

## Photo Description



This is a very old, very big oak tree growing in a park near buildings. The tree has a thick, dark brown trunk and many large branches spreading out like arms. Green leaves cover the branches, and the tree is so big that it gives shade to the ground below where children could play.

## Scientific Phenomena

Anchoring Phenomenon: Why is this tree so big and old?

This oak tree demonstrates long-term plant growth and survival. Trees grow slowly over many years by making their own food from sunlight, water, and soil nutrients through photosynthesis. The thick trunk you see developed over decades as the tree added new layers of wood each year. The spreading branches show how plants grow toward sunlight to capture energy. This tree has survived in one place for a very long time because its roots go deep into the soil to find water, and its leaves continue to make food from the sun. The tree's size and age reveal how plants grow persistently when their basic needs (water, sunlight, soil) are met year after year.

## Core Science Concepts

- \* Plant Growth: Trees grow taller and wider over time. Growth happens slowly, adding new wood each year so the trunk gets thicker.
- \* Plant Structures and Functions: The roots absorb water from the soil, the trunk supports the tree's weight, and the leaves use sunlight to make food for the tree.
- \* Needs of Living Things: Trees need sunlight, water, and nutrients from soil to survive and grow big and strong.
- \* Long-Term Change: Living things change over time. This tree shows how one organism changes dramatically across many years and seasons.

### Pedagogical Tip:

For First Grade, avoid detailed explanations of photosynthesis. Instead, use simple language: "The tree's leaves drink in sunlight like a solar panel, roots drink water from the ground, and this helps the tree grow big." Use hand motions to show roots going down and branches reaching up—this kinesthetic approach helps young learners grasp the concept of plants "reaching" for what they need.

### UDL Suggestions:

To support diverse learners, provide multiple ways to engage with this concept:

- Visual: Show pictures of the same tree at different ages (if available) so students see change over time.
- Tactile: Bring in a tree cross-section or branch for students to touch and count rings to see yearly growth.
- Kinesthetic: Have students act out being a tree growing—start small, slowly stretch arms upward and outward to show growth.
- Auditory: Use a read-aloud about trees (see resource list) so all learners access information through listening.

## Zoom In / Zoom Out

### Zoom In (Microscopic):

If we could look at the leaves with a special magnifying glass, we'd see tiny, tiny holes (stomata) on the bottom. Through these holes, the tree breathes in air and releases oxygen. Inside the leaf cells, sunlight energy is captured and turned into food the tree uses to grow. The roots have root hairs—super-tiny fuzzy parts—that suck up water and minerals from the soil like a straw drinking juice.

### Zoom Out (Ecosystem & System):

This oak tree is part of a whole community. Birds and squirrels live in its branches. Insects eat its leaves. The tree's roots help hold soil in place so rain doesn't wash it away. Fallen leaves become food for bugs and help make the soil rich. Animals eat acorns that fall from the tree. This one tree supports dozens of other living things and is connected to the whole park ecosystem and the water cycle.

## Discussion Questions

1. How do you think this tree got so big and tall? (Bloom's: Understand | DOK: 1)

This question checks if students recognize that trees grow over time.

2. What does this tree need from the ground, the air, and the sun to stay alive and keep growing? (Bloom's: Analyze | DOK: 2)

This question prompts students to connect plant needs to environmental resources.

3. Why might birds and squirrels like to live in this big tree? (Bloom's: Evaluate | DOK: 2)

This question helps students see trees as habitats and ecosystems.

4. If we came back to visit this tree in 10 years, what do you think might be different about it? (Bloom's: Analyze | DOK: 3)

This question encourages thinking about long-term change and growth.

## Potential Student Misconceptions

\* Misconception: "Trees don't grow; they just stay the same size."

- Clarification: Trees grow very slowly over many, many years—so slowly that we don't see it happen day to day. But if you measure a young tree each year, it gets taller and thicker. This old oak was once a tiny seed!

\* Misconception: "Trees eat food from the soil like we eat food from a plate."

- Clarification: Trees make their own food using sunlight, water, and air. The soil gives them water and minerals, but leaves are where the food is made. It's like the sun is the tree's kitchen.

\* Misconception: "The tree is alive, but the wood and branches are not alive."

- Clarification: The whole tree is alive! The trunk carries water up from the roots to the leaves. When we see dead wood, that part of the tree has stopped living, but the rest of the tree is still growing and changing.

## Extension Activities

1. Tree Ring Counting Activity: Bring in a cross-section of a tree branch or log (or show pictures). Have students count the rings with you and explain that each ring is one year of growth. Let them color or label the rings. This makes the concept of "tree aging" concrete and observable.

2. Plant a Seed Observation: Give each student a bean or sunflower seed to plant in a small cup with soil and water. Over weeks, students observe and draw how it grows roots, a stem, and leaves. This mirrors the oak tree's growth on a smaller, faster timescale that First Graders can witness.

3. Tree Needs Sort: Create picture cards showing sun, water, soil, wind, and other environmental factors. Have students sort these into "Things a Tree Needs" and "Things a Tree Doesn't Need," discussing why. This reinforces the concept that plants have specific requirements for survival.

## Cross-Curricular Ideas

\* Math: Measure the height of the tree using students' bodies ("How many children tall is this tree?"). Count and graph the branches. Create a bar graph showing how tall the tree was as a seed, sapling, and now.

\* ELA/Literacy: Read books about trees together. Have students draw and write sentences: "My tree is big because..." or "A tree needs water because..." Create a class big book titled "All About Our Tree."

\* Social Studies: Discuss how the tree is part of a community in the park. Who uses the park? How does the tree help people? Connect to the idea of how nature and people share spaces.

\* Art: Have students do leaf rubbings, paint trees at different ages (tiny seedling, young tree, old tree), or create a large collaborative mural of the oak tree showing all the animals living in it.

## STEM Career Connection

\* Botanist (Plant Scientist): A botanist studies plants like trees to learn how they grow, what they need, and how to keep them healthy. They might measure trees, study their leaves, or figure out why a tree is sick. Average Annual Salary: \$65,000

\* Park Ranger: A park ranger takes care of outdoor spaces like parks and forests. They protect trees, teach people about nature, and make sure plants and animals stay healthy. Average Annual Salary: \$38,000

\* Arborist (Tree Doctor): An arborist is a specialist who cares for trees by trimming branches, treating diseases, and helping trees grow strong. They climb trees and use special tools. Average Annual Salary: \$55,000

## NGSS Connections

Performance Expectation:

1-LS1-1: Use models to describe that all living things are made up of cells and that plants get the materials they need to grow chiefly from air and water.

Disciplinary Core Ideas:

- 1-LS1.A
- 1-LS1.C

Crosscutting Concepts:

- Patterns (seasonal growth patterns, yearly rings)
- Structure and Function (roots absorb water; leaves capture sunlight)
- Scale, Proportion, and Quantity (the tree's size grew over time)

Science and Engineering Practice:

- SEP.2: Developing and Using Models (students can draw or build a model tree showing roots, trunk, and leaves)

## Science Vocabulary

- \* Tree: A big plant with a thick woody trunk, branches with leaves, and roots under the ground.
- \* Roots: The part of the plant that grows under the soil and drinks up water and nutrients for the plant.
- \* Trunk: The thick, hard part of a tree that holds it up and carries water from the roots to the leaves.
- \* Leaves: The green parts of a tree that catch sunlight and use it to make food for the tree.
- \* Growth: When a living thing gets bigger and changes over time.
- \* Nutrients: Special things in soil that plants need to grow strong and healthy (like vitamins for people).

## External Resources

### Children's Books:

- The Tiny Seed by Eric Carle (shows a seed's journey to becoming a flowering plant)
- A Tree is Nice by Janice May Udry (celebrates the beauty and uses of trees)
- From Seed to Plant by Gail Gibbons (factual, illustrated exploration of plant growth)