

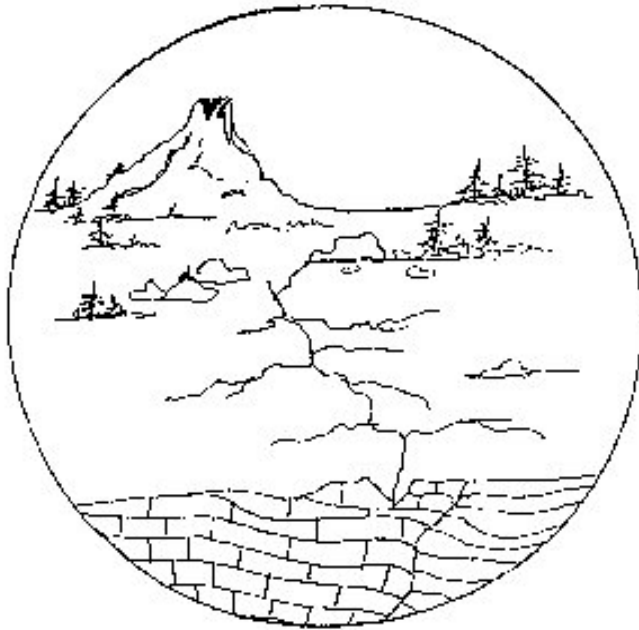


Plate Tectonic Cycle

Earth's Moving Force

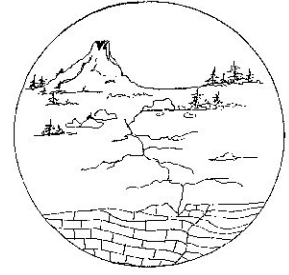


KINDERGARTEN HAZARDS



1 WEEK
LESSON PLANS AND
ACTIVITIES

PLATE TECTONIC CYCLE OVERVIEW OF KINDERGARTEN



VOLCANOES

WEEK 1.

PRE: *Learning that all mountains are not volcanoes.*

LAB: *Investigating rocks that come from volcanoes.*

POST: *Discovering how volcanoes grow.*

EARTHQUAKES

WEEK 2.

PRE: *Learning that earthquakes cause the Earth to shake.*

LAB: *Discovering that earthquakes cause different types of shaking.*

POST: *Dramatizing different types of earthquake intensities.*

PLATE TECTONICS

WEEK 3.

PRE: *Learning that the crust of the Earth moves.*

LAB: *Analyzing a puzzle of the Earth.*

POST: *Comparing the continents with plate boundaries.*

HAZARDS

WEEK 4.

PRE: *Learning to critically think during an earthquake.*

LAB: *Analyzing the sounds created by earthquakes.*

POST: *Exploring dangers in the classroom.*

PLATE TECTONIC CYCLE - HAZARDS (K)

PRE LAB

Students compare the sounds of an earthquake.

OBJECTIVES:

1. Learning to think critically during an earthquake.
2. Exploring the sounds of an earthquake.

VOCABULARY:

bang
crash
earthquake
rumble

MATERIALS:

worksheet
crayons



Damage in San Fernando, California, 1971

BACKGROUND:

The first sign of an earthquake is often a sharp thud, signaling the arrival of compressional seismic waves (P wave). The second sound and sensation are a rumbling caused by ground rolling from surface waves.

A geologist in the Valdez, Alaska, 1964 earthquake described the motion as follows: "The first tremors were hard enough to stop a moving person and shock waves were immediately noticeable on the surface of the ground. These shock waves continued with a rather long frequency which gave the observer an impression of a rolling feeling rather than abrupt hard jolts. After about 1 minute the amplitude or strength of the shock waves increased in intensity and failures in buildings as well as frozen ground surface began to occur..."

The severity of an earthquake can be expressed in several ways. The magnitude of an earthquake, or the amount of energy released can be expressed by the Richter scale. The Modified Mercalli Scale expresses the intensity of an earthquake's effects in a given locality, as experienced by people.

PROCEDURE:

1. This coloring and word exercise serves as a springboard to begin a discussion with your students about the sounds caused by an earthquake. Discuss that there are

natural sounds from an earthquake, like "rumble," but there are also other sounds like "bang" and "crash" that indicate that something is falling or breaking.

2. Ask the students which sounds should serve as a warning if an earthquake should occur. This exercise emphasizes to the students how evaluate the situation during the earthquake, using all their senses. For example, by listening to the noise the earthquake makes and observing shaking objects, they would be able to determine whether an earthquake is a weak, moderate, or strong event. This will make them better prepared to take action.

3. Instruct the students to color the worksheet, and to think about sounds made by earthquakes. You may also want students to simulate the sound of an earthquake "rumble" by having them all softly make a rumble sound. Practice as a whole group and then have students do a "rumble wave" (like the waves made by a crowd at a football game, where the sound gets progressively louder and then softer). This would simulates the movement of the "energy wave."

PLATE TECTONIC CYCLE - HAZARDS (K) PRE LAB

BANG

CRASH

RUMBLE

PLATE TECTONIC CYCLE - HAZARDS (K)

LAB

Students distinguish the different sounds of an earthquake.

OBJECTIVES:

1. Analyzing sounds created by earthquakes.
2. Distinguishing sounds of different items.

VOCABULARY:

bang
crash
earthquakes
hazards
rumble
sound
volcanoes

MATERIALS:

Internet
bells, glass, wooden blocks, and other
materials that make sounds when dropped
Earthquake Slideshow



Building collapse caused by earthquake shaking, Caracas, Venezuela

BACKGROUND:

An earthquake's destructiveness depends on many factors. In addition to the amount of energy released from the initial fault rupture, the depth where the earthquake begins (the focus), the distance a structure is located from the epicenter, local geological conditions, and the design of buildings can all influence the amount of damage that takes place.

The energy released by an earthquake travels through the Earth as seismic waves. Seismic waves travel at different speeds, depending on the material they move through, as well as the type of motion they transmit. Seismic waves cause an oscillatory, sometimes violent movement of the Earth's surface. Many of these waves make noise, because they are at a high enough frequency that we can hear them. In addition some animals can hear other seismically caused vibrations that are not audible to humans. During an earthquake, noise is also caused by falling objects and other ongoing destruction.

PROCEDURE:

1. Explain to the class that they have been discussing earthquakes and volcanoes for the last few weeks and now it is time to discuss the hazards associated with earthquakes.

2. Remind the students that earthquakes and volcanoes are natural events. This lab attempts to get students thinking about the intensities of an earthquake and what hazards may occur during a disaster.

3. Explain that earthquakes make the ground shake as seismic waves travel through the Earth. Explain that people can hear these sounds. Also discuss sounds that are made when different things fall or break during an earthquake. Point out items in the classroom. Students should imagine the sounds that would occur if the objects fell or broke. Remind the students that many times a severe earthquake will shut down electrical power. In the dark, using one's sense of hearing is very important.

4. Instruct students to close their eyes or cover their heads. Make different sounds and have them guess what fell or broke. Discuss as a class their reactions to each sound. Show pictures of earthquake damage that can found under "Slideshows" on our website (<http://msnucleus.org>) and have the students simulate the sounds that may have occurred during that instance in each picture.

5. Describe different earthquake situations that may occur while students are at school. Ask the students what action they would take in each of the situations you describe. For example, while in the classroom a rumbling sound is heard and the window panes begin to break - what do you do? This could mean a very strong earthquake and students should turn away from the glass and duck under their tables. There is never "one" answer during an earthquake. Logic and reasoning must be part of earthquake safety in assessing the situation. If you have a plan at your individual school during an earthquake, discuss this with students. You will alleviate many fears during an earthquake, if the students have a sense of what to do in advance. If you live in an area that has no earthquakes, many of these precautionary steps are also valid in other disaster situations. Remember that this is a mobile society and children may be visiting or moving to a state that does have earthquake dangers.

6. Additional earthquake damage imagery is available at:

<http://www.ngdc.noaa.gov/seg/fliers/se-0801.shtml>

This NOAA website has excellent photographs of recent events.

PLATE TECTONIC CYCLE - HAZARDS (K)

POST LAB

OBJECTIVES:

1. Exploring dangers in the classroom.
2. Comparing dangers in the classroom with dangers at home.

VOCABULARY:

damage
hazard

MATERIALS:

none

BACKGROUND:

Natural disasters have occurred throughout time. Catastrophes caused by volcanoes and earthquakes are not only spectacular, but can also be devastating if they occur in populated areas. Hazards are natural, and an important events which help keep the Earth internally "happy". Students must be prepared to act sensibly in disasters. By learning about the effects of past disasters, students can come to understand that "mother nature" is a force that cannot be tamed.

Although students are too young to understand the impact of earthquakes to the community, it is never too young to begin the discussion. Tomorrow's adults need to be aware of the dangers of earthquakes. As a teacher you should be aware of problems at your school for any disaster. If you live in "earthquake country" you should ask your principal the procedures on what is expected of you during an earthquake. If you know what the policies are, you can convey these to your students.

Earthquake education can provide insight into solving problems in science as well as making our environment a safer place to be.

PROCEDURE:

1. Have the students look around their classroom. As a group, go over what might fall on them (write a list on the board) during an earthquake. State what objects might hurt them, and what would not.
2. Discuss areas of the class room that have electricity, water, gas, and glass. If

Students find dangers in their classroom and home.



Collapsed buildings, Gilroy, California

your school has an earthquake policy, go over it with the students.

3. With the class, develop a list of actions to take during an earthquake. An example is presented below.

DANGER	WHAT TO DO TO PREVENT GETTING HURT
Books - can hit you on the head	Put hand over head and duck under a heavy desk.
Windows - can break and cut	Put hands over eyes and turn away from window.
Gas - can leak and emit bad fumes	Put cloth over nose and try to leave room.
Electricity - wires can become bare and electrocute	Do not touch wires.
Water - pipes can break and cause flooding	Will not cause much damage to classroom.

WHAT IF AN EARTHQUAKE HAPPENS WHEN I'M...

LOCATION	WHAT TO DO
At school	Listen to teacher or other person in charge.
At home	If parents are not immediately present, think and take action.
In an unfamiliar place	Think and take action.