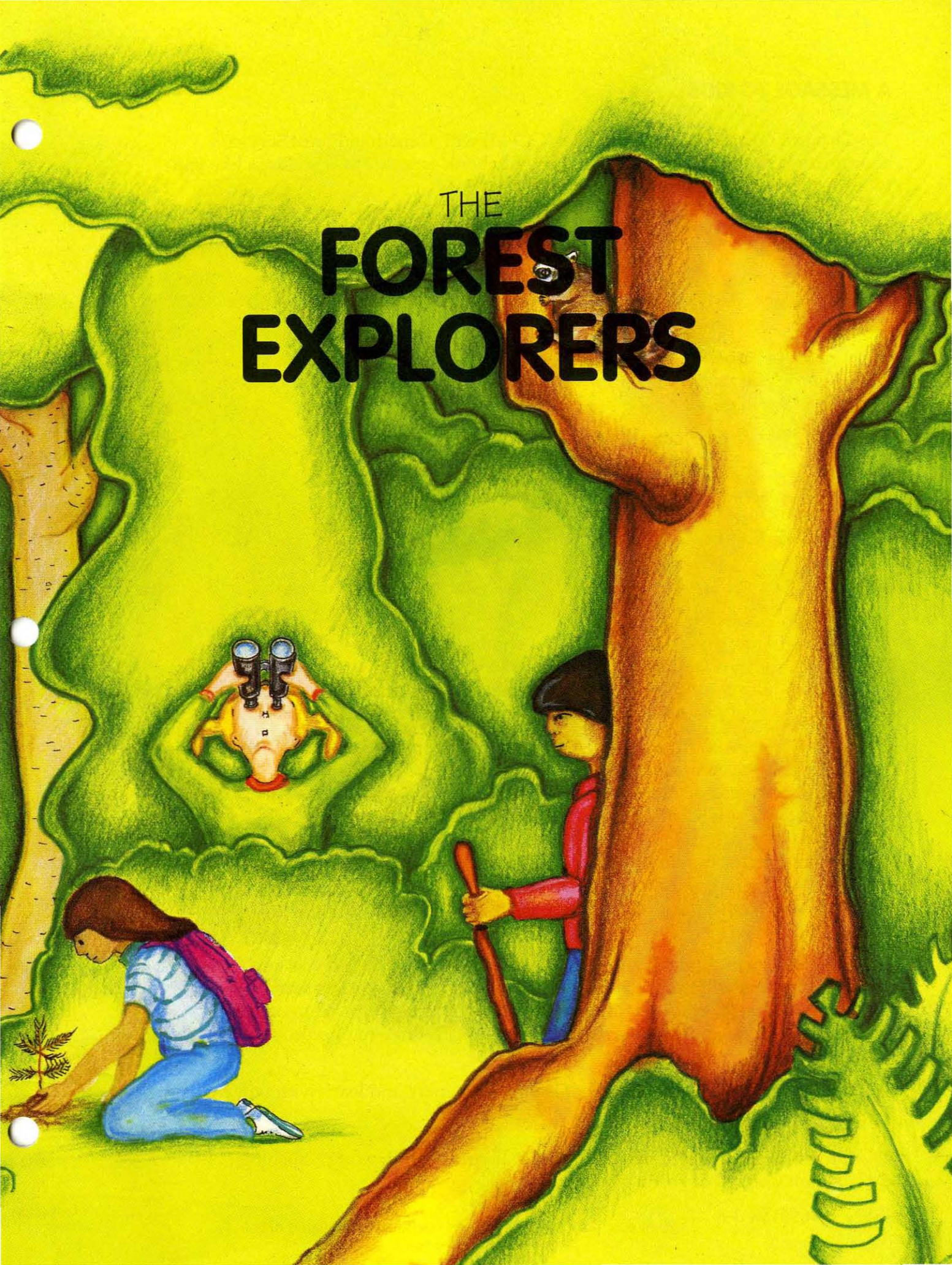


THE
**FOREST
EXPLORERS**



A MESSAGE TO KIDS

The Canadian Council of Forest Ministers (CCFM) with Canadian Forest Service's coordinated efforts, has produced this activity book especially for children like you who are interested in Canada's forests.

The CCFM, created in 1985, is comprised of federal, provincial and territorial government ministers responsible for forestry.

"Our goal is to maintain and enhance the long-term health of our forest ecosystems for the benefit of all living things both nationally and globally, while providing environmental, economic, social and cultural opportunities for the benefit of present and future generations."

We hope these activities will help you discover the beauty and richness of our forests as well as show you the valuable role forests play in our everyday lives. This is important for it is you who will ensure that those benefits will be here for future generations of kids.

Thank you for being a dedicated forest explorer!

The Canadian Council of Forest Ministers

A MESSAGE TO EDUCATORS

This activity book has been designed to develop an interest in and respect for the forest among Canada's young people, especially those up to 11 years of age.

Our objectives are: to raise awareness and eliminate misconceptions about Canada's forest and forestry operations; to give a balanced view of the many values of a forest; to promote a stewardship ethic toward the forest; to foster in children the ability to think critically; and to develop a range of skills, such as language and math skills.

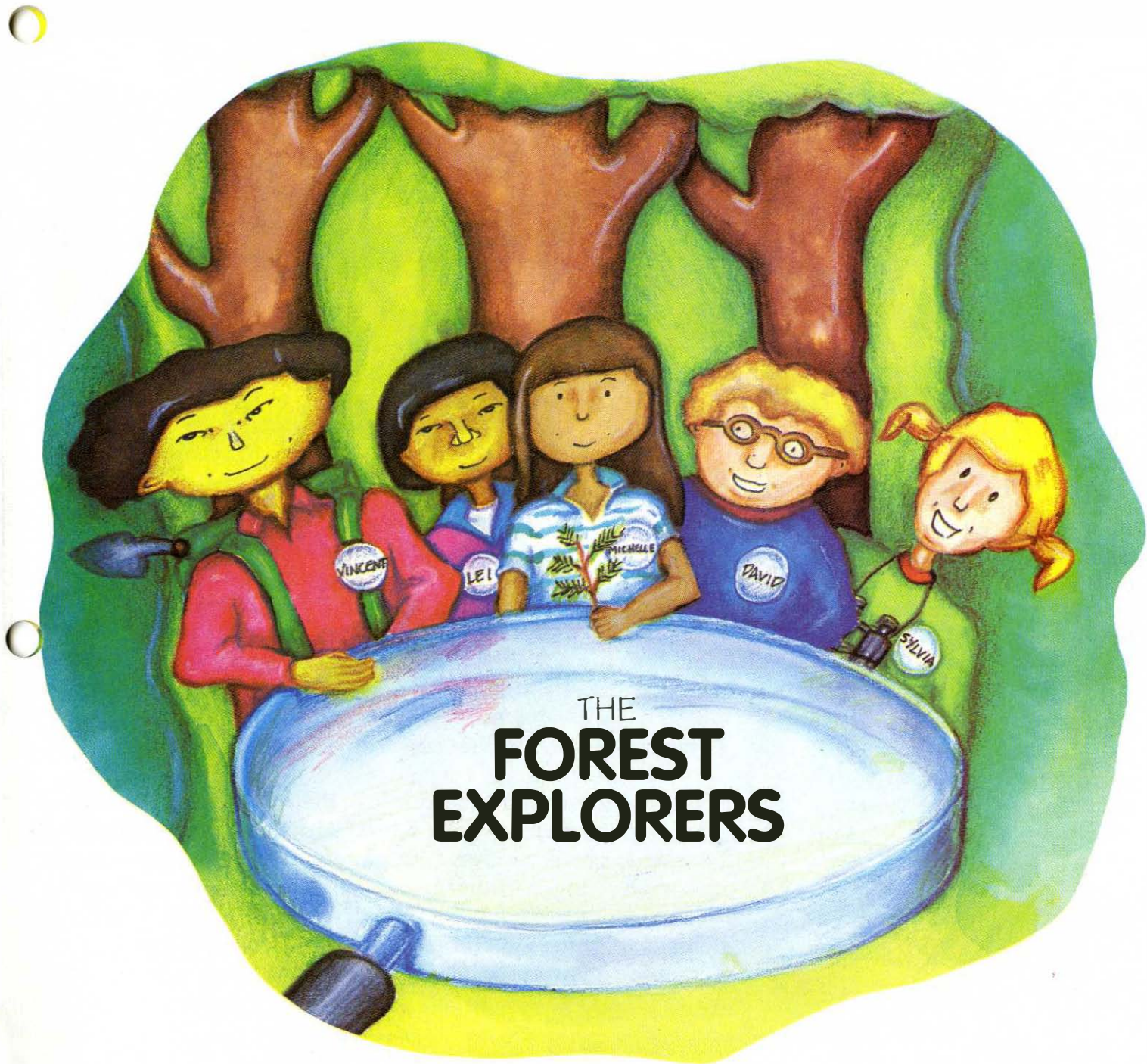
The Forest Explorers has five chapters. Chapter 1, *Life in the Forest*, deals with the forest ecosystem and the community of animals and plants that live there. Simple concepts of ecology are introduced. Chapter 2, *The Earth has Lungs!*, looks at the role of the forests in contributing to global air quality. Chapter 3, *The Forest in our Lives*, focuses on the benefits we derive from the forest. Here the stewardship ethic and the concept of multiple use and sustainable development are presented. Chapter 4, *The Four Rs and the Forest*, looks at papermaking, and ways to recycle forest products, especially paper. Chapter 5, *Caring for the Forest*, presents the basics of silviculture — the art and science of caring for a forest.

In an effort to incorporate the important concepts surrounding forests and forestry in a way that children will find exciting, we have taken a hands-on approach, with many activities suitable for children to do on their own or as a group. We invite you to modify the activities to the needs and level of your group. Feel free to photocopy any parts of the book.

We hope that you and the young people you work, play and learn with will enjoy *The Forest Explorers*.

The information contained in this booklet was current at time of publishing (1994).
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ISBN 0-9696158-3-3



THE
**FOREST
EXPLORERS**

Cette publication est aussi disponible en français sous le titre :
Les Aventuriers de la Forêt.



LIFE IN THE FOREST

An ecosystem is a community of organisms (such as plants, animals and bacteria) interacting with their environment. The northern boreal forest is one kind of ecosystem; a coral reef is another.

Some 131 different species of trees live in Canada's forests. Among the trees, you can find 200 species of mammals, and almost 550 species of birds.

Let's join the forest explorers and scout the forest for **wildlife**. Perhaps we can find some of the animals that depend on the forest ecosystem.

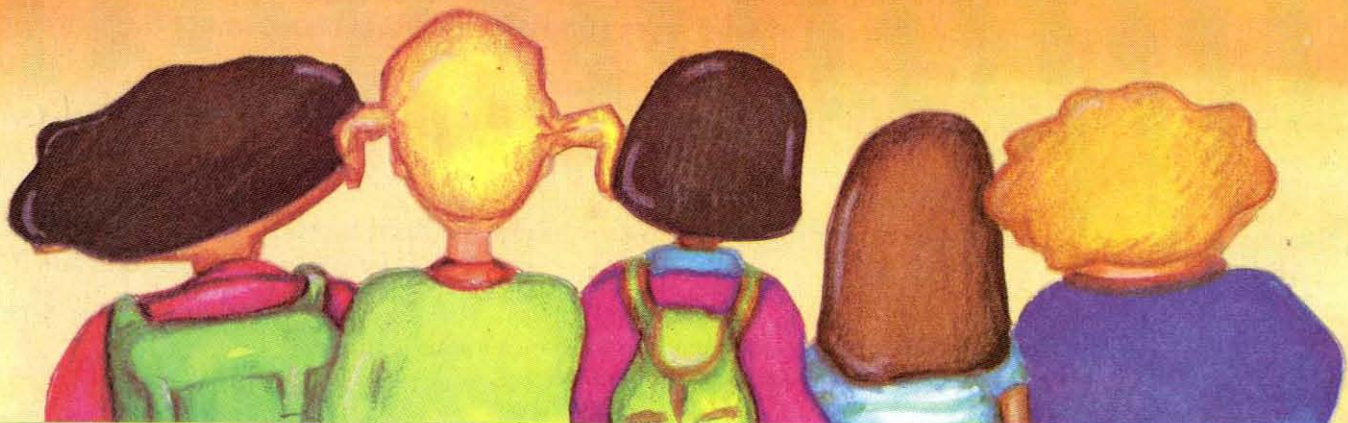
Something could be hiding beneath this log on the forest floor. David has turned it over and found a **salamander** (we must remember to put the log back in place afterwards). Look! There goes a garter snake, slithering through the dead leaves.

Listen...what's that? "Chick-a-dee-dee-dee." Michelle, a bird-watcher, tells us it's a chickadee. Up in the **canopy** (the tree tops) she points to the hanging nest of an **oriole** swaying in the breeze.

Come on, explorers, what else can we find?

Sylvia has found some footprints in the wet mud by a stream. They were made by a raccoon that hunted crayfish or **frogs** here last night. A raccoon is an omnivore, which means it eats all sorts of things — nuts, green plants, clams, even garbage!

Lei sees a light-coloured branch high in a tree. A hungry porcupine gnawed the bark there last winter, when there were no leaves and grasses to eat.





Everything in the forest has a use — even old, dead trees. Woodpeckers and flying squirrels live in them. Beetles and **worms** munch on them. Should we cut all the dead trees down, and make the forest neat? No! Dead trees provide habitat for wildlife.

Within a **community**, people depend on each other in many ways. Our families depend on the grocer for food. We also need the letter carrier, the lady who owns the drug store, the garbage collectors, and the people who remove snow in winter. Everyone has a role to play.

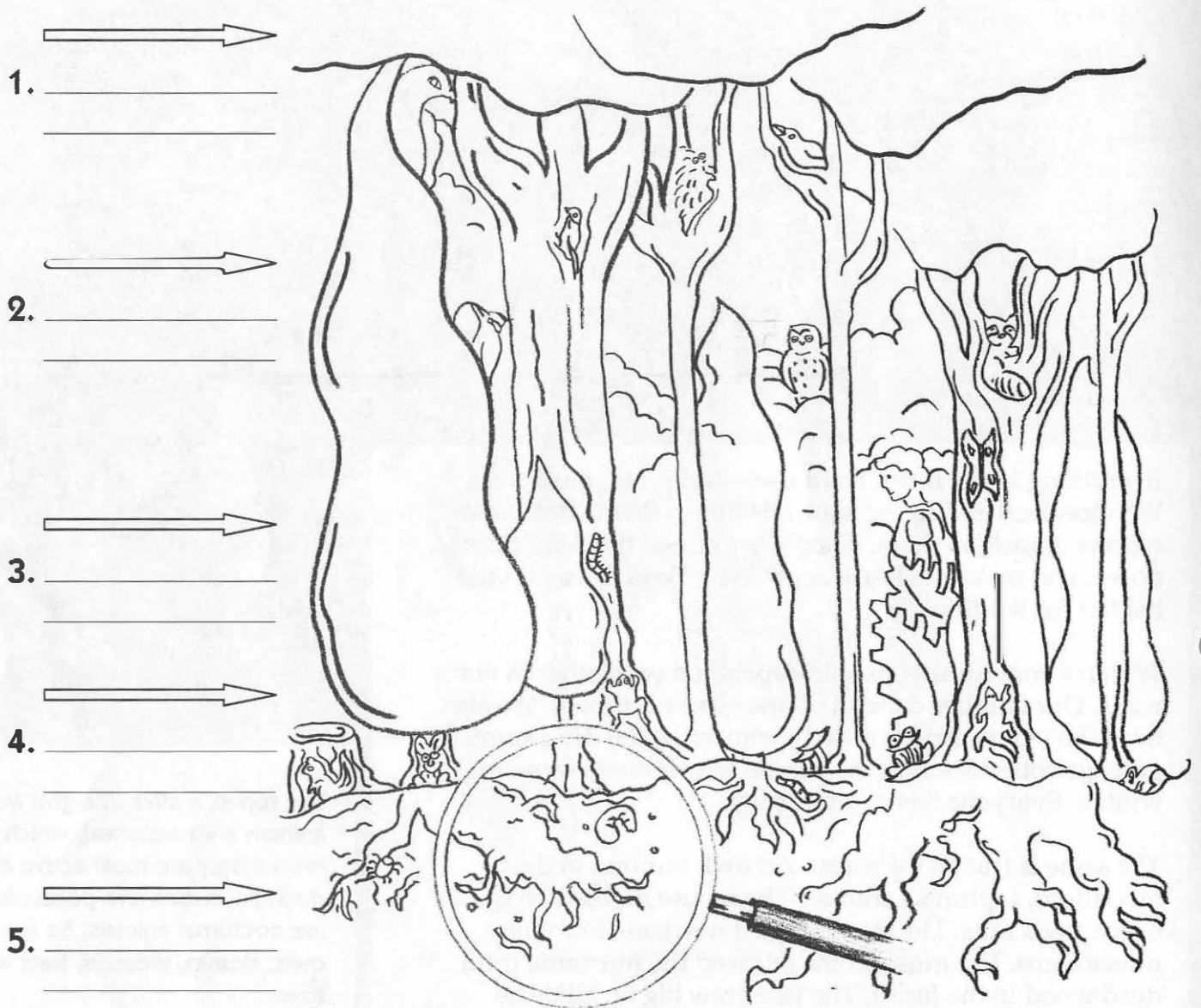
The same is true in the forest. An owl, hunting in the moonlight, captures a **mouse**. The mouse nibbled on the beech tree's nuts. The tree obtained nutrients from the mushrooms. The mushrooms released the **nutrients** from dead wood in the forest. The tree grew big on all those nutrients. Now it stays healthy because the oriole eats the insects that would eat the tree's leaves.

The forest is alive at night! Many animals are **nocturnal, which means they are most active after dark. Raccoons and porcupines are nocturnal animals. So are owls, skunks, weasels, bats and foxes.**



Find the Creatures in the Forest Community

There are 20 creatures in this forest picture. Can you find them all?
Once you have found them, colour them in.



Levels of the Forest

If we could fly from the ground straight up to the tops of the biggest trees, we would go through several different levels in the forest. Each level is home to certain groups of plants and animals, though many animals are mobile and move from one level to another.

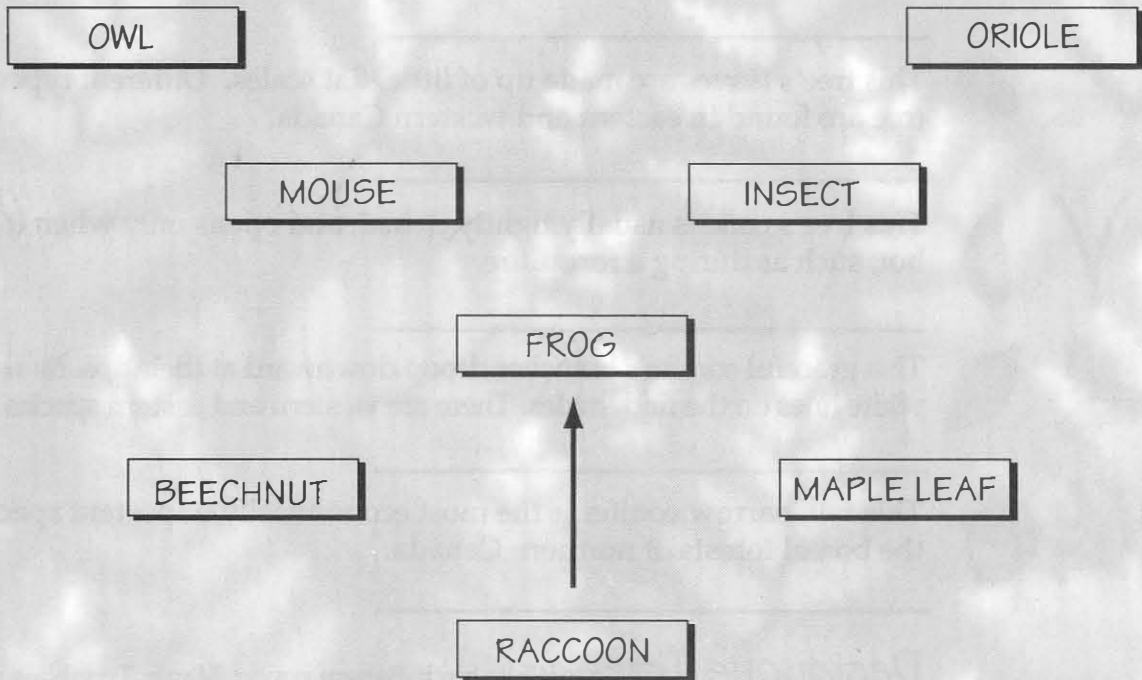
The forest shown in this picture has five layers. Insects, some birds, salamanders, toads and mushrooms live on the forest floor. Different birds and insects make their home in the canopy, the top level of the forest. The understory is home to smaller trees and shrubs. Ferns, mosses, wildflowers and other soft stem plants make up the herb layer. Finally, underground is the soil layer, where millions of tiny worms, bacteria and soil insects thrive.

Write the names of the five forest levels in the spaces provided to the left of the picture. On the second line, write the name of one animal or plant found at that level.

Who Eats Whom in the Forest?

Animals and plants in the forest are connected to each other in a food web. The direction of the arrows in the food web tell you who eats whom. For example, the raccoon eats the frog.

Vincent made this food web. As a clue, he put in one arrow showing who gets eaten by whom. Can you finish it? Remember, the arrows go from the animal that eats to the animal or plant that gets eaten.



A	F	R	O	G	S	N	C	L	T	F
H	C	L	C	M	O	U	S	E	C	C
W	A	R	T	C	W	T	A	L	O	N
O	N	B	X	U	L	R	L	O	M	T
R	O	E	I	C	L	I	A	I	M	L
M	P	E	O	T	O	E	M	R	U	O
S	Y	T	O	S	A	N	A	O	N	R
L	I	L	W	O	W	T	N	N	I	C
F	R	E	L	T	D	S	D	O	T	I
W	I	L	D	L	I	F	E	E	Y	Q
A	N	N	O	C	T	U	R	N	A	L


The Forest Challenge Word Search

All the words in bold on pages 2 and 3 are hidden in this puzzle. Some words go across, others go down. One word even runs upside down. Once you've found all the words, see if you can find one more word that the forest explorers hid in the puzzle. This word explains why the forest is important to the animals that live there. (Hint: the word runs diagonally from left to right.)


What Tree is That?

Match the name of the tree with the picture showing its silhouette, leaf and cone or seed. The forest explorers have provided some clues and interesting facts to help you identify and learn about each tree species.


Coniferous Trees (Cedar, Black spruce, Jack pine, Hemlock, White pine)

- 


1. This tree's needles come in groups of five. There are five letters in one word of its name.

- 


2. This tree's leaves are made up of little, flat scales. Different types of this tree are found in eastern and western Canada.

- 

3. This tree's cone is usually tightly closed, and opens only when it gets really hot, such as during a forest fire.


- 

4. This graceful conifer's branches droop downward at their tips. Its needles have white lines on the undersides. There are western and eastern species of this tree.


- 

5. This tall, narrow conifer is the most economically important species in the boreal forests of northern Canada.


Deciduous Trees (White birch, Balsam poplar, Maple, Trembling aspen, Oak)

- 


1. The stem on this tree's leaf is very long, causing the leaves to tremble in the breeze.

- 

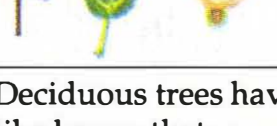
2. This is the only tree with white bark.

- 

3. This tree grows up from an acorn.

- 

4. This tree's leaf appears on Canada's national flag.

- 

5. This tree is common in the prairie provinces, where it is often used for windbreaks.

Deciduous trees have broad leaves that are shed every fall. Coniferous trees have thin, needle-like leaves that are not shed every fall. But did you know there are a few exceptions to these rules? Tamaracks are evergreens that shed their needles every fall. Arbutus are broad-leaved evergreens that shed their leaves in the spring, every two years.

THE EARTH HAS LUNGS

Is it true that forests work like a set of lungs for the earth? What a strange thought! How can forests work like lungs? Come and join the forest explorers as they try to find out.

Let's take a look at how our own lungs work. Take a deep breath. You are taking in oxygen from the air. Your body needs oxygen to burn the food you eat and produce the energy you need to go out and explore the forest.

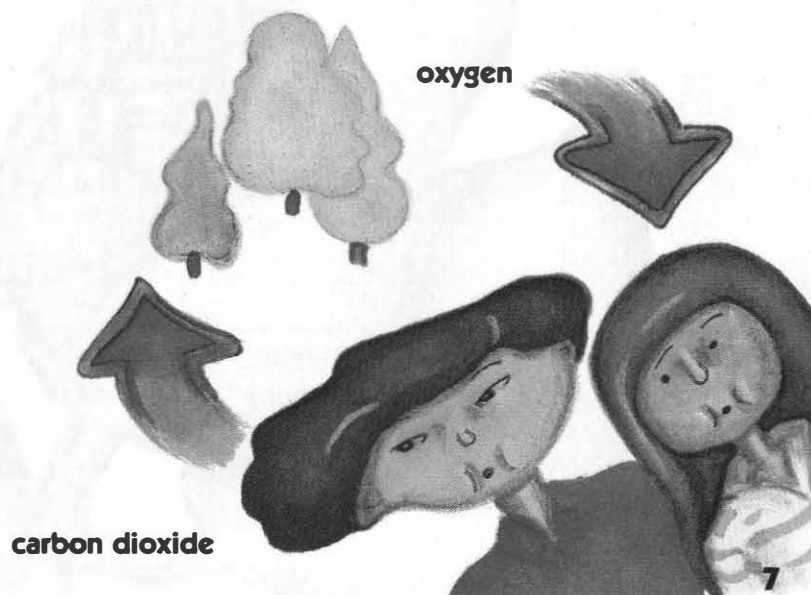
Now breathe out. This gets rid of carbon dioxide, or CO_2 , that our bodies make as we produce energy. CO_2 would poison us if our lungs didn't get rid of it. Why isn't the air full of poisonous CO_2 from billions of creatures breathing it out?

Trees come to the rescue! They don't really breathe, of course. But they exchange the gases carbon dioxide and oxygen as we do when we breathe, except that they do it in reverse. They take in the CO_2 we give off, and produce the oxygen we need. In doing so, trees purify the air.

It's a good trade, isn't it? Scientists think that all the oxygen in the earth's atmosphere has come from trees and other plants giving off oxygen over millions of years. That's why we say forests are like the lungs of the earth.

Cars and factories give off great quantities of CO_2 . There is more than the trees can use up. By planting more trees, driving our cars less, and getting factories to reduce their emissions, we can make the atmosphere healthier.

Canada plants over one billion seedlings every year. We plant two for every tree we cut down.



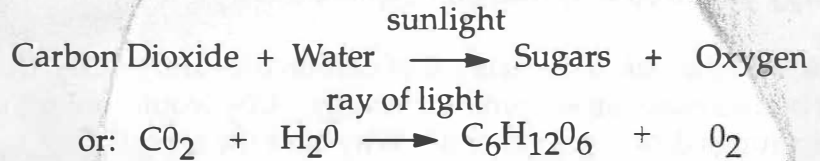
Could You Make Your Own Food? Trees Do!

What is on a hungry tree's menu? **Sugars.** (Fortunately, they don't have to worry about cavities!)

Trees combine carbon dioxide, water from the ground and **sunlight**, to make sugars. They do this in their leaves, with the help of **chlorophyll**, the compound that makes leaves green.

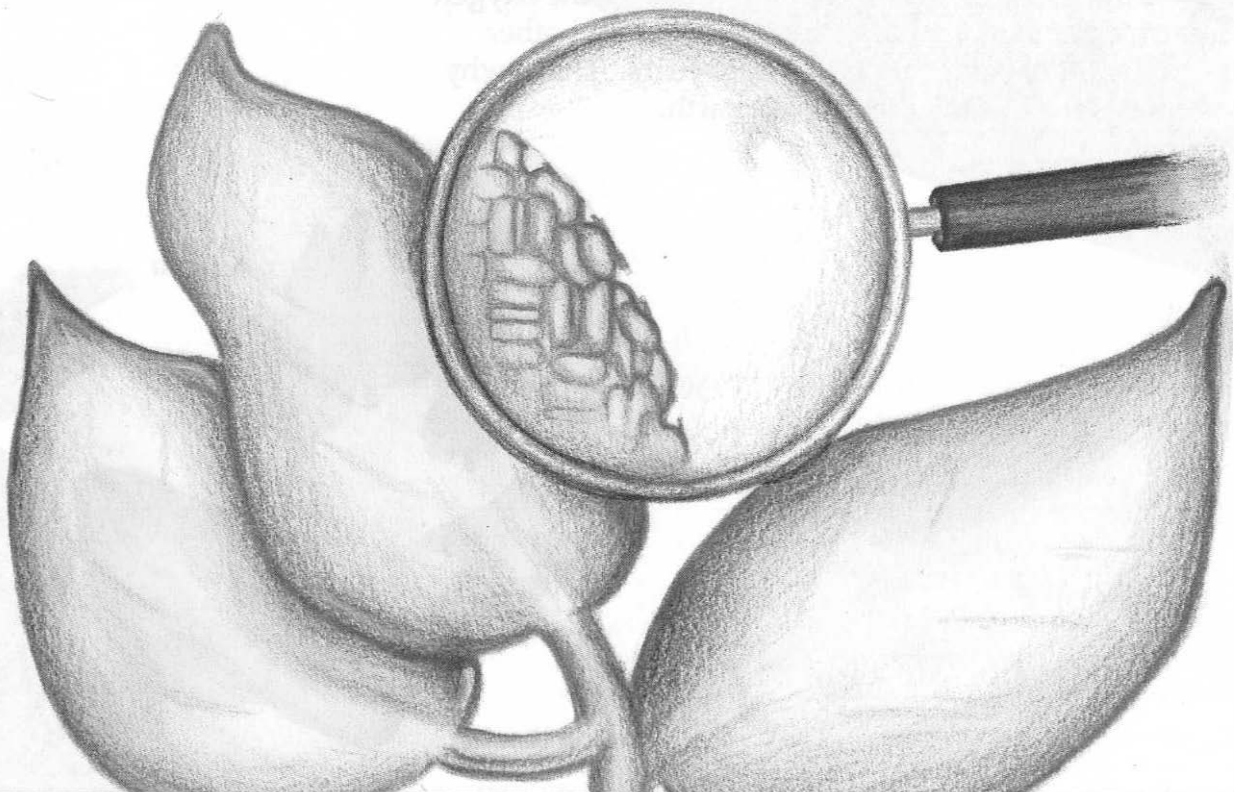
The process by which trees make sugars is called **photosynthesis**. The "photo" part of the word means that light is required, just as light is required to make a photograph. The "synthesis" part means "to make." So, photosynthesis means "to make with light."

Photosynthesis works like this:



Each tree also sends hundreds of litres of water vapour into the air every day, through another process called **transpiration**. Trees give off water through tiny holes on their leaves, called **stomata**, that open up when the tree wants to get rid of water, and close when the tree wants to save its water. Transpiration keeps the air moist and nice to breathe.

Forests play an important role in the water cycle. Trees are nature's pumps, pulling water out of the soil and returning it to the atmosphere as water vapour. Forests also store huge quantities of water, both in the trees and in their spongy soil. In doing so, they prevent flooding and landslides in spring, and provide much-needed moisture during dry seasons. Twenty per cent of the world's fresh water flows from Canada's forested watersheds.



Trees and the Greenhouse Effect

Have you heard of the **greenhouse** effect? When the sun shines on a greenhouse, the clear walls and roof trap the heat and keep it in. In the same way, carbon dioxide in the atmosphere is trapping the sun's heat and making the earth warm up.

It's nice to be warm, but too much of a greenhouse effect will not be good for the earth. Some areas would become too hot to live in, and sea level would rise if the ice caps at the north and south poles melt. We have to do what we can to stop the greenhouse effect.

Trees can help! By taking carbon dioxide from the air and storing it as **carbon** in their wood, they reduce the greenhouse effect. Even after trees are cut down and used as lumber, the wood continues to store carbon and keep it out of the atmosphere. By planting trees, we are taking steps to improve our air quality.

But, the burning of thousands of hectares of tropical rainforest to clear the land for agriculture releases the carbon stored in those trees. As a result, this carbon dioxide increases the greenhouse effect.

The forest explorers are planting trees in their school yard and around their homes, in order to reduce the CO₂ in the atmosphere. Then, they are going to try some experiments to learn how trees work, and learn more about the earth's forests. Shall we join them?

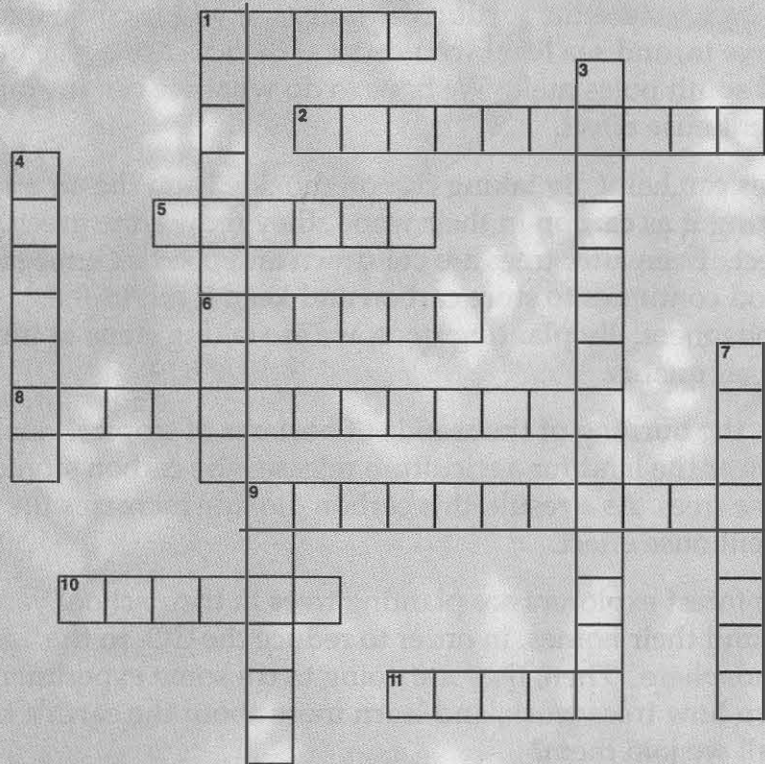
Trees do many other good things for the environment. In the country, they act as windbreaks, preventing the soil from blowing away. In the city, trees remove smog and dirt from the air. Trees also act as giant sponges for ground water and rain, thus preventing flooding. They make the landscape beautiful, especially in fall, and provide us with shade. Picture a world without trees!



The Global Forest Crossword

The forest explorers made up this crossword puzzle on a rainy day, after they had learned how forests around the globe keep our atmosphere clean.

Use the words shown in bold on pages 7, 8 and 9 to complete the crossword puzzle.



Across

1. Carbon dioxide and oxygen are types of _____.
2. The name for the blanket of gases that surrounds the earth.
5. What your body produces with the food you take in.
6. We need this gas to produce energy from food.
8. The process by which plants give off water from their leaves.
9. The compound in leaves that helps with photosynthesis.
10. Food for trees.
11. The organs with which we breathe.

Down

1. The fact that the earth is warming up because of increased carbon dioxide in the air is known as the _____ effect.
3. The process by which plants make sugars.
4. Small holes on leaves, through which trees give off water.
7. The other essential ingredient for photosynthesis, besides carbon dioxide and water.
9. Trees store this in their wood.

Plants Love Water

Just like us, plants need water to live. Try this easy experiment to see how plants, including trees, draw water up into their stems, then give it off through their leaves.

You will need: an adult assistant, a celery stick with leaves on it, red food colouring, a glass, water.



Instructions:

Cut the bottom off a celery stick with its leaves still attached, and place the stick in a glass with some water to which you have added a few drops of red food colouring.

By the next day, what has happened?

Once you have seen the change in the celery, put a plastic bag over the celery and glass, seal it tightly with a twist tie, and place it in a sunny window.

What process are you seeing as the red water appears on the inside of the bag?

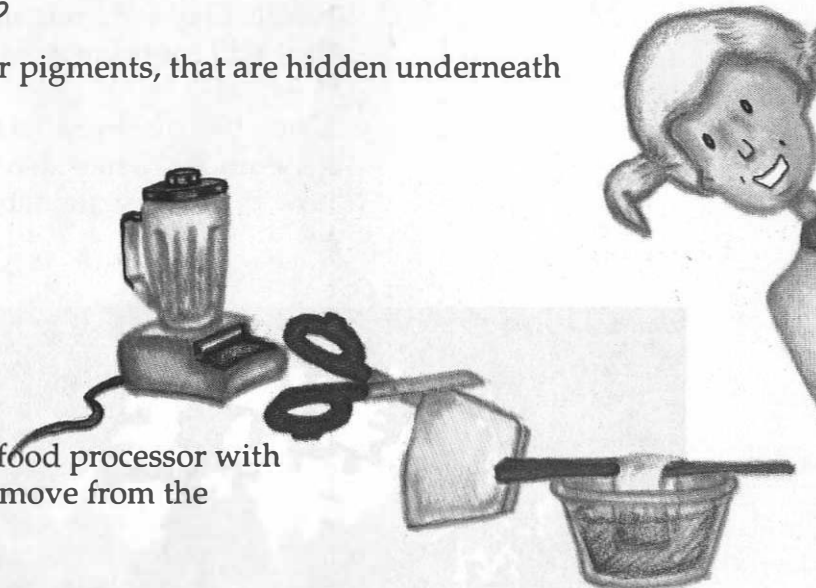
The Hidden Colours in Leaves

This experiment lets you see the colours, or pigments, that are hidden underneath the green in leaves.

You will need: an adult assistant, rubbing alcohol, some green leaves from a tree or house plant, a blender or food processor, a large paper coffee filter.

Instructions:

1. Mash some leaves up in the blender or food processor with about half a cup of rubbing alcohol. Remove from the blender and place in a small glass.
2. Cut a strip from the coffee filter, about 2.5 cm wide and 10 cm long.
3. Rest a spoon or chop stick across the top of the glass. Fold the filter paper over the spoon, letting the bottom of it rest in the alcohol/leaf mixture.



You will see the different pigments in the leaves move up the filter paper. What colours were being masked by the green chlorophyll? At what time of year would you normally see these colours in the leaf?

THE FOREST IN OUR LIVES

One in every 16 jobs in Canada depends directly or indirectly on the forests, and close to 350 Canadian communities depend almost entirely on the forest industry.

Canada exports, or sends out to other countries, more forest products than any other country in the world.

The forest explorers have been thinking about the benefits their families receive from the forest. David's mother works for the Ontario government in research. She uses computers to help develop better methods of forest management.

Michelle's older sister planted trees in northern Quebec last summer to pay her university tuition. Sylvia's uncle works in a furniture factory in New Brunswick that uses maples from southern Ontario. Vincent's uncle, who lives in Nanaimo, British Columbia, builds prefab homes made from cedars harvested on the west coast. Lei's aunt runs a restaurant in Nanaimo. Most of the people who come into her restaurant work in the forest. Therefore she depends indirectly, on the forest industry.

Do you know anyone whose work depends, directly or indirectly, on the forests?

The forest offers us other benefits too. Every summer, Michelle's family camps in Newfoundland's Gros Morne National Park, where they enjoy learning about the woodland birds. Canada's forests play a big role in our lives. We must manage them so that they will continue to be healthy and productive.

Using our resources so that they will be available for future generations, while also providing us with the benefits we need now, is called sustainable development.



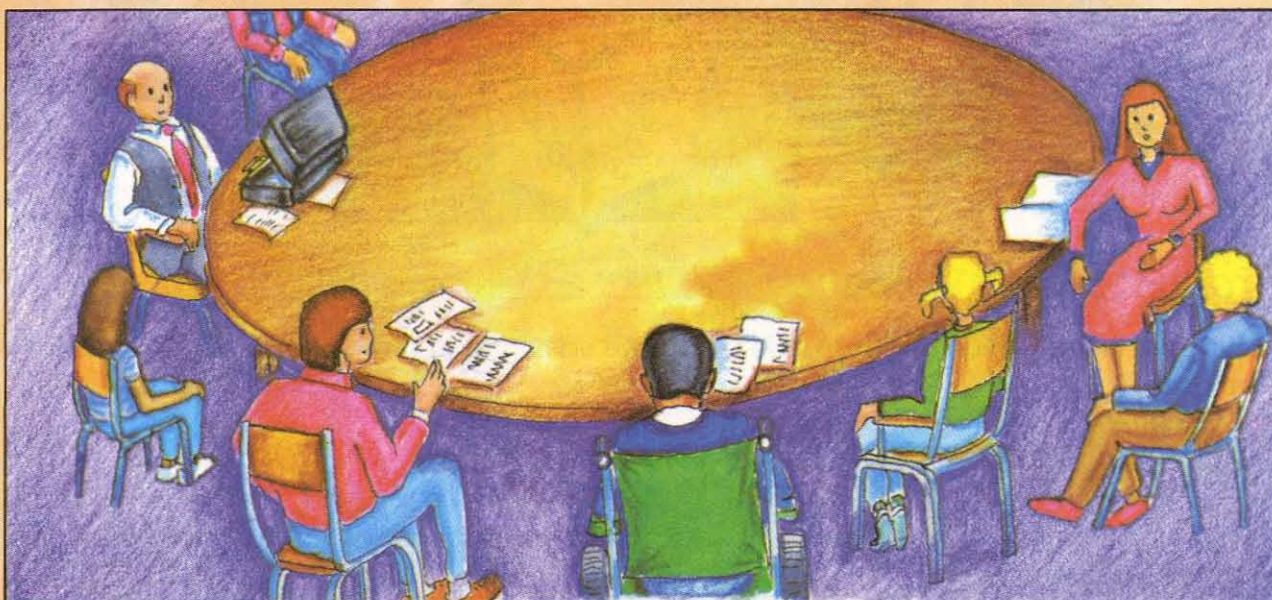
Canada has over 453 million hectares of forested land, making up over half of Canada's total area. Our forests are broken up into 12 forest regions. Which one do you live in?

Who Wants What from the Forest?

A new section of forest around Gull Lake is ready to be harvested. The logging company has invited the local people to a public meeting.

The people at the meeting are interested in finding out how changes in their forest will affect them. The logging company needs to know who these people are and what they are concerned about. The company wants to make sure that everyone who lives near the forest, or uses it in any way, will be happy with the logging and reforestation work.

Can you help the logging company out, by matching up the list of people on the left with their concerns about the forest on the right?

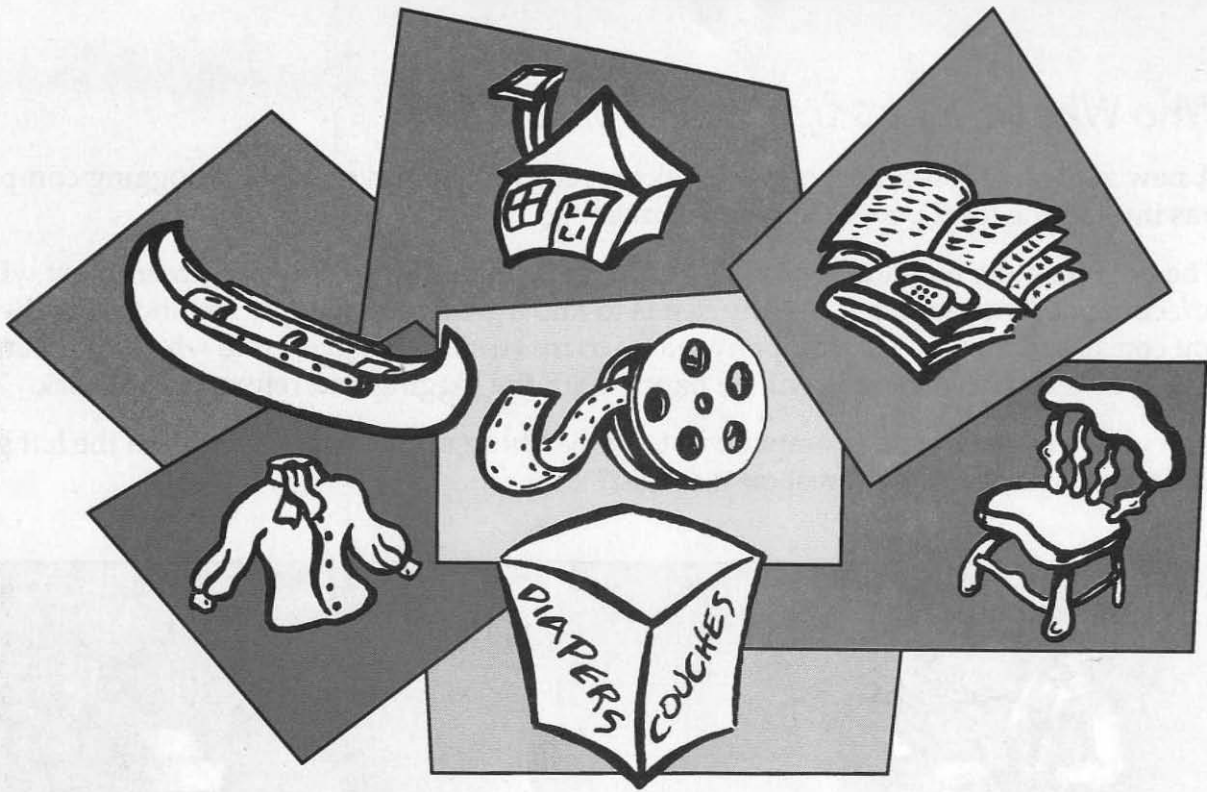


Forest Users

1. Hunters
2. Cottage owners
3. Loggers
4. Tree planters
5. Canoeists
6. Naturalists
7. Logging company managers
8. Native peoples

Their Concerns

- a) Want a nice, forested view of the lake.
- b) Want to keep working in this area.
- c) Want the ground left in good condition for planting new trees.
- d) Want forest left along the river banks, for wildlife and to prevent erosion.
- e) Want a forest with plenty of rabbit, deer and grouse.
- f) Want us to respect the spiritual values of the forest.
- g) Want the best possible forest for a wide variety of wildlife.
- h) Want to make a profit on logging.



Products from Trees

Trees give us hundreds of things. Can you find anything in these pictures that doesn't come from trees?

More Products from Trees

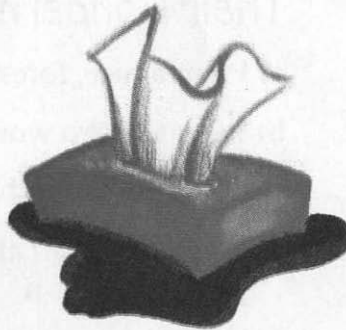
Each of the things pictured below is made from wood. Can you add the names of two more items to each category?



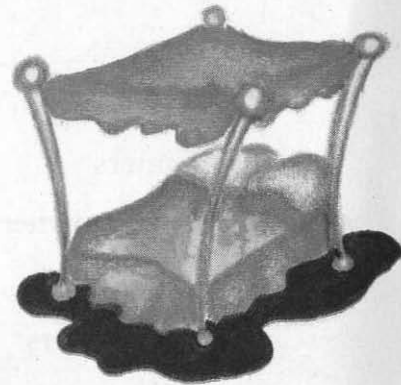
A hockey stick



A guitar



A box of tissue

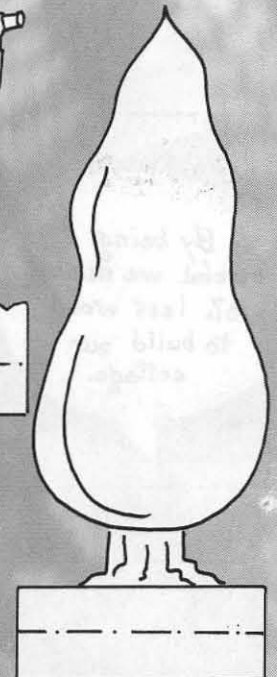
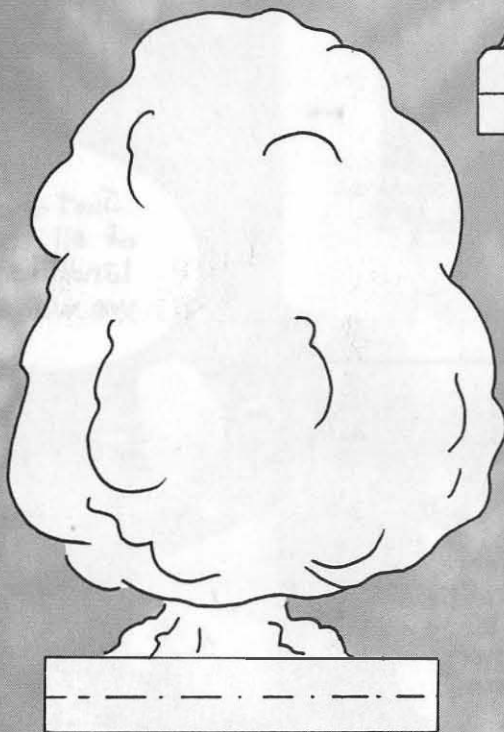
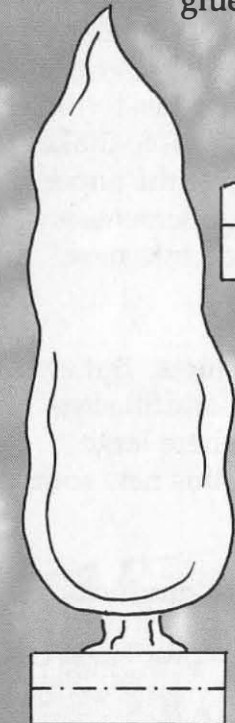
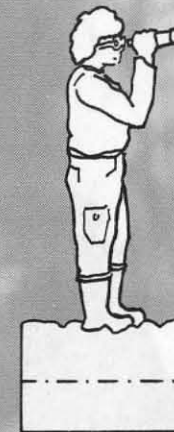
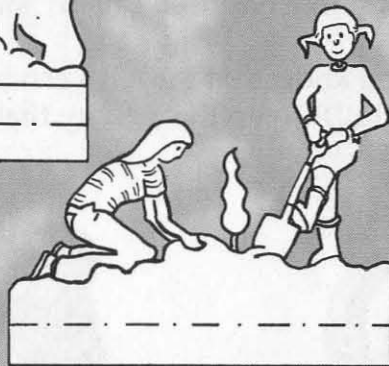
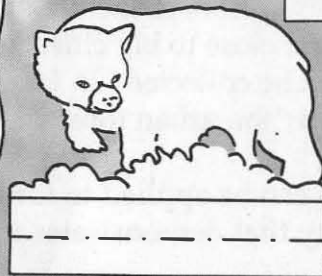
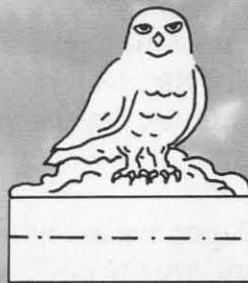
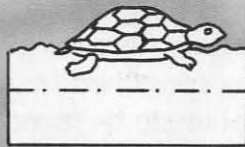
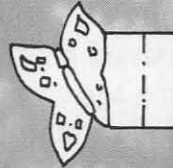
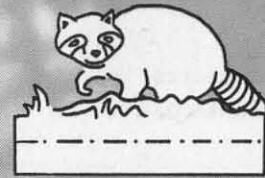


A bed

Make a Forest Diorama.

A diorama is a three-dimensional picture. You can create your own forest diorama inside a box. Draw some trees onto the bottom of the box and colour them in to look like a forest. Turn the box so that the bottom becomes the back of your diorama.

Then, colour and cut out the pictures on this page. Use the bases below their feet to glue them into the box.



THE 4 R'S AND THE FOREST

Reduce, Re-think, Re-use and Recycle

Canada actually imports old newspapers from the United States for its recycled newsprint plants.

Each Canadian generates about 1/2 kg of waste paper each day.

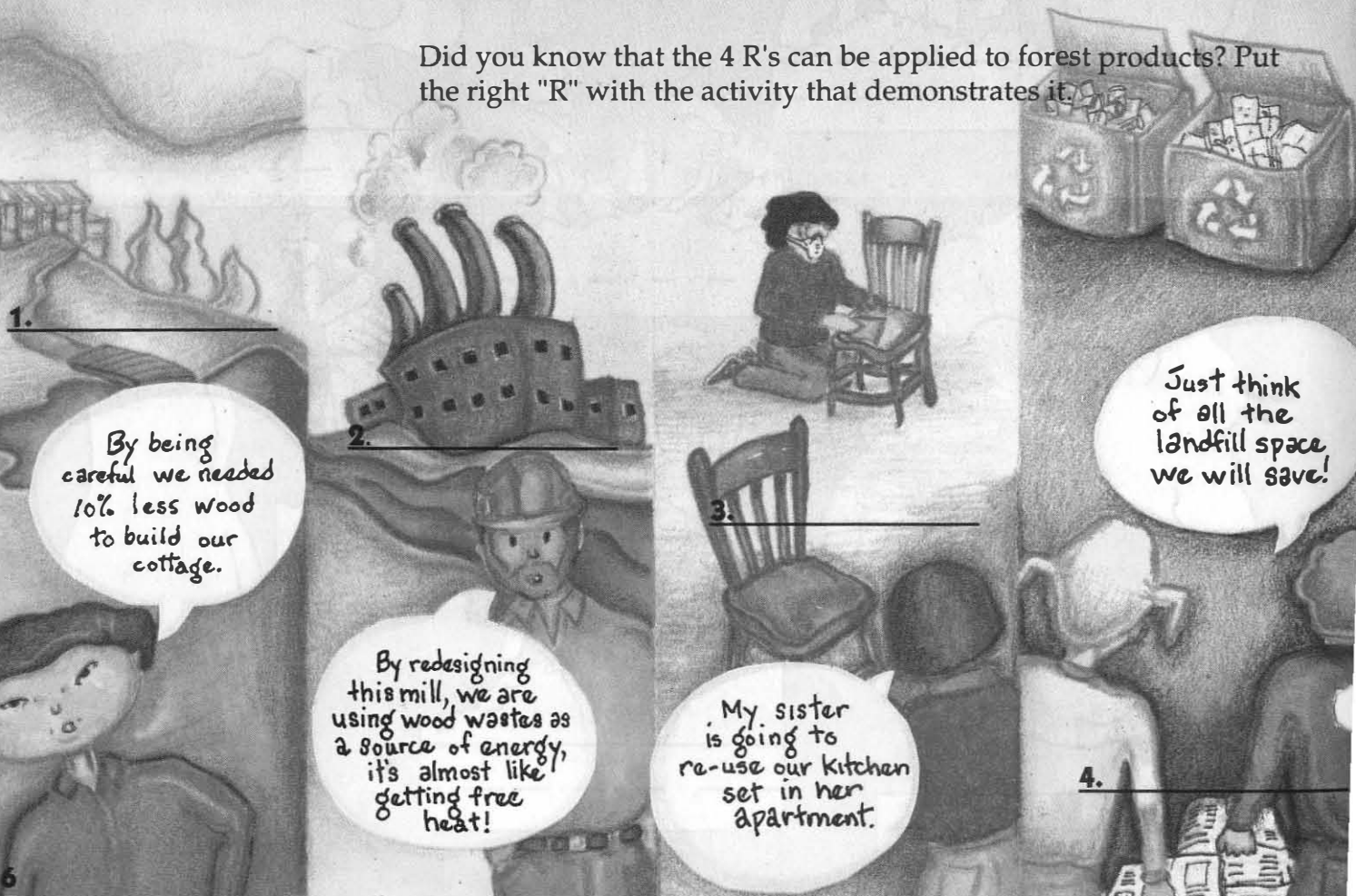
In 1989, only 3% of the newsprint made in Canada contained recycled paper. By 1993, that percentage will rise to almost 20%.

The forest explorers have just visited a newspaper recycling plant in southern Quebec. They watched as hundreds of tonnes of newspapers were made into new, recycled newsprint.

The waste paper was placed in vats about 10 metres long and 5 metres wide, and churned up with water to make pulp. The mixture went through screens and magnetic sorters, which got rid of metal and other contaminants. Then, bubbles of air were forced through the pulp, bringing the old ink to the surface, where it was skimmed off. Ink removed from the fibre, along with paper fibres, forms a grey sludge. In some areas, this sludge is used as fertilizer and soil conditioner. Some new wood pulp was added, to make sure the mixture would have some long fibres to give the paper strength. Finally, the clean pulp was spread on large screens, and sent through presses, dryers and rollers to be turned into new, clean newsprint.

By recycling paper, we are wisely using forest products. But even more important, we are adding years to the life of landfill sites. The paper recycling plants are close to big cities, where large quantities of newspapers can be collected. In fact, this new source of wood fibre has been called "the urban forest."

Did you know that the 4 R's can be applied to forest products? Put the right "R" with the activity that demonstrates it.



1. _____
By being careful we needed 10% less wood to build our cottage.

2. _____
By redesigning this mill, we are using wood wastes as a source of energy, it's almost like getting free heat!

3. _____
My sister is going to re-use our kitchen set in her apartment.

4. _____
Just think of all the landfill space we will save!

Recycling Maze

To review what they learned, Lei made up a challenging maze. You have to get the steps in recycling newspapers in the right order to get to the end of the maze.



Are You a Paper Saver?

Here are some things you can do to reduce your paper use. Can you think of others?

- Re-use paper bags.
- Use cardboard boxes for storing things.
- Buy re-usable cloth "gift bags."
- Donate books and magazines to hospitals, senior citizens' residences, schools, etc.
- Don't use more paper than you need, and use both sides of it.
- Use an old dishcloth rather than paper towels to clean up spills.
- Buy recycled paper when possible.
- If your municipality recycles cardboard, bundle up boxes and corrugated cardboard and take it to the recycling bin.
- Buy products with as little packaging as possible. Leave excessive packaging at the store. They'll get the message!

Paper Making

Try making your own paper at home. You will need:

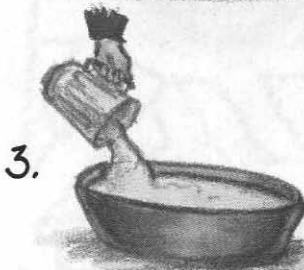
- an adult to help with the ironing and cleaning up
- some clean white paper (about five sheets)
- water
- 2 tea-towels or thin cloths
- a blender or food processor
- 2 wooden frames of the same size — old picture frames can be used
- window screening
- a stapler.



1.



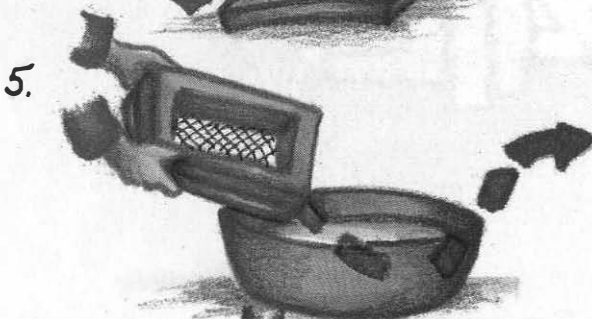
2.



3.



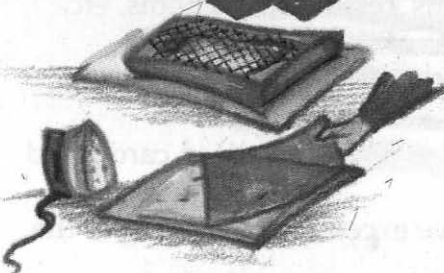
4.



5.



6.



7.

1. Tear the paper up into small pieces and place them in the blender container with hot water. Let the paper get nice and soggy.
2. While the paper is soaking, staple the screening around the outside edges of one of the frames.
3. Blend the paper and water thoroughly. This mixture is pulp. Pour the pulp into a large basin, and add some more water. The pulp and water should be a thin, soupy mixture. You may have to experiment to get the right consistency.
4. Place the two picture frames together as shown, with bottom frame placed so that the screening is on top, against the upper frame. Holding them together, dip the frames into the pulp, and move them until you have an even layer of pulp on the screen. Then lift it out of the mixture.
5. Let the excess water drain back into the basin. You will see your piece of paper forming on the screen as the water drains away.
6. Remove the top frame. Quickly turn the screened frame upside down on the tea-towel. You may have to press on the screen to get your paper to come off.
7. Place another tea-towel on top, and iron it to press and dry your new piece of recycled paper.

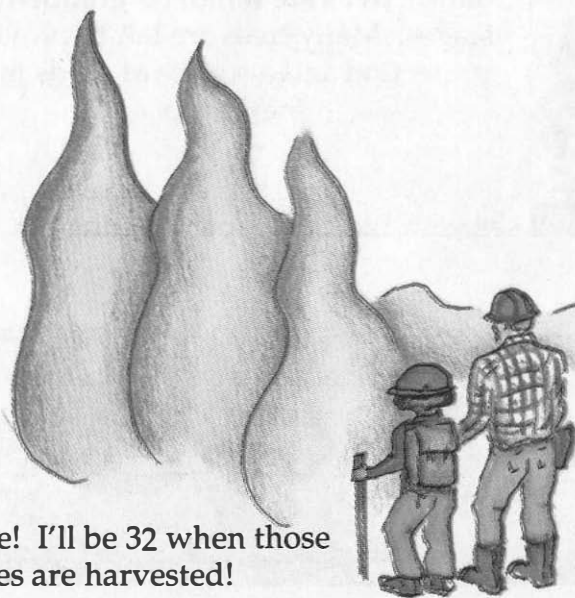
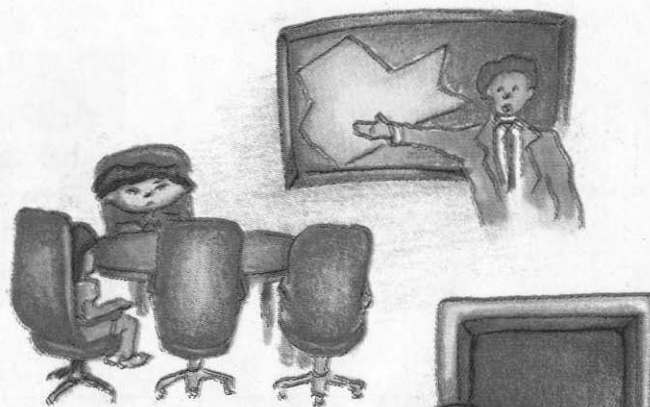
You can add all sorts of things to your mixture before you blend it, to make your paper more interesting. Try adding flower petals, or grass. Try starting out with different qualities of paper, such as newspaper, or a brown manila envelope (kraft paper) or tissues. Which one makes the strongest paper?

CARING FOR THE FOREST

A logging company has asked the forest explorers to help them start a new forest in British Columbia. Let's join them! We'll be following the six steps in forest management.

Planning

"Our company has decided to harvest an area of forest. Then we'll reforest it, partly by planting tree seedlings, and partly by letting Mother Nature regenerate the forest naturally. This is our forest management plan."



The plan says we're only going to cut trees in certain areas. Others will be left to grow bigger. They can be harvested in 20 years.

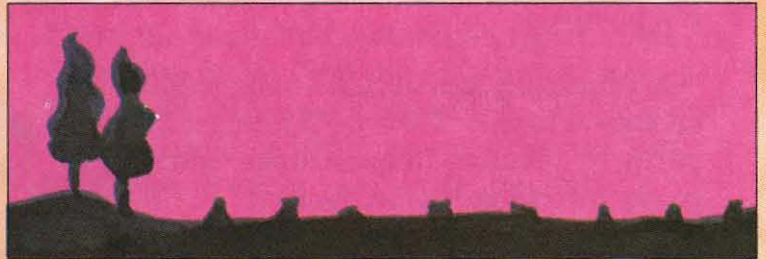


Here, we are doing strip cutting. Just over that hill, we'll use another harvesting method — clearcutting.

Harvesting

So there's more than one way to harvest trees! Logging companies use four different methods in Canada, depending on the type of forest and whether the land is hilly or flat. **Clearcutting** is a harvesting method in which all of the trees in an area are removed at once. It is used where all the trees are roughly the same age, and ready for harvest. Clearcutting is also used to get rid of insect infestations or tree diseases. In **Strip cutting**, a type of clearcutting, the forest is cut in strips. **Shelterwood cutting** is a harvesting method in which mature trees are removed gradually, in stages. Many trees are left standing to provide protection and a source of seeds for a new forest, which regenerates naturally. In **selection cutting**, the mature trees are taken, leaving more room for the smaller trees to grow up. Diseased, unhealthy and poorly formed trees are also removed. Which **cutting method** is used in each of these pictures? Fill in the answer below the clue.

All the trees in an area are removed at once.



1. _____



Mature trees are removed gradually, in stages. Many trees are left to provide protection and a source of seeds for a new crop.

2. _____

The forest is cut in strips. Between the strips the trees are left to keep growing.



3. _____

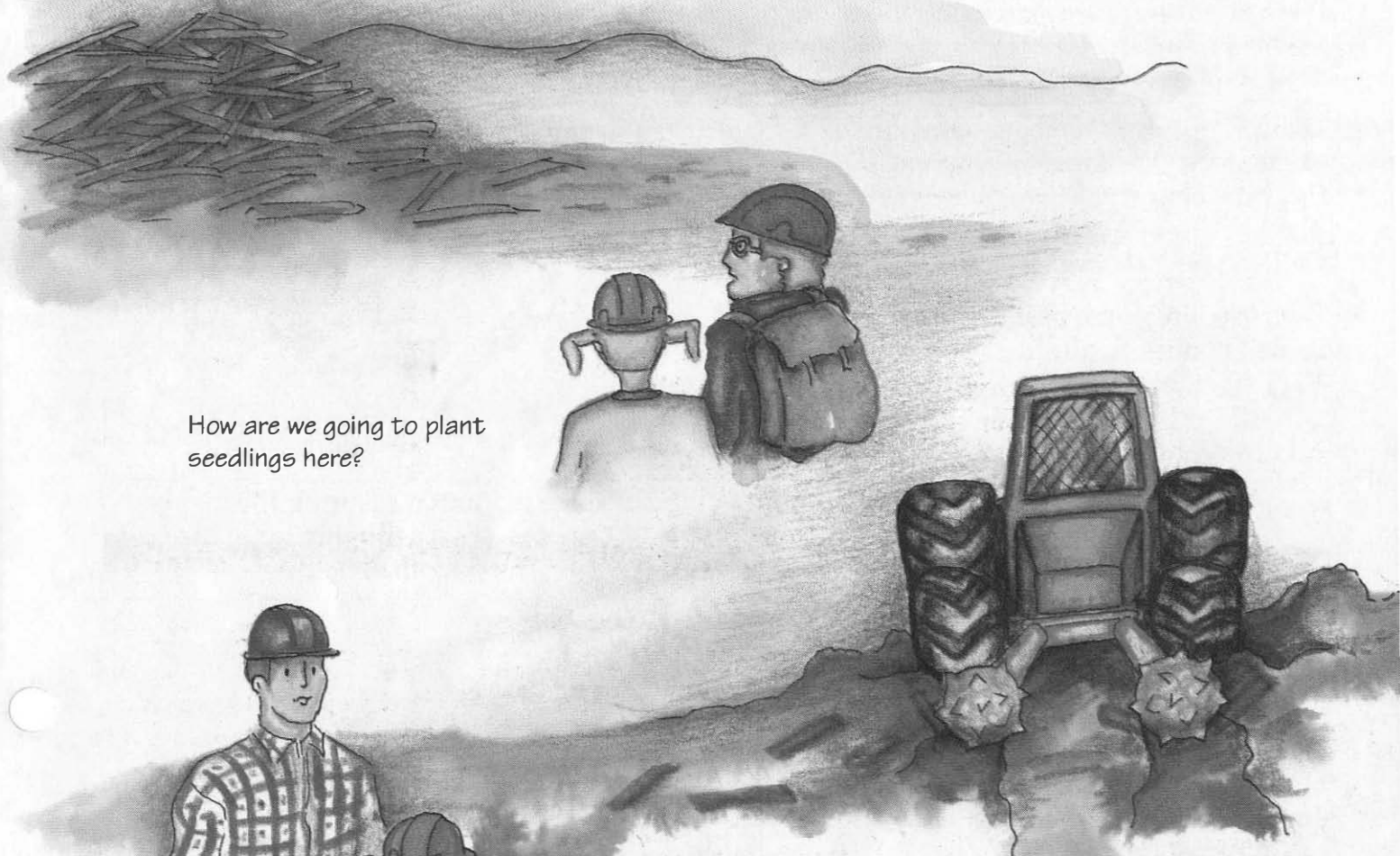


The mature trees are taken, leaving more room for the smaller trees to grow up. Diseased, unhealthy and poorly formed trees are also removed.

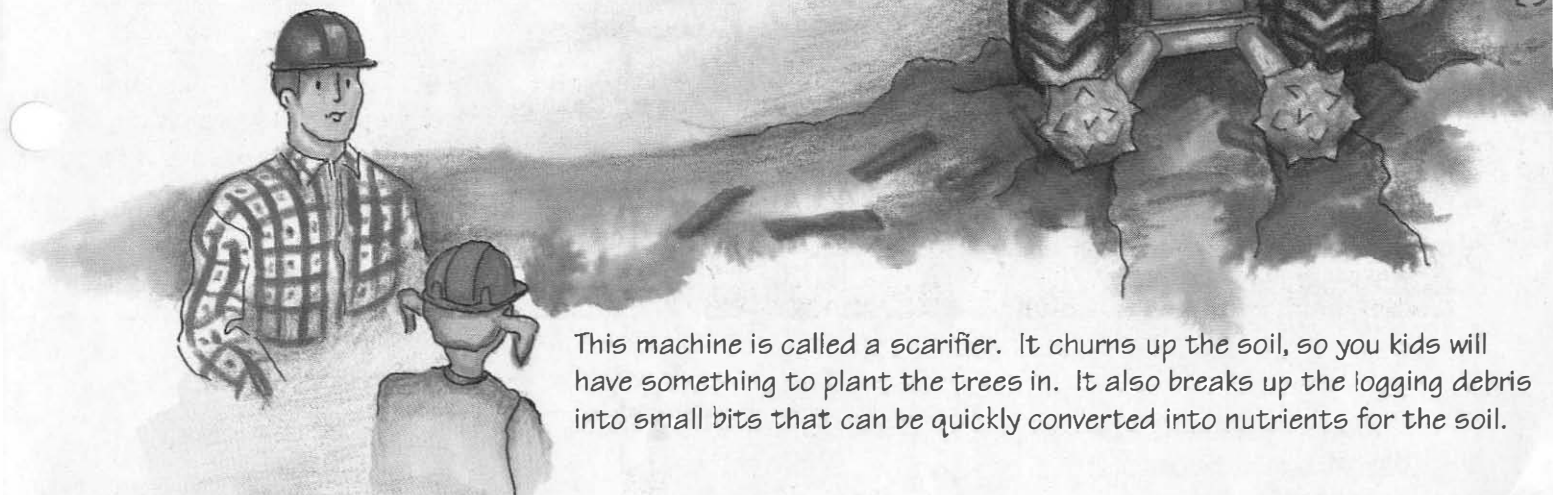
4. _____

Site Preparation

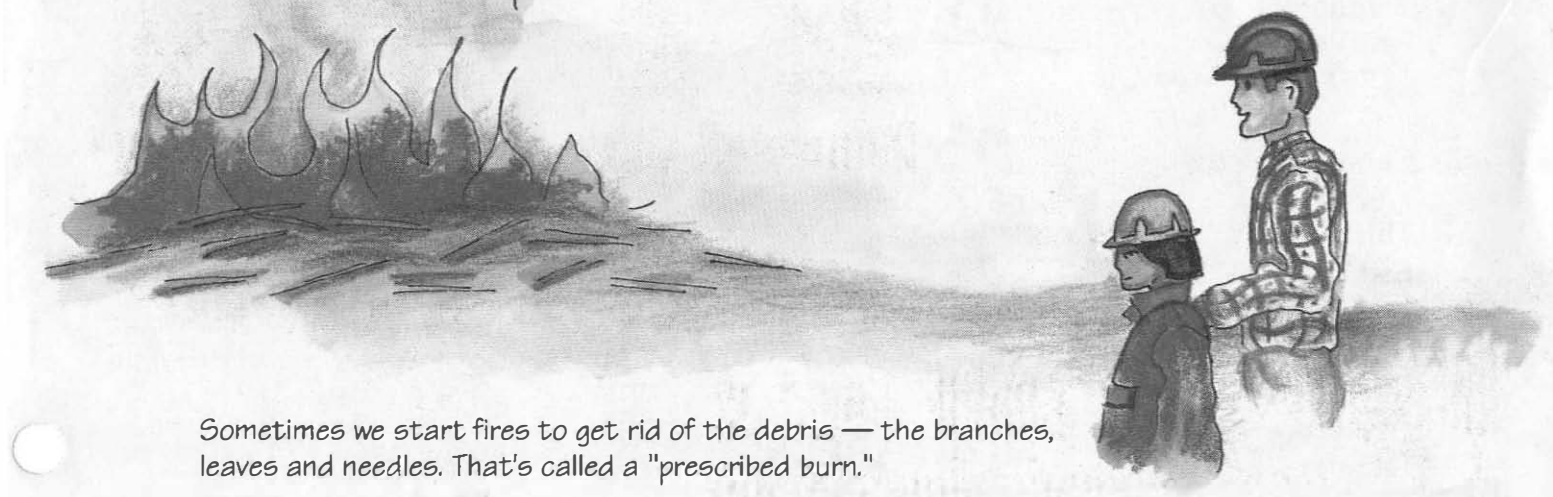
After the trees are cut, the area must be prepared for reforestation . Proper preparation, such as clearing, burning or breaking up the logging debris and mixing up the soil, will improve soil conditions and thus better the survival chances of seeds or seedlings.



How are we going to plant seedlings here?



This machine is called a scarifier. It churns up the soil, so you kids will have something to plant the trees in. It also breaks up the logging debris into small bits that can be quickly converted into nutrients for the soil.



Sometimes we start fires to get rid of the debris — the branches, leaves and needles. That's called a "prescribed burn."

Reforestation

Reforestation is the renewal of a forest after harvesting. In most cases Mother Nature takes efficient care of reforestation. In other instances, foresters plant seedlings or sow seed to start another forest.

Okay, forest explorers, get out your calculators! The logging company has to figure out how many seedlings they should plant per square hectare in the cut-over area. Can you help them?

Each seedling must be two metres away from its neighbours on all sides.

1. How many seedlings will there be in each row?
2. How many rows will there be in a one-square-hectare area?
3. How many seedlings will be planted in the area?



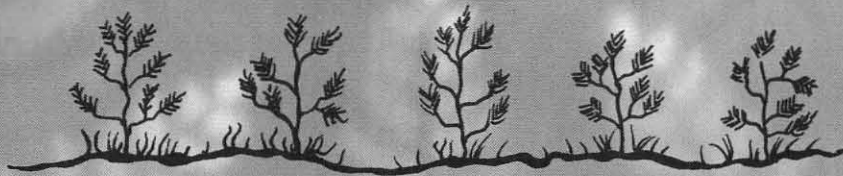
A hectare is a unit measuring 100 metres by 100 metres. That's roughly twice the size of a football field.

Tending

How would you tend the forests pictured below? Choose from among the three tending activities listed. Read the next page to find the information you need.

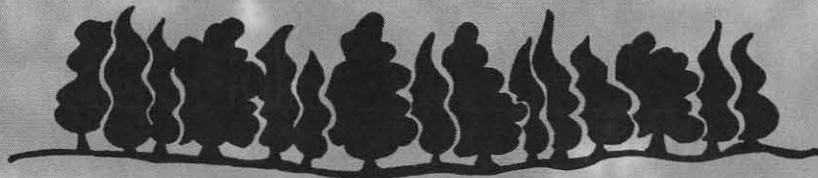
1. Choices of activities:

Weeding
Thinning
Fertilizing



2. Choices of activities:

Weeding
Thinning
Fertilizing



3. Choices of activities:

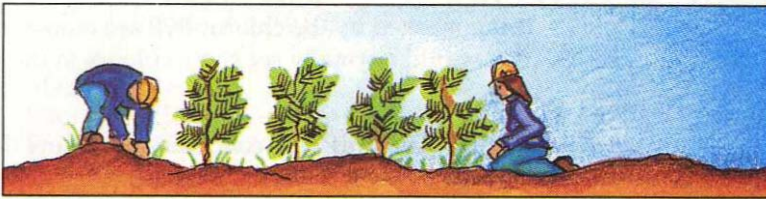
Weeding
Thinning
Fertilizing



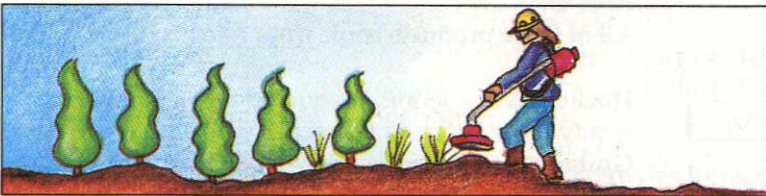
Tending and Protection

Like the plants in a vegetable garden, the new trees need to be weeded, fertilized and thinned. For a gardener, all of these steps take place in one year. For a forester like Catherine below, the steps can take 50 years or more.

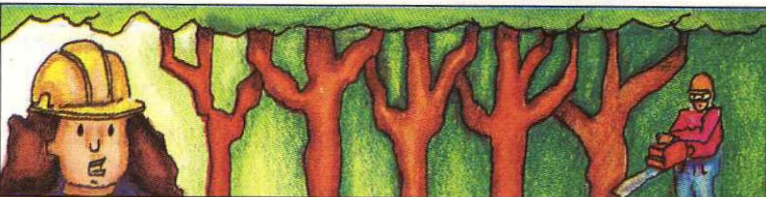
Once the trees are big, they won't need as much tending and thinning, but they will still need protection from insects, disease and forest fire. Foresters use advanced technology to keep our forests healthy. Canada leads the way in developing environmentally friendly insecticides such as the bacteria *Bacillus thuringiensis*, or *B.t.* We're also pioneers in forest fire prevention and fire fighting. Canadians developed the water bomber aircraft that now fight forest fires all over the world.



We have to get rid of all these other plants because they are competing with our trees for light and nutrients.



Three years later and Catherine is still weeding!



Now the trees are so big they're competing with each other. We'll thin the trees and use the ones we've cut down for pulpwood. Welcome to the future, explorers.



Catherine, the woman you saw earlier, retired 20 years ago. What a great job she did taking care of this forest.

Insect pests do a lot of damage to Canada's forests. They destroy about 2/5 as much wood as we harvest each year.

Over the years forest fires have destroyed more forested area than we have harvested.

Canadian forest scientists developed a new trap that attracts insects with the chemical scents they themselves use to attract their mates. Scientists use the traps to sample insect populations and decide whether it will be necessary to use control measures on them.



ANSWERS

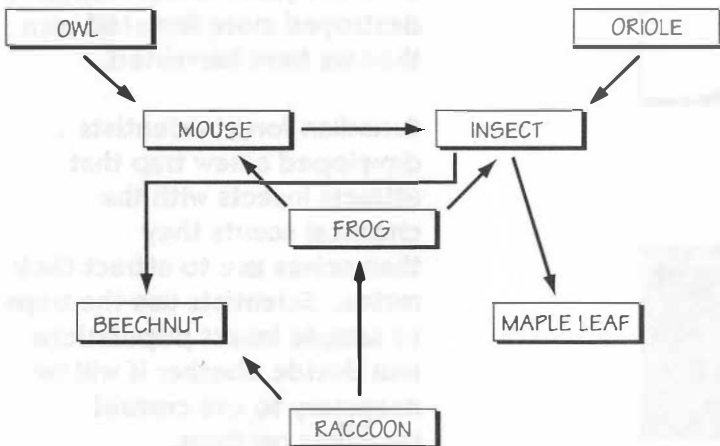
Page 4

20 creatures in the forest are: salamander, oriole, raccoon, frog, beetle, worm, owl, mouse, person, rabbit, hawk, chipmunk, grub, toad, caterpillar, butterfly, mushroom, woodpecker, porcupine, chickadee.

1. Canopy. Animals include oriole and other birds, and insects.
2. Understorey. Plants include small trees, shrubs.
3. Herb Layer. Animals and plants include ferns, wildflowers, butterfly, mosses.
4. Forest Floor. Animals and plants include mushroom, salamander, raccoon, mouse, rabbit, toad, turtle, beetle, other insects
5. Soil Layer. Animals include bacteria, worms, soil insects, and tree roots

Page 5

Besides the arrows in the food web, most of these animals will eat other things. For example, owls also eat frogs and young raccoons. Raccoons eat nuts, mice and insects, as well as frogs. Mice eat insects too. Big frogs sometimes eat mice. Insects eat beechnuts. You could make your food web even more complete by drawing in all these arrows as well.



Page 6

Coniferous Trees

1. White pine, 2. Cedar, 3. Jack pine, 4. Hemlock, 5. Black spruce

Deciduous Trees

1. Trembling aspen, 2. White birch, 3. Oak, 4. Maple 5. Balsam poplar

Page 11

What happens? The celery stick takes the red water right up its stem. The plant needs the water.

The process you are seeing inside the bag is transpiration.

Colours being masked by the chlorophyll are orange and yellow. You would normally see these colours in the fall.

Page 13

Different people have different concerns about how the forest is managed. Many of these groups, for instance hunters and naturalists, share the same concerns.

1. e, g 2. a, d, g 3. b, d, h 4. b, c, h 5. d, f, g 6. f, g 7. b, c, d, h 8. e, f, g, h

Page 14

All of these products come from trees.

Hockey stick – tennis or squash racket, baseball bat, or any other sports equipment made with wood.

Guitar – piano, wooden drum, recorder, or any musical instrument made with wood

A box of tissue – book, writing paper, newspaper, toilet paper, or any paper product

Bed – Table, chair, bench, or any piece of wooden furniture

Page 16

1. Reduce 2. Re-think 3. Re-use 4. Recycle

Page 17

Recycling Maze



Page 20

- 1st – Clearcutting
- 2nd – Shelterwood cutting
- 3rd – Strip cutting
- 4th – Selection cutting

Page 22

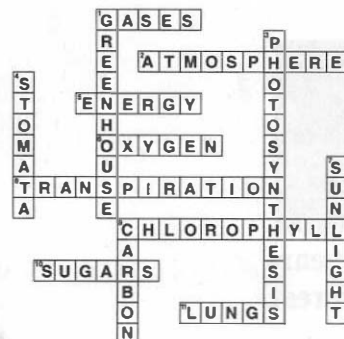
1. 50 2. 50 3. 2500

- 1st – Weeding 2nd – Thinning 3rd – Fertilizing

Page 5



Page 10



For further information you may contact the following forestry governmental agencies:

Government of Canada:

**Natural Resources Canada
Canadian Forest Service
Communications Division**
Place Vincent Massey
351 St. Joseph Blvd.
Hull, QC
K1A 1G5
Phone: (819) 997-1107

Newfoundland and Labrador Region
Phone: (709) 772-6019
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Maritime Region
Phone: (506) 452-3500
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Québec Region
Phone: (418) 648-5850
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Ontario Region
Phone: (705) 949-9461
Fax: (705) 759-5700

Petawawa National Forestry Institute
Phone: (613) 589-2880
Fax: (613) 589-2275

Forest Pest Management Institute
Phone: (705) 949-9461
Fax: (705) 759-5700

Northwest Region
Phone: (403) 435-7210
Fax: (604) 435-7359

Pacific and Yukon Region
Phone: (604) 363-0610
Fax: (604) 363-6004

Provincial and Territorial Governments:

**Newfoundland
Department of Forestry and
Agriculture**
P.O. Box 8700
St. John's, NF
A1B 4J6
Phone: (709) 729-3760
Fax: (709) 729-3374

**Prince Edward Island
Department of Agriculture, Fisheries
and Forestry**
Forestry Extension
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C1A 7N8
Phone: (902) 368-4700
Fax: (902) 368-4713

**Nova Scotia
Department of Natural Resources**
P.O. Box 698
Halifax, NS
B3J 2T9
Phone: (902) 424-5935
Fax: (902) 424-7735

**New Brunswick
Department of Natural Resources
and Energy**
Communications
P.O. Box 6000
Fredericton, NB
E3B 5H1
Phone: (506) 453-2614
Fax: (506) 457-4881

**Québec
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Direction des communications
et l'éducation
880, chemin Ste-Foy
Québec (QC)
G1S 4X4
Phone: (418) 643-1812
1-800-463-4558
Fax: (418) 644-1737

**Ontario
Ministry of Natural Resources**
Terrestrial Ecosystems Branch
70 Foster Drive, Suite 400
Sault Ste. Marie, ON
P6A 6V5
Phone: (705) 945-6613
Fax: (705) 945-6605

**Manitoba
Department of Natural Resources**
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R3N 1Z4
Phone: (204) 945-7989
Fax: (204) 489-1360

**Saskatchewan
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3211 Albert Street
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S4S 5W6
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Fax: (306) 953-2360

**Alberta
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Alberta Forest Service
Program Support Branch
10th floor, Bramalea Building
9920-108 Street
Edmonton, AB
T5K 2M4
Phone: (403) 427-3549
Fax: (403) 427-0292

**British Columbia
Ministry of Forests**
Public Affairs Branch
595 Pandora Street
Victoria, BC
V8W 3E7
Phone: (604) 387-5255
Fax: (604) 387-8485

**Northwest Territories
Department of Renewable Resources**
Forest Management Division
600, 5102-50th Avenue
Yellowknife, NT
X1A 3S8
Phone: (403) 920-6405
Fax: (403) 873-0221

**Yukon Territory
Department of Renewable Resources**
General Enquiries
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Canadian Council
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Ministers



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des forêts