

Volcanic Eruptions

- **Distinguish** between nonexplosive and explosive volcanic eruptions.
- **Identify** the features of a volcano.
- **Explain** how the composition of magma affects the type of volcanic eruption that will occur.
- **Describe** four types of lava and four types of pyroclastic material.

I. Volcanic Eruptions



A. A **volcano** is a vent or fissure in the Earth's surface through which molten rock and gases are expelled.

B. Molten rock is called **magma**.

C. Magma that flows onto the Earth's surface is called **lava**.

II. Nonexplosive Eruptions



A. Nonexplosive eruptions are the most common type of volcanic eruptions. These eruptions produce relatively calm flows of lava in huge amounts.

B. Vast areas of the Earth's surface, including much of the sea floor and the Northwestern United States, are covered with lava from nonexplosive eruptions.

III. Explosive Eruptions

A photograph of a volcano erupting. A large, billowing plume of white ash and smoke rises from the summit of the volcano, filling the upper half of the frame. The volcano itself is a conical shape with a dark, rocky surface, and its base is partially obscured by the foreground. The sky is a clear, pale blue.

A. While explosive eruptions are much rarer than non-explosive eruptions, the effects can be incredibly destructive.

B. During an explosive eruption, clouds of hot debris, ash, and gas rapidly shoot out from a volcano.

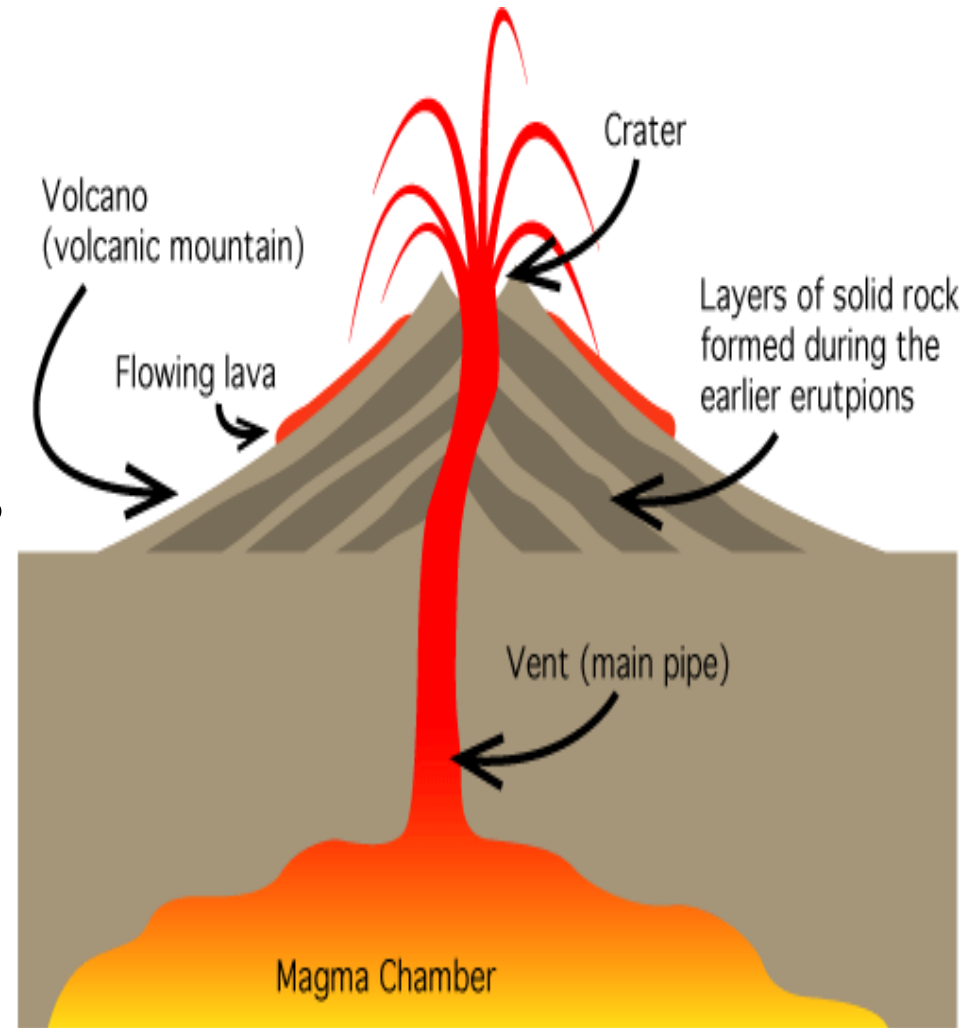
C. An explosive eruption can also blast millions of tons of lava and rock from a volcano, and can demolish an entire mountainside.

IV. What Is Inside a Volcano?

A. The interior of a volcano is made up of two main features.

B. The **magma chamber** is the body of molten rock deep underground that feeds a volcano.

C. The **vent** is an opening at the surface of the Earth through which volcanic material passes



V. What Makes Up Magma?

A photograph of a volcanic landscape. In the foreground, a bright orange-red lava flow is visible, flowing through dark, jagged volcanic rock. The background shows a range of dark volcanic hills under a blue sky with some light clouds.

A. By comparing magma from different eruptions, scientists have learned that the composition of the magma affects how explosive a volcanic eruption is.

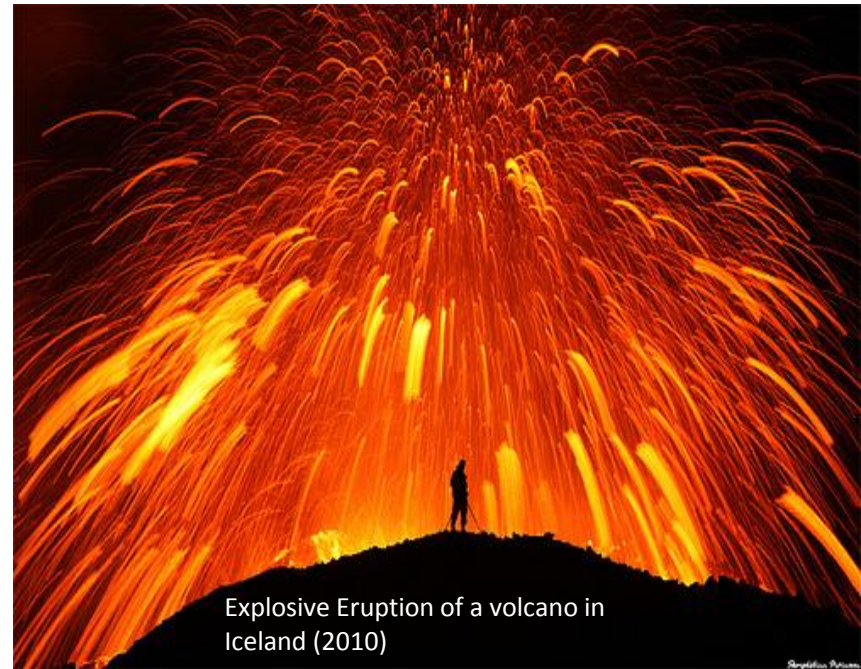
B. The key to whether an eruption will be explosive lies in the silica, water, and gas content of the magma.

V. What Makes Up Magma?

C. Water and Magma Are an Explosive Combination If the water content of magma is high, an explosive eruption is more likely.

D. While underground, magma is under intense pressure and water in it stays dissolved. If the magma quickly moves to the surface, pressure suddenly decreases and the water and other compounds become gases.

E. As gases expand rapidly, an explosion can result.



Explosive Eruption of a volcano in Iceland (2010)



V. What Makes Up Magma?

F. Silica-Rich Magma Traps Explosive Gases Magma with a high silica content also tends to cause explosive eruptions.

H. Silica-rich magma has a stiff consistency, so it flows slowly and tends to harden in a volcano's vents. As a result, it plugs the vent.

I. As more magma pushes up from below, pressure increases. If enough pressure builds up, an explosive eruption takes place.



VI. What Erupts From a Volcano?

A. Magma erupts as either lava or pyroclastic material.



B. **Lava** is liquid magma that flows from a volcanic vent.

C. **Pyroclastic material** forms when magma is blasted into the air and hardens.



VI. What Erupts From a Volcano?

Four Types of Lava

D. Types of Lava

The viscosity of lava, or how it flows, varies greatly. Lava that has high viscosity is stiff. Lava that has low viscosity is more fluid.



◀ **Aa** is so named because of the painful experience of walking barefoot across its jagged surface. This lava pours out quickly and forms a brittle crust. The crust is torn into jagged pieces as molten lava continues to flow underneath.



▶ **Pahoehoe** lava flows slowly, like wax dripping from a candle. Its glassy surface has rounded wrinkles.

E. The viscosity of lava affects the surface of a lava flow in different ways.



◀ **Pillow lava** forms when lava erupts underwater. As you can see here, this lava forms rounded lumps that are the shape of pillows.



▶ **Blocky lava** is cool, stiff lava that does not travel far from the erupting vent. Blocky lava usually oozes from a volcano and forms jumbled heaps of sharp-edged chunks.

VI. What Erupts From a Volcano?

F. Types of Pyroclastic Material When magma explodes from a volcano and solidifies in the air, pyroclastic material is formed.

G. Pyroclastic material also forms when powerful eruptions shatter existing rock.

VI. What Erupts From a Volcano?

H. There are four types of pyroclastic material:

I. **Volcanic bombs** are large blobs of magma that harden in the air.

J. **Volcanic blocks** are pieces of solid rock erupted from a volcano. Volcanic blocks are the largest pieces of pyroclastic material.



Nicaragua (6 ft. long)



Block lava flow, SP Crater, San Francisco Volcanic Field, Arizona

VI. What Erupts From a Volcano?

K. **Lapilli** are small, pebblelike bits of magma that hardened before they hit the ground.



L. **Volcanic ash** forms when the gases in stiff magma expand rapidly and the walls of the gas bubbles explode into tiny, glasslike slivers. Ash makes up most of the pyroclastic material in an eruption.



VI. What Erupts From a Volcano?

M. **Pyroclastic flows** are dangerous volcanic flows that are produced when enormous amounts of hot ash, dust, and gases are ejected from a volcano.

N. Pyroclastic flows can race downhill at speeds of more than 200 km/h.

O. The temperature at the center of a pyroclastic flow can exceed 700°C.