

Science

Science

Life Science

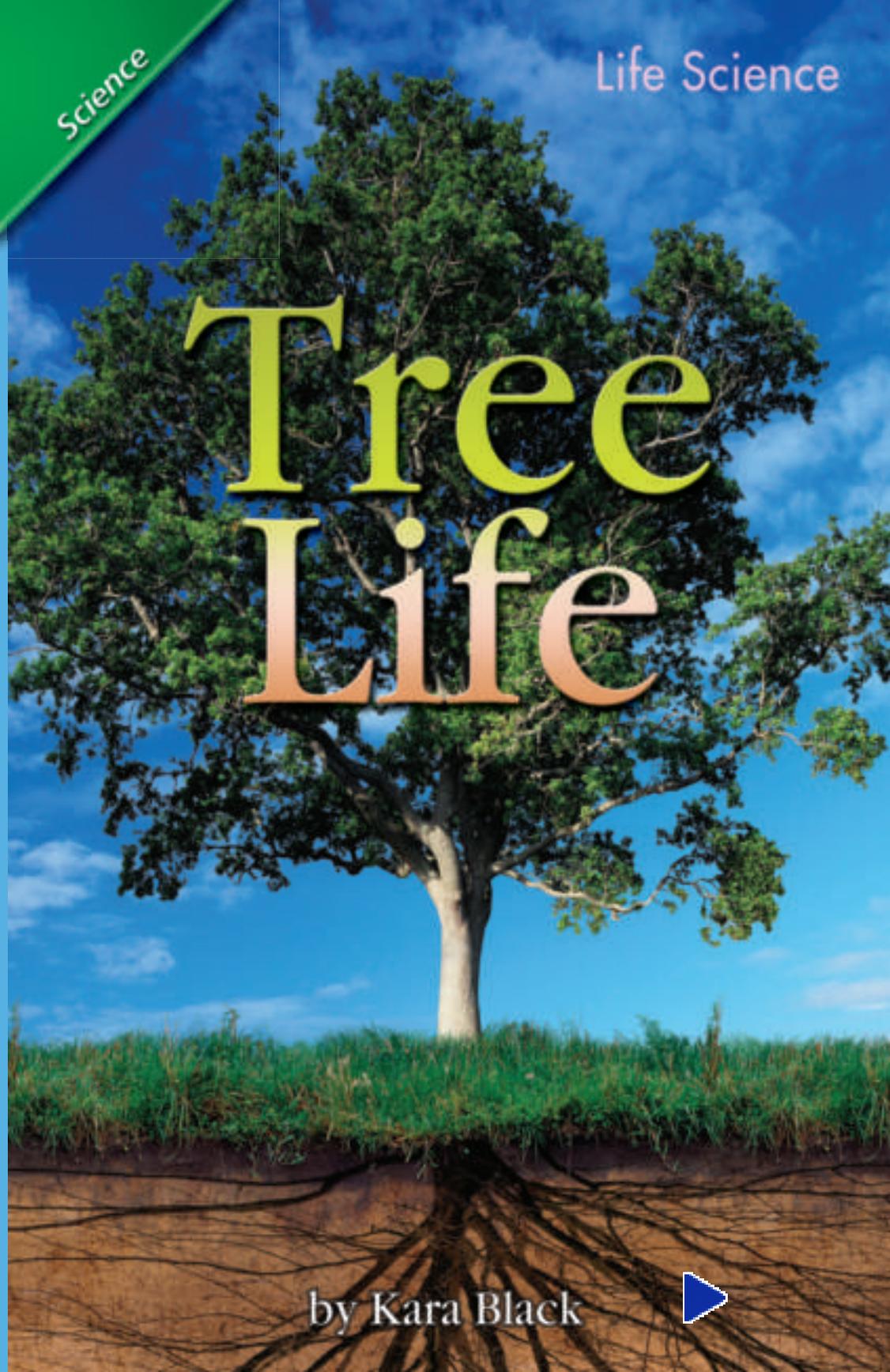
# Tree Life

Genre	Comprehension Skill	Text Features	Science Content
Nonfiction	Compare and Contrast	<ul style="list-style-type: none"> <li>• Captions</li> <li>• Call Outs</li> <li>• Labels</li> <li>• Glossary</li> </ul>	Plants

Scott Foresman Science 3.1



by Kara Black



## Vocabulary

deciduous  
coniferous  
extinct  
fossil  
germinate  
pollinate  
seed leaf  
seedling  
system

## Extended Vocabulary

bark  
chlorophyll  
chloroplasts  
compound leaf  
photosynthesis  
seedcase  
simple leaf  
tree ring  
trunk

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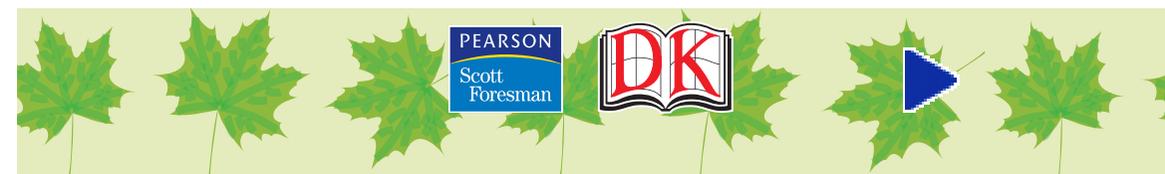
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# Tree Life

by Kara Black





## What You Already Know

Different parts of a plant work together to help it live and grow. The parts of a plant's leaf system make food for the plant. The plant's root system brings water and minerals up to the stems. The plant's stem system carries water and minerals to leaves and other parts of the plant. It also supports the plant.

Plants and trees can be grouped by their roots, stems, and leaves. There are two groups of trees. Coniferous trees keep their leaves year-round. Deciduous trees lose their leaves in the fall.

Plants reproduce in different ways. Most plants make seeds, which can form in flowers or in cones. Animals, water, and the wind spread seeds.



Deciduous leaves

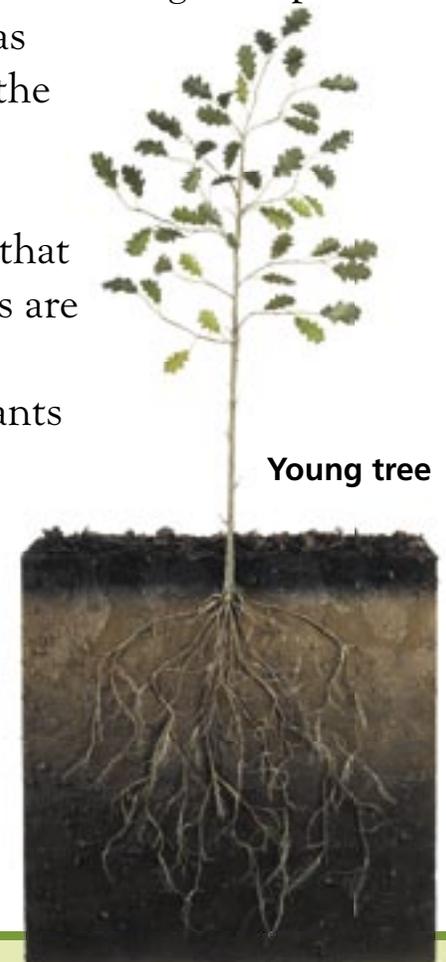


Animals and the wind help pollinate a plant when they bring pollen to the parts that make seeds.

Once a seed drops to the ground, it may germinate, or start to grow. The small plant that grows from a seed is called a seedling. The parts of the seed the plant uses as food to begin growing are the seed leaves.

By looking at fossils, scientists can study things that lived long ago. Some fossils are made from extinct plants. These fossils show how plants have changed over time.

You have read about the basics of how plants and trees grow, live, and change. Now we will dig a little deeper, to get at the roots of tree life.



Young tree



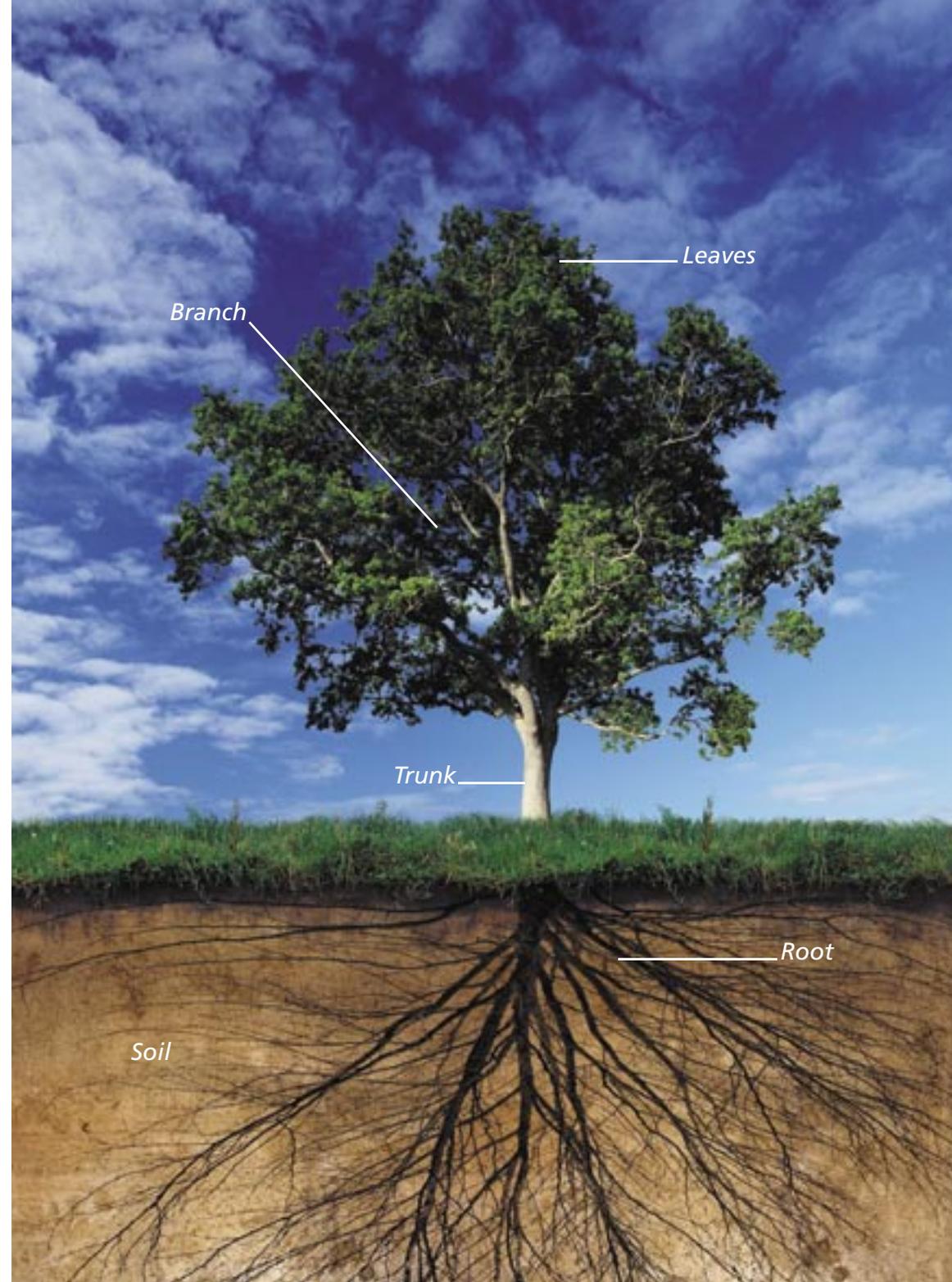


# Introduction

Trees grow all over the world in many different climates. They have adapted in order to reproduce and grow. Even with these adaptations, all trees have the same basic structure. They all have branches that grow out from a main trunk. The trunk is the stem of the tree. They all have roots that grow from the bottom of the trunk. Roots reach deep into the ground. And all trees have leaves. Some trees have flat leaves. Other trees have leaves shaped like needles.

The kind of bark and roots a tree has also may differ. Some trees have thick bark, while others have thinner bark. Tree roots support trees. They store food made by the tree. They also bring water and minerals to the tree.

**Trees have roots, a trunk, branches, and leaves.**





# Growing Trees

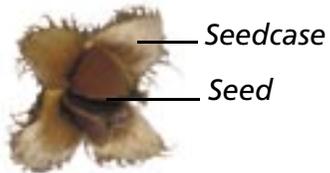
Trees, like most other plants, grow from seeds. Not many seeds grow into mature trees. Some seeds get digested inside animals' bodies after being eaten, and never reach the ground. Other seeds land in places where they cannot grow. If a seed lands in a place with good soil, sunlight, and water, it may start sprouting into a plant. When a seed begins to grow into a plant it is called germination.



First a small root develops. Then a stem begins to grow. After the stem starts growing, the seedcase falls off.

The seed leaves are the plant's first leaves. While the food in these leaves nourishes the plant, the first true leaves form. Those leaves begin to make sugar for the plant to use as food. When conditions permit, the seedling may eventually grow into a tree.

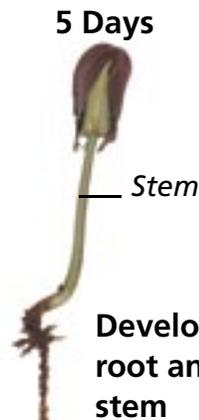
## Seed to Sapling



Seed and seedcase fall to ground



Emerging root



Developing root and stem

14 Days

Shedding the seedcase



20 Days

Seed leaves

Shoot tipped with first true leaves.

Seedcase

30 Days

True leaves

True leaves are beginning to grow.

50 Days

Seedling will not grow much more during its first year.



# Deciduous Trees

Deciduous trees grow in areas with four seasons. They are also known as broadleaf trees. They get nutrition through their roots and leaves. Deciduous trees use seeds to reproduce. After the flowers of a deciduous tree have been pollinated, seeds begin to grow inside fruits, nuts, or other seed casings.

**A mature oak tree. Oak trees have simple leaves.**



Oak leaf



Deciduous trees shed their leaves and grow them again each year. They grow several types of leaves. These include simple leaves and compound leaves. Simple leaves are made up of one part. They have one main vein that runs up the leaf. Compound leaves have several large veins that divide into different leaflets.



Elm leaves

The leaf system uses photosynthesis to turn sunlight into food energy. Photosynthesis happens inside chloroplasts. Chloroplasts are special structures in the green parts of leaves. The leaves take the energy captured by the chloroplasts and turn it into sugar, the tree's food. Leaves get their green color from the chlorophyll made by the chloroplasts.



Simple leaf



Compound leaf





Deciduous trees grow their leaves in the spring, once the days get long enough and the air warms. They grow their leaves to start photosynthesis. Photosynthesis can only happen when there is enough sunlight.

In summer the days start getting shorter, though there is still plenty of sunlight for photosynthesis. Even as the days get shorter, the air stays warm. Deciduous trees keep their leaves through the summer.

The days continue to get shorter as summer turns into fall. The air turns cold. Photosynthesis has to stop because of the short days.

**Spring**



**Summer**



**Fall**



**Winter**



When photosynthesis stops, leaves are unable to use chlorophyll, and their colors change. The leaves go from green to red, orange, brown, and yellow. Soon after the leaves turn color, they fall off their trees.

During winter, the days start getting longer again. The air is still cold. Deciduous trees shut down many of their systems during winter. They conserve energy and fight off the cold.

The days continue to get longer during the spring. Warm air returns. The heat and sunlight allow photosynthesis, as new leaves develop. Then the yearly cycle begins again.



# Coniferous Trees



**Carolina hemlock needles**

Coniferous trees are different from deciduous trees in several important ways. Coniferous leaves are thin and needle shaped. Coniferous leaves are also hard and less flexible, while deciduous leaves are soft and bendable. The leaves of coniferous trees stay on their trees through fall and winter. They are gradually replaced. This is why they are sometimes called evergreen trees.

**The Scotch pine cones open up in order to release their seeds.**



**Young Scotch pine cone**

**Mature Scotch pine cone**



**Coniferous trees keep their leaves in the winter, even when there is a lot of snow.**



Conifers usually grow in areas where the climate is cold. They have one main trunk that grows straight. Their bark has resin, a thick, sticky substance that protects the tree from the cold. The branches at the bottom of a coniferous tree are longer and thicker than the branches at the top of the tree. This gives coniferous trees a conelike shape. The conelike shape helps the trees drop snow from their branches.

Unlike deciduous trees, conifers do not reproduce with flowers or fruit. Instead, they reproduce using seeds that are held inside cones. The wind helps spread pollen to fertilize the cones. After the seeds in the cone mature, the cone opens and the seeds scatter.



# Tropical Trees

Tropical trees grow in rainforests, or other tropical forests. These forests have layers. The tallest trees of these forests are known as the emergent trees. They stick up above the canopy layer. The canopy layer is just below the emergent trees. Trees that are shorter than the emergent trees make up the canopy. Not much light passes through the canopy layer. The layer of trees below the canopy is known as the midstory layer.



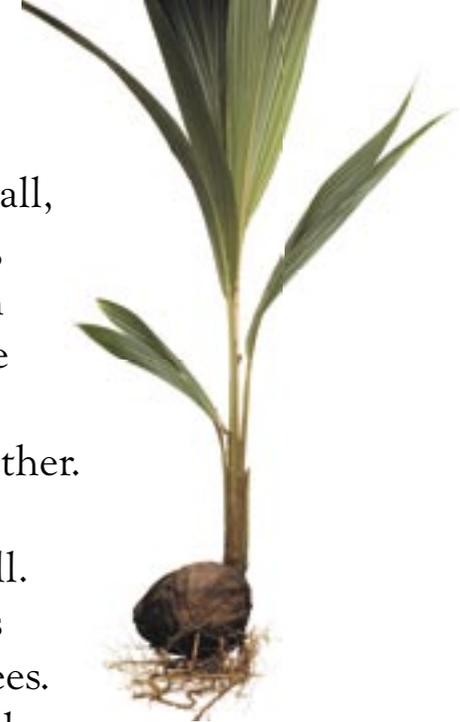
Different layers of a lowland rainforest in New Zealand



The drip tips on these leaves are quite pointy.



Tropical trees usually have tall, slender trunks. Their branches, which are long and stretch high into the sky, mostly grow at the top of the tree. Tropical tree branches often get twisted together. Because of this, when one tree falls it may make other trees fall. The gaps created by fallen trees are rapidly filled in by other trees. Tropical trees must grow quickly to get the space and light they need.



Coconut palm nut

Some tropical trees reproduce using drift seeds. Drift seeds fall from trees into rivers and oceans. Currents carry them to other areas to sprout. Some tropical trees have special leaves called drip tips. These drip tips are adapted to help rain run off the trees' leaves.



# Tree Roots

Trees collect water and minerals through their roots. Roots also anchor trees to the ground. Each root has tiny root hairs that absorb nutrients from the soil and air. Water and minerals are then carried to the rest of the tree.

Root structures are adapted to a tree's environment. For example, fig trees have buttress root structures. Buttress roots grow in tropical climates where the soil is not very good. The main part of the roots grow above the ground. Buttress roots also protect trees against tropical storms by supporting them.

Banyan tree roots, like those of the fig tree, have also adapted to survive in a tropical climate. The roots of a banyan tree grow down from the branches to eventually reach the ground. Banyan trees absorb moisture from the air, rather than the soil, during the first stages of their development.

**Roots help anchor the tree to the ground.**



**The Australian fig's buttress roots grow above the ground.**



# Bark and Tree Rings

Tree bark has inner and outer layers. The inner bark carries nutrients up and down the tree. This layer is soft. The outer bark is hard and protects the tree from very hot or very cold temperatures. As trees age, their bark thickens. On some trees the bark may be over one foot thick!



**This giant sequoia tree has many rings and thick bark.**



**Birch bark is very thin and papery.**



Some tree bark is used to make everyday products. Cork trees have bark that can be used again and again. Rubber tree bark contains a substance that is used to make rubber and latex.

To find out the age of a tree, scientists usually count the number of tree rings it has. Tree rings on very old trees can help scientists determine what the weather was like long ago. In fact, scientists can figure out weather patterns based on tree rings. During wet years trees tend to grow more. That makes their tree rings wider. During dry years the rings are usually thinner.



**Poplar bark is thick and hard.**





# Sowing Seeds

Plants make seeds in order to reproduce. Seeds grow after a plant is pollinated. Pollination can happen in several different ways. Flowering plants produce nectar, a sweet liquid which attracts insects. Butterflies and bees land on the flowers to collect the nectar. Pollen sticks to their legs and bodies and is carried to other flowers.

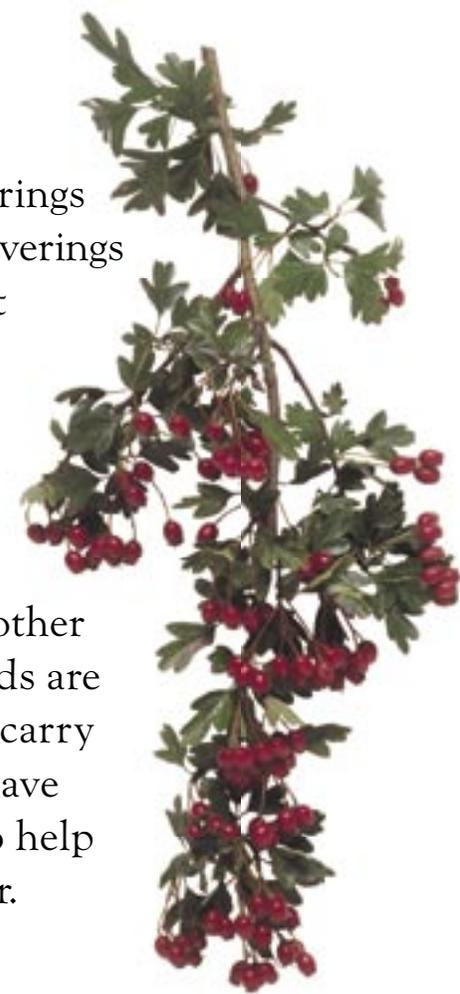


**Apple blossoms produce fruit after they are pollinated.**



Seeds develop outer coverings for protection. Some seed coverings also help attract animals that scatter seeds. Fruits, berries, and nuts are examples of seed coverings.

Some seeds stick to the fur of animals. That allows animals to carry them to another area to germinate. Other seeds are shaped so that the wind can carry them great distances. They have parts that work like wings to help the seed glide through the air.



**Hawthorn berries can be eaten by people and animals.**

**Maple seeds and horse chestnut seeds have very different seed casings.**

**Winged maple seeds**



**Horse chestnut seeds**





# Trees Everywhere

Trees can be found in a variety of shapes. They are adapted to grow in many different climates. Tropical trees grow in warm, wet climates. Coniferous trees grow in cold areas. Deciduous trees do best in places where the weather is very different in winter, spring, summer, and fall. The leaf and root systems of a tree work together to help the tree grow and develop. The roots of a tree bring it water and minerals.



Trees have many everyday uses. The fruit and seeds produced by some trees can be eaten. Tree bark can be used for many household products. Wood from tree trunks and branches is found in almost every home.

Trees have adapted to grow almost everywhere on Earth. They all have certain parts in common. But even with those common parts, each type of tree is different. They have different bark, branches, leaves, roots, and seeds, in order to live where they do.

## Trees in Florida



# Glossary

<b>bark</b>	the tough outside covering of the trunk and branches of trees
<b>chlorophyll</b>	the substance in green plants and trees that gives them their color
<b>chloroplasts</b>	tiny structures that contain chlorophyll, found in the green parts of plants and trees
<b>compound leaf</b>	a leaf that has several veins and is made up of two or more leaflets on a single stalk
<b>photosynthesis</b>	the process green plants use to make their own food
<b>seedcase</b>	any pod, capsule, or dry, hollow fruit that contains seeds
<b>simple leaf</b>	a leaf made up of one leaflet on a single stalk
<b>tree ring</b>	the circle in a tree trunk that is added each year as the tree grows thicker
<b>trunk</b>	the main stem of a tree

# What did you learn?

1. What does a deciduous tree's leaf cycle depend on?
2. How do scientists determine the age of a tree?
3. What are the tropical forest's tallest trees called?
4. **Writing in Science** You have read about the many ways that plants and trees scatter their seeds. Write to explain some of the ways seeds get carried from the adult tree, and some of the reasons seeds fail to grow up. Include examples from this book.
5. **Compare and Contrast** Compare and contrast the root structures of fig trees and banyan trees.

