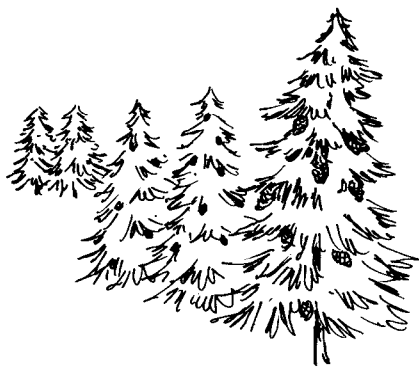


Lesson 9—Nonflowering Seed Plants: Gymnosperms

Lesson 9 —Day 1

As we have learned, plants can be divided into two groups: vascular and nonvascular. Do you remember which group ferns are in? (Ferns are vascular plants.)



Our last lab taught us about vascular plants. What do you remember about the lab? Our next group of plants is also vascular. Today we will learn about **gymnosperms**. *Gymnos* is a Greek word that means “naked” and *sperma* means “seed.” Gymnosperms have seeds that are not in a case, that’s why they are considered “naked” seeds. There are fewer than 1,000 species of gymnosperms.

Gymnosperms are woody plants that are usually a tree, shrub, or vine. Most gymnosperms have needles or scalelike leaves. Although gymnosperms produce seeds, they do not produce true flowers. Gymnosperms are softwood trees.



Most gymnosperms are called **evergreens** because they stay green all year. These plants do lose leaves but not all at once. They make up the oldest and largest trees such as the bristlecone pine and the giant redwoods.

Gymnosperms Book

Hand out Student Page Lesson 9 Day 1 **Gymnosperms book** and 8.5"x11" paper

Make a Half Book by folding your sheet of paper like a Hamburger with the fold at the top cut out and glue Graphic 9A on the cover. Title the book *Gymnosperms* and color the pictures.

Materials:

- Student Page Lesson 9 Day 1
- Gymnosperms book
- 8.5"x11" paper

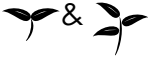
Vocabulary Words:


Review the words you want your students to learn. Encourage them to use these words while talking about the material and in their written work.

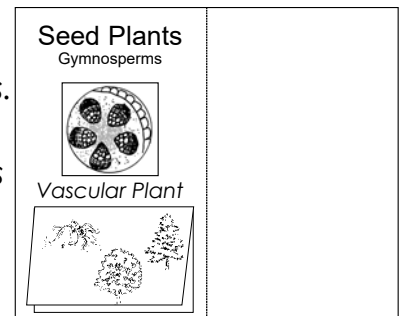
gymnosperm
evergreen

Discuss gymnosperms with your students.

Inside the book,

 Copy or write words about gymnosperms: *vascular plants, naked seeds, woody plant.*

 Write one or two complete sentences describing gymnosperms: *Gymnosperms are woody, vascular plants. Most have needles or scalelike leaves. They produce naked seeds, but not flowers. Most are called evergreens because they stay green all year.*



Glue this half book onto the bottom of the left-hand page in the *Gymnosperms book*.

Glue the vascular Graphic 9B to the top of that page. Label the graphic *Vascular Plant*.

Plant ID Book

Add another page to your *Plant ID book* (see Lesson 4 Day 2). Find two plants with the characteristics of gymnosperms.

Draw the two plants with a close-up of the leaf. Write about the plants under the tab.

Lesson 9

—Day 2

The largest and most common gymnosperm is a **conifer** (**kon** uh fer). Amazingly, giant sequoias can grow as big as 36 feet around, wide enough to drive a car through the trunk.

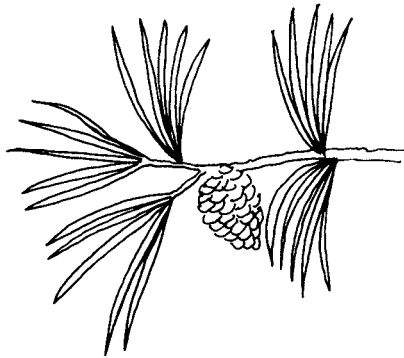
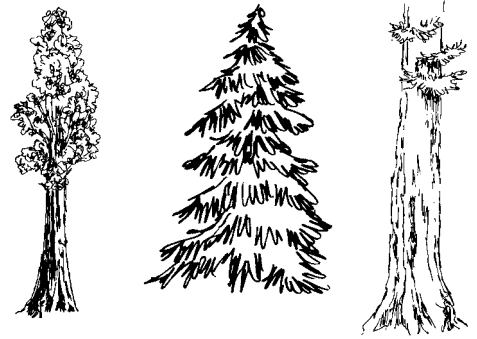


Materials:
Student Page Lesson 9 Day 2
Gymnosperms book
a piece of brown and a piece of white construction paper
one piece of 8.5"x11" paper
pinecones
magnifying glass

Vocabulary Words:
Review the words you want your students to learn. Encourage them to use these words while talking about the material and in their written work.

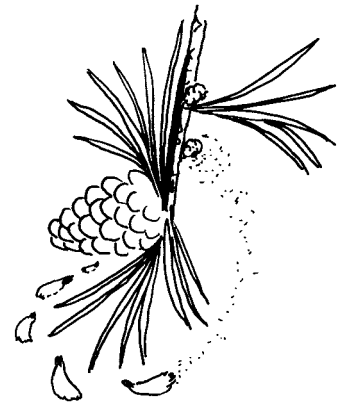
conifer
cones
pollen

Conifers are sometimes called evergreens because they stay green all year. Conifers include pines, redwoods, cedars, hemlocks, junipers, cypress, fir, and spruce.



Conifers produce both male and female **cones**. The male cones are small, contain **pollen**, and are found on the lower branches of a tree. The female cones contain seeds and are found in the upper branches of the tree.

Wind blows pollen from the male cones to the female cones. As the seeds begin to develop, the female cones' scales close to protect the new seeds. When the seeds ripen, the scales open so the seeds can fall out.



Gymnosperms Book

Hand out Student Page Lesson 9 Day 2, a sheet of brown and a sheet of white construction paper, 8.5"x11" paper, and pinecones.

Make a Half Book by folding your sheet of paper like a Hamburger. Turn the book so the fold is on the left side. Glue Graphic 9A to the cover and title the book *Reproduction of Conifers*.

Inside the book glue Graphic 9B on the right-hand side.

On the left-hand side:



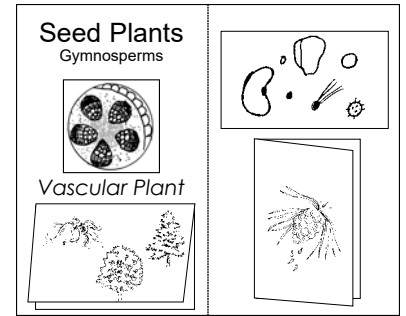
From brown construction paper, cut out 20 circle or heart shapes. From white construction paper, cut out 10 small oval shapes. Glue the brown shapes in an overlapping manner to create a pinecone look. Under some of the brown shapes, insert a white oval to represent the seeds that the cone holds.



Write words about the reproduction of conifers: *male cones—small and produce pollen; female cones—larger and produce seeds.*



Explain how the pollen from the male cones reaches the female cones and explain what happens after germination. Use your vocabulary words. *Ex: Conifers produce both male and female cones. The female cones contain seed and are found in the upper branches of the tree. Wind blows pollen from the male cones to the female cones. The female cone's scales close to protect the new seeds. When the seeds ripen, the scales open so the seeds can fall out.*



Glue the half book onto the bottom right-hand page of the *Gymnosperms* book.

Glue the seeds graphic 9C to the top of that page.

Pinecones

Find several pinecones. Observe the outside of the cones. Some may have scales tightly packed, and others may be more open. The cones with open scales have ripened seeds. The cones with tightly packed scales have seeds that are not ripe. Open some of the pinecones and look for their seeds. These seeds are called pignolia (peen **yo** lee uh).

Lesson 9

—Day 3

Choose one or more activities to complete today:

- Find two dry pinecones. Fill a bucket with water and place the pinecones in the water. What do you notice? (*The pinecones float.*) Wait fifteen minutes and take the pinecones out of the water. What has happened to them? (*The pinecones closed up.*) Why do you think this occurred? (*The bottom of the scales absorbed the water and caused enough pressure to move the rest of the scale forward.*) How does this help protect the seeds in the pinecone? (*The seeds come out when it is dry and warm and stay protected when it is wet.*)
- Make a pinecone bird feeder. Find a pinecone and tie string on one end of the cone. Spread peanut butter on the cone. Roll it in bird seed. Hang it on a tree. Observe who visits your pinecone bird feeder.

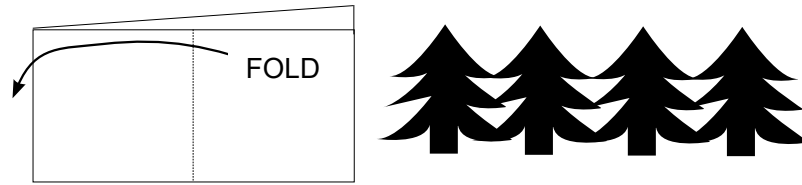
Materials:

Collect materials for the activities you choose:

- two dry pinecones
- bucket
- water
- pinecone
- peanut butter
- bird seed
- string
- 8.5"x11" paper

3. Make a Coniferous Forest by folding paper into a Hot Dog. Cut along the fold. Fold one half into a Hamburger. Bring the edges up to the middle and crease.

Draw a picture of a coniferous tree on the front, being sure the tree overlaps the folds. Cut through all four layers. Open it up and color the trees. Stand up your coniferous forest. You may want to make more than one and tape them together.



4. The ginkophyte plant is no longer found in the wild. These plants are grown by gardeners primarily in China and Japan. Research the ginkophyte plant and discover how it is used.
5. Find five items in your home that originated from gymnosperms.

Fascinating Flora



The custom of decorating Norway spruces and other conifers became widespread in the 19th Century.

