



Activity sheet: Chocolate Geology

What is the main message, theme or objective you want remembered?

- There are three geological parts to the world; crust, mantle and core.
- Mountains are formed by movement in the earth's crust.
- There are three main types of rock; sedimentary, igneous and metamorphic.

Materials or props required:

- Pink Wafer biscuits
- Mars Bars
- Crunchies
- Curly Wurlies
- Crème Eggs (to take home)
- Globe
- Large tray & polystyrene pieces
- Bowl of water
- Small zip-lock bags
- Real rock samples (named)

Setting up the activity

- Position rock samples in centre of a large table
- Fill tray with water (dye red with food colouring if desired – really effective but can be messy) and place poly pieces into the water.
- Have the sweets and zip lock bags ready to give out throughout the session (don't give them out at the start!)
- Arrange group around the large table.

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Activity guide:

Using the globe: What is geology?

It is the study of the origins of the earth, its history and what it is made of. The earth looks like a solid mass. But is it?

Using the cross section diagram we can look at the composition of our planet. Talk about the interesting facts of each layer.

The Crust is the surface of the earth; layer that we live/walk on. It is up to 22 miles thick and is mainly made up of 3 categories/groups of rocks.

But what are rocks?

Rocks are nearly always mixtures of **minerals**, which are like the ingredients in a cake. Different quantities of ingredients mixed in different ways will give you different cakes.

And so with rocks – because they are formed in different ways their recipes will vary quite a lot.

Going back to our globe we ask – is the crust solid?

The answer is no, it's not. It is actually broken into several enormous pieces called plates, which are constantly moving on the mantle.

Go to the tray with water and polystyrene plates. Move them around and ask what happens when these plates collide – earthquakes, tsunamis and volcanoes – and they also cause huge mountain ranges to be formed.

Cue the Mars Bars!

Using the Mars Bars show how the beautiful landscape of Loch Lomond was formed over 400 million years ago. Use them to show plate movement and how mountains like Ben Lomond were made.

Break the Mars Bar in half so that the caramel is all that joins the two pieces, then push the pieces back together to illustrate the crumpling upwards of the earth's surface.

From now on, every time you eat a Mars Bar you'll think of Loch Lomond!

We are now going to look at the three main groups of rocks that make up the earth's crust.

Rock type 1: Sedimentary

Hand out the wafer biscuits.

Explain that sedimentary rocks are made up from fragments of rocks and the remains of animals and plants. Rain, wind and ice wear away tiny pieces of exposed surfaces like mountains. These fragments are called sediment. Rain washes the sediment into rivers and streams where they tumble and knock into each other. This grinds them down to form sand and mud which is eventually washed into the sea.

On the sea bed the sediment builds up in layers along with the remains of sea creatures and the layers are packed down by the weight of the layers on top.

What do we call these remains that are trapped in the layers?

Eventually over millions of years the layers become solid rock.

How many layers can you count in your sedimentary wafer?

Look at our real-life sample – sandstone.

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Rock type 2: Igneous

Show the pumice. What kind of rock is this?

This is **igneous** rock, that is, rock that has been affected by heat or fire. How might rocks in this group have been formed?

Rocks in this group were formed from volcanoes, lava or magma.

Lava and magma are both molten (liquid) rock. The difference is that lava is molten rock that has come to the surface of the earth's crust and magma is still underground. (Remember, magma is the mushy liquid like hot jam inside the Mantle). Volcanic eruption is caused by the build up of heat and gas which forces the magma up and out through weaknesses in the earth's crust. As it slowly cools, air becomes trapped inside as begins to harden.

What happens if you put a piece of pumice (lava) into a bowl of water? Does rock float? Why does this particular type of rock float?

Bring on the Crunchies! Open the Crunchie and break it into 2 pieces. What does it look like on the inside? (hopefully they say pumice or lava!)

Rock type 3: Metamorphic

Metamorphic rocks are **sedimentary** or **igneous** rocks which have been **changed** by heat or pressure.

Does anyone remember the TV programme "Mighty Morphin' Power Rangers"? How did these guys get their name? It was because they "morphed" or changed from one thing into another.

Think of a caterpillar. What happens to it? In a process called metamorphosis, it changes into a butterfly. So metamorphic rocks are "changed" rocks – changed by pressure or heat. Let's have a look at some sedimentary rocks which have been changed into metamorphic rock. (From our real-life collection we can use slate, gneiss (nice) and quartzite.)

You can find examples of each of these throughout National Parks and some were important industries, such as slate quarries in Loch Lomond, the Lake District and Snowdonia.

Although they are all different varieties of rock, they all belong to the same group of **metamorphic** or "changed" rock. The gneiss also shows how different combinations of minerals (or recipes) produce very different looking rocks.

Enter the Curly Wurly!

"You may think that this is a Curly Wurly, but by a very complicated process we're going to make it into sedimentary rock. We will then change our sedimentary rock into metamorphic rock, and we'll do this twice – firstly by using pressure and then by using heat."

Place the Curly Wurly in the zip lock bag and hit gently off the floor to create sedimentary rock piece, squash between hands for pressure and then sit on the chocolate (still in the bag) while you review the session.

You can now eat your metamorphic rock – but remember where it has just been!

Finally, give each child a crème egg to take home. They have to put it in the fridge and when it's hard ask an adult to cut it in half. They can then use it show their family/friends how the earth is made up i.e. chocolate is the crust, white crème is the mantle, yellow crème is the core.

Conclusion

- There are three geological parts to the world; crust, mantle and core.
- Mountains are formed by movement in the earth's crust.
- There are three main types of rock; sedimentary, igneous and metamorphic.