



Pre and post-visit activities for *Mysteries of River Deltas* Field Trip Package

A topic lesson for grades 4-6

Learning Goals (for field trip and pre/post-activities)

1. Students will understand and implement the scientific process.
2. Students will define the role of rivers in shaping and changing the land around/throughout the river basin. (An emphasis will be placed on how soil is affected.)
3. After viewing IMAX film “Mystery of the Nile” students will infer the similar role of the Missouri and Mississippi Rivers role in affecting landscape change, specifically the impact to soil.
4. Identify and understand the following terms:
 - Erosion
 - Floodplain
 - Soil
 - Chemical (inorganic) fertilizers
 - Contaminate
 - Crop Rotation
 - Decompose
 - Environmental activist
 - Environmentalist
 - Farmer
 - Legume
 - Organism
 - Pesticide

Pre-visit Activities

Caring for the Land¹

Grade Level(s) 3 - 5

Estimated Time 1 hour

Purpose

Students will explain why people have different opinions regarding soil management and identify cause and effect relationships relating to agriculture and the environment.

Materials

- *Caring for the Land* activity sheets

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

- [Caring for the Land Activity Sheets](#)
- [Caring for the Land Activity Sheets ANSWER KEY](#)

Vocabulary

chemical (inorganic) fertilizers: synthetic materials that are added to the soil to provide nutrients—including nitrogen, phosphorus, and potassium—necessary to sustain plant growth

contaminate: to make impure by contact or mixture with harmful bacteria, fungi, or dangerous chemicals

crop rotation: the practice of planting different crops in consecutive growing seasons to maintain soil health

decompose: to decay or break down into smaller pieces

environmental activist: a person who works to protect the natural world through direct, vigorous action that is often focused on controversial issues

environmentalist: a person who works to protect the natural world from pollution and other threats

farmer: a person who works with land, plants, and animals to produce raw materials for food, clothing, shelter, and other products that are used in industry and manufacturing

legume: a family of plants which, with the aid of symbiotic bacteria, convert nitrogen from the air into a form that plants can use; legumes include many valuable food and forage species, including peas, beans, peanuts, clover, and alfalfa

organism: any living thing, plant or animal

pesticide: word used to describe a variety of substances used to control insects (insecticide), plants (herbicide), or animals (rodenticide for mice, etc.)

Background Agricultural Connections

The land is the livelihood of **farmers**. Most people, farmers included, try to avoid practices that harm their way of life. When raising crops and livestock, farmers actively manage soil, water, plants, and animals. Farming is one of the closest working relationships that people have with

¹ Lesson adapted from materials provided by Oklahoma Agriculture in the Classroom, by Debra Spielmaker.

https://www.agclassroom.org/teacher/matrix/lessonplan.cfm?lpid=136&search_term_ip=caring%20for%20the%20and

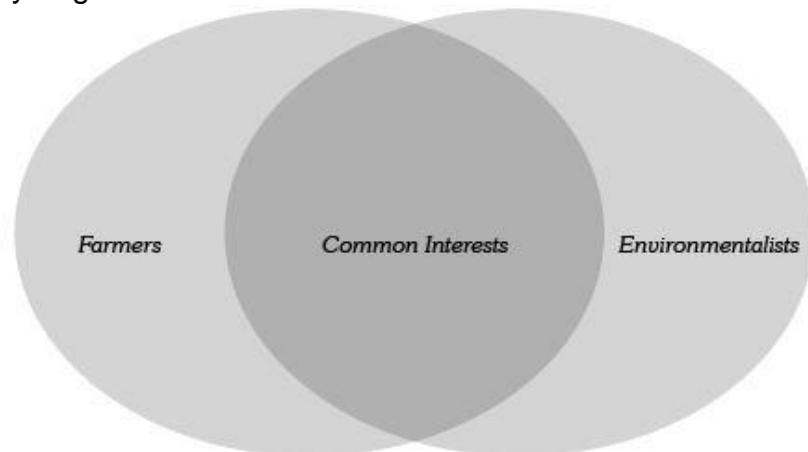
the environment, and sometimes farming practices lead to environmental problems. Often, it takes years for the environmental impacts of human activity to become evident, and it can be complicated to identify and change environmentally damaging actions. Farmers work both to produce food and to care for the land that is their livelihood. There are many different strategies for accomplishing these goals.

Interest Approach – Engagement

1. Ask students to think about people they know who farmers or environmentalists are. Can farmers be environmentalists?
2. Continue discussion on the topic to create interest and gauge students' prior knowledge using the following questions:
 - Why would farmers be motivated to protect natural resources like soil and water?
 - What motivates environmentalists to protect natural resources?
 - What are some methods farmers use to protect soil and water quality?

Procedures

1. Begin the lesson by asking students to describe and define in their own terms the words: *farmer*, *environmentalist*, and *environmental activist*.
2. Ask students if they have heard any news reports about conflicts between farmers and environmental activists (endangered species preservation, invasive species management, public land use, wetland preservation, etc.).
3. Draw a Venn diagram on the whiteboard (see the example below) and ask students to list things about which farmers and environmental activists disagree and the things they have in common. For example, both care about the land, both need food to eat. Note: You may have to make very large circles.



4. Share the background material and discuss problem/solution and cause/effect relationships.
5. Divide your class into three groups and hand out copies of one of the *Caring for the Land* activity sheets to each group.
6. Ask students to read the situation described in the text carefully to identify the cause and effect, the problem and solution, and any alternatives and their effects. Ask each group to share what they discussed with the class.
7. Discuss the following questions:
 - Why do we need farmers? (food, clothes, shelter, other manufactured goods)
 - Who should decide how to use the land?
 - How should we decide how to use the land?

Concept Elaboration and Evaluation

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

- The land is the livelihood of farmers, and most farmers try to avoid practices that harm their way of life.
- People have differing opinions about environmental issues.
- Farms provide food, shelter, clothing, and other manufactured goods.

I. Where Does Soil Come From? Worksheet and Classroom Discussion

II. Water Weight Erosion:

Ask the class the following question for group discussion:

- How does the weight of water affect the Earth?

Led class in developing a hypothesis about what will happen when changes are made to the experiment.

Experiment: Find a spot of dry earth. Pour a cupful of water on it. Have students use a KWL Chart to document their findings.

Next, repeat experiment with second cup of water. However, this time pour it from a higher point. Guide students to observe the changes that occurred when the first cupful of water was poured versus the second cup.

Ask students: How do you think this might change if you did this experiment in different places around the world? Would climate affect the outcome?

Post-visit Activities

Activities one and two can be downloaded at the following link: <http://www.nilefilm.com/guide.htm>

- I. **The Aswan Choice:** Please see attachment from The Mysteries of the Nile Educator Guide, page 11. This activity looks at the impacts of one of the world's largest dams in Egypt. It asks students to "consider the positive, negative and undecided outcomes" of its creation².
- II. **Do We Want a Dam?** Also included in The Mysteries of the Nile Educator Guide, page 12.

Standards Addressed (NGSS)

Resources

- Factors affecting soil formation: <http://www.eschooltoday.com/soils/factors-that-affect-soil-formation.html>
- Soils Overview: <http://www.soils4teachers.org/files/s4t/lessons/soils-overview-unit-sep17.pdf>
- Human and Soil Interactions: <http://www.soils4teachers.org/human-soil-interactions>
- What is desertification and what can be done to prevent it?:
<https://soilsmatter.wordpress.com/2015/11/01/what-is-desertification-and-what-can-be-done-to-prevent-it/>

² <http://www.nilefilm.com/guide.htm>

Videos

- Soil Science Society of America Video/Introduction to Soil: <https://youtu.be/vDL6F6GkAzi>
- Soil Science Society of America Video/Urban Soils: <https://youtu.be/vkJ7H9DMEX4>
- Soil Science Society of America Video/Soils Support Agriculture: https://youtu.be/GGV2jlq_P4M
- Soil Science Society of America Video/Soils Clean and Capture Water:
<https://youtu.be/ZwQeTJEeedk>
- Soil Science Society of America Video/Buildings and Infrastructure: <https://youtu.be/zJi-73qeE-0>
- Sci-Show Kids/What's the Dirt on Dirt: <https://youtu.be/f29mjcd5bc>
- BBC Earth/Fertility of the Nile: <https://youtu.be/oE2YZZgZWdE>
- Chefs Challenge Video/Soil Formation: http://forces.si.edu/soils/video/chefs_challenge.html

Appendix I. Supplement for Pre-Visit Activity Weight of Water Erosion

The Scientific Method³

Question/Purpose - The scientific method starts when you ask a question about something that you observe: How, What, When, Who, Which, Why, or Where? And, in order for the scientific method to answer the question it must be about something that you can measure, preferably with a number.

Research - Rather than starting from scratch in putting together a plan for answering your question, you want to be a savvy scientist using library and Internet research to help you find the best way to do things and insure that you don't repeat mistakes from the past.

Hypothesis - A hypothesis is an educated guess about how things work. A good hypothesis has two parts: an explanation of what you think will happen and why you think that will happen. You must state your hypothesis in a way that you can easily measure, and of course, your hypothesis should be constructed in a way to help you answer your original question.

Experiment/Observation - Your experiment tests whether your hypothesis is true or false. It is important for your experiment to be a fair test. You conduct a fair test by making sure that you change only one factor at a time while keeping all other conditions the same. You should also repeat your experiments several times to make sure that the first results weren't just an accident. Scientists always record observations (what you can see and measure) throughout the experiment.

Analysis/Conclusion - Once your experiment is complete, you collect your measurements and analyze them to see if your hypothesis is true or false. Scientists often find that their hypothesis was false, and in such cases, they will construct a new hypothesis starting the entire process of the scientific method over again. Even if they find that their hypothesis was true, they may want to test it again in a new way.

³ <http://bowenpeters.weebly.com/scientific-method.html>