



SURROUNDED BY PLANTS

LESSON PLAN

Grade Level(s)

9 - 12

Estimated Time

60 minutes

Purpose

Students identify the importance of plants to human life by surveying their home and neighborhood for plant products used for medicine, aesthetics, fuel products, fiber, and food.

Materials

- Teacher Material– *Plants in Our World* (one per teacher)
- Handout A – *Surrounded by Plants* (one per student)
- Assessment A – *Surrounded by Plants* (one per student)
- Hardiness Zone Map
- Computers with Internet access and ability to print
- Colored pencils
- Notebooks
- Map of U.S. from the 50states.com website
- USDA Agricultural Census Data from USDA website

Suggested Companion Resources

- [Troubled Waters](#) (Activity)

Vocabulary

hardiness zone: a geographically-defined zone in which a specific category of plant life is capable of growing, as defined by temperature hardiness, or ability to withstand the minimum temperatures of the zone

crop regions: certain crops grow in specific regions of Minnesota and the United States based on influencing environmental factors (Frost free periods, mean average temperature and rainfall)

Interest Approach or Motivator

Ask student to think about the many times a day they touch or eat things that come from plant materials. Our world consists of an unimaginable number of products originating with plants. Students are likely touching several as they sit in a chair and take notes in their notebooks. Plants are a major part of daily life in several forms. As a class, make a list of plant products found in the classroom.

Background Agricultural Connections

Plants are vital to all life on Earth. They mean survival. Plants are the base of food for all humans and animals. They can harvest energy from the sun and exchange gas. (Plants use carbon dioxide from the air and convert it into oxygen.) Plants use the energy from sunlight to convert raw materials from the Earth into carbohydrates, fats, and oils. Humans depend on plant materials for food, feed for livestock, fiber, fuel, medicine, aesthetic value, and much more.



Plants are affected by environmental factors, including frost-free periods or growing season, mean average temperature or growing degree days, and rainfall. These factors create unique growing conditions across the United States and throughout the world.

Objectives

- Identify why plants are critical for all life on Earth.
- List plant products found in your everyday world.
- Explain why certain plants are grown in certain regions of the United States.
- Compare and contrast the growing conditions in various areas of the country.

Procedures

Summary of Content and Teaching Strategies

1. Present and discuss *Teacher Material- Surrounded by Plants*. Have students brainstorm examples for each of the ways humans use plant material.
2. Distribute a copy of *Handout A- Surrounded by Plants* to each student. Review the handout and answer any questions. Have students complete the triangle in Figure 1. In *Part 2* of the activity, students will research the common growing regions for one crop from each category in Figure 1. The directions instruct students to print off a United States map from the 50states.com website. Using this map, students shade growth regions using colored pencils for one crop from each use category. Use a different color for each crop and label the colors in a map legend. Students must incorporate the "TODALS" (title, orientation, date, author, legend and scale) map basics into the map they create.
 - For forestry products, the [USDA Forest Service database](#) is provided.
 - Students will need to research medicinal crops separately. The following are common medicinal crops to consider providing to students who need assistance in this category:
 - aloe
 - aspirin
 - castor bean
 - Echinacea
 - ginkgo
 - hemp
 - Saint John's Wort
3. Once *Part 2* is completed, students access hardiness zone and precipitation websites to determine the climate correlations to the production regions shaded on their maps. This activity provides an understanding of why certain crops are grown in certain regions due to their dependence upon climate conditions.

Conclusion:

After conducting these activities, review and summarize the following agricultural literacy concepts:

- Plants are an important part of our every day lives.
- Plants provide food, fiber, medicines, fuel and aesthetics to our daily life.
- The value of plants is increased when they are processed. For example, cotton is made into fabric, corn and soybeans can be processed into fuel, and various parts of plants can be harvested and processed into medicine.
- Some plants grow naturally and others are produced on farms.

- How could a change in climate affect agriculture and the growth of plants?

Essential Files (maps, charts, pictures, or documents)

- [Handout A- Surrounded by Plants](#)
- [Assessment A- Surrounded By Plants](#)
- [Teacher Material- Plants in Our World](#)
- [Plant Hardiness Zone Map](#)

Essential Links

- [Minnesota Agriculture in the Classroom](#)
- [USDA Agricultural Census Data](#)
- [50 States](#)
- [USDA Forest Service Database](#)

Did you know? (Ag Facts)

It takes about 36 apples to create one gallon of apple cider.

Enriching Activities

- Get a large wall chart of the United States and have each student add different crops to it in order to summarize crop-growing regions of the United States. Next have students research the social, economic, and ecological risks and benefits of changing a natural ecosystem as a result of human activity. Ask them how these changes might influence crop-growing regions in the future. Students have researched environmental factors that affect where plants grow. Take this idea a step further and investigate how carrying capacity influences the population of particular plants. After further research, ask students to describe factors that affect the carrying capacity of an ecosystem and relate these to population growth.

Sources/Credits

Adapted from: Curriculum for Agricultural Science Education (2012) Principles of Agricultural Science – Plant. [Curriculum materials for secondary agricultural education instruction.] Lexington, KY.

Parker, R. (2010). Plant and soil science: Fundamentals and applications. Clifton Park, NY: Delmar. An Introduction to Plant Science is found on pages 174-184 and additional information on climate data is found on pages 247-257.

Author(s)

Minnesota Agriculture in the Classroom

Organization Affiliation

Minnesota Agriculture in the Classroom

- [Agricultural Literacy Outcomes](#)
- [Education Content Standards](#)
- [Common Core Connections](#)

Agricultural Literacy Outcomes

Science, Technology, Engineering & Math

- Provide examples of how processing adds value to agricultural goods and fosters economic growth both locally and globally

Agriculture and the Environment

- Evaluate the potential impacts of climate change on agriculture