



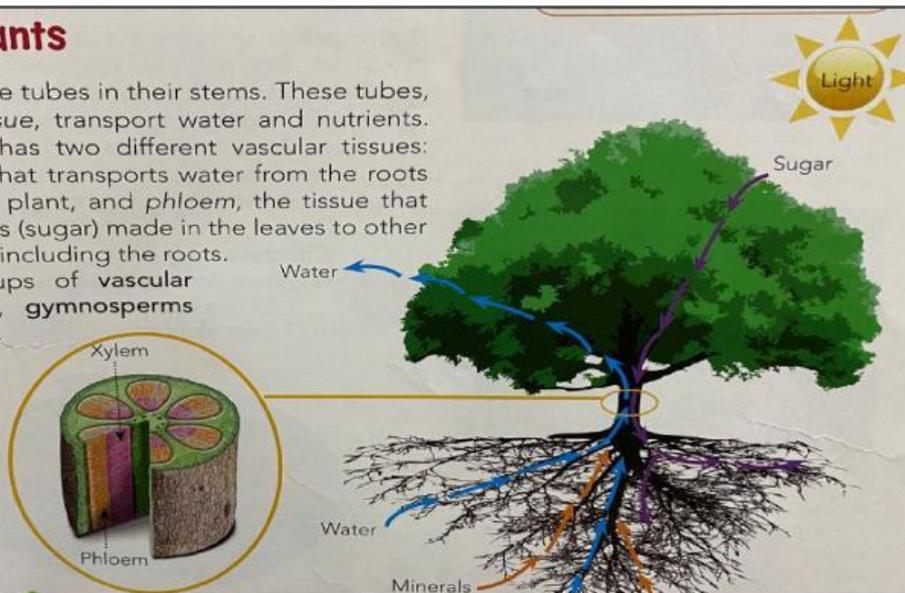
Student name: \_\_\_\_\_ Grade 4th \_\_\_\_\_ DATE: \_\_\_\_\_

1) Read the information about vascular and nonvascular plants

## Vascular Plants

Vascular plants have tubes in their stems. These tubes, called **vascular tissue**, transport water and nutrients. This plant group has two different vascular tissues: **xylem**, the tissue that transports water from the roots to all parts of the plant, and **phloem**, the tissue that transports nutrients (sugar) made in the leaves to other parts of the plant, including the roots. Some large groups of vascular plants are **ferns**, **gymnosperms** and **angiosperms**.

▶ Vascular plants have tissues that carry water and nutrients: xylem and phloem.



▶ If you observe underneath a fern frond (leaf), you can see small spots or patches. These patches contain the spores.



▶ Male cones release the pollen grains into the air. Wind carries pollen grains to the female cone.

### What Are Ferns?

Ferns are small vascular plants that live in shady, moist places like dense forests. They have large leaves called fronds. Ferns do not have flowers or seeds. For reproduction they use spores that are produced under their leaves.

### What Are Gymnosperms and Angiosperms?

**Gymnosperms**, also called *conifers*, are plants that produce their seeds inside cones. Seeds are dispersed by animals or winds to new places. **Gymnosperms** live at high altitudes and in colder climates. Sometimes conifers are called "evergreen trees" because they have green leaves all year long.

**Angiosperms** or flowering plants make up the largest group in the plantae kingdom. They live almost anywhere from deserts to rainforests. **Angiosperms** are different from **gymnosperms** because instead of cones they have flowers. Female parts of a flower produce eggs, and male parts of a flower produce pollen. A seed is made when the pollen fertilizes the egg.

## Nonvascular Plants

Nonvascular plants are small plants that live close to the water; because they don't have vascular tissue to transport water and nutrients from the ground to other parts of the plant. They absorb water from the environment like sponges.



⚡ Mosses are small, soft nonvascular plants that live on trees or rocks in shady, wet environments. They have very small structures similar to leaves but they don't have roots or stems, so they absorb water from the environment. These plants use spores for reproduction.



⚡ Nonvascular plants don't have real leaves because they don't have xylem or phloem. Liverworts are in this class.

### Project Stage

#### Making a Vivarium

What type of plants would be better to grow in a vivarium? Explain why.

2) Complete the following diagram with the characteristics of each plant group.

