

Penn State **Extension**

Planting Trees

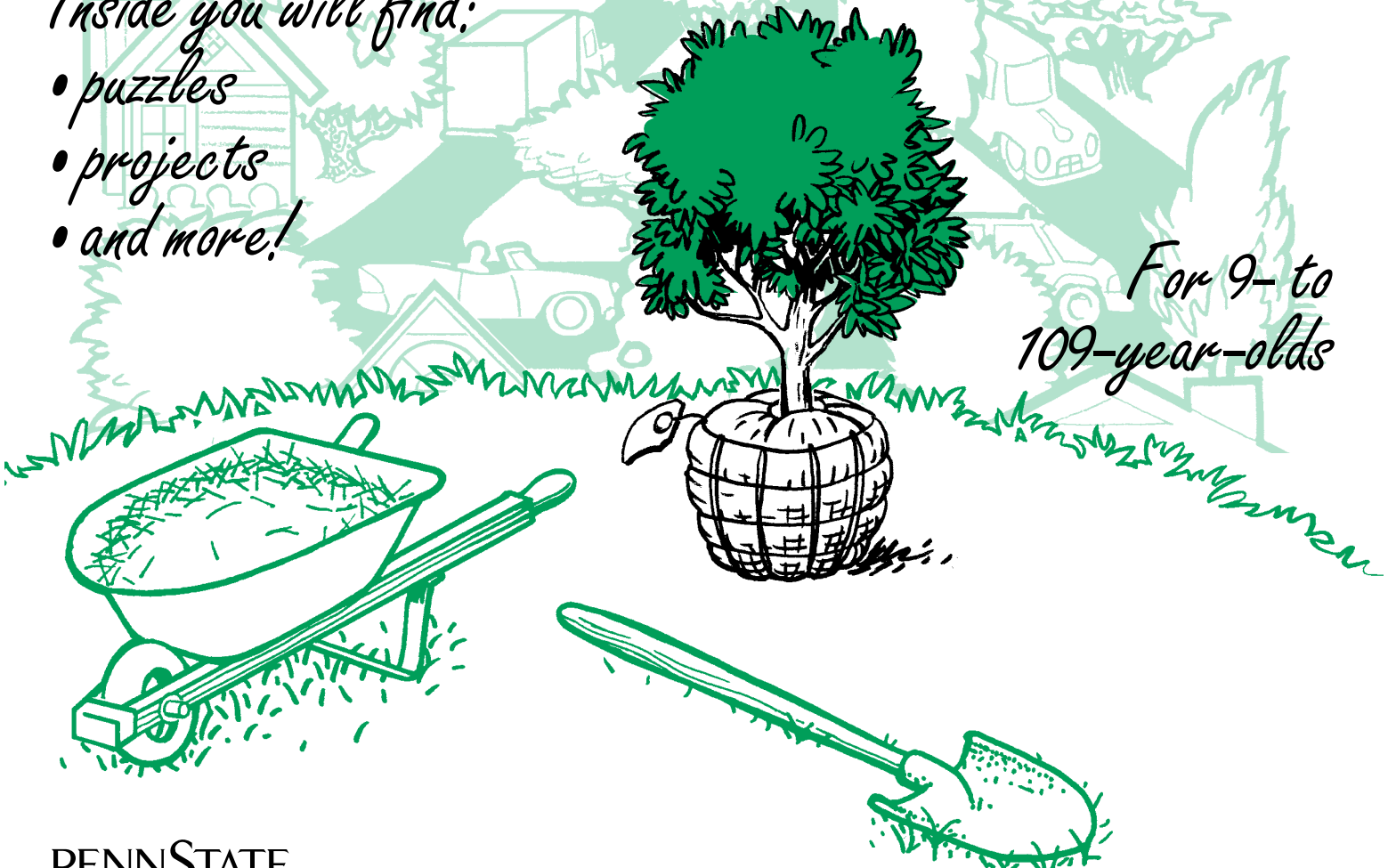
IN YOUR COMMUNITY FOREST

by Sylvan and friends

Inside you will find:

- puzzles
- projects
- and more!

*For 9- to
109-year-olds*



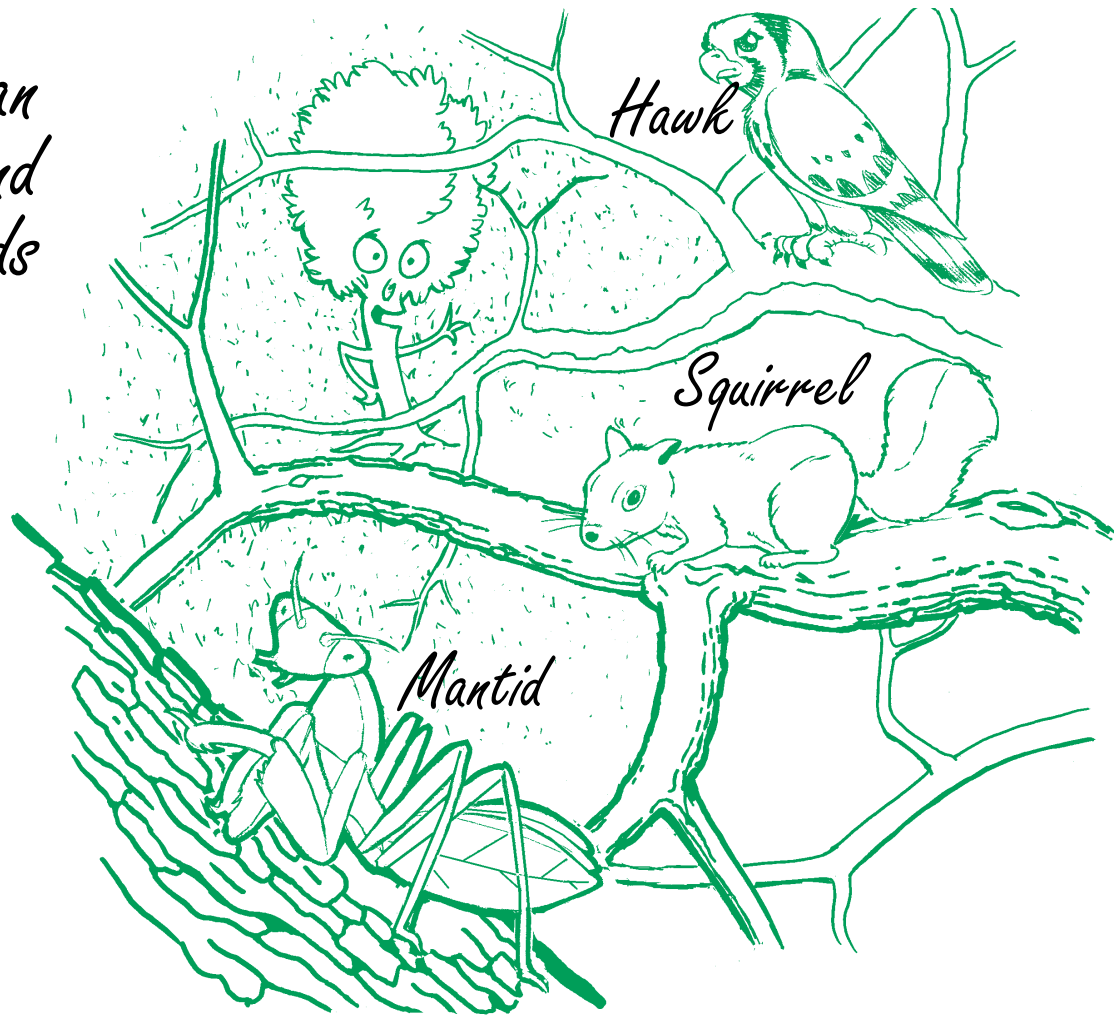
PENNSTATE



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College of Agricultural Sciences

This book belongs to:

Sylvan and friends



Produced by William F. Elmendorf, assistant professor of urban and community forestry, and Sanford S. Smith, natural resources and youth education specialist.

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Note: Near the back of this booklet you'll find a section called the Glossary. Any words you read that are in **green, bold text** are defined for you in the Glossary.



*Hi there,
my name is Sylvan...*

Have You Ever Thought About Trees?

Look outside your window
or think about your
neighborhood—I bet there's a
tree there.

- Is it a big tree?
- Is it a fruit tree?
- Is it a shade tree?
- Does it have flowers?
- Is it beautiful in the fall?
- Do birds live in the branches?

- Have you ever wondered where it came from?
- Did it grow there on its own or did someone plant it?
- How did people decide where to plant it?
- Why was that kind of tree planted?
- Is it a **native** or a **non-native tree**?

- How can you plant a tree and help it to grow?
- There are many beautiful trees to choose from.
- How do you know which tree is best for you and the place you plant it?
- Who takes care of it and helps it to grow?
- How does a tree grow anyway?

*Read on with me and together we will find
the answers to some of these questions!*

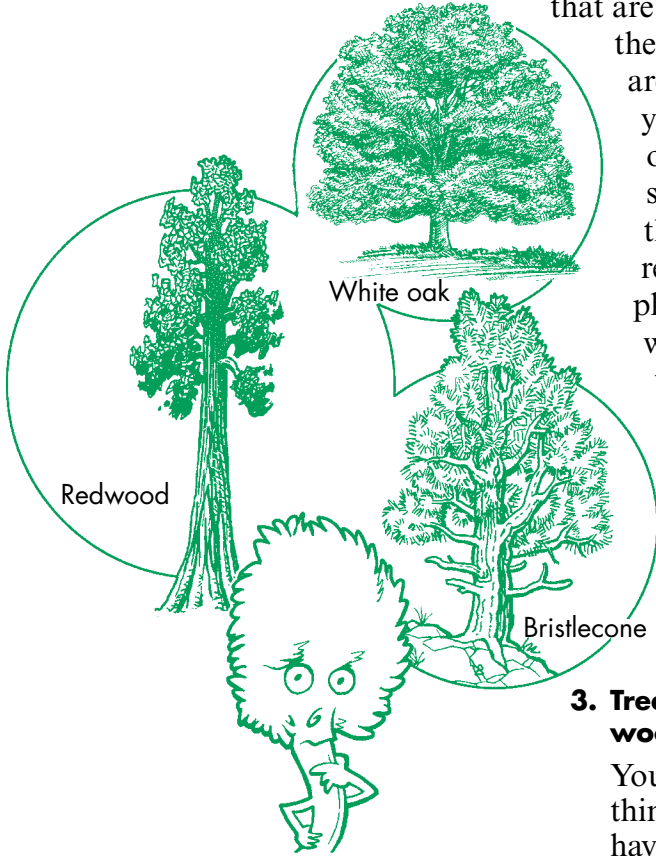
What Exactly Is a Tree?

A tree is a plant. But what makes a tree look so different from other plants?

1. **Trees are larger than other plants—redwood trees can grow to be more than 350 feet tall!**
2. **Trees grow to be much older than other plants.**

Some trees grow to be hundreds and even thousands of years old! Did you know that white oak trees can live more than 200 years? Have you read about the giant sequoia trees that are 2,500 years old, or

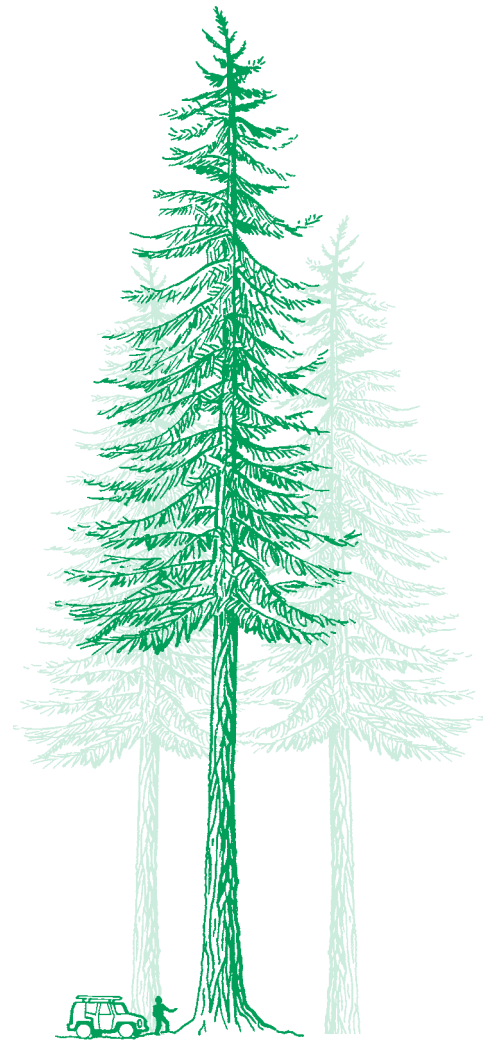
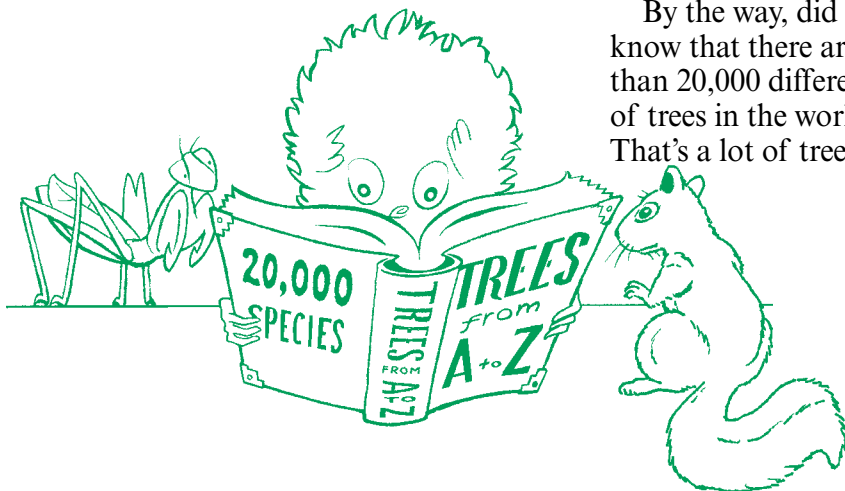
the bristlecone pines that are more than 4,000 years old? Those old, old trees make you stop and think, don't they? They make you realize that you should plan carefully the place where you plant a tree—because the tree you plant probably is going to be around for a very long time.



3. **Trees have a hard and woody stem, or trunk.**

You might be able to think of other plants that have one or two of these characteristics. But trees have all three of them, and that's what makes them different.

By the way, did you know that there are more than 20,000 different kinds of trees in the world? That's a lot of trees!



Redwoods are one of the world's largest trees.



How Many Parts Does a Tree Have?

A tree has three main parts—do you know what they are?

1. CROWN

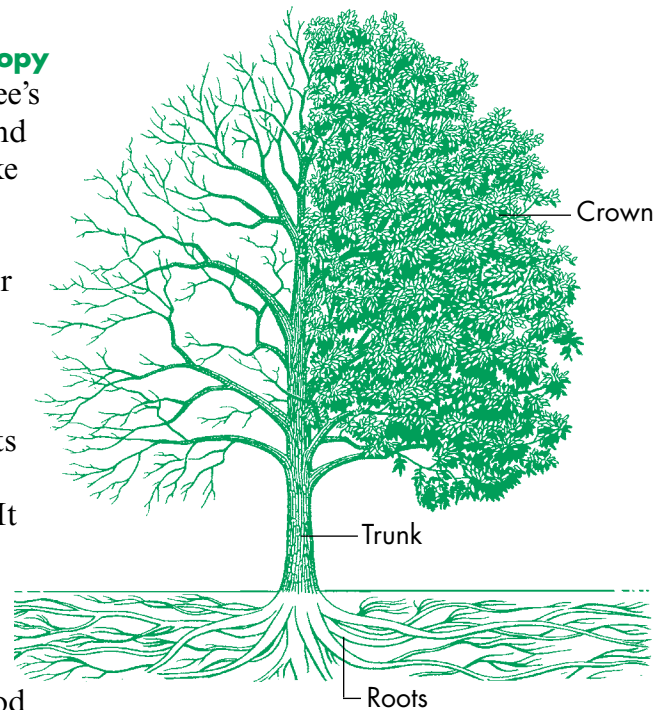
The **crown** or **canopy** is made up of a tree's branches, twigs, and leaves. Leaves make food for the tree, and the food provides energy for the tree to grow.

2. TRUNK

The trunk supports the tree, making it tall and strong. It moves water and **nutrients** from the roots to the leaves. The trunk also transports food from the leaves to the branches and down to the roots.

3. ROOTS

The tree's roots absorb water and dissolved minerals (nutrients) from the soil. They also act as an anchor for the tree—they hold it down in the soil and keep it from falling over.

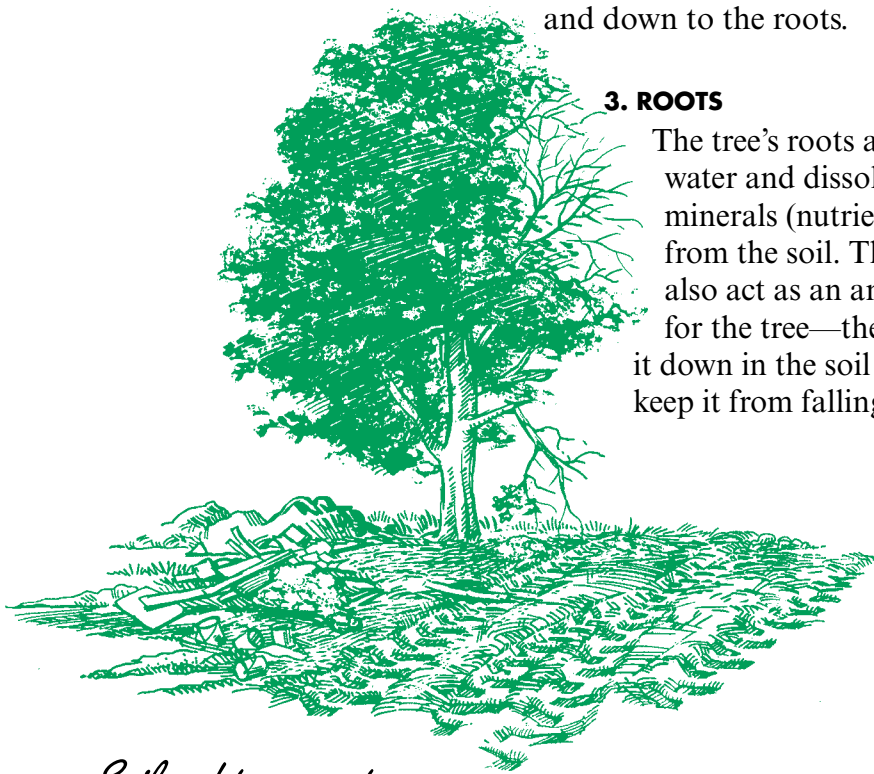


Most tree roots are in the first two feet of soil. Roots need air, water, and soil that is not crushed or damaged to grow.

PROJECT:

A root mystery for you!

Let's see if you can find out the length of the roots on a nearby tree. Roots can grow out to about three times the crown spread of a tree. Measure the distance from the trunk of the tree to a place on the ground directly beneath where the branches end (the tree's **drip line**). Multiply that number by three to get the distance the roots grow out from the trunk in the ground. Now walk from the trunk of the tree to that distance from the tree. That's a lot longer than you thought, isn't it? Think about this when you are trying to decide on the best place to plant a tree.



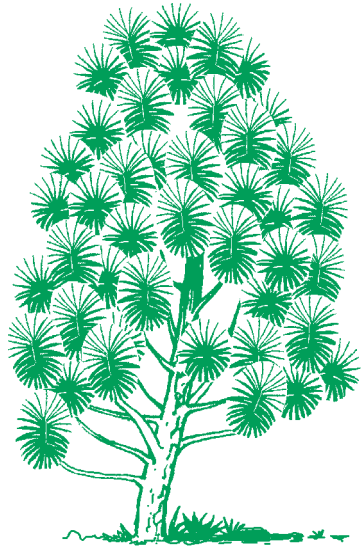
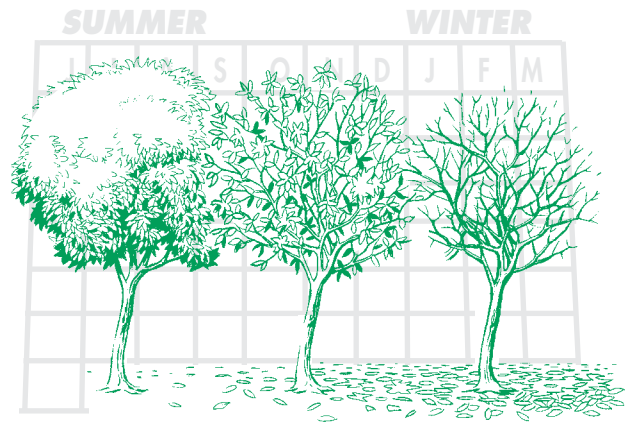
Soil and tree roots should not be damaged.



Types of Trees

Trees are divided into two categories: deciduous and evergreen.

Deciduous (say *de-SID-you-us*) trees lose all of their leaves each year when the weather gets colder. In the spring, deciduous trees grow new leaves. Do you have any trees that do this in your neighborhood? Maybe you've even had to rake the leaves that have fallen all over the ground!



Evergreen trees are green all year. That's because they don't lose all their leaves in one season like deciduous trees do. A pine tree is an evergreen tree.

Have you noticed how different trees can be from each other?

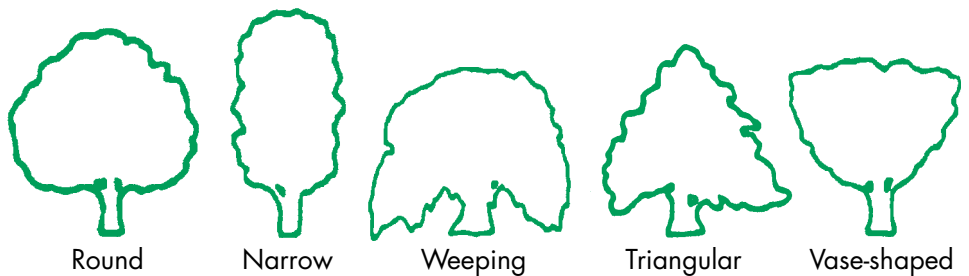
Think about some of the ways that trees can be different from each other.

Trees can be many different sizes and shapes. Their leaves also can be many different sizes and shapes. Leaves often are used to identify trees. Go outside and see how many different leaves you can find. There's one leaf out there that you may not know is a leaf. Look for a pine tree. See the needles on it? Those are leaves—they are called needle leaves. Most evergreen trees are **needle-leaved trees**. Trees

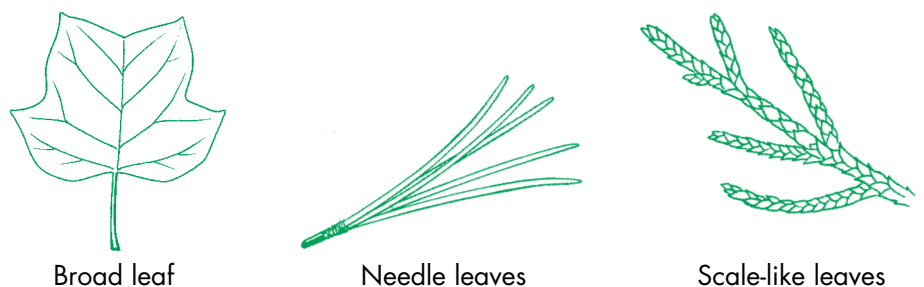
with broad, flat leaves are called **broad-leaved trees**. Some trees even have leaves that look like they are covered with tiny scales. These are called **scale-leaved trees**.

Trees also can have different kinds of **bark**. Even though different trees' bark looks different, it does the same thing for all trees—it protects them from injury and disease. Some trees can be identified by the type of bark they have. Tree bark can have different textures, thicknesses, colors, and even smells! It can be plain or it might have a pattern. It can be smooth, rough, bumpy, thorny, or flaky. What are some adjectives you can think of to describe the bark you see?

TREE SHAPES



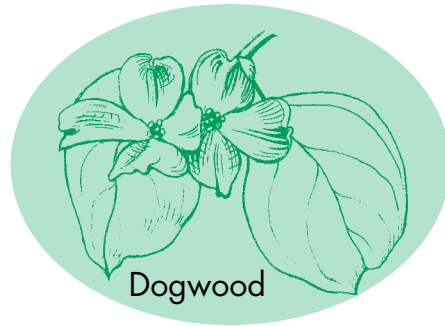
TREE LEAVES



PROJECT:

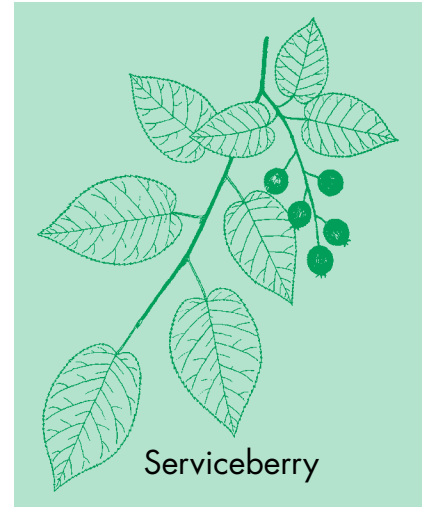
Barking Up a Tree

You can make a picture of tree bark. Take a piece of white paper and a piece of charcoal. Hold the paper against the bark of the tree and rub the charcoal firmly on the paper. Soon you will see the pattern of the bark come through on the paper. Try different trees and make a “bark” art collection!

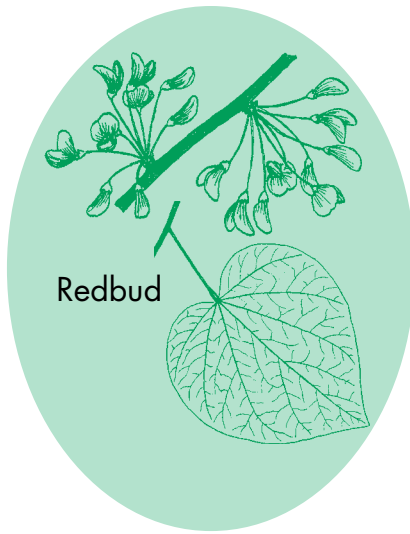


Dogwood

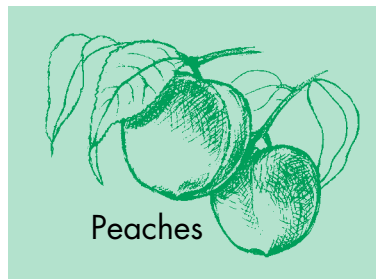
Some of our trees have beautiful flowers. Can you name the trees in your neighborhood that have flowers? Redbud, dogwoods, and serviceberry are some examples of flowering trees.



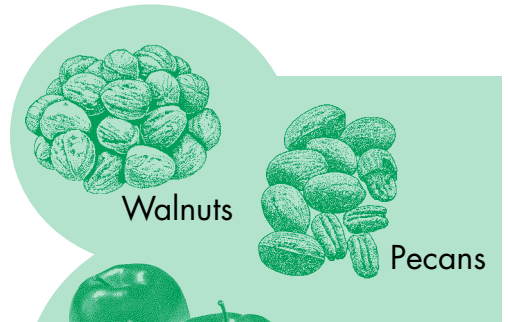
Serviceberry



Redbud

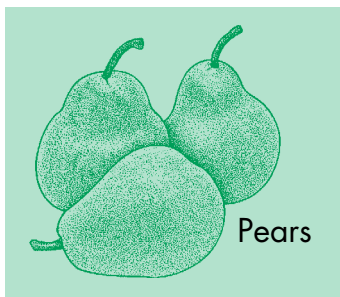


Peaches



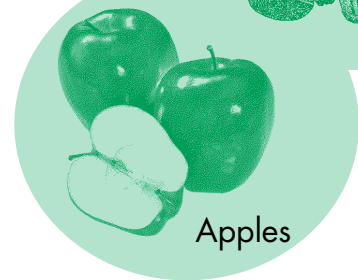
Walnuts

Pecans

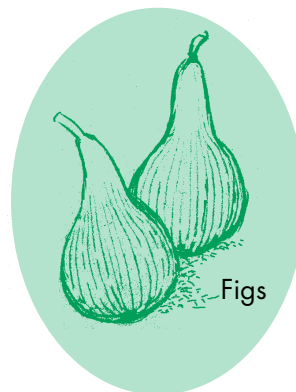


Pears

Some kinds of trees even have fruits. Pears, apples, peaches, and walnuts all are examples of fruits that grow on trees. Think about all the different shapes, sizes, and colors fruits can be.



Apples



Figs

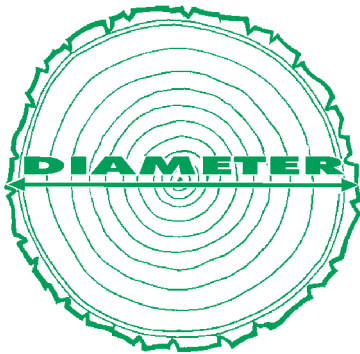
PROJECT:

Seeing Trees for the Very First Time

Take a walk and pretend that you are seeing the trees around you for the first time. Look at the height of each tree, the leaves, and the bark. Try to notice everything you can about the trees you see. You'll be surprised at how many differences you will find. Have a contest with a friend to see who can find the most differences among several trees.

How Do Trees Grow?

Trees grow upward and outward.



Trees grow upward from the top of their trunk and the tips of their branches. If a birdhouse is hung on a tree branch, do you think it will move up as the tree grows taller? (Answer on page 36.) *Try this question out on a friend!*

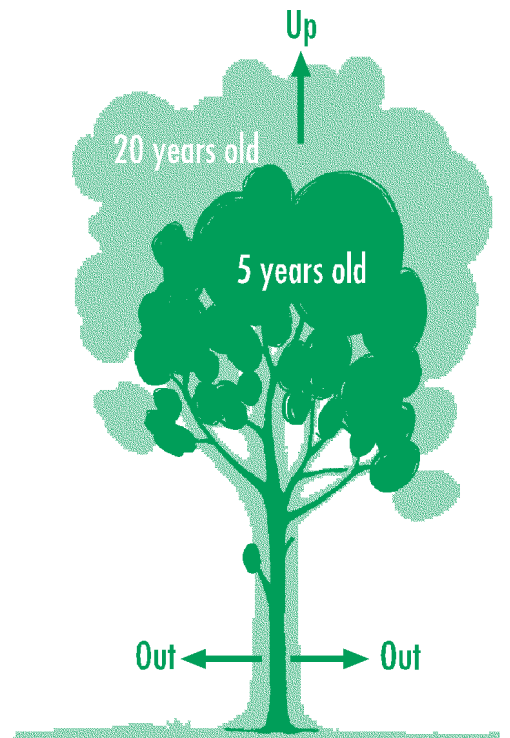
Trees also grow outward. They add a new layer (tree ring) every year. As each layer is formed, it makes the tree trunk grow wider in **diameter** (say *die-AM-uh-ter*). Do you know what diameter is? First, draw a circle. Now draw a line across the middle of the circle to divide the circle into two equal halves. The length of the line from one side of the circle to the other side is the diameter. Half of the line is called the radius. It's the same for a tree; the distance from one side of the trunk to the other side is the diameter of the tree. Diameter is the width of the tree and radius is half of the width.

Although you can't see them, a tree's roots are growing below ground as well.

Roots grow like branches. They grow from their tips and they also grow in thickness or diameter. Tree roots grow best in a place where they can find water, nutrients, oxygen, and warm temperatures. That place generally is in the top 26 inches of soil all around a tree. That's where most tree roots are found. But some roots can grow 10 or more feet under the trunk if the



Roots grow like branches.



soil is loose. Because oxygen can not move in the soil, roots will not grow where soil has been crushed or damaged by equipment or where there is standing water.

What do trees need to grow?

Trees must have sunlight, **carbon dioxide** (say *KAR-ben die-OX-side*), oxygen, water, a climate they can tolerate, and soil nutrients so they can grow.

But what do they "eat"?

Trees need food to grow, just like people. But one of the differences between trees and people is that trees make their own food!

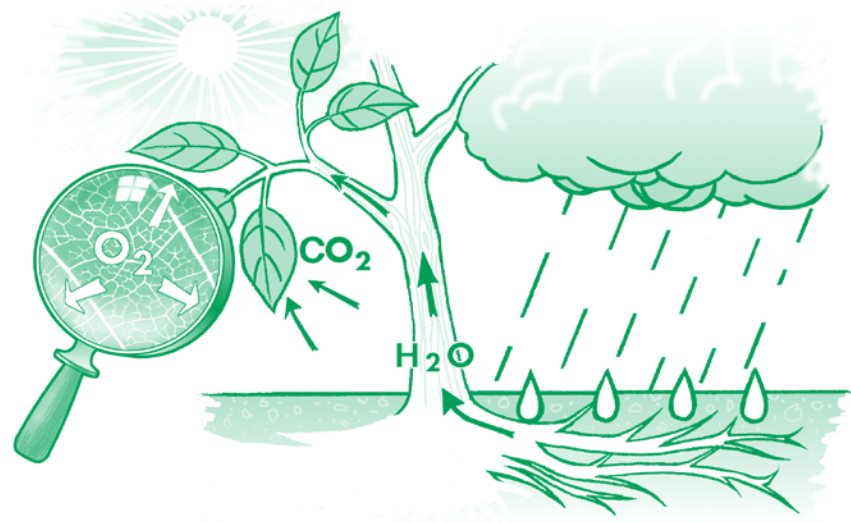
Trees make food in their leaves by a chemical process called **photosynthesis** (say *foe-toe-SYN-the-sis*). Let's break the word into two parts so you can understand what it means. The word "photo" means light (in this case, sunlight), and "synthesis" means to combine. Photosynthesis is a process that combines sunlight, carbon dioxide (CO₂) from the air, and water from the soil to make food for the tree.

How does photosynthesis happen?

Inside each leaf are millions of **chloroplasts** (say *KLOR-uh-plasts*), where photosynthesis takes place. Leaves look green because of the green **chlorophyll** (say *KLOR-uh-fill*) in the chloroplasts. During photosynthesis, the chloroplasts work like tiny factories. They use sunlight, carbon dioxide, and water to create oxygen and sugar. This special type of sugar is the food that trees need to grow.

By the way, did you know that you breathe in oxygen and breathe out carbon dioxide? Trees do the opposite during photosynthesis; they take in carbon dioxide and release oxygen. So trees provide much of the oxygen we breathe through photosynthesis. In the wood of their trunks and branches, trees store carbon dioxide made by the burning of gas and other fossil fuels. These are great reasons to plant more trees!

Some of the oxygen that trees produce during photosynthesis is used up in a process called **respiration** (say *res-pa-RAY-shun*). Trees take up oxygen and release carbon dioxide during this process (like people). During respiration, the food that was made through photosynthesis is broken down so that it can be used by the tree for growth and maintenance.



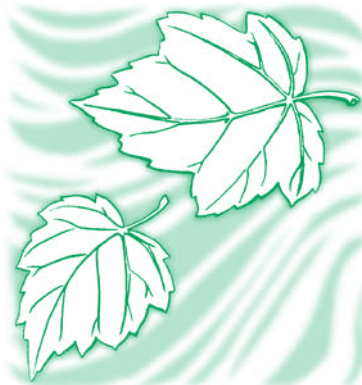
Why are those leaves changing color?

Most green leaves have more colors in them than you see. There actually are many colors (**pigments**) in a leaf. You can't see all of the other colors, though, because the green chlorophyll in the leaf is hiding them.

Tree growth slows down in the fall because the days are shorter and cooler, and there are frosts at night. This means that less sunlight is available for photosynthesis, causing the chlorophyll in deciduous trees' leaves to break down and lose its color. As the green color fades, you can see the other colors that have been there all along! What are some colors you have seen on trees in the fall? I bet you have seen many different shades of red, yellow, and orange.

Where have all the leaves gone?

Have you ever wondered why deciduous trees lose their leaves? Deciduous trees' leaves can't photosynthesize after they have lost their chlorophyll. Remember that photosynthesis produces food for trees. Without food, the leaves die and fall off the trees. Trees are **dormant** when they lose their leaves. Deciduous trees become dormant during the winter months. This means they are in a period of rest. The trees don't die because they use the food stored while the leaves were busy photosynthesizing in the spring and summer. And don't forget—new leaves will grow on the trees next spring!



What is soil?

Soil is the loose surface of the earth. It can be a few inches deep in some places and several feet deep in others. Soil is made from particles of sand, silt, and clay, and parts of plants and animals. There are many different types of soil, each having a certain texture and structure. Texture is the amount of **sand**, **silt**, and **clay** particles found in a soil. Structure is how the particles of sand, silt, and clay arrange themselves into groups. For example, the clay that we use in school is made up

mostly of clay soil particles and has a clay texture. It has a blocky structure when it's made into bricks and a platy structure when it's made into plates.

Soil structure can be hurt by bulldozers and other large equipment. When a soil's structure is destroyed (crushed) by a bulldozer, water and air will not move in and through the soil, and the tree's roots will not be able to grow or live. To be healthy, trees depend on healthy soil for water, nutrients, and structural support.

SOIL TEXTURE



Sand particles

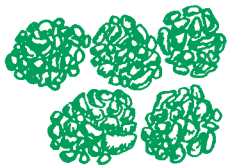


Silt particles

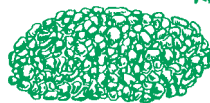


Clay particles

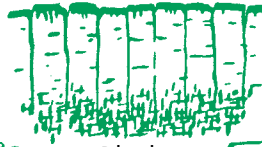
SOIL STRUCTURE



Granular



Massive



Blocky



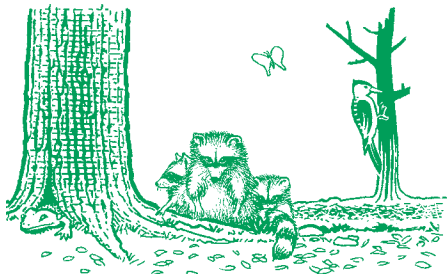
Platy

Why Do We Plant Trees?

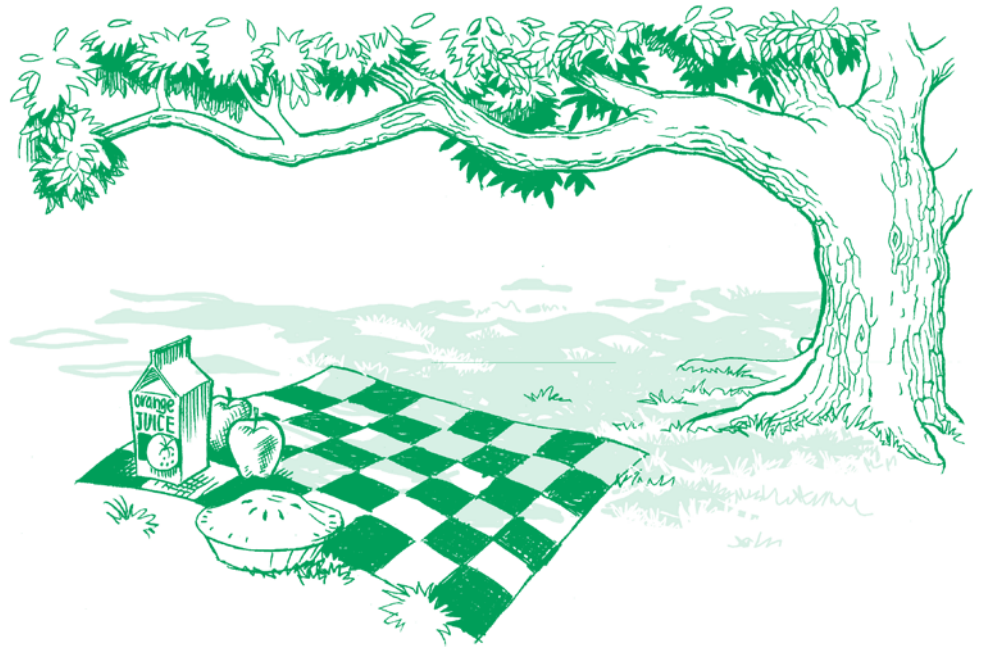
PROJECT: Tree Lists

Make a list of any reasons you can think of to plant a tree. Compare your list to mine below.

1. How many times have you sat in the cool shade of a tree?
Shade trees are very popular on hot days. The shade from trees can keep people and their homes cool.
2. Some trees provide food for us. Do you like orange juice? How about an apple for a snack? Or maybe walnuts for your favorite brownies? Many trees produce fruits, nuts, and other foods that people eat.
3. Have you noticed that many trees are pretty to look at? They may have beautiful flowers in the spring, or their leaves may change colors in the fall. Trees add beauty to our neighborhoods and communities in many ways. Some people plant trees just for that reason.



4. Trees also provide shelter and food for many birds and animals.



5. Trees' roots help to hold soil together, which reduces water runoff and soil **erosion** (say *ee-ROW-zhun*).
6. Trees clean the air we breathe. In the process of photosynthesis, they take in carbon dioxide and release oxygen. In one year, a tree can release enough oxygen for four people. That's a great reason to plant a tree (or more)!

Those are only a few of the reasons you might want to have trees where you live, play, and work. Try to think of other ways that trees or tree products are important to you. I'm sure you can think of many.

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



Trees clean the air!

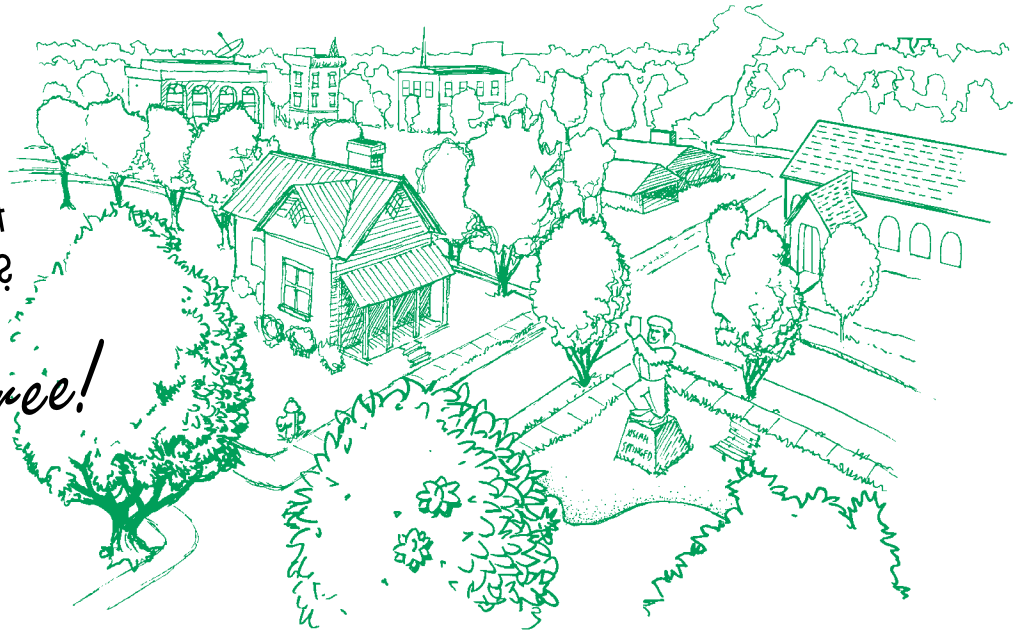
The Community Forest

Look around—all the trees
you see are part of the
community forest.

Did you know that you live in a forest? It may not be the kind of forest you think of when you hear that word. A **community forest** is made up of all of the trees in a town or city. Think about all the trees that are in your neighborhood, close to your school, and anywhere else near your home. These trees all are part of your community forest.

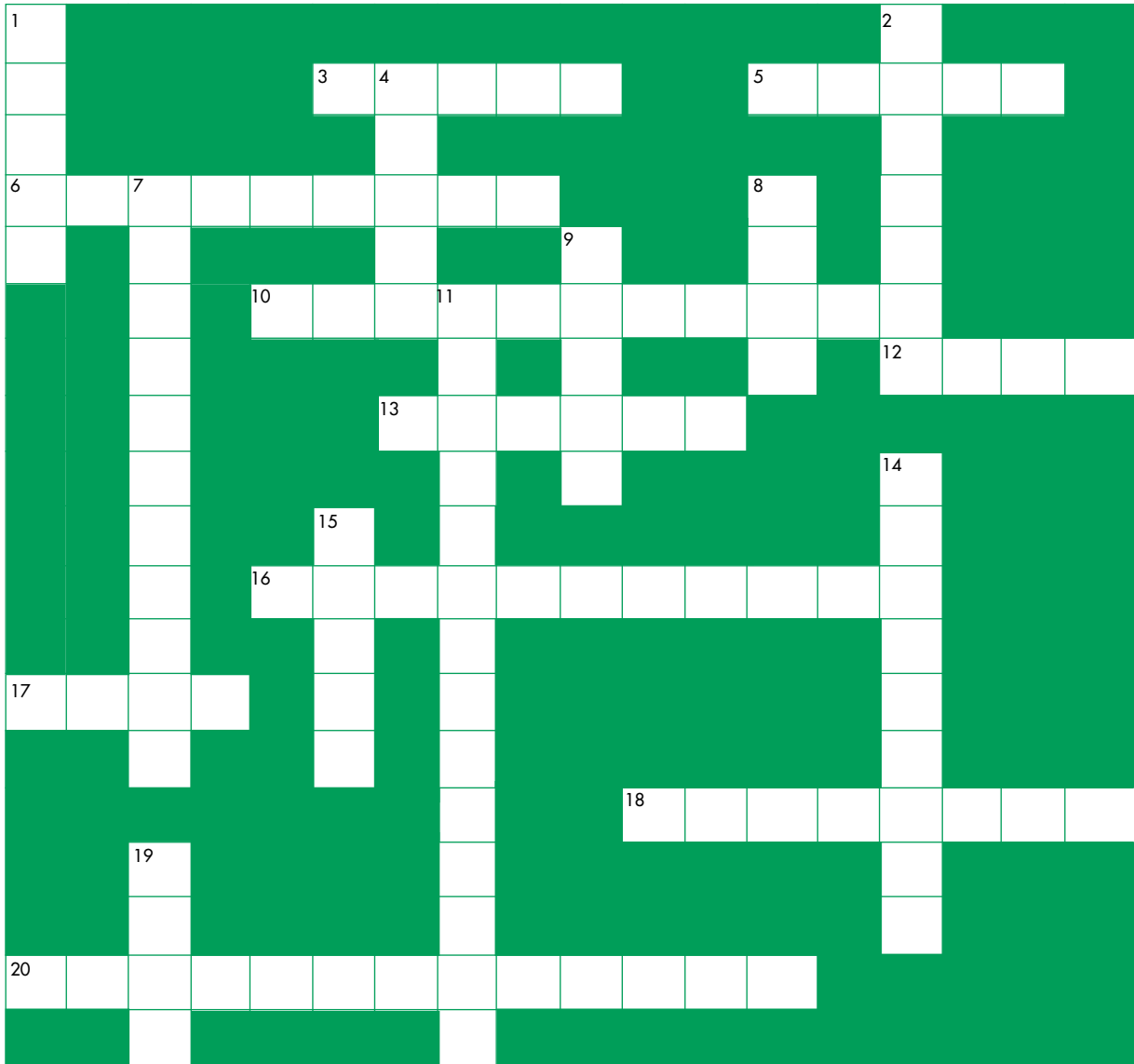
How can you
help the
community forest
grow?

Plant a tree!



CROSSWORD PUZZLE

(Answer on page 36.)



Across

3. What do a tree and an elephant have in common?
5. What do a tree and a king have in common?
6. What kind of tree loses its leaves in the winter?
10. Some of the oxygen that trees produce during photosynthesis is used up in a process called _____.
12. A small branch.
13. A group of trees in a wilderness, a town, or even a city!
16. A _____ pine is a tree that can grow to be more than 4,000 years old.
17. During what season of the year does tree growth begin to slow down?
18. When chlorophyll breaks down, you can see other _____ in leaves.
20. Photosynthesis combines sunlight, _____, _____, and water to make food for the tree.

Down

1. _____ trees are the most popular trees on hot days.
2. When trees are in a period of rest, they are _____.
4. What part of the tree is its anchor?
7. What makes leaves look green?
8. A better word for dirt.
9. The color of most leaves in the summer.
11. The chemical process trees use to make food is called _____.
14. What kind of tree looks green all year long?
15. A sweet gift to eat from a tree?
19. What do a tree and a dog have in common?

You Can Plant a Tree

- What kind of tree will you plant?
- Will it be a big tree?
- Will it be a flowering tree?
- Will it be a fruit tree?
- Will it be a shade tree?
- Will it be an evergreen?

First you have to find the right place to plant your tree. The place you choose to plant your tree is called the **site**.

The first step is for you to find the best site to plant your tree. It is very important to look at and learn about the planting site before you buy and plant the tree. Once you know the characteristics of the place you are planting the tree, then you can decide what kind of tree will grow there. Trees need good sites to grow. A good site is big enough for a tree's roots and branches to grow, has the right amount of sun, and has good soil.



How Do You Find the Best Planting Site?

Meet my friend Hawk. Hawk will show you how to find the best site to plant your tree.



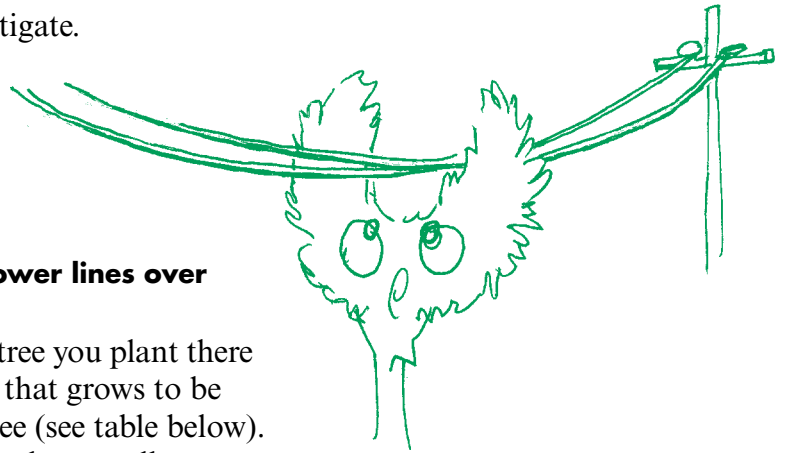
You need to do some careful investigating. First, go to the site where you think a tree might grow. Now, let's be detectives. I'll help you investigate.

LOOK UP:
Do you see power lines over your head?

If you do, the tree you plant there should be one that grows to be only a short tree (see table below). If you want to plant a tall tree, look for another site that is bigger.

Use this table to figure out if you want a short, medium, or tall tree.

TREE SIZE	HEIGHT
Short	Less than 25 feet
Medium	25 to 40 feet
Tall	More than 40 feet



LOOK AROUND:

1. Do you see a road, sidewalk, or curb nearby?

Trees' roots can grow outward underground to about three times the distance to the edge of their crown—remember that Sylvan explained this on page 6. Paved roads keep water and nutrients from getting down to the roots. Tree roots also may cause damage to a street or sidewalk. That's why it is important to choose the right tree for these locations. To see what size tree you can plant, look at the table below.

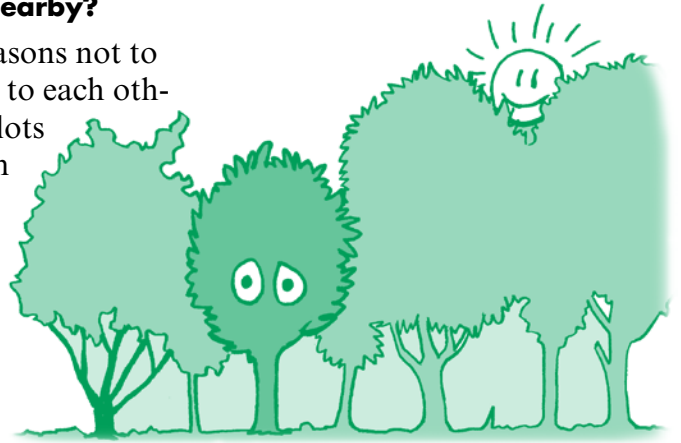
WIDTH OF PLANTING AREA	SIZE OF TREE YOU CAN PLANT
Less than 2 feet	Short
2 to 4 feet	Medium
Greater than 4 feet	Tall

2. Do you see a house nearby?

Deciduous trees planted on the east or west sides of a house can help to keep it cooler and conserve energy by shading the house from the sun in the summer. Because deciduous trees lose their leaves, they will let in the sun to warm your home in the winter. But it's important to pick the right kind of tree and to plant it the right distance from the house. Ask the people at the plant nursery how far your tree should be planted from the east or west side of the house.

3. Are other trees nearby?

There are several reasons not to plant trees too close to each other. Some trees need lots of light from the sun to grow and others need less. If a tree that requires full sun is planted in the shade of a larger tree, it will not grow well. If a tree that doesn't like full sun is planted in the open, it will not grow well.



4. How much sunlight does this spot get?

Go to your site in the morning and then again in the afternoon on a sunny day before you answer this question. Can you think of why it would be important to visit your site at different times?

(Answer on page 36.)

Here are the categories you can choose from to describe your site:

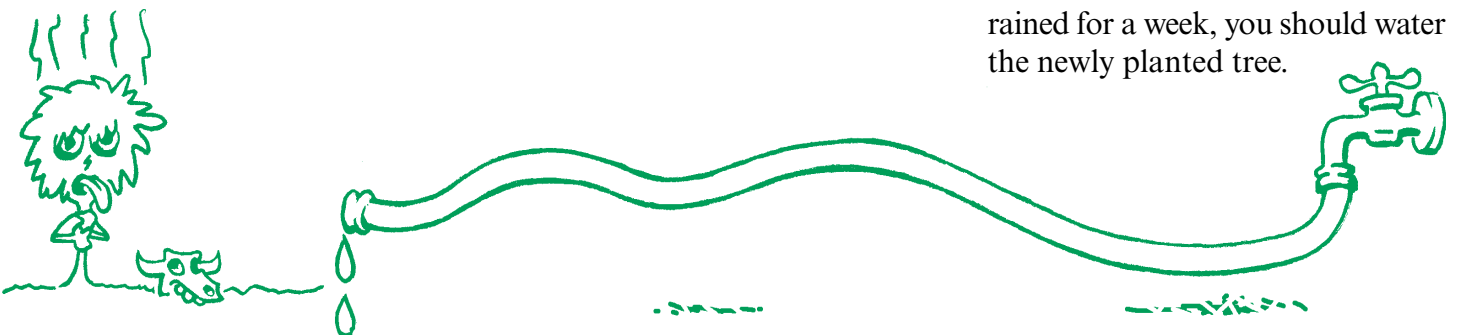
- Full sun*
(6 hours or more a day)
- Partial sun*
(4 to 6 hours a day)
- Shady*
(less than 4 hours a day)

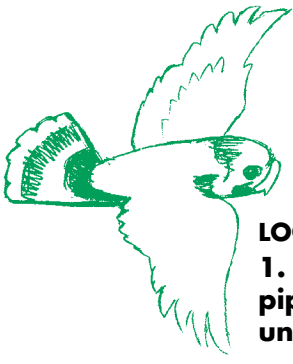
Don't forget to write down your answer. My site is in this category:

_____.

5. Is a hose nearby to water the young tree?

Trees need water to grow, especially when they are first planted. If the weather is hot and it has not rained for a week, you should water the newly planted tree.





LOOK DOWN:
1. Are there any pipes or wires underground?

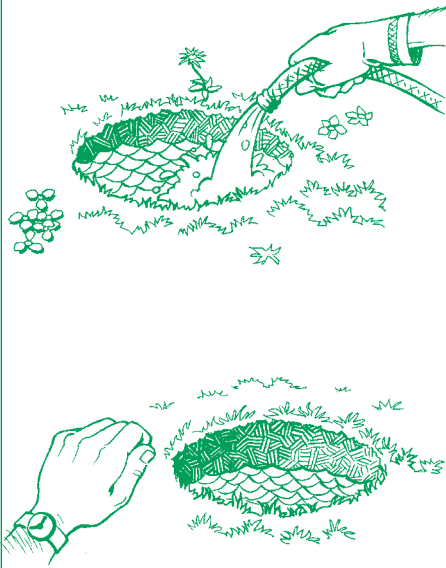
It can be very dangerous to dig a hole if there are buried electric wires, cable wires, telephone wires, water pipes, natural gas lines, or septic tanks. Ask an adult to call all the utility companies (in many places, it's as easy as calling one phone number) before you do any digging.



2. How fast does water drain from the soil?

It is very important for you to remember that there are many different types of soils, and that different types of trees need different types of soils. If water does not drain from soils quickly, air cannot move in and through the soil because the small places for air in the soil are filled with water. The roots of some kinds of trees need less air and can live in soil that drains water slowly. The roots of other kinds of trees can live in soil that drains water very fast. To know the right kind of tree to choose, you should know what kind of soil you have.

PROJECT:
A Soil Experiment!



Let's find out how fast water drains from your soil.
 Dig a hole about 18 inches deep and 12 inches wide. If you're digging the hole on someone else's property, ask permission first. Fill the hole with water. Now carefully time the water draining from the hole. If the water drains away within an hour, the soil has good **drainage**. If it takes a few hours to a whole day to drain, the soil has slow or "fair" drainage. If the water takes more than a day to drain, the soil has poor drainage. Don't forget to write down your results!

My site has _____ drainage.

A Description of the Tree I Would Like

Circle the words below that describe the tree you want. Remember to take this booklet with you when you go to the nursery.

tall
medium
small
deciduous
evergreen

shade
native
non-native
home for wildlife
broadleaf

flowering (color: _____)

fruit to eat: _____

Add more here if you don't find the words that describe your tree:

A Description of My Tree Planting Site

Circle the words in the following sentences that describe the site where you are going to plant the tree.

There **are** or **are not** utility wires.

The width of my planting site is **less than 2 feet**, **2 to 4 feet**, or **greater than 4 feet**.

There **is** or **is not** a street or sidewalk nearby.

The tree **will** or **will not** be planted near a house.

The tree **will** or **will not** be planted in the shade of other trees.

There **are** or **are not** pipes or wires underground.

The soil has **good**, **fair**, or **poor** water drainage.

If you don't find the words to describe the site where your tree will be planted, add more here:

What can you do with the information you've discovered?

Now that you have your planting site information, you can go to the **plant nursery**! In some areas, this may be called a garden center or a nursery and garden center. The plant nursery is a place that grows and sells plants and trees. The people who work there know all about trees and other plants. They can help you decide which tree is best for you and the place you have chosen to plant it. You can choose from many kinds of trees. Be sure to give the nursery workers the information Hawk helped you find, and tell them about the kind of tree you would like to have.



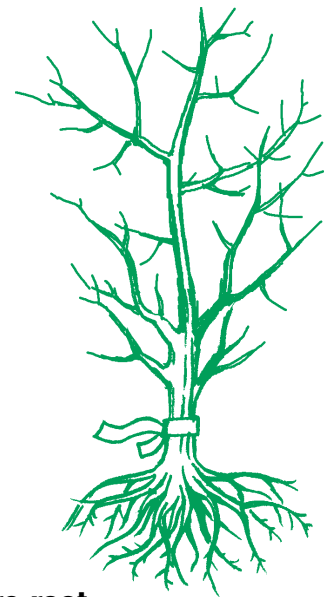
What Type of Package Will Your Tree Be In?

Nurseries have trees in different packages.



Balled-in-burlap (B&B)

These trees are grown in the ground without a container. When they are dug out of the ground, the ball of soil around their roots is wrapped tightly in **burlap**. Do you know what burlap is? (Answer on page 36.) Sometimes, to keep the ball of soil from breaking apart, it also is placed in a large wire basket.



Bare-root

You actually can see the roots on these trees! They are dug out of the ground, and the soil is removed from around their roots. It is very important to keep the roots of bare-root trees moist at all times. Do you know why this might be important? (Answer on page 36.) Bare-root trees are available only part of the year. They must be planted when they are dormant. Do you remember what “dormant” means? Look back to page 10 or in the Glossary if you need a reminder.



Container-grown

This type of tree is grown above-ground in a specially designed plastic pot. The pots can be many different sizes.

How Do You Choose the Best Tree?

You have answered Hawk's questions, and you've talked to the people at the nursery. They have helped you to select the right kind of tree for your site, and you are ready to buy your tree.

But wait!

We want you to buy a healthy tree. Please remember to inspect the trees carefully so that you can choose the best one. Here is a checklist for you to use when you go to the nursery.



The nursery has lots of trees like the one you have chosen. Do you know how to pick the best one? The best tree to pick is a strong and healthy tree.

Can you think of some trees you have seen that just don't look right? Think about why they do not look good to you. Maybe their leaves are yellow when they should be green? Or they have broken or dead branches? Maybe they have harmful **pests** on them? Those are the kinds of trees you want to avoid.



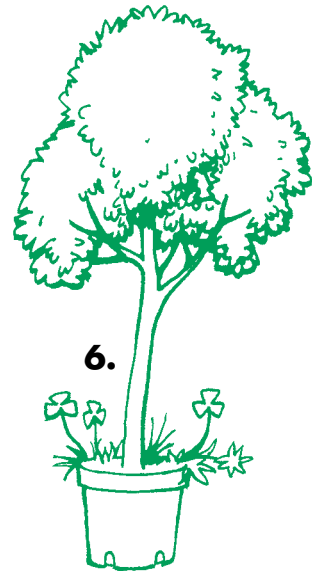
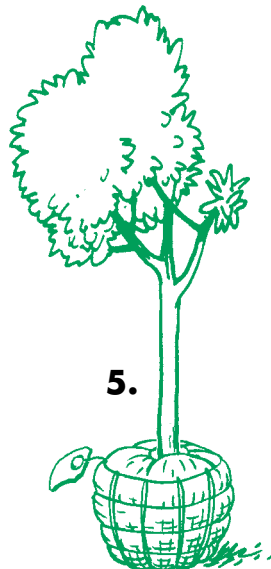
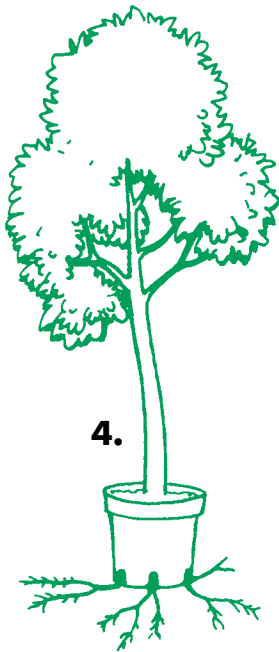
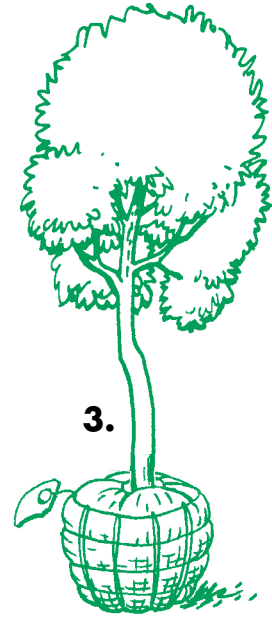
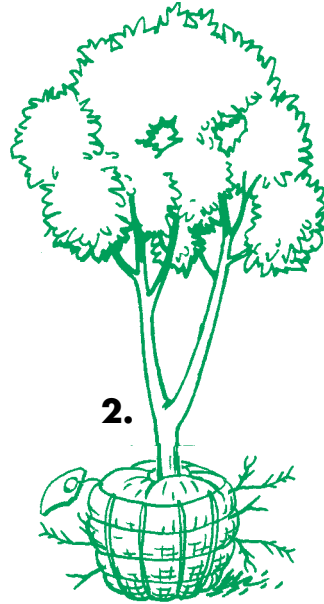
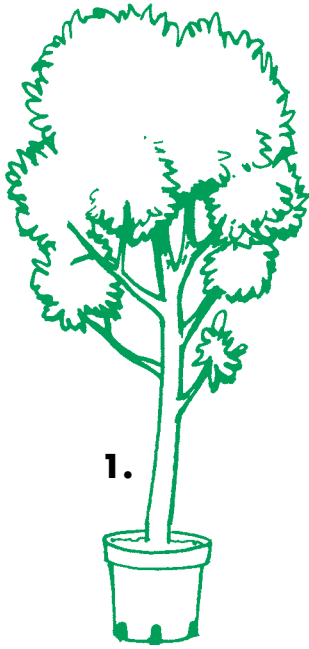
THE RIGHT TREE HAS:

- a strong, straight trunk
- a trunk that is not cut or damaged
- evenly spaced branches along the trunk
- branches that are not split or broken
- a full canopy of leaves (except when dormant)
- mostly green and healthy leaves (except when dormant)
- no diseases or harmful insects
- a root ball that is wrapped with fresh burlap
- a root ball that is firm and round
- no roots growing out of the burlap ball
- no roots growing out of the bottom of the container
- no roots circling the top of the container
- no weeds growing in the container
- moist soil in the root ball

WHICH OF THESE TREES WOULD YOU CHOOSE?

Circle the tree below that you would choose to plant.

(Answer on page 36.)



Taking Your Tree Home Safely

Once you have found a healthy tree, it is very important to take your tree home safely.

The first thing you should know is this—NEVER PICK UP A TREE BY THE TRUNK. Always lift the tree by the root ball or container; lifting the tree by the trunk breaks the contact between the roots and soil. The contact between the roots and the soil is necessary for water to be absorbed by the roots. If you lift the tree by the trunk, the weight of the soil also may damage or break roots. So remember to pick up your tree by the root ball or container.



Although your tree may not look fragile, it is. Be very careful not to slam the car trunk lid on the tree trunk or branches. Don't let your tree be whipped by the wind when you move it in a car or truck. This can happen if the tree is put in the back of a truck, tied to the roof, or has leaves coming out of the windows or the car trunk. Wind causes the leaves to lose their water, which can kill them. If possible, ask the adults to cover the tree with a tarp and drive at a slower speed. Don't forget to take the cover off as soon as you get to the planting site.



Remind the adults not to park the car in the sun and leave the tree in the car. Ask them to park the car in the shade, instead. Think about how hot you would get sitting in a car in the sun. Hot temperatures are very bad for a tree.

Always remember to load and unload a tree carefully and gently from your car.

It's Time to Plant!



Storing Your Tree at Home

By the way, if you are not going to plant your tree as soon as you get it home, here are some suggestions for you.

No unplanted tree should be kept in the sun. Keep trees in the shade of other trees or in another shady place until they are planted.

Balled-in-burlap

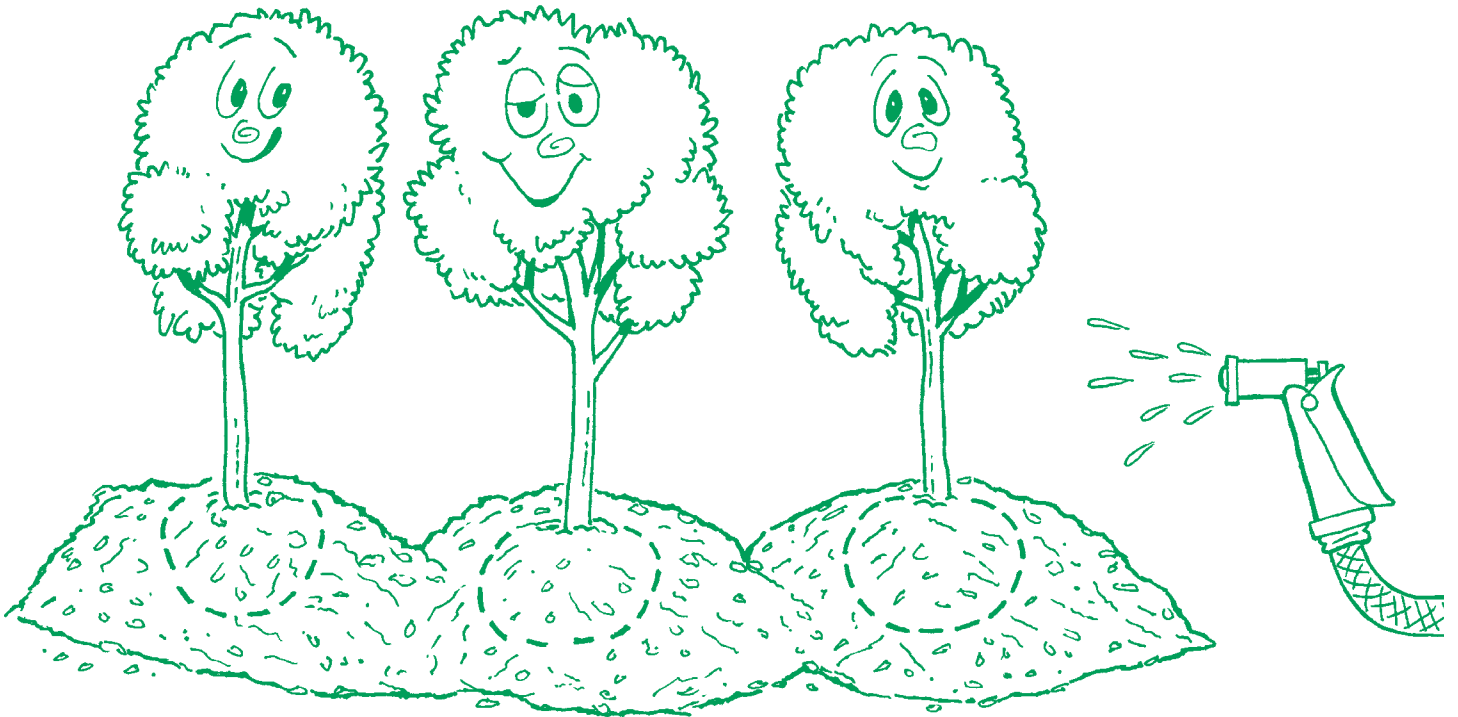
Bury the root balls of balled-in-burlap trees in mulch, and keep the mulch moist by watering. This keeps the soil and roots from drying out. Keep the root ball moist until you plant the tree.

Container-grown

Container-grown trees dry out very quickly; keep the soil moist (but not soaking wet) until you plant the tree. Water it slowly just until water runs from the bottom of the container. Check it every day; many need water every day in the summer.

Bare-root

Bare-root trees must be kept in the shade with their roots wrapped with moistened burlap or paper. You can spray water on the paper or burlap to keep it moist. Don't let the roots dry out!



Stored trees need to be watered.

How Do You Plant a Balled-in-Burlap Tree?

First you need to dig a hole for the tree.



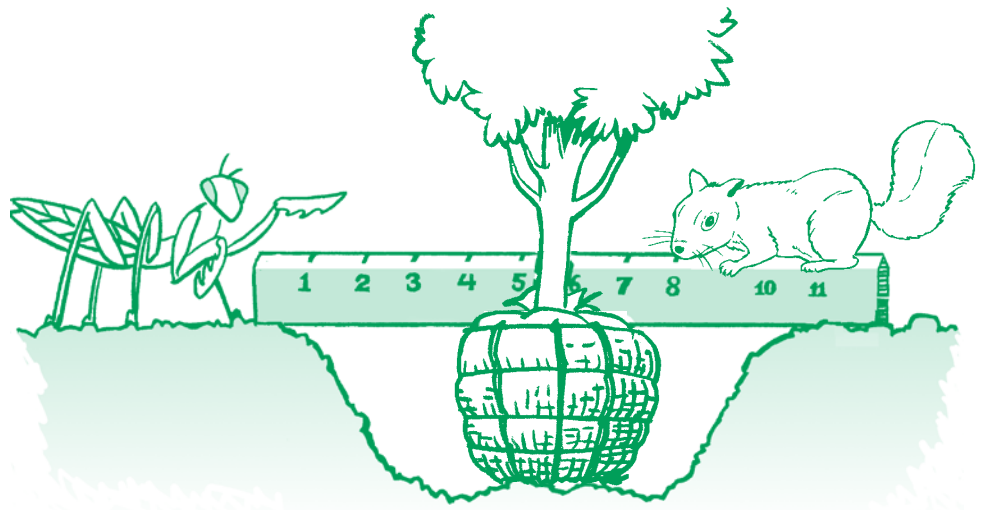
The hole should not be any deeper than the height of the **root ball**. This is very important. Do you know what the root ball is? It is the ball of soil that surrounds the roots of your tree.

Dig the hole for the tree so that the top of the root ball is level with or a little higher than the ground. Do you know why this is so important? If you dig the hole too deep and have to add soil to it to make the top of the root ball level with the ground, the soil you add to the bottom of the hole could settle. This would cause the root ball to go down and the tree to be planted too deep. Another reason not to dig a hole too deep is that any extra soil that you put on top of the root ball reduces the amount of oxygen and water getting to the roots. Only a thin layer of soil and mulch should be put on top of the root ball. We'll talk more about this later.

Here's a hint for you as you dig the planting hole. Instead of con-



stantly lifting the tree in and out of the hole to make sure that the hole doesn't get any deeper than the height of the root ball, you can use your shovel handle! Turn the shovel upside down and mark the height of the root ball on the handle. Then put the end of the shovel handle on the bottom of the planting hole to compare your mark with the depth of the hole. Keep doing this as you dig the hole, and when the mark is level with the surface of the ground, you have reached the right depth.



The planting hole should be at least two to three times wider than the diameter of the root ball. Measure the diameter of the root ball and multiply that number by two or three. The wider the hole, the better. Do you know why a wider hole will help the tree grow better? (Answer on page 36.)

Before you set the tree in the planting hole, remove any string that is tying the limbs together. Carefully lower the root ball into the center of the planting hole.

Make sure the tree is straight before you remove any string, burlap, or the wire basket. If any other straps, ties, or string are wrapped around the root ball or the tree's trunk, remove them.

If the burlap on your root ball is real, it can be left in the planting hole when you plant the tree. If the burlap on the root ball is artificial, it must be removed from the planting hole. Make sure there is no burlap showing above the soil when you plant the tree. This is im-

portant because any burlap that is above the soil can dry quickly and repel water. The roots could become too dry. You should remove the natural burlap from the top half of the root ball, but leave it on the lower sides and the bottom.

Sometimes there also is a wire basket around the burlap on the root ball. If your root ball has a wire basket on it, cut the top layer or two from the basket with wire cutters. Remove the cut part of the wire basket from the hole. Be careful not to cut yourself on the sharp edges of the wire.

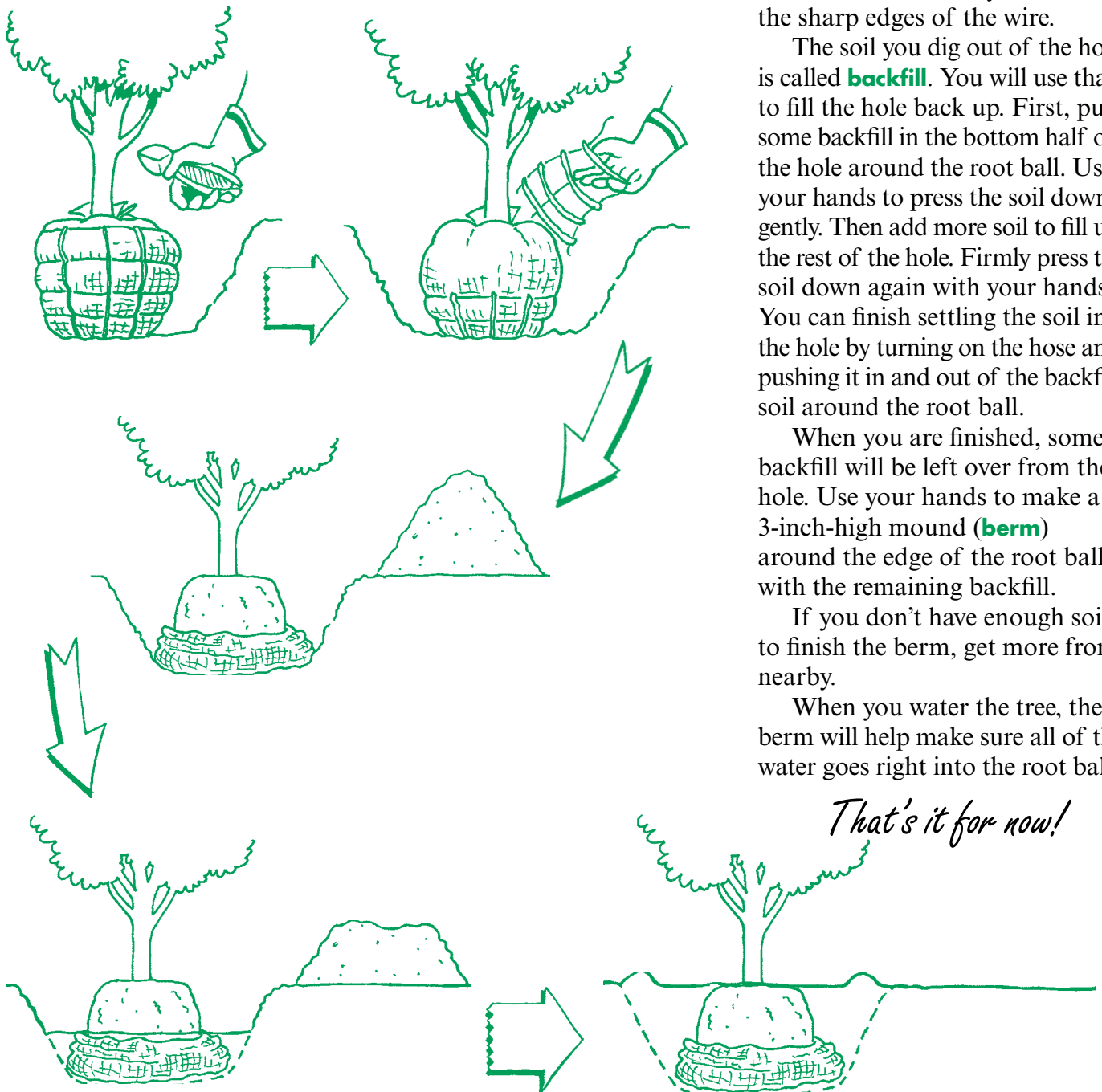
The soil you dig out of the hole is called **backfill**. You will use that to fill the hole back up. First, put some backfill in the bottom half of the hole around the root ball. Use your hands to press the soil down gently. Then add more soil to fill up the rest of the hole. Firmly press the soil down again with your hands. You can finish settling the soil in the hole by turning on the hose and pushing it in and out of the backfill soil around the root ball.

When you are finished, some backfill will be left over from the hole. Use your hands to make a 3-inch-high mound (**berm**) around the edge of the root ball with the remaining backfill.

If you don't have enough soil to finish the berm, get more from nearby.

When you water the tree, the berm will help make sure all of the water goes right into the root ball.

That's it for now!



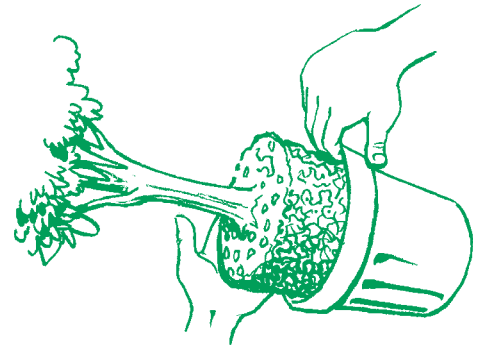
It's Time to Plant!

How Do You Plant a Container-Grown Tree?

First you need to dig a hole for the tree.

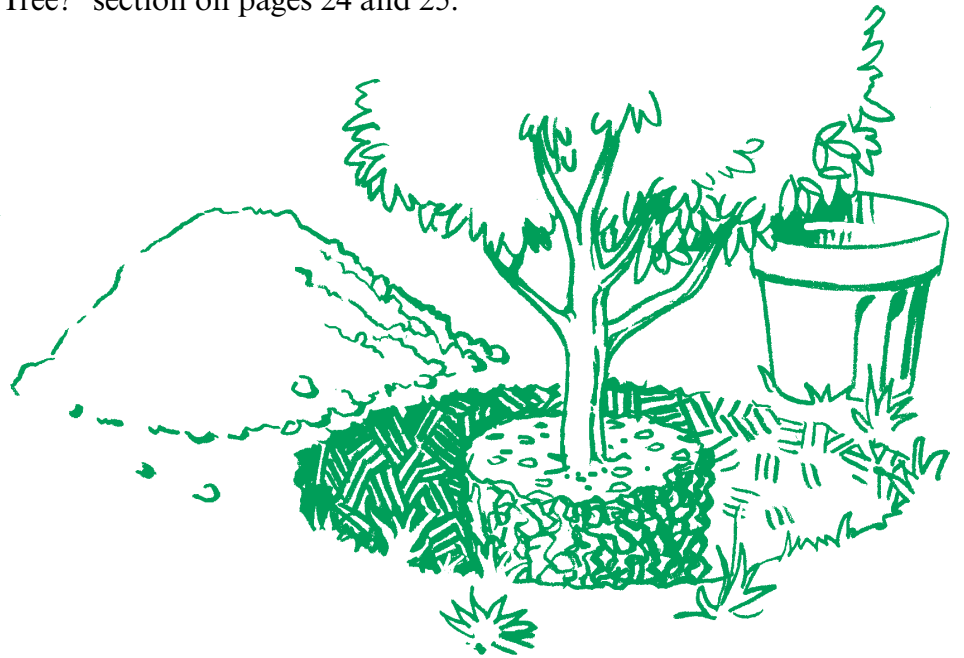


As with a balled-in-burlap tree, you should not dig the hole any deeper than the height of the root ball! This is very important. Notice that the height of the root ball is not the same as the height of the container. The height of the root ball is shorter than the height of the container because the nursery leaves space at the top of the container for water and fertilizer. Dig a planting hole for your container-grown tree just as you would for a balled-in-burlap tree.



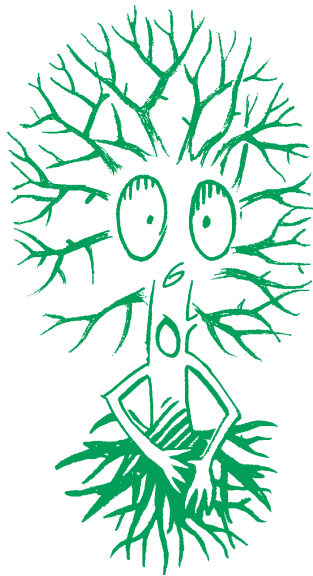
Now let's plant the tree.

Carefully remove the tree from its container and set it in the center of the hole. Before you add any soil, make sure that the tree is straight. To fill the hole, follow the instructions in the "How Do You Plant a Balled-in-Burlap Tree?" section on pages 24 and 25.



How Do You Plant a Bare-Root Tree?

Bare-root trees are planted differently from the other kinds of tree packages.



You have to keep the roots of a bare-root tree moist and shaded before you plant the tree.

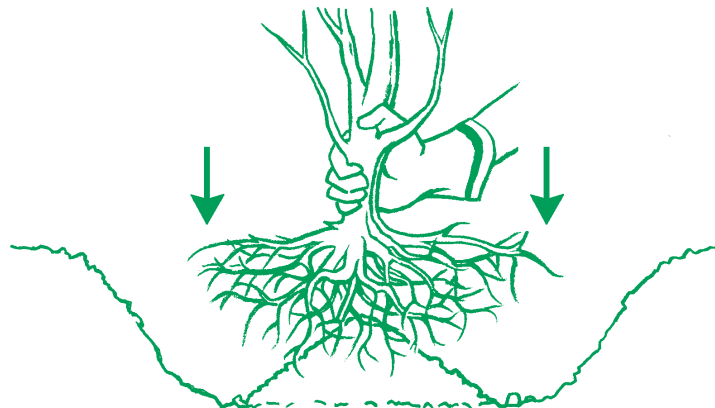
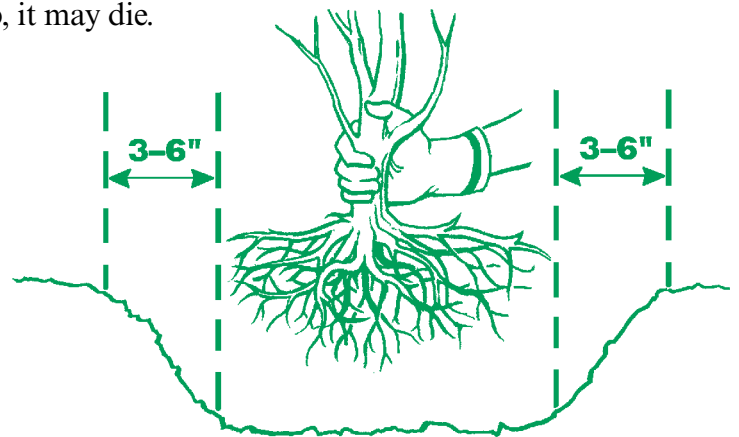
First, dig a hole that is wide enough for the roots to spread out without crowding each other. The hole should be about 6 to 12 inches wider than the roots are when they are spread out. Don't dig the hole too deep.

Next, make a cone-shaped mound of soil in the bottom of the hole. Set your tree on this mound and spread the roots around it. Since the roots are not covered by soil, they are very fragile. Be careful when you are handling the tree.

Then make sure that the topmost root on the tree is just below the top of the hole. Do you know how to find the **topmost root**? It is the first root you come to from the top down. Look carefully because this is very important. If you plant the tree too deep, it may die.

Hold the tree upright and add soil to the hole in layers. As you add each layer of soil, gently press it down with your hands. When the hole is half full, add water to settle the soil. Let the water drain, then check to make sure that the topmost root on the tree is still just below the top of the hole. If it settled deeper in the soil, pull the tree up slightly and rework the soil around the roots. Now you can finish filling up the rest of the hole. Add the soil in layers again, pressing down each layer with your hands.

The last step is the same as the other tree packages. Use your hands to make a 3-inch-high mound around the edge of the roots. When you water your tree, this "berm" will make sure all of the water goes right to the roots.



What Can You Do to Start Your Tree Off Right?

You found your tree a good home, now you need to care for it and help it to grow properly.

Can you name the three most important things you can do for your new tree?

1. WATER

The most important thing you can do for your tree is to water it. How much water does your new tree need?

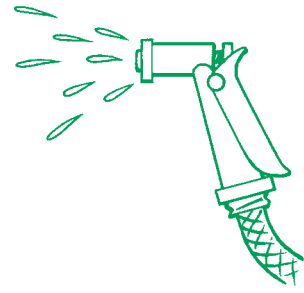
Your new tree should be watered often enough to keep the soil moist. In sandy soil, this might mean that you have to add water every week for the first 2 to 3 months if it doesn't rain. In a soil that drains poorly, watering once every 2 weeks may be enough. After the tree grows older, you can water it less often.

At each watering, your tree should get about 2 gallons of water for every inch of trunk diameter. Hold a ruler up to the tree trunk to figure out the diameter. For example, if you have a tree with a 3-inch trunk diameter, it should get 6 gallons of water. Water the tree slowly with a hose and move the hose around the top of the planting hole as you water. Pay close attention to the soil around your tree. If you think you are keeping the soil too soggy, don't water the tree as often. Be careful not to wash the soil away from the roots with the stream of water.

2. MULCH

The next most important thing to do is to put **mulch** around the base of your tree. Mulch is a tree's best friend. Do you know what mulch is made of? Actually, mulch can be made of many different things.

There are two types of mulch: **organic** (say *or-GAN-ik*) and **inorganic** (say *IN-or-gan-ik*). The organic kinds of mulch you may see at the nursery are made of bark, wood chips, or straw. Inorganic mulch can be made of many different things. Gravel, pebbles, crushed stone, and shells all are examples of inorganic mulches. Organic mulch should be used around trees.



Can you think of some reasons why it is good to put mulch around trees?

- Mulch can help the soil hold moisture longer. Without mulch, water evaporates from the soil much faster.
- Mulch can keep weeds and grass from growing around your tree. Weeds and grass compete with the tree for water and nutrients.
- Mulch helps keep the soil cooler in warm weather and warmer in cold weather. This helps roots grow.
- Mulch keeps the lawnmower and weed trimmer away from your tree. Improper use of these tools can injure the bark, which is harmful to the tree's health.
- Mulch can add beauty to your new tree.

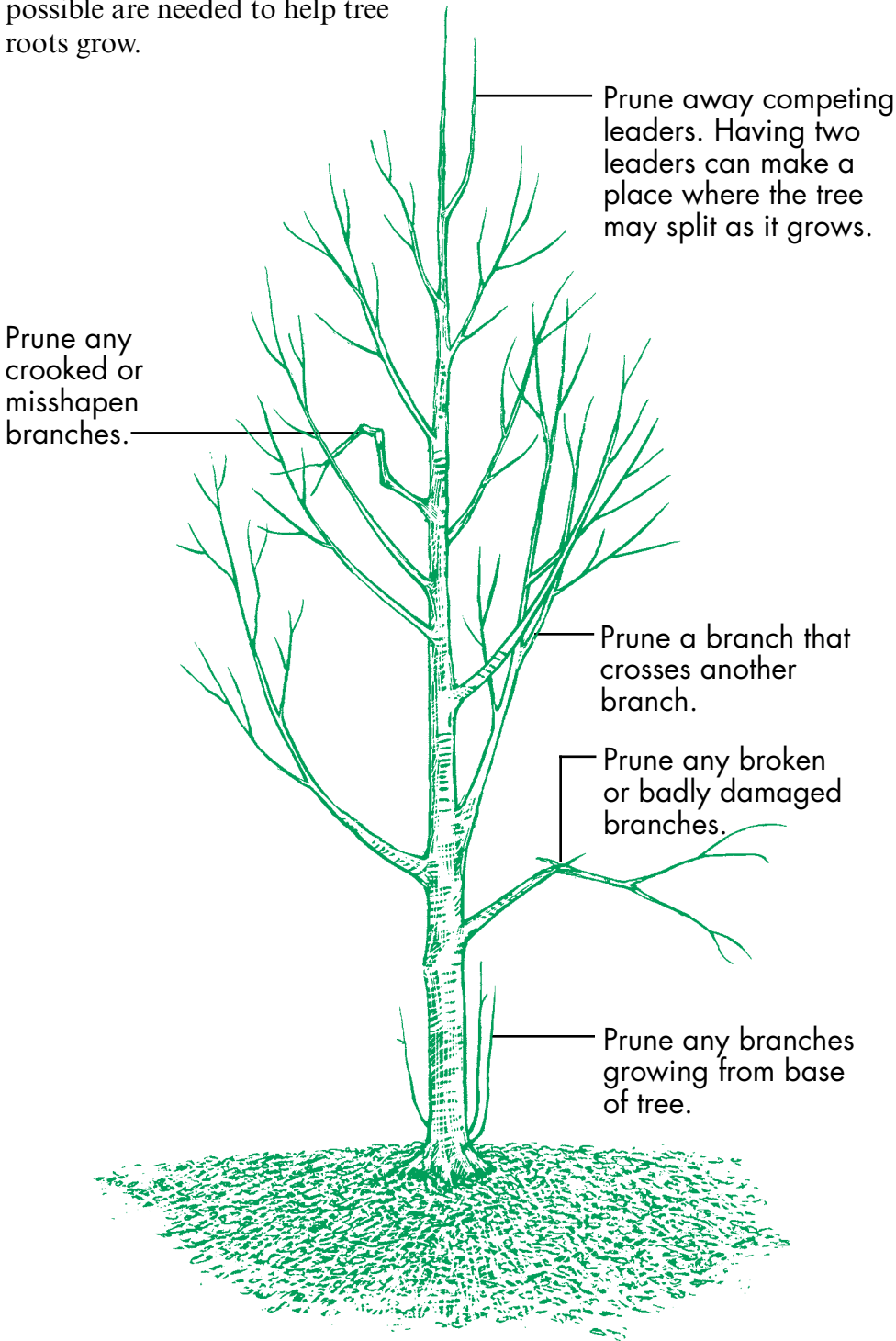
Put down the mulch in a circle 2 to 4 feet out from the trunk of the tree, and 2 to 3 inches deep around the tree. Then pull the mulch 2 to 3 inches away from the tree trunk. If mulch sits right on or next to the bark, it can cause the trunk to **decay**. Take a couple of steps away from your tree and admire your work.

Good job!



3. PROPER PRUNING

Do not prune newly planted and young trees too much. Remove only competing **leaders** and branches that are broken, unhealthy, dead, or not growing properly. As many branches as possible are needed to help tree roots grow.



FERTILIZER

Fertilizer is not tree food. Trees produce their own food during photosynthesis. Trees do not need to be fertilized when they are planted, but you can fertilize your tree after it has grown for a year.

Most soils are fertile and have enough nutrients for your tree to grow; in addition, not all trees need to be fertilized. Whether or not you should fertilize and the amount of fertilizer you should use depend on several things such as the kind of tree you have, the type of soil in your yard, and the time of year. Your nursery or cooperative extension service can help you figure out whether or not you should fertilize.

Insects and Diseases

Do you know what to look for?



Here's another opportunity for you to be a detective. It's important for you to examine your tree regularly for harmful insect and disease **pests**. You'll be better able to detect and control any problems on the tree if you check it regularly. Look for clues of insect or disease problems on the trunk, branches, and the tops and bottoms of the leaves.

Here are some clues that harmful insects and diseases often leave behind:

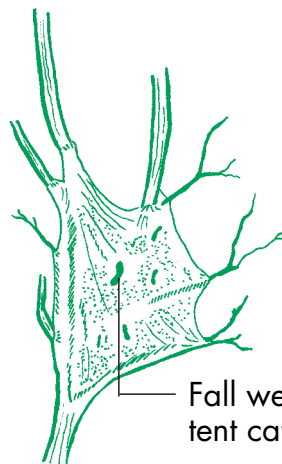
- wilting leaves or branches
- webs or sticky stuff on the leaves
- notches or holes in the leaves
- holes in the trunk or branches
- changes in leaf color

Friends

As soon as you find any clues, try to figure out whether an insect or a disease is harming the tree. Your local cooperative extension service can help you with this, and they can make suggestions about how you can handle the problem. Then you can take action.

You should know that most insects are good and don't harm plants. In fact, less than 1 percent of all insects are harmful to plants. You might think of insects as friends or foes. A friend is useful, helpful, valuable, important, and beneficial. On the other hand, a foe is harmful, destructive, and a pest. What are some other words you can think of to describe the differences between a friend and a foe?

Foes



Fall webworm or tent caterpillar

Many "friend" insects are very important to have in and around your yard; they're called **beneficial** (say *ben-uh-FISH-al*) insects. Beneficial insects act as **predators** or **parasites** (say *PAIR-uh-sites*) and attack harmful insects (pests). For example, the praying mantid and the lady bug are two beneficial insects that eat other insects that may damage plants. Beneficial insects help keep the pests under control.

How Can You Manage the Insect and Disease Pests on Your Tree?

When you discover that your tree has a pest affecting it, you should take care of the problem as soon as you can.

There are several different ways to manage pests on your tree.

Please do not use a **pesticide** (say *PEST-uh-side*) until you have decided that it is the only way to manage a pest. Pesticides are dangerous, and only adults should apply them! In most cases, pests cause little harm to trees and do not need to be sprayed with a pesticide. Keep in mind that when a pesticide is used to kill harmful insects, it also may kill beneficial insects. Beneficial insects may provide control of harmful insects, and you may not have to spray with a pesticide. Think about and try out other options before using a pesticide.

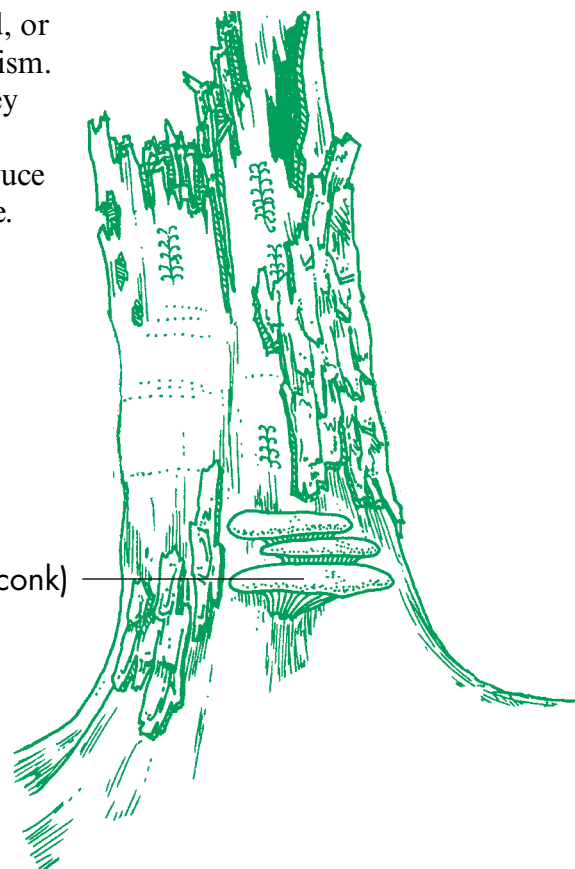
Integrated pest management (IPM) is a great way for you to manage pests. Let's break the words down so they make more sense to you. "Integrated" means that more than one method of pest management can be used together. "Pest" is any living thing that people think of as harmful, annoying, or destructive. A pest may be an insect, animal, weed, or even some other type of organism. Even people can be pests if they are damaging trees. "Management" means that you help reduce the number of pests on the tree.

IPM uses several methods to manage pests. Start by picking a tree that is known not to have disease or pest problems. Next pick a tree that fits the site where it is to be planted. Plant the right tree in the right spot; for example, don't plant a tree that needs full sun in the shade. Plant your tree properly, put mulch around your tree to keep weeds and grass away, and water your tree when the weather is hot.

Check your tree often for any clues that a pest may be on it. On small trees, you and your parents can get rid of most pests by hand-picking them off the tree or by pruning off the leaves or branches that are affected. Just be sure you're not taking any beneficial insects off the tree. Remember that pesticides should be used only after you have tried other ways to manage pests on your tree.

Good luck!

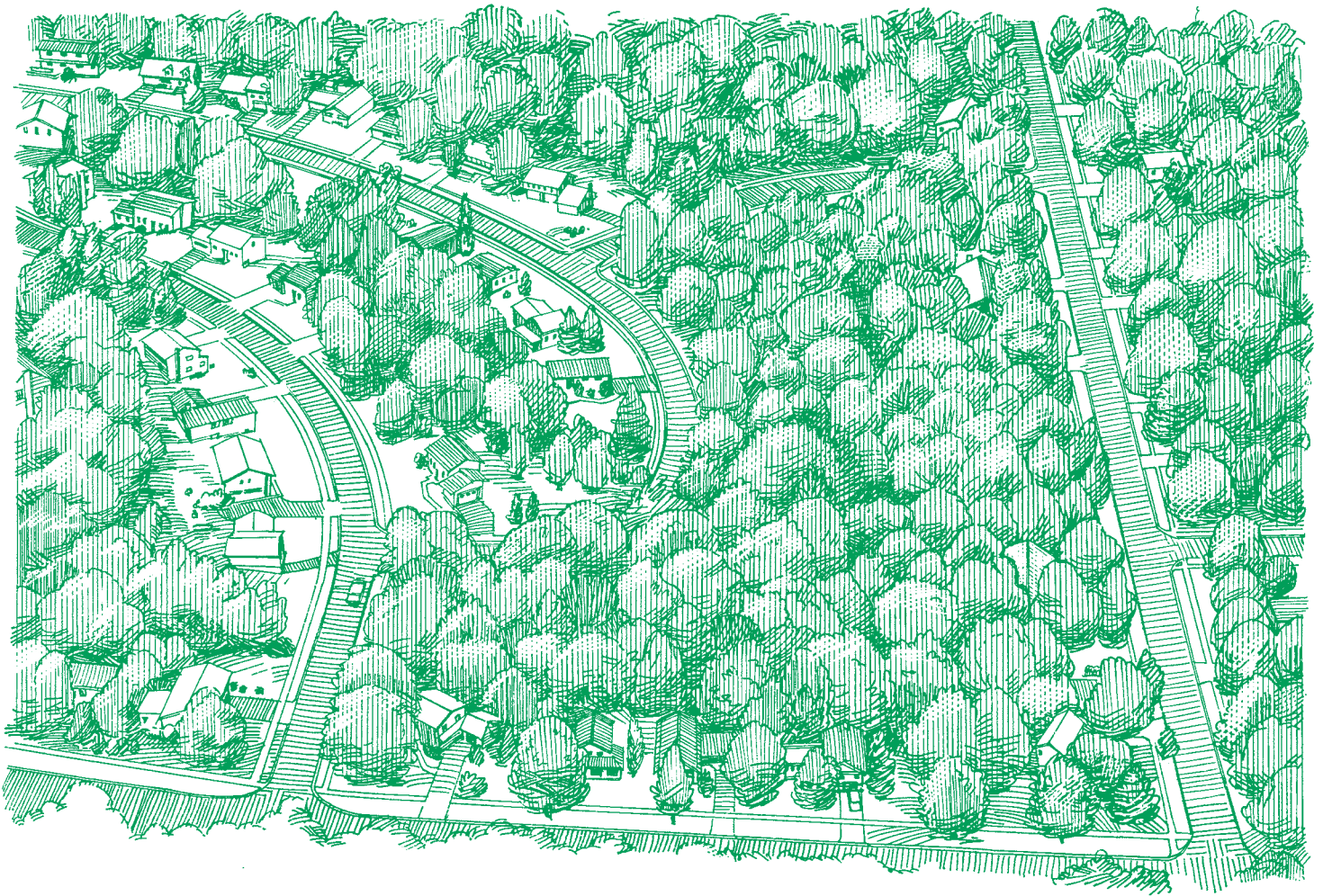
Fungus fruiting body (conk)



Groups of Trees Are Important

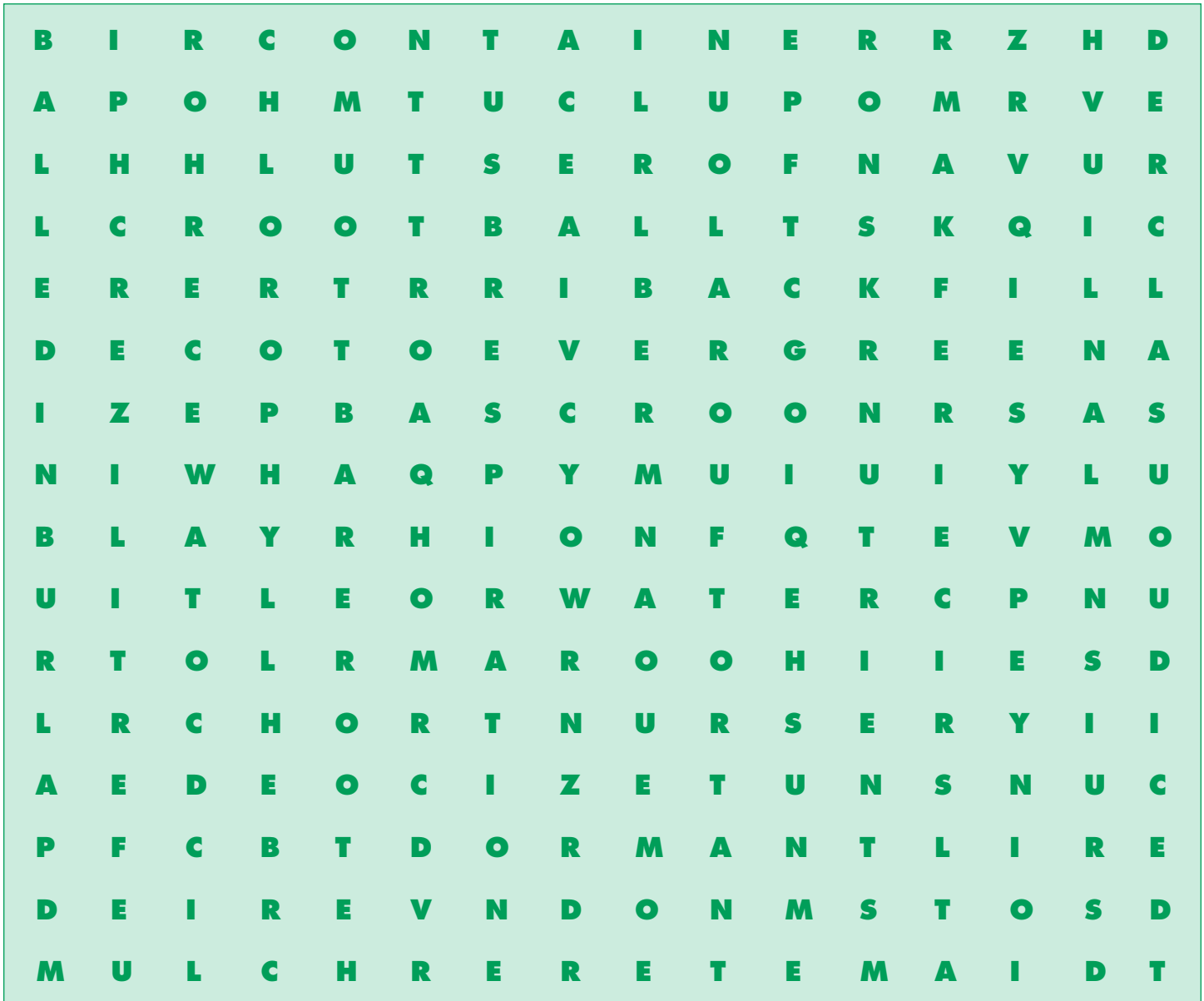
Groves and groups of trees in parks and other areas that don't have buildings and streets are important.

Groups of trees provide homes and food for wildlife (**habitat**), give us places to play and relax (**recreation**), and protect the water we drink. Groups of trees in parks and other areas help keep us healthy, help us enjoy our lives more, and make our communities more beautiful. Remember that parks and other big places that are left natural are important for people and animals.



WORD SEARCH PUZZLE

Twenty-one words related to trees and planting are hidden in the puzzle below. All of the words can be found somewhere in this booklet. The hidden words may be written forward, backward, up, down, or diagonally. See if you can find and circle all of them! (Answer on page 37.)



Hidden Words:

BACKFILL

BALLED-IN-BURLAP

BARE-ROOT

BERM

CHLOROPHYLL

CONTAINER

DECIDUOUS

DIAMETER

DORMANT

EVERGREEN

FERTILIZER

FOREST

IPM

MULCH

NURSERY

NUTRIENTS

PHOTOSYNTHESIS

RESPIRATION

ROOT BALL

SITE

WATER

Glossary

- backfill** The soil used to fill in the planting hole.
- balled-in-burlap** A type of tree package. The trees are grown in the ground and dug up with a ball of soil around their roots. The ball of soil is wrapped tightly in burlap.
- bare-root** A type of tree package. After the trees have been grown in the ground, they are dug up and the soil around the roots is removed. These trees have bare roots.
- bark** A protective covering over the trunk and branches of a tree. Bark protects trees from injury and disease and keeps the trunk from drying out.
- beneficials** Insects that act as predators or parasites and attack harmful insects. Beneficial insects help keep the harmful insects under control.
- berm** A 3-inch-high mound of soil built around the edge of the root ball of a tree after it has been planted. When you water, the berm will help to make sure all the water goes right into the root ball.
- broad-leaved trees** These trees have flat, broad leaves. Maples are an example of a broad-leaved tree.
- burlap** A type of heavy cloth made of big natural fibers that are loosely woven.
- carbon dioxide (CO₂)** A gas that trees and other plants take in and use during the process of photosynthesis. Unlike plants, humans breathe out carbon dioxide.
- chlorophyll** Pigment that gives leaves and plants their green color. Chlorophyll absorbs the sunlight needed for photosynthesis.
- chloroplast** The place inside a leaf where photosynthesis takes place.
- clay** The smallest of all particles in a soil. Soils with a lot of clay often are sticky, dense, and hold water.
- community forest** All of the trees and green spaces in a town or city form its community forest.
- container-grown** A type of tree package. The trees are grown aboveground in specially designed plastic pots that can be many different sizes.
- crown or canopy** The upper part of a tree that consists of the branches, twigs, and leaves.
- decay** To rot or break down.
- deciduous** Trees that lose all of their leaves each year at the end of the growing season.
- diameter** The length of a straight line that passes through the center of a circle, from one side to the other. The diameter of a tree trunk is the same as the width of the trunk.
- dormant** In a temporary state of rest or inactivity.
- drainage** The movement of water from the surface of the ground down through the soil.
- drip line** An imaginary circle on the ground directly beneath the outer edge of the branches and leaves of a tree.
- erosion** The removal of soil, usually caused by wind or water.

evergreen	Trees that are green all year because they do not lose all their leaves in one season like deciduous trees. Pine trees are an example of evergreen trees.
habitat	The place that provides a plant or animal everything it needs to grow or live.
inorganic mulch	Mulch that is made from something other than plant material; for example, gravel, crushed stone, or shells.
leader	The shoot, limb, or trunk of a tree that leads all other branches in vertical growth.
mulch	A protective covering that is spread on the ground around trees or other plants.
native tree	A tree that naturally grows in your area.
needle-leaved trees	Trees that have needle-like leaves. Pine trees and spruce are examples of needle-leaved trees.
non-native tree	A tree not originally found growing in your area.
nutrients	A nutrient is a substance that promotes growth. Plants, animals, and people need nutrients for growth.
organic mulch	Mulch that is made from plant material that once was living; for example, tree bark, pine needles, or shredded wood from a tree.
parasite	An insect, animal, or plant that lives on or in, and gets its food from, another insect, plant, or animal. This relationship is harmful to the insect, plant, or animal on which the parasite is living.
pest	A general term used for any kind of life form, including insects, animals, other plants, or diseases, that is destructive to trees or plants.
pesticides	Chemical substances used to kill pests.
photosynthesis	The process by which trees and other plants make food.
pigment	Color.
plant nursery	A place where trees and plants are planted, grown, and sold.
predator	An insect or other animal that captures and eats other insects or animals.
recreation	Any type of play or relaxation.
respiration	A process in which the food made during photosynthesis is broken down into energy that can be used by the tree. Respiration uses some of the oxygen that trees produce during photosynthesis. Trees take up oxygen and release carbon dioxide during respiration.
root ball	The ball of soil that contains the roots of a tree. The root ball may be inside a container, wrapped in burlap, or bare.
sand	Large soil particles. Soils with lots of sand particles are not very dense or sticky, and water flows easily through them.
scale-leaved trees	Trees that have scale-like leaves.
silt	Silt particles are medium in size compared to clay or sand. The best soils for plants have clay, silt, and sand particles.
site	A particular place. For example, the place you choose to plant your tree is called the site.
topmost root	The first root you come to when you follow the trunk from the top down.

Answers

Questions and Games

PAGE 9

Will the birdhouse move up as the tree grows taller?

The birdhouse will not move up as the tree grows taller. Remember, a tree grows upward from the top and tips, so it won't carry the birdhouse up with it.

PAGE 16

Why is it important to visit your site at different times?

Your site could be shady in the morning, but sunny in the afternoon.

PAGE 19

Do you know what burlap is?

It's a heavy cloth made of big natural fibers that are loosely woven.

PAGE 19

Why is it important to keep the roots of bare-root trees moist at all times?

Soil helps keep roots moist, but all the soil has been removed from bare-root trees. If we don't help the roots stay moist, they will dry out and die.

PAGE 21

Circle the trees you would choose to plant.

Correct choices are 1 and 3.

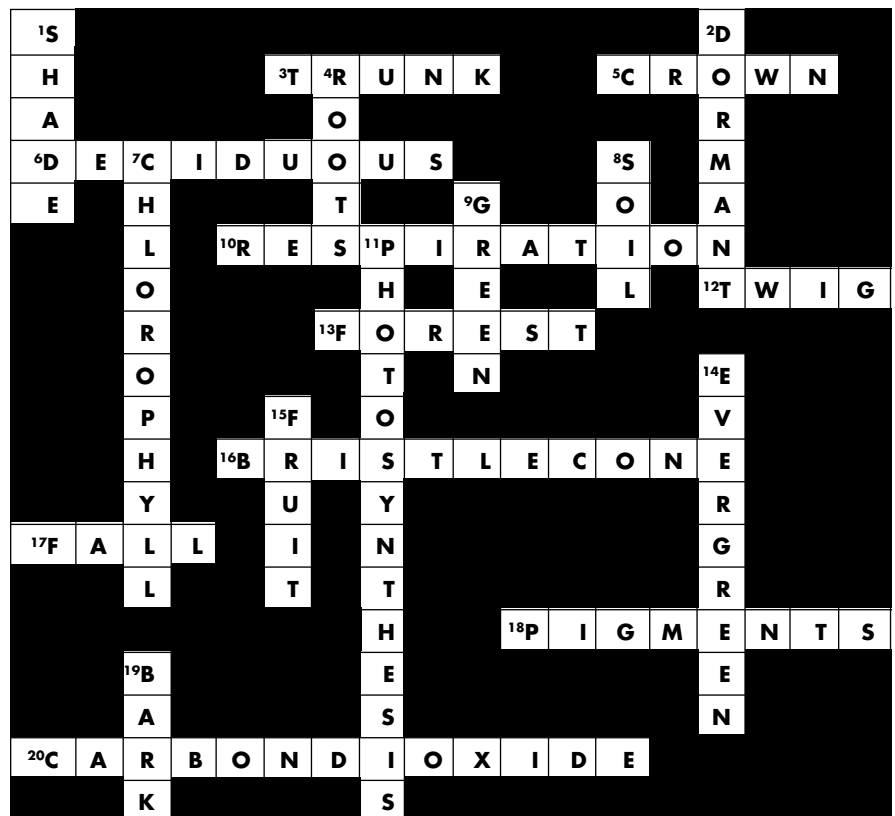
PAGE 25

Do you know why a wider hole will help a tree grow better?

You loosen the soil when you dig the hole. The tree's roots will grow better and faster into the loosened soil because more air and water are available.

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CROSSWORD PUZZLE



WORD SEARCH PUZZLE

Word search puzzle grid with words highlighted:

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

Sources of Information

Here are some places where you can go to find more information.

Plant nursery

The employees at the plant nursery will gladly answer any questions for you.

Cooperative extension office

Look in the phone book for the phone number of your county cooperative extension office. The educators there will be happy to answer your questions.

Arborist

Look in the phone book for the phone number of a local arborist or tree expert company. They can answer any questions you may have.

Library

Visit your local library and look for books that have been written recently about your area.

Farewell from Sylvan and Friends

Planting a tree and caring for it is one of the most wonderful things you can do. My friends and I hope we have helped you understand how important trees are for the community forest.

Now you know what makes trees different from other plants, how they grow, why we plant trees, how to find the best place to plant a tree, how to plant your tree, how to take care of it, and much more!

We hope you will enjoy visiting your local plant nurseries and garden centers.

Happy planting to you!