle. Loop around. Trim. Twist ends together. Add a pin and a tag for swapping.



Adapted from www.makingfriends.com

Hiking Necklace

DESCRIPTION

Make your next hike a safe and fun adventure

YOU NEED

1. Assorted Pony Beads
2. Magnifying Glass
3. Flashlight and Battery
4. Compass Key Ring (Not Shown)
5. Whistle
6. Hole Punch

INSTRUCTIONS

Untie the knot on the cord that comes with the whistle. Retie it with a double knot down near the whistle to hold it in place. String three beads on each side. String on a flashlight and then add more beads. Punch a hole in the magnifying glass and string it on with more beads. Add a compass if desired. Tie the ends of the cords together to finish.



Adapted from www.makingfriends.com

Hiking Rain Poncho

DESCRIPTION

Decorate an emergency rain poncho before you go camping or hiking. Clip one on to your back pack so you'll have it just in case!

YOU NEED:

1. Emergency Poncho
2. Plastic Clip
3. Foamie Insects
4. Glue Dots
5. Sticky Alphabet Letters

INSTRUCTIONS:

Peel and stick your name on to the poncho's zip lock bag. Use glue dots to attach foamie insects. Add a plastic clip through hole in the bag.



Adapted from www.makingfriends.com

Survivor Pouch

DESCRIPTION

Stitch up a pouch to hold all of your exploring necessities.

YOU NEED

1. 1 Sheet Animal Print Foam
2. 1 Yard Black Plastic Lace
3. 8 Brown Pony Beads
4. Eagle Claw Beads
5. 1/8" Hand Held Hole Punch
6. Ruler and Pen
7. Binoculars
8. Magnifying Glass
9. Compass Key Ring

INSTRUCTIONS

On the back of your animal print foam, place a dot with your pen every 1/2". Make the marks 1/4" from the edge. Punch a 1/8" hole at every dot. Fold foam in half, print side out. Tie a double on one piece of plastic lace. Whip stitch one side, double knot. Trim. Repeat with the other side. String 10" piece of plastic lace through one of the top holes. Slide 2 pony beads on each side and 1 bear claw bead through onto one side. Double knot the ends together. Tie 2 beads on each end, double knotting to hold in place.



Adapted from www.makingfriends.com

Trail Sign

DESCRIPTION

Use sticks or pebbles to make swaps with trail markers.

YOU NEED

1. Mini Sign Blanks
2. Jewellery Craft Pins
3. Low Temp Glue Gun
4. Paint & Markers

INSTRUCTIONS

Rub brown paint into mini signs to make them look more rustic. Glue on twigs or pebbles to make trail markings. Print the words "THIS WAY" from your computer.



Adapted from www.makingfriends.com

Section F
Hiking & Outdoor Nature Games



This collection of games is best suited for Grade 6 students. However, with a little creativity, the lessons can be modified for younger and older students.

D'Juno?

Equipment

Paper and pen, tape

Description

The leader hides an envelope (the D'Juno!) that has information inside about something in our natural environment (see samples below). The object of the game is to use clues to discover the location of the envelope containing this new information about the outside world, thereby becoming the winner of the D'Juno Award!

After the D'Juno has been hidden, the leader plants a clue (often rhyming couplets) for all to read. If, after ten minutes, no one has located the envelope, the leader posts another clue. Clues continue until someone discovers the award.

SAMPLE CLUES:

(Location of D'Juno is: taped to the back of a thermometer at the Weather Station).

1. I'll brighten your day by degrees and degrees But leave me alone -don't hug me please.
2. If it's warm outside I'm the first to know, a little red bulb always tells me so.

SAMPLE D'JUNO's:

A. D'JUNO that some plants receive their nourishment by eating other plants and insects?
B. D'JUNO that a large porcupine may have as many as 35,000 quills?
C. D'JUNO that the Canadian United States boundary is 6,097 kilometres in length not including Alaska?
D. D'JUNO that one of the largest vultures ever known weighed more than 6 kilograms and had a wing span of 2.4 metres?
E. D'JUNO that the weasel, the smallest carnivore, is credited with being able to pass through a wedding ring?

Wells Fargo

Equipment

- Six silver or gold ingots (if budget restraints prevent the use of real ingots, pieces of 2x2 wrapped in silver or gold foil will do).
- Strips of paper 2 cm x 20 cm in two colours for "lives".
- Safety pins (one per player plus extras)

To Play (20 minutes)

Organize the group into two equal teams and assign each a "life" colour. Each player pins a life of the appropriate colour on his right shoulder.

Organize the play area unto halves and assign each team one half to defend. Each team sets up a bank and a jail in its territory, marking out a ground area 3 m x 3 m for each with string or flour.

Give each team three ingots to deposit in its bank.

On signal, players try to sneak into their opponents' territory to steal their ingots and carry them to their own bank.

A player may carry only one ingot at a time.

A player is captured when an opponent tears his life from his shoulder. Captures may be made only in the opposition's territory (attacking zone).

If he is carrying one, a captured player must surrender the ingot to his captor, and then go to the enemy jail, where he receives a new life but must stay until rescued by a teammate. In order to make the rescue, the teammate must run into the jail and tag inmates without being caught.

When time is up, the team with the most ingots in the bank is winner.

Discovery Scavenger Hunt

Give each group a list and half an hour to see how many items they can locate within the boundaries of your play area. Remind participants of the importance of making minimum impact. They write notes on the items they observe in each category but do not collect specimens.

When the hunt is over, groups gather and compare findings. If their report includes particularly interesting observations, take the whole group for a walk to see them.

Group Instructions

As a group, find as many of these natural items as you can within the designated area.

1. Two things with chlorophyll in them
2. Coniferous trees
3. Things that fly
4. Parasites
5. A natural object that is red
6. Plants with berries
7. Something you might use if you were fishing
8. Something that swims or climbs if you are not near water
9. Evidence of death
10. Insects
11. A natural object that is blue
12. Things that are part of the food chain
13. Evidence of disease
14. Mammals
15. An example of the interdependence of natural things

Poachers and Eco-Police

Equipment

- 50 animal cards (8 cm squares cut from cardboard: draw an animal outline, paste a picture or write an animal name on each)
- Strips of paper 2 cm x 20 cm in two colours for "lives"
- Safety pins one per player and some extras

To Play (15 minute rounds)

Hide the cards randomly throughout the play area. Explain that it is a wildlife reserve and hunting is prohibited.

Organize the group into two equal teams and assign a colour to each. Players pin a life of the appropriate colour to their right shoulder.

Name one team the EcoPolice (conservation officers), who ensure there is no hunting in the preserve. Name the other team the Poachers, who try to capture animals and take them back to their hunting lodge.

Designate a zone at one end of the play area the hunting lodge. Poachers begin the game at the lodge and EcoPolice scatter through the whole preserve area. Set a time of 15 minutes for the game.

On a signal, Poachers set out to hunt animals, capture them by putting the cards in their pocket, and return to the hunting lodge without being caught.

Poachers may capture only one animal on each trip from the lodge.

EcoPolice try to arrest Poachers with animals. They make the arrest by removing the life from a Poacher's shoulder. If the Poacher has an animal, he must surrender it and return to the hunting lodge for a new life. If he isn't in possession of an animal, the arrest is unlawful and the EcoPolice must return the Poacher's life. Poachers may not capture EcoPolice.

When time is up, bring the teams together and tally up the number of animals captured and the number saved by the EcoPolice. Gather up all the animal cards, including those still hidden in the area, send out leaders to hide them again, switch team roles, and play another 15 minute round.

Project: Forest Inventory

Within your plot, select a rectangular zone for each team and mark it with flagging (be sure to remove flags when the activity is over). The size of the plot will depend on the density of tree

cover. Ideally, each area will contain 20 to 30 trees and include both conifers and deciduous varieties.

Make available source materials to help participants identify the trees: field guides for your area; publications prepared by your provincial parks ministry or forestry association.

Instructions to Patrols

Examine the trees in the area assigned to you and answer the questions as best you can. You have 30 minutes to complete the task.

1. How many trees are there in your area?
2. How many are coniferous?
3. How many are deciduous?
4. List the different species of trees in your area and the number of each species.
5. Which tree in your area is tallest? How tall is it?
6. Which tree is shortest? What height is it?
7. Do any of the trees show evidence of disease? If so, record observed signs.
8. Do any of the trees show damage inflicted by people? If so, what sort of damage?
9. What evidence do you see that trees support other forms of life?
10. Which tree do you think is the oldest? Why?
11. Are there any zones in your area where no trees are growing? What do you think causes this?
12. Is the undergrowth near the base of all the trees the same throughout your area? If not, what differences do you observe?
13. Are the trees in your area equally spaced? If not, what factors do you think contributes to the irregular spacing?
14. Which tree contains the greatest volume of wood? What do you estimate as the number of cubic metres of wood it contains? The following formula for calculating the volume of a cylinder will help you make the estimation: volume equals 3.12 times the radius squared times the height.
15. Do you think your area would be improved if some or all of the trees were cut down? Please give reasons to support your answer.

Quick Frozen Critters

From the Project Wild Activity Guide, this game focuses on the relationship between predators and prey. Use any set of predators and prey you wish (hawks and squirrels, wolves and deer, etc.).

Equipment

- Strips of paper 2 cm x 20 cm for prey
- Safety pins
- Predator identification (the simplest is to ask predators to tie their neckerchief around the right arm)
- Five small circles (one to two metres diameter) marked with string or flour com on the ground to serve as temporary shelters
- At least three food tokens per player (5 cm squares of cardboard work well)

To Play

Designate one end of the playing area permanent shelter for prey and the other end the prey's food supply where food tokens have been scattered on the ground.

Mark out five temporary shelters between the two ends of the play area. Organize the troop into predators and prey - one predator for every five prey. Prey animals pin a life on the right shoulder. Predators tie on neckerchiefs.

Play a series of five minute rounds so that no prey languishes too long in the cemetery and everyone has a chance to be a predator.

During each round, prey must collect food tokens and bring them to their permanent shelter. They may bring only one token each trip. Predators must capture at least two prey animals by tearing a life from the shoulder. Captured prey goes to the prey cemetery on the sidelines. Prey are safe from capture when standing in the permanent or any of the temporary shelters, but predators may go anywhere else in the play area. Prey have one other defensive option. They may freeze whenever a predator approaches within two metres. In the freeze position, the only things prey may move are eyelids. As long as a prey animal remains frozen, a predator may not capture him. Once the prey moves, it is open season.

Photo Essay

Divide the group into teams.

In this activity, teams prepare a pictorial record of some of the natural phenomena they've observed. Each team needs a disposable camera with flash and 20-24 exposure colour print film or a digital camera.

Teams have a list of 12 subjects to photograph and must choose six other subjects. A time frame for when they must have their prints developed and mounted on cardboard for display.

Team Instructions

Your task is to take 18 photographs in your area. The photos must include the 12 subjects listed below as well as six others of your own choice. The only criteria for the subjects you choose yourselves is that they must feature some natural phenomena or object in the area. As well as natural subjects, your photos must include members of your team.

1. At least two pictures must include all team members except one.
2. Each member of your team must appear in at least three pictures.
3. At least four pictures must contain only one team member.
4. At least two pictures must contain only two team members.

Mandatory Photo Subjects

1. The most beautiful tree in the area
2. The most littered part of the area
3. The most colourful natural object
4. An example of old life providing for new
5. Your team's favourite spot in the area
6. The spot where the presence of people is most noticeable
7. The best smelling spot
8. The ugliest nonhuman natural object in the area
9. Evidence of the season – spring, summer, fall or winter
10. A plant you cannot name
11. The spot containing the densest vegetation
12. The best team in the area

Flower Face

Equipment: [Per team]

- Map of area
- Pencil and Paper
- Whistle
- Wildflower Field Guides (if available)

(The game is played best in an area with a good variety of wildflowers growing within a reasonable distance of each other.)

Description

This game requires the assistance of 8 or more leaders. These people are 'planted' in specific locations prior to the start of the game. Each location has a wildflower growing close by. The leader draws up several sketch maps of the area in which the instructors are located.

Divide the group into teams of 4 -6 people. Each team is given a sketch map, and pencil and paper. Teams assemble at a central starting area, where the leader explains these rules:

1. Members of each team must hold hands throughout the game
2. Teams must return to the starting area in 30 minutes (a whistle will be blown).

The object of the game is to 1) find the leaders who are hidden in the playing area and 2) to identify the wildflower found in the general location of each leader. Each team writes down the name of the wildflower and the name of the leader; a dot can be put on the map to indicate the proper location.

Teams search for as many leaders and flowers as they can find in 30 minutes. When the whistle sounds, all teams and leaders return to the starting area; the game leader collects the maps and tallies the results. The team with the highest number of correct identifications wins.

The entire group can then discuss the types of wildflowers that grow in the area, and the characteristics of the various locations in which they can be found.

Frogs, Insects, and Flowers

Equipment

- Whistle

Description

- Divide the group into three circles, one inside the next. The people in the outer circle are flowers, and remain stationary. The players in the inner circle are insects, and begin the game with one knee to the ground. The players in the middle circle are frogs -they begin the game standing.

- When the whistle sounds the insects have ten seconds to run and tag a flower. They may avoid capture (being tagged by a frog) by flying (touching one knee to the ground). Frogs chase the insects and can "follow" an insect by turning 360° pivot during which the insect can dash off.

- After each round, the results are noted. A successful animal remains as that animal for the next game. A captured animal becomes the same animal as his captor. An unsuccessful but un-captured animal dies and becomes a flower.

- Each round creates changes in populations and inter-relationships can be easily observed. A balanced game can go on indefinitely, but if frogs become too efficient, the insects are wiped out whereupon the frogs ultimately die. If the frogs are inefficient they may be wiped out and large uncontrolled fluctuations can result in the insect population.

18 Games for Restless Hikers

Some of these games can take place while on a hike, some as post hike activities and others will serve to prepare young hikers for a hike.

Colors in Nature

As you are hiking along the trail, challenge your kids to find at least 10 things in nature that are, say, blue. The first one to find 10 blue things chooses the next color challenge.

Scavenger Hunt

Create lists of sounds, sights, textures, and smells to watch for on the trail or during a camping excursion. Award special prizes for collecting trash. Do not collect plants or other living objects. Instead, search for acorns, pine cones, or rocks on the forest floor. Always remember to return your natural objects to the woods where they came from (Based on Leave No Trace Principles)

1. Plan ahead and prepare. Know the terrain and any regulations applicable to the area you're planning to visit, and be prepared for extreme weather or other emergencies. This will enhance your enjoyment and ensure that you've chosen an appropriate destination. Small groups have less impact on resources — and on the enjoyment of other backcountry visitors — than large ones.

2. Travel on durable surfaces, which include established trails and campsites, rock, gravel, dry grasses, or snow. If you are camping, camp at least 200 feet from lakes and streams, and focus activities on areas where vegetation is absent. In pristine areas, disperse use to prevent the creation of campsites and trails.

3. Dispose of waste properly. Pack it in, pack it out. To wash yourself or your dishes, carry water 200 feet away from streams or lakes and use small amounts of biodegradable soap. Scatter strained dishwater.

4. Leave what you find. Cultural or historic artifacts, as well as natural objects such as plants or rocks, should be left as found.

5. Minimize campfire impacts. Cook on a stove. If a campfire is built, keep it small and use dead sticks found on the ground. Use established fire rings, fire pans, or mound fires.

6. Respect wildlife. View critters from a distance. Feeding wildlife alters their natural behaviour.

7. Be considerate of other visitors. Be courteous, respect the quality of other visitors' backcountry experience, and let the natural sounds of the forest prevail.

Life under Logs

Take some time to explore the fallen logs you come across. Encourage your kids to use their senses to listen (tap the log — does it sound hollow or solid?), smell (does it smell wet or dry? like anything they've smelled before?), and feel the log (hard or soft? rough or smooth?). Look for insect holes or nibble marks. Remember that decomposing logs are habitat for living creatures, so carefully replace any logs you turn over.

I Spy

While hiking along the trail, silently pick out something you see. Tell the group whether it's animal, vegetable, or mineral. The rest of the group asks yes or no questions to figure out what it is. The one who figures it out is the next one to spy.

Everyone Knows It's Windy

Which direction is the wind blowing? Is it warm or cold? Find two different ways to tell which way the wind is blowing, and how fast.

Hug a Tree

You'll have to know your trees for this one! One hiker is the treemaster. While hiking along the trail, the treemaster calls out the name of a tree in the area —for example, birch. Everyone scrambles to find a birch tree and give it a big hug. Try not to step on live vegetation or wander too far from the trail.

Slide Show

Give each hiker a six-inch by six-inch cardboard frame and ask them to pick up a leaf off the forest floor. Be sure not to collect leaves from living plants. After they've made and studied their "slide," say "click" and pass the slides to the left. Continue until everyone has their original slide back.

Mystery Bag

You'll need a stuff sack or lunch bag and items found along the trail. Collect items (acorns, pine cones, small stones, trash, etc. — no fair picking any living plants). When you stop for a rest, have your kids put their hands in the bag and try to identify the items they touch. Scatter the materials back in the woods when you're finished.

Make Rain Art

Paint shapes with watercolours or poster paint. After the paper is dry, bring them out on a rainy hike and let the water work its artistic magic. What kinds of patterns do different kinds of rain (drizzle, downpour) make?

Sniff It Out

For a night hike, put scents (vanilla, vinegar, mint, etc.) in film canisters (two for each scent). Hand them out and let kids, without talking, find the person holding the scent that matches theirs. To go one step further, ask kids to think of which animals use their sense of smell during the night.

You Can't See Me!

Equipment: A nature trail.
Formation: Scatter

The object of this game is to allow the players the opportunity to pretend they are animals, trying to hide from Man. The group walks a given distance down a nature trail, while the leader explains the rules:

- Each player is given time to hide along the trail.
- They may travel no more than 15 feet from either side of the trail, and may use anything in the natural environment to provide camouflage.
- The leader waits about five minutes until all players are hidden.
- He walks the distance of the trail ONCE ONLY, and tries to find as many players as possible.
- After his walk, he calls out, and watches to see where all the successful 'animals' hid.

This game can be repeated many times, with different players taking the role of the searcher. It is fun to talk about the hiding places that were the most successful, and how animals might protect themselves from predators.

Whistle Tag

Equipment: one whistle for each 'hunted' leader or staff member.

The group is divided into teams of 6-8 players. The leaders or staff members who are to be 'hunted' are given a two-minute head start into the playing area (5 acre wooded area is ideal).

Teams have to stay together during the entire game. Each team begins to 'hunt' the staff members, who are required to blow their whistles at one minute intervals (or variations which you may want to work out). Leaders may remain mobile, or seek a hiding place.

Teams try to touch as many staff members as possible within the time limit of the game. Captured staff are immediately freed to run and whistle again. The team who tags the most wins.

Variation: as a night game, using flashlights instead of whistles. Same rules apply.

Capture the Flag

Equipment: 2 handmade flags on staffs 2' long; 2 different coloured sets of arm or headbands made of crepe paper.

Formation: Divide the group into two teams. Identify each by a set of arm or headbands.

Set up a jail area (3-4 square yards) and a separate hiding spot for each flag. Jails are set up at opposite ends of a 5-20 acre area.

The object of the game is to penetrate the other team's area and capture their flag. A flag is 'captured' after it has been returned to the captor's jail area. Prisoners are taken by having their arm or headbands removed by an opponent. Prisoners are taken to the jail of their captor's; then they wait there quietly until they are released. Prisoners can only be released when a member of their team (with arm or headband intact) runs through the jail in which they are being held captive. After their release, prisoners are given free escort back to a central spot near their end of the area. Here, they are issued a new arm or headband.

The game continues until a flag is captured, or time is up.

Note: Supervision at the jails and 'new arm or headband area' is important. Encourage teams to plan elaborate strategies of defence and offence.

Variation: try playing the game with three or four teams, each with its own jail area and hiding spot for their flag.

Light - No light

Equipment: flashlight
Formation: scatter

The game is best in a large open wooded area. Players line up at one end of the playing area, while one player, holding a flashlight, stands at the other end.

The object of the game is to move from one end of the playing area to the other, past the person holding the flashlight.

The player with the flashlight stands with his back to the other players. Every five seconds, he turns around, turns on the light and scans the area for three seconds. If a moving player gets caught by the flashlight beam, he has to return to the starting end. Stationary players may remain where they are. The first person to successfully move past the 'flasher' becomes the light for the next round.

Variation: The player with the flashlight keeps the flashlight on, and continuously scans the playing area. Stalking players dress in dark clothes. If stalking players are caught, they must return to the starting end.

Smugglers and Spies

Equipment: Tiny pieces of paper with the following smuggled items and point values written on each:

Chocolate - 50 points. Quantity: 10
Sugar - 75 points. Quantity: 8
Animal pelts - 100 points. Quantity: 8
Gunpowder - 150 points. Quantity: 6
Designs for new secret weapon - 300 points. Quantity: 3
Map to buried treasure - 500 points. Quantity: 1

Divide the group into two teams. Have each team put on its armbands. One team becomes the smugglers - the other the spies. After the rules of the game are given, each team retreats to separate ends of the playing area (3-20 acres with open woods is ideal for the game.)

The smugglers each receive the tiny pieces of paper, which they are going to try to carry into enemy (spy) headquarters. The spies set up their headquarters inside a 10' by 10' square area that has its definite boundaries. The scorekeeper sits inside spy headquarters.

After each team has been given the opportunity to devise a strategy, play begins. The spies fan out away from their headquarters and try to intercept smugglers as they attempt to take their goods inside.

When a smuggler gets caught (tagged), he must stand still and permit a one minute search of his person by the spy who caught him. If the spy cannot find the piece of paper within one minute (paper has to be hidden in external clothing layers), the smuggler is free to try to advance again into the headquarters. If the spy does find the 'loot', he takes the piece of paper into spy headquarters and gives it to the scorekeeper, while the smuggler returns to his headquarters to receive another piece of paper.

If a smuggler penetrates inside the spy headquarters, he gives his goods to the scorekeeper, and is escorted back to his own headquarters by a staff person or leader supervising the game. The game continues for a set period of time. When it ends, goods (points) are totalled, and a winner is declared.

Find the Bell

Equipment: a little bell that rings easily.
Formation: circle.

Have the group sit in a circle. Choose one person to sit in the centre of the circle. The leader gives the bell to one of the players, who begins to pass it around the circle. The object of the game is to pass the bell quietly so that the person in the middle cannot guess who is holding the bell. Players may not silence the bell by holding the clapper - they have to try to pass it carefully enough so that it does not ring.

Triad

Equipment: 3 soccer balls painted white; 6 markers with reflectors attached (to make 3 goals).
Formation: teams.

Divide the players into three teams. On the playing field, set up three goals in the shape of a triangle. The game begins with a jump ball in the centre of the field. All three balls are put into circulation at once and players try to move the ball through either of their opponent’s goals.

The balls may be rolled, kicked or thrown to team mates. No player may hold a ball longer than five seconds. Teams devise strategies to protect their own goal, while trying to advance to score goals.

Richmond Hill Hand Ball

Equipment: soccer or volleyball.
Formation: teams.

Divide the group into two equal teams. Find a suitable playing field about the size of a soccer field, with an area to be used as an end zone. The play starts with a jump ball. The object is to move the ball down the field to score points. Players throw the ball to their team mates, or run with the ball. Players may not take more than five steps while carrying the ball. If they do, the ball is handed to the other team, who throws it in from the sidelines.

Points are scored when the ball is thrown to a team mate in the opposing team's end zone, and caught. The ball must be thrown from outside the end zone into the end zone and caught by a team mate. If the ball is missed or dropped, the opposing team gets a chance to move it out of their end zone. One point is scored for each catch.

The team with the most points after a given amount of time is declared the winner.

Judge Nature Says!

Description

Every player chooses the name of an animal they would like to represent. One player is chosen to become JUDGE NATURE. Animals follow the instructions given by Judge Nature. If animals should happen to die during the game, they go to a designated area called "SOIL". There, they may be given a task by Judge Nature, such as 'hop on one leg for one minute', or 'do a somersault'.

Judge Nature calls out one of the following instructions

(Feel free to add to this list!):

1. "SURVIVAL OF THE FITTEST" -players run around a designated tree and touch Judge Nature. The first four players back remain alive -the others die.

2. "DROUGHT" -Players run to an area designated as the water hole (perhaps around a different tree) and touch Judge Nature. The first three back live and the others die.

3. "HUNTER COMING" "ATTENTION ALL GAME ANIMALS" -Those players have five to ten seconds to run and hide from the sight of Judge Nature. If they are seen, they are dead.

4. "ILLEGAL HUNTER" -This hunter shoots every animal he sees, so all animals run and hide. If any are seen, they die.

5. "FAMINE" -Among the remaining players, there must be some sort of animal that each player can feed from (in the natural environment). If there is none, that animal dies.

6. "WINTER" -All hibernating animals live, while the others die. With younger players, it might be necessary to help them in the choosing of their animal, and to review some of the habits of the animals in the game, so that all understand each of the instructions, and their reaction to each instruction.

Meet My Friend

Equipment: None

Formation: Group

The object of this game is to discover a friend in nature, without harming any living thing that might be found in the out- of-doors.

Players are taken on a short hike during which time each player collects something from the natural environment (nothing may be broken or picked from any living thing - the item has to be either lying on the ground or resting on another object (e.g. stump or log)). Everyone keeps his object hidden from all players.

Following the hike, each player is given the opportunity to build a small home for his 'friend'. He is also asked to give his friend a name, and to think of one way in which he could take care of his friend, if it was still out of its natural environment.

When all in the group is ready, everyone tours the small homes that have been created, and meets each special friend.

E.g.: 'This is my friend Twiggy. He is a small branch that I found lying on the ground. I've built him a house from soft leaves and moss that I found on the ground. If he was still on a tree, I could take care of him by protecting him from the wind. I could build him a fence so the wind wouldn't snap him off his tree. I could also make sure he doesn't catch diseases - I could check for termites and insects that might harm him."

The friends that are made are refreshing to everyone.

Nature Hunt

Send off each six with a bag, a pad of paper, pen or pencil, and a box of wax crayons.

Please do not pick, harm or remove any piece of anything that is still alive.

- Bring back something you can see light through.
- Bring back something to make music with.
- Bring back a soft rock.
- Bring back something gooey.
- Find three things that have changed: since this morning...since last winter...since you were born... Tell us about them.
- Find and draw a picture of something that is ending its life and something that is beginning its life.
- Bring back the sound of the rain, even if it isn't raining.
- Find something natural to mark with. Bring back a picture you drew with it.
- Find three signs that animals are living here. What animals do you think they are?
- Describe something that changes so slowly you don't notice.
- Draw the wind.
- Bring back a piece of litter. Tell or write a story about its life. What would happen to it if you left it where you found it?
- Measure and record the length of the shadow of the tallest person in your group, using a finger, toe, hand, foot, arm or leg as a ruler.
- Find something you would like to make better. Tell how you would improve it.
- Using everyone in your group, make a human sculpture to show the other groups something that you see on your hike.
- Bring back rubbings of three different textures. Tell where you got each rubbing from.
- Draw a picture using five different colours you see.
- Find something you don't understand and make up a question about it to ask the others.
- List 10 words to describe a natural object 10 paces to your left.
- Find and draw or describe a sign of the season.

As a follow-up activity sort the non-living objects they bring back from the hunt into groups: e.g. interesting shapes or patterns, interesting smells. interesting colours, interesting to touch. seeds, insect homes or food. food for mammals, etc. Later, they can use the objects to make a display in the meeting place or to create a nature craft.

Note: Depending on the age and abilities of the participants, these hunt items can be divided to create two or three shorter sessions.

North by Northeast

Equipment: 1 compass

Formation: scatter

The leader gathers the group together. Using the compass, they all learn how to determine which direction is north. Someone from the group is asked to select an object that lies directly north, (e.g., a tree, or a doorstep, or a post). Then the group decides on an object that lies directly south, one that lies directly east, and one that lies directly west.

Everyone assembles in the centre of the playing area. The leader calls out one of 'North', 'South', 'East' or 'West', and everyone runs to touch the object that lies in that direction. The last one to touch the object is eliminated.

After new rounds of the game, play can stop, and objects for the intercardinal points (Northeast, Northwest, Southeast and Southwest) can be added. Everyone can begin the game again, as all eight points are used.

A great game to introduce the skill of orienteering!

Oh Deer!

Equipment

- Rope (2 6-10 ft long pieces)

Description

1. Place two parallel lines on the floor or ground, ten to twenty feet apart
2. Count group off in fours (1,2,3,4,1,2…)
3. Ones become deer, the others are needs of the deer, which are three: food, water and shelter
4. Show the groups what the symbols are for each of the needs, which include: holding hands over head for shelter, holding hands on stomach for food, and holding hands on mouth for water.
5. The groups (both deer and needs) turn their backs to each other and pick a need by placing hands in one of the 3 positions.
6. At your signal (count of three), both groups turn towards each other holding their signs clearly.
7. The deer must then run to “need” that is holding the same sign. Each need may only have one deer.
8. Any deer who find the “need” they are searching for, then takes the “food”, “shelter” or “water” back to their side of the lines. Those needs then become deer as well, as deer are able to reproduce if they find what they need. Any deer who does not find what they are looking for, dies and becomes part of the habitat, or stays on the need side of the line.
9. Continue play for 10 –15 rounds
10. Have a discussion about how the deer population continues to change because of cycle of available needs

Picture Scavenger Hunt

Prepare a picture scavenger sheet for each student by ruling a piece of paper into a dozen squares and either drawing or gluing down a picture of a different natural item in each square. Include one picture of litter. Glue each sheet to a sturdy piece of cardboard and cover the front with clear contact paper

Give each a hunt sheet and a grease pencil for marking an X on pictures of things he sees along the way. Talk briefly about the items in the squares, then set out on your hunt. Carry a plastic bag for litter, the only item you will bring back. When the hunt is over, talk about the things you saw. How many birds, flowers, bees. etc. ?

This hunt is also good for leaders because, when it is over, you can collect the scavenger hunt sheets, wipe off the grease pencil marks, and store away the cards to use another year

26 Sense & Skill Activities

Newspaper Study

Equipment for each group: one copy of the same edition of a daily newspaper, scissors and pencils.

Each group reads through the news items and finds those that illustrate some aspect of hiking, walking or trails. These headlines, articles or photos are cut out and marked with the corresponding description. Winner is the group with the largest number of clippings in a given time.

Compass Relay

Line up teams in relay formation, parallel to each other. Opposite each team a compass is drawn on the floor, the points indicated but only the North lettered. The leader calls out a point. No. 1 man in each team steps out and places a pencil on the compass, pointing in the given direction, before the leader has counted six. If correct, the player falls in behind compass; if incorrect; he goes back and falls in at the further end of his team. Another point is called and the No. 2's step out. The first team to fall in complete behind the compass wins.

There should be a referee for each team to avoid time waste in verifying the compass directions shown.

Morse Relay

Equipment: one signal flag for each group, improvised from a neckerchief tied to a stick, four feet long, OR one flashlight or blinker for each group.

Groups line up in a relay formation. On the word "Go," first player from each group runs up to the flag or blinker and sends Morse letter "A", races back to touch off the next player, who runs up, sends "B", returns, and so on, until all letters of the alphabet have been sent. First group to finish with all letters correct is declared the winner.

Variation: Have each player, in turn; send one word from an eight-word message tacked to the opposite wall.

Sixteen Point Compass Game

A circle is marked on the floor and sixteen cards are prepared each giving one of the sixteen compass points. These cards are placed face down on a table. Each of the sixteen players takes one of the cards at random. The umpire finds the player who has picked up the North card and places him anywhere on the circle. On the words, "This is North -- Fall in," the others take up their appropriate places in the circle. After the players have become thoroughly proficient the umpire should take any player (say ESE) place him anywhere in the circle and say. "This is ESE-- Fall in."

North, South, East and West

Players are formed up in open formation.

The four sides of the room are named North, East, South and West respectively. The corners of the room are named to correspond with the intermediate compass directions. Whenever the umpire names a direction the players immediately jump to face in the direction. Players who make a mistake, or who move too late, sit down in their places until only one remains standing. When the players have become thoroughly proficient the game should be stopped suddenly and another direction indicated as North.

Dutch Compass Game

Fifteen players stand in a circle, 10' to 12' in diameter.

The umpire stands in the centre of the circle holding a staff upright with one end on the ground. On the words, "Fall In," players take up positions on the circle (facing inwards) to represent the compass points, the umpire indicating where a space is to be left to represent North. He commences by calling a compass direction say ESE and simultaneously releases his hold of the staff. The player occupying the ESE position on the circle must catch the staff before it has fallen. If he succeeds he returns to his place and another direction is called.

When a player fails, he goes to the North space on the circle and the place he left becomes the new North, all of the players immediately picking up their new compass points. The umpire calls new direction.

Blind Man's Knot

The group is blindfolded. The leader passes down the line, holding a piece of cord knotted in one of the familiar knots. Each player may finger it for ten seconds to discover which knot it is. The

group is then provided with a cord. At the word "Go" each blind player makes the knot he considers the right one. The quickest (if correct) wins.

Compass Point Contest

Make two compass boards by drawing a circle on a piece of cardboard (one for each compass board) and securing it to a wooden board with brads at each of the eight compass points. Let the brads protrude about 1/2 inch, and mark one point N for North. Initial the eight points of the compass on small pieces of cardboard with a small hole in each label.

Line your contestants up in two teams (your guests could participate in this game). This is a team contest in which members (one from each team) compete in placing seven labels (omit North) on the brads quickly and correctly. A contestant receives one point for placing the labels correctly and a second point for doing so first. Winning team is the one with the most total points at the end.

Weathercock

Group spreads out facing leader who is to be the Weather Bureau. The leader calls out which way the wind is blowing, North, Southeast, West... As the direction is named the players will turn and point in the correct direction. When the command "Whirlwind" is given, the players all spin around twice quickly on their right heels.

Hunt the Rabbit

Everyone leaves the room, and a "rabbit" is hidden somewhere in plain sight. The "rabbit" may be a toy rabbit, or any other object may be used instead. As the players return to the room everybody tries to locate the "rabbit." When they see it they sit down quietly and watch the others continue their search. Last player to see it gets three groans, or may be otherwise penalized. First player to sit down may hide the "rabbit" next time.

Kim's Game

Thirty-six objects, (can be pictures glued to cardboard), are placed on the ground at a certain distance from the players. Each team sends up one player at a time to take a look. This player runs back to group and tells of an object, next runner is sent up etc. Keep runners and to-run players separate. Number of players will determine how many objects you will need on the cardboard.

Variation--Kim's Game

This game is very adaptable. Objects can be categorized - First aid Kim's: all objects are related to first aid (bandages, pins, splints, etc.); Conventional Sign Kim's: all objects are models or drawings of conventional signs used on maps; Knotting Kim's: all objects are knots, splices or kinds of rope; Leaf Kim's: an assortment of different kinds of leaves, etc.

Objects can be placed on tray, studied for a set period then covered. Objects can be shown one at a time by leader and then put away in his pocket.

One-Leaf Trail

A trail is laid using one kind of leaf as a marker and letting the stem point in the direction to be followed. At the end of the trail the players hunt for the tree whose leaves were used.

Compass Golf

Bury a small tin can in the centre of a large circle marked on the ground. Mark North, South, East and West with small pegs on the circle's circumference. These are used to tee golf shots toward the buried can. Record how many strokes you need to get in from each point.

Lost Player

One player is sent out of the room in an unobtrusive manner; the leader then announces that he sees that someone is missing and asks for a description for a search-party. Best description of missing player and his clothes wins.

Treasure Hunt Variations

1. Give group a message in code or semaphore telling layers where to find message number two.
2. Give group a message telling leader to phone a given number for directions or ask a parent (previously briefed) for a task to be accomplished. Like:

- carry a message, bring back ten articles whose names start with a certain letter,
- bring back an article previously hidden,
- identify objects of nature (flowers or trees),
- go to a parking lot and obtain the license number of five cars parked there which are a certain colour or from out of the province.

Cage

Groups must construct a cage from staves, sisal and rope large enough to hold a small player from another group. The player in the cage must escape within one minute.

Pocket Murder

The contents of a "murdered man's" pockets are displayed. Players must deduce his age, profession, and interest in recent activities.

Track Memory

A group sits with their feet up and other groups study them. After three minutes, one of the groups makes some footmarks in a good bit of ground. The other groups approach one at a time and try to decide who made it.

String Burning

A string is pulled tight between sticks. Each contestant builds a fire under the string and lights it. The one whose fire burns through the string first is the winner. Fires should be spaced along the string at wide intervals.

Log Chopping

Logs must be of equal size and diameter. The first to chop through his log is the winner.

Log Swing

Logs of equal thickness must be sawed into two pieces. Crosscut saws and pulp saws must be used.

Memory Testing

Groups are lined up. The leader tells them they must not move until he says "Move." He then gives a number of orders, i.e. left-turn, about-turn, right-turn, about-turn. This brings them back to the original front, but can be varied. He then gives the word "Move." Winning group is the one who has the most boys facing in the right direction at the end of the turns.

Note: This can be varied by substituting the (?) paces forward and (?) paces backward.

Rope Throw

One member of group is seated on a piece of cardboard (2' x 2') 30' - 35' away from the group. Balance of group each have one piece of rope about 6' long. On "Go" each group must join all pieces of rope using a specified knot (square, reef, clove hitch) and throw completed rope close enough to player on cardboard so that he can reach it. Player on cardboard cannot move and rope must fall within his arms reach. When he catches rope, he must tie bowline around waist and be hauled across line where rest of group throws rope from. Works well on most indoor floors. If you haven't enough rope for all your groups, game can be run by groups in turn using best time to declare the winners.

Knotting Circle

Players in circle, one ties a knot in a bit of rope and drops it at the feet of one of another group, who must name the knot correctly and say if it is tied right before the tier has run round the circle. Whichever wins ties the next knot, and so on.

Black Knots

All players have a piece of rope. Assign a specific knot. Shut out lights for a specified time and see how adept group is in the darkness. Vary knots called and time lights are out.

Silly Symphony

Equipment: The Outdoors

Formation: Semi-circle

The purpose of this game is to discover the beautiful sounds that can be created by the natural objects in our environment.

Each player is given 10 - 15 minutes to find objects in nature that make a noise when banged together, or blown on, or rubbed together. Players bring back their 'instruments' and a conductor is chosen who organizes the group into a semi-circular orchestra.

Each musician is allowed to 'tune' their instrument, so the rest of the group can hear the different sounds. Any player, who can play more than one instrument at the same time, is welcome to do so.

The conductor can then choose a familiar tune with an easy rhythm, and lead his orchestra in song. Let the players make requests for songs they would like to play; give musicians the opportunity to work on 'solos' that they can perform for everyone.

Silly Symphony: Clouds on the Clothesline

Give the players 10 to 15 minutes to find natural objects that make a noise when you bang them together, rub them together, or blow on or through them. When they come back, organize them into a semicircle and ask each to "tune" his/her instrument so that the others hear what it sounds like. Then, ask the orchestra for a simple, favourite song and conduct them as they sing and play along with it. After a few of their own songs, introduce them to this one from Scouting (U.K.) magazine. The tune is Baa, Baa, Black Sheep.

Paper, plastic, scattered on the ground,
Litter, litter, everywhere around.
Why do we leave it?
Why not take it home?
No more litter wherever we may roam.

Broken glass and bottles on the land,
If you leave them, you may cut a hand,
Do your duty,
Take away the glass,
Leave the animals to enjoy the grass.

Discarded fish hooks by the riverside,
Discarded litter scattered far and wide.
Do the ducks a favour,
Have a bit of care,
Let's leave a countryside that we all can share.

Listen carefully to this little tune,
Litter bugs aren't welcome, even on the moon.
Pick up your litter, Put it in the bin.
Then we'll all enjoy the world we live in.

Splash Hike

Equipment: None

Formation: Group

This is a super small group game.

As everyone to wear bathing suits and an old pair of shoes (a pair they can get wet).

The game takes place in a stream or along the shallow shoreline of a lake or river.

The leader steps into the water, and instructs the group to 'follow the leader'. Everything the leader does is copied by the followers. After a few minutes of hiking, the leader falls to the back of the line to let a new leader take over. The hike can be as long or as short as time allows - it is fun to walk back to home base in the water, rather than by land; see if the group can hike backwards for some of the return distance.

Some 'follow the leader' ideas:

Sit down on a stone; hop on one foot; play leap frog; skip a flat stone out to sea; jump from one stone to another; build a small castle on the shore; climb a tree; stop, take off one shoe, empty water from it, and put it on again; crouch so that all of you is under water; sing a song about the sea; try to catch a frog.

Swamp

Equipment: Pen and Paper.

Formation: Small groups.

Divide the group into teams of 4 to 6. Give each team a large piece of paper and a pen.

Each letter in the word SWAMP stands for another word that describes something in nature:

S Stars
W Weather
A Animals
M Minerals
P Plants

On 'Go', each team writes down as many words as it can think of that relate to the words STARS. The only stipulation is this: They must be able to SEE what they write down from where they are sitting (e.g., sky is where stars are seen; clouds cover stars on a dull night). Each team has five minutes to write down as many words as possible.

The next five minutes are devoted to the word WEATHER, the next five to ANIMALS and so on until all letters of the word SWAMP have been given equal time.

At the end of the writing session, the leader tallies the number of words to see which team has the sharpest eyes, and the most vivid imagination (some teams may have to explain their rationale behind writing down certain words - the leader may not understand how they relate to the 'master' word).

You'll be amazed at the imagination.

Switch

Equipment: None.

Formation: scatter, in a wooded area with several varieties of trees.

Players are divided into three or four groups such as Sugar Maple, Beeches, Yellow birches, ironwoods. In an appropriate and defined area, players stand touching their trees - only one per tree. 'It' stands at the centre spot and calls the name of a group.. 'Beeches' for example. At this signal, the designated group changes place with on another, running from one beech tree to another. 'It' tries to claim a tree of his own during the interchange. If 'It' is successful in claiming a tree, the player who is left without a tree becomes the new 'It'. If 'it' calls 'FOREST', everyone is required to change to another tree of his team's name.

To end the game, it is fun to have 'it be it' for four or five rounds of the game calling 'FOREST' every time. As 'it' beats a player to a tree, that player is eliminated. In this way, some trees may be altogether wiped out from the forest, as could happen in our natural environment.

Team Radar

Equipment

- 1 long piece of rope or webbing
- A marker for the final destination
- Blindfolds

Description

- 2-15 people start at one end of a course that will lead them through the woods. They should be able to see the final mark.

- The group is given minutes to “landmark,” pace, and work out how they will find the marker when blindfolded.

NOTE: They may not disturb the vegetation or ground!!

- When they begin, all must be blindfolded and holding onto the rope.

- Safety Note: The facilitator(s) must be alert to the group “running” into obstacles and use the word “STOP.” If the group gets “lost” they may begin again.

The Endangered Hoppit

Here's a great game with a whole lot of energy to burn. Hoppits are imaginary creatures that hop around gathering materials from the ground (rocks, twigs, leaves). Hoppits need a home where they can store the things they gather and stop hopping when they need to rest. Mark out a large circle as home.

When the game begins, the Hoppits hop around on two legs gathering materials from the ground and taking them to the home area, where each builds his own pile. Every Hoppit needs to keep his pile at least as high as the other piles, so he must keep hopping and gathering. When he's tired, however, he can stop in the home area to rest.

After about five minutes. tell the Hoppits that bad weather has limited their food supply. Because life is now harder for Hoppits, they can only hop on one leg. The Hoppits continue hopping and gathering materials, resting when necessary in the home area. If a Hoppit accidentally hops on two legs, he dies and takes to the sidelines.

After about 5 minutes of one-legged hopping, tell the Hoppits that humans have built a shopping mall on their home. Although they may leave their piles there and continue adding to them, they no longer have a place to stop and rest. To stay alive, however, they must continue hopping on one leg and adding to their piles. How many are left after two minutes? Five minutes? How long can the Hoppits survive?

The Stalker

Equipment: Blindfolds, stones

Formation: Scatter

Half the group is given blindfolds to wear. These players are placed in scatter formation within the boundaries of the playing area. A stone is placed between their feet, but not touching them.

The other half of the group (the ones that can see) begin to stalk the blindfolded players in an effort to obtain the stone from between their feet. In an attempt to pinpoint a stalker, the blindfolded players may point to a sound. If a stalker is there, the two players switch positions.

Stalkers try to collect as many stones as possible without being caught.

The Stalker (Variation)

Indoor nature game

Equipment: Blindfolds, flashlight

Formation: Scatter.

This is a terrific evening program variation to the original Stalker game. The players protecting the stone between their feet are given flashlights. When they think they know the location of a stalker, instead of pointing to him, they flash the light in the direction from where they hear the noise. Each player is given three separate 'flashes' of light before losing his stone to the nearest stalker

The Wonder of Nature

Description

The group assembles in an outdoor area with open fields and wooded edges. Players are asked to stay within outlined boundaries, set by the leader. The leader calls out one of the instructions listed below, and players are given 2 minutes to run and do or find whatever is needed. Everyone gathers in the centre of the playing area to discuss each action or direction, before the next one is called. A great way to learn about the environment in a fun way!

1. Count something so that you know more about it after you have counted it than you did before you counted it.

2. One at a time, find objects that are: hard, big, high, dead, wise, land; use threatening, soft, small, low, calming, sad, funny, ugly, unhappy, happy, beautiful, wasteful, useful etc.

3. Find a place where water has washed away the soil.

4. Look for an object that has a geometric shape in its structure. Think about how that form is related to its function.

5. Find and bring back a sound that makes you feel: angry, sad, beautiful, afraid, happy, tough.

6. Find an unpleasant odour. Can you describe the smell? Find an odour that you like? Describe it. Can you think about why some things smell good and others don't?

7. See if there is anything you can do to change something that makes you sad.

8. Describe something of power.

9. Find the oldest thing and try to guess its age. What are ways of determining the age of something?

10. Find an object that has one of the textured of: smooth, rough, slippery or shiny

11. Find a change that is predictable.

12. Find the highest thing and the lowest thing.

13. Look for a natural object that has five parts.

14. Find an object that has at least four colors showing.

15. Take a familiar object from the unnatural environment. Find and demonstrate a new use for it in the natural environment.

Section G
Pedometer Activities



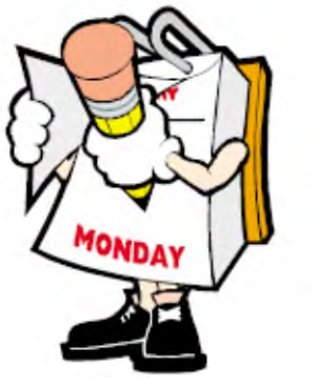
A Day in the Life

Subject: English

Objective: The student will write a creative story about a day in the life of a pedometer.

Materials

- Pedometers
- Paper
- Pencils



Procedure

1. Brainstorm ideas about a day in the life of a five dollar bill. Discuss what the dollar bill might see, hear, taste, smell, and touch. Discuss sensory words.
2. Allow the students to examine the pedometer for a few minutes to see how it works if they have not done so already.
3. Assign a creative writing assignment about a day in the life of a pedometer.
4. Have the students share their ideas.

Assessments: Class participation and rubric for creative writing

Adapted from Louisiana Department of Education, Pedometer Pizzaz Book

A Walk in the Park

Subject Areas: English, Mathematics, Science, and History

Objectives: The student will determine his/her own average number of steps. The student will determine the average number of steps it would take to walk to various places.

Materials



- Pedometers
- Paper
- Pencils
- Maps

Procedures:

1. Review the instructions and uses for the pedometer.
2. Have each student wear a pedometer and march in place for 60 seconds, recording the number of steps as he/she finishes.
3. Each student should determine how many steps would be taken if he/she kept up the same pace for one hour. One week? One year?
4. Determine the class average by adding their total steps and dividing by the number of students.
5. In groups, determine how long it would take to walk to an Ontario city or a trail nearby using the class average.

Assessments: Class participation and data analysis

Adapted from Louisiana Department of Education, Pedometer Pizzaz Book

All About Pedometers

Subject Area: English

Objectives: The student will recognize characteristics of an informational article. The student will research information about a pedometer. The student will create an original informational article about a pedometer.

Materials

- Pedometers
- Informational articles
- Various research materials
- Paper
- Pencils

Procedures:

1. Read and discuss the characteristics of an informational article.
2. Have the students research the uses and benefits of a pedometer.
3. The students will imagine that they are writing an informational article for a science magazine. They should include the information found in their research.

Assessments: Class participation and research rubric

Adapted from Louisiana Department of Education, Pedometer Pizzaz Book

Calorie Count

Subject Areas: English, Mathematics, and Science

Objectives: The student will identify the number of calories in various foods. The student will attempt to "walk off" the number of calories in various foods.

Materials

- Pedometers
- Various candy bars
- Various nutritional snacks
- Paper
- Pencils
- Calorie Conversion Chart (see next page)



Procedures:

1. Discuss the key terms fat cell and calorie.
2. Show the students a candy bar and discuss how many calories are in the candy bar.
3. Students will compute the number of steps it would take to walk off the calories in the candy bar.
4. Show them a nutritional snack and discuss how many calories are in the snack.
5. Compare the difference between the two snacks.
6. Give them a time period and have them wear a pedometer to see if they are able to walk off the Candy bar or the nutritional snack.
7. Have them discuss their observations.

Assessments: Class participation and research rubric

Adapted from Louisiana Department of Education, Pedometer Pizzaz Book

Calorie Conversion Chart

The following chart is approximate,
but should fulfill the requirements for the lesson.

10,000 steps approximately equals:

WEIGHT (in kilograms)	CALORIES USED
45 – 54	420
54 – 63	440
63 – 72	460
72 – 81	480
81 – 90	500
90 – 99	520
99 – 108	520
108 – 117	560
117 – 126	580

Source: Louisiana Department of Education, (Summer 2003). Pedometer Pizzazz.



Feel the Burn!

Subject Areas: English, Mathematics, and Science

Objective: The student will perform different activities to determine which activities burn more energy.

Materials



- Pedometers
- Jump ropes
- Paper
- Pencils
- Calorie Conversion Chart (see previous page)

Procedures:

1. Lead a discussion about calorie intake and how the body uses calories as energy.
2. Have the students hypothesize which activity burns more energy: hopping, skipping, jumping rope, jogging, or walking.
3. Group students and have them wear a pedometer and perform one of the tasks for a given period of time.
4. Chart each group's results using the Calorie Conversion Chart and discuss these findings.

Assessments: Class participation and charts

Adapted from Louisiana Department of Education, Pedometer Pizzaz Book

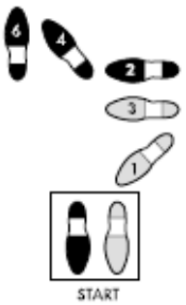
Footsteps to Your Future

Subject Areas: English and Science

Objectives: The student will brainstorm possible after-school activities. The student will compare and contrast active and inactive lifestyles. The student will record his/her activities and the number of steps taken during five hours each day. The student will use data to predict his/her lifestyle in the future.

Materials

- Pedometers
- Paper and pencils



Procedures:

1. Review the instructions and uses for the pedometer.
2. Brainstorm the activities the students are involved in after school.
3. Compare an active lifestyle to a sedentary lifestyle.
4. Have students wear pedometers after school for one week and record the number of steps they take each hour for five hours, as well as the activity in which they participate.
5. Compare the students' activity levels and their number of steps.
6. Have each student write a paragraph predicting his/her future if the activity level remains the same.
7. Allow students to share their paragraphs.

Assessments: Class participation and paragraphs (rubric)

Adapted from Louisiana Department of Education, Pedometer Pizzaz Book

Healthy Hearts

Subject Areas: Mathematics and Science

Objective: The student will measure and record his/her pulse rate and number of steps over a given distance at various speeds.



Materials

- Pedometers
- Paper and pencils

Procedures:

1. Review the instructions and uses for the pedometer, how to take a pulse rate, and the class graph made in previous activity “Step to the Beat”
2. Pose the following question: “Does speed affect pulse rate?”
3. Using the pedometer, have the students travel the same distance at three different speeds and record their number of steps and their pulse rates as they finish. One should be slow, one should be average, and one should be fast.
4. Make a classroom comparison of their number of steps and their pulse rates.
5. Analyze the data with the students. What can be inferred from the information? Why are there differences among students?

Assessments: Class participation and data gathering

Adapted from Louisiana Department of Education, Pedometer Pizzaz Book

Healthy Steps

Subject Area: English

Objectives: The student will identify the benefits of exercise in a person's life. The student will set realistic exercise goals for a nine-week period and evaluate their progress toward this goal at regular intervals.

Materials

- Pedometers
- Story
- Foot pattern
- Colored pencils



Procedures:

1. Read an inspirational story about someone who endured a hardship (e.g. Terry Fox.)
2. Discuss the importance of setting and meeting goals in life.
3. Discuss the benefits of exercise in everyone's life.
4. Have the students create an exercise goal for a nine-week period. This does not necessarily have to be a weight goal. Those who do choose a weight goal, however, should be allowed to use the pedometers to measure their progress. Each week, have the students evaluate their progress toward their goals. With each step they move toward their goal, the students should decorate or color a foot to be added to the wall with a title such as Stepping Towards Our Goal. When the nine weeks ends, evaluate and discuss each class' progress.

Assessments: Evaluation chart and class participation

Adapted from Louisiana Department of Education, Pedometer Pizzaz Book

Mapmaker, Mapmaker, Make Me a Map

Subject Area: History and Social Science

Objective: The student will create a map of their school/ hiking trail by using the pedometer

Materials

- Pedometers
- Paper and pencils



Procedures:

1. Review basic map skills and discuss the key terms direction, scale, legend and key with the students
2. Ensure each student knows how to correctly use the pedometer.
3. Show the students how to convert steps to metres.
4. Have the students create a map of the school/ hiking trail to scale by walking off distances using the pedometer and converting their steps to metres.
5. Allow students to share their maps.

Assessments: Teacher observation, class participation, and map (rubric)

Adapted from Louisiana Department of Education, Pedometer Pizzaz Book

Nature Scavenger Hunt

Subject: Science, Math

Objective: To integrate the classroom study of plants/soil/rocks within a physical education classroom

Prior Knowledge: Students have been studying plants/soil/rocks in their classroom. They are able to recognize various types of plants, rocks and soil, as well as the parts of plants. Students are also aware of the various locomotor skills that can be used for traveling

Materials

- Scavenger hunt worksheet
- Clipboard and pencil for each group
- Pedometer for each student

Procedures:

1. Introduce/instruct the students on the value of pedometers.

2. Demonstrate how to use the pedometer and give the students some short practice time to experiment.

3. Divide the students into small groups (4-5) and give each group a scavenger hunt worksheet. Students will use their knowledge of plants/rocks/soil to find items listed on the scavenger hunt worksheet.

4. Review all of the items on the list that they are to find.

5. Students are to use a different type of locomotor skill as they travel to each site. Record the skill that was used on the scavenger hunt worksheet.

6. Estimate how many steps that they think they might take during the activity

7. Discuss the boundaries for the hunt outside, if needed.

8. When the list is complete turn in the clipboard and wait for the other groups to finish.

9. Once everyone has finished move back inside and open up the pedometers. Ask students to write down the number of steps on the scavenger hunt worksheet.

10. Use this time to discuss:

    - place value
    - Estimation (Compare their estimates how many steps that they thought it would take during the activity and then have them subtract the actual steps and estimated steps to find out the difference. Have they over estimated or under estimated?)
    - addition, subtraction, multiplication, and division
    - the ability to categorize the objects found (How are they classified?)

11. Track or record steps taken (compare/contrast steps taken between/among activities). (Older students could compute total distance covered over the course of a unit [in kilometres] or even the average number of steps taken per activity.)

Assessments:

The assessment is to be on the scavenger hunt worksheet. Did they find all of the objects listed and did they move around to find them?

Adapted from Louisiana Department of Education, Pedometer Pizzaz Book

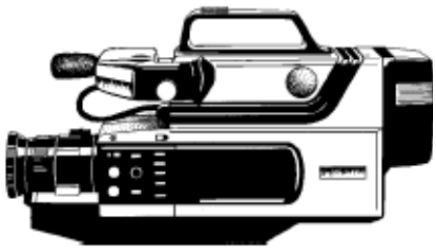
Pedometer Propaganda

Subject Area: English

Objectives: The student will distinguish between various propaganda techniques. The student will create an original advertising campaign for a pedometer.

Materials

- Pedometers
- A variety of advertisements and commercials for the students to analyze
- Posters
- Colored pencils
- Video camera (if possible)



Procedures

1. Discuss various propaganda techniques as the students view different advertisements and commercials.
2. Discuss the uses and benefits of the pedometer.
3. Have the students create an advertising campaign to introduce the pedometer to the public. Their campaign should include an advertising layout for a magazine, newspaper, or storyboard as well as a commercial.
4. Have the students present their campaign to the class. Video the commercials if possible.

Assessments: Teacher observation, class participation, advertising rubric, and oral presentation rubric

Adapted from Louisiana Department of Education, Pedometer Pizzaz Book

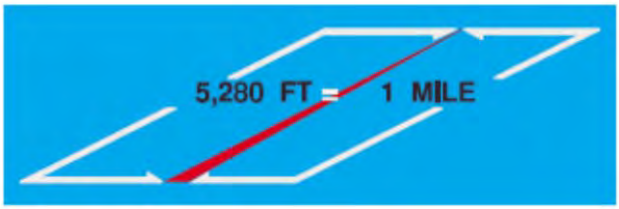
Show Me the Steps

Subject Areas: English and History

Objective: The student will create a set of directions using a community/ trail map.

Materials

- Pedometers
- Community/ trail maps
- Paper
- Pencils
- Steps-to-Metres Conversion Chart (see next page)



Procedures:

1. Review the instructions and uses for the pedometer with the students.
2. Divide the class into groups and provide each group with a community map.
3. Have the students study the map and write directions from the school to various places within the community. Each group should convert the metres into steps. (See Appendix)
4. Groups should then exchange directions, convert them back to metres, follow them and tell the class where they feel the map would lead them.

Assessments: Class participation, group participation rubric, and maps

Adapted from Louisiana Department of Education, Pedometer Pizzaz Book

Steps to Metres Conversion Chart

The following chart is approximate

STEPS	KILOMETRES
660	500 METRES
1,320	1000 METRES
1,980	1500 METRES
2,640	2000 METRES
3,300	2500 METRES
3,960	3000 METRES
4,620	3500 METRES
5,280	4000 METRES
5,940	4500 METRES
6,600	5000 METRES
7,260	5500 METRES
7,920	6000 METRES

NOTE: Groups with access to a Canadian regulation football field may wish to find each member's steps to metres ratio by walking it lengthways and counting their own steps. A 110 yard football field is 101 metres so walking it will give each person a number of steps to go approximately 100 metres. Multiplying by 10 will give the number of steps to go 1 kilometre (on flat level ground). Remind your group that trail terrain will add steps due to uneven ground.

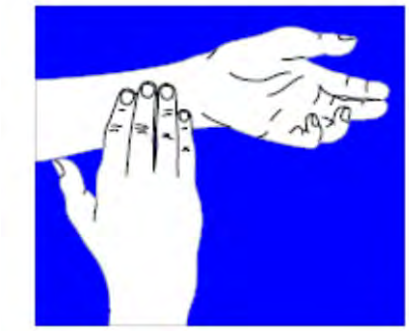
Step to the Beat

Subject Areas: Mathematics and Science

Objectives: The student will determine his/her pulse rate after walking a given distance. The student will make a data table or graph the classroom results.

Materials

- Pedometers
- Paper and pencils



Procedures:

1. Review the instructions and uses for the pedometer.
2. Pose the following question: “Does everyone’s heart rate remain the same when walking a set distance?”
3. Teach the students how to take their own pulse.
4. Using pedometers have the students walk a long distance such as a track around a football field or a hiking trail nearby.
5. As they finish, have them immediately record their pulse rate.
6. Create a class graph of the results.

Assessments: Class participation, graph or data table

Adapted from Louisiana Department of Education, Pedometer Pizzaz Book

Steppin‘ Trails

Subject Areas: English

Objectives: The student will research routes to a certain destination. The student will create journal articles about a walking trip to a particular destination.

Materials:

- Pedometers
- Research materials
- Paper and pencils

Procedures:

1. Review the instructions and uses for the pedometer.
2. Research different routes one might take around the city using hiking trails.
3. Divide the class into groups and assign each group a route.
4. Students should pretend* they are walking this route. Have them keep a journal of their trip. They should tell the distance they have traveled each day along with what they have seen, smelled, tasted, touched, and heard along the way. Pedometers may be used to convert steps to metres and vice versa. Their information should be accurate and align with the assigned route.

*This activity would be much more meaningful for students if they could actually walk their chosen route instead of pretending.

Assessments: Class participation, group presentation, and journal writings

Adapted from Louisiana Department of Education, Pedometer Pizzaz Book

Trail Travel Tips

Subject Areas: English and History

Objectives: The student will research information about hiking trails. The student will plan a weeklong hiking trip. The student will create a map and a brochure to accompany their hiking trip.

Materials



- Pedometers
- Research materials
- Paper
- Colored pencils
- Steps to Metres Conversion Chart (see page 356)

Procedures

1. Have the students research and plan a weeklong hiking trip to a destination of their choice.
2. The students should decide how far they will hike each day and where they will camp for the night.
3. Using the pedometer, the students will convert steps to metres and decide how many steps they would have to make each day to reach their goal. (See Appendix)
4. Students would then create a map of their hiking trail and a brochure to advertise their trip.
5. Have the students share their hiking trip information, map, and brochure with the class.

Assessments: Class participation, teacher observation, map, and brochure

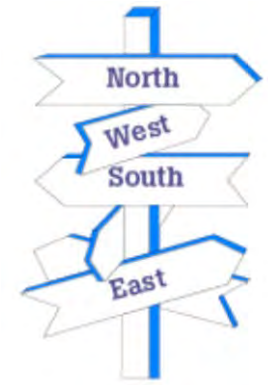
Adapted from Louisiana Department of Education, Pedometer Pizzaz Book

Walk This Way

Subject Areas: English, Mathematics, and History

Objective: The student will follow a set of directions to create a design.

Materials



- Pedometers
- Instruction (direction) sheets
- String
- Markers

Procedures:

1. Review the instructions and uses for the pedometer.
2. Give the students a list of directions and have them walk them off using the pedometers. Allow them to carry a string and lay it down as they walk. Have them place a marker on the ground each time they change directions. When they finish, they should have constructed a design. One example might be:

10 steps Northeast
10 steps Southeast
10 steps West Northwest
10 steps East
10 steps West Southwest

**If done correctly, they will have created a star. **

3. Have the students calculate the total distance walked and the displacement (number of steps in a straight line from where they started to where they ended).

Assessments: Class participation and design
North
South
East
West

Adapted from Louisiana Department of Education, Pedometer Pizzazz Book

Section H
Extras for Teachers



How to Start a Walking Club

Walking clubs provide an excellent way to get the people in your community, neighborhood, school, workplace, church or organization walking toward better health and vitality!

WALKING CLUB PROGRAM INFORMATION SHEET

PROGRAM NAME
Walking Club

PROGRAM OBJECTIVE
To provide a safe, accessible and motivational opportunity for people to be more active through walking

TARGET GROUP
It's up to you! We suggest adults from 20 – 65, who have indicated that they would like to be more active on a regular basis through walking.

ROLE OF THE WALKING CLUB "CO-ORDINATOR"

- Program Development: determine dates and times, book facility (if needed)
- Develop program budget
- Recruit a walking leader
- Distribute material to leader
- Program Registration
- Promotion
- Encourage people to join
- Issue honorarium payment (if appropriate) to walking leader
- Confirm program outline
- Provide class attendance lists to leader
- Assist in mapping out walking routes in the community

ROLE OF THE WALKING CLUB "WALKING LEADER"

- Lead the walks
- May take program registrations (if appropriate)
- Take attendance and complete evaluation form (gather stats)
- Motivate and inspire participants
- Encourage social component following the walk (get group to assist in planning)
- Encourage people to join

- Ensure safety
- Meet the needs of the participants (why they joined, goals, how they are doing)
- Encourage/assist participants to advance their walking program (i.e. self-directed with others)
- Assist in mapping out walking routes in the community

"THE TOP 10 STEPS TO A SUCCESSFUL WALKING CLUB" CHECK LIST

- Determine the need for a program in your area. Review neighborhood demographics and ask around (find out who's interested)

- Choose appropriate dates and times for the program.

- Book a facility. The preferred location should have adequate space for walking and a meeting place for participants to socialize following the walk. Examples of walking venues include schools, libraries, churches, long-term care facilities, outdoors, parks, Recreation facilities, legion halls, shopping malls, etc.

- The location for the social component could be determined by the participants on the first day: options include: community cafes, schools, churches, homes etc. (depending on the size of group).

- Determine program design (refer to program content and variation handout)

- Develop a program budget. The revenues from the program should cover all expenses. Revenues may include: program registration fees, donations, sponsorships, grants, etc. Expenses may include: facility rental, walking instructor honorarium, refreshments.

- Recruit a walking leader. You need to recruit a dynamic and committed individual to take the lead in the walking club. The leader does not need to be a certified fitness instructor: the enthusiasm and commitment of the individual will lead to the success of the program. The leader should be a resident of your community. Suggestions for recruiting include: place an ad in the community newspaper or newsletter, put up a poster at registration; contact people that have registered for the program, word of mouth (ask around in the community).

- Promote the program. Place posters/flyers in community schools, shopping centers, cafes. Place advertisements in the community newsletter, school newsletters, and church bulletins.

- Take program registration. This should be done at your registration night. Ongoing registration is encouraged. You will need to discuss registration procedure with the walking leader (i.e. do new registrants contact you or can they register at the program?) You should determine if the walking leader will take ongoing registrations, or if individuals should contact you.

- Give materials to the walking leader to distribute (i.e. attendance lists, goal-setting cards, etc.). Provide refreshments for the first day.

- Monitor the program.

WALKING CLUB PROGRAM VARIATION IDEAS

- Develop a Buddy System (buddies can encourage one another)

- Plan for additional days of walking (rather than just walking once, you can set up optional days: may want to have two "buddies take the lead role in each alternate day)

- Plan walking routes (determine distance)

- Encourage participants to record progress in a journal (and review goals regularly)

- Bring in a guest speaker to discuss health issues following walks. Call or email Hike Ontario, to have one of our Ambassador's come and speak to your group! 1-800-894-HIKE or info@hikeontario.com

- Schedule group field trips

- Encourage healthy nutrition; have everyone bring a healthy recipe to share

- Encourage others to lead the walk

Tips for Leading a Hike

Hiking

Hiking can be an excellent activity, not only from a physical fitness aspect but also to encourage the development of skills in planning, teamwork and leadership when preparing for and undertaking a hike or expedition.

Hiking can also be a means to an end, for example, hiking to a campsite, to a National property, or to a place of interest.

Planning a Hike

Listed are the steps required to plan a hike. If you are new to hiking, then it may be a good idea to discuss your plans with an experienced hiker, so that he or she can give you some help and advice.

1. A great place to start is by enrolling in or hosting a Hike Ontario's Safe Hiker Program. This one-day course will provide you and fellow with the fundamentals skills you need to embark on a hike. After that course, you can further enroll in our Hike Leader Certification Program to become a certified hike leader. Info on both of these programs can be found at www.hikeontario.com

2. The first thing you will need to do is to decide where and how far you want to go, and if there is a purpose to the hike. Are you going just to walk, or are you visiting something en route?

3. When this has been decided, you will need to plan the specific route and produce a route plan

4. Once the route and purpose have been decided, you will need to inform and ask for permission from the parents or guardians of the Scouts taking part (if applicable). This must be done in writing.

5. Nearer to the day of the hike, you will need to gather your equipment, check that it is in working order and pack it. You will also need to check that all of the Scouts taking part have all of the required equipment.

Equipment

The equipment you will require is dependent on where you are going, the time of year, the terrain and the weather. There follows a list of items that you will need:

- *Map and compass* - These are essential, and it is best to have a 1:25,000 or 1:50,000 Ordnance Survey map. A 1:25,000 map is required if you are going up into the hills or into remote areas. The map should be contained in some type of waterproof carrier (such as a stout plastic bag or transparent plastic folder).

- *Route plan* - You will need to take a copy of your route plan with you and also leave a copy with someone. This is a form completed with details of where you intend to go, type of terrain, escape routes, names of those taking part, weather forecast and so on.

- *Whistle* - This is another necessity and should be available for use in case of an emergency when you need to attract other people's attention.

- *Flashlight* - If you are planning to be out after dark, then this should be carried as well as spare batteries and a spare bulb for the flashlight. Fluorescent clothing will also be necessary if walking in the dark.

- *Mobile phones* – These can be a useful resource, but should not be relied upon as the sole means of contact. They may not work in poor reception areas and batteries can drain down.

- *First aid kit* - This is an essential item for any sort of hike. Apart from the usual requirements, it should include plasters and dressings to deal with blisters.

- *Survival bag* - This is a heavyweight plastic bag, which is large enough for someone to get into in an emergency to prevent hypothermia.

- *Walking boots* - If you are intending to go hill walking, then you will require a good pair of walking boots - do not attempt to go hill walking in ordinary shoes, as they do not give adequate support to your ankles. If you only intend to go for an easy stroll in the local forest, then you can wear shoes, but make sure that they are stout enough for the job. Always 'break in' new boots before undertaking long hikes.

- *Waterproof outer clothing* - It is necessary to have with you waterproof clothing that is both wind and waterproof whatever the weather is like when you start out. It is important to keep yourself warm and dry, as a lot of accidents occur when people are cold, wet and miserable.

- *Layers of clothing* - It is better to wear several layers of thin clothing, rather than one thick garment, as several tops, for example, will trap layers of warm air around you. If you get very hot, then one or more layers can be removed and you can still keep warm. Do not wear tight fitting clothes or jeans, as they will not keep you sufficiently warm and they may possibly rub

and become uncomfortable. Thick socks also help with not only keeping feet warm, but also with reducing the possibility of blisters. Depending on the terrain, weather forecast, and time of year, you may also require a hat, scarf and gloves.

- *Food* - When walking, you expend a lot of energy, so you will need to take food with you. Have a good breakfast before you set out and take something rich in carbohydrates for lunch, for example, sandwiches, biscuits, nuts, raisins, cakes, chocolate. It is also a good idea to have something that you can eat whilst walking, such as glucose sweets, to keep your blood sugar level high. If the weather is cold, a thermos flask with a hot drink, such as hot chocolate, tea or soup will be appreciated!

- *Rucksack* - Finally, you will need a daypack or small rucksack to carry all the equipment. A pack with padded shoulder straps and a waist belt is best. Any spare clothing should be packed in plastic bags to ensure that it is kept dry. If you are going for an overnight hike, you will need to bring extra equipment, such as spare clothing, sleeping bag, carry mat, tent, cooking equipment, and so on. It is important to remember that whatever you take, you will have to either wear or carry it. Try the weight of your pack before you leave home to check that you feel comfortable carrying it around for a day.

Safety

As with any activity, it is very important to consider the safety factors when hiking.

- You must never walk alone, always go in small parties. The party must not be more than seven people in size including the leader of the party. Each party should include a named and designated party leader.

- If you have more than seven in an area each party must move either on different routes or, if on the same route, with a clear time and geographical separation in order that they do not become mixed.

- The minimum size of a party should be four. Make sure that you have got a Home Contact. This is somebody, not related to anyone in the party, who has a list of members taking part, with their home contact telephone numbers, a copy of your Route plan and who knows what your estimated time of return is. This is appropriate even for a day hike. This person must know whom to call if you don't turn up at the time you have planned to.

- Everyone in the party should be able to recognize and treat hypothermia and wind chill, especially if you are going up into the hills or into large open spaces.

- At least one member of the party should have a basic knowledge of first aid. You should have several members in your party that know the emergency procedure if someone becomes injured. (One person stays with the casualty, whilst others go for help.)

- You also need to know the international distress signal, which is three whistle blasts, one-minute silence and a repeating of this signal.

Tricks of the Trade

When walking in a group, walk in single file or on a wide trail, pair off in twos. In addition to your hike leader, have a “sweep”. A sweep is a person who stays at the end of the line to ensure that slower hikers don’t get left behind or lost.

Always plan a route that is right for the weakest of your participants. If the route is too hard or too long, then you will stop having fun and may put those involved off hiking in the future. If you are hiking with children, try to have a purpose or objective for the expedition and discuss what you see on the way, as this might keep their minds off tired feet or aching backs!

When you go hiking, have a set number of planned breaks (for example, ten minutes an hour), but do not keep stopping, as this will not only use up a lot of time, but also in the long run, make people feel more tired as it will ruin their walking rhythm.

If planning to undertake an expedition or weekend hike without much previous experience, you will probably need to go on some training or practice hikes. These are relatively short hikes which give you an opportunity to find out about your own capabilities for walking (pace, distance and so on), to 'break in' new boots, and to practice carrying a loaded backpack.
Finally, always remember to tell your Home Contact when you have arrived back, so that they do not call out the emergency services for no reason.

Hydration on the Trail –Facts about Water

The fact is your body need water, every part of the body from your muscle to your blood to your brains need water. Did you know that most people do not consume enough water in a day? The following are some tips on our bodies and water.

- Water is a necessity to our bodies, more so than food. Water controls our body temperature, carries waste away, transports oxygen and nutrients throughout the body and helps detoxifies the liver and kidneys. It also cushions the body from injury.

- When drinking fluids, water is the best choice but milk and juice are approximately 90% water as well so they will help a bit with dehydration. Alcohol and caffeinated beverages act as a diuretic and do not count.

- Be careful not to become dehydrated. Dehydration can lead to other health problems. Some symptoms are loss of appetite, headaches and dizziness. Drinking water may also prevent some diseases like kidney stones. Every day our bodies lose 10 – 12 cups of water so make sure you replenish it!

- Drinking eight glasses of water a day is not always accurate. Depending on your body, you may need more. You can calculate your fluid intake by dividing your weight in half. Take this number and that is how many ounces you should be drinking a day. You may need to drink more water daily in such weather conditions as humid, hot or cold weather and in higher altitudes. Drink more if you have the flu or a cold as well and more if you have a fever. Some experts also say that by drinking a glass of water before every meal will help reduce food intake and aid in digestion.

- If you wait until you are thirsty to drink, you may already be slightly dehydrated. By drinking a glass of water when you get up in the morning and before you go to bed, this will help with preventing dehydration.

- While exercising, you need to drink water often, as perspiring releases water from our bodies. It is recommended that you drink two glasses of water before exercising and replenish your fluids during exercise.

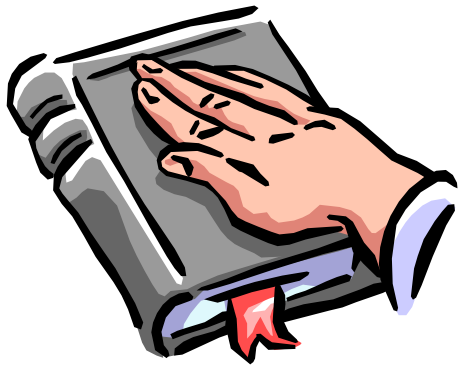
- If you find yourself drinking too much water and urinating too much (in volume and frequency), consult a physician because it could be symptoms of a disease such as diabetes

Trail Users Code

There is a code that all hikers should know. It's not a secret code – but it's just as important!

The Trail Users Code has some really simple rules to follow when you are out on the trail. These rules will help keep everyone safe and happy!

- Stay on existing trails
- Avoid very wet and muddy conditions
- Know the local rules, regulations and concerns of the area
- Obey gate closures and signs
- Keep the trail clean
- Slower traffic has the right-of-way
- Keep right, except when passing
- Get owners permission on private land
- Do not disturb the wildlife



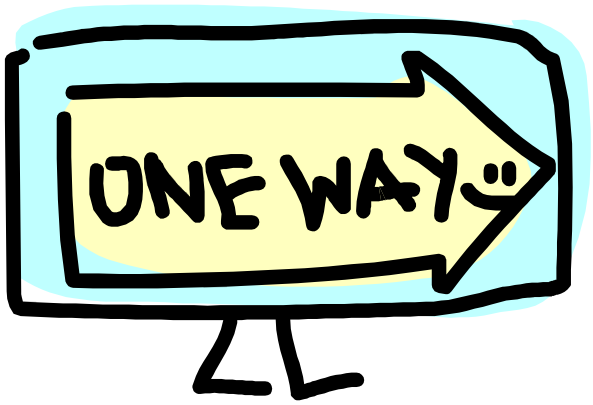
How to Follow a Trail

In most provincial parks and conservation areas, maps are available or are posted at the beginning of a trail. Each intersection will be signed. It is simply a question of knowing the name of the trail and your destination.

Hiking trails managed by trail clubs are usually "blazed". Although individual variations do exist, the usual symbol is a white rectangle, 15 cm high and 5 cm wide, painted on trees or fence posts beside the trail. Usually as you hike the trail, the blazes face you, and if the path ahead is not obvious, another blaze is visible from the first.

A double blaze (one above the other) indicates a turn. Usually the upper blaze is offset in the new direction of travel; otherwise, look for the next single blaze to either the left or the right.

If by chance you lose the footpath, simply return the way you came to find the previous blaze or sign. From here you should be able to relocate the trail and your route.



Tips to overcome exercise obstacles

Here are a few examples of obstacles we may come across

Not interested in walking

The health benefits are too important not to walk. To distract your mind, trying listening to music while walking, enjoy the surroundings, walk in a shopping mall, take a friend along and enjoy the conversation, take your pet.

No Time to Exercise

Establish an exercise program that fits into your busy life. Many people schedule a walk in the morning, walk to work, at lunchtime, or even during their break. Ask yourself if you are using lack of time as an excuse. Did you know there are 1440 minutes in a day, so trying to find 30 minutes should not be too hard?

Too Tired to Exercise

Did you know that exercise often creates beneficial hormones and improves your fitness level? Exercising regularly will result in a more energetic and rejuvenated body.

Too Out of Shape

It is never too late to start exercising. The sooner you start, the sooner you will start to feel better! Start slow and work your way to a healthier body.

No Convenient Place to Exercise

Walking can be done anywhere, at work, in a shopping mall, at a variety of outdoor settings or walk around your neighborhood and enjoy nature.

Hiking Books and Resources

- **Bruce Trail: An Adventure Along the Niagara Escarpment** Richard E. Freeman, Susan J. Freeman, 224 pp, 1998, Footprint Press
  Travel/narrative describes preparations for a long hike

- **The Hike Ontario Guide to Walks in Carolinian Ontario** Brad Cundiff, 176 pp, 1998, Boston Mills Press

- **Hike Ontario's Guide to Walks Around Toronto** Brad Cundiff, 176 pp, 1994, Boston Mills

- **Hiker Mike's Best Hikes: The Mega City and Beyond** Mike Kirby, 168 pp, 2000, Boston Mills Press
  Hikes and walks ranging from city walks and the Toronto Islands to the Bruce Trail and the Niagara Escarpment

- **Hiking in Ontario** Tracey Arial, 352 pp, 2001, Ulysses Books
  Describes hikes in more than 50 destinations classified by level of difficulty, 24 maps.

- **Ontario Provincial Parks Trail Guide** Allen MacPherson, 168 pp, 2000, Boston Mills Press

JUST FOR KIDS

- **Follow the Trail: A Young Person's Guide to the Great Outdoors** by Jessica Loy
- **The Kids Campfire Book and The Kids' Summer Handbook** by Jane Drake, Ann Love
- **Kids Camp!: Activities for the Backyard or Wilderness** by Laurie Carlson, Judith Dammel
- **Buck Wilder's Small Twig Hiking & Camping Guide** by Timothy R. Smith
- **Trekking on a Trail: Hiking Adventures for Kids** by Linda White, Fran Lee (Illustrator)

JUST FOR PARENTS

- **Introducing Your Kids To The Outdoors** by Dr. Christopher Van Tilburg
- **Kids in the Wild: A Family Guide to Outdoor Recreation** by Cindy Ross, Todd Gladfelter
- **Parents' Guide to Hiking & Camping: A Trailside Guide** by Alice Cary
- **Camping and Backpacking With Children** by Steven Boga
- **Hiking with Kids: Taking Those First Steps with Young Hikers** by Robin Tawney
- **365 Outdoor Activities You Can do With Your Child** by Steven and Ruth Bennett
- **Sharing Nature with Children and Sharing Nature with Children II** by Joseph Cornell

Even More Recommended Reading

The following books explore different philosophies and approaches to the world of hiking, walking and environmental education.

For Kids:

- **The Kids Campfire Book** by Jane Drake and Ann Love.
- **Do Princesses Wear Hiking Boots?** By Carmela Lavigna Coyle
- **Follow the Trail: A Young Person's Guide to the Great Outdoors** by Jessica Loy
- **Trekking on a Trail** by Linda White
- **Buck Wilder's Small Twig Hiking & Camping Guide: A Complete Introduction to the World of Hiking & Camping for Small Twigs of All Ages** by Timothy R. Smith
- **Sheep Take a Hike** by Nancy E. Shaw
- **Kids Camp!: Activities for the Backyard or Wilderness** by Laurie Carlson and Judith Dammel

For the grown-up hiker:

- **Last Child in the Woods** by Richard Louv
- **Paddling and Hiking in Ontario's Southern Shield Country** by Kas Stone
- **Hiking Ontario's Heartland** by Shirley Teasdale
- **Camping and Backpacking With Children** by Steve Boga
- **Ontario Provincial Parks Trail Guide** by Allen Macpherson
- **Take A Hike Vol. 1: Exploring Ontario Trails** by Fay Beck-Ryall
- **Hiker Mike's Best Hikes: The Megacity and Beyond** by Mike Kirby
- **Halton Hikes** by Gary Hutton
- **Toronto's Ravines: Walking the Hidden Country** by Murray Seymour
- **Backpacking With Babies and Small Children: A Guide to Taking the Kids Along on Day Hikes, Overnighters and Long Trail Trips** by Goldie Silverman
- **Take 'Em Along: Sharing the Wilderness With Your Children** by Barbara J. Euser
- **Kids in the Wild: A Family Guide to Outdoor Recreation** by Cindy Ross and Todd Gladfelter
- **The Complete Hiker,** Revised and Expanded by John Long
- **Adventuring With Children: An Inspirational Guide to World Travel and the Outdoors** by Nan Jeffrey
- **Environmental Education in the 21st Century** by Joy Palmer
- **Environmental Education Teacher Resource Handbook** by Richard Wilke

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experience it...one step at a time

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