

Soil: The Secret to Our Survival

Grade Level: 4-8

Lesson Overview

Every day, most of us look down on a substance that helps sustain our very lives. We ignore it, trample it, or try to wash it away. In this lesson, students will complete a web quest to explore important aspects of one of our most important natural resources. They will then choose a specific soil topic and dig deeper (see what we did there?) for more information. With this information, students will develop infographics, PSAs, or videos to raise awareness of soil's importance.

Student Objectives

1. Describe ways in which soil sustains human life.
2. Describe ways humans can take care of the soil.
3. Perform research on a soil topic (e.g., how soil forms, soil nutrients, soil erosion, soil health, etc.)
4. Utilize a digital platform to create a shareable image or short video to inform others about soil.

Materials

- ✓ Computers or tablets with access to a variety of digital presentation tools such as Canva, Google Slides, Prezi, Screencastify, TikTok, etc.
- ✓ Soil Secrets Webquest
- ✓ Guiding Questions worksheet
- ✓ Paper and pencil

Vocabulary

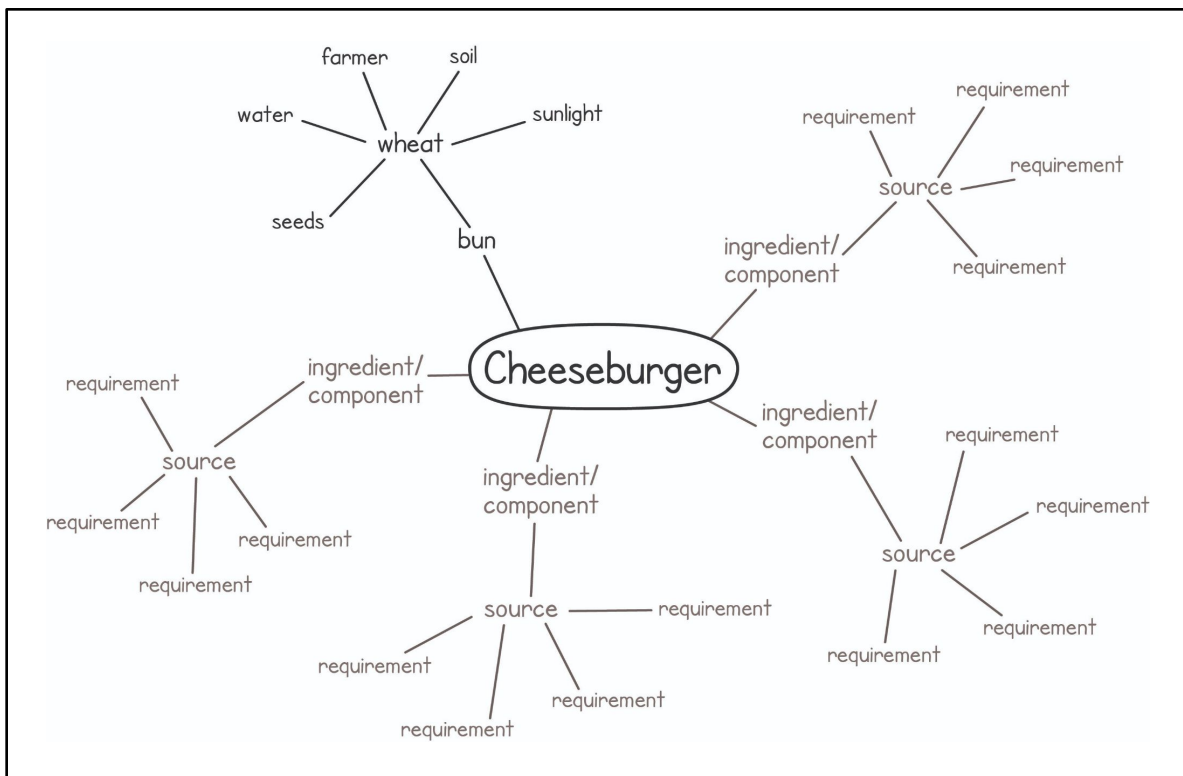
Specific terms will depend on students' chosen topics.

Background Information

Students will search for and provide the background information for their chosen soil-related topic.

Procedure

1. Ask students to get out a notebook or sheet of paper and pencil in order to create a word web. Ask them to do the following:
 - a. In the center of the page, draw or write the name of a popular **food item**, such as: cheeseburger, pizza, taco, macaroni & cheese, fried rice, apple pie, or chocolate chip cookies. (Students may choose a different food item as long as it contains multiple ingredients.) Draw a circle around the item.
 - b. Around the circled food item write the **components or ingredients** it contains. For example, a cheeseburger would have words like, "bun, cheese, ketchup, ground beef," etc.
 - c. Draw a line from each ingredient to the food item listed in the center.
 - d. Near each component or ingredient, write a word or phrase that describes its **source**. For example, near "bun," write "wheat." As before, draw a line connecting each word or phrase to the ingredient it describes.
 - e. Near each source, write words describing what the source requires to exist. For example, next to "wheat," you might write "seeds, water, sunlight, soil, air, farmer." Draw lines connecting these **requirements** to the ingredient source.



2. Once students have completed their word webs, invite several students to share with the class their chosen food item and one “arm” of their web. Model what you wish them to share with an example: “My favorite food is cheeseburgers. One of the ingredients is a bun. The bun is made from wheat, and in order for there to be wheat, it needs a farmer to grow it, the right climate, water, sunlight, and soil.”
3. After several students have shared, discuss what the webs have in common. Do any parts of their own webs repeat words? What words are repeated among multiple student webs?
4. Ideally, the idea of “soil” has come up repeatedly in students’ webs. If not, bring it up and ask where students think it should fit. Use this as a starting point to discuss the importance of soil.
5. Distribute the Soil Secrets Webquest worksheet. Allow students to work individually or in pairs to complete the scavenger hunt.
6. Once students have completed the webquest, ask them to choose one of the soil topics listed at the end of the webquest worksheet.
7. Distribute the Guiding Questions worksheet. Students may work individually or with a partner to find the information needed to complete this worksheet.
8. Students should then use the information they have gathered to create an informative and/or persuasive image or video about their chosen topic. The following are examples students may view to help them get started:
 - a. Infographics from the USDA Natural Resources Conservation Service: <https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/health/?cid=stelprdb1143889>
 - b. PSAs from the USDA Natural Resources Conservation Service: <https://youtu.be/swisspqO424>
 - c. International Year of Soils videos: <https://www.soils.org/iys/monthly-videos>
9. Allow students to share their finished infographics or videos with the class. (Optional: make it a competition to see which student or team creates the most memorable and meaningful image or video.)

Extension Activities

1. Link to soil erosion “bonus” mAGic lesson
2. Link to Crop Swap (crop rotation) mAGic lesson

3. Caring for the Land: <https://agclassroom.org/matrix/lesson/136/>
4. Digging Into Nutrients: <https://agclassroom.org/matrix/lesson/123/>

Additional Resources

- Claude's Got the Scoop on Soil: <https://web.extension.illinois.edu/soil/>
- Dr. Dirt: <https://www.doctordirt.org/>
- National Association of Conservation Districts:
<https://www.nacdnet.org/conservation-education-hub/>
- Nutrients for Life: <https://nutrientsforlife.org/for-teachers/>
- Soil Science Society of America <https://www.soils4teachers.org/>

Standards

Illinois Social Science Standard

SS.G.2.6-8.LC Explain how humans and their environment affect one another.

Illinois English Language Arts Standard

W9 Draw evidence from literary or informational texts to support analysis, reflection, and research.

The **M**ultidisciplinary **A**gricultural **I**ntegrated **C**urriculum (mAGic) was created in 2004 under the leadership of the Illinois State Board of Education (ISBE) and the Facilitating Coordination in Agricultural Education Project (FCAE). Funding was made available through the FCAE grant budget from the agricultural education line item of the ISBE budget. This revision, as printed, was developed in April 2021.



These mAGic lessons are designed to bring agriculture to life in your classroom. They address the Illinois Learning Standards in math, science, English language arts and social studies.

Soil mAGic project update writers/reviewers: Rhodora Collins – Dekalb County; Suzi Myers – Kane County; Connie Niemann – Montgomery County; Debbie Ruff – Livingston County; Jennifer Waters – Sangamon County; and Dawn Weinberg – Hancock County.

Name _____

Soil Secrets Webquest

Visit the Soil Science Society of America's (SSSA) "Soil and Food" web page at <https://www.soils4teachers.org/soil-and-food>. Answer the following question:

1. Soil provides us with what?

Now go to <https://www.soils.org/about-soils/basics>. Answer the following questions:

1. How would a soil scientist define soil?
2. Fill in the blank: Soils are _____ natural resources because they are constantly forming, but at extremely slow rates.
3. How long can it take for one inch of topsoil to form?
4. What does CLORPT stand for? (Hint: Five major factors control how a soil forms.)
5. The "goods and services" provided by soils are known as (two words):

Now go to SSSA's Dig Deeper website, <https://www.soils4kids.org/>. Click on "Soil Games." Play the game SoilTris, then answer the following questions:

1. What are the 4 main ingredients of soil?
 - a.
 - b.
 - c.
 - d.
2. Do all crops require the same soils?

Go to <https://www.soils4teachers.org/human-soil-interactions>. Answer the following:

1. The phrase used to describe the human-induced or natural process which impairs the capacity of soil to function is (two words):

2. List seven forms of soil degradation caused by human activities.
 - a.
 - b.
 - c.
 - d.
 - e.
 - f.
 - g.

Finally, go to <https://www.soils4teachers.org/soil-and-environment> and answer this question:

1. Name seven functions of soil in an ecosystem:
 - a.
 - b.
 - c.
 - d.
 - e.
 - f.

Now that you have explored some “secrets” of soil and its importance, you are going to dig deeper into a specific soil topic. Your goal is to research your chosen topic and create a sharable infographic, public service announcement (PSA), or video to inform others of soil’s importance.

You may choose from the topics listed below or select another soil-related topic.

- soil conservation (agriculture)
- soil conservation (urban)
- soil degradation
- soil ecology
- soil erosion
- soil formation
- soil health
- soil nutrients
- soil structure
- soil texture
- soil types

Soil Secrets Webquest ANSWER KEY

Visit the Soil Science Society of America's (SSSA) "Soil and Food" web page at <https://www.soils4teachers.org/soil-and-food>. Answer the following question:

1. Soil provides us with what?

Soil provides food and fibers for us to eat, and clothes to wear.

Now go to <https://www.soils.org/about-soils/basics>. Answer the following questions:

1. How would a soil scientist define soil?

The surface mineral and/or organic layer of the earth that has experienced some degree of physical, biological and chemical weathering.

2. Fill in the blank: Soils are **limited** natural resources because they are constantly forming, but at extremely slow rates.

3. How long can it take for one inch of topsoil to form?

several hundred years or more

4. What does CLORPT stand for? (Hint: Five major factors control how a soil forms.)

climate, organisms, relief (landscape), parent material, and time

5. The "goods and services" provided by soils are known as (two words):

ecosystem services

Now go to SSSA's Dig Deeper website, <https://www.soils4kids.org/>. Click on "Soil Games." Play the game SoilTris, then answer the following questions:

1. What are the 4 main ingredients of soil?

a. ***sand***

b. ***silt***

c. ***clay***

d. ***organic matter***

2. Do all crops require the same soils? **No**

Go to <https://www.soils4teachers.org/human-soil-interactions>. Answer the following:

1. The phrase used to describe the human-induced or natural process which impairs the capacity of soil to function is (two words): ***soil degradation***

2. List seven forms of soil degradation caused by human activities.
 - a. ***erosion***
 - b. ***desertification***
 - c. ***acidification***
 - d. ***deforestation***
 - e. ***salinization***
 - f. ***mining***
 - g. ***urbanization***

Finally, go to <https://www.soils4teachers.org/soil-and-environment> and answer this question:

1. Name seven functions of soil in an ecosystem:
 - a. ***habitat***
 - b. ***air quality & composition***
 - c. ***temperature regulation***
 - d. ***carbon & nutrient cycling***
 - e. ***water filtration***
 - f. ***water cycling & quality***
 - g. ***waste decomposition***
-

Name _____

Guiding Questions Worksheet

Answer the questions below. Then, use this information to create an infographic, public service announcement (PSA), or video to inform others of soil's importance.

What soil-related topic have you chosen to research?

Why is this topic important to you; what is your personal connection to this topic?

Why do you think this topic is important for others to understand?

List three important facts about this topic. For each fact, provide the web address where you found this information.

- 1.
- 2.
- 3.

Describe a positive action people can take regarding this topic. (For example, homeowners can grow native plants to reduce soil erosion.)

Brainstorm at least three possible titles for your informational graphic or video:

- 1.
- 2.
- 3.