

Erosion, Fire, Flood, and Disease

Strand	Earth Resources
Topic	Effects of erosion, fire, flood, and disease
Primary SOL	3.10 The student will investigate and understand that natural events and human influences can affect the survival of species. Key concepts include c) the effects of fire, flood, disease, and erosion on organisms.
Related SOL	3.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which j) inferences are made and conclusions are drawn; k) data are communicated; m) current applications are used to reinforce science concepts. 3.6 The student will investigate and understand that ecosystems support a diversity of plants and animals that share limited resources. Key concepts include a) aquatic ecosystems; b) terrestrial ecosystems.

Background Information

Habitats are all around us, while factors – both avoidable and unavoidable – affect the organisms of these habitats.

Fires: A fire can be both a detriment and a benefit to soil. The soil can become more nutrient-rich after a fire due to the high mineral content of the ash and charcoal and also due to warm, moist conditions that increase microbial activity. High heat can cause soil particles to become water-repellant, causing rain to run off. As the rain runs off, it can cause erosion. Most large mammals can flee a fire; however, they can have a difficult time finding food after the fire. Scavengers have an increase in abundance of food. Predatory animals have an advantage due to the reduced forest coverage; prey are easier to find. Deer will eat the nutrient-rich ash and birds thrive on an increased availability of seed and nest in dead or partly dead trees. Plants that survive have less competition and will be able to get more sunlight, water, and nutrients.

Floods: Many fish species depend on regular flooding to wash wood debris into the water which they use for shelter. In wetland areas, flooding creates spawning and nursery sites for numerous fish. This leads to more food for waterfowl. Flooding can help native species which will be able to survive a flood whereas invasive species will not. Floods also transport soil and other materials needed for deltas and coastal marshes.

Disease: The equilibrium between predator and prey or host and parasite can change; sometimes leading to disastrous consequences.

Erosion: Stream banks can be destroyed which leads to stream beds deepening overtime causing instability in the stream system. Adding sediments to a waterway can bury aquatic insects and cause fish to suffocate. Pollutants can also be added to the water, through run-off, affecting all water life. Coastal areas lose 1-4 feet of land each year resulting in habitat loss.

Materials

- Copies of Cause and Effect sheet
- Copies of Note Taking sheet
- Copies of rubric
- Chart paper
- Poster board or chart paper for each group
- Markers/crayons

Vocabulary

cause, effect, habitat, organism, erosion, mineral, nutrient, sediment

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

Introduction

1. Instruct students to take the Cause and Effect handout home and look for things happening in their community that effect the surrounding ecosystem – these things can be harmful or helpful, e.g., watering the grass – helpful.
2. Examples can be – watering the grass, using electricity, climbing trees, building homes.
3. The next day in school, divide students into groups and have them discuss whether each of the things they listed were harmful or helpful on the surrounding habitat and check it off on their paper.
4. Compile a class list of all of the causes and effects.
5. Discuss each cause and look for possible other effects that students mentioned. For example, watering the grass can be helpful because it keeps the grass hydrated and organisms can use it as shelter and/or a food source, but it can be harmful because it depletes water resources and can cause run-off.

Procedure

1. Discuss large ecosystems – the beach or ocean, mountains, grasslands, pond, and/or rainforest. Start a new class list on chart paper of possible causes and effects and decide if they are harmful or helpful.
2. Lead students to think of erosion, fire, floods, and disease – try to find both harmful and helpful effects of each when possible, for example:
 - fire destroys ecosystems but also restores nutrients in the soil
 - floods destroy ecosystems but also restore nutrients in the topsoil
3. Provide groups with a poster or piece of chart paper. Assign each group one habitat and one of the harmful effects:
 - ocean/beach – erosion
 - rainforest – disease
 - pond – flood
 - grassland – fire
4. Instruct students to draw a before picture and an after picture on their paper showing the effects of erosion, flood, fire, or disease on the ecosystem. Instruct them to write a

sentence or two describing the ecosystems before and after. Students should include organisms that are indigenous to that ecosystem.

5. Finally, have students write a paragraph or list of ideas of how they would propose to help the ecosystems and the organisms in it after the harmful effects.
6. Have students present their before and after posters to the class.
7. Provide the audience with a graphic organizer to take notes during the presentations.

Conclusion

1. “What are some things we can do in our community to eliminate the harmful effects on the environment?”
2. “What are some things people can do in various habitats to eliminate the harmful effects on the environment?”

Assessment

- **Questions**
 - “What would you do to help the habitat and the organisms in it after erosion/disease/fire/flood?”
- **Journal/Writing Prompts**
 - Write a journal entry/biography about a day in the life of an organism in one of the assigned ecosystems. How do certain actions (fire, flood, erosion, disease) affect this organism?
 - Research and select a natural disaster that has occurred in Virginia in recent years. Write a brief history of what happened and then write what happened to “you” from the perspective of being an animal in the situation.
- **Other**
 - See rubric for poster activity.

Extensions and Connections (for all students)

- Write a community plan to present to the Board of Supervisors of the county to prevent harmful effects of fire, flood, erosion, or disease. Be sure to explain the role of various citizens in the community.

Strategies for Differentiation

- Provide students with pictures of before/after events of floods, fire, disease, and erosion. Have them match the pictures in a t-chart to show before and after. Students should explain their reasoning.
- In place of the “Cause and Effect in My Community” worksheet, students may take pictures of things happening in their community that affect the surrounding ecosystems. They may dictate the causes and effects of those actions and check a box as to whether it's harmful or helpful.

Cause and Effect in My Community

Name: _____

Date: _____

Location	Cause	Effect/s	Harmful	Helpful

Notes for Presentations

Name: _____ Date: _____

Habitat	Cause	Effect/s	Harmful	Helpful

Poster Rubric

Name: _____ Date: _____

_____ poster adequately describes the habitat before the harmful effects (10 pts.)

_____ poster adequately describes the habitat after the harmful effects (10 pts.)

_____ poster adequately demonstrates effects on the organisms in the assigned habitat (10 pts.)

_____ poster adequately describes solutions to the harmful effects (10 pts.)

_____ poster is neatly presented (5 pts.)

_____ students use proper grammar (5 pts.)

46 – 50 pts. = A

42 – 45 pts. = B

39 – 41 pts. = C

36 – 38 pts. = D

0 – 35 pts = F