

SMCOE Green Career Awareness

AGRISCIENCE

Solutionary Phase	Solutions
Lesson # and title	Lesson 10: Regenerative Agriculture Practices in Action
Duration	45 minutes

Lesson Overview

In this lesson, students will reflect on all they have learned up to this point by matching words, definitions, and pictures for regenerative farming practices. After that, they will use an online interactive to find specific farms in their area and the regenerative methods that those bay area farms are using.

Learning Objectives

- Students will review the Regenerative Agriculture Practices covered in the unit through matching proper terms, definitions, and pictures.
- Students will look for Regenerative Practices used in different farming and ranching operations in the San Francisco Bay Area.

Content Standard(s)

NGSS:
ESS3.A
MS-ESS3-1

Agriculture CTE:

G6.4 Research how soil biology affects the environment and natural resources.

G7.0 Integrate effective tillage and soil conservation management practices.

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)

Students will make connections with a variety of farming and ranching careers involved in the Agriculture Industry. Students will familiarize themselves with a variety of agriculture-related operations that exist in the San Francisco Bay Area. This can expose students to potential careers they may be interested in later in life.

Equipment, Instructional Resources, and Materials

[Regenerative Agriculture Practices in Action Slides](#)

[Vegetative Practices Cards](#)

[Regenerative Agriculture Practices in Action Worksheet](#)

[Regenerative Farm Map Resource](#)

Optional - Kiss the Ground → Regenerative Agriculture/Climate Change (35:11-37:50)

Suggested Student Grouping

Students will work in groups of 3-4 (table groups) or pairs

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.
- Criteria - Requirements, rules and/or features of the design.
- Constraints - Limitations of the design
- 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 tiling 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).
- Compaction - describes how close the particles are to each other; describes the amount of space in the soil.
- 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 (Monocropping) - The practice of growing or producing only one crop, species, or animal in the same place at the same time.
- Nutrients - a substance that provides nourishment essential for growth and the maintenance of life.
- 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.
- Run off - Water that flows over the ground surface rather than soaking into the ground
- 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.
- Sediment - Small, solid pieces of material from rocks or organic material.
- Soil fertility - A measure of how well soil supports plant growth.
- Texture - A description of the size of the particles that make up the soil.

The Lesson

Preparation

- Pull up slides for LP10
- Print copies of the [Regenerative Agriculture Practices in Action Worksheet](#)
- Cut out each individual box (term, definition, and picture all separated) of the [Vegetative Practices Key Terms](#) (1 set/group of students)
- You can pull up the Kiss the Ground movie clip to the proper timestamp → [Kiss the Ground \(50:12-55:57\)](#)

Lesson Procedure

Link to Lesson Slide Deck:

https://docs.google.com/presentation/d/1asNNern9bC4RjYMzqyTT5azzqBd6oILEapuXZf9wQCU/edit#slide=id.g12654ded520_0_70

Activity/Task	Description	Time (min)
Warm-up	As a warm-up, have students (in pairs) list as many beneficial agricultural practices that improve soil health and harmful agricultural practices used in the Agriculture Industry that contributes to soil degradation. Time students for 5 minutes to come up with as many examples for both columns. Have students share their examples and write it on the board for the class to see. Elaborate on each example the students provide and try to tie it back to soil regeneration and soil degradation.	5-10
Concepts/Terms Review	Vegetative Practices Key Terms - Cut out each individual box (term, definition, and picture all separated), students can work in table groups and rearrange the mixed up pictures to go with the correct word and definition. When students finish, have their work	10

	checked by the teacher. If there are incorrect placings for any terms, definitions, or pictures, try to push them in the right direction without giving them the answer.	
Answer Key	Go through the answers/proper matching for the Vegetative Practices Key Terms. Be sure to have students fix their misplaced cards.	5
Regenerative Farm Research	Regenerative Agriculture Practices in Action - Students will do research on the different agricultural practices used in a variety of operations in the San Francisco Bay Area. Students will fill out the Regenerative Agriculture Practices in Action Worksheet with their partner (or table group). Students will access all needed information on the Regenerative Farm Map. <i>If you want to get more specific, you may set filters on the Regenerative Farm Map to limit your results (certifications, practices used, etc.) → HIGHLY SUGGEST ENTERING YOUR ZIP CODE TO KEEP THE MAP FOCUSED ON LOCAL FARMS. Press "Search"</i> If time, debrief/discuss students' findings with the whole class.	15
Optional (if time): Kiss the Ground	Optional - Regenerative Animal Management → Kiss the Ground (50:12-55:57)	5
Exit Ticket	Exit ticket - Describe a method you found today to improve soil health from your selected site last week?	2-3

Assessment

Exit ticket - Describe a method you found today to improve soil health from your selected site last week?