## Volcanoes



http://kids.discovery.com/games/build-play/volcano-explorer

## What will you find out?

- What a volcano is
- Why volcanoes erupt
- The different types of volcanoes there are
- The difference between lava and magma
- How many volcanoes there are
- What the ring of fire is
- Pompei

#### Did you know?

 The word "volcano" comes from the little island of Vulcano in the Mediterranean Sea off Sicily. Centuries ago, the people living in this area believed that Vulcano was the chimney of the forge of Vulcan -- the blacksmith of the Roman gods. They thought that the hot lava fragments and clouds of dust erupting from Vulcano came from Vulcan's forge as he beat out thunderbolts for Jupiter, king of the gods, and weapons for Mars, the god of war.



### What is a volcano?

Volcanoes are dramatic evidence of the powerful forces at work inside the Earth. Eruptions of ash, gas and lave destroy entire cities and kill large numbers of people.

> Volcanoes are like giant safety valves that release the pressure that builds up inside the Earth.

A volcano is a mountain that opens downward to a pool of molten rock below the surface of the earth. When pressure builds up, eruptions occur. Gases and rock shoot up through the opening and spill over or fill the air with lava fragments.

Deep in the earth it is very hot. It is so hot that rocks melt. The melted rock is called magma. The magma is lighter than the rocks around it so it rises. Sometimes it finds a crack or hole in the earth's crust and bursts through. This is how a volcano begins.



Eruptions can cause lateral blasts, lava flows, hot ash flows, mudslides, avalanches, falling ash and floods. Volcano eruptions have been known to knock down entire forests. An erupting volcano can trigger tsunamis, flash floods, earthquakes, mudflows and rock falls.

## What causes volcanoes to erupt?

- The Earth's crust is made up of huge slabs called **plates**, which fit together like a jigsaw puzzle. These plates sometimes move.
- The friction causes earthquakes and volcanic eruptions near the edges of the plates. The theory that explains this process is called plate tectonics.



•Between the Earth's crust and the mantle is a substance called **magma** which is made of rock and gases.

•When two plates collide, one section slides on top of the other, the one beneath is pushed down. **Magma** is squeezed up between two plates.

### What are plate tectonics?

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The theory of plate tectonics is a interesting story of continents drifting from place to place breaking apart, colliding, and grinding against each other. The plate tectonic theory is supported by a wide range of evidence that considers the earth's crust and upper mantle to be composed of several large, thin, relatively rigid plates that move relative to one another. The plates are all moving in different directions and at different speeds. Sometimes the plates crash together, pull apart or sideswipe each other. When this happens, it commonly results in earthquakes.



As well as the danger from the hot lava, an erupting volcano can trigger are life threatening things.

- tsunamis
- flash floods
- earthquakes
- mud flows
- rock falls.









## Effect of Volcanoes on people and the environment

- Volcanoes can have a very serious effect on the lands and people around them when they erupt.
- Buildings are destroyed and people are made homeless.
- People are killed.
- Clouds of ash cover plants making them inedible.
- Poisonous gases kill people and animals.
- Dust causes pneumonia and illnesses to the survivors.
- Dark skies, severe winds and heavy rains may follow an eruption for months afterwards.

- One in 10 people in the world live within 'danger range' of an active volcano.
- People can get used to living near a volcano, but it is always a little dangerous. Scientists have estimated that at least 200,000 persons have lost their lives as a result of volcanic eruptions during the last 500 years.
- People set up homes on the slopes of volcanoes because of the rich, fertile soil produced.

### Types of Volcanoes and the Shapes of Volcanoes

- There are 3 different types of volcanoes:
- Active eruptions can be anytime and often.
- **Dormant** has been a while since it has erupted, but could at anytime.
- Extinct, meaning it hasn't erupted in a very long, long time so it probably won't ever again.



Mount Fuji in Japan is a dormant volcano

# How many different shapes of volcano are there?



This **cinder cone** in western Nicaragua has a name that means "black hill

The type of magma in the earth creates **four** different types volcanoes:

- 1. shield volcanoes
- 2. composite volcanoes
- 3. cinder cones
- 4. lava domes

## Shield Volcano - flat

- Volcanoes that build up from many slow, steady, flows of hot lava, are called shield volcanoes.
- If the magma is runny, the gas can escape easily and there will not be an explosion. The magma just comes out of the mountain and flows down the sides.
- Shield volcanoes are a type of volcano given their name for their broad gently sloping profile which looks like a warrior's shield.
- Examples include the volcanoes in Hawaii and Mount Etna.



## Composite Volcano - tall and thin

- If the magma is thick and sticky (like honey), the gas cannot escape, so it builds up and up until it explodes sending out huge clouds of burning rock and gas.
- Composite volcanoes are steep-sided volcanoes composed of many layers of volcanic rocks, usually made from thick sticky lava, ash and rock debris (broken pieces).
- Composite volcanoes are also known as strato-volcanoes.
- Examples include Mount Fuji in Japan, Mount Cotopaxi in Ecuador, Mount Shasta and Lassen in California, Mount Hood in Oregon, Mount St. Helens and Mount Rainier in Washington and Mt. Etna in Italy



## Cinder cones

• Cinder cones are circular or oval cones built from erupting lava that breaks into small pieces as it shoots into the air. As small pieces fall back to the ground, they cool and form cinders around the vent.





## Lava domes



Lava domes are formed when erupting lava is too thick to flow and makes a steep-sided mound as the lava piles up near the volcanic vent. The eruption of Mount St. Helens in 1980 was caused in part by a lava dome shifting to allow explosive gas and steam to escape from inside the mountain.

#### What is the Ring of Fire?



 The Pacific Ring of Fire is an area of frequent earthquakes and volcanic eruptions encircling the basin of the Pacific Ocean. The Ring of Fire has 452 volcanoes and is home to over 50% of the world's active and dormant volcanoes. Ninety percent of the world's earthquakes and 81% of the world's largest earthquakes occur along the Ring of Fire.

## Pompeii (79AD)





On August 24, 79AD Mount Vesuvius literally blew its top, erupting tonnes of molten ash, pumice and sulfuric gas miles into the atmosphere. Pyroclastic flows flowed over the city of Pompeii and surrounding areas.

## Pompeii (79AD)

Pyroclastic flows of poisonous gas and hot volcanic debris engulfed the cities of Pompeii, Herculaneum and Stabiae suffocating the inhabitants and burying the buildings.





## Pompeii (79AD)



The cities remained buried and undiscovered for almost 1700 years until excavation began in 1748. These excavations continue today and provide insight into life during the Roman Empire.



#### Further information about volcanoes

- <u>http://www.woodlands-</u> junior.kent.sch.uk/Homework/mountains/volcanoes.htm
- <u>http://www.bbc.co.uk/science/earth/natural\_disasters/volcano</u>
- <u>http://www.weatherwizkids.com/weather-volcano.htm</u>
- <u>http://kids.discovery.com/games/build-play/volcano-explorer</u>
- <u>http://vulcan.wr.usgs.gov/Outreach/AboutVolcanoes/what\_is\_a\_volcan</u>
  <u>o.html</u>
- general-facts-about-volcanoes
- <u>http://www.learner.org/interactives/volcanoes/entry.html</u>
- <a href="http://volcano.oregonstate.edu/volcano\_table">http://volcano.oregonstate.edu/volcano\_table</a>
- <u>http://kids.nationalgeographic.com/kids/games/puzzlesquizzes/quizyou</u> <u>rnoodle-volcanoes/</u>