







Copyright © 2012 Board of Trustees of Te Aho o Te Kura Pounamu, Private Bag 39992, Wellington Mail Centre, Lower Hutt 5045, New Zealand. All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means without the written permission of Te Aho o Te Kura Pounamu. Volcanoes do not happen in every country. We have to look at how the world is made to find out why.

The Earth's crust is not in one piece. It is made up of huge pieces of rock called **plates**. These plates float on a layer of hot rock.

New Zealand sits right on top of where two plates meet and push up against each other. The Indo-Australian plate is moving one way. The Pacific plate is moving against it.

On the edge of these plates is the Ring of Fire. This is where most volcanic activity occurs. That is why New Zealand has so many volcanoes.





New Zealand has many volcanoes.

Most of the volcanoes are in the North Island.

The most active volcanoes are Mount Ruapehu, Mount Tongariro, Mount Ngauruhoe and White Island.

Auckland has 49 separate volcanoes, which are thought to be extinct.

The last eruption was Rangitoto, around 500 years ago.

Look on the map of New Zealand to take a close look at where these volcanoes are located.

Which major cities are near these volcanoes?

Do you live close to a volcano?





Mount Ngauruhoe

This is a volcano in the middle of the North Island. Sometimes you can see smoke coming from the top.

White Island

This is a volcano in the sea in the Bay of Plenty. You can often see steam coming from the top.





Mount Eden, One Tree Hill These Auckland hills were once active volcanoes.

Lake Taupo

The water in this lake fills an enormous hole. The hole was made when a volcano blew up a very long time ago.



What makes a volcano?

A volcano is a mountain that opens downward to a pool of molten rock (magma) below the surface of the Earth.

It is a hole from which molten rock and gas erupt.

We have to know about the inside of the Earth to find out how this all happens.





The Earth is made up of layers of rock like this.

The middle of the Earth is the core. The **Inner Core** is solid iron. The **Outer Core** is liquid iron.

The next layer is made up of hot rock. This is called the **Mantle**. In some places the rock gets so hot it melts and some gas is made. The mixture of melted rock and gas is called **magma**.

The thin outside layer is called the **Crust**. The land we live on and the sea are the top part of this crust. Sometimes the magma rises to the Earth's crust. It finds a weak place and bursts through. That is how a volcano is made.



The diagram shows the magma pushing against the Earth's crust. It bursts through a hole called a vent and out of the crater at the top.

The gas escapes into the air. The melted rock runs down the sides. It is called **lava**.

When this happens we say it is an eruption.

Volcanoes erupt in different ways.

Some volcanoes send out a lot of lava. Some send out dust, ash and rocks. All of them send out a lot of steam.

Different kinds of eruptions make different shaped volcanoes.

Some volcanoes are shaped like Mount Ngauruhoe. Mount Ngauruhoe has erupted many times. Most of the eruptions threw out rocks and ash. Some threw out lava. Each eruption added a new layer to make the mountain the size and shape it is today.



Undersea volcanoes

White Island is an undersea volcano. Undersea volcanoes are made in the same way as the ones on land, but they start on the sea floor.

The volcano begins on the sea floor. It grows bigger each time it erupts until a new volcanic island is formed.

There are many volcanoes under the sea, but they are not all big enough to show above water.

White Island is New Zealand's most **active** volcano. An active volcano is one that might erupt at any time.





Extinct volcanoes

Not all volcanoes are active. Some are **extinct**. That means that scientists think the pool of magma has gone from the volcano and it will not erupt again.

Auckland has 49 extinct volcanoes. One Tree Hill and Mount Wellington are two of these volcanoes. They look like ordinary hills now. Thousands of years ago they were active volcanoes. You cannot see all of Auckland's volcanoes because the rock has been taken away and used.

You can see Rangitoto in the harbour. It was the last of Auckland's volcanoes to erupt. That happened 500 years ago.



One of the biggest eruptions in the world happened about 2000 years ago where Lake Taupo is now. At the time Taupo was just a very small lake. A volcano near it erupted.

The eruption was so powerful that:

- rocks, ash and pumice were thrown 50 km up into the air and were spread out across the land for 90 km around the volcano.
- the burning gas and hot lava shot out as fast as a jet plane
- the shock wave flattened trees and killed all living things.



Scientists say there is still a vent under Lake Taupo today. Along the shores of Lake Taupo hot mineral water comes onto the shore. Perhaps Lake Taupo will erupt again one day. A separate workbook accompanies this reading booklet.

You can choose to complete activities after reading each section of the booklet or at the completion of the whole booklet.

You are encouraged to read the booklet several times to increase your comprehension.

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GNS Science photo library Mt Nguauhoe pyroclastic eruption © Lloyd Homer GNS Science. Whakaari (White Island) erupting © Lloyd Homer GNS Science. Crater of Mt Wellington, Auckland region. © Lloyd Homer GNS Science.

