Plate Tectonic Cycle

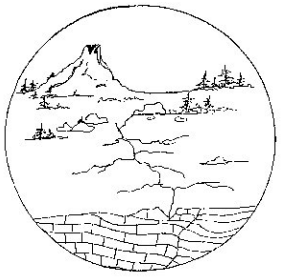
Earth's Moving Force

FIRST GRADE

HAZARDS

1 WEEK
LESSON PLANS AND
ACTIVITIES

PLATE TECTONIC CYCLE
OVERVIEW OF FIRST GRADE



VOLCANOES

WEEK 1.
PRE: *Learning the shapes of volcanoes.*
LAB: *Experimenting with "lava."*
POST: *Comparing parts of an erupting volcano.*

EARTHQUAKES

WEEK 2.
PRE: *Demonstrating how energy can be released from an earthquake.*
LAB: *Simulating how an earthquake shakes an area.*
POST: *Learning about what happens when the earth shakes.*

PLATE TECTONICS

WEEK 3.
PRE: *Learning about stress within the Earth's crust.*
LAB: *Demonstrating features caused by stress.*
POST: *Comparing the shapes of South America and Africa.*

HAZARDS

WEEK 4.
PRE: *Investigating hazards caused by volcanoes.*
LAB: *Plotting different volcanoes in the west coast.*
POST: *Learning more about Mt. Shasta in California.*

PLATE TECTONIC CYCLE - HAZARDS (1)

PRE LAB

Students draw and color volcanic hazards.

OBJECTIVES:

1. Explaining that the movement of the Earth causes hazards.
2. Exploring the hazards that are created by volcanoes.

VOCABULARY:

ash
gas
hazard
landslides
lava
volcano

MATERIALS:

worksheet
Hill of Fire by Thomas P. Lewis
Volcano Slideshow

Paracutin, Mexico as it erupts.

BACKGROUND:

Many hazards are associated with volcanic eruptions. This lab focuses on four hazards: lava, gases, ash flows, and landslides. When lava (melted rock) erupts, this thick liquid flows downhill. It is very hot, so it burns or melts almost everything in its path. Gases such as CO_2 (carbon dioxide), CO (carbon monoxide) and SO_2 (sulphur dioxide) are also emitted by volcanoes. These gases can kill most animals. Gases may be discharged at the summit area during eruptions or along vents on the sides of the volcano. Heavier gases than air, particularly CO_2, can also flow down the sides of the volcano. They may fill valleys with a thick blanket of toxic gas, which may kill much of the life in the area. Large amount of ashes frequently shoot high into atmosphere. The heavier particles settle back to the Earth's surface, forming a layers of ash. Depending on the size of the eruption, this layer can be a few inches to several feet in thickness. The smaller particles are carried away by the wind. The particles of ash, along they are very small, can cause breathing problems in animals. The particles can get into their lungs and suffocate the animal. They may settle further away, or may interfere with flying aircraft. Landslides are a downhill movement of loose material on the side of a volcano. Landslides on volcanoes result when unstable rocks are shaken loose during eruptions, or when ash mixes with water and snow, making a thick slurry that flows down the sides of the volcano.

Some volcanoes are explosive and kill people and other animal life with little warning. Mt. Pinatubo in the Phillippine and Mt. St. Helens, in western Washington caused many problems because of the ash that was set off in the atmosphere. Nevado del Ruiz in Columbia, killed thousands of people because of mudslides that occurred when melted snow and ash combined, creating walls of mud that came cascading down the mountainside into villages. The mud buried the people alive. Some volcanoes, however, like Kilauea in Hawaii usually erupt quietly, spewing out lava flows but giving humans amble warning.

Volcanic eruptions rarely happen without warning. An increase in earthquake activity (due to magma moving upwards); changes in the amounts of gases coming out of the volcano; and bulging at the summit of the volcano are signs that geologists look for. Every volcano is different, so scientists must carefully look at each mountain before predicting its activity.

Eruptions have positive effects. One of the gases emitted by volcanoes is steam, which through time has been one of the sources of water on the Earth. Ash also enriches the soil, making it for excellent plant growth. A volcano disaster is usually only a "disaster" when people are involved.

This coloring, drawing, and handwriting exercise illustrates that a volcano can cause several types of hazards.

PROCEDURE:

1. Discuss with the class the hazards that they will be examining in this worksheet. You may wish to show them pictures of each hazard, to guide their drawings. You may wish to mention the positive effects of eruptions as well. Show the students the volcano damage images in the Volcano Slideshow found on our website (http://msnucleus.org).

Additional images are available on the Internet at:
http://www.ngdc.noaa.gov/seg/fliers/se-0801.shtml
This NOAA website has excellent photographs of recent events.

2. Have the students draw and color hazards on the worksheet. Notice there is space for "practice" so students can draw the symbol once before they put it on the volcano. Have the students trace the words on the worksheet, to practice their writing skills.

3. You may wish to read *Hill of Fire* by Thomas P. Lewis, to the class. This story revolves around the eruption of Paricutin, a real volcano in Mexico, and a little boy's experiences.

PLATE TECTONIC CYCLE - HAZARDS (1)

PRE LAB

VOLCANIC HAZARDS

gas

landslide

ash

lava

PLATE TECTONIC CYCLE - HAZARDS (1)

LAB

Students examine dangerous volcanoes in the United States.

OBJECTIVES:

1. Plotting volcanoes in western United States.
2. Interpreting the results of data from plotting volcanoes.

VOCABULARY:

active
dormant
extinct
volcano


The 1980 eruption of Mt. St. Helens

MATERIALS:

worksheet
crayons
scissors
paste
Volcanoes Slideshow
United States Placemats

BACKGROUND:

Volcanic hazards occur where there are active or dormant volcanoes near inhabited areas, especially urban regions. An "active volcano" is defined as a volcano in an eruptive stage or shows signs of eruption. A dormant volcano is a volcano that has been active in the past, but is presently "sleeping." Dormant volcanoes can erupt again. Dormant volcanoes often have small earthquakes, suggesting magma is moving underneath them. Volcanic areas may have active hot springs, triggered by water heated by the magma. A third type of volcano, an extinct volcano, does not have a magma sources, and will never erupt again.

Your students should realize by now that volcanoes are a hazard. Many volcanoes are located in the western United States, in California, Oregon, and Washington. The most recent eruption in this area was at Mt. St. Helens, in Washington, in 1980. This eruption deposited ash over a wide area stretching as far east as Montana. Landslides caused major damage in the surrounding area, and even prevented river travel on the Columbia River (between Washington and Oregon). Mt. St. Helens continues to erupt lava and the volcano grows.

Mt St. Helens and the other volcanoes in this area are a part of the “Ring of Fire,”

the geologically active area of volcanoes that encircles the Pacific Ocean. First graders do not have to understand why they occur in this ring. They need to understand that volcanoes can cause damage.

PROCEDURE:

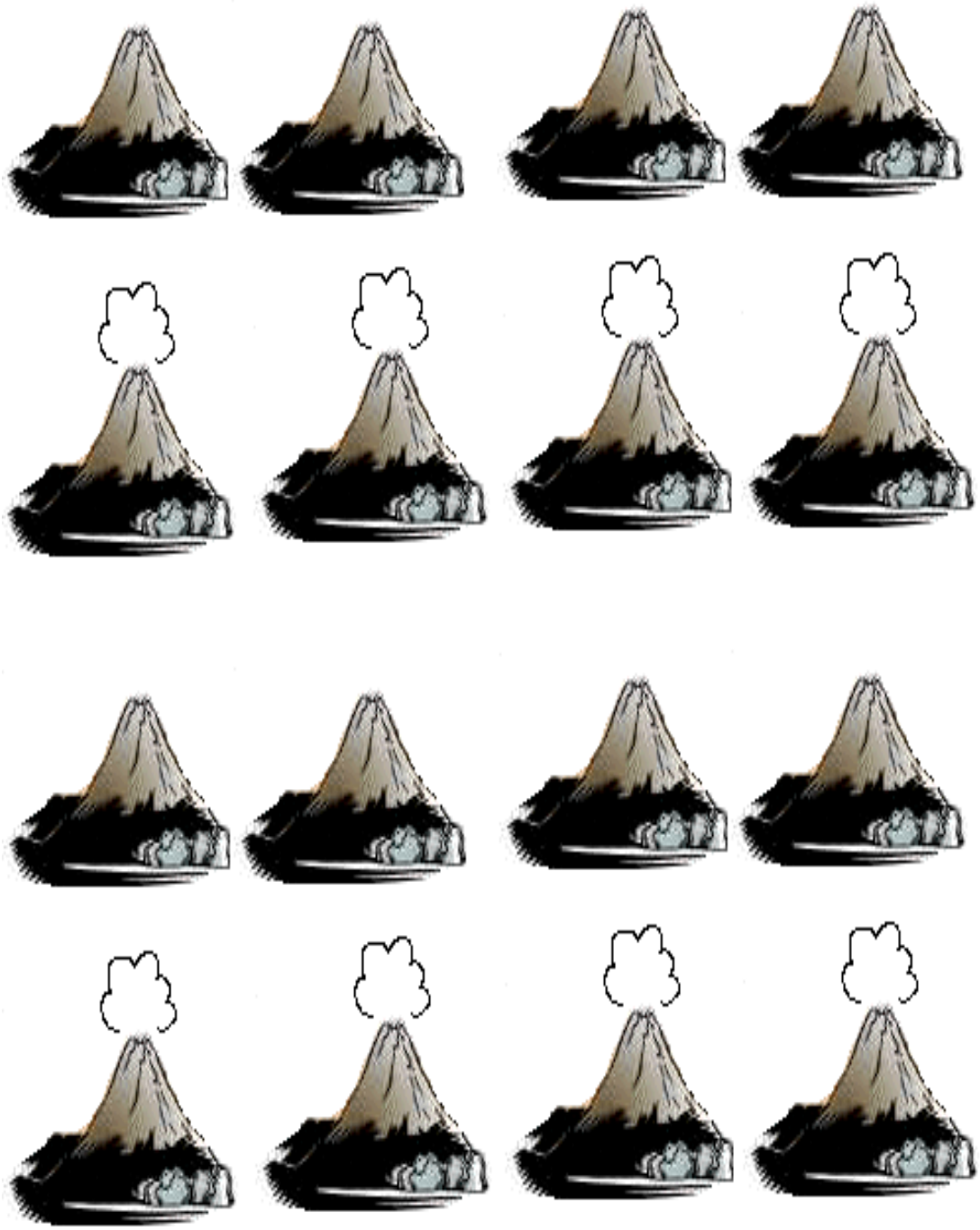
1. Show the Mt. St. Helens slides within the Volcano Slideshow to your students. Locate Mt. St. Helens on a map of the United States. Most of the other slides in the set show other volcanic hazards. Tell your students that Mt. St. Helens erupted in 1980 and is still active.

2. Have the students cut out the active and dormant volcano figures on one of the worksheet. Using the list below, review which volcanoes are active and which are dormant. Have the students cut out the volcano figures. You may want to use “cotton balls” for the active volcanoes. Instruct them to paste the pictures on the appropriate volcano. Here are the volcanoes to review:

Mt. Rainier (dormant)
Mt. St. Helens (active)
Mt. Hood (dormant)
Mt. Baker (dormant)
Glacier Peak (dormant)
Mt. Adams (dormant)
Mt. Shasta (dormant)
Mt. McLoughlin (dormant)
Mt. Lassen (dormant)

3. All of these volcanoes are either active or dormant. Ask the students if this might be a hazardous area. The answer is "yes" because all of these volcanoes have the potential for eruption. Ask the students if people should build big cities near these volcanoes. The answer is "no,” because it might endanger people if the volcanoes decide to erupt.

PLATE TECTONIC CYCLE - HAZARDS (1) - LAB



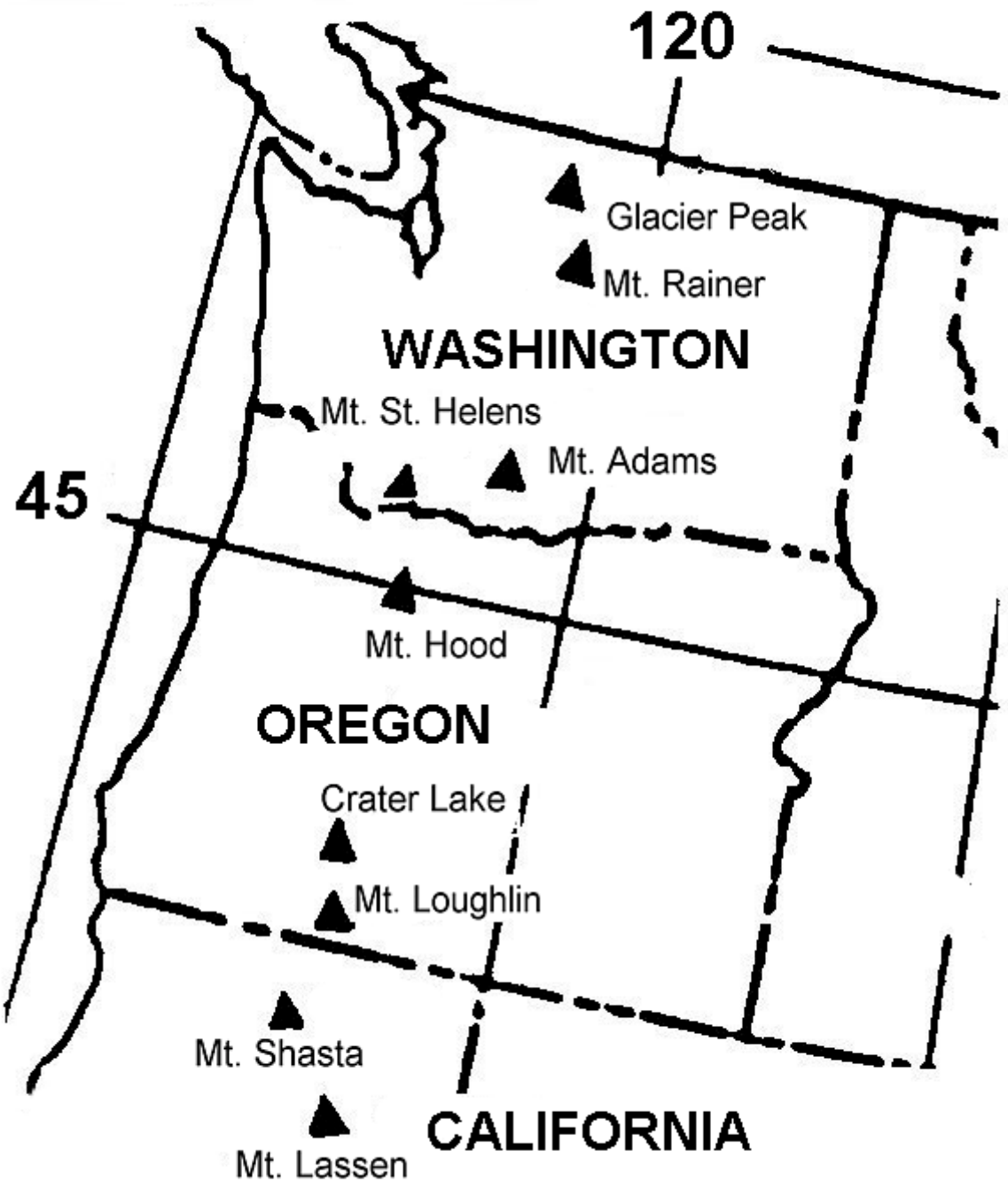

120
Glacier Peak
Mt. Rainer
WASHINGTON
Mt. St. Helens
Mt. Adams
45
Mt. Hood
OREGON
Crater Lake
Mt. Loughlin
Mt. Shasta
CALIFORNIA
Mt. Lassen

PLATE TECTONIC CYCLE - HAZARDS (1)

POST LAB

Students are exposed to different volcanic hazards.

OBJECTIVES:

1. Investigating Mt. Shasta, California.
2. Discussing the different types of hazards.

Mt. Shasta

VOCABULARY:

ash
landslide
lava

MATERIALS:

Volcano Slideshow

BACKGROUND:

Mt. Shasta is in northern California, part of the Cascade Range. Studies by geologists show that Mount Shasta has erupted 10 or 11 times during the last 3,400 years and at least 3 times in the last 750 years. Mount Shasta does not erupt at regular intervals, but its history suggests that it erupts at an average rate of once every 600 year during the last 4,500 years. Future eruptions could develop from vents at or near the present summit. In the picture above, a second cone, called Shastina can also erupt.

They type of eruption would most likely be explosive. Explosive eruptions can produce volcanic ash, pyroclastic flows, and lateral blasts. Non-explosive eruptions, can also develop after the initial eruption and form lava flows and domes. Both types of eruptions can cause mudflows down local drainage, and both types often are accompanied by gas emissions.

PROCEDURE:

1. Discuss the information on Mt. Shasta with the class. Show the students the slides of dangers associated with a volcano (see below). If you project the picture large enough, have students "walk" amongst the rubble.

2. Show the slides that illustrate the following terms. At this point, you are just exposing the students to the terms. They should not attempt to memorize them.

Volcanic ash = small particles of the magma that are blown out of the volcano. They are carried away by the wind, along with volcanic gases

Volcanic gases = gases emitted by a volcano either alone or along with ash or lava. Volcanic gases consist chiefly of water vapor, carbon dioxide, carbon monoxide, and various compounds of sulfur, chlorine, and other elements.

Pyroclastic flows = streams of hot ash and rock fragments that are mixed with hot air and other gases. Together these form a fluid which rapidly flows down the side of a volcano.

Lava flow = a “river” of lava that moves downhill and can crush, burn, and bury structures

Mud flow = a mass of water-saturated rock debris that moves downslope as a fluid

Landslide = a downhill flow of rock debris on the side of a volcano