

**Project G.L.A.D.
Forest Grove School District
Volcanoes and Earthquakes**

Idea Pages

- I. UNIT THEME: How volcanoes and earthquakes change the earth over time.
 - Describe the layers of the earth.
 - Identify causes and effects of volcanic / earthquake activity.
 - Describe different types of volcanoes/lava.
 - Describe different types of fault zones.
 - Understand scientific prediction of volcanoes / earthquakes and apply safety considerations.
 - Evaluate how volcanoes and earthquakes have affected people over time.
- II. CUE SET
 - Big Book – Volcanoes & Earthquakes
 - Video / Films
 - Inquiry Charts
 - Observation Charts
 - Field Trip ? (OMSI, Mt. St. Helens)
 - Play “Let the Earth Roll Under Your Feet”
- III. CLOSURE / ASSESSMENT
 - Student generated question/answer book on volcanoes and earthquakes
 - Field trip to Mt. Saint Helens or OSI
 - Make earthquake survival kits
 - Written Test ? Authentic Assessment
 - Oral/Written report on Volcanoes /Earthquakes
- IV. CONCEPTS/UNDERSTANDINGS/CRITICAL LEARNINGS
 - Science
 - 1.01 Cycle
 - Layers of the earth/rock cycle
 - 1.02 Change
 - How earthquakes and volcanoes change the earth over time
 - 1.05 Cause & Effect
 - How volcanoes/earthquakes affect people
 - How pressure affects seismic activity / eruptions
 - Different types of volcanoes / earthquakes create different landforms
 - Movement of plates
 - 1.13 Model
 - Cross section of volcano
 - Model of 4 types of fault zones
 - 2.1 Observing
 - Teacher led experiments, student center experiments & films
 - 2.2 Communicating
 - Observation chart on earthquakes and volcanoes
 - Data gathered from experiments
 - Question & answer book on volcanoes and earthquakes
 - Oral presentation
 - 2.3 Using Numbers
 - Look at Mercali scale and Richter scale

- Measurement in experiments
- 2.4 Classifying
 - Types of volcanic eruptions
 - different fault zones
 - Different types of rock?
 - Different kind of lava
- 2.6 Predicting
 - Teacher led experiments, student center experiments
- 2.7 Questioning
 - Teacher led experiments, student center experiments
- 2.8 Interpreting Data
 - Teacher led experiments, student center experiments

Mathematics

- 1.01 Whole number sense
 - Learning the thickness of the layers of the earth
- 1.11 Technology
 - CCC Earth science CD ROM
- 5.01 Metric Measurement
 - Seismograph, Richter scale, Mercalli scale

Social Science

- History of volcanoes and earthquakes
- Native American myths and legends of volcanoes and earthquakes
- How people are affected by seismic activity and volcanoes
- Map reading
- Careers in the field of geology
- Comparing, contrasting, inferring

Language Arts

- 1.05 Vocabulary
 - Content vocabulary
- 2.04 Facts
 - Identify facts about earthquakes and volcanoes from given set of literature
- 2.10 Locating information
 - Locating information from literature/charts/living walls on volcanoes and earthquakes
- 4.05 Paragraphing
 - Story map
 - Pocket chart story
- 4.07 Parts of Speech
 - Farmer in the Dell on volcanoes and earthquakes
- 5.01 Modes of writing
 - Journal writing
 - Story telling
 - Chants/raps/poems
- 5.02 Writing process
 - Revising/editing skills
- 7.01 Oral Delivery?
 - Mini reports on volcanoes and earthquakes
- 8.01 Forms and characteristics
 - Play “Let the Earth Roll Under Your Feet”
 - Poetry
 - Non-fiction / fiction

V. VOCABULARY

Pre-Requisite Vocabulary

cycles	erosion	igneous	metamorphic
mineral	rock cycle	sedimentary	soil
structure			

Unit Vocabulary

a' a' (ah-ah)	ash	asthenosphere	basalt
caldera	cinder	cinder cone	composite cone
continental drift	convergent (colliding)	faults A & B	core
crater	crust	dormant	epicenter
eruption	extrusive	faults	fissure
flow	focus	folding	gas
geologist	innercore	intensity	intrusive
lava	lithosphere	magma	magma chamber
magnitude	mantle	Mercalli scale	molten
myths	obsidian	outer core	pahoehoe
pangaea	potential energy		pressure
pumice	richter scale	ring of fire	seismic waves
seismograph	seismologist	shield cone	spreading zone
structure	s-waves	p-waves	tectonic plates
theory	thunder egg	vent	volcanologist

VI. ORAL LANGUAGE/READING/WRITING SKILLS

- See above

VII. MATH/SCIENCE/SOCIAL STUDIES SKILLS

- See above

VIII. RESOURCES AND MATERIALS

TITLE	AUTHOR	PUBLISHER	PRICE	LOCATION
<i>Earthquakes</i>	Lambert, David	Franklin Watts		J.G. Library
<i>Earthquakes</i>	Simon, Seymour	Mulberry Books	\$5.95	J.G. Library
<i>Earthquakes and Volcanoes: Usborne Understanding Geography</i>	Watt, Fiona	EDC Publishing	\$6.96	
<i>Earthquakes & Volcanoes (Activity book)</i>	Deery, Ruth	Good Apple		
<i>If you lived at the time of the Great San Francisco Earthquake</i>	Levine, Ellen	Scholastic	\$4.95	J.G. Library
<i>Jigsaw Continents</i>	Berger, Melvin	Coward, McCann & Geoghegan, Inc.	\$4.97	J.G. Library
<i>Learn about Volcanoes & Other Natural Phenomena</i>	McCurdy, Robin and Murial	OR Publishing Co.		J.G. Library
<i>Mt. St. Helens –The Volcano</i>		OR Publishing Co.		J.G. Library
<i>Volcano: The Eruption and Healing of Mt. St. Helens</i>	Lauber, Patricia	Aladdin Books	\$6.95	
<i>Volcanoes and Earthquakes</i>	Lauber, Patricia	Scholastic	\$2.95	
<i>Volcanoes and Earthquakes</i>	Elting, Mary	Scholastic		
<i>A True Book About Volcanoes</i>	Sipiera, Paul	Children's Press	\$6.95	Powell's
<i>A True Book About</i>	Sipiera, Paul	Children's Press	\$6.95	Powell's

<i>Earthquakes</i>				
<i>Discovering Earthquakes</i> (Activity book)	Field, Nancy and Schepige, Adele	Dog Eared Pub.	\$5.95	Powell's
<i>Discovering Volcanoes</i> (Activity book)	Field, Nancy and Schepige, Adele	Dog Eared Pub.	\$5.95	Powell's
<i>Eye Witness Books: Volcanoes and Earthquakes</i>		Alfred A. Knopf	\$12.50	Powell's
<i>The San Francisco Earthquake</i>	Dudman, John	Wayland Publishing	\$4.98	Powell's
<i>Volcanoes</i>	Branley, Franklin	Thomas Y. Crowell	\$8.50	Powell's
<i>Volcanoes</i>	Clarke, Penny	Franklin Watts	\$7.00	Powell's
<i>Hill of Fire</i>	Lewis, Thomas P.	Harper Trophy		
<i>Earthquakes and Volcanoes</i>	Merriams, Deborah	Troll		
<i>Closer Look at Volcanoes</i>	Green, Jen	Copper Beech Books		
<i>Volcanoes</i>	Steele, Philip	Barron's		
<i>Earthquakes</i>	Branley, Franklyn	Harper Collins		
<i>Earthquakes</i>	Morris, Neil	Barron's		
<i>Fascinating Facts About Volcanoes</i>	Walker, Jane	Millbrook Press		

Books in Spanish

1. *Volcanes*, Jane Walker, Aladdin Books, 1994

Videos/Films - Volcanoes

<u>Title</u>	<u>E.S.D. Catalogue Number</u>
The Eruption of Mount St. Helens	8806
Fire Mountain	3730-4872
Heartbeat of a Volcano	3748-3939
Mount St. Helens Keeper of the Fire	9384-9385
Pompeii and Vesuvius	F75

Videos/Films – Earthquakes

<u>Title</u>	<u>E.S.D. Catalogue Number</u>
Earthquakes	58901
Earthquakes Lesson of Disaster	16816
Earthquakes: Quake, Rattle and Roll	60390
Earthquakes and Volcanoes	5119
In Search of Earthquakes	58901

**G.L.A.D.
VOLCANOES AND EARTHQUAKES
Forest Grove School District**

Unit Planning Pages

UNIT THEME:

- How volcanoes and earthquakes change the earth over time.

OUTCOMES:

- Describe the layers of the earth.
- Identify causes/effects of volcano/earthquake activity.
- Identify and describe different types of volcanoes/lava
- Identify and describe different types of fault zones.
- Understand scientific prediction of volcanoes/earthquakes and apply safety considerations.
- Evaluate how volcanoes and earthquakes affect people over time.

UNIT CUE SET:

- Big Books– Volcanoes/Earthquakes

INPUT/BEST SHOT:

- Introduction: -Layers of the earth/Rock Cycle
- Volcanoes/ Earthquakes
 - Parts of a volcano (cross section)
 - Causes/effects of volcanoes
 - Types of volcanoes
 - Volcanoes and people
 - Types of faults
 - Causes/effects of volcanoes
 - Measurement/prediction of earthquakes
 - Earthquakes and people

GUIDED ORAL PRACTICE:

- Pictorial Input Chart – Layers of the Earth
- Pictorial Input Chart – Cross section of volcano
- Narrative Input Chart –Legend of Mt. St. Helens
- Narrative Input Chart – Hill of Fire
- Chants, songs, poems
- Note taking – Learning Log entries corresponding to info on charts
- Comparative Input Chart – Good & Beautiful/Bad & Ugly
- Teacher led experiments with discussions and note taking/scientific process.

INDEPENDENT PRACTICE:

- Journal Entries – learning logs and daily journal entries
- Oral/Written reports
- Reading Choice time
- Writer's Workshop
- Picture File Cards

READING/WRITING ACTIVITIES:

- Group Frame:
 - Graphic Organizers
 - Living Wall

- Farmer in the Dell
 - Poetry Frames, Group Frames, Big Books, Student Books
- Cooperative Choices:
 - Poetry Frames, Group Frames, Big Books, Student Books
 - Flip Book
 - Expert Groups
- Individual Choices/Writer's Workshop
 - Learning Log, Daily Journal, Poetry
 - Same as above (A & B) but individual

CORRECTIVES/EXTENSIONS:

- Field Trips
- Hands on Models made by students
- Student experiments
- Guest Speakers

INTEGRATION:

- Math – Whole number sense, technology, measurement
- Social Studies – Native Americans, Lewis and Clark, Westward Movement, Geography
- Language Arts – Vocabulary, Facts, Locating Information, Paragraphing, Parts of Speech, Modes of Writing, Writing Process, Oral Delivery, Forms and Characteristics

CLOSURE/EVALUATION:

- Student generated question/answer book – Class Book
- Field Trips
- Earthquake survival kits
- Written Test
- Oral or written reports (on going)
- Journal entries/input on posters

Unit Inventory

GLAD UNIT

#30448

EARTHQUAKES & VOLCANOES

2 PROCESS GRIDS, 2 GRAPHIC ORGANIZERS, 3 PICTORIALS

1 COMPARATIVE INPUT W/ INFO

TEACHER-MADE BIG BOOK (VOLCANO)

TEACHER-MADE BIG BOOK (SHAKE, RATTLE AND ROLL)

TEACHER-MADE BIG BOOK (HOW CRATER LAKE WAS FORMED)

*2 NARRATIVE INPUT BACKGROUNDS, ENGLISH AND SPANISH NARRATIVE
PIECES*

ENGLISH AND SPANISH NARRATIVE TEXTS

2 BIG BOOK TEXTS

MAP-EARTH'S FRACTURED SURFACE

UNIT PLANNING PAGES & IDEA PAGES

GLOSSARY

7 CHANTS

42 VOLCANO PICTURE FILE CARDS

66 EARTHQUAKE PICTURE FILE CARDS

EYEWITNESS VOLCANO ACTIVITY FILE

BOOK TITLES:

I CAN READ ABOUT EARTHQUAKES AND VOLCANOES

HILL OF FIRE

FROG GIRL (HARDCOVER)

VOLCANOES LET'S-READ-AND-FIND-OUT SCIENCE

FASCINATING FACTS ABOUT VOLCANOES

EARTHQUAKES LET'S-READ-AND-FIND-OUT SCIENCE

EARTHQUAKES NATURAL DISASTERS

VOLCANOES NATURAL DISASTERS

CLOSER LOOK AT VOLCANOES (HARDCOVER)

EARTHQUAKES A TRUE BOOK

EARTHQUAKES AND VOLCANOES (USBORNE)

VOLCANO: ERUPTION OF MOUNT ST. HELENS

DISCOVERING VOLCANOES

POMPEII...BURIED ALIVE

MAGIC DOGS OF THE VOLCANOES

IF YOU LIVED AT THE TIME OF THE S.F. EARTHQUAKE

MOUNTAIN DANCE

DISCOVER VOLCANOES AND EARTHQUAKES

VOLCANES (HARDCOVER)

LOS TERREMOTOS

LOS VOLCANES

EL VOLCAN

MONTANAS Y VOLCANES

Volcano... More Than A Mountain

A **volcano** is any opening in the crust of the earth through which melted rock erupts.

Magma is melted rock while it is still inside the earth. If **magma** was not so hot and you could touch it, it would feel like melting snow.

A **magma chamber** is an area inside the earth or5 a volcano where the magma begins to collect and pressure begins to build.

Volcanoes have at least one **vent** that is like a long pipe. The magma travels through this **vent** from inside the earth to the outside.

Whenever magma rises through the earth's crust to the surface of the earth it is called an **eruption**

There are different types of **eruptions**. Some are quiet and slow, and some are explosive and fast.

When magma reaches the earth's surface in an eruption it is called **lava**.

When lava flows from a volcano in a **lava flow**, it eventually hardens. This forms new mountains and earth's crust.

During violent eruptions **ash** is formed from very fine particles of rock and lava.

After the eruption there is often a deep hollow found around the central vent of the volcano. This hollow is called the **crater**.

Shake, Rattle, and Roll

Geologists believe that the crust and upper mantle of the earth are not one sheet of solid rock. Instead the crust is divided into about 12 enormous pieces called **tectonic plates**, and many smaller ones. These plates “float” like icebergs on top of the **mantle**.

In addition to the many plates, are cracks in the surface of the earth’s crust. These cracks are called **faults**. Some faults may be where two plates meet. Most earthquakes occur along faults.

These **tectonic plates** are slowly, but constantly moving. Some plates move apart, some move together, and some slide past each other.

Isn’t it interesting that earthquakes change the earth over time?

Forces push or pull against plates on both sides of a fault. As the forces continue to push or pull **pressure** builds up.

Earthquakes happen when this pressure between the faults has built up so much that it has to be released.

When the pressure is released it causes sudden movement in the earth’s crust. This movement causes the surrounding earth to **vibrate**, creating an **earthquake**.

Isn’t it interesting that earthquakes change the earth over time?

The actual point within the earth’s crust where the pressure is released is called the **focus**.

The **epicenter** of an earthquake is the point directly above the **focus**, where the vibrations or shock waves of an earthquake are the strongest.

The vibrations of an earthquake travel through the earth’s crust in waves, getting weaker as they get further away from the epicenter.

Isn’t it interesting that earthquakes change the earth over time?

There are 4 main types of **faults** that cause earthquakes. A **strike-slip fault** or sliding fault occurs when two plates slide horizontally past each other.

Isn't it interesting that earthquakes change the earth over time?

Normal or separating faults occur when pieces of crust pull apart suddenly. New crust forms when magma fills in the space that is created.

Thrust faults occur when two pieces of crust press together, or collide, forcing one side over the other. New mountains may be formed.

Blind thrust faults also press against each other, but both pieces of crust wrinkle up. New mountain ranges are formed.

Isn't it interesting that earthquakes change the earth over time?

Narrative Input Chart: Hill of Fire: English

HILL OF FIRE

(Adapted from *Hill of Fire*, by Thomas P. Lewis)

About sixty years ago, in the state of Michoacán, Mexico, something happened which had only happened once before in all of history. And the funny thing is, it happened to someone who was always complaining that nothing interesting ever happened in his little town.

A farmer named Dionisio lived with his wife and son in that town, and nearly everyday he went to his cornfield to work. At planting time he took his ox with him to plow the rocky soil to get it ready for sowing the corn. One afternoon when there was no school, the farmer's son Pablo came to help him.

As the ox was pulling the plow through the earth, the plow got stuck. The farmer yelled at the ox to pull harder, but the plow still didn't move. Dionisio and Pablo pushed together on the handle of the plow, but it went deeper and deeper into the ground. All of a sudden, the little hole the plow was stuck in began to get bigger, and there was a loud rumbling noise, and smoke shot up through the opening. "Run!" screamed the farmer to his son. As he and Pablo and the ox raced down the hillside, there was a loud CRACK and a BOOM as a crevice opened up, and the volcano known as Parícutin was born.

When they reached the town plaza, Dionisio rang the church bell, so that everyone would come out to see what was happening. The farmer pointed at where his field had been, and people stared in amazement at the flames erupting from the mouth of the volcano, the scalding lava streaming down its slopes, and the ash and cinders flying through the air. They watched all night as the volcano turned the hill to a mountain, and a river of molten rock flowed closer and closer to the town.

Days later, when the noise and fires had died down somewhat, Dionisio and his family and neighbors returned from the surrounding countryside where they had gone to escape the danger. Half the town

was completely buried by chunks of igneous rock expelled by the volcano. Soldiers arrived to evacuate the town, telling people they would have to start a new life somewhere else. For their own safety, they could not continue to live so close to an active volcano.

Even though the place where they would build their new town was not so far from the old one, the only thing still visible was the church bell tower, rising above the rock pile. So they started over. When they had finished building a new school, new homes, and a new marketplace, they celebrated with a *fiesta*, eating and drinking and singing and dancing as the volcano glowed in the night sky.

After that, life went on pretty much as before. Farmers grew corn, women ground it into tortillas to feed their families, and people sold food and crafts in the marketplace. But the town now had something it had never had before: tourists. People came from miles around to see the volcano Parícutin and the destruction it had caused, and to hear the story from Dionisio, the man whose wish for something exciting to happen came true.

MONTAÑA DE FUEGO

(adaptado del libro *Hill of Fire* por Thomas P. Lewis; traducción al español por Dora Godínez)

Hace como sesenta años, en el estado de Michoacán, México, algo pasó qué sólo había pasado una vez antes en toda la historia. Y lo chistoso es, le pasó a alguien que siempre estaba quejándose de que nada interesante pasaba en su pueblito.

Un granjero llamado Dionisio vivía con su esposa e hijo en ese pueblo, y casi todos los días él iba a su maizal para trabajar. En el tiempo de sembrar, llevó a su buey con él para arar la tierra rocosa, para después sembrar el maíz. Una tarde cuando no había clases, Pablo, el hijo del granjero, vino a ayudarlo.

Iba el buey jalando el arado por la tierra, cuando el arado se atorró. El granjero le gritó al buey que jalara más fuerte, pero el arado todavía no se movía. Juntos Dionisio y Pablo empujaron el asa del arado, pero se fue más hondo y más hondo en la tierra. De repente, el agujero pequeño donde el arado estaba atorrado empezó a crecer, y hubo un ruido retumbante muy fuerte, y salió humo por la apertura. "¡Corre!" gritó el granjero a su hijo. Mientras que él y Pablo y el buey corrían hacia abajo de la ladera, hubo un CRUJIDO fuerte y un TRONIDO, y una hendedura se iba abriendo y el volcán conocido como Parícutin nació.

Cuando llegaron a la plaza del pueblo, Dionisio tocó la campana de la torre, para que todos salieran a ver lo que estaba pasando. El granjero apuntó a donde su campo había estado, y la gente veía en asombro las llamas que hacían erupción de la boca del volcán, la hirviente lava que corría cuesta abajo, y las cenizas que volaban por el aire. Vieron toda la noche como el volcán cambió la colina a una montaña, y un río de piedra derretida corría más cerca y más cerca del pueblo.

Días después, cuando el ruido y los fuegos ya se habían apagado un poco, Dionisio y su familia y vecinos regresaron de los campos de los

alrededores donde habían ido para escaparse del peligro. La mitad del pueblo estaba completamente enterrado con pedazos gruesos de piedras ígneas arrojados por el volcán. Soldados llegaron a evacuar el pueblo, diciéndole a la gente que tendría que empezar una nueva vida en alguna otra parte. Por su propia seguridad, no podrían seguir viviendo tan cerca de un volcán activo.

Aunque el lugar donde ellos construirían su pueblo nuevo no estaba muy lejos de su pueblo viejo, la única cosa todavía visible era la torre de la campana de la iglesia, saliendo de entre las piedras. Así que volvieron a empezar. Cuando habían terminado de construir una escuela nueva, casas nuevas, y un mercado nuevo, celebraron con una fiesta, comiendo y tomando y cantando y bailando mientras el volcán brillaba en el cielo nocturno.

Después de eso, la vida seguía más o menos igual que antes. Los granjeros cosechaban maíz, las mujeres lo molían para hacer tortillas para alimentar a sus familias, y la gente vendía comida y artesanías en el mercado. Pero ahora el pueblo tenía algo que nunca había tenido antes: turistas. Viajaba gente de muchas partes para ver el volcán Parícutin y la destrucción que había causado, y para escuchar la historia contado por Dionisio, cuyo deseo que algo emocionante pasara se había hecho realidad.

SMOKING MOUNTAIN

The legend of Mt. St. Helens

Loowit was an old ugly witch who guarded the sacred fire. This was the only fire in the world, and so it was very precious.

Loowit lived, and tended the fire on a natural rock bridge that crossed the Columbia River. It was known as the Bridge of the Gods.

As a reward for guarding the fire so well, the Great Spirit Sahale gave the witch eternal life.

Loowit was unhappy however because she did not want to be an ugly old woman who would live forever.

Sahale made her young and beautiful, thinking this would solve the problem of her unhappiness.

Now Sahale had two sons: Wy-East and Klickitat. Both sons fell in love with Loowit, but she was unable to choose between them.

They fought over her, burning forests and villages in their anger.

This angered Sahale so much that he crushed the stone bridge, then killed Loowit and his sons.

He created a mountain peak where each of them had fallen.

Loowit's mountain was as beautiful as she: Mt. St. Helens, a perfect symmetrical cone cloaked in pure white.

Mt. Hood - (Wy-East) lifted his head arrogantly. But Mt. Adams hung his head as he watched his beautiful maiden, now wrapped in snow forever.

Inquiry Chart: Earthquakes

What do you know about earthquakes?	
What do you want to learn about earthquakes?	

Inquiry Chart: Volcanoes

What do you know about volcanoes?	
What do you want to learn about volcanoes?	

Comparative Input Chart

THE GOOD AND THE BEAUTIFUL	THE BAD AND THE UGLY

Vocabulary

GLOSSARY

A'a' (ah ah) Hawaiian word to describe lava that is thick and slow moving. It can take hours to push its way forward only ten feet. The surface of the lava flow is rough and jagged.

Ash Fine particles of pulverized rock blown from an eruption. Ash may be either solid or molten when first erupted.

Asthenosphere

Basalt Volcanic rock that doesn't hold much gas, therefore it is runny, not explosive, when it erupts.

Caldera An extra large crater (more than a kilometer across), made when a volcano blows its top or collapses into an empty magma chamber.

Cinder A light-weight lava which is thrown high into the air by an erupting volcano. It rapidly cools and falls to the ground as small lava rocks. Smaller pieces of cinder are called ash.

Cinder cone A mountain with steep sides formed from the build up of cinder and ash.

Composite cone A mountain that is formed with layers of lava flows and layers of ash on top of each other.

Continental drift The theory which states that the tectonic plates carry the lighter continental material along on top of them as they move, thus changing the relative positions of continents.

Convergent zone A Two plates collide, forcing one plate under the other. New mountains may be formed.

Convergent zone B Two plates collide head on, causing the land to wrinkle up. New mountain ranges are formed.

Core The very hot inner layer of the earth.

Crater The bowl shaped pit at the top of a volcano where lava flowed or blew out.

Crust The very thin, hard outer layer of the earth.

Cycles A period of time in which events happen in a certain order, and which constantly repeats itself.

Dormant The term used to describe a volcano that is inactive but could erupt again. Literally “sleeping”.

Earthquake Vibrations caused by movements within the earth’s crust.

Epi-center The point directly above the focus where the shock waves of an earthquake are the strongest.

Erosion The process of the earth’s crust being gradually worn away.

Eruption When lava, steam, and/or ash come out of a volcano.

Extrusive The forcing out of rocks from beneath the surface of the earth.

Fault A large crack in the earth’s crust in which an earthquake may occur.

Fissure Long fractures or cracks on the slopes of a volcano. Fissure eruptions typically produce liquid flows, but cinder and ash may also be ejected.

Flow To run, as water; to move in a stream; to glide smoothly.

Focus A point within the earth’s crust where pressure is released in an earthquake.

Folding A doubling of anything upon itself; a crease; a part laid over on another.

Fracture zone Two plates slide past each other.

Gas

Geologist A person who studies rocks and minerals.

Igneous Rock A rock that forms from the cooling of magma or lava.

Inner core

Intensity

Intrusive The forcible entry of rock in a molten state among and through existing rocks.

Lava Melted rock that reaches the earth’s surface.

Lithosphere The rocky layer of the earth’s crust.

Magma Melted rock deep beneath the earth.

Magma chamber The area beneath the earth’s surface where liquid magma collects before an eruption.

Magnitude The amount of energy released by an earthquake, measured using a seismograph.

Mantle

Mercali scale

Metamorphic Rock A rock that is formed when minerals are changed by heat and pressure.

Minerals Inorganic materials found naturally in the earth.

Molten Another word for melted, usually applied to melted rock or metal.

Myth An ancient traditional story offering an explanation of some fact or phenomenon.

Obsidian A hard black volcanic rock/glass.

Outer core

Pahoehoe A Hawaiian name for lava that is pronounced “pa-hoey-hoey”. It is a fluid type of lava and flows down the volcano to form rivers and pools of molten lava. When pahoehoe lava cools it has a smooth surface with ripples which shows the direction it flowed.

Pangaea Super continent which started to break up about 200 million years ago. Pieces of it form our present continents.

Potential energy

Pressure The force directed over a surface.

Pumice Light-colored, frothy volcanic rock formed by the expansion of gas in erupting lava.

P-waves

Richter Scale A scale ranging from one to ten for expressing the intensity of an earthquake.

Ring of Fire The area around the Pacific Ocean where many volcanoes erupt and earthquakes occur.

Rock Cycle The changing of rocks from one type to another.

Sedimentary Rock A rock that forms from layers of sediment.

Seismic waves

Seismograph A special instrument used to measure the strength of an earthquake.

Seismologist A scientist who studies earthquakes.

Shield cone A broad, very gently sloping volcano built almost exclusively of lava flows. These volcanoes are characterized by quiet eruptions with little or no explosive action.

Soil The surface layer of the earth in which plants grow.

Spreading zone Two plates that move away from each other. New crust often forms in the space created.

Structure

S-waves

Tectonic plates Large sections of the earth's crust that move as units.

Theory

Thunder egg A nodule of stone having a cavity lined with crystals.

Vent A crack in the earth through which lava may escape.

Volcano The eruption and buildup of lava and ash.

Volcanologist A scientist who studies volcanoes.

Process Grid: types of volcanic eruptions

<u>ERUPTION</u>	<u>MAGMA</u>	<u>LAVA</u>	<u>EXAMPLE:</u> (name and location)

<u>ERUPTION</u>	<u>MAGMA</u>	<u>LAVA</u>	<u>EXAMPLE:</u> (name and location)
Violent	Thick magma; large amounts of gas	None; ash and rock	Mt. St. Helen's in Washington State
Active	Thin magma; large amounts of gas	Hot lava shoots out	Mt. Pinatubo in the Philippines
Quiet	Thick magma; small amounts of gas	Thick slow moving lava; forms a smooth dome	Kilauea in the Hawaiian Islands

Process Grid: Volcanoes and Earthquakes

	TYPES	CAUSES	EFFECTS	DAMAGE	SAFETY	PREDICTION	PEOPLE
Volcanoes	<ol style="list-style-type: none"> 1. cinder cone 2. shield cone 3. composite cone 	Caused by the build-up and release of pressure from hot magma and gas below the surface of the earth	<ol style="list-style-type: none"> 1. volcanic eruption 	<ol style="list-style-type: none"> 1. fire 2. poisonous gas 3. ash may cover many miles 4. forests, rivers, wildlife damaged 	Possible evacuation	Volcanologists measure seismic activity, crater temperatures	Can affect farming, people may lose their homes, may get sick from poisonous gasses or ash.
Earthquakes	<ol style="list-style-type: none"> 1. fracture zone 2. spreading zone 3. convergent zone A 4. convergent zone B 	Caused by two plates pushing against each other, causing a buildup of pressure	<ol style="list-style-type: none"> 1. earthquake 	<ol style="list-style-type: none"> 1. buildings collapse 2. fires caused by broken gas lines 3. no fresh water 	<ol style="list-style-type: none"> 1. if inside: duck, cover, and hold on 2. if outside: find a space free from tall trees or power lines 3. if in your car: stop moving and stay in your car. 	Seismologists monitor seismic activity using a seismograph, but earthquakes are almost impossible to predict.	Can destroy homes, leave people homeless Lack of fresh water can lead to disease

Process Grid: Volcanoes and Earthquakes (blank)

	TYPES	CAUSES	EFFECTS	DAMAGE	SAFETY	PREDICTION	PEOPLE
Volcanoes							
Earthquakes							

Chants, Raps, and Poems:

EARTHQUAKE HOKEY POKEY

by Lori Klaus

You move the fault to the north,
you move the fault to the south,
you move the fault to the north,
and you shake it all about.
You're at the epicenter, that's the center of it all.
That's what earthquakes are about!

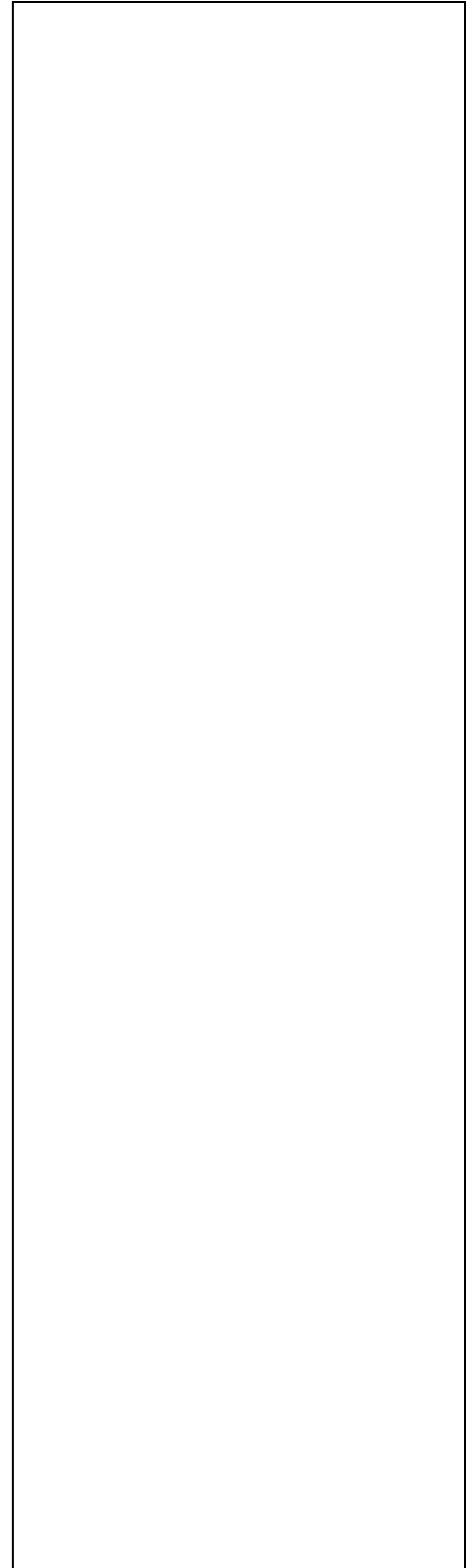
The earth moves in waves.
The earth moves in waves.
The earth moves in waves.
That's what earthquakes are about!

It starts at the focus,
it starts down below,
it starts at the focus,
when the rocks start to go.
The earth shakes around and it moves the ground.
That's what earthquakes are about!

The earth moves in waves.
The earth moves in waves.
The earth moves in waves.
That's what earthquakes are about!

When the earth starts shaking,
get down under your bed.
If the glass starts breaking,
just cover your head.
It might rattle, rock and roll, but you'll be safe.
That's what earthquakes are about!

The earth moves in waves.
The earth moves in waves.
The earth moves in waves.
That's what earthquakes are about!



Earthquake Rap

By John Gorman

The earth is made
of nine different plates.
They're constantly moving
at a very slow rate.

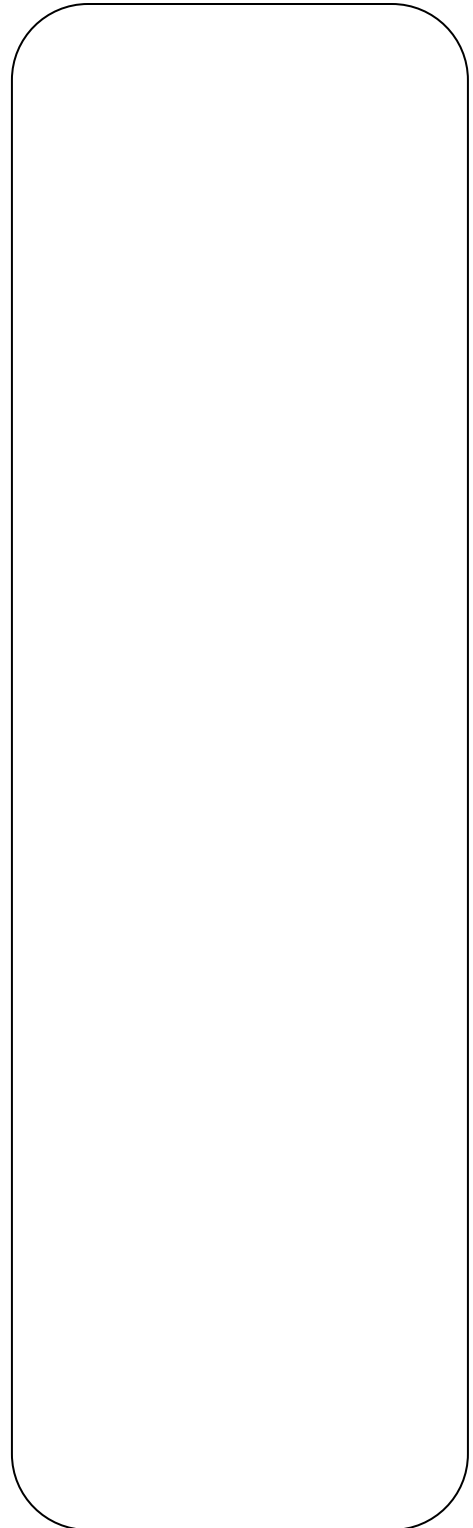
There are plates in the ocean,
and plates on the land.
They're shakin' up the water,
and shifting the sand.

These plates move together.
These plates move apart.
There are people called seismologists
who track this movement on a chart.

When under the ocean
these plates move apart,
magma bubbles up
and volcanic mountains start.

When plates move together
and form a subduction zone,
the bottom plate gets melted
and it makes new stone.

Continental plates collide
and mountain ranges are made.
Those mountains will be there
after the quake memory fades.

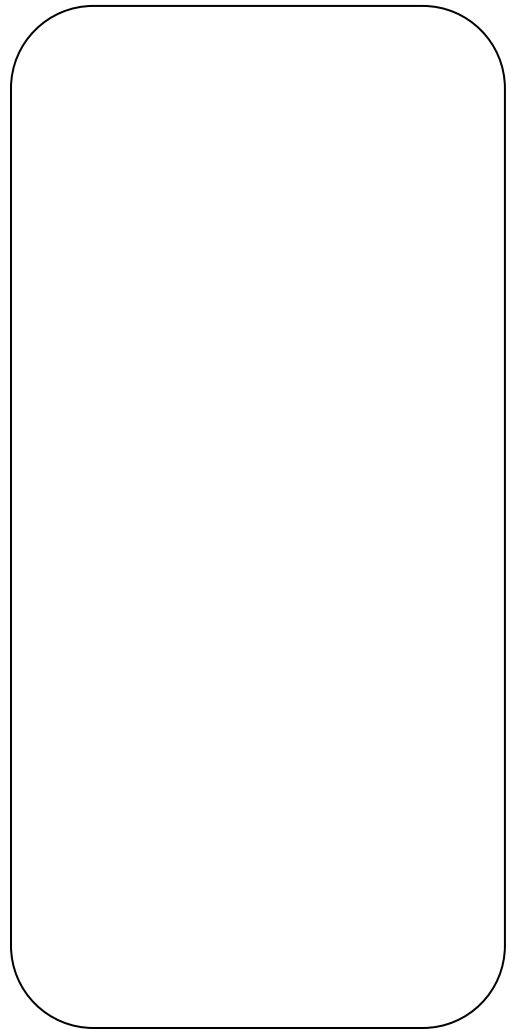


When sliding plates slide
it creates a big shock.
It may shake up a city
but won't make new rock.

The focus is the place
inside the earth,
Where pressure builds
and earthquakes have their birth.

The epicenter is the place
directly above,
on the surface
where the land gets a shove.

Earthquakes change the earth
and you should know,
How they sometimes make craters
or make mountains grow.



Mt. St. Helens

(To the tune of "Oh Susanna")

by Theresa Watters and Melissa Alexander

In May of 1980

Mt. St. Helens blew her top,
Through earthquakes and explosions
That they thought would never stop.

It started back in March
With a rumble here and there,
A little spew of gas
That clogged up all the air.

*****CHORUS*** (To be sung after every 2 stanzas)**

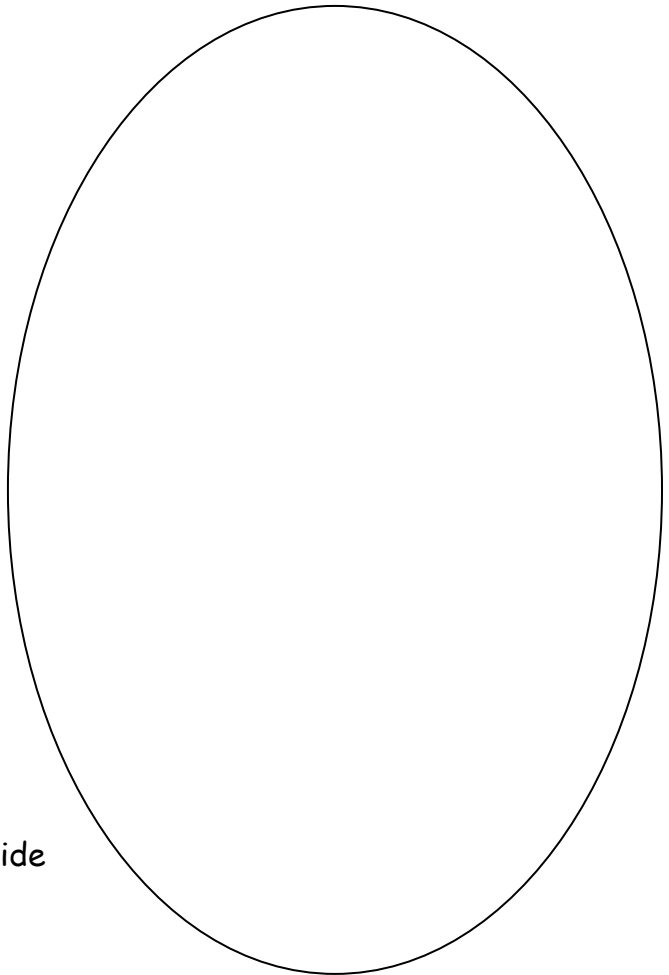
Oh St. Helens,
In 1980 you blew,
With earthquakes and explosions
And an avalanche or two.

By May there were new craters
And a bulge on her north side,
It was filled with molten lava
And the rodents all did hide.

At 8:32 on May 18th
The mountain went into shock,
Phase 1 the earthquake avalanched
The bulging face of rock.

*****CHORUS*****

Pressure had built for many years
Out the north side came phase 2,
The "stone wind" leveled the mountainside
When St. Helens sneezed, achool!



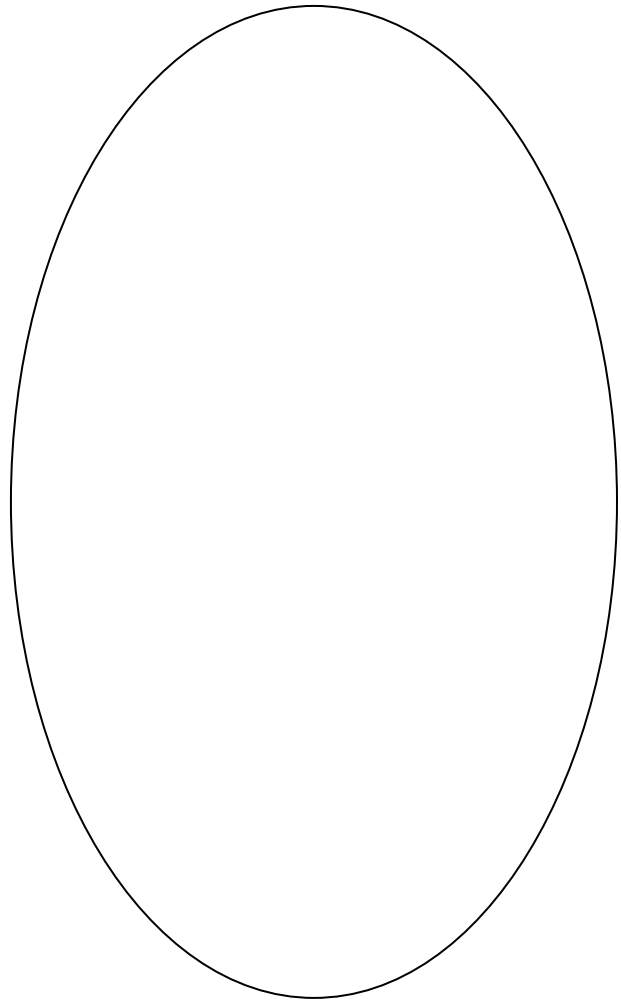
New lava traveled down the mount
At 100 miles per hour,
Mudflow destroyed another route
Wiping out the trees and flowers.

*****CHORUS*****

By 5 p.m. most things were quiet,
All forms of life were gone,
More than 1000 ft. shorter
Than when we woke at dawn.

2 decades after Helens blew
Some forms of life are back,
Plants, seeds, bugs and rodents
Had survived her attack.

*****CHORUS*****



Volcano Rap

By John Gorman

Down deep within the mantle brewing magma finds a crack.
Its heat propels it upward, never looking back.

A volcano is beginning, though we may not have a clue;
Earthquakes may be rumbling around the mountain too.

A volcano has a magma chamber deep inside,
Where pressure builds while the magma hides.

When magma needs a way to an outside hole,
It travels through a vent that's like a pole.

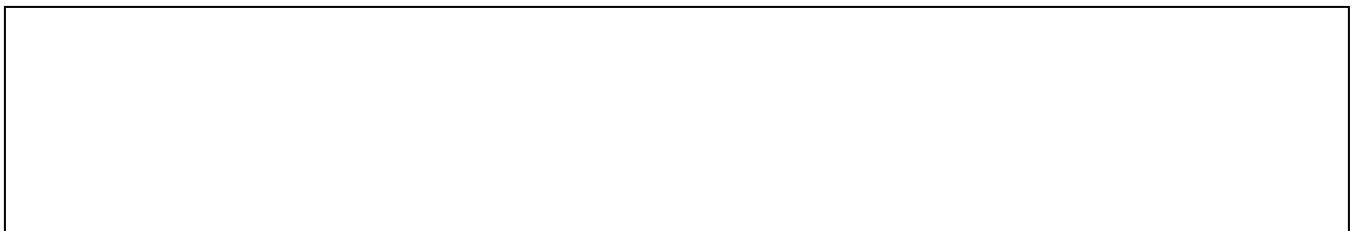
Finally the magma erupts through the vent!
It gets to the surface and then it's sent.

During the eruption magma changes its name.
Outside the earth it's "lava", but it's really still the same.

Lava flows from a volcano and you can trust
That lava will harden and form a new crust.

In violent eruptions ash comes out.
It's bits of rock and lava the volcano spouts.

After the eruption there may be a deep hollow
That's called a crater, and more eruptions may follow!



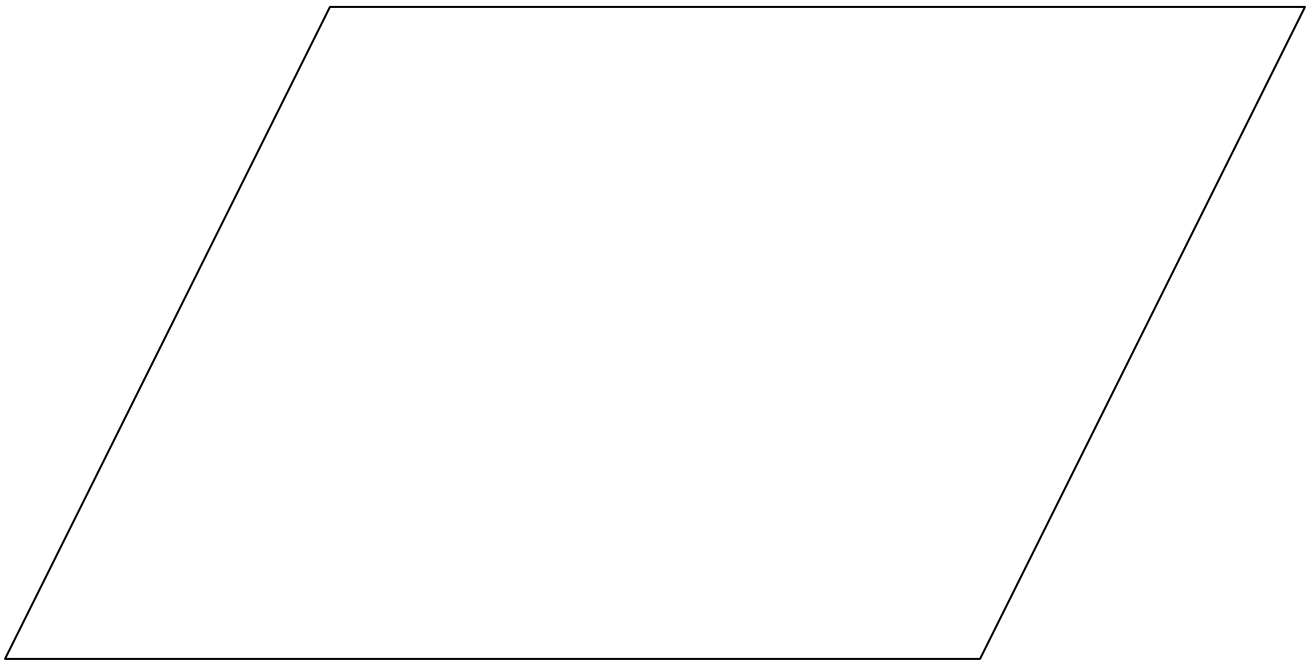
VOLCANOES AROUND THE WORLD

By Serene Campbell

Volcanoes are formed around the world. Hurrah! Hurrah!
Volcanoes are formed around the world. Hurrah! Hurrah!
The crust cracks and the magma rises,
Out comes the lava causing surprises,
And new igneous rock forms all around the ground.

New land is formed around the world. Hurrah! Hurrah!
New land is formed around the world. Hurrah! Hurrah!
As the lava cools, it makes more rocks,
The conduit path eventually blocks,
And new vents form all over the new ground.

Volcanoes erupt around the world. Hurrah! Hurrah!
Volcanoes erupt around the world. Hurrah! Hurrah!
The top blows off leaving a crater,
Evacuate! And we'll see you later!
As the steam rises up and the ash comes pouring down.



I'm A Fault

(To the tune of "I'm a Little Piece of Tin")

by Melissa Alexander and Theresa Watters

I'm a fault, they call me spreading zone,
Bottom of the ocean is mostly my home.
I happen when two plates separate,
Magma might come and then life's great

I'm a fault (shake shake)
I'm a fault (quake quake)
I'm a spreading zone fault.

I'm a fracture zone fault.
Pressure builds up and I can't halt.
One plate will move forward or back,
The earth's gonna move, so watch out Jack!

I'm a fault (shake shake)
I'm a fault (quake quake)
I'm a fracture zone fault.

I'm a fault, I'm convergent A.
I form new mountains, don't stand in my way!
I push up against a fault friend of mine,
I push on past and I'm first in line.

I'm a fault (shake shake)
I'm a fault (quake quake)
I'm a convergent A fault.

I'm a fault, I'm convergent B.
I make the mountain ranges that you see.
When two plates crash there's no place to go,
So up we go but magma won't flow.

I'm a fault (shake shake)
I'm a fault (quake quake)
I'm a convergent B fault.

