

# Lesson 1

## Summary

Students identify the ecosystem services forests provide and describe the factors that influence plant growth. They learn the differences between coniferous and deciduous trees and explain how adaptations help trees survive.

## Learning Objectives

Students will be able to:

- Identify the benefits forests provide to humans and the environment.
- Describe the factors that affect plant growth.
- Give examples of adaptations that help deciduous and coniferous trees live in specific climates.
- Name three jobs that are related to trees and forests.

## Vocabulary

- **Photosynthesis:** The process by which plants capture energy from the sun in their cells and use it, along with carbon dioxide and water, to synthesize food that is used to build more cells and grow.
- **Growing season:** The time of year when the range of temperatures and other environmental factors allow a plant to photosynthesize and grow.

# Get in Touch with Trees!



- **Mineral:** A naturally occurring inorganic substance that provides organisms with necessary building blocks to grow.
- **Coniferous:** Cone-bearing trees that do not drop their leaves annually.
- **Deciduous:** Trees that drop their leaves annually.

## Materials

- Get in Touch with Trees! PowerPoint
- Get in Touch with Trees! Notes Page Key
- Get in Touch with Trees! Notes Page
- Get in Touch with Trees! Homework

## Optional

- Photosynthesis Infographic

## Teacher Preparation

- Copy Get in Touch with Trees! Notes Page (1 per student)
- Copy Get in Touch with Trees! Homework (1 per student)

# Activities

## Part 1 (15 minutes)

### Engage and Explore

1. Ask students, are palm trees coming to Michigan? Probably not next week. Yet, the climate is changing. Past and present temperature data indicate that Earth's climate is changing, and much more rapidly than in the past.
2. According to the Ann Arbor Climate Action Plan, the average temperature of the Great Lakes Basin has increased 1.3°C (2.3°F) in the past 40 years alone! This increase in average temperature will impact forests, but how? In this unit we will explore how climate change impacts trees and forests, humans, and larger ecosystems called biomes.
3. Ask students, why do you think forests are important to humans and the environment? Have them work in pairs to list as many reasons as possible for 3 minutes.

Open the Get in Touch with Trees! PowerPoint and project Slide 2 "Why Are Forests Important?" onto your chalk or dry-erase board. Use this slide to review the students' answers as a class. Ask students to come up and mark any answers they wrote down.

## Part 2 (35 minutes)

### Explain

1. Distribute the Get in Touch with Trees! Notes Page.
2. Use the Get in Touch with Trees! PowerPoint to go through the Notes Page as a class. Students can write their answers on the notes page as they follow along.

### Extend and Evaluate

- Assign and collect the Get in Touch with Trees! Homework.
- **Optional:** Ask students to draw a diagram of photosynthesis.

## Michigan Grade Level Content Expectations (Grade 7)

- L.OL.07.61 Recognize the need for light to provide energy for the production of carbohydrates, proteins, and fats.
- L.OL.07.62 Explain that carbon dioxide and water are used to produce carbohydrates, proteins, and fats.

## Next Generation Science Standards (Middle School)

### Performance Expectations

Students who demonstrate understanding can:

- MS-LS1-5 Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.
- MS-LS1-6 Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.

### Science and Engineering Practices

#### Constructing Explanations and Designing Solutions

- Construct a scientific explanation based on valid and reliable evidence obtained from sources and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (MS-LS1-5, MS-LS1-6)

### Disciplinary Core Ideas

#### LS1.B Growth and Development of Organisms

- Genetic factors as well as local conditions affect the growth of the adult plant. (MS-LS1-5)

#### LS1.C Organization for Matter and Energy Flow in Organisms

- Plants, algae including phytoplankton), and many microorganisms use the energy from light to make sugars (food) from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen. These sugars can be used immediately or store for growth or later use. (MS-LS1-6)

#### PS3.D Energy in Chemical Processes and Everyday Life

- The chemical reaction by which plants produce complex food molecules (sugars) requires an energy input (i.e., from sunlight) to occur. In this reaction, carbon dioxide and water combine to form carbon-based organic molecules and release oxygen. (secondary to MS-LS1-6)

### Crosscutting Concepts

#### Energy and Matter

- Within a natural system, the transfer of energy drives the motion and/or cycling of matter. (MS-LS1-6)

#### Cause and Effect

- Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability. (MS-LS1-5)