

Five Minute Field Trips



**teaching about nature
in your schoolyard**



CANADIAN
PARKS AND
WILDERNESS
SOCIETY





Global, Environmental & Outdoor Education Council

25 November 2002

Dear Teacher:

The activities in *Five Minute Field Trips* have been grouped into three sections: Awareness, Understanding and Action. We feel that sequencing activities in this order is a natural flow for learning about our world.

How does it work? Begin your nature studies with **AWARENESS**: outdoor activities that are sensory and experiential. They give kids a chance to reconnect with the earth, to become a bird or a tree, to smell the dandelions, and imagine the wind.

After having some fun, ooohing and ahhhhing with the natural world, lead the group into the **UNDERSTANDING** activities that are more exploratory and inquiry-based. For instance, investigate a tree from its bark and leaves to the functions of various parts; or examine and record the insects that live in a shrub; or locate and make a temporary habitat for insects that live in a nearby pond.

After the students have had a chance to reconnect with and explore the natural world, they're ready to look for a local **ACTION** project. In schools, we often overlook the action component of education. This is the opportunity to give students valuable citizenship skills while guiding them towards shaping a more ecologically sound, sustainable community. Please don't overlook the significance of small, local habitat projects. From our experience, small projects teach kids how to have a positive impact on their local world, and then they get to live with the beautiful change. Take our advice, try it! You'll like it! It's some of the most meaningful education you'll ever do.

Five Minute Field Trips was produced through a partnership between the Canadian Parks and Wilderness Society, the Calgary Zoo, and the GEOEC. More information on the annual conference, workshops, and on-line website based resources for teachers can be obtained from our website (www.geoeec.org) or by calling the Alberta Teachers' Association at 1-800-232-7208. To request a workshop for teachers on *Five Minute Field Trips*, or to give us your valuable feedback, you can contact the authors through Gareth (e-mail gthomson@cpawscalgary.org, or call 403-678-0079). Thanks to Alberta Ecotrust for their support of this project.

Have fun!

A handwritten signature in cursive script that reads "Sue Arlidge".

Sue Arlidge

A handwritten signature in cursive script that reads "Gareth".

Gareth Thomson

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Acknowledgments

Many of the activities in *Five Minute Field Trips* are the “classics” of environmental education. Treasured activities are like an old blanket that gets passed on from generation to generation. Tears and stains are mended with new fabric; the colours change over the years; somebody sews a new liner on it. The blanket becomes more valued with age.

After you’ve led an activity a few times, you add your own twist, perhaps making it more local, or adapting it for other purposes. That is what we have included in this activity guide. This said, the authors gratefully acknowledge the following authors for their invaluable contributions to environmental education. Their works are still our favourite books. Their bibliographies appear in the Resource section.

Joseph Cornell, is quite simply, a brilliant nature educator. He has produced, among other things, two classic outdoor activity books, *Sharing Nature With Children*, and *Sharing the Joy of Nature*. These two books are a complete library of outdoor experience and learning activities. A number of the activities have seeds in his work.

David Sobel’s book, called *Beyond Ecophobia: Reclaiming the Heart of Nature Education*, is a wonderful read. In it, he eloquently states what many of us already intuitively know, “If we want children to flourish, to become truly empowered, then let us allow them to love the earth, before we ask them to save it.” Our Awareness section is designed to do just that: suggest ways in which you can help students appreciate the natural world. In sequencing these activities as we have, we have followed Sobel’s suggested flow of nature education.

Dan Stoker’s activity book, *Monsters and Mini Beasts*, is a fine selection of fun, no-muss outdoor activities, many of which are easily adapted for different needs.

Five Minute Field Trips is a publication of the Global Environmental and Outdoor Education Council of the Alberta Teachers’ Association, in partnership with Calgary Zoo. The Canadian Parks and Wilderness Society has given permission to reproduce several activities in this booklet. Funding has been generously provided by the Alberta Ecotrust Foundation, EcoAction 2000, Shell Environmental Fund and AB Sport, Recreation and Wildlife Foundation. The authors and the GEOEC are grateful for the financial support of these agencies.

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ACTION 21

About the Authors

Five Minute Field Trips was written by two teachers: Gareth Thomson and Sue Arlidge. Gareth is the Education Director for the Calgary-Banff chapter of the Canadian Parks and Wilderness Society (CPAWS). Gareth has an engineering degree, an MSc in Environmental Geology and is a certified teacher. Sue Arlidge, an educator at the Calgary Zoo, has a BSc and a BEd. She developed the Zoo's successful Grounds for Change - Schoolyard Naturalization Project. Gareth and Sue have both worked as full time environmental educators for the past decade and have workshopped many thousands of teachers.

Gareth and Sue serve on the executive of the Global, Environmental and Outdoor Education Council (GEOEC), a specialist council of the Alberta Teachers' Association. The GEOEC

exists to promote involvement in quality global, environmental and outdoor education. Gareth has recently initiated the *Getting Connected Project*, an on-line one-window approach to putting busy teachers in touch with lesson plans, free resources, and teacher workshops. Visit the GEOEC website www.rockies.ca/geoec for more information.

A major goal of the Zoo's "Grounds for Change - Schoolyard Naturalization Project" is to encourage daily interaction between students and nearby native plants, animals and child-friendly, natural places. This activity guide was produced through a partnership between the GEOEC and the Calgary Zoo to provide educators with local ideas and activities that are fun, simple and can take place right on the school site, or in any nearby natural area.

Note: Being Safe in the Outdoors

In many of the activities in this book, students are encouraged to explore a portion of a natural area. Use the following tips in your outdoor work:

- Get students used to gathering around you in a semi-circle (either sitting or standing) so that you can communicate effectively.
- For most effective supervision, the entire study area should be within visual range.
- When outdoors, be very clear that your behavioural expectations in the outdoor classroom are the same as if they were indoors in class.
- Establish clear physical boundaries for each activity.
- Depending on the site, the activities, and the students' ability to stay on task, you may need additional supervision. Don't be shy in asking for parent volunteers! The GEOEC recommends a ratio of 1 adult per ten students for outdoor schoolyard activities.
- Try to build flexibility into your teaching schedule to allow for really harsh weather, but don't become weather wimps! Go out when it rains, but be prepared. Either start a clothing collection, or send kids home for the right clothes.

Curriculum Connections

The beauty of *Five Minute Field Trips*, and indeed with environmental education in general, is this: it crosses content area lines and lends itself to integrated, multidisciplinary, cross-curricular study. Teachers might need to make slight adaptations to activities to suit their particular group or curriculum; luckily, teachers are fabulously skilled at doing just that! Some of the more striking connections with the Alberta curriculum are shown below.

Grade	Curriculum Connection
Grade 1	Science (Seasonal Changes, Senses, Needs of Plants and Animals) Social Studies (My Family) Language Arts and Drama
Grade 2	Science (Small Crawling and Flying Animals) Social Studies (People Nearby) Language Arts, Phys. Ed., and Drama
Grade 3	Science (Animal Life Cycles, including endangered species) Social Studies (My Community - Past, Present, and Future) Social Studies (Special Communities) Language Arts, Phys. Ed., and Drama
Grade 4	Science (Waste and Our World; some of Plant Growth and Changes) Social Studies (Alberta: its Geography and People) Language Arts, Phys. Ed., and Drama
Grade 5	Science (Wetland Ecosystems) Social Studies (Canada: its Geography and People) Mathematics Language Arts, Phys. Ed., and Drama
Grade 6	Science (Trees and Forest) Social Studies (Local Government) Language Arts, Phys. Ed., and Drama

AWARENESS ACTIVITIES

Nature Trust Walk

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!

Time Required: One hour

Materials Required: blindfolds (one per pair of students)

Instructions: 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**.

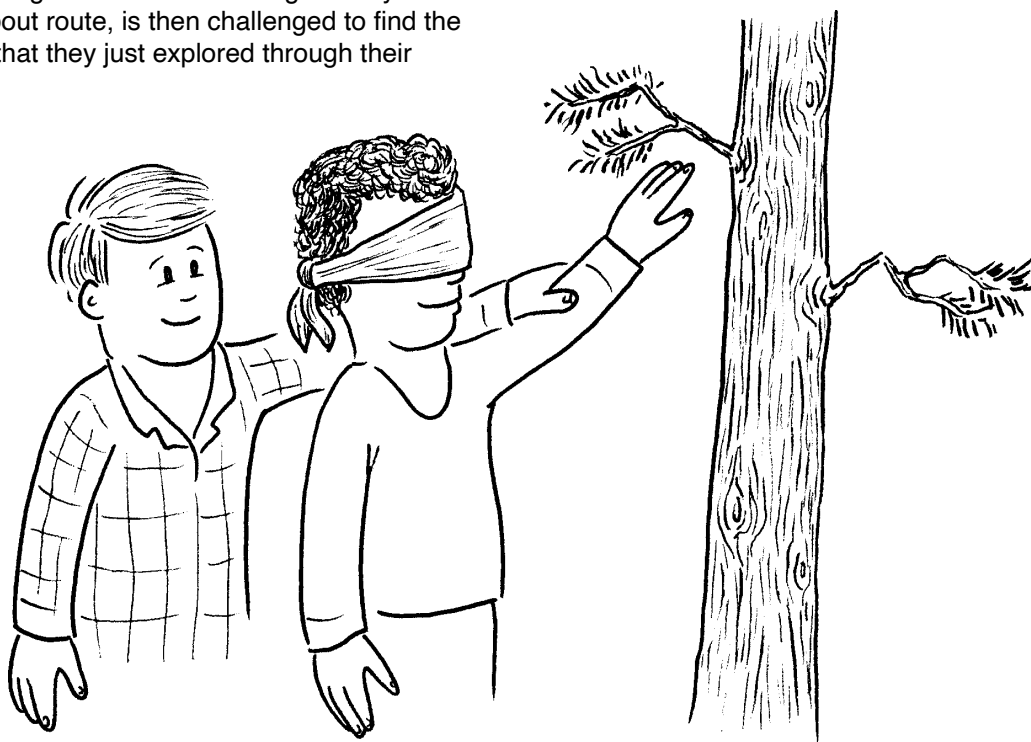
Divide students into pairs. Have one of the pair blindfold their partner, and have the “sighted” partner slowly lead their “blind” partner to a unique feature in the area: an old stump, perhaps, or an interesting patch of moss, explaining to them what it is they are touching and smelling. The blindfolded 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.

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



Un-Nature Trail

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.

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).

Instructions: 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.

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.

Then lead the way on the trail. Walk veery sloowly, and model quiet looking 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!). 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).

Encourage students to walk the trail again and look for items they missed the first time.

Extension: Your students could set up a simple nature trail for other students to walk during recess. They could also use this as an opportunity to ask other classes to help in the crusade against littering!



Nature Scavenger Hunt

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

Time Required: 30 minutes

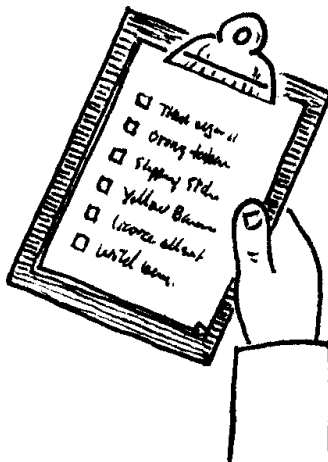
Materials Required: Checklists

Instructions: 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. 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.

In a normal scavenger hunt, you're supposed to collect items. This is NOT the case in this activity: tell students that objects 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

Noah's Ark

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!

Time Required: 15 - 30 minutes

Materials Required: Class set of blindfolds

Instructions: 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 - ie: 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.

Variations: For younger players, remove the blindfolds 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.

This activity has been adapted from *Sharing Nature With Children*, by Joseph Cornell, page 81.



Sound Map

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.

Time Required: 15 minutes

Materials Required: Pencils and journals

Instructions: 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?



Be a Tree

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.

Time Required: 20 - 30 minutes

Materials: Guided imagery reading, below; background instrumental music, such as Vivaldi's, *The Four Seasons* (optional)

Instructions: 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.

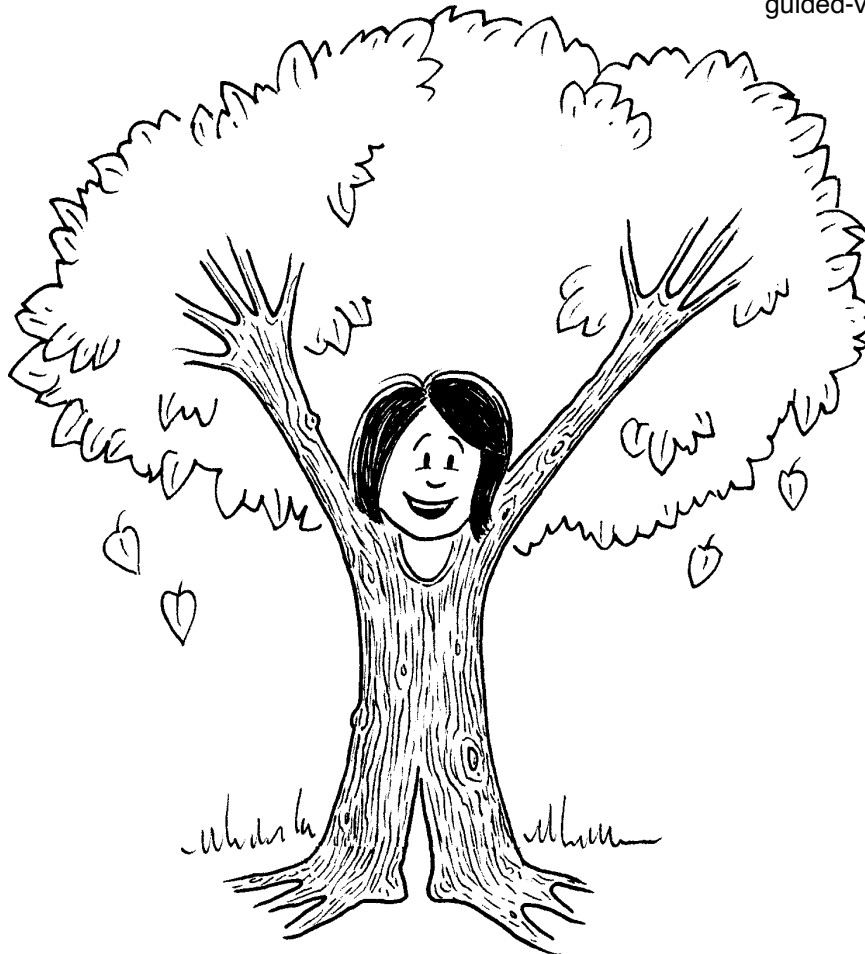
Trees are essential to life on Earth. They produce about half of the oxygen that animals need to breathe. Tree roots hold soil. They provide food and shelter for billions of animals. Trees provide moisture and warmth to the immediate environment in the winter. In the summer,

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.

This guided visualization has been adapted from *Sharing the Joy of Nature*, by Joseph Cornell (page 98). He has also created a number of recorded guided-visualizations.



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. ””

Make-a-Park

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.

Time Required: One hour

Materials Required: 3 m lengths of ribbon (or string or rope) for each pair of students. You'll also need an area that has some natural diversity in it - the more 'natural' the better.

Instructions: 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

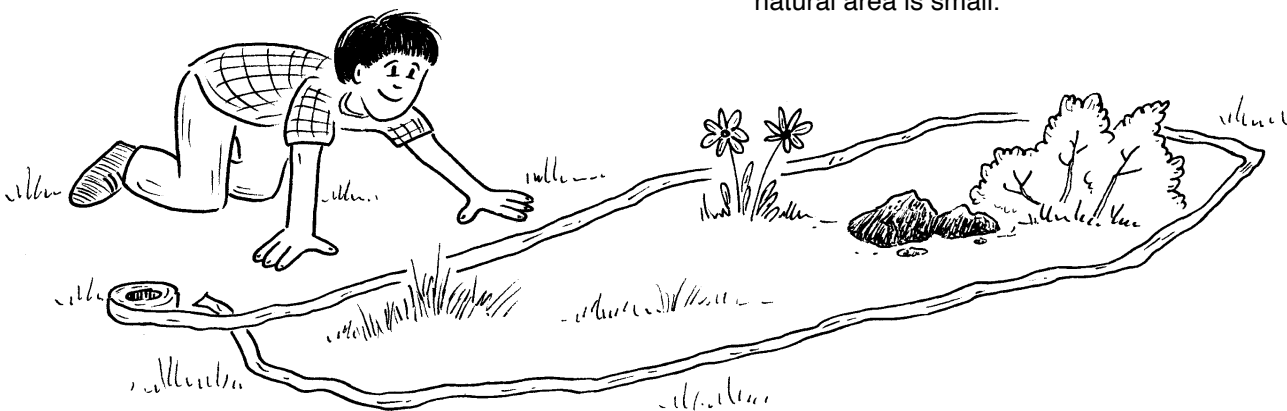
to model this for students: e.g. a ribbon surrounding an interesting and unique stump is a good example of #1, while a ribbon surrounding an area crammed full of different plant species is an example of #3.

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?

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.



Deer Ears

Students learn about the importance of stealth and good listening skills in this enjoyable outdoor activity. Cougars try to stalk and “kill” a blindfolded deer, whose only weapon is their sense of hearing. Will all the cougar starve before they reach the deer? It depends on how sure-footed they are... (adapted from an activity in *Rediscovery*, by Thom Henley)

Time Required: one hour

Materials Required: One blindfold and a ‘flag’ of long, brightly coloured material

Instructions: To begin this activity, 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.

Tell students about deer ears, which are shaped to pick up the slightest noise from the surrounding area. Have students cup their hands 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 well with lower frequency noises such as running water, wind in the treetops, or even traffic on a road! The difference in ‘reception’ as they move their hands away from their ears and back again is truly remarkable!

In this game, one student - the deer - is blindfolded, but is allowed to use their cupped hands to listen (Make sure the blindfold doesn’t cover their ears). The deer wears a brightly coloured ‘flag’ of material that is stuffed into a pocket and dangles below their knees. Everyone else in the game is a cougar: their job is to kill the deer by sneaking up without being heard and pulling away the ‘flag’, in the same manner as a player stops another in the game of

flag football. If the deer hears the cougar, it can kill it by simply pointing in its direction and yelling “Starve!”; a correct ‘hit’ means the cougar has to leave the game (have the ex-cougar sit quietly either where they are, or beside you).

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 “Stalk!” so cougars can resume their stalk. Have all cougars begin their stalking of the deer at least 10 metres away from the blindfolded deer. If a cougar manages to kill the deer, let that cougar become the deer for the next round. Give the deer a limited number of “Starves” - if you have 15 stalking cougar, try giving the deer only twenty chances to say ‘Starve’.

Discussion: Remind students 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 its lack of stalking skill. Ask the deer how it feels to be stalked - and ask if deer actually live in a state of constant alertness, like you had to in this game (the answer is yes!).

Variations: 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.



Observation Games

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.'

Details, Details...

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

Time Required: 15 - 30 minutes

Materials Required: Paper, pencils

Instructions: 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 and 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.

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!



Nature Words

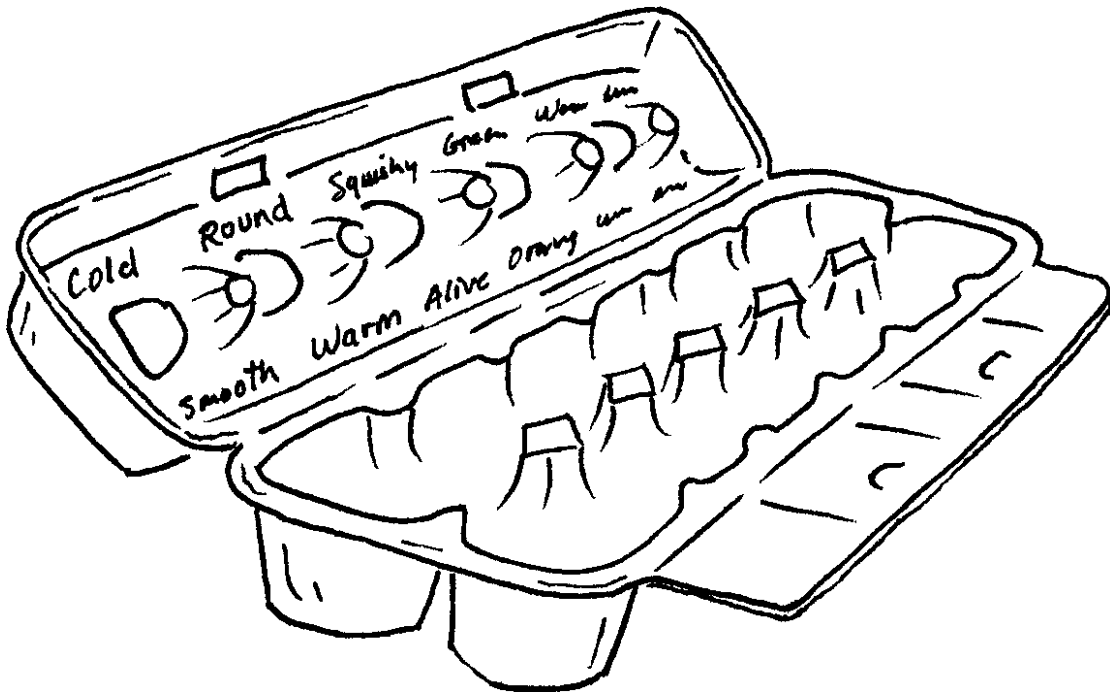
What's the one best way to describe something? After observing natural items, the students explore the power of description. *This activity has been adapted from **Monsters and Mini-Beasts**, by Dan Stoker.*

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

Instructions: 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, 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?



Simile Stroll

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.

Time Required: 15 - 30 minutes

Materials Required: Pencils, journals

Instructions: 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:

the root of a problem
a carpet of grass
a blanket of snow
sheets of rain

Sample similes:

slow like molasses
as sweet as honey
as fresh as a daisy
quick like a bunny

'UNDERSTANDING' ACTIVITIES

Nature Charades

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

Time Required: One hour (not including research time)

Materials Required: Posters or information on animals.

Instructions: 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 Alberta*, 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.

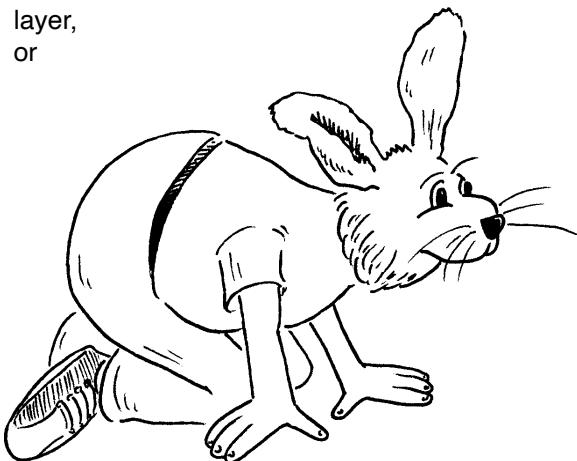
Next, have students do charades, and have other students wait at least 15 seconds before they attempt to guess the plant or animal. When students have guessed, have the acting student show their poster and tell one or two Biofacts.

Extension: This can also be done using communities instead of individuals: a rotten log, a pond, the humus layer, or

the treetop canopy are all examples of communities. Introduce these communities to students and then have groups of students (with one narrator) act out the 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.

* Maps of Alberta's Natural Regions are available from Alberta Environment. See **Resources** section.



Who am I?

This is an entertaining activity in which students get a crash course in both schmoozing and ecology! A picture of a common ecosystem element (e.g. grass, hare, coyote, etc.) is attached to the back of each student. Students mingle with others and ask questions to determine what plant or animal they are. (Reproduced with the permission of Canadian Parks and Wilderness Society)

Materials: Laminated **Who am I?** signs, string. Please note that you should either make these signs yourself (with the help of students!) or alternatively download the signs from the **Who Am I?** activity on the CPAWS website: www.rockies.ca/cpaws/education

Time Required: 30 minutes (can be done in conjunction with **Weird Webs**)

Instructions: Introduce (or review) with the class a number of different classification schemes, recording them on the board so that students will be able to see them throughout the activity.

producer, consumer and decomposer
first order, second order, third order consumer
predator and prey
carnivore, omnivore, and herbivore.

Students should then be given a picture of one of the common ecosystem elements included in the **Who am I** tags (e.g. grass, hare, coyote, etc.). Tell students to show this card to no one.

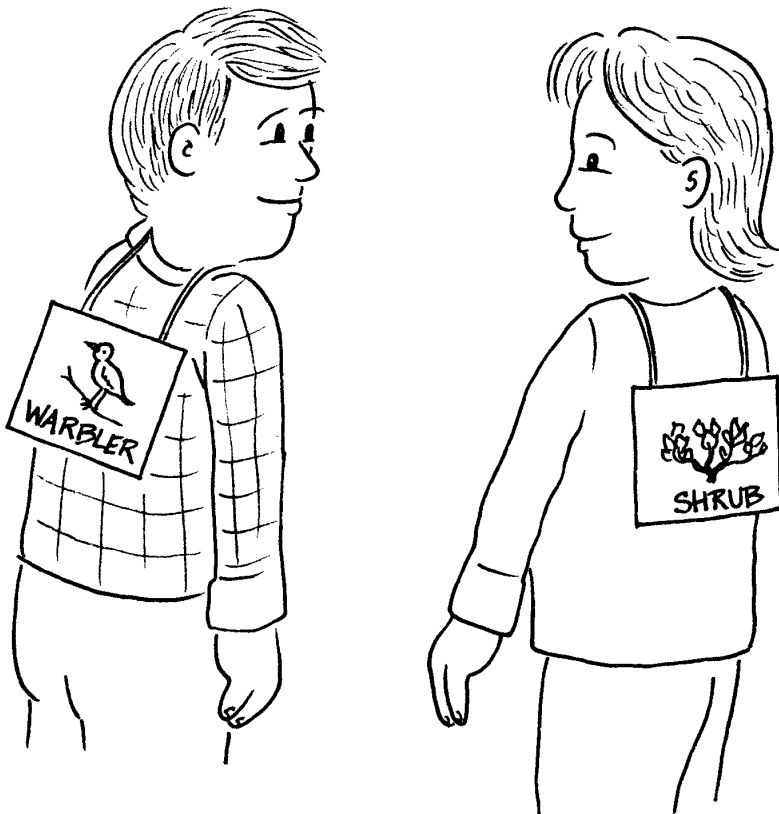
Next, ask each student to hang a sign around the neck of one of their fellow students so that the sign is on their back. Tell the students: "The object of this game is for you to determine what ecosystem element you are. You can do this only by asking questions of the other students that use the vocabulary on the board. You'll have to ask questions like 'Am I a consumer?' - and all your questions can only be answered by a "Yes" or a "No". You can guess what your ecosystem tag is - but you only get one guess, and if you're wrong, you're out of the game! I encourage you to 'schmooze' around and mingle, moving from student to student".

Next, answer any questions and let the game commence. Monitor all questions and answers. If students find they need more information, stop the game briefly, tell students that they are allowed to ask more general yes/no questions ("Do I have fur"? "Am I bigger than a breadbox?") to find out more. Towards the end, allow students to give hints to their peers.

Once everyone has found out their identity, ask students to get into one of the following groups:

- producer, consumer and decomposer
- first order, second, order, third order consumer
- predator and prey
- carnivore, omnivore, and herbivore

Extension: Weird Webs (next activity), in which the **Who Am I** characters are joined together with string to create a food web. It is an excellent follow-up activity that you can do immediately after **Who Am I?**



Weird Webs

Students use a ball of twine to create a classroom food web that shows the interactions between the members of the ecosystem. Students will appreciate interconnections and interdependence within the natural community and will identify food chain relationships and energy flows within the “web of life”.
(Reproduced with the permission of Canadian Parks and Wilderness Society)

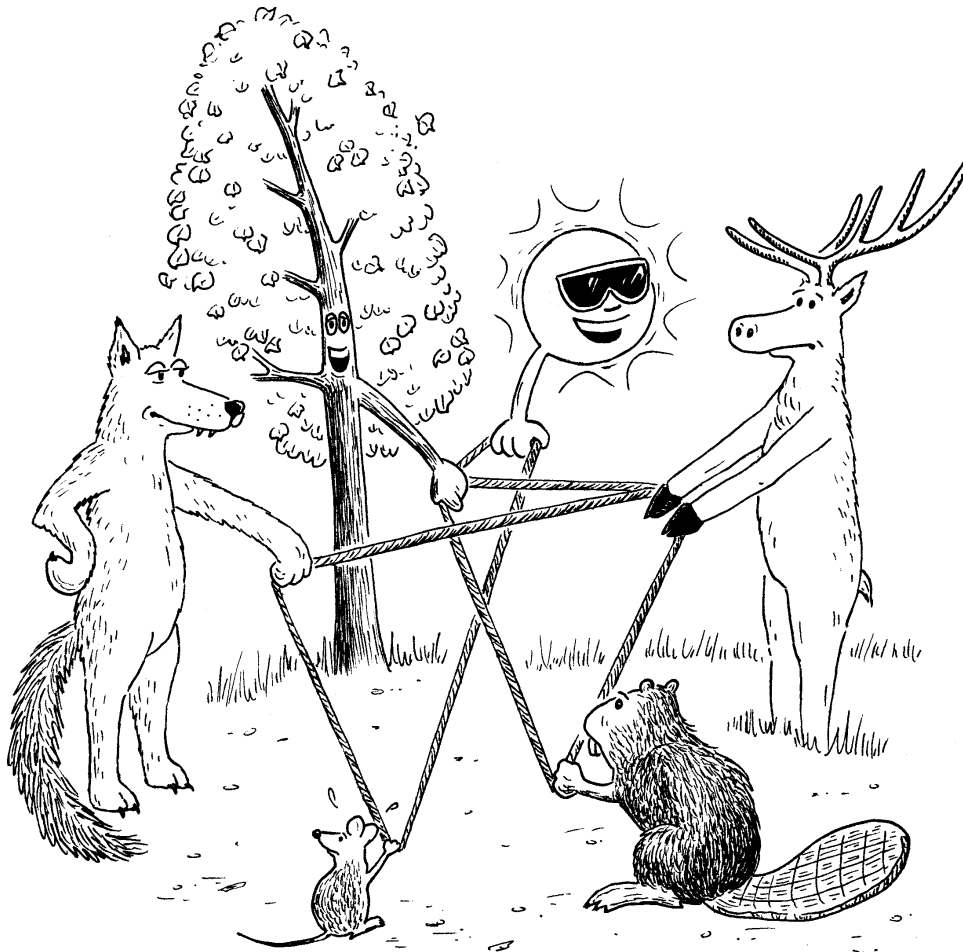
Materials: signs from **Who am I?** activity, two balls of at least 100 m of twine or very thin rope

Time Required: 30 minutes

Instructions: Have students stand or sit in a circle, still showing the tags they received in the **Who am I** activity. You should also be part of the circle. Have every student describe their card, i.e. ‘who they are.’ Tell students that you will be playing the role of the sun, the ultimate source of life for all things (as befits your role as teacher!). Pass the ball to the tree, and say “I am passing the ball to the tree, because it needs me to survive. I give energy to the tree.”

Tell students that they can pass the ball to

another ecosystem element in the circle “**only if it needs you in order to survive, or if you need it in order to survive**”. For example, the squirrel could pass the ball to the tree (which it needs to survive) or to the owl (which needs it to survive). Make sure that each exchange is justified by each student as they pass the ball to another. Make sure that the whole group understands and agrees with the rationale that is given. Challenge students to establish connections with everyone in the circle, so that no organisms are left out. (Note: you might find it useful to have students rehearse this by having them point to ecosystem elements they need to survive - or that need them to survive - before the ball of string is passed).



When you have every organism connected, ask students to pull gently to take in the slack so the string becomes taut. Ask students to examine the pattern they have created. Tell them that this pattern represents the very complex pattern of interconnections between organisms that occurs in a natural ecosystem. For this reason, interrelationships within an ecosystem are sometimes referred to as the 'web of life'. Ask students if the web they created is more simple or more complex than the web of life that actually exists in their schoolyard or in a park; students should realize that things in nature are far more complex than the simple web they have created.

Next, tell students that something has just happened to change this ecosystem: a timber company has just received the right to log this forest ecosystem. Keeping the string taut, ask the "tree" student(s) to suddenly release the string when you count to three. After the string is released, immediately ask if anyone felt the tension in the string change when the tree dropped out (several, including the squirrel, should say yes.) Ask those affected by the loss of the tree to say how they are affected.

Count to three again, and ask these "affected" students to in turn drop the string. Keep going until everyone has dropped the string. Have students drop the string in front of them so they can pick it up again for the next round. Students should come to realize that any change to an ecosystem - whether slight or profound - is felt throughout the system. Tell students the golden rule of ecology: ***In an ecosystem, you can never do just one thing.***

Ask students to repeat this activity using the following changes to the ecosystem:

- the municipality sprays to remove pesky mosquitoes from the area
- hunters come in to harvest moose, elk, and white-tailed deer from the area
- decreasing ozone levels allow more ultraviolet radiation, which kills cells and slows the growth of the trees
- the forest is in a park - but the park is too small to preserve large carnivores, so they are extirpated from the area (Note: tell students that recent studies are showing that carnivores are far more important than previously thought - that their presence or absence will actually dictate how healthy the entire ecosystem is.)

Have students hand in their tags and sit at their desks. Ask them to suggest things that humans do to harm and to help ecosystems.

As an entertaining finale for this activity, take a few minutes to read the true story of 'Cats in Parachutes' by Bart Robinson.

Extension: The wording used above was "Pass the ball to another ecosystem element only if it needs you in order to survive, or if you need it in order to survive." You could change this activity significantly by telling students that they can only "Pass the ball to another ecosystem element only if you take energy from it, or it takes energy from you, in order to survive." (The second wording is more difficult: e.g. an eagle 'needs a tree' to nest in, but doesn't get food from the tree.)

Cats in Parachutes

In the early 1950's, the Dyak people of Borneo were suffering from Malaria. The World Health Organization was called, and they had a ready-made solution, which was to spray copious amounts of DDT all over the place. As a result, the mosquitoes died off and the malaria diminished. So far, so good.

There were some side-effects, however. One was that the roofs of the houses began to fall in on their owners' heads because the DDT had not only killed mosquitoes, it had killed a species of parasitic wasp that up to that point had controlled a population of thatch-eating caterpillars. Furthermore, the DDT affected a great many species of small bugs that were eaten by lizardy-type creatures called geckoes, which were in turn eaten by the many resident cats.

In time, the DDT worked its way up the food chain and the cats begin to die, and when the cats died, the rats began to multiply and flourish, and soon the Dyak people were suffering from typhus **and** sylvatic plague, which was much worse than the original malaria. The World Health Organization was called again, except this time they didn't have a ready made solution and had to invent one, which was, believe it or not, to parachute live cats into Borneo.

Operation Cat Drop, courtesy of the Royal Airforce.

All of which is to say simply that... If you don't understand the interrelatedness of things, the cause of problems is often solutions... And that simple questions often require complex and reflective thinking if good solutions are to be found.... And that, as the Father of Ecology Aldo Leopold once said: **"The first Law of intelligent tinkering is to keep all the pieces."**

- by Bart Robinson, reprinted with permission (based on a story originally told by Amory Lovins).



Shelter Shuffle

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 a animal population, and that populations are subject to limiting factors. *Based on concepts in the game 'Oh Deer' (Project Wild Elementary Activity Guide, 1985).*

Time Required: ~ 45 minutes

Materials: four markers to establish boundary lines, open space for playing the game (indoors you'll need the gym, outdoors the playing field is best)

Instructions: 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:

- if they decide they need food, they should place their hands over their stomachs.
- if they need water, they should place their hands over the mouths;
- 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 a 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 re-populate. 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).

Food Chain Game

There are probably dozens of variants of the Animal Game - this one strives to be the simplest version! 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! *(Reproduced with the permission of Canadian Parks and Wilderness Society)*

Time Required: 70 to 80 minutes

Materials Required: laminated character cards on coloured paper (see next pages for cards and numbers). A natural area with hiding cover and trees is also nice, although this game can be played in the schoolyard as well!

Instructions: 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 (see Safety Note at the beginning of this guide). 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 choose 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.

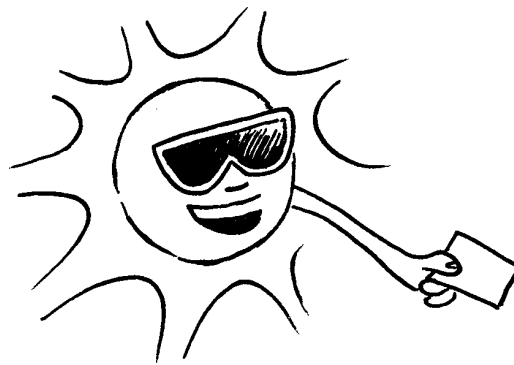
After you've described the roles, hand out character cards (Table 2 suggests the numbers of different cards you should make.) As in most ecosystems, there are far more producers than herbivores, far more herbivores than carnivores, etc. You should punch a hole in each card and insert a stout elastic band, thereby allowing cards to be worn on students' arms.

Have them attach it above their elbow.

As teacher 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 are 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:

- What did you feel when you played the game. Is this how a wild animal might feel?
- What strategies did you use to avoid being caught? Do plants or animals use these strategies?
- What strategies did you use to catch other

students? Do plants or animals use these strategies?

- If humans were introduced to this game, what rules would you give them? What about disease? What about famine?

Extension: Have students write about their experience. What would life be like as a 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

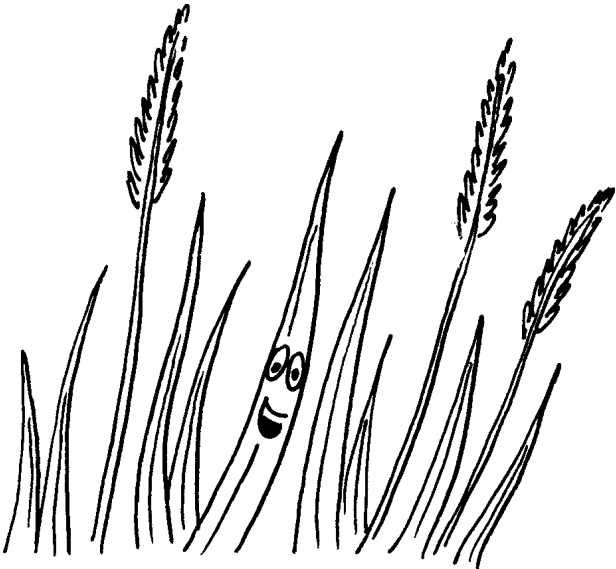
** Note: what does $16 + 10 = 24$ mean? The first number (16) refers to cards given out to students before game begins; second number refers to the extra cards you can distribute to 'dead' students (10). The total (26) refers to the number of cards you should photocopy.



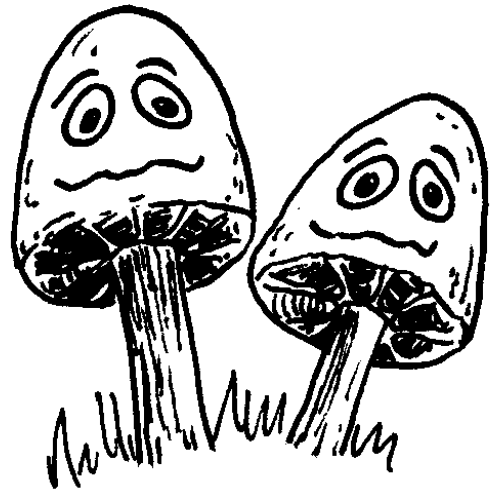
HERBIVORE



CARNIVORE



PRODUCER



DECOMPOSER

Environmental Factors Hunt

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.

Time Required: 30 minutes

Materials Required: Student-created base maps of natural site, thermometers, magnifying glasses, measuring tapes, light meters (optional), pencils, journals

Instructions: 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?



Student Sundial

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.

Time Required: 30 minutes, with a twenty minute break in the middle

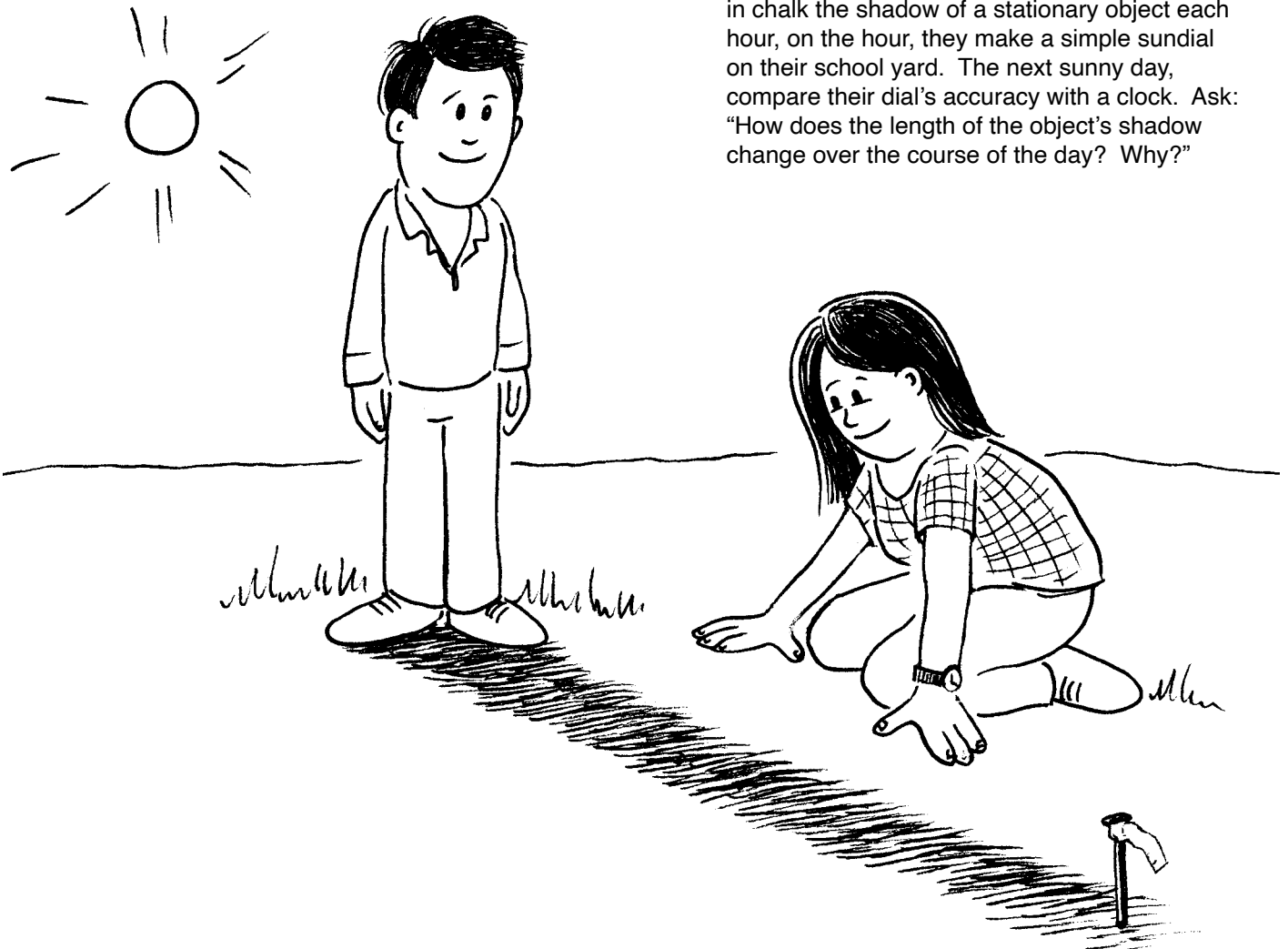
Materials Required: a sunny day, one pointed stick about a metre in length, and one metre stick per pair of students, compasses, 50 large nails with flagging tape tied on the ends, journals, pencils

Instructions:

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?"



Tree: Guided Exploration

In this activity, students explore the structure and function of the various parts of a tree.

Time Required: 45 minutes

Materials Required: A site with about 15 different trees, journals, pencils, loose white paper, chalk or crayons, a stethoscope (optional - try borrowing it from the nurse's office), Optional: *Trees and Shrubs of Alberta* book and poster (available from FEESA)

Instructions:

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.

Make a Tree

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. This activity has been adapted from *Sharing the Joy of Nature*, by Joseph Cornell.

Time Required: 30 minutes

Materials Required: At least 12 students, a large, dry, open play space, and cue cards with script for different parts of tree

Instructions: 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 the



air, saying Wheeeee!'. Let's practice, with the roots drawing the water into the tree, and the xylem pumping it up. "Suck it up!" (Slurpppppp!) "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 Whooooop! for being such a flourishing tree.

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.

TAPROOT

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.

LATERALROOTS

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.

OUTERBARK

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

Bugs 'R Us

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.

Time Required: 45 minutes

Materials Required: This activity is best done on a warm day between May and October. You'll need 5-6 white sheets, blank paper and pencils, journals, and magnifying glasses. Optional: magnifying boxes, Petri dishes (with a top that can be closed), nets, margarine containers, etc.

Instructions: 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 mini-beast, 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.



Schoolyard Mapping

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.

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).

Instructions: 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.

Four Seasons of a Tree

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.

Time Required: at least half an hour each month

Materials Required: Journals, pencils, measuring tapes or other means of determining tree height

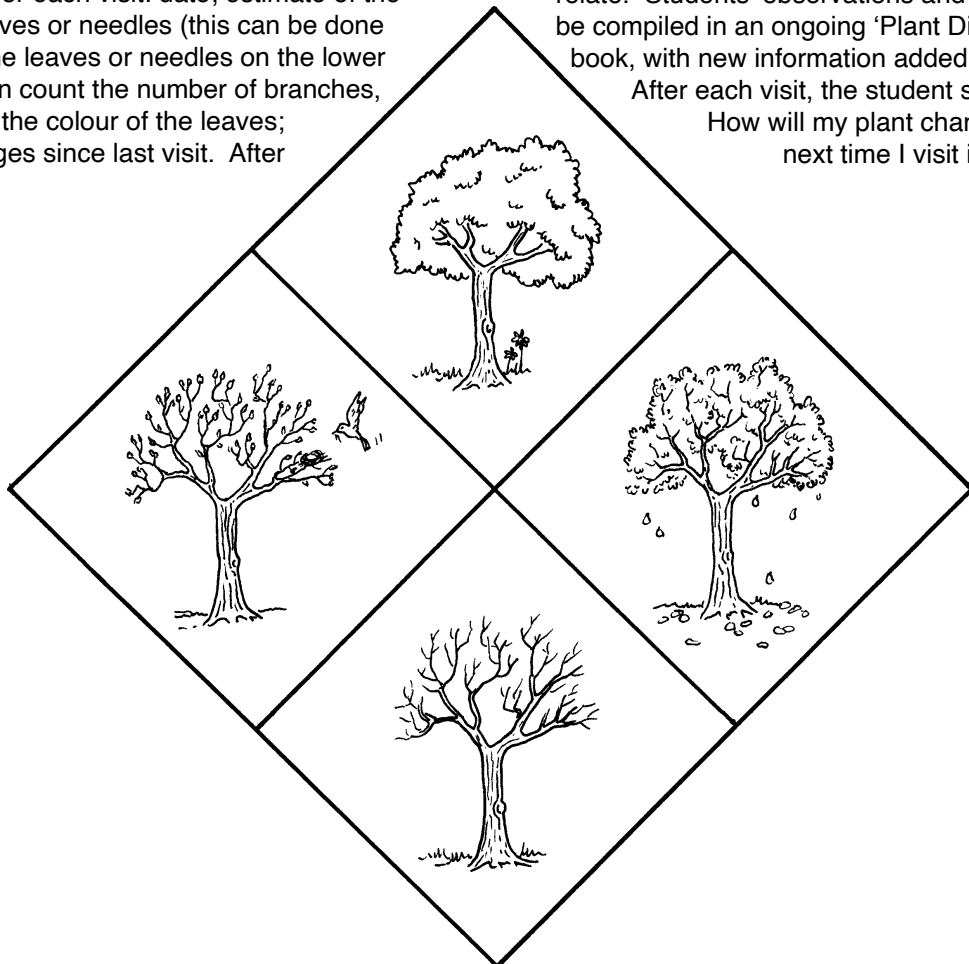
Instructions: Each student chooses one tree or plant or plant species for the school year. They then complete and record activities with their adopted plant, spending at least a half hour every month getting to know their plant in as many ways as possible.

Students should record the following observations for each visit: date; 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); the colour of the leaves; 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?



More Understanding-level activities for 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.

ACTION ACTIVITIES

Getting Started

After studying an issue or challenge facing the natural world, help students brainstorm a list of actions they could do to address the issue. Suggestions may include an education component, such as making posters, collecting information, making phone calls, writing letters, planning a fund-raising campaign, and so on. Accept all suggestions... THEN with your class, review the list of actions suggested, and evaluate for the most feasible ideas. Help the students to develop a plan of action and make a presentation to the class on how the project will proceed. Now step back and facilitate as the students take action!

*“Without action, environmental education is just talk, talk, talk...”
(Author unknown)*

Local Monitoring Projects

Before you can protect something, you’ve got to understand it. When an ecosystem changes, the plant or animal populations that live there will also change. An important way for scientists to monitor ecosystem health is to monitor plant and animal populations and distributions. Here are a few samples of the local monitoring projects that you and your students can participate in. See the Resource section for further details.

PLANTWATCH

Plantwatch is a monitoring program that uses phenology, the study of the seasonal timing of life cycle events, to link students as the “eyes of science”, tracking the green wave of spring moving north. Students develop scientific skills while observing springtime changes in plants and learning about biodiversity. Students monitor the flowering of up to eight plants and report the bloom times to central scientists over the Internet or via electronic mail.

Resulting maps are posted weekly to the Internet. Teacher manuals illustrate the plants, their North American distributions, and describe the program and curriculum connections. Schools can establish Plantwatch Gardens’, planting some of the key indicator species.

Observers have fun and learn through watching, recording and comparing their results with other locations. They learn about ecological relationships while contributing electronically to a climate change monitoring program. With climate warming, we are seeing a trend to earlier flowering in Western Canada. This valuable seasonal information can help farmers and foresters to correctly time operations such as planting, fertilizing and crop protection, and to predict harvest timing. It also is useful in wildlife management (e.g., in early springs more deer fawns are successful), human health (pollen warnings for allergy sufferers) and tourism (best times to photograph or observe particular flowers, animals, etc.)



Based at the University of Alberta's Devonian Botanic Garden, home of the Alberta Wildflower Survey, Plantwatch is seeking observers across North America, throughout the range of the following key indicator species:

- Common purple lilac, *Syringa vulgaris* (worldwide, a cultivar);
- Aspen poplar, *Populus tremuloides* (continent-wide);
- Prairie crocus, *Anemone patens* (Prairies and north);
- Saskatoon, Serviceberry, Amelanchier species (continent wide);

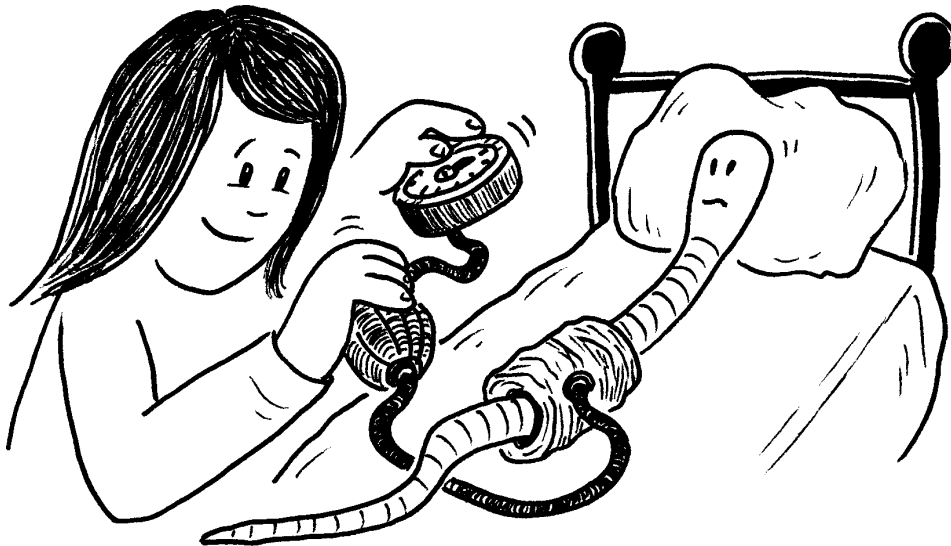
- Western trillium, *Trillium ovatum*
- White trillium, *Trillium grandiflorum*
- Purple saxifrage
- White dryad, *Dryas octopetala*

If you would like to participate in this project, you can register using the home page, or by phone or e-mail. A "How to Plantwatch" manual is available for teachers. Contact: Elisabeth Beaubien, at the University of Alberta's, Devonian Botanic Garden in Edmonton, T6G 2E1, phone: (780)987-5455/3054, fax:(780)987-4141 E-mail: <e.beaubien@ualberta.ca> web site: <http://www.devonian.ualberta.ca/pwatch>.

WORMWATCH

There is an amazing world living beneath our feet! Worm Watch wants to know how many different species of earthworms there are in Canada and where they live. Volunteers receive a Worm Watch kit containing sampling instructions and handbook, taxonomic key and reference lists. An instructional video for the sampling protocol is available, and the Worm Watch office is always ready to answer question.

Your data helps scientists understand the value of earthworms as indicators of soil quality. It can also help determine policies for introducing earthworms for waste and integrated pest management, as well as for site reclamation. Learn more about your soil and be a Worm Watcher! For more information, contact: Worm Watch at Agriculture and Agri-Food Canada in the Lethbridge Research Centre. PO Box 3000, Lethbridge, AB T1J 4B1 or phone: (403) 317-2294 and e-mail: wormwatch@em.agr.ca.



Naturalize your Schoolyard

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. Please refer to the Resources section for contact phone numbers, website resources, and a valuable Rationale document that summarizes why naturalization is such a powerful educational tool.

Process: 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:

Inventory and map the whole site. Record the main natural and human features. Research the site's human and natural history. Describe the site in as much detail, and as many ways as possible. Describe how the site is currently used by all stakeholders.

The educators need to brainstorm the potential curricular links for each subject area, through the various stages of the project.

Develop and distribute community surveys. What does the community want and need? Who can help with the project? Based on your research, native flora and fauna will the site

support? What does wildlife require? Refine and record your group's overall vision for the site. Record the project goals and objectives.

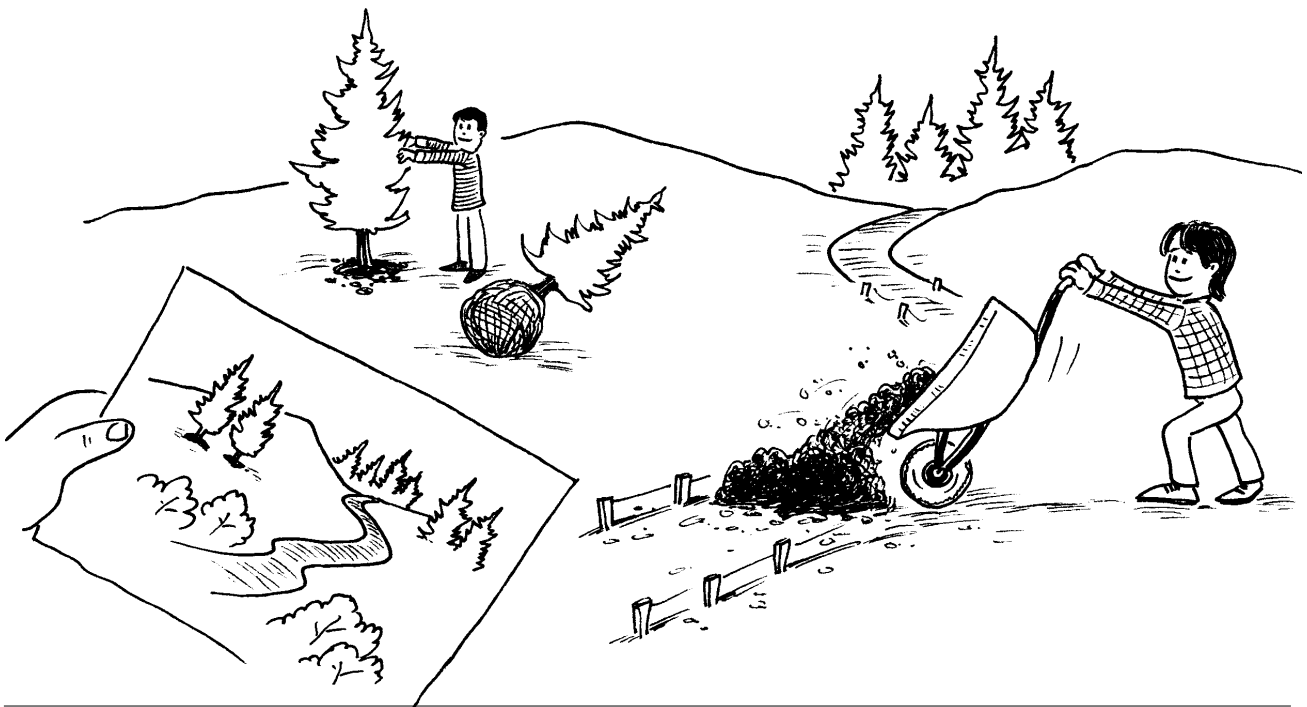
List the resources necessary to complete the project. Recruit volunteers for each stage of the project.

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

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

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

Document, monitor, evaluate - and celebrate! - each stage.



Defending Nature

"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!

Time Required: will vary

Material Required: up-to-date resource material from environmental group

Instructions:

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. A network of environmental groups can be accessed to provide you with this information, and are listed in the Resources section.

You may wish to take on a CPAWS campaign. CPAWS works to protect nature in many regions of Alberta. Up-to-date information on CPAWS campaigns can be obtained on the Internet at <http://www.rockies.ca/cpaws>, or by calling CPAWS in Calgary at 1-403-232-6686.

"Without action, environmental education is just talking, talking, talking..."

Dr. Wangari Maathi



CPAWS' tips for writing effective letters

Keep the following tips in mind as you write your letter:

- state your purpose for writing
- make a very specific request
- 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
- check to make sure that the person you're sending the letter to the right person. Ask yourself if the letter should be copied to anyone else.
- if possible type your letter, using a business letter format - however a neatly handwritten letter can be just as effective.
- be honest: include only necessary and truthful facts
- be concise, brief, and organized. It would be nice if your letter fits onto one page
- be courteous: there is no harm in being polite
- ask for a reply
- check your letter before sending it: edit, revise, check for spelling and grammar
- keep a copy for your records
- SEND a copy to CPAWS for entry into the Edu-Action Award program.

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 displays 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.

Two excellent resources to get going on any type of green mapping project are <www.greenmap.org> and Green Teacher Magazine, issue 58 which is dedicated to green mapping.

EVALUATION ACTIVITIES

Assessment is a continual process. As a teacher, there are three basic questions to ask: What do my students know? What are my students able to do? What else do I want them to know and be able to do? It's not always necessary to complete formal evaluations or write tests to assess your students. Observing their behaviours and examining their products helps to determine progress attained.

Crows and Cranes

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

Time Required: Thirty minutes

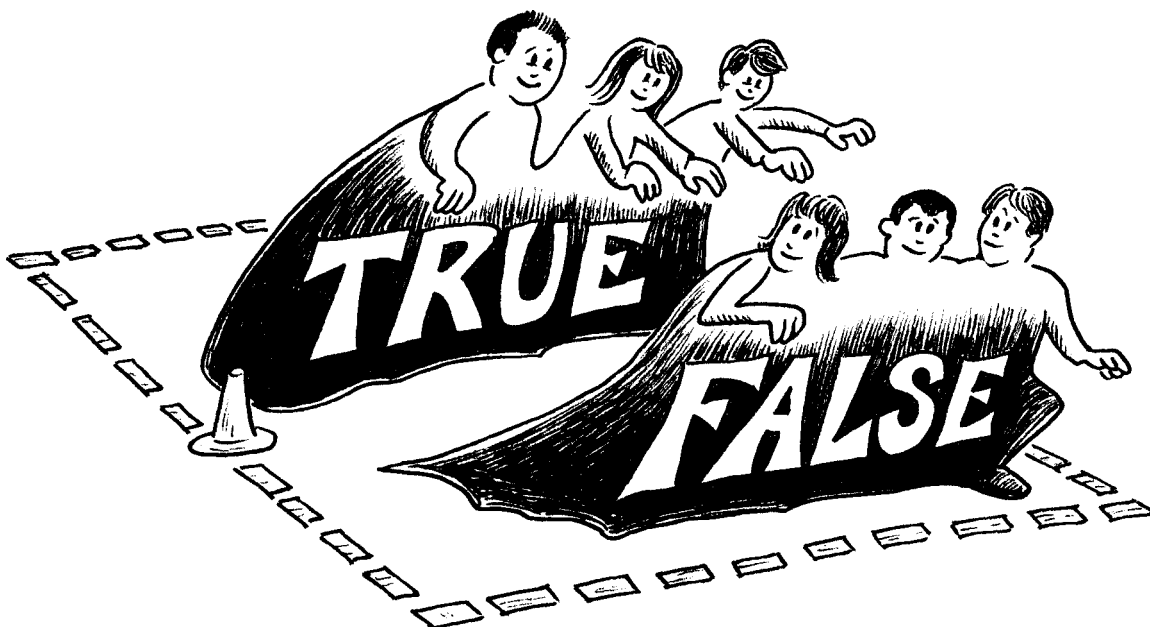
Materials Required: six pylons, list of questions

Instructions: 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.



Crows and Cranes: Sample Questions

At least four different species of organisms are found in the schoolyard.
(TRUE)

One of the things consumers eat is producers. (TRUE)

The three basic needs for survival that every living things needs to survive are food, water - and television. (FALSE)

In the past 100 years our schoolyard hasn't changed at all. (FALSE)

At one time, large carnivores like Grizzly bears and wolves would have used this area as their home. (TRUE)

In a web of life, organisms generally do not need each other to survive.
(FALSE)

An adaptation is something that helps an animal to survive in its habitat.
(TRUE)

Humans can change areas such as schoolyards to make them better places for wildlife to live. (TRUE)

Herbivores are meat-eating animals. (FALSE)

Insects have six legs. (TRUE)

The sun rises in the West and sets in the East. (FALSE)

When we use all of our senses, we learn better than if we were sitting at a desk. (TRUE)

Sharing Circle

This is a wonderful way to bring closure to an afternoon or a whole program.

Time Required: 10 minutes

Materials Required: none

Instructions: At the end of an activity, ask everyone to sit in a circle. Choose one of the following topics, and ask each person completes the sentence with a simple answer:

- My favourite thing about this activity was...
- The coolest thing I saw today was...
- I got to know my friends better when...

- One thing I'll never forget about the activity is...
- Two words that describe how I feel about the activity are...
- For the first time in my life, I...

Instead of completing the sentence verbally, students could draw or write their response in their journals.



Resources!

Contact Organizations: Some useful contacts to help you teach about the environment

CPAWS Education Program offers field trips, in-school presentations, teacher P.D , student action awards, and activity guides. Contact Gareth Thomson, 1-403-678-0079, e-mail cpaws_education@telusplanet.net, website www.cpawscalgary.org

Global, Environmental and Outdoor Education Council (GEOEC) offers a quarterly newsletter, workshops, and an annual conference. Contact Alberta Teachers' Association at 1-800-232-7208. Website www.rockies.ca/geoc; e-mail geoec@agt.net

Alberta Environment - Fish Creek Environmental Learning Centre offers "Taking it Outside" teacher training series, numerous self-directed programs. Contact Jeff Reading at 310-0000/297-7927, e-mail jrreading@agt.net.

Alberta Environment - Kananaskis Country offers field trips and numerous FREE teacher resources. Contact Carey Booth at 310-0000/678-5508, www.kananaskis-country.org, e-mail Carey.Booth@gov.ab.ca.

Alberta Environment - Edmonton office offers workshops and numerous FREE teacher resources. Contact Heather Wheeliker at 310-0000/427-6310, www.gov.ab.ca/env, e-mail

FEESA offers teacher resources, teacher training sessions and institutes. Contact Marnie Scheffer at 780-421-1497, e-mail Info@feesa.ab.ca, website www.feesa.ab.ca

SEEDS Foundation offers Learners in Action, Green School, and BIT (Bird Identification Tally) challenge. Contact Dan Stoker 1-800-661-8751; e-mail seeds@agt.net <http://greenschools.ca/SEEDS>

Calgary Zoo and Botanic Garden offers in-school or zoo site presentation and tours, zoo school, and a school yard naturalization program. Contact Judy Archer or Kevin Strange at 1-403-232-9300. Email judya@calgaryzoo.ab.ca, website www.calgaryzoo.ab.ca



World Wildlife Fund - Canada has a Schools for Wildlife program, annual COSEWIC listing, posters, activity guides, exciting website for kids, and an automated e-mail listserve. Call 1-800-267-2632. Email kbilous@wwfcanada.org, Website www.wwfcanada.org

University of Calgary, Kananaskis Field Stations offer a variety of field-based, curriculum specific programs, including a Trees and Forests program. Contact Mike Mappin, University of Calgary, Kananaskis Field Station, General Delivery, Seebe, AB, T0L 0X0, (403) 673-3662, <http://www.ucalgary.ca/UofC/research/KFS>

Books, Magazines and Videos

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Green Teacher Magazine. School habitat issues: volumes 47, 49, 50, 51, 53. 95 Robert

Street, Toronto, ON, M5S 2K5. tel: (416) 960-1244 e-mail: green tea@web.net or web: <http://www.web.net/~greentea>

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Local Naturalization Interest Groups

Alberta Native Plant Council, P.O. 52099
Garneau Postal Outlet, EDMONTON, AB
T2G 2T5 www.anpc.ab.ca

NatureScape Alberta. An exciting new book by the Federation of Alberta Naturalists that is an A-Z naturalization resource for Alberta. P.O. Box 1472, EDMONTON, AB T5J 2N5 (403) 453-8629

Alberta Naturalization Network, c/o
Recreation, Parks and Culture, 2025 Oak
Street, SHERWOOD PARK, AB T8A 2P9 (780)
910-5043

ALCLA Native Plant Restoration Inc. Pat and
Al Fedkenheuer 3208 Bearspaw Drive, N.W.
CALGARY, AB T2L 1T2 (403) 282-6516

The Evergreen Foundation. *A Guide to School Ground Naturalization: Welcoming Back the Wilderness.* (Scarborough, ON; Prentice Hall Canada, 1994) and *Grounds for Change* inspirational video about schoolyard naturalization. The Evergreen Foundation: 163 West Hastings ST. Suite 106, Vancouver, BC tel: (604) 689-0766 web: www.evergreen.ca

Monitoring Programs

Butterfly Survey, Canadian Wildlife Federation, 2740 Queensview Drive, Ottawa, ON K2B 1A2 tel: 1-800-563-2286 or e-mail: info@cwf-fcf.org or web: www.cwf-fcf.org

Frog Watch! For more information about frog monitoring in your area, click on the National Frogwatch Web site at <http://www.cciw.ca.emanops/>. To learn more about the amphibians of Canada, check out the Web site of the Canadian Amphibians and Reptile Conservation Network at <http://www.cciw.ca/ecowatch/dapcan>. phone: (780) 427-1429 e-mail: lisa.takats@gov.ab.ca

GLOBE (Global Learning and Observations to Benefit the Environment) is an international program supported by NASA and NOAA that allows students to learn locally and share globally-based inquiry and scientific methods using state of the art technology.

Plant Watch. Elisabeth Beaubien, at the University of Alberta's, Devonian Botanic Garden in Edmonton, T6G 2E1, phone: (780)987-5455/3054, fax:(780)987-4141 E-mail: e.beaubien@ualberta.ca web site: <http://www.devonian.ualberta.ca/pwatch/>

Worm Watch at Agriculture and Agri-Food Canada in the Lethbridge Research Centre. PO Box 3000, Lethbridge, AB T1J 4B1 or phone: (403) 317-2294 and e-mail: wormwatch@em.agr.ca

Canadian Nature Federation <http://www.web.net/~cnf> or e-mail: epiccnf@web.net
Green Map - greenmap.com

Rationale: Why a schoolyard naturalization project is important

By the end of sixth grade, students will have spent the equivalent of 260 eight-hour days in their schoolyard. For many kids, this is still a concrete or hard packed playing surface, with nowhere to sit and no shelter from the sun. An environment like this can be very dull for the young mind. Restoring natural habitat to a school ground provides a number of possibilities for learning and playing.

Often the nature that young people know is often abstract - a television special, a picture book. If the natural world is a place 'out there' and not in a child's daily surroundings, it is unlikely to be understood and ultimately, protected. By restoring native habitats, seeds of hope are sown reminding people that they can work together with natural systems. Empowering children to take positive action in shaping their school environment gives them the opportunity to acquire the knowledge, skills and attitudes necessary for solving environmental challenges. The process of restoring nature models community stewardship so that others can learn from it and be inspired to reproduce it in their own backyards, and on other school sites, ultimately gaining a sense of stewardship for wilderness.

The Calgary Zoo's Grounds for Change Schoolyard Naturalization Project has worked with a number of Calgary area schools as they plant native trees, shrubs and other plants in urban-friendly wildlife habitats. These working partnerships have created innovative learning opportunities and heightened environmental awareness. The process of bringing all of the stakeholders together for schoolyard projects provides schools with networks of volunteers, new sources of financial support, and is an excellent example of community environmental stewardship.

In consultation with school district personnel, matters like fire lanes, service infrastructures,

viewing lines, long term maintenance, and mowing patterns are taken into consideration when realizing the community vision for the schoolyard. In addition to being manageable and affordable, schoolyard projects have a remarkable number of positive effects. The creation of natural landscapes produces an innovative forum for education in all subject areas and is a springboard for discussion of environmental issues. Children are given the opportunity to learn about the natural world in a hands-on manner where complex issues, such as the role of trees in climate change or biological diversity become easily accessible. Shade trees also provide students with some reprieve from the sun's harmful rays.

Natural areas on school grounds benefit the educational progress of students and enhance their social development. Current research indicates that programs that integrate outdoor learning with a number of subject areas improve academic performance in most every subject areas. * When provided with a natural setting, studies show that children's playgroups tend to be less segregated by gender and age and more creative in play activities. Research indicates that interactive, natural environments reduce violent behaviour and promote positive social experiences for students.

Aside from the being beneficial to children, as natural areas shrink, school grounds can provide numerous species of plants and animals with habitat. Grounds for Change is an example of how cooperative effort can attain an ecological balance between all forms of life. A naturalization project educates and empowers the next generation to lead the way in creating a sustainable future.

for more information about the research on academic improvement and integrated programs, see Green Teacher's Fall 1999 issue, dedicated to the topic.

"One of the great dreams of man must be to find some place between the extremes of nature and civilization where it is possible to live without regret."

-Barry Lopez

Notes