

Name: \_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_

### I&ES 38: Beneath the Earth's Surface

#### **Get Started:**

1. Use Student Sheet 38.1, "Talking Drawing 1: Beneath the Earth's Surface", to help prepare you for the following reading.

**Challenge Question:** What is beneath the earth's surface?

#### **Reading Notes:**

##### **On the Earth's Surface**

A \_\_\_\_\_ is an opening in the earth from which \_\_\_\_\_ and \_\_\_\_\_ erupt. Gases within the magma build up enough pressure to force it upwards and eventually through gaps in the earth's surface, causing an \_\_\_\_\_. Once magma has erupted onto the earth's surface, it is called \_\_\_\_\_. As it cools, the \_\_\_\_\_ forms volcanic rock. Over time, volcanic rock and ash can result in a hill or \_\_\_\_\_ around the opening. This resulting landform is also called a \_\_\_\_\_.

Volcanic eruptions are not all alike. Some eruptions are \_\_\_\_\_, with \_\_\_\_\_ slowly seeping from a vent. Other eruptions are \_\_\_\_\_, with \_\_\_\_\_, ash, and other materials being hurled hundreds of \_\_\_\_\_ into the air. Differences in volcanic eruptions result in different volcanic mountain shapes, such as \_\_\_\_\_ volcanoes, cinder \_\_\_\_\_, and composite volcanoes.



_____	_____	_____
_____	_____	_____
_____	_____	_____

There is a lot of evidence of volcanic activity on earth. Many \_\_\_\_\_ have been formed from volcanoes that are now extinct or \_\_\_\_\_. Yucca Mountain was formed from volcanic material exploding from a \_\_\_\_\_ volcano that is now \_\_\_\_\_.

The Cascade Mountain Range that extends from British Columbia through Washington, Oregon, and Northern California, was mostly formed by volcanoes. Alaska's Aleutian Islands and all of \_\_\_\_\_ are volcanic formations.

##### **Inside the Earth**

Early evidence about the inside of the \_\_\_\_\_ came from volcanic eruptions. In the last \_\_\_\_\_ years, scientists have been learning more about the earth using technology and new

methods for gathering \_\_\_\_\_. For example, scientists have learned a lot from studying \_\_\_\_\_. \_\_\_\_\_ move through different materials in different ways and at different speeds. In general, these \_\_\_\_\_ move faster through more dense solids than they do through \_\_\_\_\_ dense solids. The \_\_\_\_\_ move slowest through \_\_\_\_\_. Scientists measure the waves from a single earthquake at different places on earth's \_\_\_\_\_. By analyzing and comparing the data from many earthquakes, they have been able to determine the state—solid, \_\_\_\_\_, or \_\_\_\_\_—of the material inside the earth.

Scientists now know that the \_\_\_\_\_ on the earth's surface are only a tiny fraction of what makes up the \_\_\_\_\_. Think of the earth as an egg. The thickness of the eggshell would represent the thickness of all the \_\_\_\_\_ at the surface. Beneath an eggshell there is egg white and yolk. What is beneath the rocks at the surface of the earth? Research indicates that the earth has three layers: a \_\_\_\_\_, a **mantle**, and a \_\_\_\_\_. The \_\_\_\_\_ is made up of both a solid and a \_\_\_\_\_ layer, which are usually described separately as the **outer core** and the \_\_\_\_\_ **core**.

_____ of the Earth				
	Approximate depth below surface (km)	State	Material	Temperature (°C)
<b>Crust</b>	_____ (average)	solid	many kinds of _____	0-700
<b>Mantle</b>	40-2, _____	upper part is _____, Lower part is _____.	iron, magnesium, and silicon compounds	700-2, _____
<b>Outer Core</b>	2, _____ - _____, 200	_____	_____ and _____	2,800-5, _____
<b>Inner Core</b>	5,200-6,400	_____	_____ and _____	Over _____, 000

The \_\_\_\_\_ that erupts from volcanoes often comes from the \_\_\_\_\_. Magma rising from the mantle can collect in underground chambers in the earth's \_\_\_\_\_, building up pressure before exploding toward the surface. The \_\_\_\_\_ is almost 3,000 km thick, which is about the same as the distance from New York City to \_\_\_\_\_, \_\_\_\_\_. The land from New York to \_\_\_\_\_ is not always the same, and neither are all the parts of the \_\_\_\_\_. The uppermost part of the \_\_\_\_\_ is more solid than the \_\_\_\_\_ part. Because the upper mantle and the crust are both solid, geologists have a name for the combination of these two layers: **lithosphere**. *Litho* means “\_\_\_\_\_” in Greek, and the lithosphere refers to the first \_\_\_\_\_ km below the earth's surface.