

SMCOE Green Career Awareness

AGRISCIENCE

Solutionary Phase	Problem Cycle
Lesson # and title	Lesson 7: Vegetative Practices
Duration	45 minutes

Lesson Overview
In this lesson, students will focus on current crop-based (vegetative) practices used in the agriculture industry and their effect on soil health. Students will participate in 2 activities. The first activity consists of sampling fruits & veggies with observations. The second activity will have students learn how different commonly grown crops affect soil health through placing crop cards on a scale.
Learning Objectives
<ul style="list-style-type: none"> • Students will be able to figure out where food gets its nutrients from • Students will then model what happens to the soil if the same crops are grown in the soil over and over
Content Standard(s)
<p>CA NGSS</p> <p><i>ESS3.D: Global Climate Change</i> - Human activities, such as the release of greenhouse gasses from burning fossil fuels, are major factors in the current rise in Earth's mean surface temperature (global warming). Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depend on the understanding of climate science, engineering</p>

capabilities, and other kinds of knowledge, such as understanding of human behavior and on applying that knowledge wisely in decisions and activities. (MS-ESS3-5)

MS-ESS3-5

Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century. [Clarification Statement: Examples of factors include human activities (such as fossil fuel combustion, cement production, and agricultural activity) and natural processes (such as changes in incoming solar radiation or volcanic activity). Examples of evidence can include tables, graphs, and maps of global and regional temperatures, atmospheric levels of gasses such as carbon dioxide and methane, and the rates of human activities. Emphasis is on the major role that human activities play in causing the rise in global temperatures.]

CTE Agriculture

G7.1 *Plan how to effectively manage and conserve soil through conventional, minimum, conservation, and no-tillage irrigation and through drainage and tillage practices.*

College and Career Connection(s)

This lesson ties the concepts of how growers (farmers) have a direct effect on soil health through farm management. This shows students that there can be careers in both horticulture/farming and agronomy (soil science).

Equipment, Instructional Resources, and Materials

- [Vegetative Practices Slides](#)
- Crop Cards (cut out/mixed up)
- Printed [Soil Scale](#)
- Vegetable/Fruit Samples
- Chromebooks for independent research

Suggested Student Grouping

Groups for tasting, independent during research.

Vocabulary

- Agriculture - The practice of growing plants for food, clothing, animal feed, and other resources humans need or desire. It also includes raising domesticated animals (livestock).
- Atmosphere - A thick layer of air that surrounds the Earth, supports life on Earth, and protects living things from the sun's harmful radiation.
- Biodiversity - Biological diversity is the variety of life in an area. Examples include the variety of individuals in a species, the variety of species in an ecosystem, and the variety of biomes or species on earth.
- Carbon - An element that is in all living things (e.g., humans, animals, and plants) and many nonliving things (i.e., rocks, soil, water, and our air/atmosphere). Atmospheric carbon is often attached to oxygen in the form of carbon dioxide.
- Carbon footprint - The amount of carbon dioxide and other greenhouse gasses that a person or group of people puts into the atmosphere from their use of fossil fuels.
- Carbon sequestration - The process of capturing and storing carbon dioxide and other forms of carbon from the atmosphere. The natural process of sequestration stores carbon in soil and bodies of water. The human-designed processes using technology to capture and store carbon.
- Carbon release - The process of carbon being released from the soil. This happens naturally as soil organisms breathe (respire), and can be sped up through human activities such as tilling or plowing.
- Climate change - The global long-term change in temperature and weather patterns due to increases in atmospheric carbon dioxide, mostly due to use of fossil fuels.
- Conventional/degenerative agriculture - Industrial practices of farming which include large single-crop farms, intensive tilling and irrigation, and the use of synthetic fertilizers, pesticides, and herbicides. This way of farming is very productive, but requires high amounts of energy, adds toxins to the soil, and increases carbon release from the soil rather than carbon sequestration (capture).
- Decomposer - Any organism that breaks down dead or decaying organic matter such as dead animals, fallen trees, or leaf litter.
- Ecosystem - A place where all the living things (plants, animals, microorganisms) interact with each other and with nonliving parts of their environment (water, sun, temperature, rocks and soil).
- Erosion - When rocks, soil, or other landforms are gradually worn down by ice, water, or wind.
- Fertilizers - Any substance, natural or man-made, added to soil to increase the level of nutrients it contains and speed up plant growth.
- Greenhouse effect - The natural process of the Earth's atmosphere trapping heat from the sun. Human use of fossil fuels has increased the amount of carbon in the atmosphere, leading to more of the sun's heat being trapped (global warming).

- Herbicides - Chemicals used to kill unwanted plants. Also known as weedkillers
- Microorganism - A living thing such as bacteria or fungi that is too small to be seen without the use of a microscope or other magnification.
- Macro-organism - A living thing that can be seen by the naked eye.
- Monoculture - The practice of growing or producing only one crop, species, or animal in the same place at the same time.
- Pesticides - Chemicals used to kill unwanted organisms such as insects, rodents, plants, or fungi.
- Photosynthesis - The process by which plants use the sun's energy to create carbon-based sugars from carbon dioxide and water.
- Polyculture - The practice of growing or producing multiple crops, species, or animals in the same place at the same time.
- Regenerative agriculture - Farming and grazing practices that focus on restoring soil health and biodiversity, and sequestering (capturing) carbon in the soil.
- Soil - The material on the surface of the Earth in which plants grow. It is a mixture of eroded rocks, minerals, and organic matter. It holds water and air, provides nutrients and structural support to plants, and supports a diverse ecosystem of living micro- and macro-organisms.

The Lesson

Preparation

Teacher will need to cut fruit and place it on plates around the classroom for the guided activity.
 Print out/cut the crop cards for students to arrange on the crop scale (1 set of cards & scale/pair or individual).
 If desired, have the video pre-loaded and at the correct time stamp for **Regenerative Vegetative Practices → Kiss the Ground (37:00-44:11)**

Lesson Procedure

Link to Lesson Slide Deck:

https://docs.google.com/presentation/d/1HLnP3GqN7Qrjcpixl5pBl6DfFv2j5q0z/edit#slide=id.g12543de80f4_0_61

Activity/Task	Description	Time (min)
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Warm-up	What do you know about carbon and climate change? → review responses with students and write down their ideas on the board. Look for similarities and themes that relate carbon emissions leading to an overall increase in global temperatures.	5
Guided Practice	Teacher will hand out samples of different local foods that are grown (make sure to be aware of any potential food allergies before doing so, and shy away from nuts, strawberries, and other common food allergies). Students will make observations about the food samples they have using all of their senses BESIDES taste. Let them know they will have the opportunity to taste the food soon, but not yet. After observations on the food are made, have the students pair share, and then share out to the class as a whole what they noticed. Have students eat the food, any food not eaten they can add to the school's compost. Propose the question, where does food get its nutrients from?	10-15
Independent Practice	Students will be given plant cards and a scale in which they arrange the plants based on if they mostly add to the soil, or take nutrients from the soil. Have students place the pre-cut crop cards on the nutrients in soil scale (replaces, depletes, or no effect)	15
Discussion/Reflection	Have students discuss/reflect on the independent practice activity by a think/pair/share. Students will answer the following question: <i>Every plant requires taking of nutrients from the soil to grow, but plants require different nutrients. What are some ideas or techniques farmers can use to minimize depleting soil nutrients?</i>	5
Video (optional)	(if time allows) Have students watch the Regenerative Vegetative Practices → Kiss the Ground (37:00-44:11)	7-8

Assessment

Students write and share what type of farming techniques they mostly see in their communities. (they did this in an earlier lesson as well, this should be an extension now that they have more knowledge)

