Reading Comprehension

Text and Questions

Miss Wiseman's group

Volcanoes

What is a Volcano?

A volcano is an opening on the Earth's surface, where molten (liquid) rock is spewed out from under the ground. They can appear as cone-shaped mountains or as wide sloping hills, some even occur under the sea. Volcanoes have helped to shape much of the Earth's surface.

Why do they happen?

Is the ground beneath your feet solid? You would think so wouldn't you! However, the surface of the Earth is like a giant 3D jigsaw puzzle. These enormous puzzle pieces, called tectonic plates, fit together tightly. The magma, which forms under this layer, or crust, is under so much pressure it is almost solid. As the plates move, the pressure is released, allowing the magma to melt and bubble up through the gap, as a volcano.

Why do volcanoes erupt?

There are 500 active volcanoes around the world and about 60 of these will erupt each year. Even as you read this, there could be at least 10 volcanoes blowing their top! An eruption happens when magma collects inside the magma chamber, deep below the volcano. Slowly, the pressure builds up and the magma rises up the crater pipe to the surface. Eventually it gushes upwards, forcing its way out. Once magma has escaped the volcano, it is called lava.

Did you know that not all volcanoes are the same?

What kind they are, depends on how they erupt! Shield volcanoes produce a hot, runny lava, which flows from the volcano's vents. The lava spreads over a wide area, helping to create a gently sloping volcano. Their eruptions are known as *Hawaiian eruptions*. When a cinder cone volcano erupts, hot ash, lava and rocks shoot high into the air, creating tall, steep slopes with a crater on the top. These eruptions are called *Strombolian eruptions.* A stratovolcano is made by big, blasting explosions. Lava, rock and ash explode out of the volcano, coating the sides of the mountain. This destructive eruption is known as a *Plinian eruption (*named after Pliny the Elder, who died helping people escape the eruption of Mount Vesuvius in AD 79).

So what makes a volcano so deadly?

Lava flows – These are extremely dangerous. They can knock down buildings, bury objects and set light to flammable materials. However, most lava flows travel slower than walking pace, so people and animals have a good chance of escaping.

Ash – This can be deadly. It feels like finely crushed glass, and is often scorching hot. This settles over huge areas, making it difficult for people and animals to breathe.

Gas – Carbon dioxide and sulphur dioxide can be blasted out of an erupting volcano. As carbon dioxide is heavier than air, it can settle in low-lying areas, creating a poisonous environment. Sulphur dioxide causes acid rain and air pollution.

Lahars – These devastating mudflows are caused by hot volcanic materials combining with water, snow or ice on volcanic slopes. They slide down the slopes, ripping houses and trees from the ground.

Pyroclastic flow – When large amounts of ash and gas explode out of the volcano, deadly pyroclastic flows can occur. Temperatures inside the flow can reach hundreds of degrees Celsius. These destructive flows of boiling gas and ash, travel at terrifying speeds, destroying everything in their path. The pyroclastic flow from Mount Pelée in 1902, completely destroyed the town of Saint-Pierre, in Martinique. Almost every person in the town died.

Active, dormant or extinct?

An active volcano is one which is erupting currently, or seems likely to erupt soon. Scientists state that an active volcano must have erupted during the last 10,000 years. A dormant volcano could be described as sleeping, because it is still active, but not erupting at the moment. If a volcano has not erupted during the last 10,000 years, then it can be classified as an extinct volcano, however experts can't be completely sure that it will never erupt again!

How deadly can a volcano be?

We tend to think that volcanoes only affect nearby towns and villages, however it is possible for just one volcano to have a big impact on the Earth and its climate. In April 1815, the Indonesian volcano Tambora erupted. The ash column from Tambora reached a staggering height of 43 kilometres. Wind helped to spread the ash and gases around the world. The following year, 1816, was known as 'the year without a summer'. North America, northern Europe and China suffered frosts and snowstorms throughout the months of May and June. Crops couldn't grow so thousands of people starved, or became so weak that they caught diseases. Over 90,000 people died.

Can the power of an eruption be measured?

The power of an eruption is measured on the VEI scale. This stands for Volcanic Explosivity Index. This is based on the amount of material erupted from a volcano, and the height of the ash column. The VEI scale is made up of 8 stages in total, with stage 1 being a 'gentle' eruption and stage 8 being classed as a 'mega colossal' eruption! Tambora had a VEI of 7 (super-colossal), Mount Vesuvius had a VEI of 4, meaning 'cataclysmic'! Scientists believe that a VEI 8 eruption happens once every 100,000 years. These are called super-eruptions! The last super-eruption happened in Indonesia, over 74,000 years ago, when Toba erupted. This eruption nearly wiped out the human population. So when and where will the next super-eruption happen? Yellowstone National Park in the USA may be next, as it has seen three super-eruptions over the last two million years!

Can we predict when a volcano will erupt?

Scientists who study volcanoes are called volcanologists. They use special equipment to measure how much gas is building up inside a volcano. They know that an increase in sulphur dioxide may mean that fresh magma is near the surface, so an eruption could happen soon. Scientists also measure vibrations in the ground, which occur just before an eruption. The study of old lava flows help provide evidence of the frequency and size of past eruptions. Scientists cannot prevent volcanoes from happening, but they can predict when a volcano might erupt and with what force, helping people to escape in time!

Can volcanoes help us?

Millions of people live near active volcanoes. They live with the constant threat of an eruption occurring at any time. However, there are many benefits to living close to a volcano. Volcanic soil is very fertile, making it ideal for growing crops. The heat from the ground can also be used to power homes. Power stations pump water into the ground, allowing the extremely hot rocks to heat it up. The hot water is used to heat homes, whilst the steam is used to drive turbines and generators in order to make electricity. This power source is used very successfully in Iceland. Volcanoes can also boost tourism in an area. The Roman city of Pompeii, buried during the eruption of Mount Vesuvius, attracts 2.5 million tourists a year, providing a good source of income for the local people.

Did you know?

Lava erupts at temperatures of up to 1200°c.
About 60 million years ago, an underwater volcano poured out so much lava it made new land - we know this land as Iceland!
Volcanoes can even be found in space! Astronomers have discovered volcanoes on Venus and Mars.
Mount Etna in Italy is Europe's highest active volcano.

Glossary

acid rain	rain made acidic by the mixing of sulphur in the air
carbon dioxide	a gas which is absorbed by plants but dangerous in large amounts
crater pipe	a tube connecting a magma chamber to the surface
crust	the outermost solid layer of the Earth, between 5 and 50 kilometres thick
generator	a machine that converts one form of energy into another
income	the amount of money received in exchange for goods or services
magma	melted rock beneath the Earth's surface that becomes lava when it flows out of a volcano
magma chamber	hollow space underground where magma collects
sulphur dioxide	a gas which smells of rotten eggs, it causes acid rain and can make it difficult to breathe
turbine	a machine for producing power in which a rotor fitted with blades is made to revolve
vent	openings in the Earth's surface that allows molten rock and gases to escape

Questions

1. What is the surface of the Earth like?

2. How many active volcanoes are there around the world?

3. What is magma?

4. Are all volcanoes the same?

5. Why are lava flows dangerous?

Questions

6. Why is 'blasted' a good word to describe how gases can be erupted out of a volcano?

7. How did the eruption of Tambora in 1815 manage to affect so much of the Earth?

8. Why do you think so many people died after Tambora erupted??

9. What is a VEI 8 eruption classed as?

10. What is the name of a scientist who studies volcanoes?