

Name _____

Date _____

Volcanoes!

Key Words		
ash	constructive force	crater
crust	destructive force	erosion
erupt	extinct	fault
igneous	inner core	lava
magma	mantle	outer core
vent	weathering	

The Earth is a huge, spinning sphere whose surface is constantly changing. Some changes to the Earth's surface, such as **weathering** and **erosion**, occur very slowly. The Earth can also be changed very quickly by events such as volcanoes and earthquakes. A **volcano** is a mountain built up from hardened **lava**, rocks, and ash that erupted out of the Earth.

The Earth is made up of four major layers: the **crust**, the **mantle**, the **outer core**, and the **inner core**. We live on the outermost layer, the crust. The thickness of the Earth's crust varies. It is thickest under the continents (about 40 km thick) and thinnest under the oceans (about 8 km thick). Made of rocks and soil, the crust is the thinnest and coldest of the Earth's layers.

The mantle is the layer of Earth just below the crust. It is made of rocks composed mainly of iron, magnesium, silicon, and oxygen. The top of the mantle reaches nearly to the Earth's surface and is stiff and brittle. The temperature in the mantle can get as high as 1,500°C. The lower portion of the mantle is composed of extremely hot, molten rock, called **magma**.

The core is the centermost layer of the Earth and is believed to be made of metal. The immense pressure from the rest of the Earth makes the core extremely hot, about 6,100°C. This heat causes many of the events and changes that occur throughout the Earth. The outer core is made of iron and nickel. The extreme heat in the core keeps the metals in the outer core in the form of melted liquids. The inner core

of the Earth is solid iron and nickel. Approximately 1,200 km thick, the inner core is the hottest layer of Earth. Why is the inner core solid although it is the hottest layer? The inner core is under extreme pressure. It is not able to become liquid.

Volcanoes often form along a crack in the Earth's surface called a **fault**. Volcanoes form when pressure within the Earth's crust is so great that it forces magma to flow through vents in the crust. A **vent** is an opening or a crack that reaches from pools of hot magma deep in the ground to the Earth's surface. At these openings, magma breaks through the surface. Below Earth's crust, liquid rock is called magma; after the liquid rock flows onto the surface of the Earth, it is called **lava**. A cup-shaped opening called a **crater** is at the top of the mountain. When magma shoots out of a volcano, it is said to **erupt**.

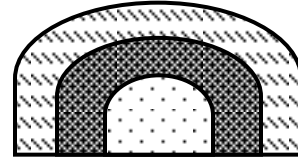
For many people, the word *volcano* creates images of destruction. Volcanoes have a huge impact on the life around them and can be a **destructive force**. Flowing lava will destroy anything in its path. However a volcano can also be a **constructive force**—creating new landforms and adding minerals to the soil. Many famous volcanoes form large mountains. Years of eruptions put new and higher layers of lava on the mountain. Volcanoes differ in size, structure, and how often they erupt.

When magma nears the Earth's surface, and gas in it begins to explode, a volcanic eruption occurs. What does an erupting volcano sound like? What does it look like? Sometimes volcanoes look like a fireworks display. Lava will shoot from the vents or openings with great force. Loud explosions can be heard. In the explosion, hot rock may be blown into the air. It may cool quickly and harden into small pieces called cinders or **ash**. The cinders and ash fall to the ground around the opening and make a cone-shaped hill. Some volcanic eruptions, however, are just quiet outpourings of lava. As a volcano erupts over and over, layers of cinders, ash, and lava build up. The hill may become a mountain.

A volcano that has not erupted for many years is said to be **extinct**. When a volcano no longer erupts, the magma in the vent cools and becomes solid **igneous** rock. The kind of igneous rock formed from magma depends partly on how fast or slowly it cools.

1. What is the main idea of paragraph 1?
- A The Earth is a spinning sphere whose surface is constantly changing.
 - B Some changes to the Earth's surface occur very slowly.
 - C The Earth can also be changed very quickly by some events.
 - D A volcano is a mountain built up from hardened lava, rocks, and ash that erupted out of the Earth.
2. Which of the following statements is TRUE?
- A A volcano that erupts every year is said to be extinct.
 - B Magma is the hot rock that flows down a volcano's sides.
 - C Volcanoes can be a constructive force.
 - D Almost all of the volcanoes on the Earth are just alike.
3. Which of the following shows the correct order of the layers of the Earth from the surface to its center?
- A inner core, outer core, mantle, crust
 - B outer core, crust, mantle, inner core
 - C mantle, inner core, crust, outer core
 - D crust, mantle, outer core, inner core

4. Some students built the model below to illustrate the three layers of the Earth.



What could the students do to improve their model?

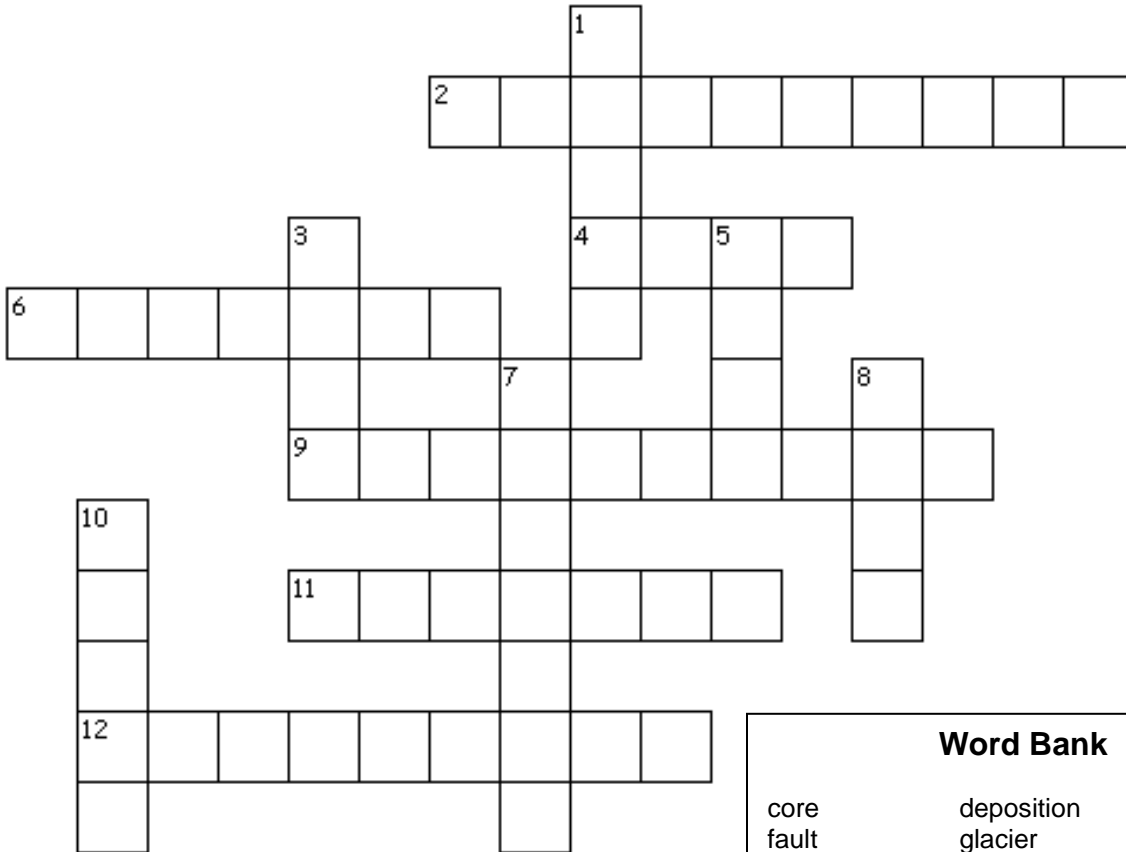
- A Make each layer of equal thickness.
 - B Make the core much larger than it is.
 - C Make the mantle the thinnest layer.
 - D Make the crust much thinner than the mantle.
5. Which of the following might cause the formation of a volcano?
- A Pressure from movement under the Earth's surface pushes a block of rock upward.
 - B Pressure inside the Earth's crust forces magma to bubble up to the surface.
 - C A glacier erodes sediments from one place and deposits it in another place.
 - D The force of gravity pulls magma and rocks to the top of a mountain.

Study the chart below. Answer the questions that follow.

Major Volcanic Eruptions		
Date	Location	Facts
79 A.D.	Vesuvius, Italy	Destroyed the city of Pompeii
1815	Tambora, Indonesia	Caused a change in weather patterns around the world
1883	Krakatoa, Indonesia	Created sea waves forty meters high
1902	Mount Pelée, Martinique	Glowing cloud destroyed the city of Saint-Pierre in minutes
1970	Coast of Peru	Caused an avalanche
1980	Mount. St. Helens, Washington State, USA	Blew down or buried beneath volcanic deposits nearly 230 square miles of forest
1985	Nevado del Ruiz, Columbia	Caused mud slides and floods that destroyed the town of Armero

6. Where did a volcanic eruption cause forty-meter high sea waves?
- A Vesuvius, Italy
 - B Tambora, Indonesia
 - C Krakatoa, Indonesia
 - D Coast of Peru
7. How many years went by between the volcanic eruption in Krakatoa and the eruption of Mount St. Helens in the United States?
- A 97 years
 - B 103 years
 - C 197 years
 - D 2,863 years
8. Which of the following volcanic eruptions MOST LIKELY lowered the average daily temperatures around the world for a short period of time?
- A Mount Pelée, Martinique
 - B Mount. St. Helens, Washington State, USA
 - C Tambora, Indonesia
 - D Nevado del Ruiz, Columbia

Volcano Crossword Puzzle



Word Bank		
core	deposition	erosion
fault	glacier	lava
mantle	sediments	vent
volcano	weathering	wind

Across

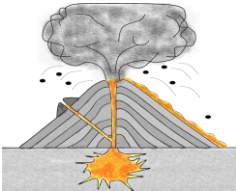
2. breaks down the Earth's surface
4. molten rock that flows down the side of a volcano
6. movement of soil caused by wind and water
9. the dropping of sediments by moving water or wind
11. a moving river of ice
12. particles that settle out from moving wind or water

Down

1. a crack in the Earth's crust
3. causes erosion and weathering by blowing dirt or sand against rock
5. an opening that leads from the crater of a volcano down to pools of magma
7. an opening in Earth's surface through which magma comes out
8. innermost layer of the Earth
10. the outer layer of the Earth

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ERUPT!

				
		Free Space		