



OREGON DEPARTMENT OF EMERGENCY MANAGEMENT

Exploring Volcanoes: The Cascades vs. Hawaii!



Mt. St. Helens Before and After the 1980 Eruption

The Mount St. Helens Eruption (1980) A long time ago—well, in 1980—Mount St. Helens, a volcano in Washington State, right on the border with Oregon, had a HUGE eruption! It was one of the biggest eruptions in U.S. history. The blast was so strong that the top of the volcano blew off, sending ash into the sky for miles. It destroyed forests, changed the landscape, and reminded people that volcanoes can be powerful forces of nature.

Now, let's dive into two types of volcanoes: those in the **Cascade Range** and those in **Hawaii**!

Cascade Volcanoes (Like Mount St. Helens!)

These volcanoes are called *stratovolcanoes* (say: strat-oh-vol-kay-noes). They are tall, cone-shaped mountains that can have explosive eruptions.

- **Location:** The Cascade Range stretches from northern California to Canada!
- **Type of Lava:** Thick and sticky! This lava traps gas, which leads to BIG eruptions.
- **Eruption Style:** BOOM! They can explode suddenly, like Mount St. Helens did, sending ash and rocks into the air.
- **Examples:** Mount St. Helens (Washington), Mount Rainier (Washington), Mount Hood (Oregon).

Hawaiian Volcanoes

These volcanoes are called *shield volcanoes*. They are wide and gently sloping, like a warrior's shield. They don't explode like Cascade volcanoes, but their lava flows for miles!

- **Location:** Hawaii!
- **Type of Lava:** Thin and runny! It flows down the volcano instead of trapping gas.
- **Eruption Style:** Ooze and flow! The lava spills over the edges, creating new land.
- **Examples:** Mauna Loa, Kilauea (one of the most active volcanoes in the world!).

Fun Facts!

- Hawaiian volcanoes create new land—this is how the Hawaiian Islands were formed!
- Cascade volcanoes help scientists study how explosions happen deep inside the Earth.
- Both types of volcanoes come from **magma** (hot, melted rock beneath the Earth's surface).
- There is a third type of volcano: **Cinder Cone Volcanoes** – These volcanoes are much smaller than the others and have steep, cone-shaped hills. They erupt in short bursts, throwing lava and rocks into the air. Over time, the lava cools and piles up into the cone shape. One example is **Parícutin** in Mexico, which grew from a farmer's field!

Hope this helps you understand the cool differences between these fiery mountains!

Disclaimer

Some ingredients and/or materials used might cause allergic reactions or health problems. You should ensure that you are fully aware of the allergies and health conditions of anyone making or consuming these products and taking part in the activities. If you have any concerns about your own or somebody else's health or wellbeing, always speak to a qualified health professional. Activities listed within the resource should always be supervised by an appropriate adult. Children should be supervised when using sharp items such as scissors or other tools. These activities may also involve the use of knives, hot water and kitchen appliances. It is your responsibility to assess risks and ensure the activity is safe for those participating. We will not be held responsible for the health and safety of those participating and cannot accept any liability. Children should be carefully supervised by a responsible adult at all times, especially when using any sharp items or when near a heat source. It is the responsibility of supervising adults to ensure the safety of children in their care.



Parent Guide

How can I use this with my children?

Use this fun experiment as part of a Mount St. Helens-themed activity day or as a one-off science experiment.

How does this help my children's learning?

Experimenting with materials helps your child to better understand the world around them and can help build curious minds. This experiment can also be a safe introduction to chemical reactions.

Ideas for further learning:

This experiment would pair well with an informative book or video aimed at your child's age and level of understanding.



Erupting Volcano Experiment

You will need:

Volcano Cone
Template

scissors

glue or sticky tape

plastic cup water

red or orange food
coloring

3 tsp baking soda

2 tsp

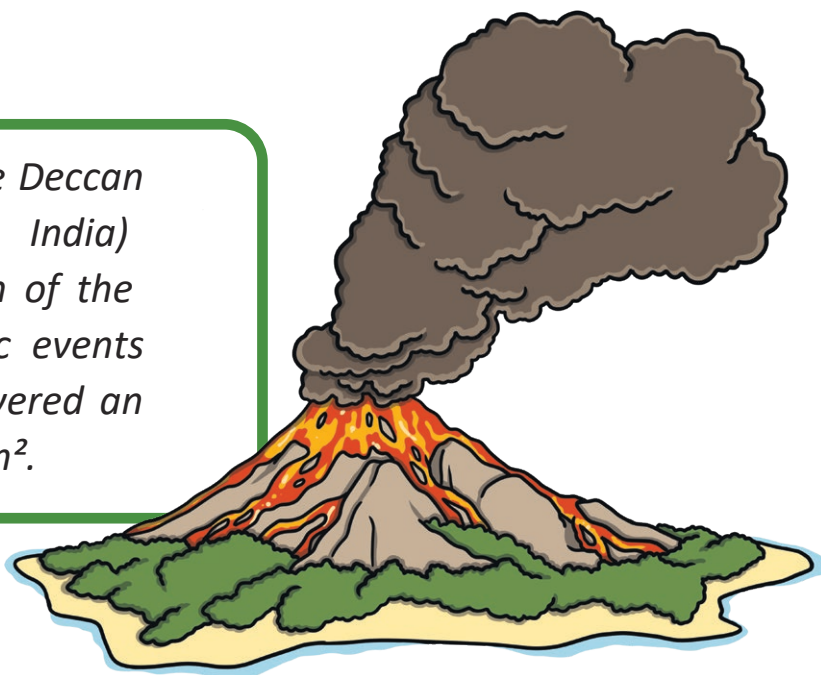
washing-up liquid

vinegar tablespoon

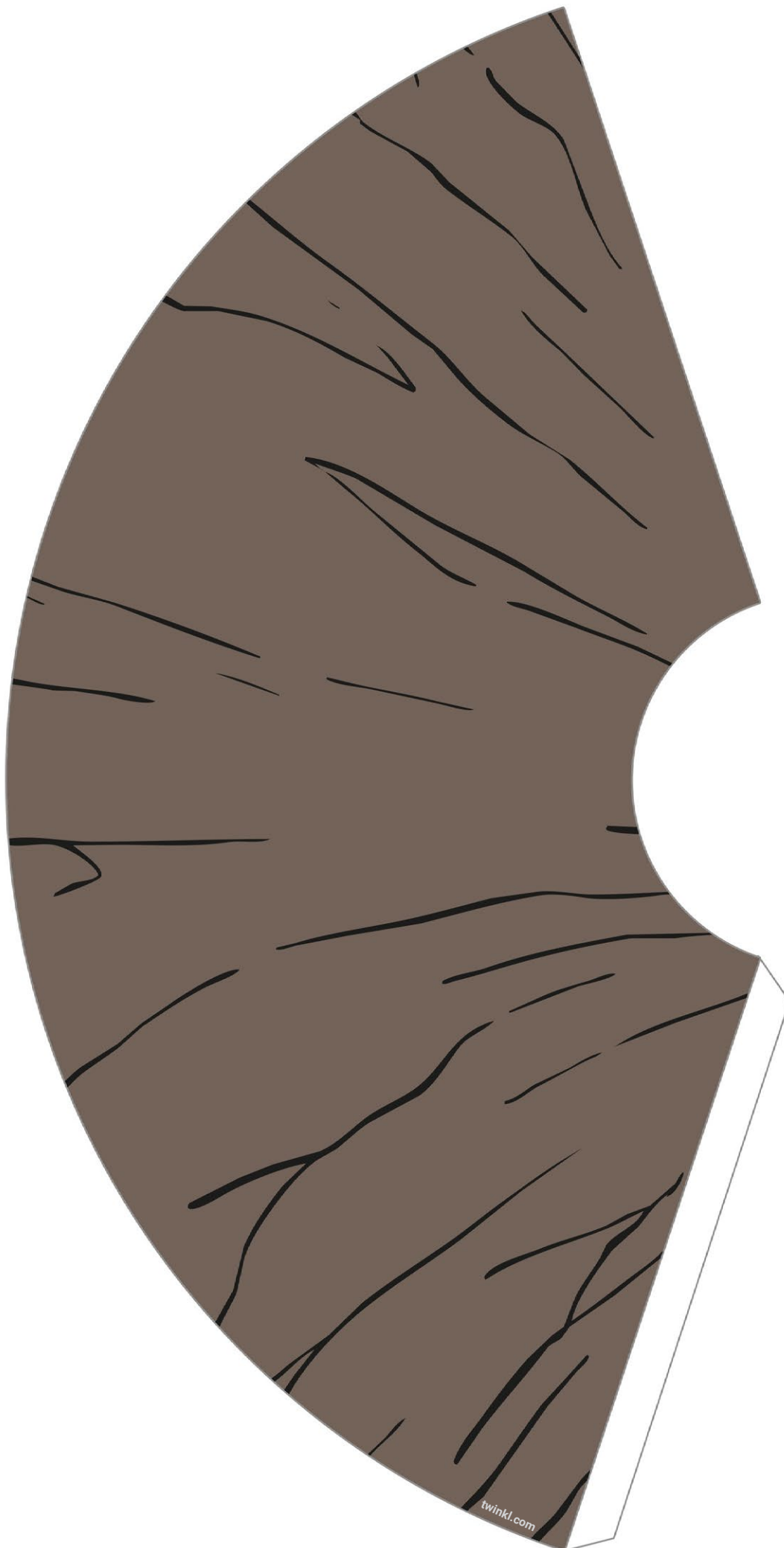
Method

1. Print, cut out and assemble the volcano cone by attaching the two flat sides together with glue or sticky tape, using the tab to provide the overlap for sticking.
2. Fill the cup halfway with water, add two or three drops of food coloring and stir in the baking soda.
3. Add the washing-up liquid to the cup.
4. Place the volcano cone over the cup.
5. Quickly, pour a tablespoon of vinegar into the cup through the top of the volcano cone.
6. Watch the eruption happen! Keep adding vinegar to the cup, a tablespoon at a time, until the reaction has finished.

Some scientists believe that the Deccan Traps (ancient lava flows in India) played a part in the extinction of the dinosaurs. A series of volcanic events here led to lava flows that covered an estimated area of 1.5 million km².



We hope the information on our website and resource is useful. However, some ingredients and/or materials used might cause allergic reactions, so if you have any concerns about your own or somebody else's health or wellbeing, always speak to a qualified health professional. Remember, activities listed within the resource should always be supervised by an appropriate adult.



Parts of an Erupting Volcano

crater:

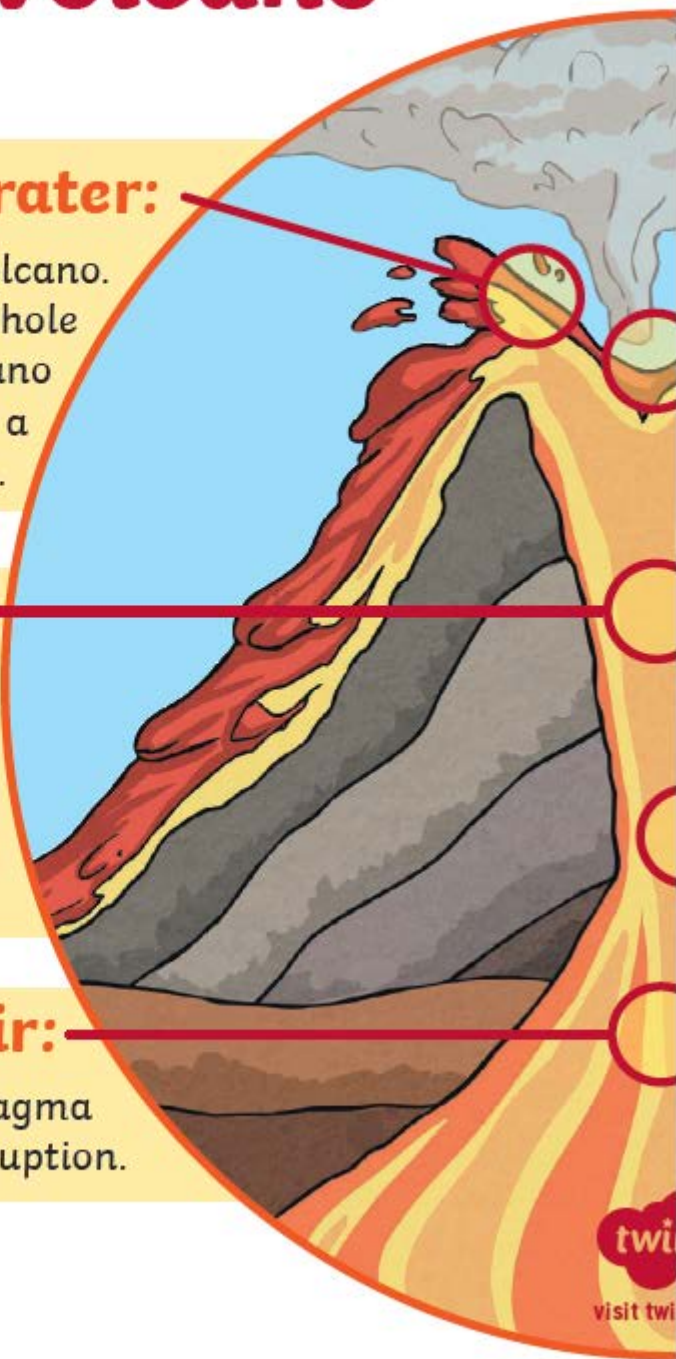
The mouth of the volcano.
It is a bowl-shaped hole
at the top of a volcano
that is formed as a
result of the explosion.

throat:

The entrance and
uppermost part
of the volcano.
It ejects lava and
volcanic ash.

magma reservoir:

A large chamber where magma
builds and pools awaiting eruption.





ash cloud:

Clouds of ash made of tiny particles of rock, volcanic glass, and other minerals are thrown into the air during a volcanic eruption. It can spread for hundreds of miles and bury surrounding areas in sometimes almost as much as seven feet of ash!

vent:

The location in the Earth's crust where gases from the inside of the volcano escapes. Molten rock and lava erupt from this opening.

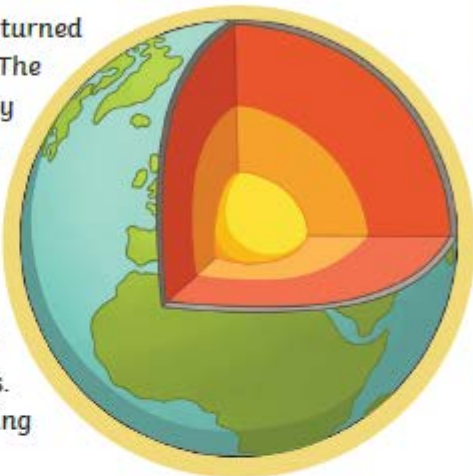
conduit:

An underground passage which magma travels through. Large volcanoes may have multiple conduits underground.

Volcanoes

What is our Earth made of?

Deep inside the Earth, our planet is made of four different layers. Geologists believe as the Earth formed, heavier materials sank to the middle of the Earth and lighter materials stayed on the outside. The two deepest layers of the Earth are called the "core." The inner core is a solid, dense, and heavy layer made up of iron and nickel. It is extremely hot and can reach temperatures of up to 10,000°F! The outer core is a liquid layer made up of molten iron and nickel. It is so hot in the outer core that the metals in this layer have turned into liquid. The third layer is called the "mantle." The mantle is the thickest layer. It is approximately 1,802 miles thick. It is made of solid magma, which is made of molten rock and minerals. When a volcano erupts, magma escapes. The final layer of the Earth is the "crust." This is a very thin layer. It is only about 20 to 50 miles thick. It is not a single, smooth layer, but instead broken into many different pieces, called plates. These pieces can rub against each other causing friction and pressure.

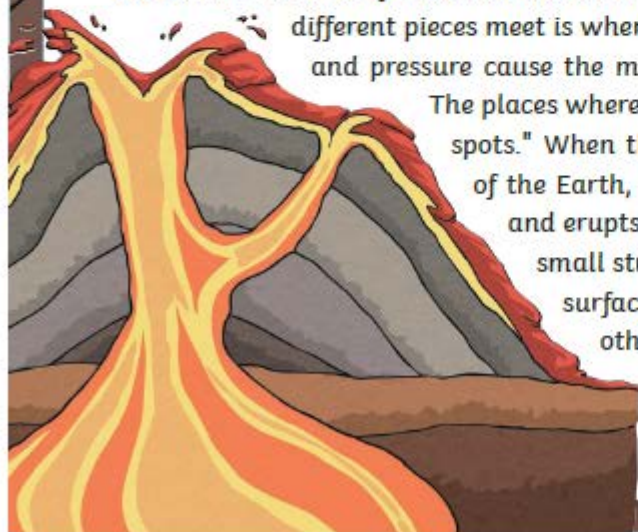


How are volcanoes formed?

The intense heat and friction created in the different layers cause a constant change in the Earth. The crust of the Earth is broken into different pieces. The gaps where these different pieces meet is where magma and gases escape. The high heat and pressure cause the magma to rise to the surface of the Earth.

The places where magma heats up and rises are called "hot spots." When there is a gap or a weak spot in the crust of the Earth, magma can break through to the surface and erupts. This eruption can be explosive or a single small stream. When magma breaks through to the surface, it is then called lava. Cinders, ash, and other gases also escape during this eruption.

As lava cools, it builds up, creating the steep slopes of mountains we associate with volcanoes.



Millions of people around the world live close to active volcanoes that can erupt at any time. Many of the world's volcanoes are located in a string around the Pacific Ocean, called the Ring of Fire. A large part of the danger of volcanic eruption is the lava that spews from the top of the mountain. However, the volcanic ash and gases that explode from the volcano can cause severe health problems and harm. Volcanic ash can travel hundreds of miles and contaminate water supplies, damage machinery, reduce visibility, and make it hard to breathe. In 79 B.C.E. Mount Vesuvius erupted near the Roman city of Pompeii. Many of the citizens living near the volcano were buried under the tons of

volcanic ash and debris that fell from the sky from the eruption. At the same time, volcanoes can also have many benefits to the local environment. When volcanoes erupt, many minerals are also ejected. These minerals can help plants and can make the soil surrounding the volcanoes very rich and fertile.



Questions

1. Which layer of the Earth is made up of liquid iron and nickel?
 - ☐ inner core
 - ☐ outer core
 - ☐ mantle
 - ☐ crust
2. The crust of the Earth _____.
 - ☐ is the thickest layer of the Earth
 - ☐ is smooth and made of a single, connected piece
 - ☐ is made of solid magma
 - ☐ is broken up and made of multiple pieces
3. When volcanoes erupt, _____.
 - ☐ magma cools and solidifies in the magma chamber
 - ☐ magma slowly rises to the surface of the Earth and escapes in gaps in the crust
 - ☐ ONLY explosive eruptions occur
 - ☐ the Earth's core explodes, causing magma to quickly rise through the layers of the Earth
4. How can volcanoes be beneficial?
 - ☐ Minerals ejected can help plants.
 - ☐ The smoke from volcanoes is good to breathe.
 - ☐ Volcanic ash helps tree grow.
 - ☐ Lava helps crops grow quicker.
5. What is the main idea of this text?

6. What can you infer from this text about living close to a volcano?

Answers

1. Which layer of the Earth is made up of liquid iron and nickel?

- ☐ inner core
- ☒ **outer core**
- ☐ mantle
- ☐ crust

2. The crust of the Earth _____.

- ☐ is the thickest layer of the Earth
- ☐ is smooth and made of a single, connected piece
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3. When volcanoes erupt, _____.

- ☐ magma cools and solidifies in the magma chamber
- ☒ **magma slowly rises to the surface of the Earth and escapes in gaps in the crust**
- ☐ ONLY explosive eruptions occur
- ☐ the Earth's core explodes, causing magma to quickly rise through the layers of the Earth

4. How can volcanoes be beneficial?

- ☒ **Minerals ejected can help plants.**
- ☐ The smoke from volcanoes is good to breathe.
- ☐ Volcanic ash helps tree grow.
- ☐ Lava helps crops grow quicker.

5. What is the main idea of this text?

Possible answer: Volcanoes are caused by the pressure of magma building up underneath the Earth. When volcanoes explode, they can cause extensive damage.

6. What can you infer from this text about living close to a volcano?

Possible answer: Living close to a volcano can be dangerous because of the ash, lava, and smoke that can erupt from a volcano.