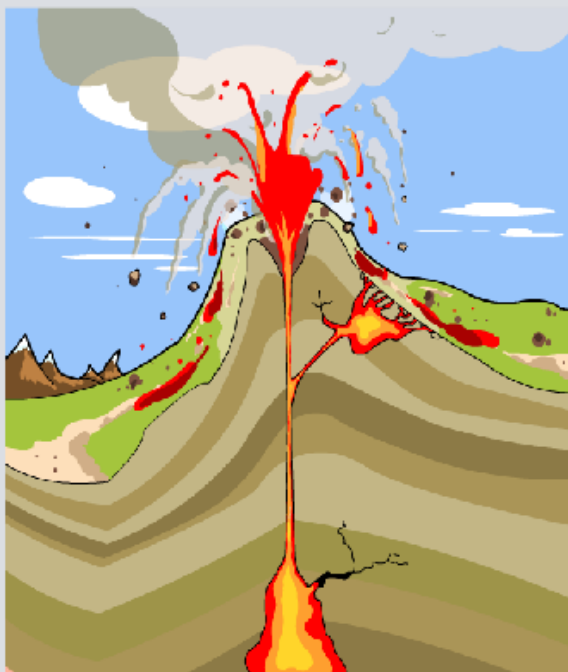
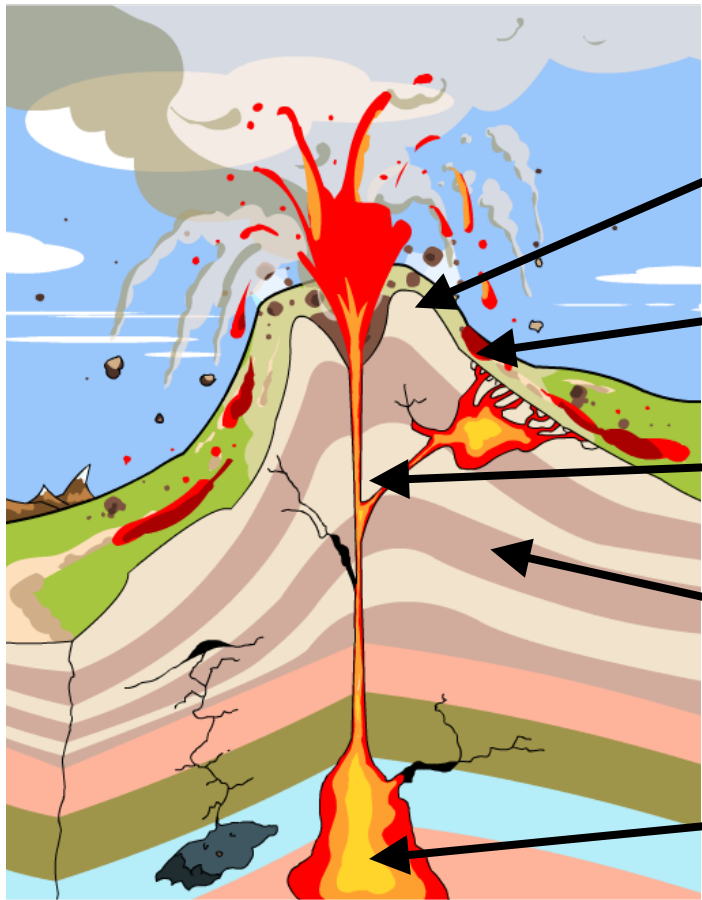


Volcanoes



How are volcanoes formed?

Volcanoes form where molten rock (**magma**) from the mantle pushes upwards through weaknesses in the Earth's surface. Magma that reaches the surface is known as **lava**.



crater

lava

central vent

strata (layers)

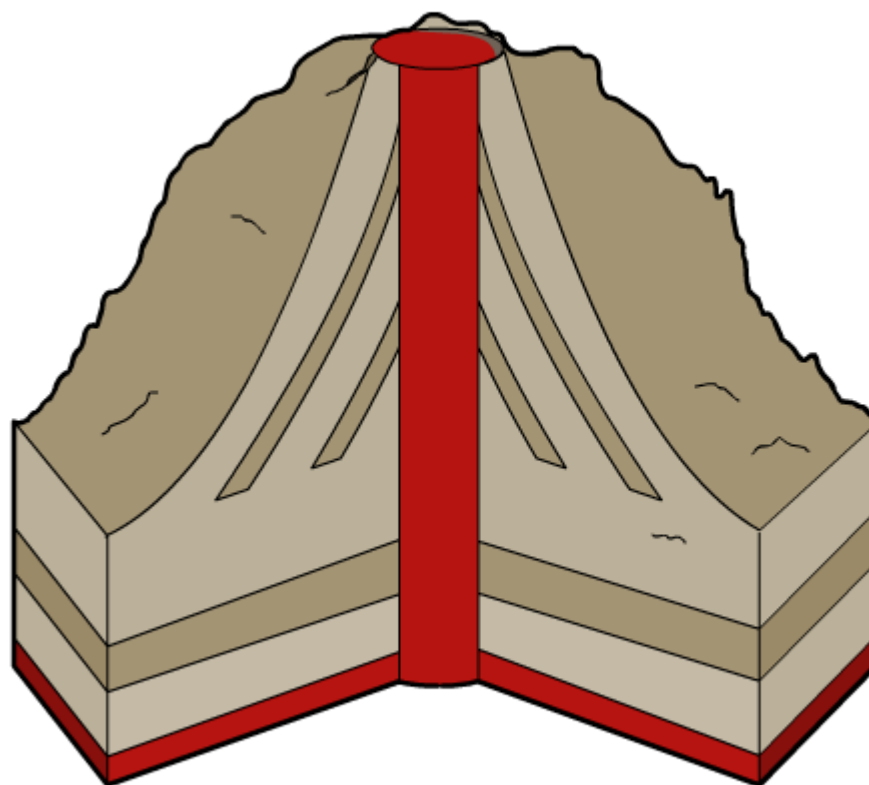
magma chamber

What are the common types of volcano?

You might be surprised to learn that geologists have identified at least 26 different types of volcano.

Some types of volcano are easy to recognize and some are not.

Click "**start**" to find out about the characteristic features of the three most common types of volcano.



start



What happens when magma cools?

As magma from the Earth's mantle cools, it solidifies and crystallizes to form igneous rocks. **Granite**, **basalt** and **obsidian** are examples of igneous rocks.

Rocks formed when expelled lava cools on the Earth's surface are called **extrusive** igneous rocks.

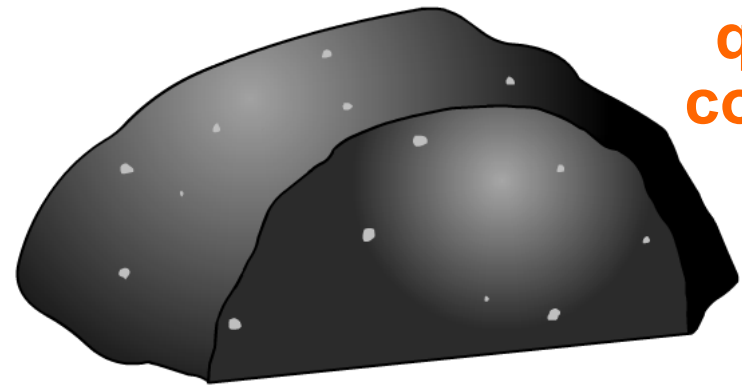
When magma cools below the Earth's surface, **intrusive** igneous rocks are formed.



How does cooling affect crystal size?

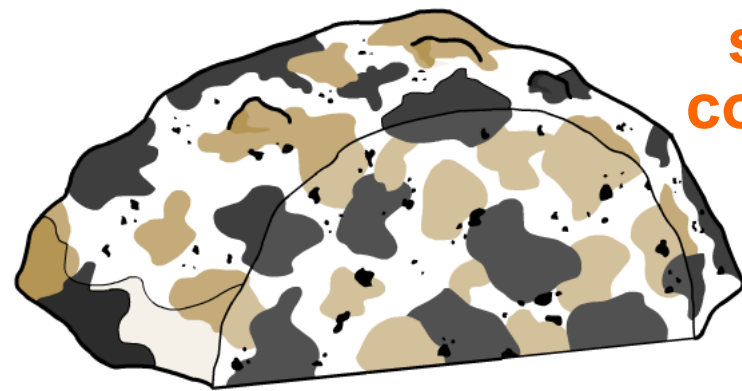
Magma is full of minerals that turn into crystals under the right conditions. The size of the crystals in an igneous rock is related to the rate at which the molten magma cools.

If magma cools **quickly**, the crystals do not have very much time to form and so are **small** in size. **Basalt** has small crystals.



**quick
cooling**

On the other hand, if magma cools **slowly**, the crystals have more time to grow and so are **large**. **Granite** has large crystals.



**slow
cooling**

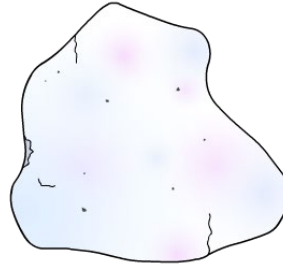


How are different igneous rocks formed?

Are these igneous rocks formed by quick or slow cooling?

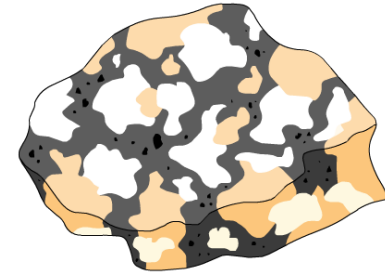
Rocks from
low-silica lava

rhyolite



quick cooling

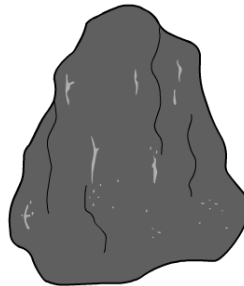
granite



slow cooling

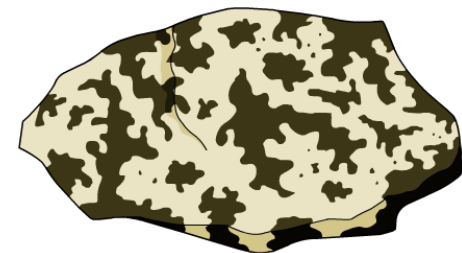
Rocks from
high-silica lava

basalt



quick cooling

gabbro



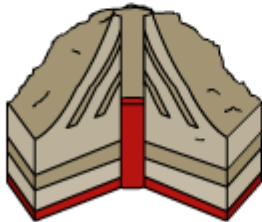
slow cooling

How can volcanic eruptions be predicted?

Volcanic eruptions can be a huge threat to humans.

Scientists use a number of different indicators to try and predict when a volcano might erupt.

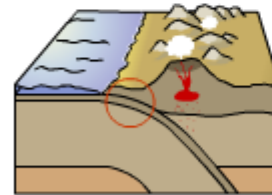
Click on each factor below to find how it can be used in predicting eruptions.



**volcano
shape**



**water
levels**



earthquakes



emissions



Why are predictions hard to make?

Scientists who study volcanoes are called **volcanologists**.

They are skilled at monitoring the changes in active volcanoes that can indicate when an eruption might occur.

Monitoring equipment is very expensive and there are not enough resources to observe every active site in the world.

This means that volcanologists cannot always pinpoint exactly when an eruption will happen.



Can volcanoes have benefits?

Volcanoes can be extremely destructive but they are also a creative force.

When volcanic lava cools and solidifies, new land mass is created.

The lava is weathered and breaks down into a fine soil, which is often very fertile.

Volcanoes also produce and transport igneous rocks, which are useful building materials.

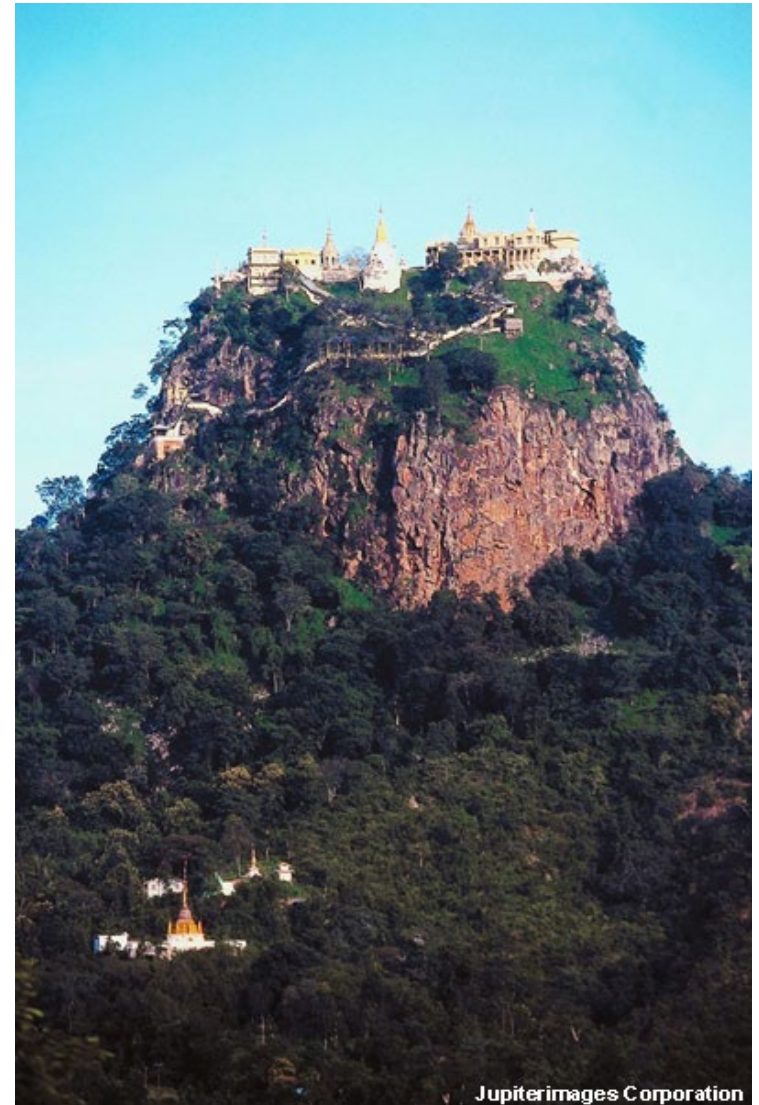


Why do people live at plate boundaries?

Many people chose to live in areas where earthquakes or volcanic eruptions are a threat, despite the risks involved.

Why might people do this?

- The soil is often more fertile.
- The area attracts tourists.
- Power is easily obtained from geothermal vents.
- Their culture or religion is based around the area and they do not want to leave.



How can geothermal energy be used?



Iceland sits on the boundary of the mid-Atlantic tectonic plates.

A plate boundary is not always a peaceful place, but its location does provide an endless supply of energy.

Icelanders use hot water directly from the Earth to heat their homes and businesses.

The hot water is stored in huge tanks on one of Reykjavik's few hills. Gravity is then used to distribute the water to the city.