# Reading: Raindrop Journey by Edward Dix

## *Instructions:*

Assign a student volunteer to read the following "Raindrop Journey" story aloud while the other students follow along silently.

A raindrop falls through the air at fourteen miles per hour. It smacks into a leaf at the top of an oak tree and splashes into many droplets, **dissipating** the energy from its fall.

The droplets join together with other raindrops to form larger drops that fall from the leaf to the ground under the tree. They land on other plants, mosses, and the layer of dead leaves on the forest floor. Slowed by the leaf **canopy** and absorbed by the forest floor, almost all of the rain drops soak into the **groundwater**, creating little or no **runoff**.

The water soaks slowly into the ground, where the tree's roots absorb it. The tree also takes in minerals—especially nitrogen, phosphorus, potassium, sulfur, magnesium, and calcium—from the soil.

Like all living things, the tree's roots are made of tiny cells. Within the roots, water passes from cell to cell until it reaches the **xylem**. The xylem contains long hollow cells that form continuous pipelines through the trunk to the leaves at the top of the tree.

At the center of its trunk, the tree's heartwood is made of old xylem cells that no longer transport water. Instead, these old cells make the trunk strong so that it can hold its branches and leaves high, where they can receive the most sunlight.

Leaves are the tree's "kitchens," and it is important that they receive light energy to make food through the process of **photosynthesis**. Water **molecules** that reach the leaves from rain mix with carbon dioxide. Through photosynthesis, **chlorophyll** molecules in the leaves capture energy from sunlight and use it to "cook" the carbon and water into simple sugars, called **carbohydrates**. Through pores called **stomata**, the leaves release oxygen and water vapor resulting from photosynthesis into the air. The tree uses the sugars for energy, and through chemical processes, it creates proteins, fats, and other necessary compounds from the sugars.

**Phloem** cells in the tree's inner bark pass the sugars from cell to cell down the trunk to the roots, feeding all of the tree's living cells along the way. Each growing season, the tree trunk grows wider because cells of its **cambium** layer divide to form new phloem cells (inner bark) on the outside and new xylem cells (sapwood) on the inside. As new growth in the cambium pushes older phloem cells outward, the cells die and form the outer bark. This bark helps to protect the tree's tender inner tissues from injury by bugs, fungi, or fire.

### Minerals Critical to a Tree's Survival

- **Nitrogen** is a major component of chlorophyll, proteins, enzymes, hormones, and vitamins.
- **Phosphorus** is necessary for seed germination, photosynthesis, protein synthesis, and almost all aspects of growth and metabolism in plants. It is essential for flower and fruit formation.
- **Potassium** is necessary for the formation of sugars, starches, carbohydrates, and proteins, and for cell division in roots and other tree parts.
- **Sulfur** is a structural component of amino acids, proteins, vitamins, and enzymes, and is essential for chlorophyll production.
- **Magnesium** is a critical structural component of chlorophyll molecules, and is necessary for the functioning of plant enzymes to produce carbohydrates, sugars, and fats.
- **Calcium** is a structural component of cell walls; influences water movement in cells; activates enzymes; and is necessary for cell growth and division.