Volcano lesson plan

In this lesson, students develop their understanding of major volcano types and their defining features.

Students investigate active volcanoes around the world and demonstrate ways to prepare for and respond to eruptions. Students explore historical volcanic eruptions and evaluate the impact of these on people and the environment.

Australian Curriculum: Science, Geography
UPPER PRIMARY / LOWER SECONDARY

ITEMS

- Teacher lesson plan
- Student assignments
- About volcanoes
- Real life stories
- Volcanoes: Be prepared
- Related links
Contents

Lesson plan 2

About volcanoes 4

Volcanoes: Be prepared 7

Student assignment: Investigating volcanoes 10

Student assignment: Types of volcanoes 12

Student assignment: My volcano project 13

Real life stories 14

Related links 15
Volcano lesson plan

Objectives

Participating in this lesson will enable students to:

- identify the five major types of volcanoes and describe their features
- make connections between earthquakes and volcanic eruptions
- communicate ways to prepare for and respond to volcanic eruptions
- locate active volcanoes around the world and describe their proximity to Australia.

Learning areas

YEAR 6 SCIENCE

ACSSU096  Sudden geological changes and extreme weather events can affect Earth’s surface
ACSHED098  Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena and reflects historical and cultural contributions
ACSHED100  Scientific knowledge is used to solve problems and inform personal and community decisions

YEAR 8 GEOGRAPHY

ACHGK042  Causes, impacts and responses to a geomorphological hazard
ACHGSO55  Develop geographically significant questions and plan an inquiry
ACHGSO56  Evaluate sources for their reliability and usefulness and select, collect and record relevant geographical data and information
ACHGSO57  Represent data in a range of appropriate forms
ACHGSO58  Represent spatial distribution of different types of geographical phenomena
ACHGSO59  Interpret geographical data and other information using qualitative and quantitative methods
ACHGSO60  Apply geographical concepts to draw conclusions
ACHGSO61  Present findings, arguments and ideas in a range of communication forms selected to suit a particular audience and purpose

REQUIRED RESOURCES

- Computers with internet access
- ‘Investigating volcanoes’ activity sheet
- ‘Types of volcanoes’ activity sheet
- ‘My volcano project’ activity sheet
Lesson steps

Activities: Investigating volcanoes; Types of volcanoes
Individually, in pairs or in small groups, students to read the information on the About volcanoes and Be prepared pages, paying particular attention to:

1. the five main types of volcanoes
2. eruption warning signs
3. the different types of hazards that a volcanic eruption causes.
4. what to do in the event of an eruption.

Students should then complete the ‘Investigating volcanoes’ activity sheet. Students could also complete the ‘Types of volcanoes’ activity sheet.

My volcano project
Students can complete this activity individually or in pairs. Provide students with ‘My volcano project’ activity sheet. They are to complete the tasks on volcano dangers listed on their sheet according to instructions provided.
About volcanoes

Volcanoes can pose many hazards but not only in the immediate vicinity of an eruption. Volcanic ash can be a threat to aircraft; in particular those with jet engines where ash particles can stick to turbines and erode the compressor blades.

A volcano forms when a break in the earth’s crust allows magma and hot gas to reach the surface. The magma and hot gases are under extreme pressure, resulting in dangerous eruptions.

Large eruptions can affect temperature as ash and droplets of sulfuric acid obscure the sun and cool the earth’s lower atmosphere or troposphere. They also absorb heat radiated up from the Earth, thereby warming the stratosphere.

Volcanoes come in all different shapes and sizes. Some volcanoes have very steep sides that have been caused by the piling up of volcanic material over time, whilst others have shallow slopes from very runny lava.

Volcanoes can also look like depressions in the ground which are formed when underground explosions cause the land to sink.

How many?

There are over 1500 potentially active volcanoes worldwide, and eight to ten could be erupting at one time. There are also many more dormant and under ocean volcanoes around the world.
Types of volcanoes

There are many types of volcanoes – here are five major types:

- Caldera – a large depression in the earth that is created when a volcano collapses.
- Cinder cone – a volcano that is built from blobs of lava that are ejected from a single vent.
- Shield volcano – a low volcano that builds up from countless outflows of fluid lava.
- Stratovolcano – volcanoes that are made up of layers of ash, lava and volcanic debris.
- Lava dome – large mounds that form from lava that piles up around a vent.

Where?

Although the vast majority of volcanoes in Australia are extinct, scientists believe further minor volcanic activity is possible from long dormant ones in South Australia and Victoria.

There are two active volcanoes in the Australian Antarctic Territories of Heard Island and McDonald Island. The bigger of these two volcanoes is called Big Ben (2750 m). The volcano on McDonald Island is an active volcano, having erupted for the first time in 1992 and again in August 2005.

The Ring of Fire
The image above shows that about 80 per cent of the world’s volcanoes form a circle around the Pacific Ocean in a belt known as the ‘Ring of Fire’.

In the Australian region, the ‘Ring of Fire’ volcanoes in Indonesia and the Philippines have erupted as recently as 1982 when the Galunggung volcano in West Java caused the engines of a passenger plane to stop as it was flying towards Australia.

In 1991, Mt Pinatubo in the Philippines erupted threatening the lives of a million people. A giant ash cloud rose 35 km into the sky. The Philippines authorities were able to evacuate 60,000 people from the slopes and valleys, and the American military evacuated 18,000 people from a nearby base.

**Our closest neighbours**

In Papua New Guinea, two volcanoes, Vulcan and Tavurvur, erupted and literally buried the town of Rabaul under millions of tonnes of ash, resulting in 80,000 people becoming homeless.

In New Zealand, Mt Ruapehu erupted in late 1995 and again in June 1996, closing ski fields, causing floods from its crater lake and interrupting air traffic in the North Island.
Volcanoes: Be prepared

Volcanic eruptions can create immense destruction to whole towns, crops, forests and roads.

Lava flows may block rivers, cause floods, mud flows and landslides.

An eruption can result in the evacuation of many people, who then need to find safe shelter and food before they can be resettled into new homes.

**Be prepared**

You can survive a volcano by being prepared and following these safety tips:

- Stay away from active volcanoes.
- If you live near an active or dormant volcano, keep goggles and a mask in your emergency survival kit.
- Know your evacuation route and where to meet if you are separated.
Are you at risk?

Some of the main risks during an eruption include:

- lava flows
- pyroclastic flows
- landslides
- lahars
- blasts and explosions
- land collapse
- ash clouds
- volcanic earthquakes
- tsunami

Research your local emergency services websites to locate an appropriate Emergency Survival Plan.

During the disaster

- Evacuate only as recommended by authorities and stay clear of lava, mud flows and flying debris like rocks and ash.
- Avoid river areas and low-lying regions.
• Before you leave your house, put on long pants and a long-sleeved shirt.
• Wear goggles or eyeglasses to protect your eyes.
• Wear an emergency mask or hold a damp cloth over your face.
• If you are not evacuating, close doors and windows and block chimneys and air vents. This will help to stop ash from coming in.
• Be aware that falling ash can become heavy and damage metal objects (like car engines and trucks). If you need to go outdoors, wear protective clothing.
• Avoid driving as ash and falling debris can be dangerous.
Investigating volcanoes

Student name: ____________________________ Date _____ / _____ / _____

Use the websites listed below (and others of your choice) to find the following information.

You may need to type ‘volcano’ into the sites’ search bars or browse the sites to find the information.

- National Geographic volcano facts, information and photos -


1 What’s missing from these facts? Write the correct word in the space

a) Volcanoes form when a break in the earth’s crust allows _______ and hot gas to reach the surface. The magma and hot gasses are under extreme _______ resulting in dangerous eruptions.

b) There are _______ active volcanoes in the Australian Antarctic Territories of Heard Island and McDonald Island. The bigger of these two volcanoes is called _______ (2750 m). The volcano on McDonald Island is an active volcano, having erupted for the first time in 1992 and again in August 2005.

c) Some of the main risks during an eruption include:
   _______ flows
   pyroclastic flows
   _______ slides
lahars
blasts and explosions
land collapse
       clouds
volcanic    
tsunami.

2

In your own words, describe three types of volcanoes and explain how they form.

Volcano #01


Volcano #02


Volcano #03


Types of volcanoes

Use information from the websites listed above and other sources to match the volcano picture to the description of how it is formed. Draw a line from the picture to the correct explanation.

This volcano builds from eruptions of lava and tephra that pile up in layers, or strata, much like layers of cake and frosting. These volcanoes form symmetrical cones with steep sides.

This volcano forms from eruptions of flowing lava. The lava spreads out and builds up volcanoes with broad, gently sloping sides.

This volcano builds from erupting lava that breaks into small pieces as it blasts into the air. As the lava pieces fall back to the ground, they cool and harden into cinders that pile up around the volcano’s vent.
My volcano project

The projects on this page will help you discover:

- how volcanoes are formed
- the different types of volcanoes
- the main risks caused by a volcanic eruption.

Types of volcanoes

This activity should be done individually or in pairs. Complete the ‘Types of volcanoes’ activity sheet.

Volcano dangers

In pairs, or as a small group, brainstorm the following:

1. Name some of the main risks from a volcanic eruption.
2. What are the main dangers to humans, animals and the environment that can be caused by:
   - volcanic ash
   - lava flows
   - lahars
   - pyroclastic flows
Real life volcano stories

Australia has a mix of dormant and active volcanoes. Australian volcanoes have erupted as recently as 2005.

❖ Mount Schank – South Australia

Mount Schank is a volcanic cone that formed approximately 5000 years ago. Even though that sounds like a long time ago, it is still considered to be one of the youngest volcanoes in Australia.

❖ Mount Noorat – Victoria

Mount Noorat is considered to be Australia’s largest dry volcanic crater, measuring 310 m above sea level. One of the main features of Mt Noorat is its 85 metre-deep crater. Surrounding the main crater are a number of other smaller craters (or depressions) which are probably other eruption points.

❖ Mount Fox – Queensland

Mount Fox was created by a volcanic explosion about 100,000 years ago. During the eruption, a lava flow ten metres thick came from the southern end of the crater and chunks of molten magma were ejected out of the vent. Mount Fox has a crater that is about ten metres deep and is surrounded by large rocks, known as ‘bombs’.

❖ Active volcanoes in Australia

There are two active volcanoes in the Australian Antarctic Territories of Heard Island and McDonald Island. The bigger of these two volcanoes is called Big Ben (2750 m). The volcano on McDonald Island is an active volcano, having erupted for the first time in 1992 and again in August 2005.
Related links

Darwin Volcanic Ash Advisory Centre

Volcano glossary – USGS website
https://volcanoes.usgs.gov/vsc/glossary/

What is a volcano? - Geoscience Australia

Volcanoes - BBC GCSE Bitesize
http://www.bbc.co.uk/schools/gcsebitesize/geography/natural_hazards/volcanoes_rev3.shtml