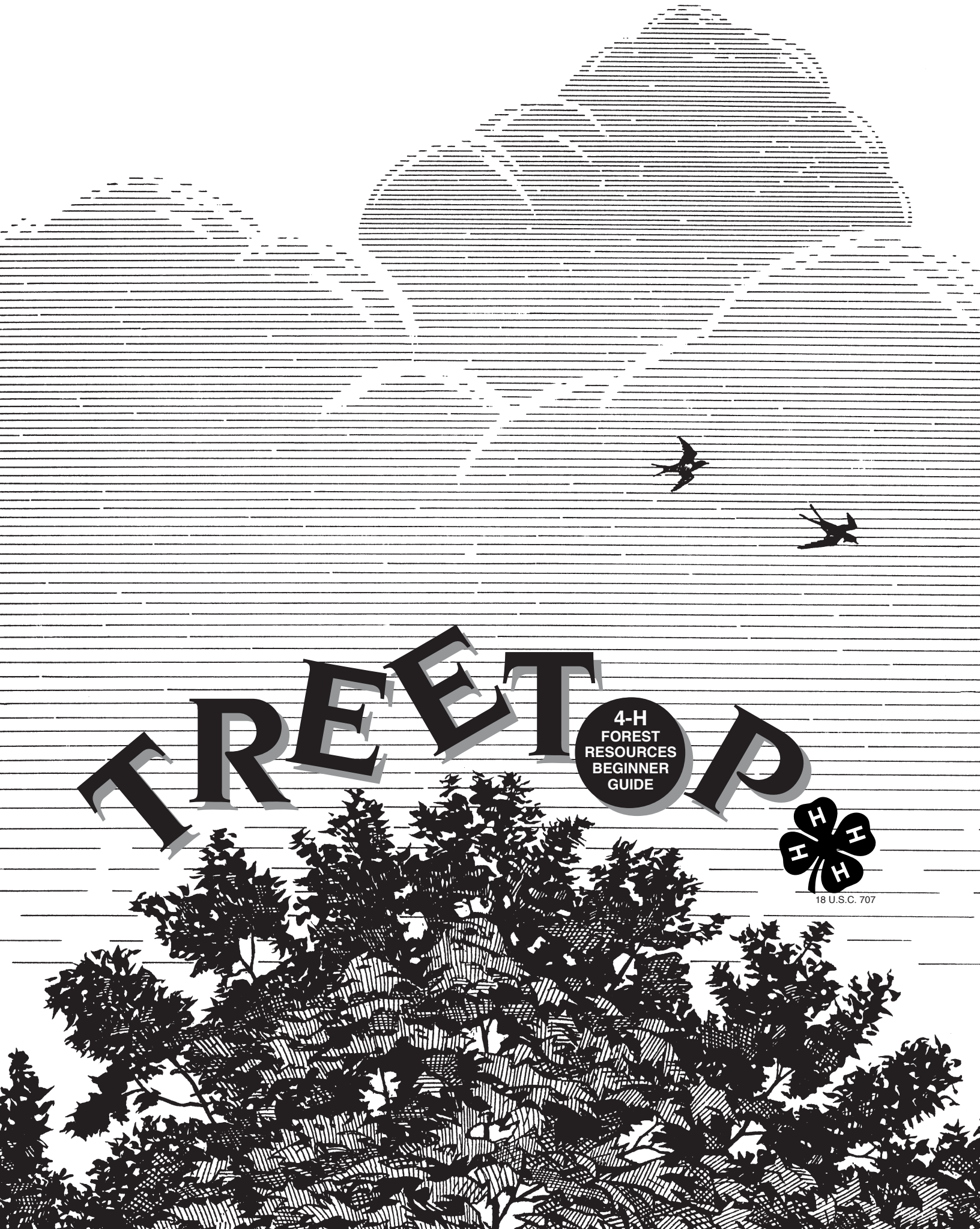

TREETOP

4-H FOREST RESOURCES BEGINNER GUIDE

TREETOP

4-H Forest Resources Beginner Guide

Contents

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Welcome to

TREETOP

Do you like trees? Do you like to sit under one on a hot day? Do you like to climb the branches of a tree, like a ladder? Do you like tall trees? Wide trees? Brown trees in the winter? Green trees in the summer?

Forests are made of trees and other plants. Animals live in forests. Forests are alive! Everywhere!

TreeTop helps you find out about forests and trees. Trees are very, very important! We use trees for making things like paper and houses. Trees shade and cool our homes. They absorb sounds and keep the city from getting too noisy. They make the air cleaner. Trees give squirrels, birds, and other animals food and places to live.

This book is for learning and fun. It is yours to write, draw, and color in. Write your name in this book at the bottom of this page.

4-H'ers can use the project ideas at the end of each chapter. School-children and everyone else can use the project ideas for class projects or science fairs. Or you can just do the projects for fun!

My name is:

_____

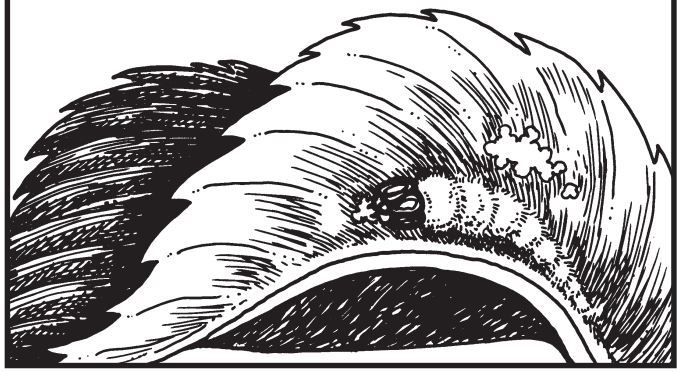
Trees Up Close

What is a tree? Is it something to climb? What do you imagine when you think of a tree? A giant old oak? A weeping willow with branches that touch the grass? A white pine that doesn't look even on all sides?

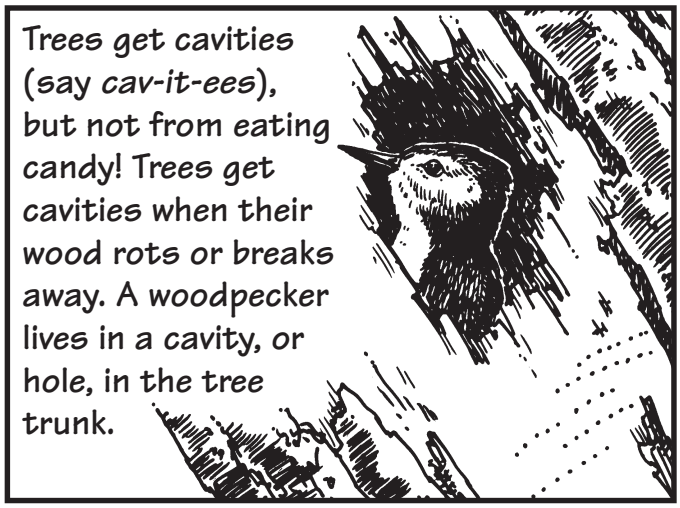
You see a tree from your viewpoint. But how do other living things see a tree? How do an earthworm, a caterpillar, a squirrel, and a woodpecker look at a tree?

An earthworm who lives under the ground "sees" only roots.

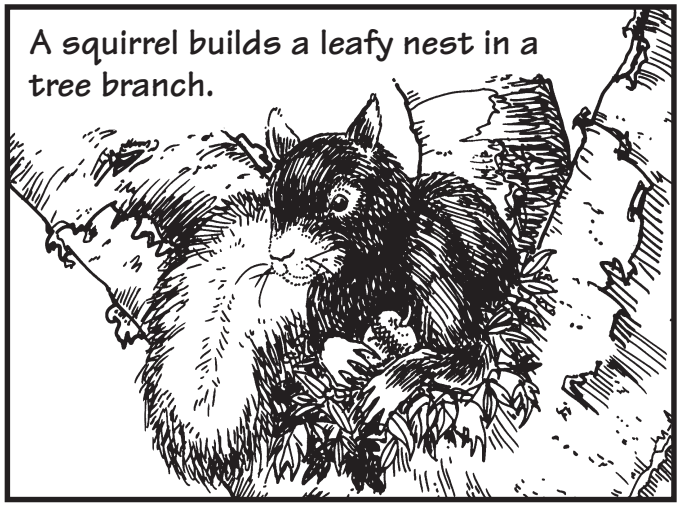
A caterpillar munches all day long on tree leaves.



Trees get cavities (say *cav-it-ees*), but not from eating candy! Trees get cavities when their wood rots or breaks away. A woodpecker lives in a cavity, or hole, in the tree trunk.



A squirrel builds a leafy nest in a tree branch.



A tree has four main parts:

- **roots**
- **trunk**
- **branches**
- **leaves**

The **roots** take water and **nutrients** (nutrients are minerals) from the soil. Roots also help hold a tree in place. If a tree didn't have roots, it would fall right over!

The **trunk** helps water and nutrients get to the rest of the tree. Inside the trunk there is wood. This wood acts like many tiny pipelines or straws all bound together to help keep the water and nutrients moving. The trunk is also stiff, which helps the tree to stand straight!

The **branches** grow and grow as a tree gets older. Branches hold leaves and help make food. But the **leaves** are the hard workers! They make most of the food for the tree.

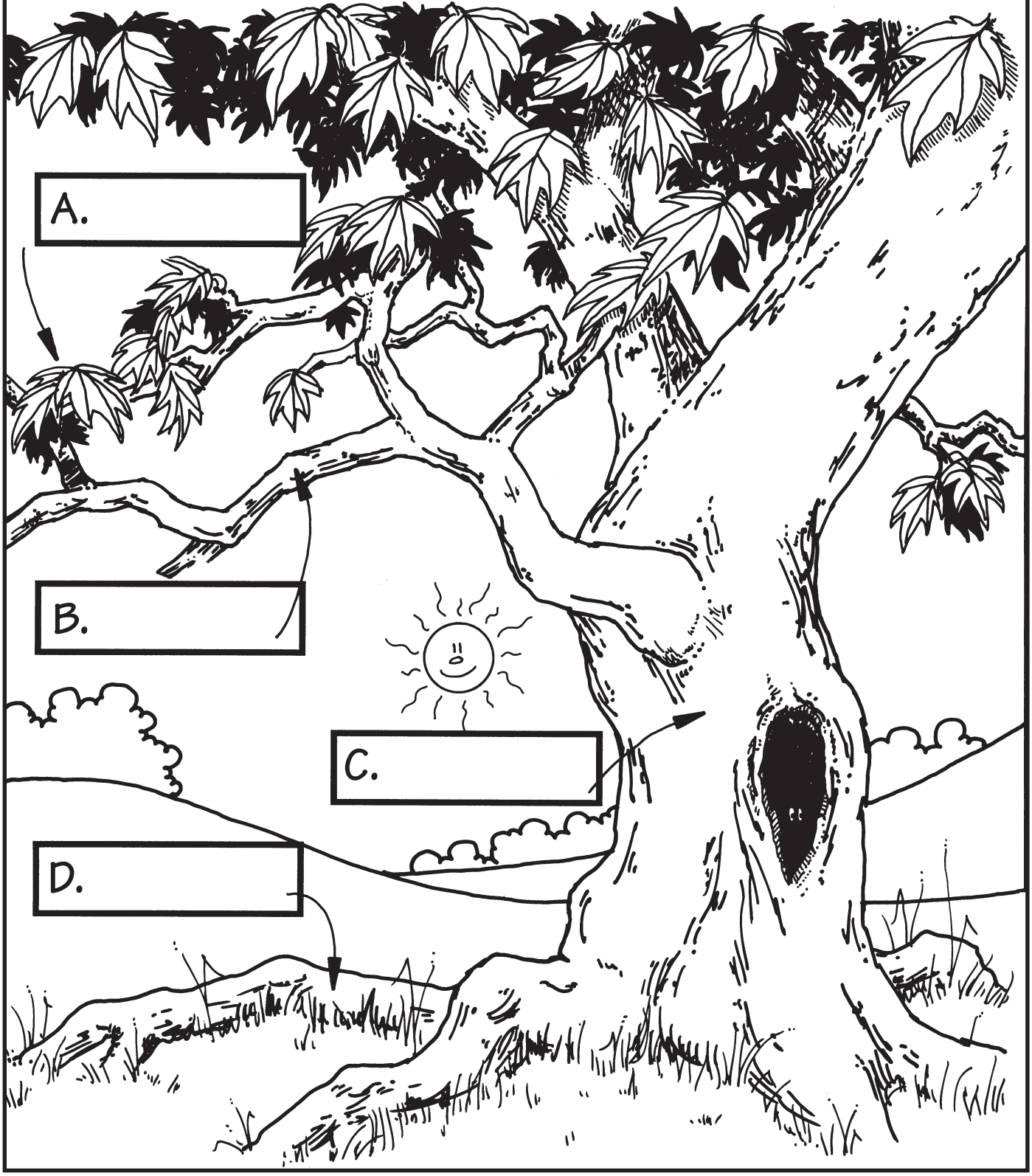
But what happens when the leaves fall to the ground in autumn? The trunk and roots store food for the tree to use during winter and next spring!

A tree needs all four parts—roots, trunk, branches, and leaves—to live a long life. A tree is a living thing, just like you. It uses air. It needs sunlight. It needs food and water. It grows. But a tree is not a human being! It is a member of the plant family. You are a member of the animal family.

Nutrients (say *new-tree-ents*) are like food. They help an animal or plant grow. Three nutrients that are important to trees are:

CARBON
NITROGEN
COPPER

Write the name of the tree part on the correct line. A list of tree parts is on the bottom of the page. Decide if it is summer or autumn, then color your tree.



roots **trunk** **branches** **leaves**

(Answers on page 51.)

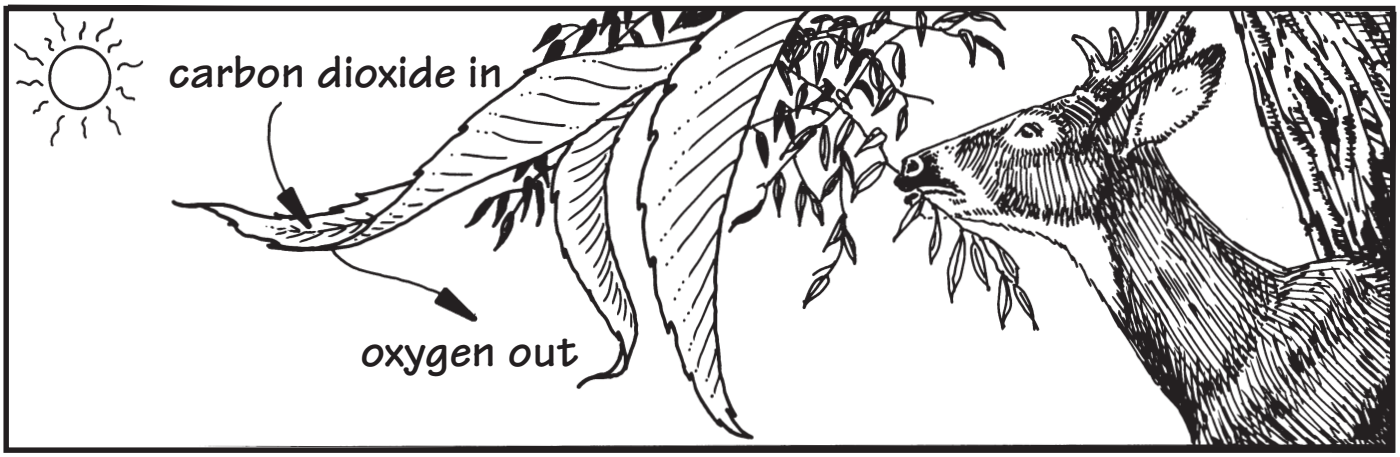
A tree helps you survive in the world. How can that be? Well, a tree takes in a gas from the air called **carbon dioxide**. It then gives off **oxygen**. And who breathes the oxygen? You do! Without trees and other plants, you would not be able to live on Earth. Trees and plants need to use some oxygen and give off some carbon dioxide, too! Fortunately for us, they make far more oxygen than they need!

Trees and other green plants make their own food. No, they don't slap together a peanut butter and jelly sandwich. Instead, they use sunlight, water, and carbon dioxide (the gas in the air) to make sugar and oxygen. This process is called **photosynthesis**. This sugar, plus the nutrients and water that the roots take up, helps trees grow leaves and branches. These leaves can be food for living things like caterpillars and deer. Trees feed many animals!

Makers, Eaters, and Breakers

We know that trees and other green plants make their own food. They are the **makers**, or **producers**. They are the only things on the Earth that can make food from sunlight, water, and carbon dioxide. You can't do this, even if you stand outside with your arms stretched over your head!

If you are not a producer, what are you? You are an **eater**, or a **consumer**. This means you have a lot in common with a caterpillar! You both like to munch on food. Have you ever eaten grapes or green beans? How about squash or strawberries? If you have, then you've eaten plant material. Trees and green plants make food for you and other animals.



Worms, snails, and mushrooms are **breakers**, or **decomposers**. They feed on animals and plants that are dead. Ughhh! This may sound disgusting, but it's very important. Breakers give the makers nutrients. The makers use the nutrients to grow bigger and to make new food for the eaters.

Color the makers green, the eaters orange, and the breakers brown. (Answers on page 51.)

Pieces and Parts of the Forest

Are there any dead trees in your neighborhood or near your home? Dead trees don't have any green leaves. Their bark may fall off onto the ground.

People often **harvest**, or cut down, dead trees. They use a saw to make firewood. Or they look for trees laying on the ground. People will make firewood from these trees. But is it a good idea to harvest all dead or fallen logs from the woods?

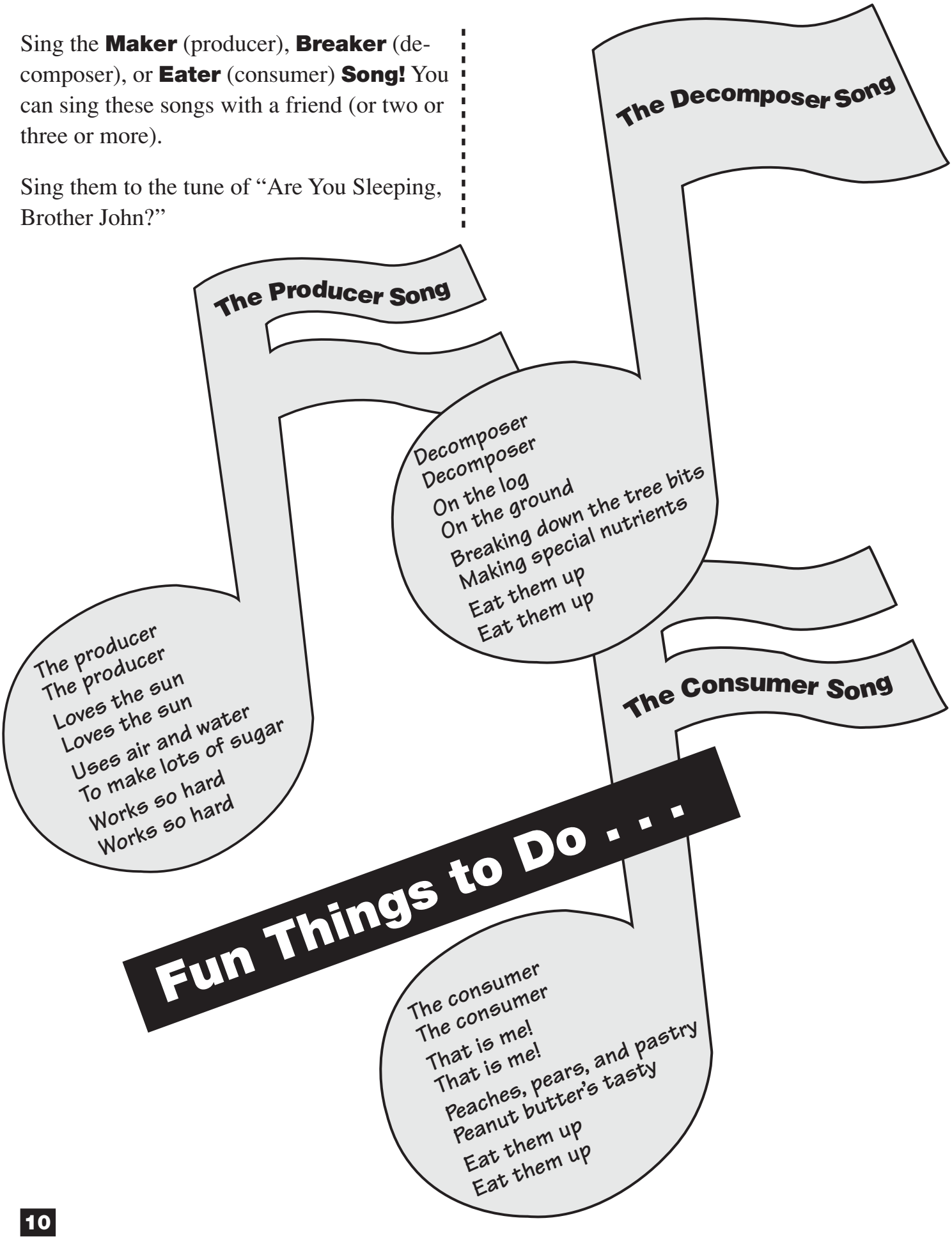
Not always. Some of these trees should be left where they are. Scientists have found that dead trees and logs are important. Think about it. Where do you see squirrels in the forest? Are they sitting in wildflowers? Or do they chatter while standing on logs? What about birds in the forest? Do you see them sitting on a rock? Or do they perch in the limbs of dead trees? Animals love to hide and find food in logs and dead trees.

Have you ever seen a stream in a forest? Did you know that dead trees are important to the stream? How can that be? Well, when a tree falls into a stream, it creates a pool. This pool can be a home for fish. Trout, salmon, and other kinds of fish love logs. They can hide from bigger fish and rest behind these logs.

Circle each animal above that uses dead trees and logs. (Answers on page 51.)

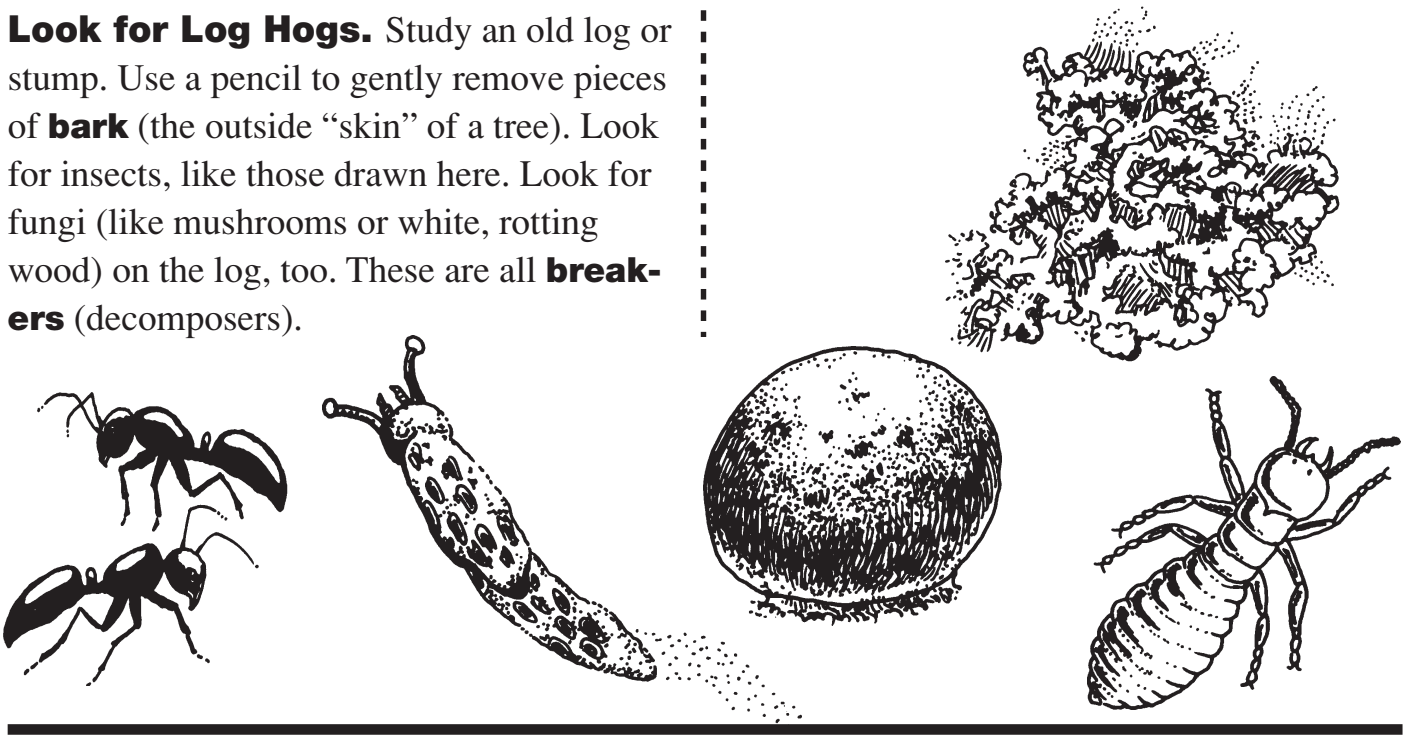
Sing the **Maker** (producer), **Breaker** (decomposer), or **Eater** (consumer) **Song!** You can sing these songs with a friend (or two or three or more).

Sing them to the tune of "Are You Sleeping, Brother John?"



Fun Things to Do . . .

Look for Log Hogs. Study an old log or stump. Use a pencil to gently remove pieces of **bark** (the outside "skin" of a tree). Look for insects, like those drawn here. Look for fungi (like mushrooms or white, rotting wood) on the log, too. These are all **breakers** (decomposers).



Science or Roundup Projects

Complete at least one of the following projects:

PROJECT 1. Become a tree dentist—look for cavities!

Remember, cavities are holes in trees where animals live. Look at trees around or nearby your home. Do they have cavities? Dead or dying trees usually have more cavities than healthy, young trees.

Watch the cavities to see if birds or other animals use the holes. If you have binoculars, use them to watch the holes. Draw the types of animals that use the cavities. Are they birds? Owls? Squirrels?

Write the times of day you see the animals. Watch your cavity for about 15 minutes each day for a week. For your project, glue your drawings onto a poster board. Also glue your record of when you saw the animals and what they were doing.

PROJECT 2. If you were a tree, what kind of tree would you be?

Are you big and strong, like a red oak? Do you smell good, like a white pine? Are you kind of a nut, like a walnut tree? Do you change from season to season, like a red maple?

Learn about the tree you pick. You may want to read in a book, such as a field guide, about the tree you've chosen. Then draw pictures of your tree. Glue the drawings to a poster board. If you can find "your tree" growing near you, glue several leaves and twigs from the tree to your poster. Write down five things that you know about the tree. And be sure to write why you are like the tree you've picked!

"TreeTime!"

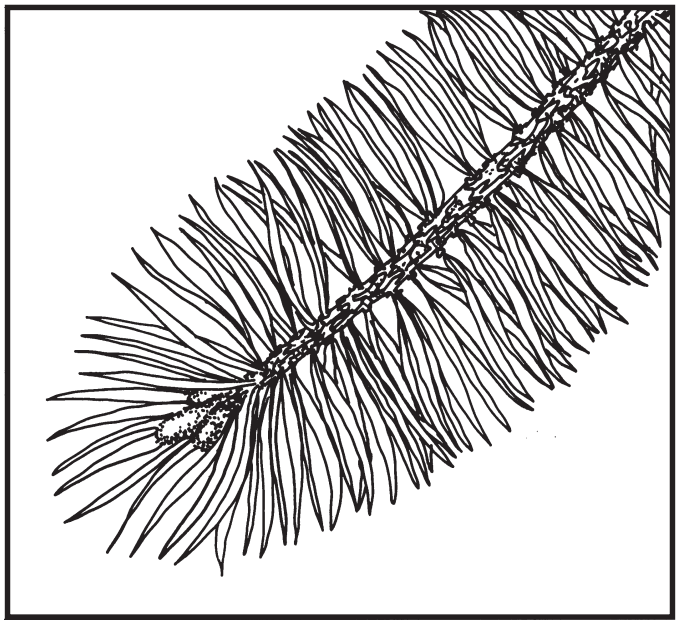
If you like trees, choose one to study! Pick one special tree that is close to where you live. It can be a big tree or a little tree. It can be a tree with needles. It can be a tree that loses its leaves in the autumn. In the next few chapters, you'll need your special tree to do **TreeTime** activities.

First, find out the kind of tree you've chosen. If you do not know, have your parent, another adult, or your teacher help you.

If the leaves are thin like needles, you've chosen a **conifer** (say *con-i-fur*). Conifer needles can be long or short, and stiff or flexible. If the leaves are flat and broad like the bottom picture on the right, you've chosen a **deciduous** (say *de-sid-you-us*) tree. Deciduous leaves come in all sizes and shapes!

Draw your tree on a piece of paper, using crayons, markers, or pencils. Write the name of your tree on the picture, too. Gently take a leaf or needle from the tree's branch and glue it to your picture. Hang your picture in your room or keep it in a safe place with your **TreeTop** book.

Do its leaves look like this?



or like this?

CHAPTER 2: Flows and Goes in the Forest

Water Cycles

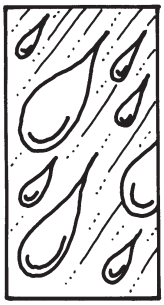
Water is sometimes called the most important substance in the world. But why is it? Well, it's very important to animals and plants (remember what plants need to make their food), and it makes up much of the **atmosphere**, the layer of gases that surround and protect our planet. In fact, without water there could be no life on Earth. Think about it. What would you drink if you didn't have water? Milk? Noooooooooo! Milk comes from cows. Cows eat hay. Hay needs WATER to grow. Sorry!

Okay, what else would you drink? Soda pop? Nope! Soda pop is made from carbonated WATER! How about juice? Wrong! Juice is mostly WATER. Orange trees need WATER.

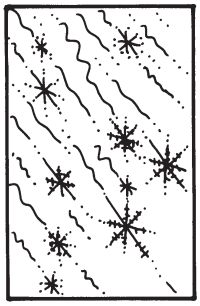
Are you getting thirsty yet? Face it! WE NEED WATER! And so does the forest and all the living plants and animals! Without water, we're all dried up!

Where does water come from? Take a guess.

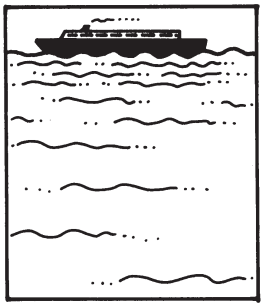
Mark an **"X"** on the box for each picture that you think gives us water.



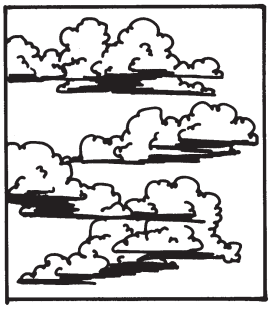
rain ☐



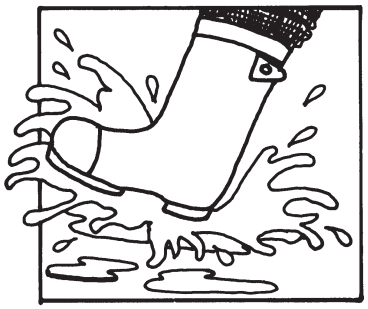
snow ☐



oceans ☐



clouds ☐



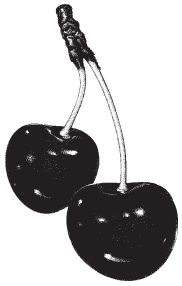
puddles ☐

last page you are...right! We get water in the form of rain and snow from clouds. But how do we get water from oceans and puddles?

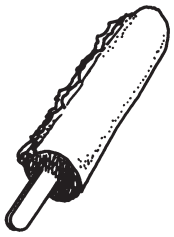
Well, water in oceans and puddles **evaporates** (say *ee-vap-o-rates*) into the air. This means that tiny water drops are pulled into the sky by sun energy. Think about it, then try this:

We can't make new water. That's why we need to keep our water clean. Remember, the water you drink today was here before you were born. And it will be here when your children turn 90. And when their children turn 90.

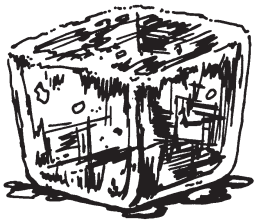
On a hot, sunny day, put each of the following things on the sidewalk:



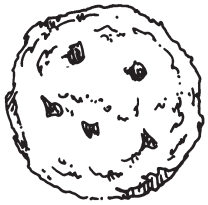
cherries



a popsicle



an ice cube



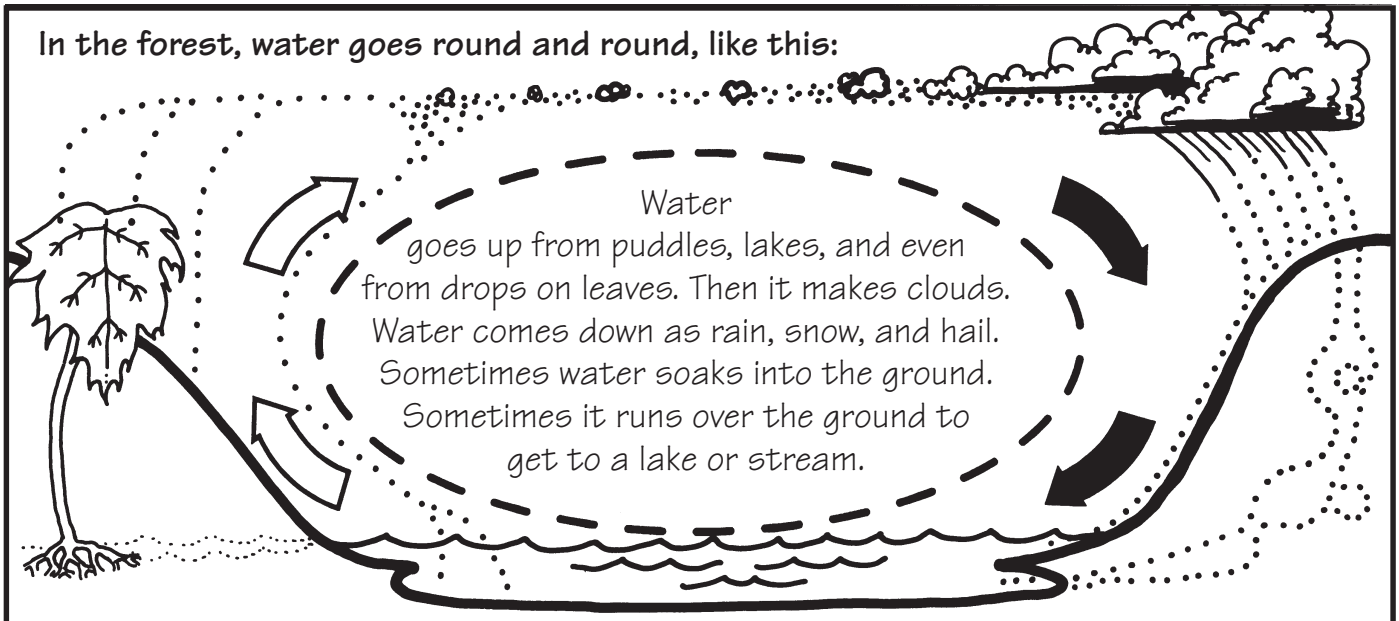
a cookie

a rock

See how long it takes for each of these things to melt. You can use a watch to keep time. Do all these things melt or change? Which ones change? Where does the water in these things go—into the sidewalk or into the air? Come back in a few hours. Now where did the puddles go? (Answers on page 51.)

So where does water go when it gets into the air? It forms...**clouds!** Right! And then what happens? It rains or snows! Water is used over and over and over again. In fact, we're still using the same water that dinosaurs used. (Yech! I hope a Tyrannosaurus Rex didn't brush his teeth in your bath water!)

In the forest, water goes round and round, like this:



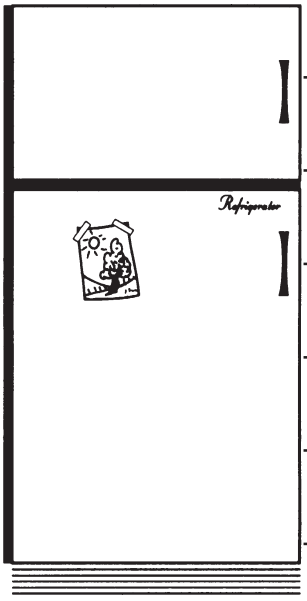
This process is called a **cycle**, because it goes round and round!

Fun Things to Do . . .

To REALLY show yourself that everything you drink is made from water, try this. **Open your refrigerator**.

Take out everything you could drink. Ketchup, pickle juice...everything. Then look on the labels. Read to see if the word "water" is listed anywhere.

Write down all the things in your refrigerator that have water in them.



Now, what about the things you didn't list? For example, ketchup doesn't say "water" on the label. But look again. You'll see the word "vinegar." If you have vinegar, you can check that label and see "diluted with water." Yikes. So ketchup has water in it after all! Write "ketchup" on your list.

Keep searching for the water in all the things you didn't list. Remember that juice (from apples or oranges) contains water, and apple and orange trees need water to grow. So write juice on your list! If it's milk, ask yourself whether the cow needs water to make milk. How long is your list now?

Oh...you'd better put all the things back in the refrigerator after you're done!

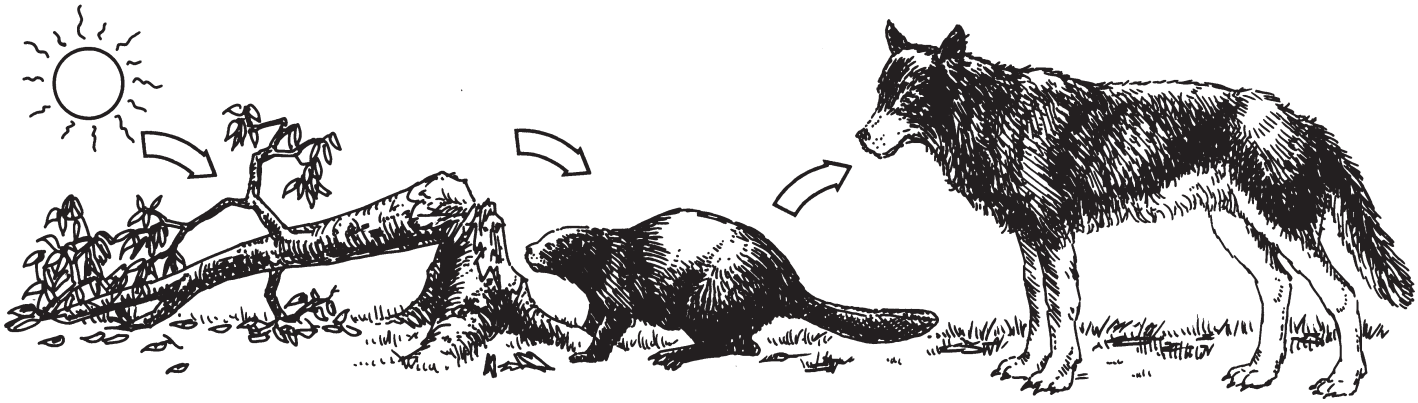
Energy Takes Off

Did you ever get really tired during school when you hadn't eaten any breakfast? Have you sat on the couch before dinner, too sleepy to move? Well, chances are you had run out of fuel! You needed to eat something to get going again! You needed **energy**.

Trees and forest animals need energy, too. Trees, like other green plants, get their energy from the sun. They use the sun's energy to make food. Animals get energy from eating trees and plants, or from eating other animals that eat trees and plants.

If water cycles in the forest, does that mean that sun energy (heat) from the sun cycles too?

Noooooooooo! Energy flows **one way** through a forest, like this:



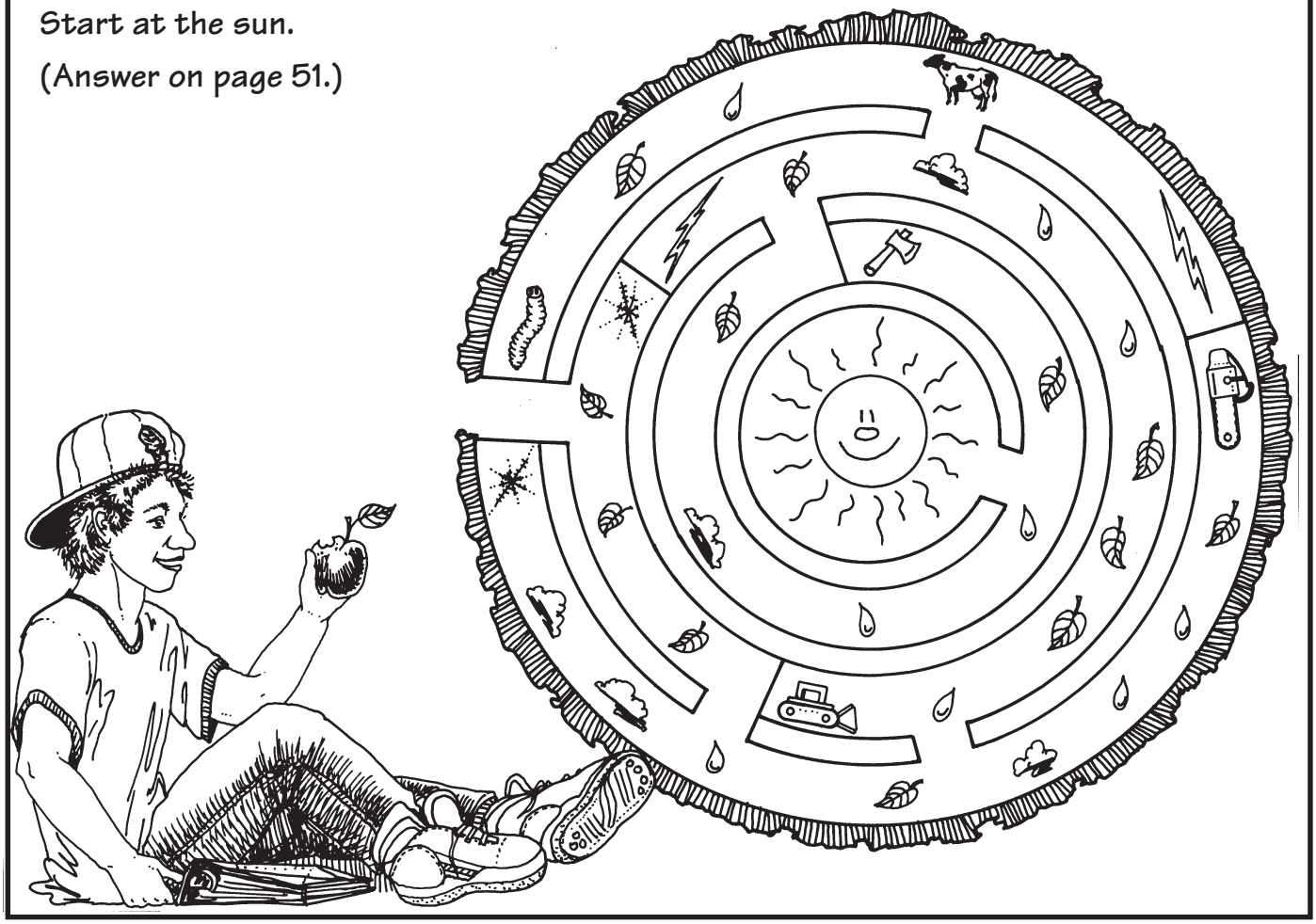
A tree uses sun energy to make sugar. This sugar helps the tree grow leaves. The leaves, now food energy, are eaten by animals. Other animals will eat these animals. The food energy gets passed from animal to animal.

Some of the food energy escapes to the air, because it takes work (and heat) to chew and chase food! But the energy in animals doesn't cycle back to the tree. It flows one way through a forest.

In the drawing below, help the energy get to the person at the end.

Start at the sun.

(Answer on page 51.)



Supermarket in the Soil

Did you ever go shopping in a pile of dirt? Did you ever push a cart through some mud, looking for something to eat? Maybe you haven't, but other creatures find lots to eat in the soil! The ground below your feet has lots of nutrients.

But how does the black, brown, red, and yellow soil get on the ground? It doesn't come from the clouds. (Have you ever seen it raining mudballs?) It doesn't come from a big dump truck. Some parts of soil are made when plants and animals die. The dead plants and animals are broken down by **breakers** (decomposers). Soil also is made by the wind and water wearing rocks into tiny pieces. This takes a long, long time.

The Lowdown on Soil

Try this. Go outside and collect two spoonfuls of soil from three different places. (Scientists would call the soil from each location a **sample**.) For example, you may dig for soil under a tree, near some water, or under a lawn. Bring the soil samples inside without mixing them. Now, take some from your first sample. Using your thumb, rub the soil into the first box below.

Now rub soil from your second spoonful into the second box. Finally, rub some of the third sample into the third box. Be sure to write down the place you took your samples from under the boxes provided. Okay! What colors are the soil samples? Why might the samples be different in color?

Sample 1

Sample 2

Sample 3

Use this color key:

Black: Rich soil with lots of dead animals and plants
Brown: Average soil
Red: Clay soil with iron
Yellow: Clay soil with few nutrients
Light Brown and Gritty: Sandy soil

Science or Roundup Projects

Complete at least one of the following projects:

PROJECT 1. Look for critters in the litter!

You'll need:

- **a large paper bag**
- **newspapers**
- **a small jar or box-type hand lens**
- **a pencil or tweezers**
- **crayons, markers, or colored pencils**
- **art paper**
- **poster board**
- **glue**

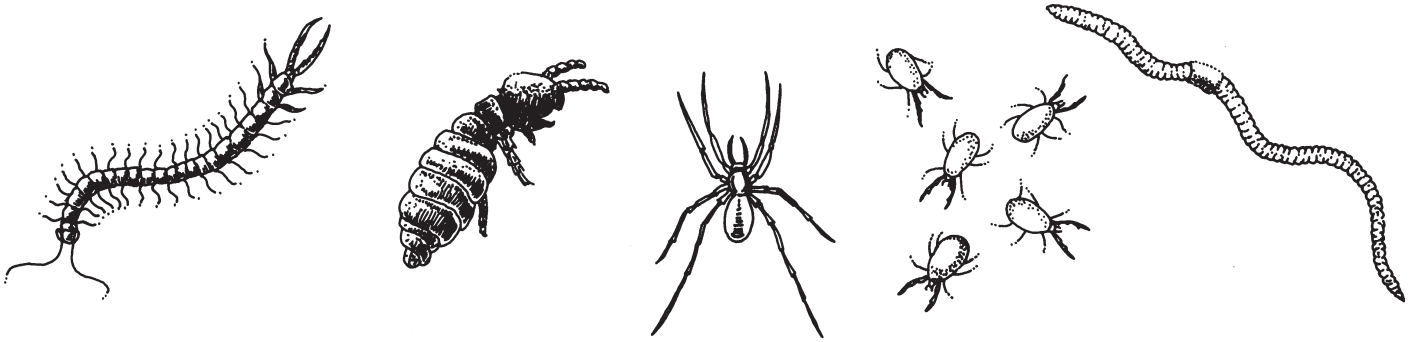
Go to an area with many trees, like a park or forest. Using your hands, gather some leaf litter. **Leaf litter** is the top layer of the soil. It sometimes is wet and muddy. It contains leaves, sticks, soil, and other small tree parts. Scoop up a paper bag full of leaf litter.

At home (in a garage or backyard), dump some leaf litter onto newspaper. Carefully look through the litter for these creatures:

You'll need patience! It takes time to find these little critters. When you find one, carefully lift it from the litter using a pencil or tweezers. Put it into a jar or box-type hand lens. Look at it carefully. Does it have legs? An antenna? A tail? What color is it? Draw a picture of your creature on paper.

Keep looking through the litter and drawing pictures of the insects and spiders you find. When you are done, take the litter back where you found it if possible. Glue your pictures of the insects and spiders onto a poster board. Write "Living Creatures of the Leaf Litter" or another title on your board.

You may want to use a book about insects to help you identify what you have found. If you do, write the type of insect/spider on your poster.



centipede **springtail** **spider** **mites** **earthworm**

PROJECT 2. Find the best soil for beans!

You'll need:

- **some lima bean seeds**
- **four paper cups**
- **soil from four different areas**
- **spoon to dig up soil**
- **markers**
- **a cardboard box**
- **glue**

Dig soil from four different places. You can get some from under a log. You can dig some soil from near the street. Anywhere! Just be sure to keep your four samples separated. You need enough soil to fill the paper cup almost to the top.

Using a marker, write where you got the soil on each cup. Then, plant a seed in each cup. Water the seed. Keep the cups inside a building near a sunny window. Watch for the seeds to sprout (come out of the soil). You'll have to check your plants every day. When a seed sprouts, write the date that it sprouted on the cup. (Remember to water your plants to keep them moist.)

Grow your plants for three weeks. Is there a big difference in size among the plants? Which plant is the biggest? Do they all look green and healthy?

The biggest bean plant probably grew in the best soil. The best soil had the most nutrients to help the plant grow big.

Put your plants in a display box, or take photos of the plants for use on a poster exhibit. Tell others what you've learned about soil and nutrients.

"TreeTime!"

(Refer to the tree you selected in "TreeTime!" in Chapter 1.)

Shake hands with your tree! Are the leaves on your tree shaped like your hand? Let's find out! Draw your hand in the box at the right or on a sheet of paper. Now place your leaf underneath the same paper. Peel the paper off a crayon. Lay the crayon on its side. Now gently rub the crayon on the paper covering the leaf. You should get a picture of a leaf. Well, is the leaf like your hand? Some leaves, like maples, look a lot like hands! White pine leaves are needles, but their needles are in bundles of five—just like there are five fingers on a hand!

CHAPTER 3: I Need You, You Need Me

It's Alive!

Sometimes, when you walk through a forest, it seems as if everything is alive. Tree branches sway and creak in the wind. Bright red mushrooms grow on fallen logs. Crickets hum. Slugs slide. Porcupines hide in the tops of trees.

Draw one living thing that you need in your habitat.

But surprise! In a forest, not everything is alive. Water gurgles, but it is not alive. Rocks get in your shoes, but they are not alive. Soil can be squeezed and mixed with water to make a mess, but it is not alive. Air is all around you, but it is not alive.

Living things depend on other living things. But they also depend on nonliving items such as air, water, and soil. In a forest, everything needs something else.

What do you need in your habitat? (A **habitat** is a home—the place or places where you get the things you need to live.)

Now draw one nonliving thing that you need.

Breakfast With Ben

Once there was a boy named Ben. Ben loved breakfast. Sometimes he would get up at 3:00 a.m. because he was hungry. Ben liked Scootie-Os best of all for breakfast. He liked to splash orange juice on his cereal.

One day Ben's sister Ellie asked him where his breakfast came from. "Well," said Ben, "from the store, of course."

"What?" said Ellie.

"From the store, of course," repeated Ben.

"No, silly," said Ellie. "Those Scootie-Os came from oats. Oat plants grow in the soil. So you got your cereal from a plant that grew in the ground."

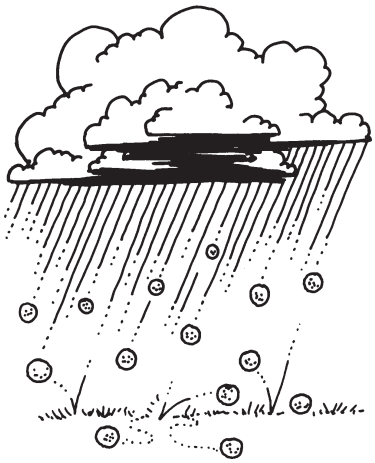
Ben thought about that for a minute. Hmm...if he got his Scootie-Os from a plant, where did his orange juice come from?

"I know where I got my orange juice," said Ben brightly. "From a big truck in Florida!"

"What?" said Ellie. "Try again."

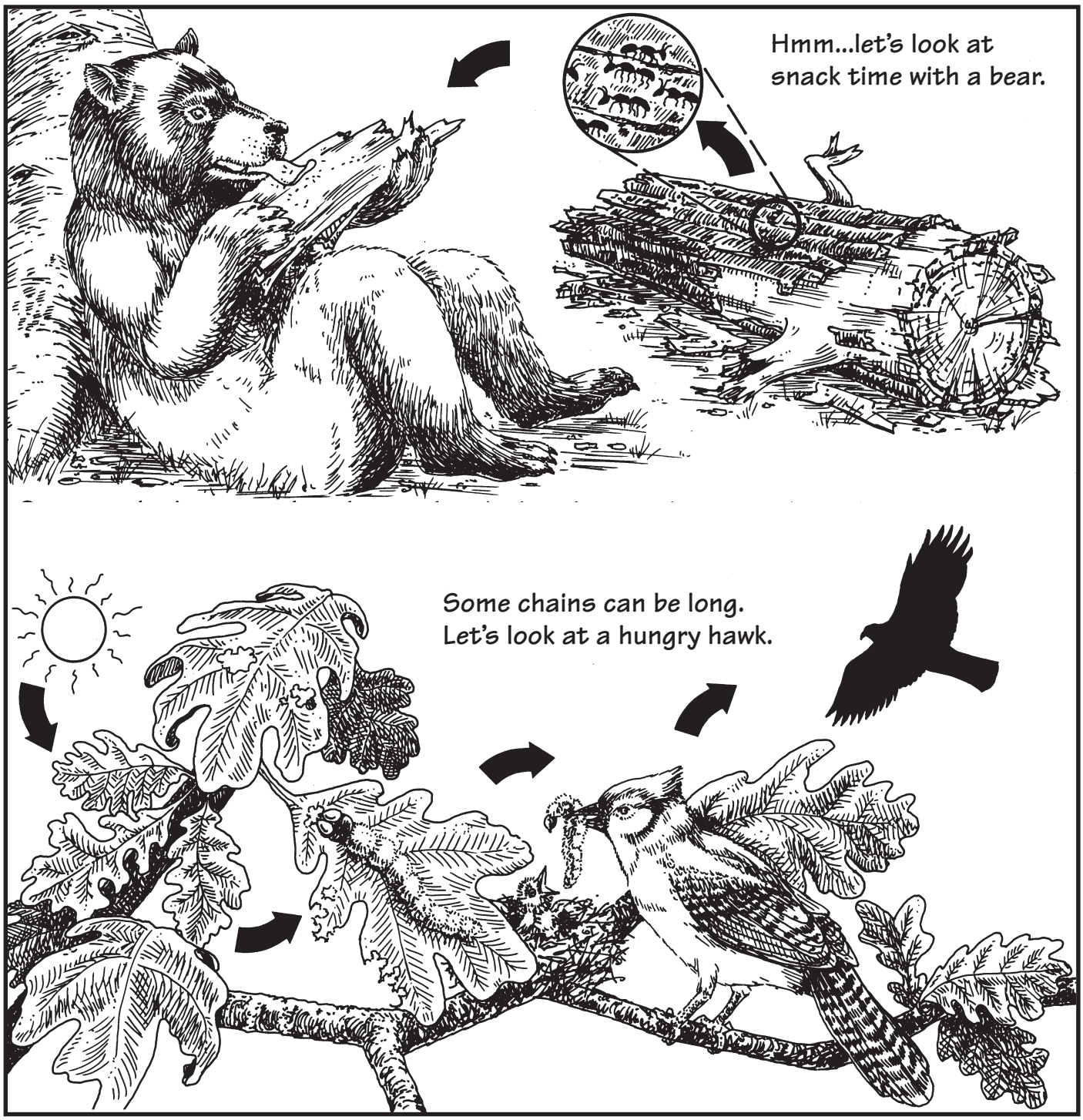
Without even thinking about it, Ben has become part of a food chain. Just by eating breakfast! Ben (and you!) depend on other living things, like oats and orange trees, for food.

Where do you really think Ben got his orange juice? Circle your answer. (Answer on last page.)



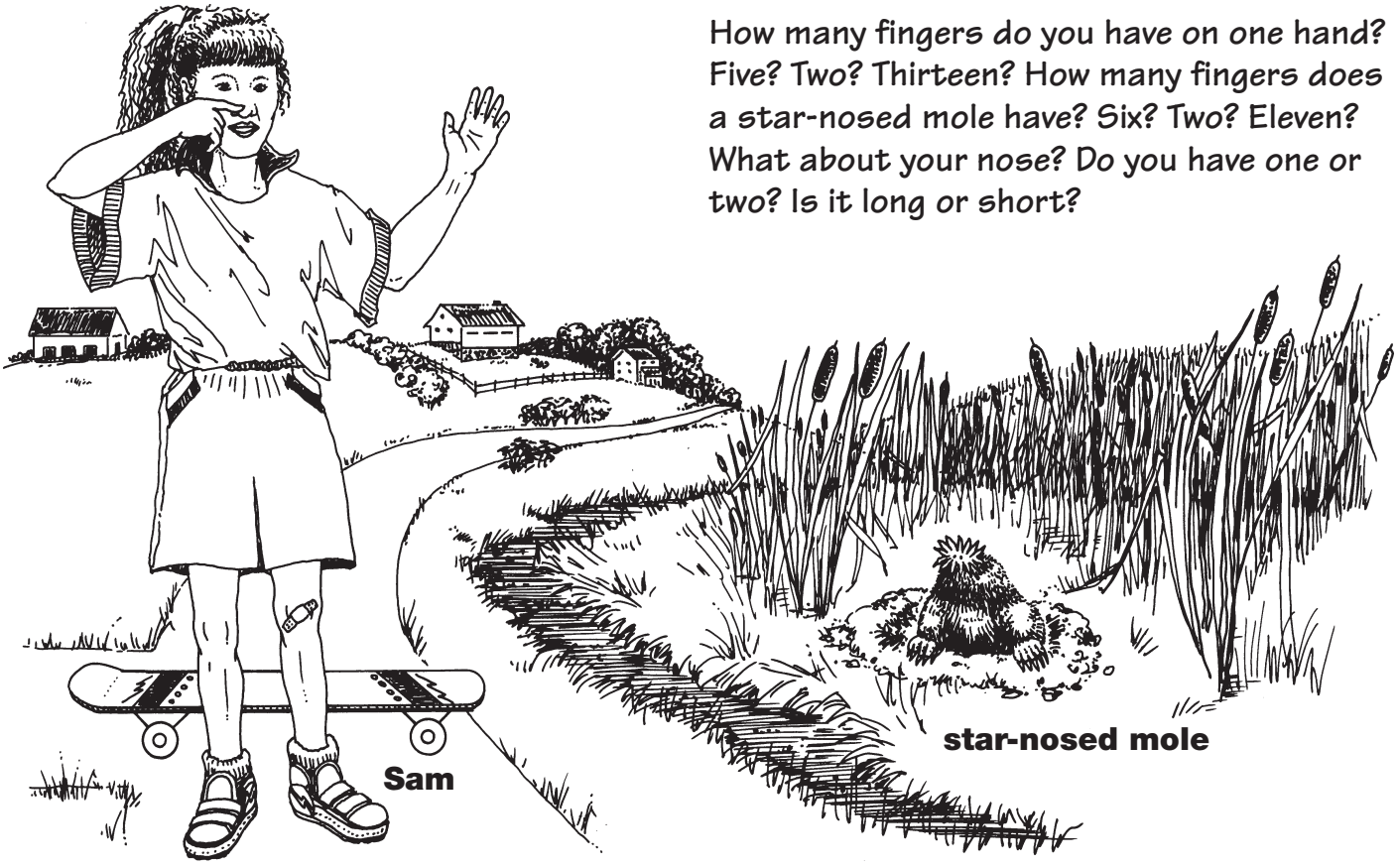
Forest Food Chains

What happens in the forest? Are there food chains in the forest?



Most forest food chains cross over each other. They begin to look like a spider web. When they do this, they are called a **food web**.

A Special Role for Everything



How many fingers do you have on one hand? Five? Two? Thirteen? How many fingers does a star-nosed mole have? Six? Two? Eleven? What about your nose? Do you have one or two? Is it long or short?

You aren't the same as a star-nosed mole, are you? Well, maybe you do the same things. Let's see. Do you spend a lot of time looking near rivers for worms? Do you gobble small fish whole? Do you store fat in your tail for the winter?

Noooooooooo! Okay, do you...eat cotton candy at fairs? Skin your knees when you skateboard? Break the crayons when you color? Maybe! Do you eat peanut butter, pears, and pizza? Or do you eat minnows, mosquitoes, and moths?

Well, it's pretty obvious that you aren't the same as a star-nosed mole. You are different, and special. You are unique. The star-nosed mole is unique, too. Both of you have important jobs to do on Earth. You each have your own roles to fill.

You do special things. You live in a special place (your home)! You look different than anyone else (unless you have a twin)! So do animals and plants. They all have their own special roles to fill on Earth.

Fun Things to Do . . .

Collect nonliving things from a forest, park, or even your backyard. Try to find nonliving things that are:

- **gray and smooth**
- **brown and long (might be sharp)**
- **brown and blown by the wind**
- **white and cold (but only in the winter)**
- **gray or brown and tickle your nose**

You know that you are special and fill a unique role. **Draw a picture of your family.** Write below each person the special role they fill. Show them your picture. Then draw a picture of the special role you'll play when you are an adult. Will you be a math teacher? Will you be a biologist who studies wetlands? Will you be a forester who cares for forests? Will you fix huge computers or leaky faucets? Will you write books? Draw it!

Science or Roundup Projects

Complete at least one of the following projects:

PROJECT 1. Make a forest touch box.

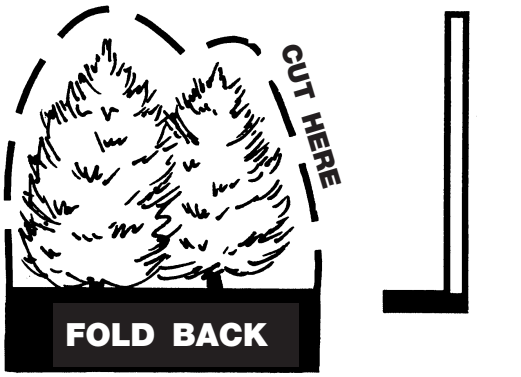
You'll need a shoebox. Cut a hole big enough for a hand to fit through on one side of the shoebox. (An adult can help you with this.) Now collect some items from the woods or a park that have special shapes or textures. A stone is smooth and flat. A pine cone is round and sometimes prickly. After you have found about eight items, glue them to the shoebox floor. Then paint or cover your box with colored paper, and write Forest Touch Box on the top. People should be able to put their hand into your forest touch box and feel the different things. Then they will have to guess what they are touching!

Make Your Own Forest

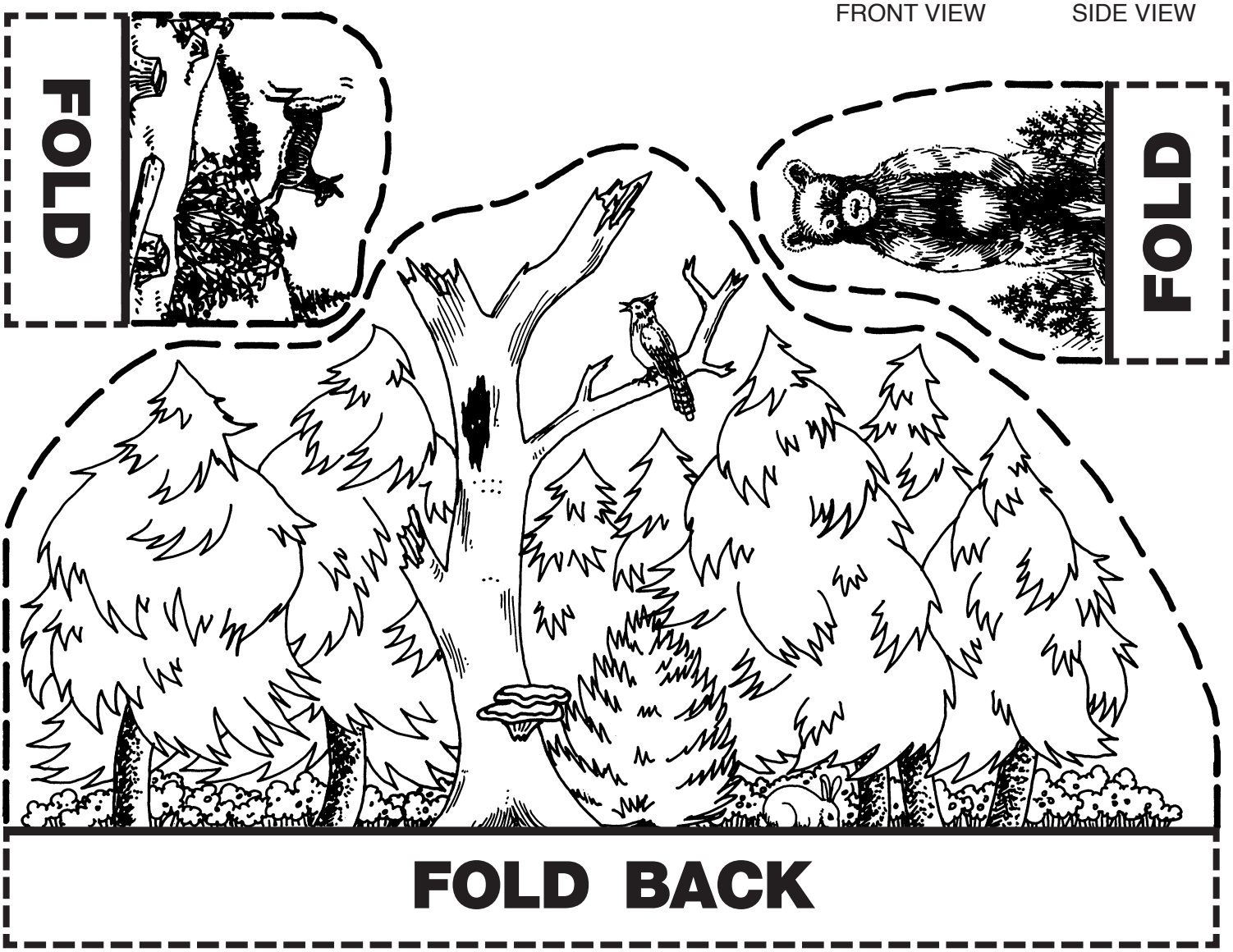
Carefully color your forest with markers, colored pencils, or crayons. Cut around each piece of your forest on the dotted lines. Next, fold them on the solid lines so your forest can stand up. You may need an adult to show you how to do this.

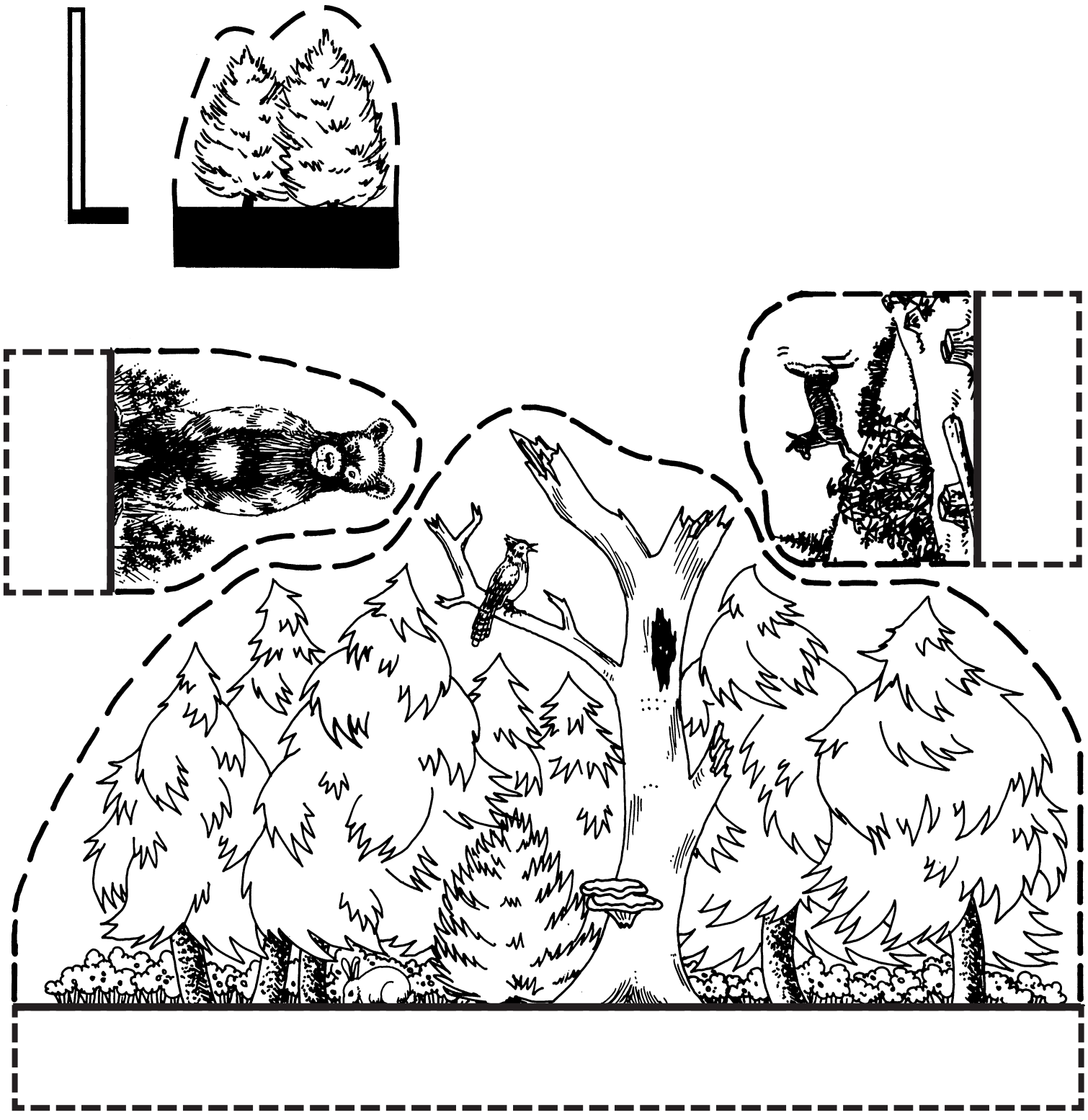
What kind of forest have you made? Is this a deciduous or coniferous forest? What season is it in your pictures? Now it's time to set your pictures up on display for everyone to see.

EXAMPLE



FRONT VIEW SIDE VIEW





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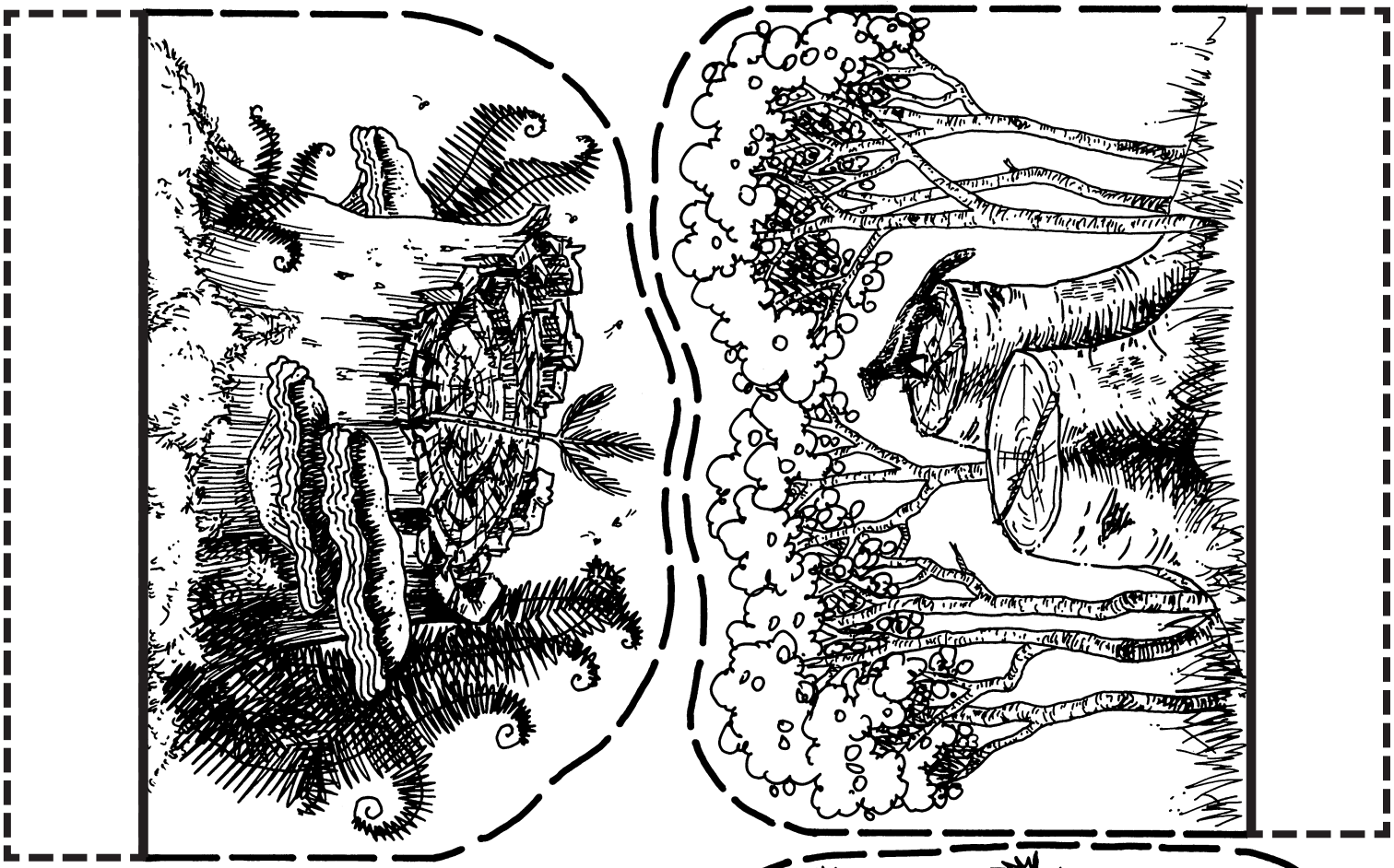

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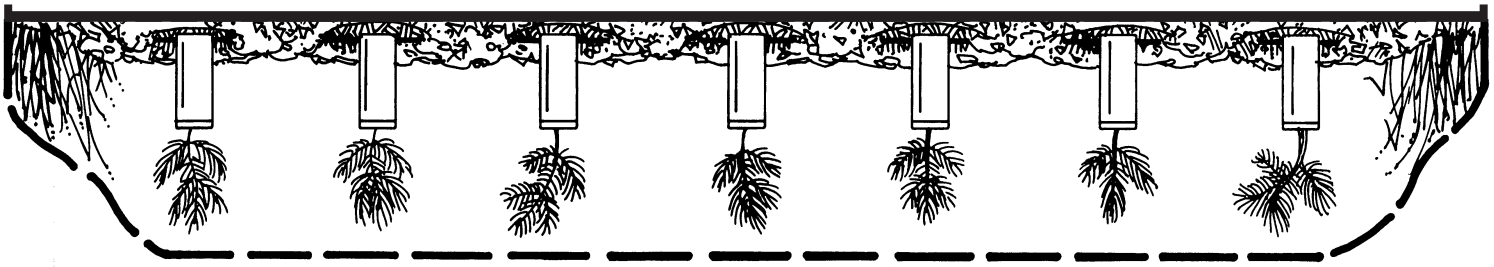

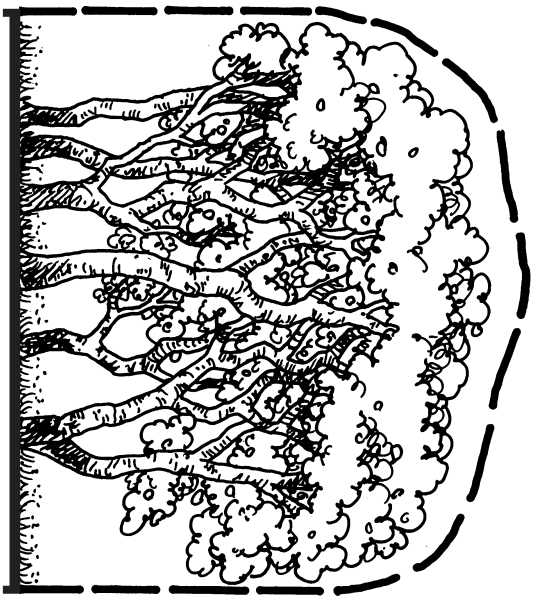

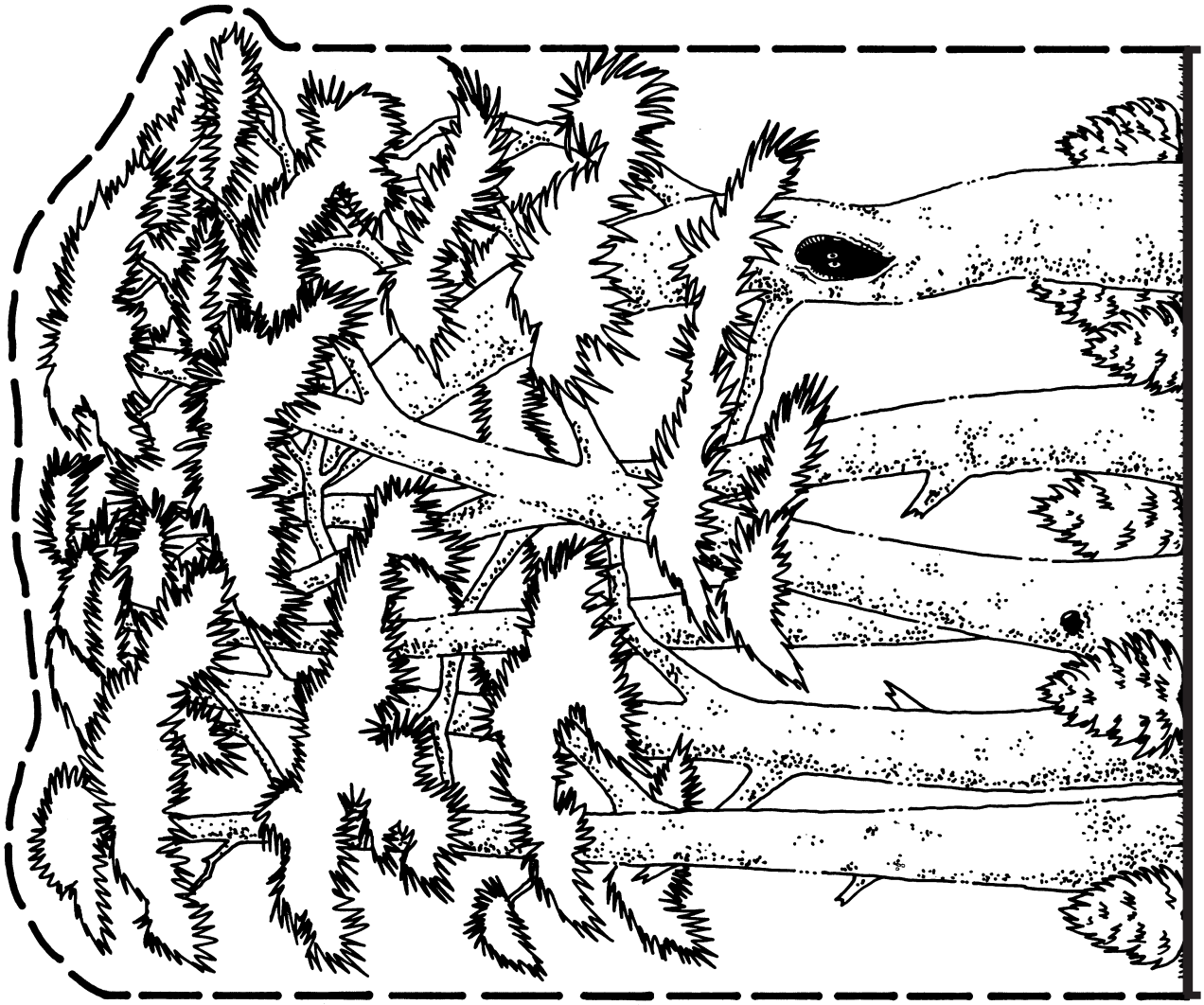

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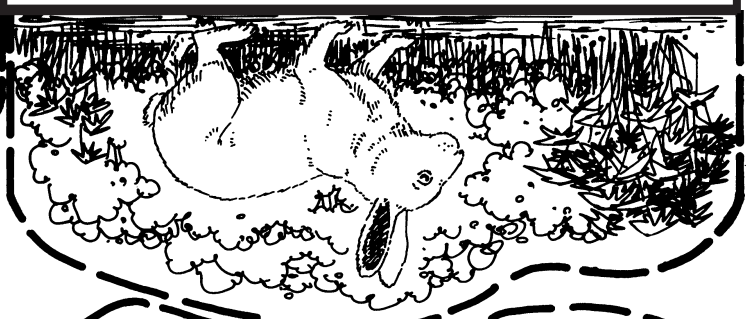

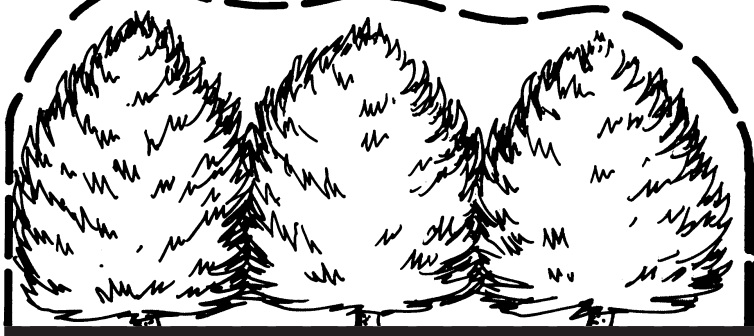

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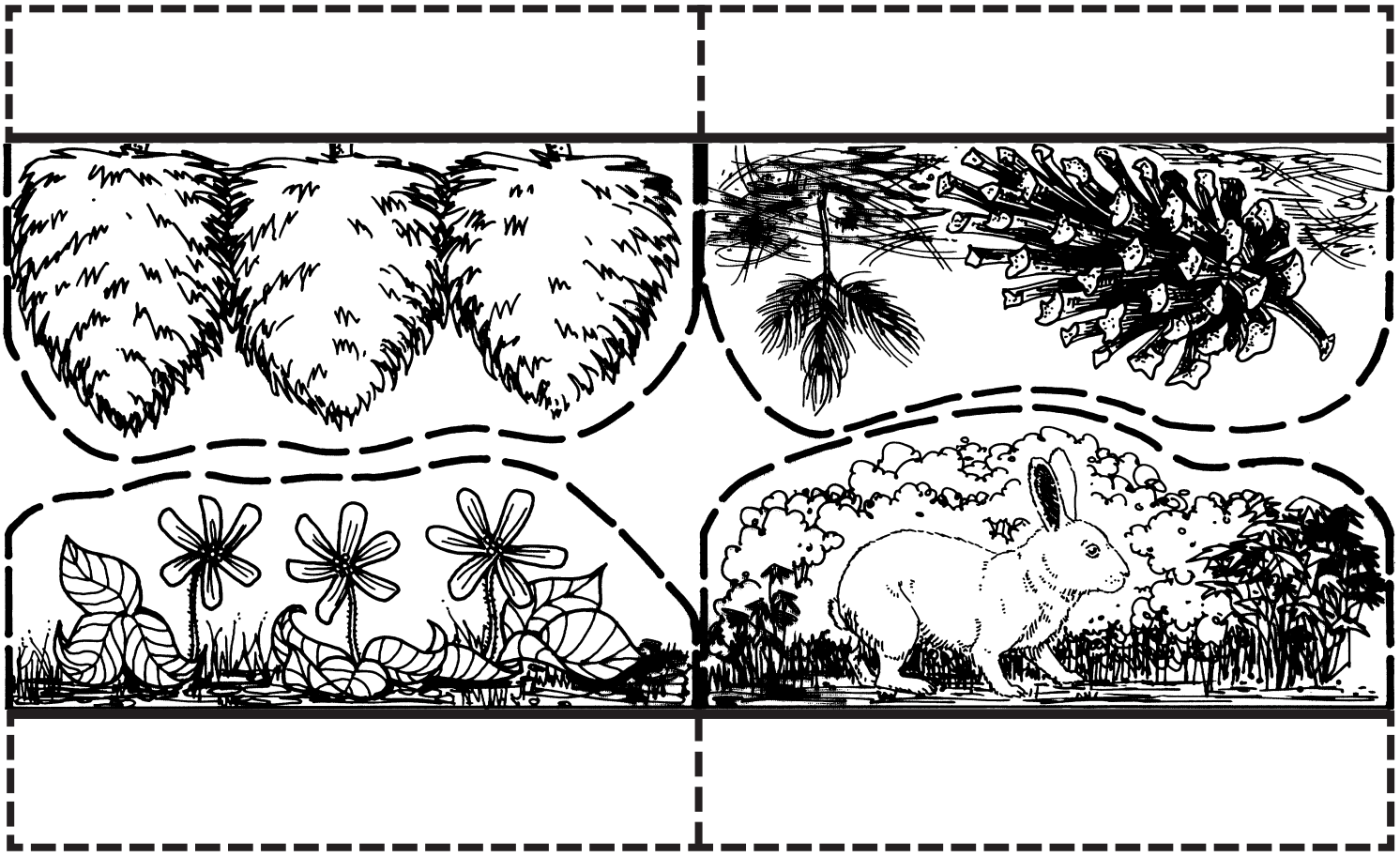
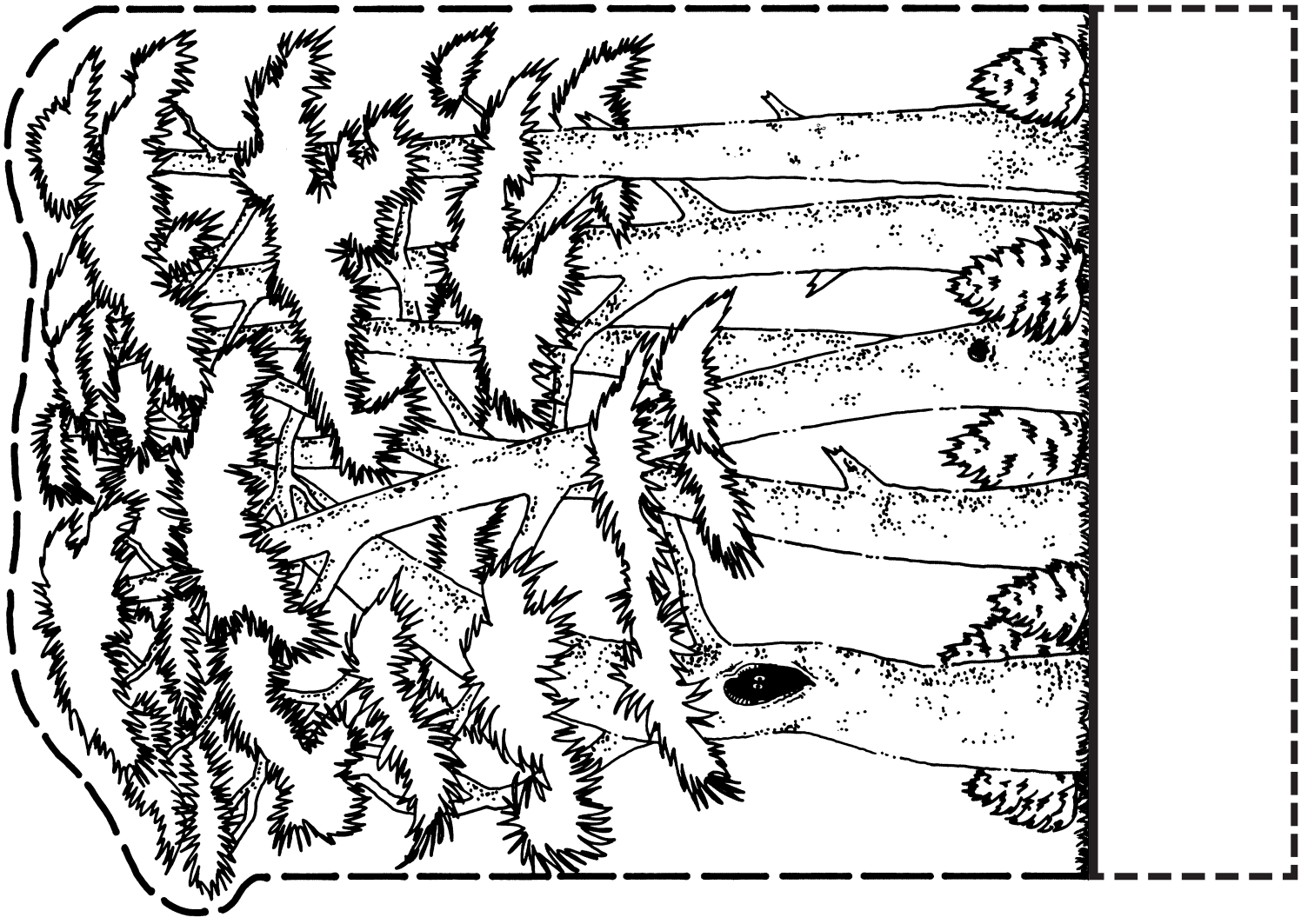
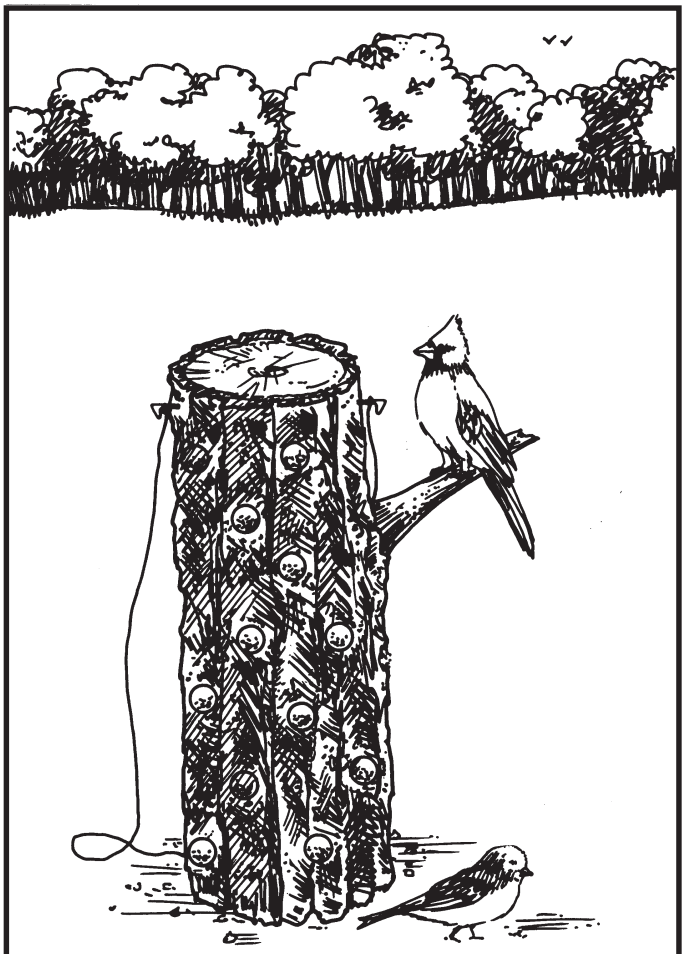
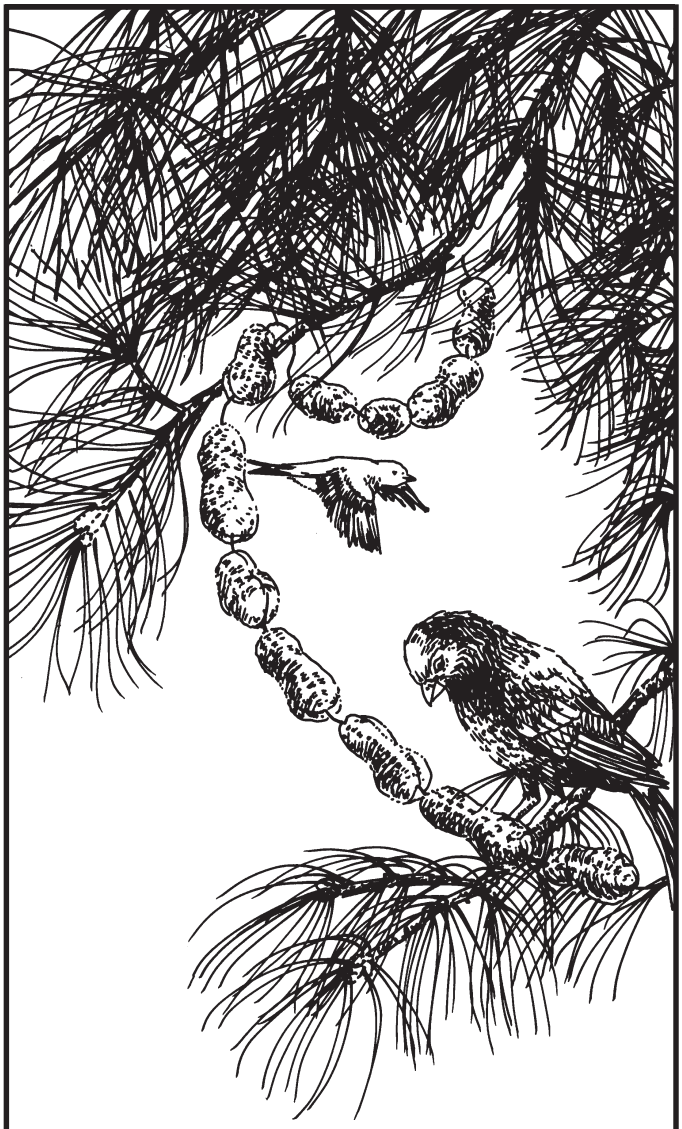




PROJECT 2. Make a bird feeder. Below are two easy kinds to make. Be sure to watch and see what kinds of birds use the feeder. You'll probably have to make another peanut feeder to use as an exhibit or roundup project. You can just refill the log feeder with fat, or suet, and seeds to reuse it. Be sure to share your knowledge about the birds that visited.



With help from an adult, drill some holes in a log or piece of firewood (it should have bark). Fill the holes with a mixture of bacon grease and sunflower seeds or other nuts. Hang the feeder from a tree limb, or place in a safe location on the ground (where cats, dogs, or other animals won't bother it), and watch for birds.

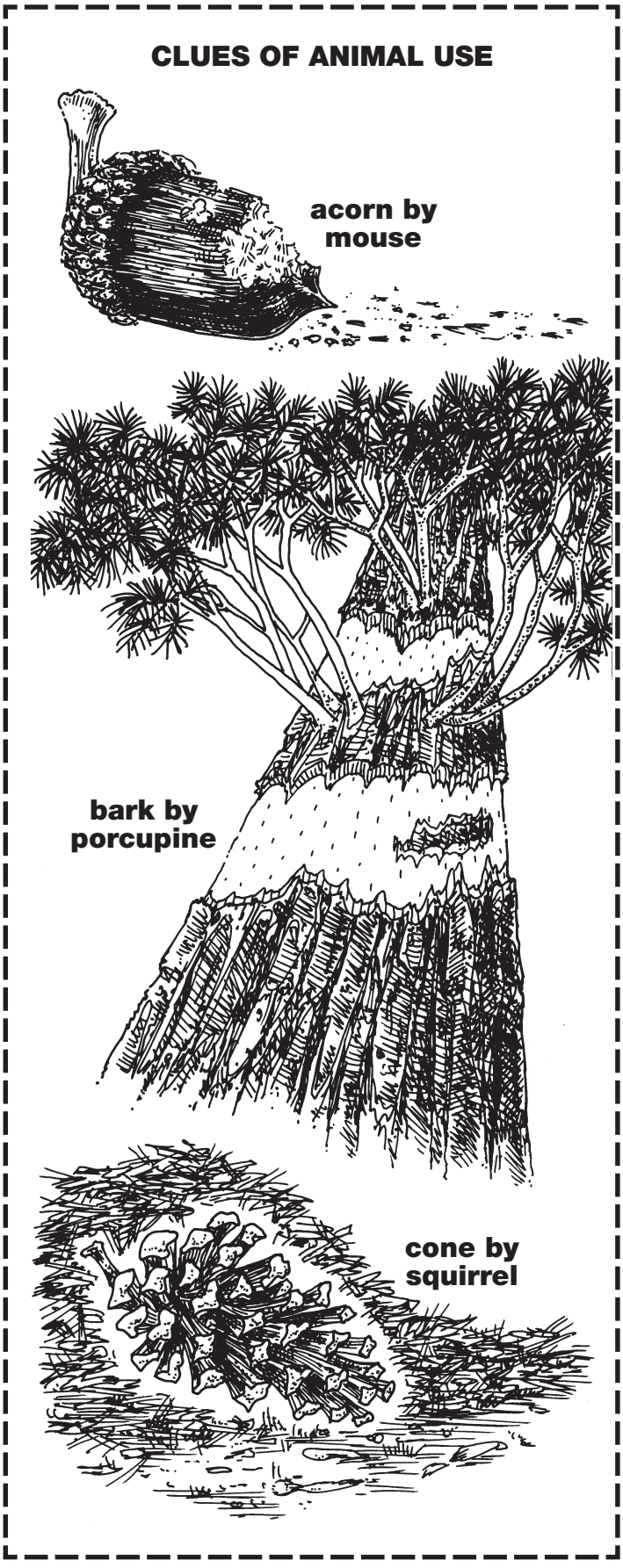


Using a strong needle and strong thread, sew some peanuts together. Hang them from a tree, outside a window, or on a porch. Watch the finches come in for a landing!

"TreeTime!"

(Refer to the tree you selected in "TreeTime!" in Chapter 1.)

Does your special tree give food and cover to animals? Sit quietly as long as you can about 20 feet from your tree. Be very quiet and don't move around. What types of animals visit the tree? Now get closer to your tree. Take a spoon and dig a small, cup-size hole next to your tree. Are there earthworms? Beetles? Other insects? Look on the tree trunk. Do you see any caterpillars or bugs? How about on the leaves? Do you see any insects chewing holes? Have the bark or the branches been eaten by a larger animal? Are there any cavities in your tree? If so, watch your tree again at different times of the day. You might be lucky and spot the animal using the cavity.



CHAPTER 4: Different Trees, Different Forests

Forests on the Planet Earth

Look around you. Are you alone? Are there other people in the room?

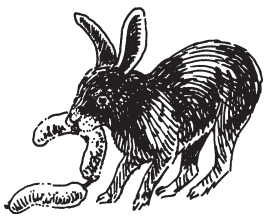
Do you have brothers or sisters? Aunts or uncles? Friends? Are any of these people the same as you? Do they look the same? Dress the same? Talk the same?

Probably not. Everyone is a little bit different. Everyone is special and fills a unique role.

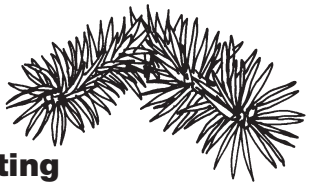
Animals and plants are special. Raccoons and owls have a unique role in the forest. Shrubs and ferns have a special place, too. There are many types of animals and plants living in the forest.

Have you ever been to a forest? If you have, make a mark in the boxes below for the things you've seen.

I saw these things in a forest:

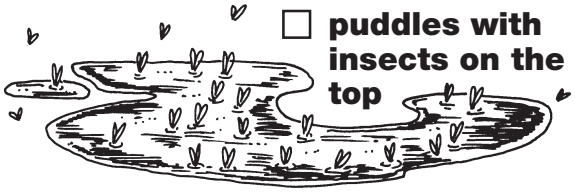


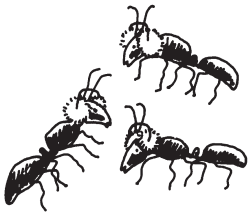
☐ **trees with needles**



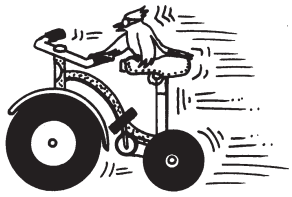
☐ **rabbits eating hot dogs**

☐ **puddles with insects on the top**





☐ **birds riding bicycles**



☐ **seeds that stuck to my clothes**

☐ **ants wearing earmuffs**

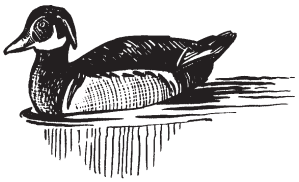
You probably didn't see rabbits eating hot dogs or birds riding bicycles. And ants don't wear earmuffs! The forest that you remember is like many other forests. But there are far-away forests that don't look ANYTHING like the one you remember!

Different forests have different plants and animals. Some forests have trees that need a lot of rain. Some forests have trees that need cool moisture or hot winds. Animals also live in forests that suit them best. Pandas must have forests where they can find bamboo. Black bears prefer cool forests where they can find berries and rotten logs with tasty insects.

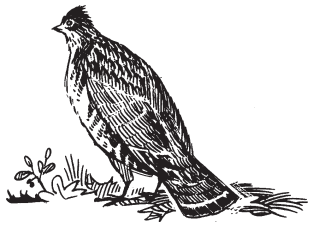
Who lives here? Draw a line from each plant or animal to the place it belongs. (Answers on page 51.)

BEAR

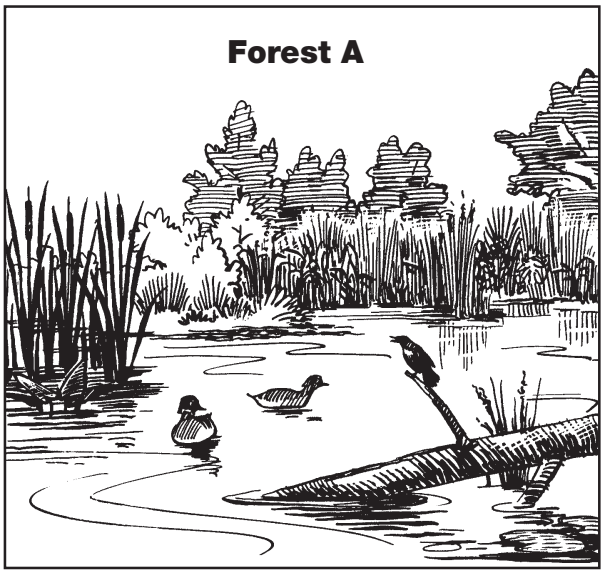
WOOD DUCK



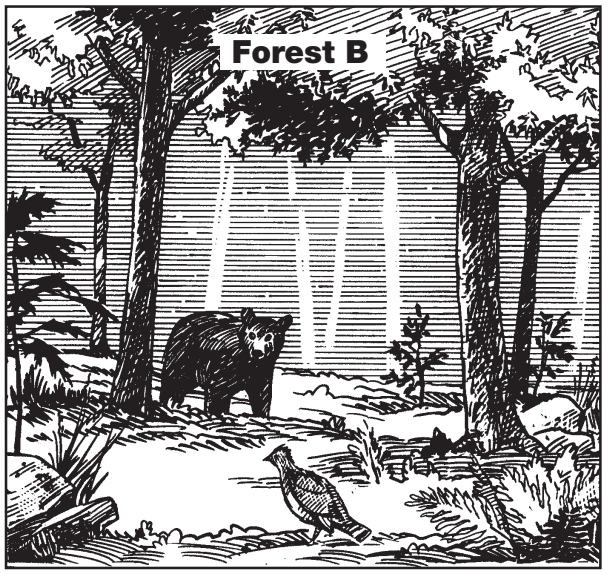
RUFFED GROUSE



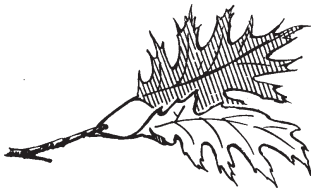
Forest A



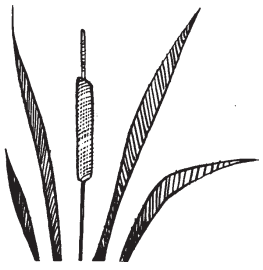
Forest B



RED-WINGED BLACKBIRD



RED OAK



CATTAIL

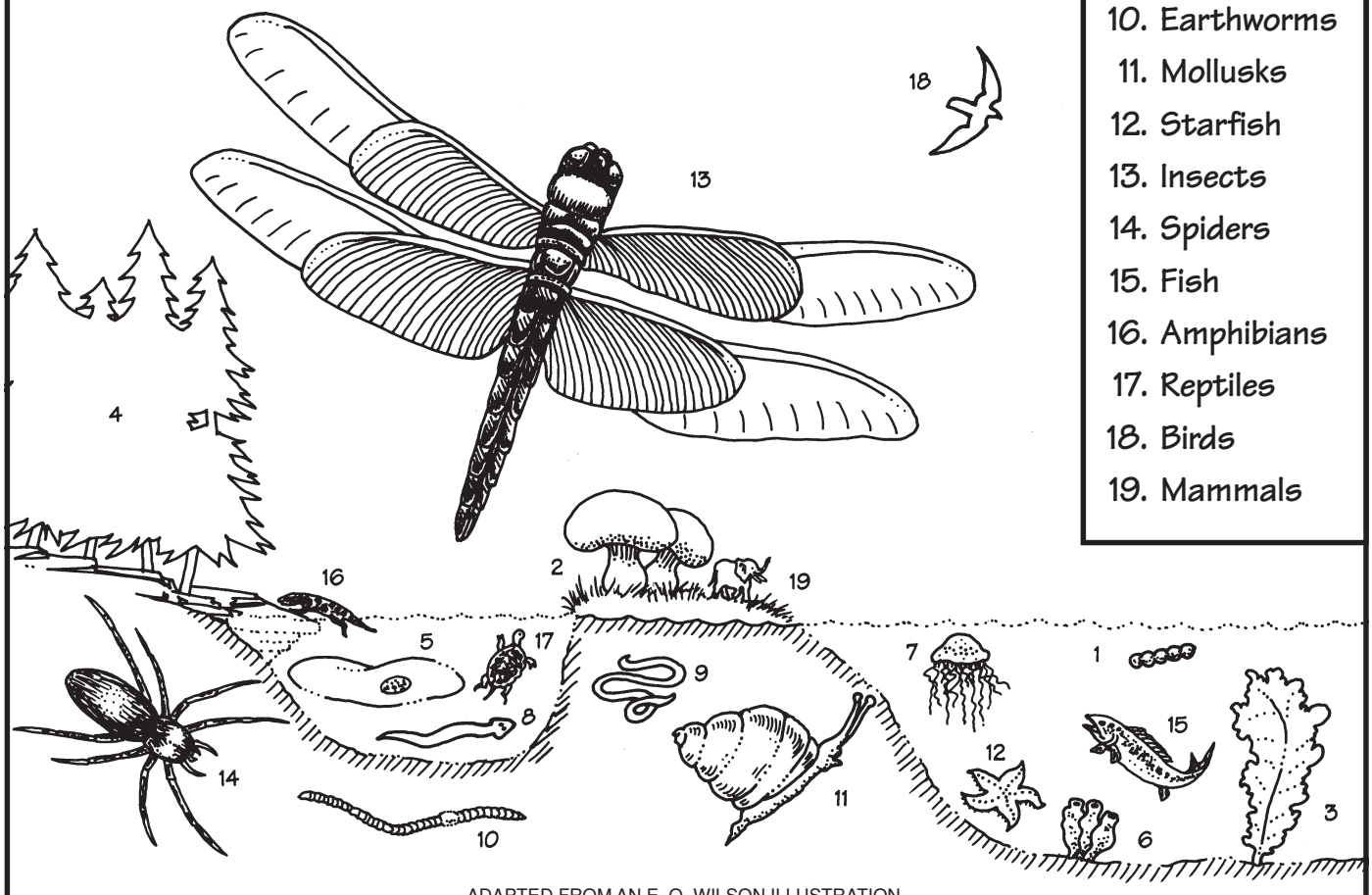
A Million Billion Bugs

Did you know that there are more kinds of insects than kinds of any other living thing? More types of beetles and gnats than bears and cats? Insects are the clear winner in the Most Kinds Of Things Race.

KEY

1. Bacteria
2. Fungi
3. Algae
4. Plants
5. Protozoa
6. Sponges
7. Jellyfish
8. Flatworms
9. Roundworms
10. Earthworms
11. Mollusks
12. Starfish
13. Insects
14. Spiders
15. Fish
16. Amphibians
17. Reptiles
18. Birds
19. Mammals

In this picture, the bigger the item, the more types are in its family! Insects have the most types on Earth. Spiders aren't far behind. There are also many kinds of plants and fungi.



ADAPTED FROM AN E. O. WILSON ILLUSTRATION

But why is it important to have many kinds of plants and animals? Why is it important to have many types of forests? Well, because nature is more stable when there are many kinds of animals and plants.

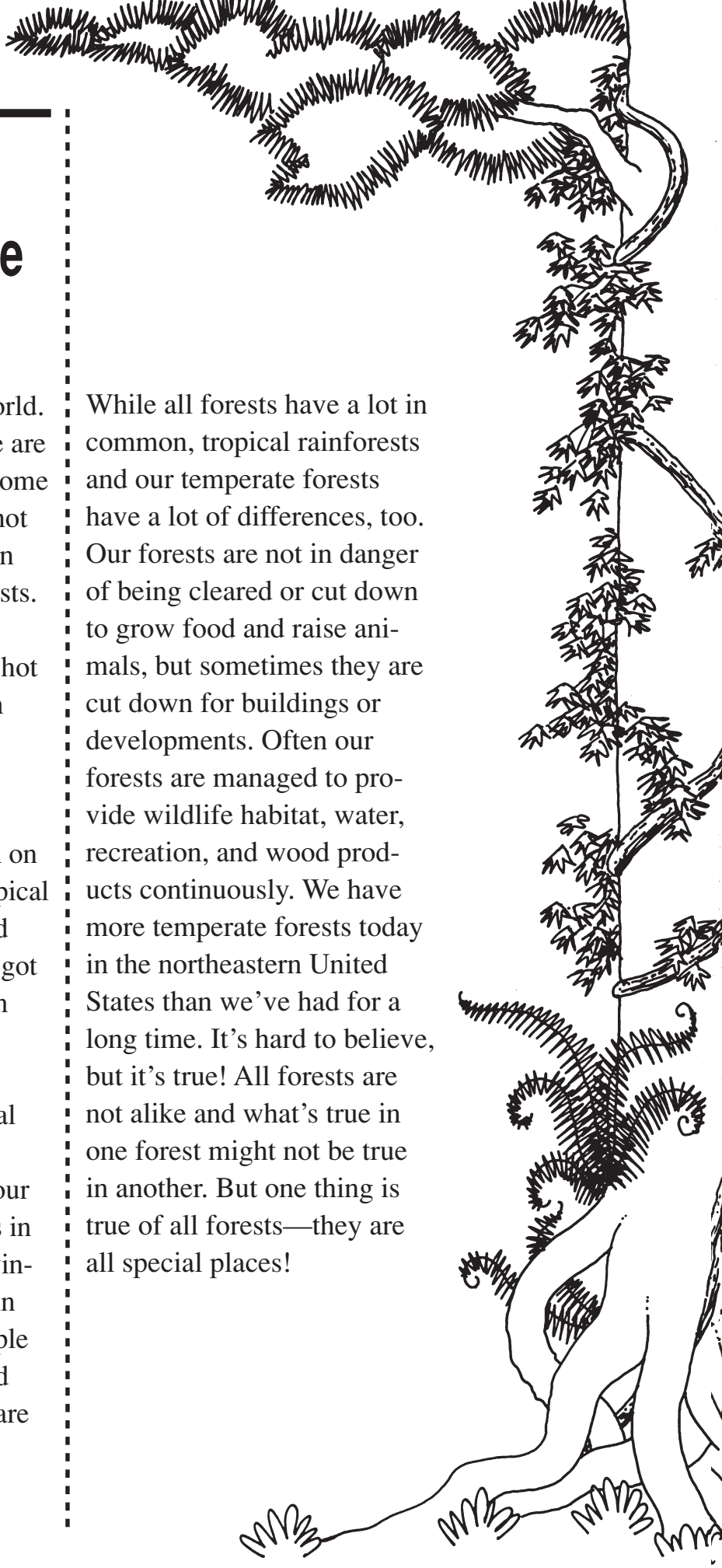
It is very important to have many different types of plants and animals in the world. We need to see to it that all types of birds, animals, and plants survive. The best way to do this is to protect animal and plant habitat!

All Forests Are Special...But Not All Are the Same

There are many types of forests in the world. Some forests are on mountainsides, some are in swamps, and others are near the sea. Some forests are very dry and cold; others are hot and humid. The forests in the northeastern United States are called "temperate" forests. Temperate forests receive about 40 to 44 inches of rain each year, and they have a hot and a cold season. We call our hot season "summer" and our cold season "winter."

There's another type of forest that you've probably heard about or maybe even seen on TV. It's called the tropical rainforest. Tropical rainforests are found near the equator, and they receive lots of rain. That's how they got their name! Over 100 inches of rain fall in tropical rainforests each year. Tropical rainforests are home to many interesting trees, plants, insects, and animals. Tropical rainforests have more types of plant and animal species than are usually found in our temperate forests. The tropical rainforests in Central and South America are also the winter homes for many of the birds that live in our temperate forests in the summer. People are concerned about losing rainforests and are working to protect them. Rainforests are threatened as people cut them to clear the land to grow food and raise animals.

While all forests have a lot in common, tropical rainforests and our temperate forests have a lot of differences, too. Our forests are not in danger of being cleared or cut down to grow food and raise animals, but sometimes they are cut down for buildings or developments. Often our forests are managed to provide wildlife habitat, water, recreation, and wood products continuously. We have more temperate forests today in the northeastern United States than we've had for a long time. It's hard to believe, but it's true! All forests are not alike and what's true in one forest might not be true in another. But one thing is true of all forests—they are all special places!



Color this tropical rainforest. Be sure to use bright colors for the insects and other animals! How is this forest different from any you've seen?

ELMS IN TROUBLE

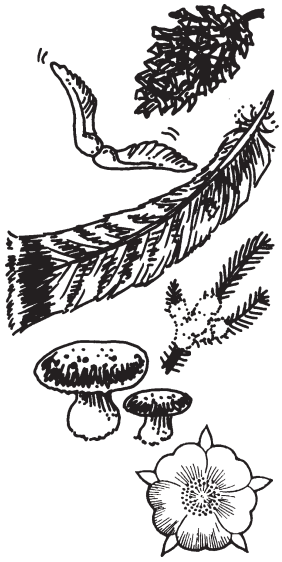
The American elm was once a popular tree in towns. A sickness, called Dutch Elm Disease, came to the United States. The disease made many elms die. Soon many people didn't have any shade left in their yards.

The disease killed so many trees because people made it easy. They had planted too many elms. The disease didn't have to go far to make another elm sick. If people had planted other kinds of trees, too, they might still have shade in their yards.

Fun Things to Do . . .

Play *Forest Scavenger Hunt*. You may want to do this with friends. The first one to find the following things in a forest wins.

- ☐ **an acorn with a cap**
- ☐ **a leaf with bumps or holes**
- ☐ **a caterpillar with lines on its back**
- ☐ **a rock with two colors**
- ☐ **something that sticks to you**



- ☐ **a brown pinecone**
- ☐ **a seed with wings**
- ☐ **a feather**
- ☐ **bug spittle on a twig**
- ☐ **something that matches the color of your shirt**
- ☐ **something that smells good**

Science or Roundup Projects

Complete at least one of the following projects:

PROJECT 1. Make an alphabet board.

You know that there are many different things in the forest. Try to show how many things there are by making an alphabet board. You might need help from an adult to finish this project.

Go to a place where there are trees. Collect things that begin with the letter A, then B, then C, and so on. You might find an acorn for A. You might find a birch leaf for B. Try to find an object or item for at least 20 of the letters of the alphabet. Attach an example of it to your board or draw a picture of it. Use tape or quick-drying glue to attach the items to a poster board. Be sure to write the letter (A, B, C, etc.) in large print by the object as well as what the item is.

Can you find all 26 letters? You might need some help for letters like X and Z.

Sample poster board:

A = acorn

B = bark

C = cone

D = dragonfly

E = eggshell

F–Z (find your own)

PROJECT 2. Find items from the woods.

Did you know that a forest gives us lots of things that we use every day? We get wood, chemicals, and food from the forest. For example, this book is made from wood. You may use artificial vanilla when you make cookies. This vanilla comes from trees! Maple syrup, pecans, and walnuts all come from forest trees.

Try to find the things in your house that are made from trees. Some will be obvious—like a bed, table, or chair. Some will be harder, like Ping-Pong balls and cereal boxes. An adult can help you.

Take photos of all the things in your house that are made from trees. Put the pictures in a photo album for your project.

"TreeTime!"

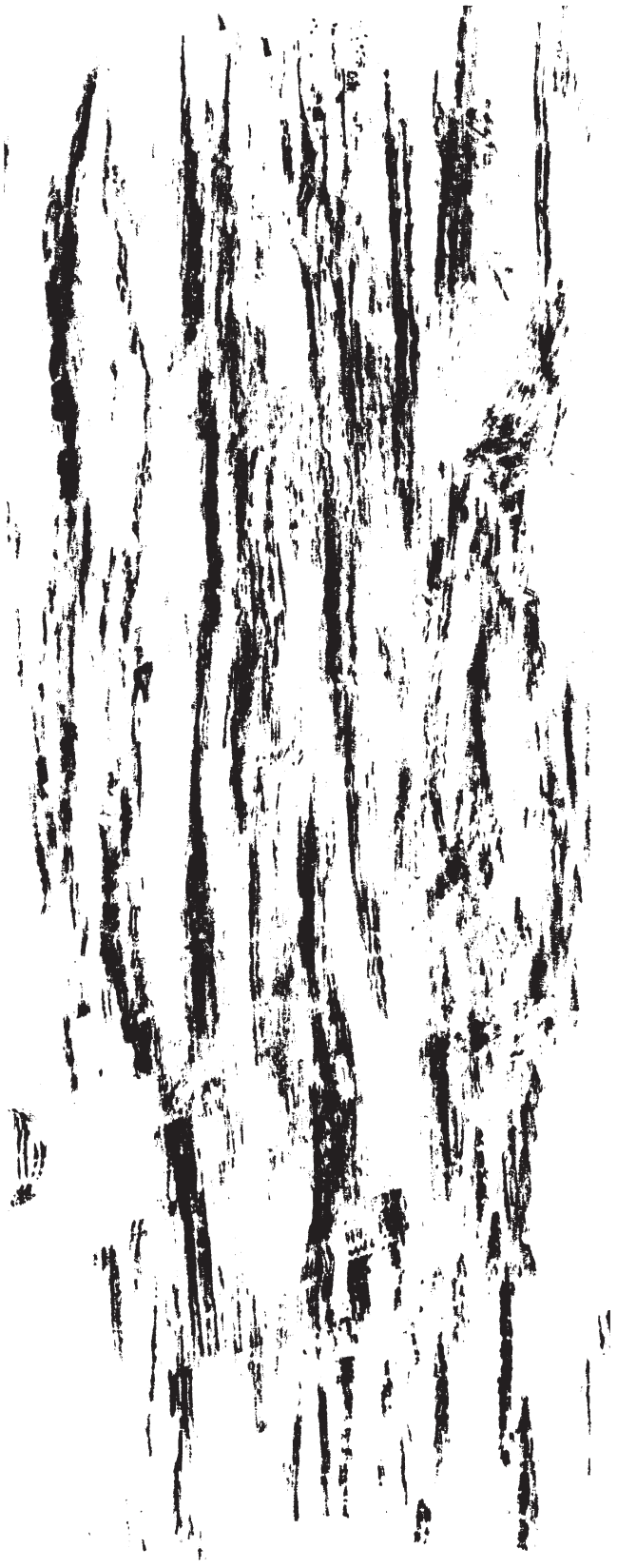
(Refer to the tree you selected in "TreeTime!" in Chapter 1.)

How is your tree like other trees around it? Is it the same kind of tree? Is it different? Is it part of a forest or a park?

Look around until you find a tree that is the same kind as your tree. How did you figure out they were the same (did you look at leaves, bark, tree shape, or seeds)?

Watch your tree in the winter. If it is deciduous, it will lose its leaves. How could you find a tree like yours in the winter when the leaves are gone? It's harder, but you can still get clues from the bark. Try this. Peel the paper from a crayon. Lay a piece of art or thin paper against the bark of your tree. Rub the crayon over the paper. You are making a bark rubbing!

Now try to make a bark rubbing of another tree that you think is the same kind. Do they look the same? Make a bark rubbing of a different kind of tree. Does the bark rubbing look different from the bark rubbing of your tree?



bark rubbing of a cedar tree

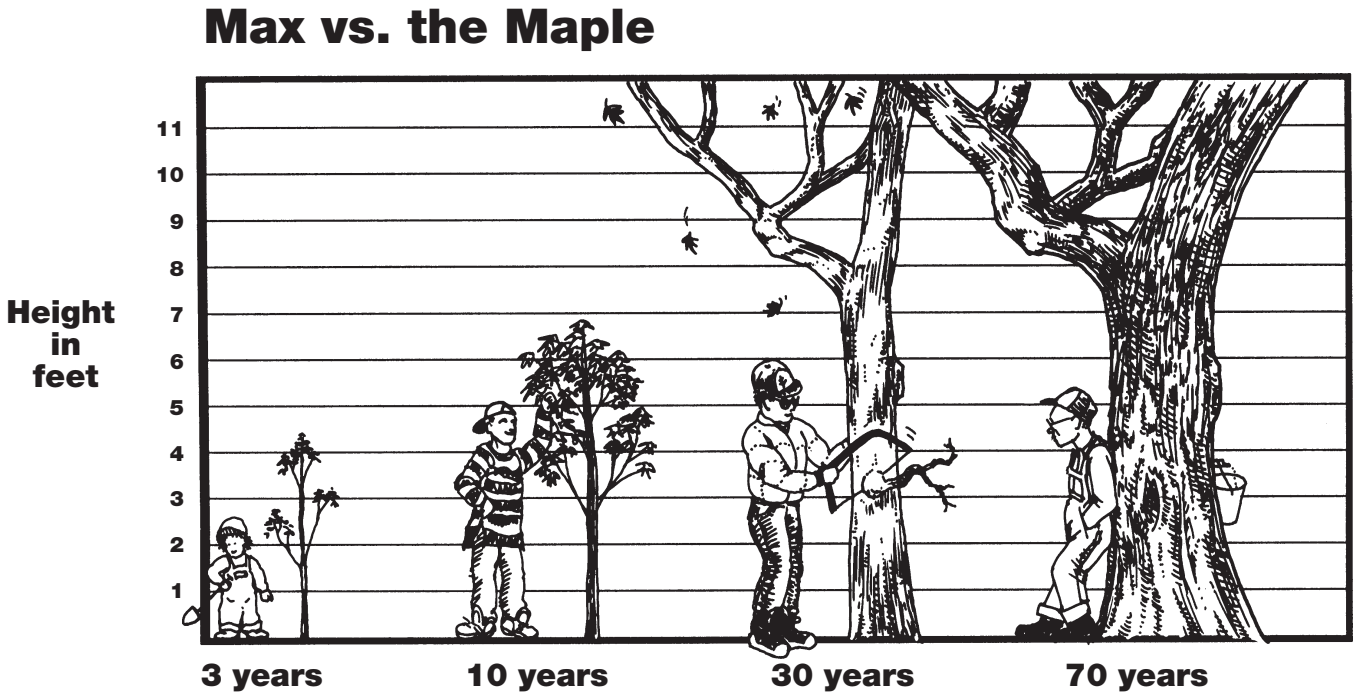
CHAPTER 5: Change in the Wind

STOP!
Stay Where You Are!

Forests change. Sometimes a fire will burn all the trees. Sometimes people harvest the trees for wood. Hurricanes, tornadoes, or even a volcano can knock all the trees down. But does the forest die?

Well, no. The trees that were there before are gone. But new trees grow back. These may be new seedlings that grow from seeds that were on the forest floor. Or they may be sprouts that grow from roots or stumps left behind. Other plants, insects, and animals come back, too.

Trees are **renewable** (say *ree-new-a-bul*). That means more can be grown again. If a fire burns a forest, new trees grow back again. It seems like it takes a long time for a tree to grow. But does it really?



When people cut down trees, it's called harvesting. But people aren't the only thing that removes trees from the forest. Nature is busy, too, with hurricanes, windstorms, and fire. Not all fires are set by nature. People set fires, too.

Trees usually grow faster than people.

Still, many people don't like to look at a harvested or burned forest. Do you? A burned forest doesn't look green. It looks bare for awhile. In a few years, trees, bushes, and other plants grow. Some forests are really old. If they are harvested, they may not look the same for hundreds of years.

People and nature change forests. In either case, forests often have to start over.

Starting Over

Do you like the sun? Or do you sit in the shade when you're outside?

Well, if you enjoy the sun, you are like an **aspen** tree. We say an aspen is sun loving. It grows faster than almost any other kind of tree when it has sunlight.

If you enjoy the shade, you are like an **Eastern hemlock** tree. An Eastern hemlock doesn't need a sunny spot. It often grows best in the shade of other trees. We say it is shade tolerant.

sun-loving aspen **shade-tolerant Eastern hemlock**

Now try to solve this:

Which tree would grow faster on a site where the trees had been harvested? Sun-loving aspen or shade-tolerant Eastern hemlock? (Answer on page 51.)

When a forest changes, the change is called **succession** (say *suk-sesh-un*). Trees and other plants grow and change how the forest looks over time. We can't stop forests from changing.

Can you put this aspen forest in order?

What happened first?

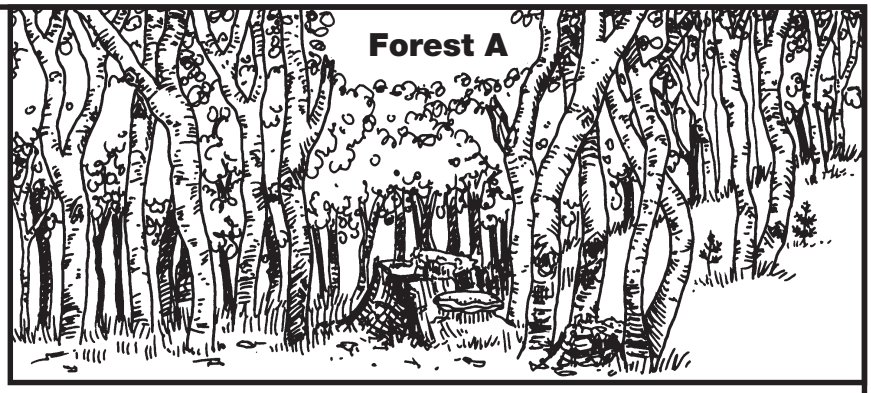
Write "1" for the scene that happened first, "2" for the scene that happened second, and "3" for the one that happened third.

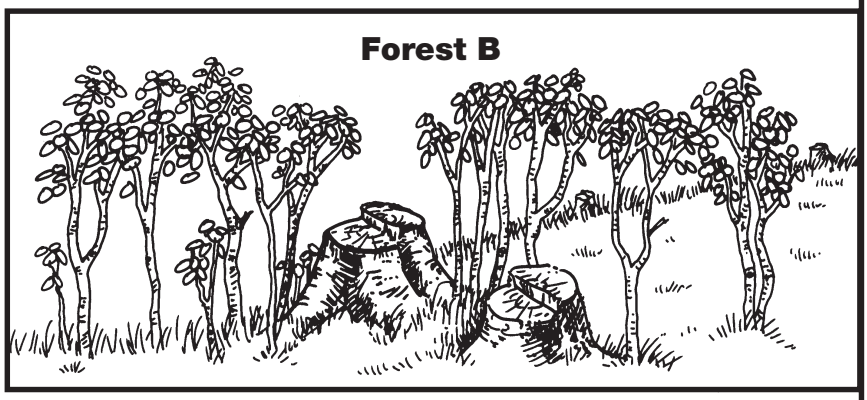
(Answers on page 51.)

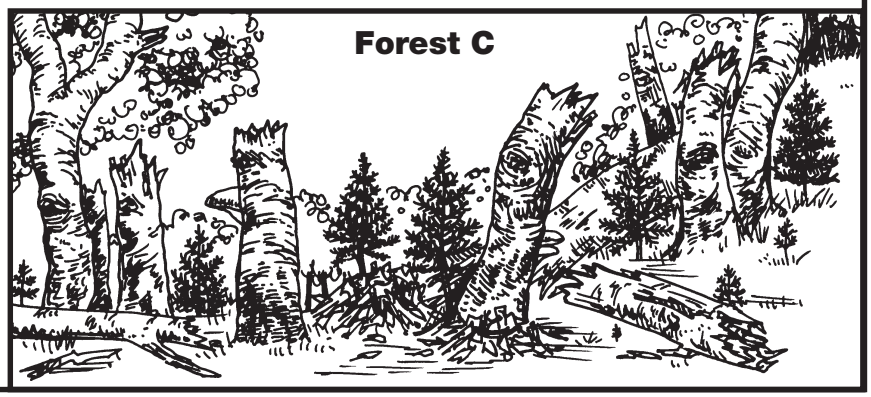
Forest A is: # ☐

Forest B is: # ☐

Forest C is: # ☐







People often cause forests to start over. They harvest trees from forests. But why do we need to harvest trees?

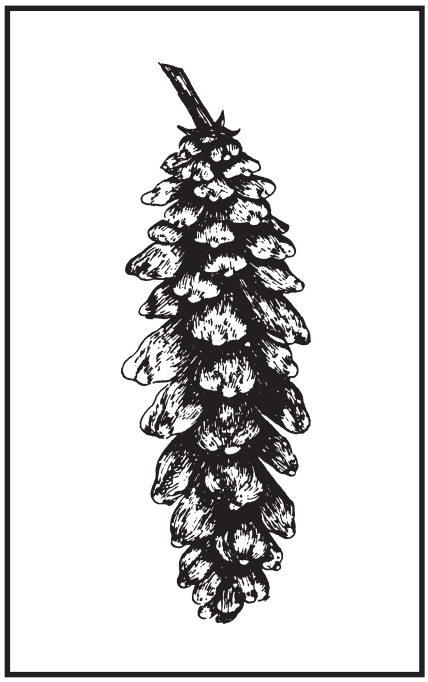
Well, we use the wood and other things that a tree gives. You know that paper and lumber come from the forest, right? Okay. How about Ping-Pong balls? Car tires? Pencils? Money? Even fiber in breakfast cereal? All of these things are made from parts of a tree. If we decide not to use trees, then we have to find new ways to make the things we need or enjoy.

If we choose to make the things we need from steel, plastic, or cement we are making them out of what are called **nonrenewable** materials, because we cannot grow more of these. Wood products, however, are made from a **renewable** material. This is because forests can grow over and over again to provide wood for the products that we need and enjoy.

Growing the Forest Again

Sun-loving trees and plants pop up on land that is cleared. But where do they come from?

young aspen



white pinecone

young white pine

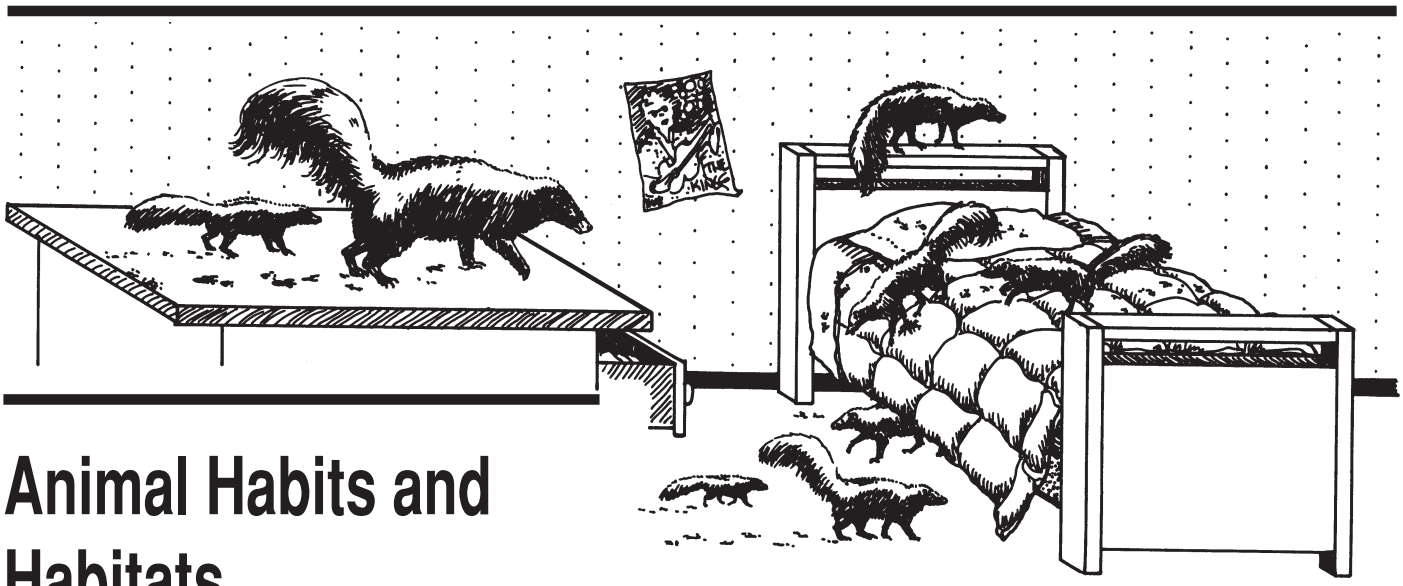
Young aspen trees often grow from the roots of the parent tree. They "sucker" out of the ground. They can grow to be six feet tall in one year! Other young aspen trees grow from very small seeds.

White pine trees come from **pinecones**. Pinecones hold the seeds that start new trees.

Every year, people plant lots of trees. Have you ever planted a tree in your yard? It's important! But we also need to take care of the trees we already have.

In some cities, four trees die for every one that is planted! Yikes! We need to plant and take care of trees in our communities too!

All animals have four basic needs in their habitat. Animals need food, water, shelter, and space. Could you live without a place (your shelter) to keep you dry and warm? Could you exist without food (like pizza and hot dogs)? Do you need water to drink? Do you need some space to live in, or would you like to share your room with a family of eight skunks?



Animal Habits and Habitats

Some animals like the forest best when it is starting over. Some animals only like very old forests. Many animals use more than one type and age of forest.

Think about it. Do you spend ALL of your time in your bedroom? Do you spend every waking moment in the kitchen? What if you weren't allowed to leave your school?!

During the day, you roam to different places. You leave your bedroom to go to the kitchen. You leave your house to go to the playground. Perhaps you go to school. Or the nearest pool. Maybe you go to visit a friend. You find and meet your needs in all of these different places. This is your habitat!

Fun Things to Do . . .

Look for sun-loving and shade-tolerant plants and trees in your backyard. Fill in the chart below.

See how many sun-loving and shade-tolerant plants you can find. Write the name for each plant or tree you find.

sun loving

shade tolerant

_____ _____

_____ _____

_____ _____

Science or Roundup Projects

Complete at least one of the following projects:

PROJECT 1. How does the forest grow?

Do this experiment in February or March. With help from an adult, cut a live twig from five different trees. Put each twig in its own paper cup of water right away. Watch the twigs over the next week. What happens to the buds on each twig? Do they open into leaves?

Take pictures of your experiment. Glue or tape the pictures to a poster board. Write the kind of tree underneath the picture (aspen, oak, etc.).

You could also put your experiment in a cardboard box. You could glue the cups into the box. You might need help from an adult. Be sure to write the kind of tree next to the cup.

PROJECT 2. Collect leaves from sun-loving and shade-tolerant trees.

Divide them into the two groups. Glue the leaves onto a poster board in their groups. Write the kind of tree under the leaf.

PROJECT 3. Find renewable and nonrenewable items.

You know that trees are renewable. That means that if harvested, more trees can grow and replace them again. Other things grow again, too (like corn and cattails). Some things won't grow again (like oil, water, or plastic).

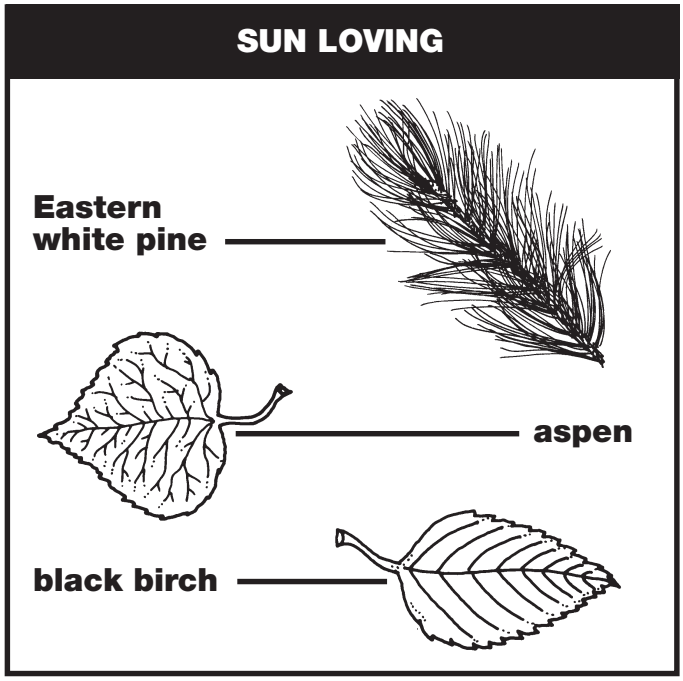
Use a cardboard box to make a display of items made from renewable and nonrenewable materials. Glue the items onto the inside of the box. Be sure to explain why something is renewable. Also explain why another thing is not renewable.

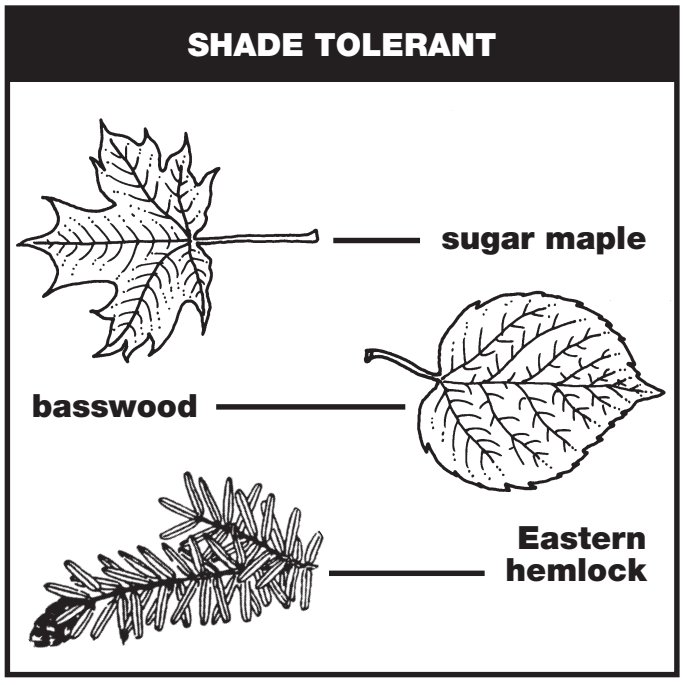
"TreeTime!"

(Refer to the tree you selected in "TreeTime!" in Chapter 1.)

Decide if your tree is sun loving or shade tolerant. Here are some leaves of common sun-loving and shade-tolerant trees.

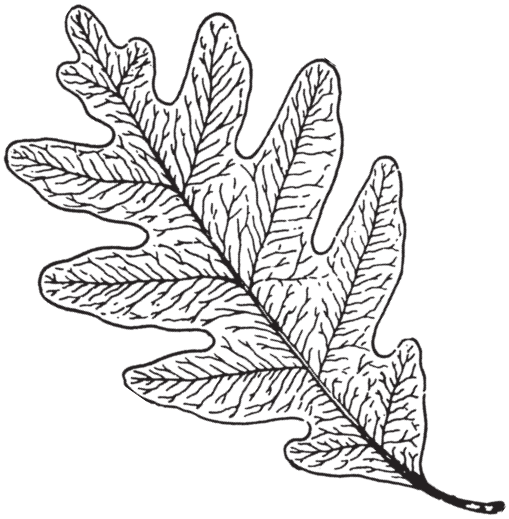
You know, just because a tree is growing in the shade doesn't mean it's shade tolerant. Many people plant sun-loving trees in the shady sections of their yards. These trees would grow better in a sunny location. Use the **Kids Cards** in this book to find out about some common trees near your home. If you need more help, ask an adult.

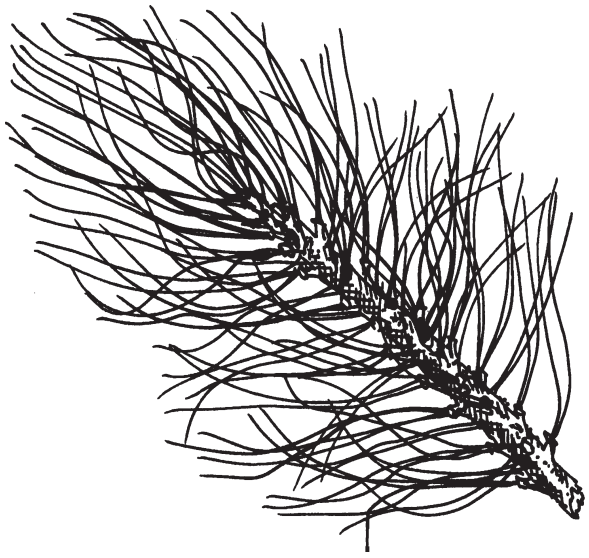




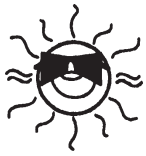
Kids Cards!

Cut out and use these cards. Color them if you like! They are like name cards for trees. They will help you get to know some beautiful trees! Show the leaf side to your friends and see if they can guess the tree names, or study them and quiz yourself!

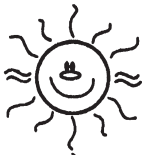




WHITE OAK

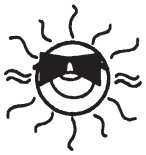


This tree produces acorns and its leaves have rounded, bumpy edges. Its bark is pale and flaky gray and it can live for hundreds of years!



means this tree is **sun loving**

means this tree is **shade tolerant**



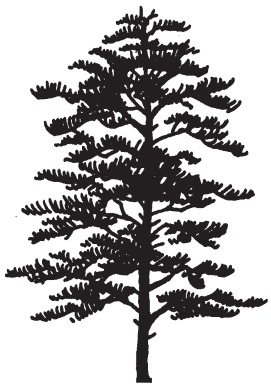
means this tree likes both **sun** and **shade**

SUGAR MAPLE

In the fall, this tree turns a golden or orange color. In the spring, it gives us sap to make maple syrup. Its leaf is so beautiful that it's even on Canada's national flag!

EASTERN WHITE PINE

This tree is a giant of the forest. It looks soft from a distance. Like the fingers on your hand, it has five needles in each leaf bundle.

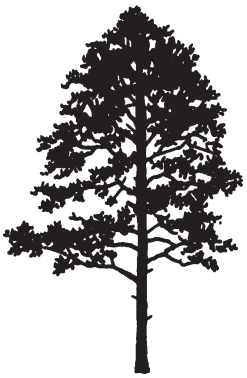


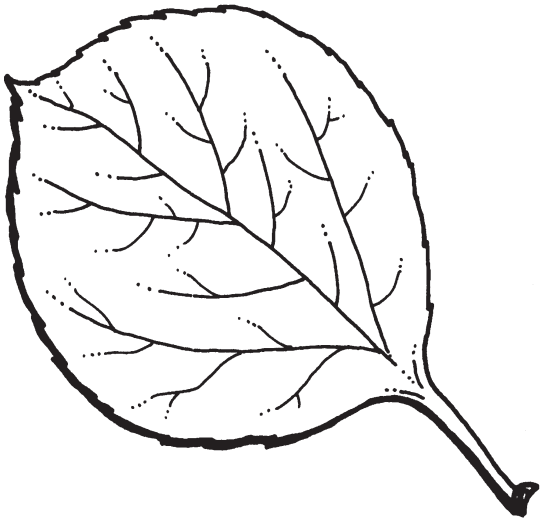
SASSAFRAS

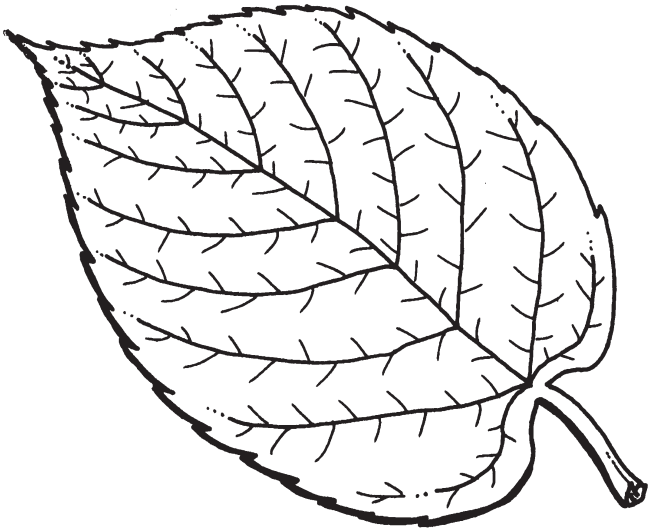
The leaves of sassafras can be different on the same tree. Some are shaped like mittens, others like a mitten with two thumbs, and others are shaped liked a football with pointed ends!

RED PINE

Red pine has leaves that are two needles bundled together. Its needles snap when they are bent. Often it has been planted in groups with many other red pines.







ASPEN

Aspen can grow new young trees from its roots. Its leaves quake or flutter in the wind and sound like rain. Its bark is greenish white.

BLACK CHERRY

The bark of this tree is dark and smooth when it is young. When it is old, its bark looks like blackish, burned corn flakes. Its wood is valuable for furniture.

WHITE ASH

White ash bark has ridges which form shapes that look like lots of long diamonds. Its leaves are called "compound" because each leaf has seven smaller leaflets that look like leaves themselves.

BASSWOOD

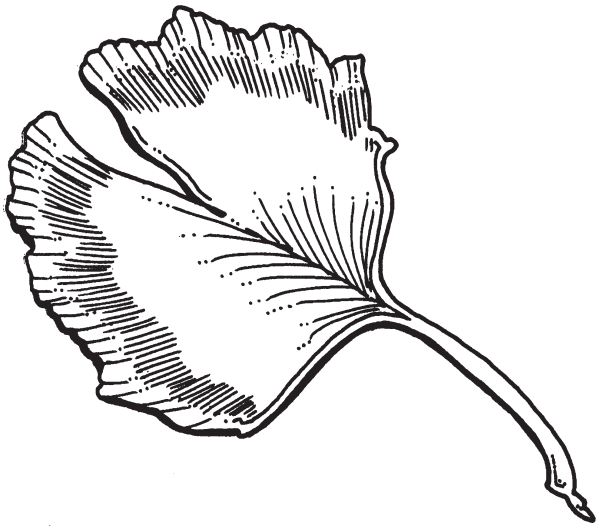
Basswood leaves are heart shaped. In the winter, it has bright red buds on the tip of its twigs. Its other name is American linden.

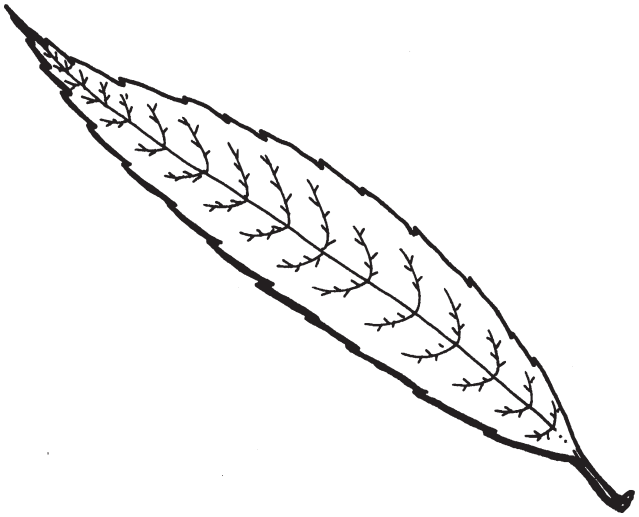
FLOWERING DOGWOOD

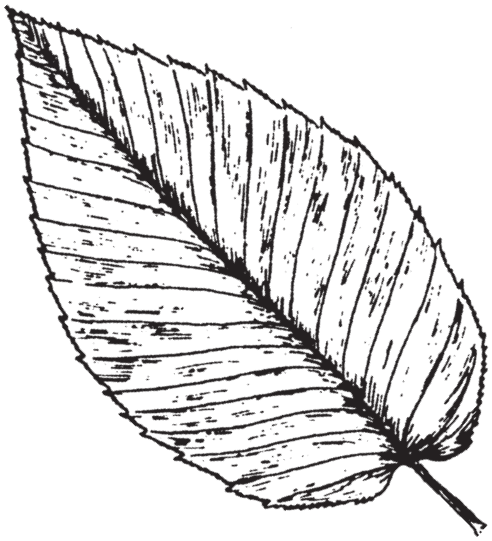
This tree is known for its white springtime blossoms. Though it is a forest tree, many people plant it in their yards. Its bright red fruits are eaten by birds.

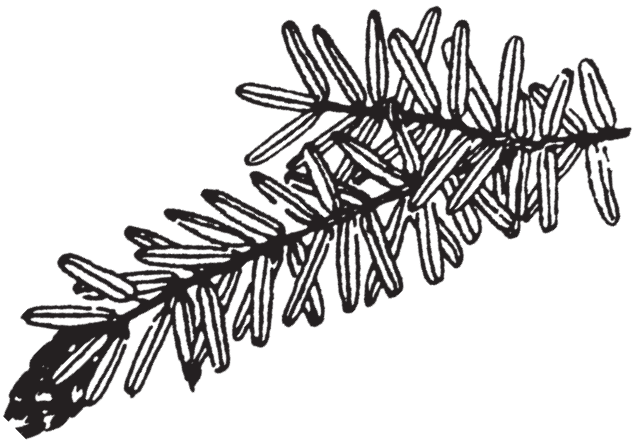
RED OAK

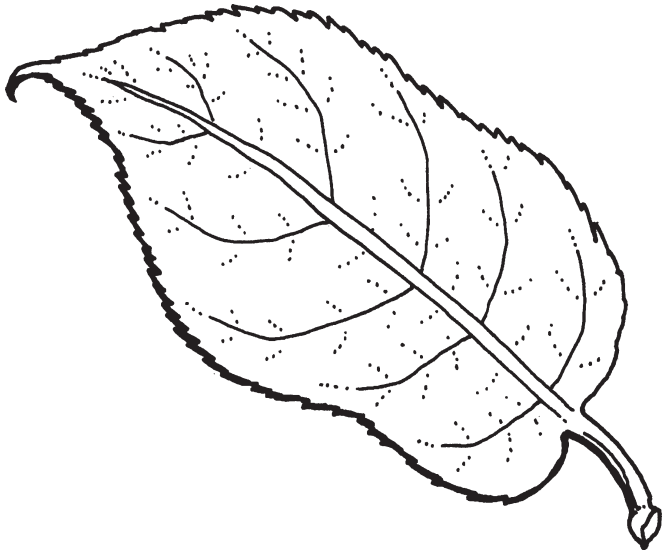
This is a tall and straight tree in the forest. It produces lots of acorns for turkeys and squirrels to eat. The tips on its leaves are pointed.



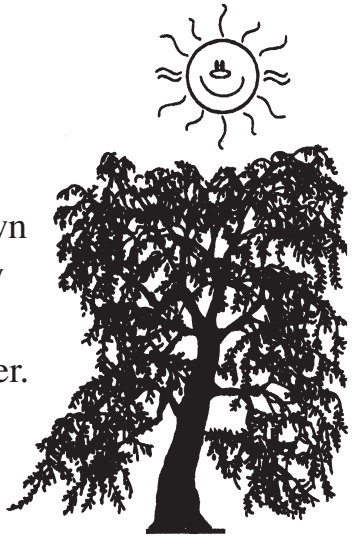








WEEPING WILLOW



Weeping willow branches sweep down to the ground. Many times you'll find these trees near water. They are often planted in yards.

GINKGO BILOBA

This is one of the oldest types of trees on earth! It has graceful, fan-shaped leaves. This tree often lives on city streets.

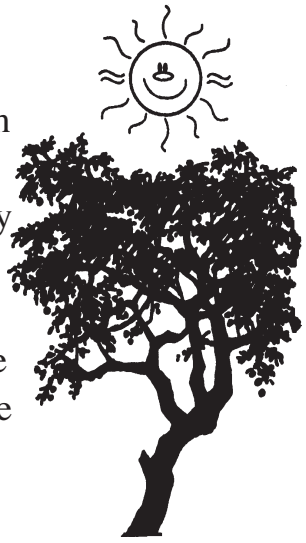
AMERICAN ELM

This tree was the "ruler of the streets." It grew tall and shaded many yards and roadsides. Many American elms have died from Dutch Elm Disease in the past 60 years.

BLACK BIRCH

Black birch bark is black and smooth with horizontal lines (called lenticels) on it. Its leaves and twigs have an oil that smells like wintergreen inside of them.

APPLE



This tree often grows in abandoned farm fields or orchards. It generally produces apples on its branches in the fall. When animals eat these fruits, they spread apple seeds far and wide in their droppings.

EASTERN HEMLOCK

This tree likes streamsides. Each of its needles is on a tiny stalk. Eastern hemlock bark was once an important source of chemicals for tanning leather.

ANSWERS

CHAPTER 1

Page 6: Line A=leaves, line B=branches, line C=trunk, line D=roots

Page 8:

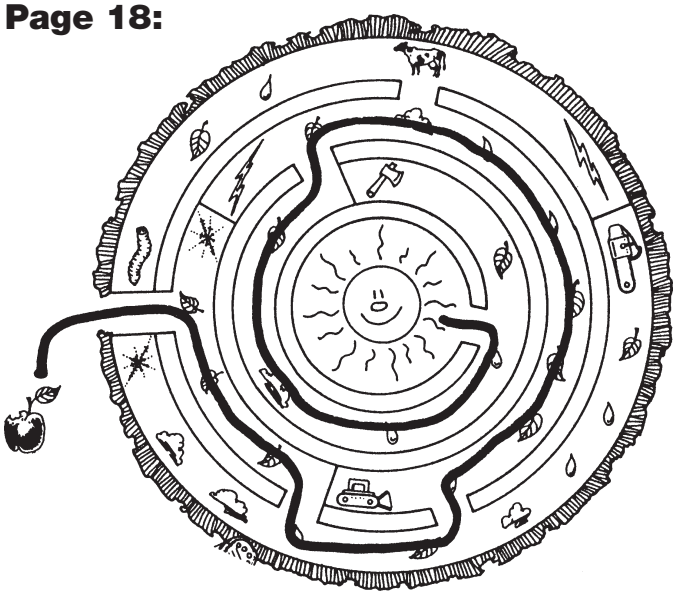
Page 9: ALL of these animals use dead trees and logs in one way or another!

CHAPTER 2

Page 14: The popsicle and ice cube should change. They will melt. Then they will become puddles. Then they will evaporate. The cherries might become shriveled or a bird might eat them.

If the cookie is gone, maybe your dog or a squirrel ate it!

Page 18:



CHAPTER 3

Page 23: Circle the orange tree.

CHAPTER 4

Page 30:

Forest A—cattail, red-winged blackbird, wood duck

Forest B—black bear, red oak, ruffed grouse

CHAPTER 5

Page 39: The sun-loving aspen is the first to grow.

Page 40: Forest scene B is first, Forest scene A is second, Forest scene C is third.

Notes

4-H ACTIVITIES REPORT

This report will help you keep a better record of your club activities. Fill it in as you complete each assignment. Refer to this record when you are entering county, state, and national programs. Ask your local leader to explain these programs to you.

My 4-H Activities Report for the 19 _ _ _ _ Club Year

Projects taken _____

_____

_____

_____

Offices held _____

_____

Club _____

County _____

"Show-and-tells" given to

Family _____

Friends _____

Local club _____

County _____

Regional _____

State _____

News articles _____

Radio _____

TV _____

Things done to improve my health _____

_____

_____

Community service or citizenship work done

By myself _____

With club _____

Number of meetings my club(s) held this year _____

Number I attended _____

Number of new members I encouraged to join 4-H _____

Number of boys and girls I helped with projects _____

In what way? _____

_____

_____

Check those attended and tell how you helped

_____ 3- or 4-day camp

_____ 1-day camp

_____ Club or county tours

_____ Club picnic

_____ Countywide picnic

_____ 4-H Sunday

_____ County fair

_____ Achievement programs

_____ Roundup

_____ Teen Leader Retreat

_____ State 4-H Capital Days

_____ Camp Leadership Training

_____ Penn State 4-H Achievement Days

_____ Pennsylvania Farm Show

_____ National 4-H Week

_____ State Ambassador Conference

_____ Judging training

Others:

_____

_____

_____

PENNSTATE

College of Agricultural Sciences
Cooperative Extension

Name _____

Address _____

_____

Name of club _____

Leader's name _____

4-H Club Motto

"To make the best better"

4-H Club Pledge

I pledge
my head to clearer thinking,
my heart to greater loyalty,
my hands to larger service, and
my health to better living, for
my club,
my community,
my country, and
my world.

4-H Club Colors

Green and White