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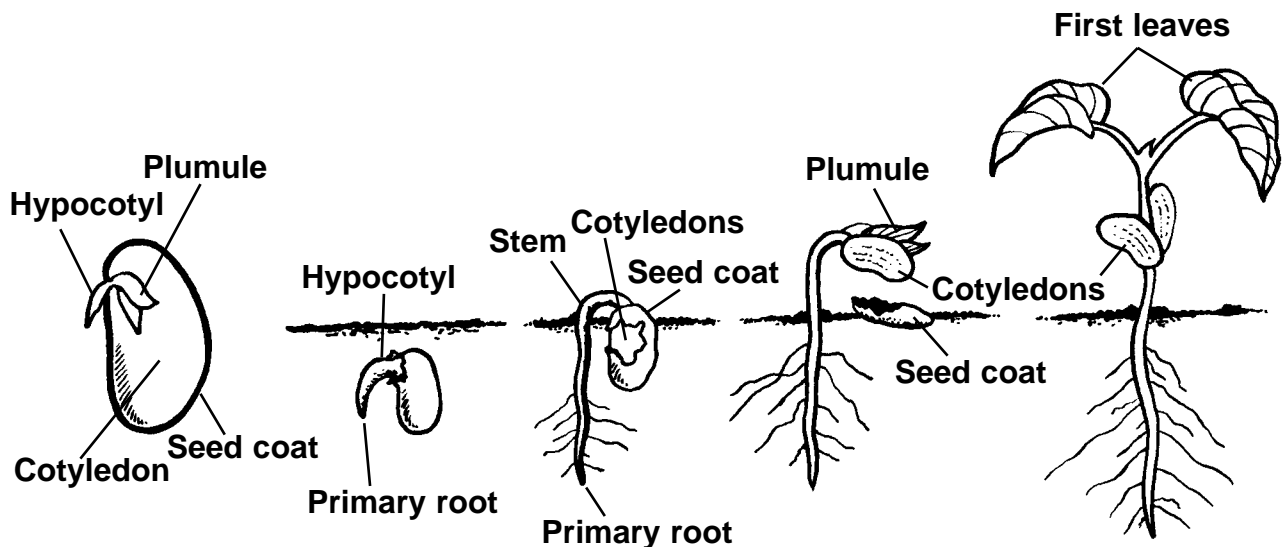
Introduction

Plants grow in almost every part of the world – mountain tops, oceans, deserts and polar regions. Plants have amazing abilities to adapt to many different environments, much as insects have done. Without plants, there would be no life on Earth. They provide the air we breathe and the food humans and other animals eat. Plants also supply us with many useful products such as timber and cotton fibres.

Scientists believe there are more than 350,000 species of plants. Their size varies from barely visible plants that grow on the forest floor to the largest life forms on Earth, giant sequoia trees of California. Some are more than 88 m high and over 9 m wide. Plants are also the oldest living things on Earth. One bristlecone pine tree in California started growing 4,000 to 5,000 years ago.

Plants develop from a tiny form called an embryo, which is usually contained within a seed. Seeds vary in size; the tobacco seed is so small that more than 2,500 grow in a pod less than 19 mm long. The largest seed is the coconut, which may weigh up to 9 kg. The seed provides food for the embryo plant until it can push its leaves above ground and begin to manufacture its own food. This is done from air, sunlight, and water by a process known as photosynthesis. Roots bring nourishment to the plant by absorbing dissolved minerals from the soil and water. Seeds require warmth, moisture and oxygen to grow. The stages of a sprouting seed, called *germination*, are shown below.

Seed Germination



Cross section of a seed shows the embryo in a seed coat.

The seed splits and the hypocotyl forms the primary root.

As the root grows down, the stem breaks through the soil.

The cotyledons free the plumule, and the seed coat drops off.

As the stem grows upward, the plumule forms the first leaves.

The activities in this book are designed to provide students with opportunities to observe a wide variety of plants. This will begin with a search for seeds at school and home. Students gather data as they observe seeds germinating and do simple research on growing plants in different environments. Other methods of growing plants from parent plants (*cloning*) are explored using yams, carrots, begonia leaves and pineapple. Seeds and flowers are dissected to discover their parts. Finally, students create models of flowers and plants and then learn the importance of bees to plants.



Is This a Seed?

Overview: *Students will sort a variety of materials to learn how to identify seeds.*

Materials

- variety of seeds (including seeds from fruits such as avocado, orange and apple) These may be purchased in packets at a nursery. They will be used in the next activity as well.
- small objects which may look like seeds (e.g., styrofoam pellets, marbles)
- paper plates
- blank file cards

Lesson Preparation

- Mix the materials to be used in sorting for seeds (listed above).
- Divide this among paper plates for groups of students to sort.
- copies of page 5 (one per group)

Activity

1. Give each student a blank file card and have each draw a seed on it. Do not give them any help since this is a pretest. Have them share their drawings and tell what they think a seed looks like. Collect the cards to use in a later lesson.
2. Explain that students are going to do an activity to see if they can tell seeds from things which are not seeds. Divide the students into small groups and distribute a plate of the mixture to each group. Give each group a copy of page 5. Discuss the sorting sheet with them so they see that there are three choices for the things they will sort. Tell them to take turns putting each item from the paper plate into the box in which they think it belongs.
3. As students sort the items, encourage them to discuss objects with the group members if they are unsure of where each belongs. Tell them to put any item in the ‘?’ box if the group cannot agree on classifying it as a seed or nonseed.
4. When all sorting has been done, have the groups move to another group’s area and, without moving any of the items, see if they agree. Discuss the results of the sorting to find which items were in the ‘?’ box and which items were placed in different categories by the groups. (Do not give the answers; this same activity will be repeated at the end of the study.)

Closure

- Take students on a ‘seed hunt’ around the school grounds. Collect seeds, if permitted, and then bring them into the classroom to begin a display of seeds. Include nonseed items which the students may have thought were seeds. Set aside a table area where students can display the seeds and nonseeds they collected.
- Send home the parent letter requesting that seeds be sent to school to help in this study. Add these to the seed display table. Put some strange seeds (e.g., a coconut) in the display.