

Extrusive igneous rock formation

Intrusive igneous rock formation

# Edible Igneous Rocks

EARTH AND SPACE SCIENCE



**QGC**

**FUTUREMAKERS**



**QUEENSLAND MUSEUM NETWORK**



**Queensland Government**

# Introduction

The Queensland Museum Network has one of the largest and most significant Geosciences Collections in the southern hemisphere. The Geosciences Collection consists of 55,000 geological samples and 27,000 mineral samples, as well as over 7 million fossil specimens! This includes nearly 10,000 primary type specimens (reference specimens used to identify, name and classify fossil plant or animal species).

The Geosciences Collection contains pivotal resources that help scientists to:

- Discover and document past Australasian biodiversity as revealed from the fossil record.
- Interpret the evolutionary history of animals and plants over 3000 million years.
- Understand the geological history of Australia and how that impacted upon both terrestrial and marine ecosystems.
- Understand historical environmental changes in Australia as seen in the fossil record.
- Interpret past climates and understand how living things responded to these climatic and environmental changes.
- Use historical data to predict future trends, and infer how ecosystems may respond to the changing climate and environment.

*Source: Queensland Museum Network*

This resource may be used individually or with the [Queensland Museum online resources](#) 'Plate Tectonics Part 1-3', and 'Volcanoes'.

Activity 2 requires rocks from the [Active Earth loans kit](#) for completion. This can be borrowed from [Queensland Museum loans](#). Many more rocks and minerals can be seen at the Queensland Museum, Brisbane.

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Future Makers is an innovative partnership between Queensland Museum Network and QGC formed to encourage students, teachers and the community to get involved in science, technology, engineering and maths (STEM) education in Australia.

This partnership aims to engage and inspire people with the wonder of science, and increase the participation and performance of young Australians in STEM-related careers — creating a highly capable workforce for the future. <http://www.futuremakers.org.au/about/>

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# Activity Overview

## Edible Igneous Rocks

In the following activity you will model the formation of igneous rocks, compare these to real rocks, and then use a key to classify the types of igneous rocks in the *Active Earth kit*.

### Teacher Tips

- Activity 1 is edible if conducted in a food safe area.
- Activity 1 requires heating butter, sugar and glucose. This can cause severe burns. Make sure students are actively supervised and wear protective equipment including heat mitts, safety goggles and lab coats.
- Students may compare real rock specimens with their rock lollies.
- Igneous rock specimens may be used with sedimentary and metamorphic rocks to highlight the similarities and differences.

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## Australian Curriculum Links

### Year 8

#### Science Understanding (SU)

Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales (ACSSU153)

#### Science Inquiry Skills (SIS)

Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge (ACSIS139)

Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships, including using digital technologies as appropriate (ACSIS144)

Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions (ACSIS145)

# Activity 1

## Extrusive Igneous Rocks

Extrusive igneous rocks are formed when lava cools quickly outside of volcanoes (see diagram on cover page). Lava has different consistencies and compositions. As a result, when lava cools and solidifies, rocks with different properties are formed. In this activity you will investigate the formation of two different extrusive igneous rocks.

## A Rocky Recipe – Making Igneous Rock Lollies

**Objective** To demonstrate how different igneous rocks are formed.

### Materials

- 1 cup sugar
- ½ cup liquid glucose
- ½ cup water
- 1 tablespoon butter
- 1 teaspoon bicarbonate of soda
- Saucepan
- 2 x baking trays
- Oil or baking paper to cover trays

### Method

1. Put sugar, liquid glucose, water and butter in a heavy saucepan.
2. Heat gently until dissolved and then boil for about 6 minutes, until it turns light golden brown.
3. Pour half into a cold oiled baking tray and watch it flow and set like lava. This is lolly A.
4. Add the bicarbonate of soda into the remaining half. This releases carbon dioxide into the mixture in lots of little bubbles. You will need to pour it in another tin quickly before it sets. This is lolly B.
5. Both can be broken with a hammer when set, forming the similar patterns of cracks you find in rocks after earthquakes.

### Safety

- Complete only with adult supervision.
- Saucepan and sugar solution are hot like lava! Do not touch. Wear heat mitts, goggles and a lab coat, and leave to cool for 15 minutes.
- Final product is edible only if experiment is conducted in a food-safe area.

### Questions

#### 1. Record your observations and results

**2. Compare the formation of igneous rock lollies to real igneous rocks.**

**Similarities**

(Words to use include: both, similarly, likewise, also)

**Differences**

(Words to use include: whereas, however, although, while, but)

**3. Compare your lolly rocks to the extrusive igneous rocks below**

**a. Obsidian**



Image: [James St John](#), cc.

Obsidian, also known as volcanic glass, is uniform in texture as it has minimal crystal growth due to rapid cooling. It is not porous.

i) Lolly

is similar to obsidian because:

ii) Include a picture or draw a diagram of your lolly.

**b. Pumice**



Image: [Mauro Cateb](#), cc.

Pumice is a very light and porous volcanic rock. Air is trapped when the rock hardens, and as a result the lightweight rock often floats.

i) Lolly

is similar to pumice because:

ii) Include a picture or draw a diagram of your lolly.

Obsidian was used to make tools such as knives, arrow heads and spears by many Australian Aboriginal groups, as well as indigenous cultures all around the world. This made it a valuable resource for trade, and it was the first product of organised mining.

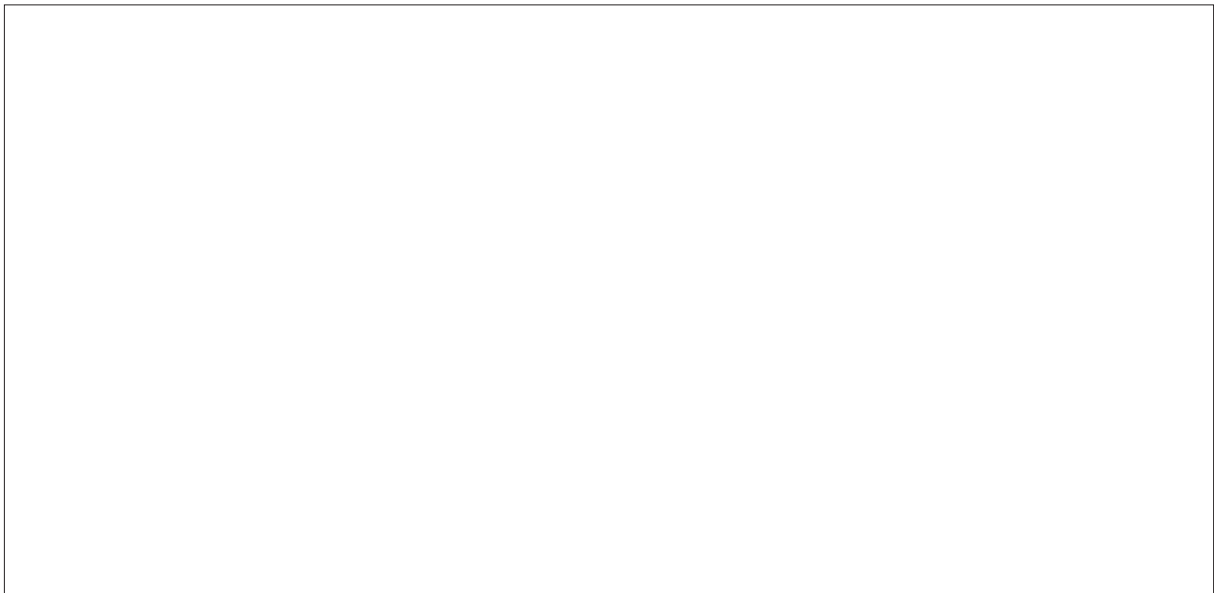
Pumice is used to make lightweight concrete (and has been since Roman times!). It is also used as an exfoliant, often to remove dead skin from feet.

**4. How do the properties of obsidian and pumice make them useful for the above purposes? (What would happen if you tried to use pumice to make a knife, or obsidian to exfoliate your feet?)**

**5. Imagine your lollies were crushed up, and the pieces then compressed back together. Explain the type of rock this would represent.**



**6. Predict how the properties of your lolly would change if you put it in a hot oven for 6 hours. What type of rock could this represent?**



# Activity 2

## Identifying Igneous Rocks

This activity should be used in conjunction with the *Active Earth kit*, which can be borrowed from [Queensland Museum loans](#).

The rocks contained in the *Active Earth kit* are formed from one of the following:

- a) viscous lava that came out of a volcano: *pumice, rhyolite, andesite, obsidian*
- b) nonviscous lava that came out of a volcano: *basalt, vesicular basalt*
- c) volcanic ash: *tuff*
- d) magma that cooled deep within the Earth: *granite*

These rocks differ in density, appearance, mineral composition, and other features. This is because the lava that each rock comes from has a different composition.

Compare this with the concept of a cake. There are different types of cakes, such as sponges, tea-cakes, and fruit cakes. They are different because the ingredients are different and the methods of cooking are different.

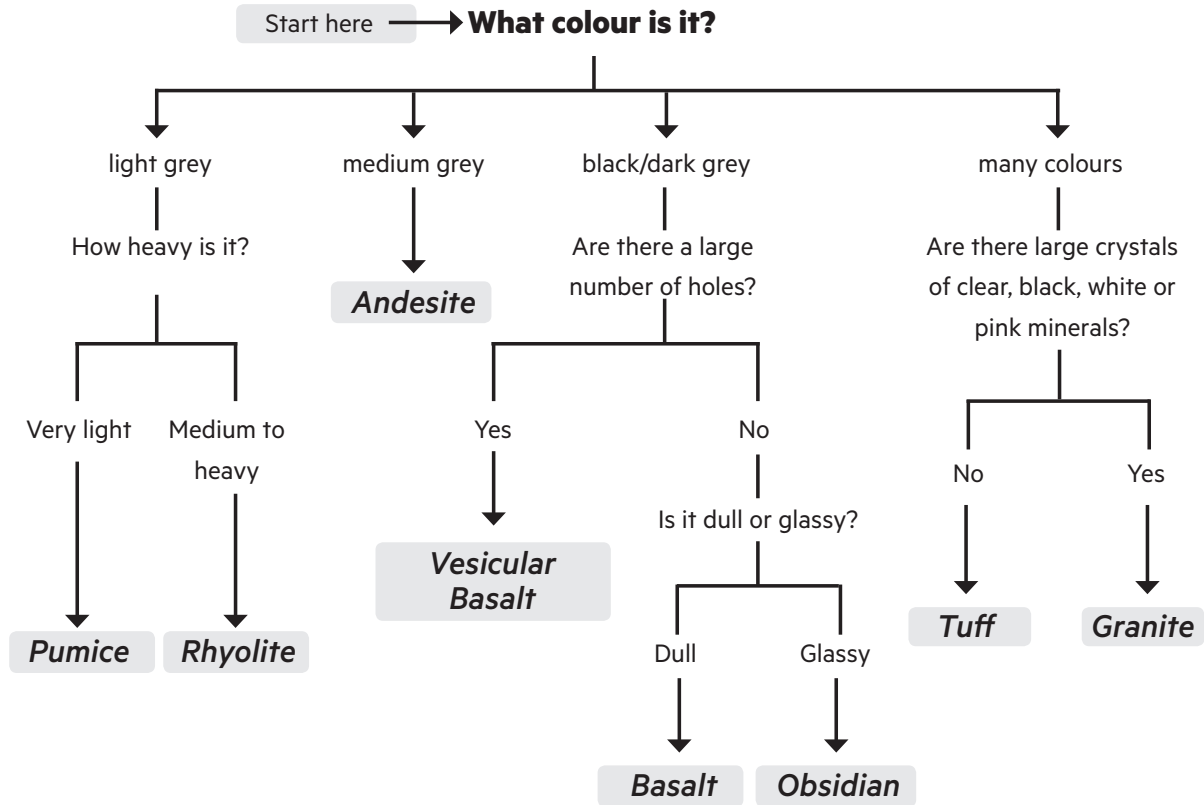
There are different igneous rocks because they have different 'ingredients', they have been formed in different ways, and cool at different speeds.

Extrusive igneous rocks form outside of volcanoes, while intrusive igneous rocks are formed when magma inside the Earth cools slowly.



1. Use the key below to correctly identify the eight rocks in the *Active Earth kit*.

# Key to Volcanic Rocks



2. Label each of the rocks on the key as intrusive or extrusive.