

Recovery in the News

Activity based on
Gopher to the Rescue! A Volcano Recovery Story

I. Introduction

Using *Gopher to the Rescue! A Volcano Recovery Story* and other research, students will learn how life returned to a mountain devastated by a volcano. In collaborative groups of two or three, students will create an interview to perform in front of other members of the class. Each group will be given one species or part of the recovery. This activity may be spread over several class periods. Grades 3-6.

II. Materials and Handouts:

- A. Plant and Animal Facts Handout
- B. Survivor, Seed and Returning Animal Worksheets
- C. *Gopher to the Rescue! A Volcano Recovery Story*

III. Concepts:

- A. After a volcanic eruption, the affected area is devastated.
- B. There are different ways in which a volcano erupts.
 - 1. Each volcano's eruptions are unique.
 - 2. Mount St. Helens had several areas of damage.
 - a. Blast zone where the trees were burned and leveled.
 - b. Avalanche where the side of the mountain slid down to the valley in a rock fall.
 - d. Mudflow or lahar, where the glacier melted and mixed with soil and flowed down the mountain.
 - e. Pyroclastic flow where the ash covered the landscape.
 - f. This activity is about the area damaged by ash flow.
- C. Water is affected by an eruption, but there was always water on the mountain, before and after the eruption. Streams and rivers changed course. A river became dammed and created Coldwater Lake. On the other hand, Spirit Lake was filled with logs and its depth decreased dramatically. Because ash fell over a wide area, some water was not fit to drink until the ash settled out, but there was still rain. Since most animals did not return to the mountain right away, by the time the return began, water was not an issue.
- D. Plants need soft, fertile soil to be able to sprout.

- E. In this book, and at Mount St. Helens (MSH), gophers were agents that cracked the crusty surface of erupted ash and brought up nutritious bacteria from below.
- F. Seeds need the right conditions to sprout
 - 1. Conifer seeds need shade to sprout
 - 2. Deciduous seeds need sun to sprout and live
- G. In a recovery situation, there is succession.
 - 1. Plants which were not a large part of the mountain's ecosystem may colonize the damaged area. e.g. deciduous trees' seeds blow in on the wind easily, and can sprout in the sun. Need the sun to live.
 - 2. Plants which were a bigger part of the ecosystem, (In MSH this was conifers) need shade to sprout. They need to wait until the deciduous trees and other shrubs provide shade and allow them to sprout.
 - 3. Eventually, the conifers become much taller than the deciduous trees and shrubs and shade them out and kill them. But this is what the mountain was like before the eruption. Many, many conifers on the flanks. Deciduous trees only close to waters' edges.
- H. Animals will return to the mountain when there is an abundance of new food, shelter, and places to nest. Each animal has particular food, shelter and place to nest it requires to return to the mountain.
 - 1. For this exercise, shelter provides an animal for a place to rest, hide from the sun and hide from predators. Nesting place may be in a totally different sort of place than where an animal may seek shelter.
 - a. Consider tree nesting birds. They can seek shelter under low growing bushes, or rock ledges. They need tall trees to nest. They would not be able to return to the mountain until tall trees are available.
- I. Predators will follow their prey.
 - 1. Food chain
- J. Even if a plant (including seeds) or an animal is not successful in its try at living on the mountain, its carcass will provide fertilizer to pave the way to other colonizers.
- K. Recovery is not predictable. Each area on the mountain was affected differently and the recovery in each area will be different. Rates of recovery vary under different situations.
- L. Recovery takes decades and still continues today.
- M. Recovery may be stopped or set back by another eruption

IV. Skills

- A. Understanding that plants and animals have essential needs for surviving
 - 1. In addition to water, they need food, shelter and places to nest.
- B. Understanding that animals need to get more energy from food than they spend obtaining the food

- C. Understanding that even when a plant or an animal does not thrive in a recovering environment, their remains contribute to the recovery
- D. Understanding the food chain
- E. Practicing interview skills
- F. Presenting information to the class in an engaging manner

V. Attitudes

- A. Increasing awareness of the devastation wrought by a natural disaster
- B. Appreciating effects of a natural disaster
- C. Appreciating effects of man-made disasters
- D. Appreciating effects of individual's actions on an ecosystem.

VI. Science Vocabulary:

- ash/tephra
- colonization
- conifer
- deciduous
- ecosystem
- eruption
- lahar
- predator
- prey
- shelter
- succession
- survival
- volcano

VII. Additional Vocabulary

- fertilizer
- moisture
- nutritious

VIII. Pre-Reading Discussion:

- A. Ask students to share what they know about volcanic eruptions and how they think the mountain will change—what will happen to ponds and streams on the mountain, what will happen to the soil, how will plants and animals be affected?
- B. Discuss what kinds of plants and animals might survive and what they think plants and animals will need to live on the mountain after the eruption.

IX. Post-Reading Discussion:

- A. Share with students what the habitat was like before the eruption.
 - 1. The mountain was covered with conifers (hemlocks, firs, trees that look like Christmas trees) (First three spreads in the book).

- B. Share with students that the mountain became covered in hard crusty ash.
 - 1. Slide 2 provided on the PPT or spreads 5-6 in the book.
 - 2. Discuss what could live in that sort of environment.
- C. Discuss with students how plants might come back to the mountain.
 - 1. Seeds that blow in the wind (Slide 5).
 - 2. What about seeds that don't blow in the wind? (slide 6)
 - a. Conifer seeds (encased in pine cones) fall to the ground close to the tree. They depend on animals to distribute to far locations in their gut or in their coats.
 - 3. It will take a lot longer for conifers to return to the mountain.
 - 4. What do plants need to sprout?
 - a. Place to send down their roots
 - b. Nutrition
 - c. Moisture
- D. Explore with the students which animals survived the eruption. (Spreads 6-8).
 - 1. Consider why they survived.
 - a. They were sheltered from the force of the eruption in their tunnels or rotting trees, or under the ice in ponds.
 - 2. Consider the food these animals had on hand that would let them continue to live after the eruption.
 - a. Gophers eat roots and bulbs that were not damaged. This food remained undamaged inside the earth and accessible from their tunnels.
 - b. Animals in the rotten log use these rotten logs for food as well as shelter.
 - c. Toads have bugs that fly in.
 - 3. Consider the shelters these animals had that would let them continue to live after the eruption.
 - a. Gophers had tunnels.
 - b. Mice and beetle, etc. had the rotten logs
 - c. Gave them a place to rest, sleep, keep out of the sun, hide from predators and nest.
 - d. Discuss toads and salamanders.
 - (1). Need shade. Depended on the shade of the forest before the eruption.
 - (2). Without a forest, they used gopher tunnels to find shade.
 - (3). Also have mud where they can take shelter.
 - 4. Consider the food chain with the students to determine the sequence of return to the mountain.
 - a. Carnivores (predators) need smaller animals
 - (1). Smaller carnivores
 - (2). Smaller herbivores
 - b. Herbivores need plants

- c. Plants need nutritious soil where they can spread their roots.
 - (1). Some plants need sun to sprout.
 - (2). Some plants need shade to sprout.

X. Activity: Recovery in the News

- A. Group students for this activity. In each group there should be one interviewer and at least one animal. Groups that will contain more than one animal are marked with an asterisk.
 - 1. Gophers
 - 2. Ants, Beetles, animals that survived in rotten logs
 - 3. Toads and salamanders
 - 4. Seeds*
 - a. Deciduous trees and shrubs
 - b. Coniferous trees
 - 5. Insects*
 - a. Flew in on the wind
 - b. Flew in under their own power.
 - 6. Birds*
 - a. Ground nesting birds
 - b. Tree nesting birds
 - 7. Squirrels, rabbits and other small mammals
 - 8. Eagles and other predatory birds
 - 9. Bobcats and other predators
 - 10. Bears
 - 11. Elk
- B. The groupings above will serve 25 students. More students may be added (other small mammals and other predators, both birds and mammals) or the groupings can be collapsed (predators following their prey or eliminate animals that survived in rotten logs).
- C. Using *Gopher to the Rescue! A Volcano Recovery Story*, Plant and Animal Facts Handout below and additional research if needed, students will cooperatively create a skit where one student is a news reporter and the other(s) an animal that has just been through the eruption.
 - 1. By answering the questions in "Recovery In the News" worksheet, students will determine:
 - a. Where animal was during the eruption
 - (1). Ran
 - (2). Stayed and survived
 - (3). Seeds and insects and birds that flew in as well as other animals may not have participated in the eruption at all but were in nearby forests.
 - (4). Students should concentrate on the recovery rather than on the eruption.
 - b. What the plant/animal will need to return and thrive on the mountain.

- (1). Consider that not all plants/animals will thrive but they will still contribute to the recovery by decaying and enriching the soil.
 - (2). When will the conditions be right for returning to the mountain. (This will not be an exact date, but will reflect the conditions).
2. Information to answer these questions should come primarily from the book, Plant and Animal Fact sheet, the pre-activity discussions and student research
 - a. A Recovery in the News fact sheet is provided for students' use.
 - b. Encourage students to research interesting facts on the internet to fill in and make the report more informative and fun.
 3. Ask students to draw inferences and conclusions from their data.
 4. Review students' work to make sure all pertinent facts are taken into account.
 5. Students will create a skit and present to the class.

XI. Post-Activity Discussion

- A. Review with the students the relevant concepts.
 1. Plants need soft, fertile soil and the right conditions to sprout.
 2. Animals will return to the mountain when there is an abundance of the type of food, shelter and places to nest that each particular animal requires.
 3. Shelter and nesting places are not always the same thing.
 4. Predators will follow their prey.
 - a. Food Chain
 5. Recovery is not predictable. Happens at different rates in each area depending on the damage.
 6. Even plants and animals that do not thrive still contribute to the recovery by decaying and enriching the soil.
 7. Recovery takes decades and still continues today.
 8. Recovery may be stopped or set back by another eruption
- B. Consider with students how humans can damage and ecosystem and how long the ecosystem will take to recover, if ever.
 1. Man-made damage may be too severe for nature to be able to overcome.

Recovery In the News

Plant and Animal Facts

1. Conifer trees like hemlocks, firs and cedars (Christmas-tree shaped trees) were the main trees of Mount St. Helens (MSH) before the eruption.
 - a. Conifers reproduce by seeds which grow inside cones. Seeds are normally heavier than other seeds and do not travel very far from the mother tree. Animals eat the seeds that fall out of the cones and carry them in their gut to other places. They also carry them in their coats by picking them up when they rest on the ground.
 - b. Conifer seeds need shade to sprout
 - c. Conifers grow about 2 feet per year. They can grow to 200 feet tall, can live 500-1000 years
2. Deciduous trees like red alders and black cottonwoods lived by the water on MSH. There were not as many of them as there were conifers.
 - a. They have seeds which are very light and travel well in the wind
 - b. They like the sun both to sprout and to live
 - c. They grow 2-3 feet per year. Can grow 90-100 feet tall
 - d. Cottonwoods grow 35-75 years. Red Alders can grow to 100 years old.
 - e. If a red alder or cottonwood doesn't have light, it will die.
3. Elk visited MSH damaged area the day after the eruption. Elk eat any plant material, but really prefer to eat conifer needles.
4. Some bugs flew in. If they flew in, and the environment was not good for them to stay, they could fly away.
5. Some bugs were carried in on the wind. If they landed in the damaged area in a place where they have food, shelter and nesting places, they will live. If they fall in a place where there is not good food, shelter and nesting places, they will die, but their carcasses will become food for visiting birds, or fertilizer.
6. Cool Fact! Half of all insects are in the air at any time.
7. Deer mice are nocturnal, they live underground or in rotting logs. They eat nuts, seeds and insects.
8. Longhorn Beetles - live in rotting logs and eat wood-rotting fungi.
9. There are birds that nest on the ground, like juncos, and birds that nest on trees.

10. Squirrels and rabbits have small legs. They will live on the areas not damaged by the volcano, where they have food, shelter and places to nest. It would be difficult for them to walk a long way into the damaged area without food and shade.
11. Huckleberries and currants, berries that lived on the mountain before the eruption also returned to the mountain.
12. Some fish were protected from the eruption because the streams were frozen and covered in snow.
13. Amphibians survived in the frozen lakes and ponds, and when they came out, there were no predators. Amphibians eat insects.
14. Ash at Mount St. Helens in some areas was a 5-6 inches deep, but in other areas it was feet deep.