

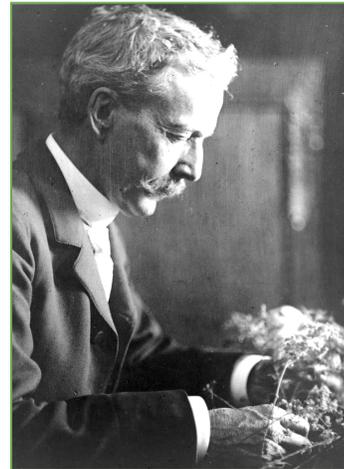
## Exploring Science / Historical Steps

**A Fruit-Salad Tree: Fact Or Fake?** Picture in your mind a sort of fruit-salad tree. Most of its branches have peaches. But one branch has apricots. Another branch has plums. Fact or fake? Strange as it may seem, such a tree really can be grown.

The fruit grower starts with a young peach tree. Two of its branches are cut off. A twig from an apricot tree is joined, or **grafted**, onto one cut. A twig from a plum tree is grafted onto the other cut. Each twig grows into a branch that bears its own kind of fruit. (See page 178).

In the early part of the 20th century, **Luther Burbank** was the “plant wizard” of California. As a boy, Burbank lived on a farm where he learned to love plants. He also learned about grafting, a method used on his family farm to grow apples. Breeding better kinds of plants became Burbank’s life work. He developed hundreds of new fruits and other plants.

Suppose a new type of fruit had to be grown in large numbers. Often, it could only be reproduced by grafting onto another tree, called the **stock**. Sometimes, but not always, a graft would “take.” When a graft takes, the stock accepts the graft as part of itself.



**Luther Burbank created many new kinds of plants by grafting.**

Plum and apricot grafts “take” on a peach stock. But a pear graft does not “take” on an apple stock. Why? Here’s a clue. Plums, apricots, and peaches all belong to the same genus of plants. Pears and apples are not grouped into the same genus. Usually, grafts are more likely to “take” between closely related plants. When seeking whether a graft will “take,” it helps to know how the plants are classified.

➤ Lemons and oranges both belong to the genus *Citrus*. Growing an orange graft on a lemon stock is probably [possible / impossible].

## The Plant Kingdom

In the plant kingdom there are two broad groups of plants. Each group is called a **phylum**. The grouping depends on how a plant takes up water.

All plants need water. Some plants have no **veins**, which are tubes that carry water. The term **vascular** (VAS-kyuh-lur) means “having tubes,” so plants with no veins belong to the phylum of **nonvascular plants**. These are the mosses and liverworts (LIV-ur-wurts). Both have leaf-like, stem-like, and root-like parts. Because they lack veins, scientists do not consider these structures to be true leaves, stems, or roots.



**Phylum of nonvascular plants / moss on rotted log**

Without veins to move water efficiently, mosses and liverworts stay small and grow near moisture. Mosses often grow on the shady base of trees. Liverworts have flat, leaf-like parts and commonly grow on wet rocks - often beside slow-moving springs or streams.

Plants with veins belong to the phylum of **vascular plants**. Ferns, grasses, shrubs, and trees are vascular plants. All have true leaves, true stems, and true roots; with these, vascular plants grow much taller than nonvascular plants.

There are three main classes of vascular plants. **Ferns** make up one class. Another class contains the cone-bearing plants, or **conifers** (KUH-nuh-furs). A pine tree is a conifer. So is a giant redwood tree. The third class of vascular plants contains the **flowering plants**. A dandelion, a rose bush, and a red oak tree are all flowering plants.



**Plants with veins are certainly able to grow tall!**

Shown: "General Sherman" (a giant sequoia tree in western USA) is the world's largest tree by volume.

**The three main classes of vascular plants:**



1) the class of ferns / cinnamon ferns near log



2) the class of conifers / spruce tree twig and cone



3) the class of flowering plants / dogwood tree

**REVIEW**

**U-2 L-6**

I. In each blank, write the word that fits best. Choose from the words below.

**nonvascular      vascular      veins      grafts**

Some plants have tubes called \_\_\_\_\_ that carry water. Plants that have no veins are \_\_\_\_\_. Plants with veins are \_\_\_\_\_.

II. Write the letter of the group to which each plant belongs. Use the pictures and captions of this lesson to help find the answers.

- |                        |                              |  |
|------------------------|------------------------------|--|
| <b>A.</b>              | <b>a. Vascular plants</b>    | <b>b. Nonvascular plants</b>           |
| (1) ____ grass         | (2) ____ moss                | (3) ____ fern      (4) ____ liverwort  |
| <b>B.</b>              | <b>a. Cone-bearing plant</b> | <b>b. Flowering plant      c. Fern</b> |
| (1) ____ pine          | (3) ____ dogwood tree        | (5) ____ rose                          |
| (2) ____ cinnamon fern | (4) ____ sequoia tree        |  |

III. Why do mosses and liverworts never grow tall? Hint: What are they 'missing' that would help them grow?