

# Internal Forces Shaping the Earth

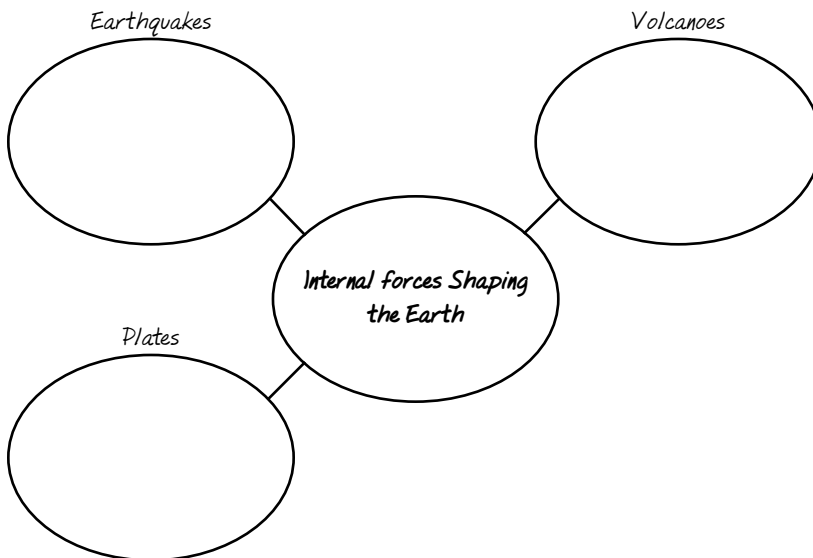
**BEFORE YOU READ**

In the last section, you read about the features of the earth’s surface.

In this section, you will learn about the forces that move and shape the earth from the inside.

**AS YOU READ**

Use this graphic organizer to take notes on details of internal forces that shape the earth.



**PLACES & TERMS**

**tectonic plate** an enormous moving piece that forms the earth’s crust

**fault** a fracture in the earth’s crust

**earthquake** violent movement of the earth caused by the movement of tectonic plates

**seismograph** a device that measures the size of an earthquake

**epicenter** point on the earth’s surface directly above an earthquake

**Richter scale** a scale that measures the energy released during an earthquake

**tsunami** a giant wave in the ocean caused by an earthquake

**volcano** an opening in the earth’s crust where magma and gases escape

**lava** what magma is called when it reaches the earth’s surface

**Ring of Fire** a zone around the rim of the Pacific Ocean where most active volcanoes are found

**Plate Tectonics** (pages 37–38)

*What are tectonic plates?*

The internal forces that shape the earth’s surface begin immediately beneath the crust. The magma beneath the crust circulates like a conveyer belt. The heated magma moves up toward the crust, cools, and circulates downward. Above this circulation system are the **tectonic plates**, enormous moving pieces that form the earth’s crust.

**1. How does magma move under the earth’s crust?**

\_\_\_\_\_

\_\_\_\_\_

**PLATE MOVEMENT** (pages 38–39)

*How do plates move?*

The tectonic plates move in one of four ways:

- 1) sliding past each other in a shearing motion;
- 2) subduction, or diving under another plate;
- 3) convergence, or crashing into one another;
- 4) spreading, or moving apart.

Three types of boundaries mark plate movements:

- **Divergent boundary** Plates move apart.
- **Convergent boundary** Plates collide with each other.
- **Transform boundary** Plates slide past one another.

When two plates meet each other, they may cause folding and cracking of the rock. Because the rocks are under great pressure, they become more flexible and will bend or fold, creating changes in the crust. However, sometimes the rock is not flexible and will crack under the pressures exerted by the plate movement. This *fracture* in the earth's crust is called a **fault**. It is at the fault line that the plates move past each other.

## 2. What happens when plates meet each other ?

---



---

## Earthquakes

### EARTHQUAKE LOCATIONS (pages 39–40)

#### *Where do earthquakes occur?*

As the plates grind or slip past one another at a fault, the earth shakes or trembles. This movement of the earth is an **earthquake**. A special device called a **seismograph** can detect them.

The location in the earth where an earthquake begins is called the focus. The point directly above the focus on the earth's surface is the **epicenter**. Nearly 95 percent of all recorded earthquakes occur around the boundaries of the major tectonic plates.

## 3. What is a seismograph?

---



---

### EARTHQUAKE DAMAGE (page 40)

#### *What is a tsunami?*

Earthquakes cause squeezing, stretching, and shearing motions in the earth's crust that damage land and structures. Ground motion can cause landslides, displacement of land, fires, and collapsed buildings. *Aftershocks* are smaller-scale quakes that occur after the initial shock. The **Richter scale** uses information collected by seismographs to determine the relative strength of an earthquake.

Sometimes an earthquake can cause a tsunami, a giant wave in the ocean. A tsunami travels at speeds of up to 450 miles per hour. It produces waves of 50

to 100 feet or higher. Tsunamis may travel across wide stretches of the ocean.

## 4. How is earthquake damage caused?

---



---

## Volcanoes (pages 40–41)

#### *What is a volcano?*

A **volcano** occurs when magma, gases, and water from the lower part of the crust or mantle collect in underground chambers and eventually pour out of cracks in the earth's surface. Most volcanoes are found along the tectonic plate boundaries.

Magma that has reached the earth's surface is called **lava**. The most dramatic volcanic action is an eruption. This occurs when which hot lava, gases, ash, dust, and rocks explode out of vents in the earth's crust. Volcanoes do not erupt on a predictable schedule.

## 5. What happens during a volcanic eruption?

---



---

### RING OF FIRE (page 41)

#### *What is the Ring of Fire?*

The **Ring of Fire** is a zone around the rim of the Pacific Ocean. It is the location of the vast majority of active volcanoes and earthquakes. Other volcanoes appear over "hot spots" where the crust is very thin and occasionally magma melts through.

Hot springs and geysers also are indicators of "hot spots" in the earth's crust. Hot springs occur when ground water circulates near a magma chamber.

Not all volcanic action is bad. Volcanic ash produces fertile soil. In some places, the hot springs, steam, and heat generated by the magma is tapped for energy.

## 6. What are hot springs and geysers ?

---



---