



Lesson Plan

Syngenta: Why is Soil So Important?

Created: 06/2016 by the National FFA Organization

STUDENT LEARNING OBJECTIVES

After completing these activities students will...

1. Articulate the importance of soil.
2. Label the basic layers of a soil profile.
3. Identify the percentages of organic matter, mineral matter, air and water in soil.
4. Describe why sustainable soil practices are needed.
5. Identify the challenges of soil management.

TIME REQUIRED: 30 minutes

RESOURCES:

1. FFA.org
2. Video – Syngenta: Why is Soil So Important? https://youtu.be/H_YXEh0eQD4

EQUIPMENT AND SUPPLIES NEEDED:

1. A copy of the “So(il), What’s the Big Deal?” worksheet for each student.
2. Internet access for students to complete the worksheets.

THIS QUICK LESSON PLAN WOULD WORK WELL AS:

1. A portion of a plant systems curriculum.
2. A portion of an agricultural companies lesson/unit.

THESE ACTIVITIES ARE ALIGNED TO THE FOLLOWING STANDARDS:

AFNR Performance Element

- CS.01: Analyze how issues, trends, technologies and public policies impact systems in the Agriculture, Food and Natural Resources Cluster.
- CS.06: Analyze the interaction among AFNR systems in the production, processing and management of food, fiber and fuel and the sustainable use of natural resources.

FFA Precept

- FFA.PG-J.Mental Growth: Embrace cognitive and intellectual development relative to reasoning, thinking and coping.
- FFA.CS-M.Communication: Effectively interact with others in personal and professional settings.

Common Career Technical Core

- AG1: Analyze how issues, trends, technologies and public policies impact systems in the Agriculture, Food and Natural Resources Cluster.
- AG6: Analyze the interaction among AFNR systems in the production, processing, and management of food, fiber, and fuel and the sustainable use of natural resources.

NASDCTEc

- AGC02.02: Employ the use of technical information effectively to maintain and communicate records and reporting procedures commonly used in the AFNR cluster.
- AGC10.04: Envision emerging technology and globalization and project its influence on widespread markets to demonstrate an understanding of technologies and trends that will impact the AFNR industry.

Common Core- Reading: Informational Text

- CCSS.ELA-Literacy.RI.9-10.4: Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language of a court opinion differs from that of a newspaper).

Common Core- Writing

- CCSS.ELA-Literacy.W.9-10.1 Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

Common Core- Speaking and Listening

- CCSS.ELA-Literacy.SL.9-10.1: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9-10 topics, texts and issues, building on others’ ideas

and expressing their own clearly and persuasively.

- CCSS.ELA-Literacy.SL.9-10.4: Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

Common Core- Science & Technical Subjects

- CCSS.ELA-Literacy.RST.9-10.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-10 texts and topics.
- CCSS.ELA-Literacy.RST.9-10.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

Common Core- Literacy in Science & Technical Subjects: Writing

- CCSS.ELA-Literacy.WHST.9-10.1: Write arguments focused on discipline-specific content.
- CCSS.ELA-Literacy.WHST.9-10.6: Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information and to display information flexibly and dynamically.

AFNR Career Ready Practices

- CRP.02.: Apply appropriate academic and technical skills. Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive.
- CRP.04.: Communicate clearly, effectively, and with reason. Career-ready individuals communicate thoughts, ideas and action plans with clarity, whether using written, verbal and/or visual methods.

Partnership for 21st Century Skills

- Communication
- Critical Thinking and Problem Solving
- Information, Communications and Technology Literacy

LESSON PLAN:

1. Introduction:

We know soil is important in growing plants. But why is it so important?

Ask students the following questions to begin talking about the importance of soil:

1. What do you know about soil?
2. What does soil do for plants?

Transition: Syngenta, an agricultural company, does a good job introducing us to the important role soil plays in agriculture.....

2. Activity: Distribute the handout "So(il), What's the Big Deal?" to each student. Instruct them to fill out the worksheet.

- a. Show, or have students watch on their own, the video *Syngenta: Why is Soil So Important*. The direct URL is https://youtu.be/H_YXEh0eQD4
 - i. *Note:* The video is relatively short, so be prepared to pause frequently for students to capture answers, or make them aware before you ask them to complete the worksheet.
 1. Why is soil so important? – 0:00-0:19
 2. What is soil? – 0:19-0:56
 3. Why do we need soil? – 0:56-1:42
 4. What are the challenges? – 1:42-2:12
 5. What is Syngenta doing to help? – 2:12-3:43

3. Follow-up: Have students discuss the overarching question of "Why is Soil So Important?". Facilitate a class wide discussion revolving around their thoughts and their reasoning.

4. Leveling Up: Introduce students to the National Land and Range Judging Contest. Resources can be found here: <http://www.landjudging.com/>.

NAME: _____

Aligned to the following standards:
CS.01; CS.06; AG1; AG6; AGC02.02; AGC10.04; CCSS.RI.9-10.4; CCSS.W.9-10.1;
CCSS.SL.9-10.1; CCSS.SL.9-10.4; CCSS.RST.9-10.4; CCSS.RST.9-10.7; CCSS.WHST.9-10.1; CCSS.WHST.9-10.6; CRP.02; CRP.04

So(il), What's the Big Deal?

DIRECTIONS:

Check out the video by Syngenta: *Why is Soil So Important?* Follow the link, https://youtu.be/H_YXEh0eQD4. Review the video to complete the questions below.

#1 Why is soil so important?

#2 What is soil?

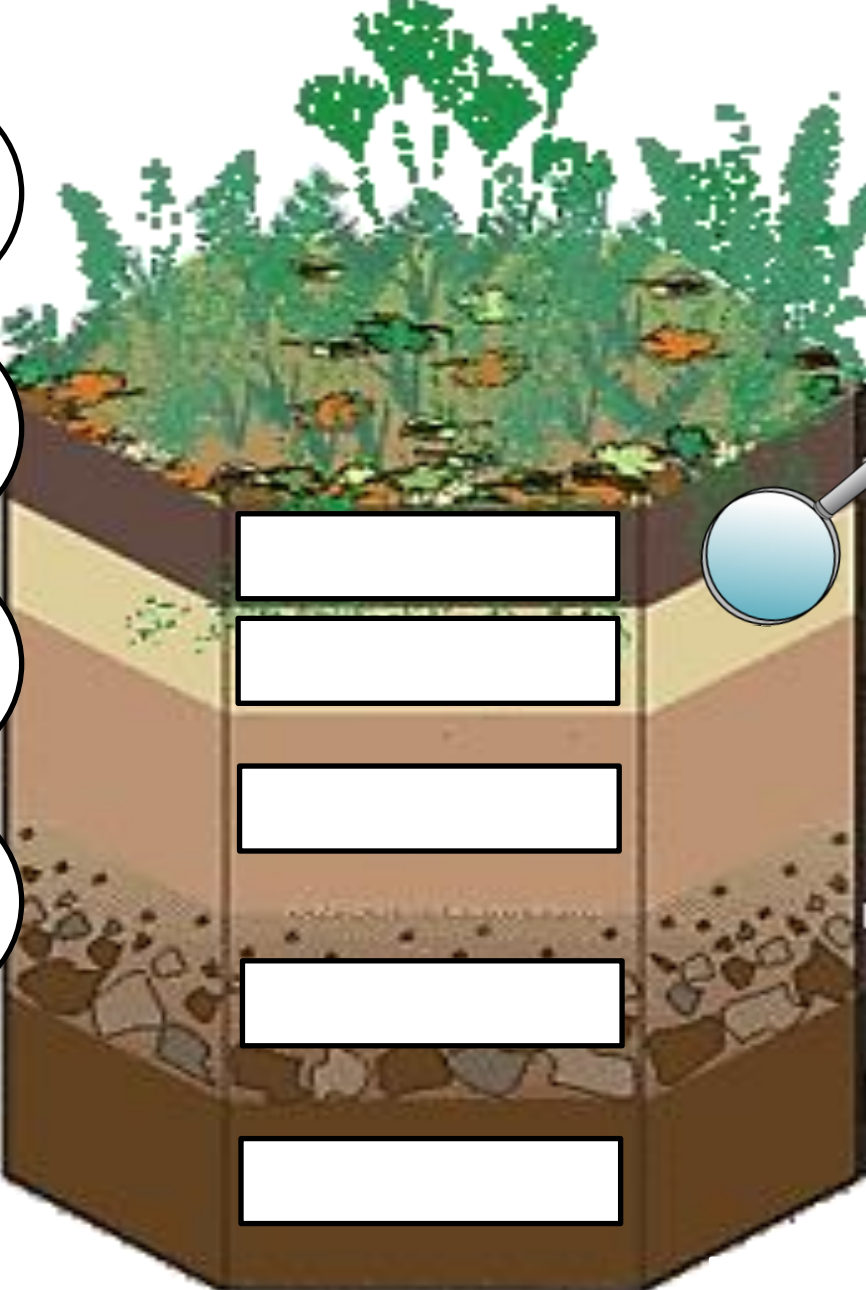
- ☐ Label the soil layers on the soil profile
- ☐ Identify the percentages of soil components in the circles
- ☐ Fill in the statements to the right of the soil profile

Organic Matter:
%

Mineral Matter:
%

Air:
%

Water:
%



1. **It's alive!** Soil can contain up to _____ bacteria and other organisms

2. **It's** _____
Soil absorbs air and water.

3. **It's nutrient –** _____
Nitrogen, phosphorous and other nutrients.

NAME: _____

#3 Why do we need soil?



- Only _____% of the land on earth is suitable for agricultural use.
- _____, _____ soil is essential to agriculture and _____.
- _____ of agriculture is needed to _____ yields and allow us to produce _____ food on _____ land.



Think on it, then write it down: Why do we need to be producing food that way?

#4 What are the challenges?

Threats	Poor Soil Management
1.	• Every _____ we lose a soccer field of farmland.
2.	
3.	• Nature takes _____ to replace 25mm of lost soil.
4.	→ _____
5.	• _____ of the world's farmland is considered degraded.
6.	

#5 What is Syngenta doing to help increase yield and reduce soil loss?

List three sustainable practices helps growers utilize:

1. _____ 2. _____ 3. _____

NAME: _____

Aligned to the following standards:
CS.01; CS.06; AG1; AG6; AGC02.02; AGC10.04; CCSS.RI.9-10.4; CCSS.W.9-10.1;
CCSS.SL.9-10.1; CCSS.SL.9-10.4; CCSS.RST.9-10.4; CCSS.RST.9-10.7; CCSS.WHST.9-10.1; CCSS.WHST.9-10.6; CRP.02; CRP.04

So(il), What's the Big Deal? – Answer Key

DIRECTIONS:

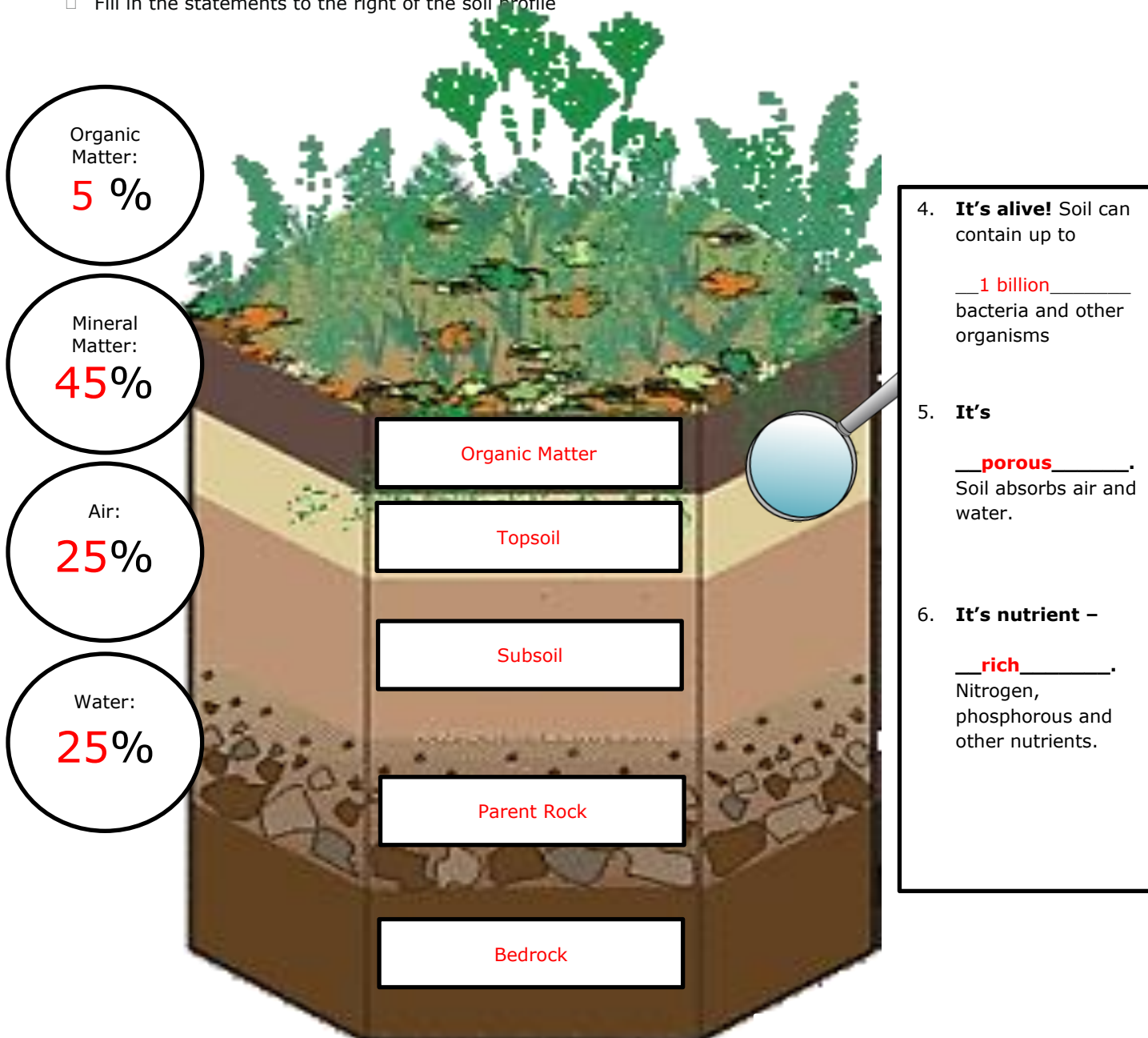
Check out the video *Syngenta: Why is Soil So Important?* by following the link, https://youtu.be/H_YXEh0eQD4. Review the video to complete the questions below.

#1 Why is soil so important?

Without it, we couldn't grow the food we need to live.

#2 What is soil?

- ☐ Label the soil layers on the soil profile
- ☐ Identify the percentages of soil components in the circles
- ☐ Fill in the statements to the right of the soil profile



NAME: _____

#3 Why do we need soil?



- Only 12% of the land on earth is suitable for agricultural use.
- Fertile, healthy soil is essential to agriculture and food security.
- Sustainable intensification of agriculture is needed to improve yields and allow us to produce more food on less land.



Think on it, then write it down: Why do we need to be producing food that way?

Answers will vary as this is not specifically in the video, but look for answers that relate to the knowledge that our world population is increasing quickly.

#4 What are the challenges?

Threats	Poor Soil Management
1. <u>Water erosion</u>	• Every <u>second</u> we lose a soccer field of farmland.
2. <u>Wind erosion</u>	
3. <u>Desertification</u>	• Nature takes <u>500 years</u> to replace <u>25mm</u> of lost soil.
4. <u>Compaction</u>	
5. <u>Loss of organic matter</u>	• <u>40%</u> of the world's farmland is considered degraded.
6. <u>Urbanization</u>	

#5 What is Syngenta doing to help increase yield and reduce soil loss?

List three sustainable practices helps growers utilize:

1. Conservation tillage, permanent cover, crop rotation, technology, training and diagnostics are all acceptable answers.