

Best classroom eruption? Which type of classroom eruption best shows how volcanoes erupt?

Which of these classroom eruptions best shows how volcanic eruptions are triggered?

Erupt your own volcano

To make an eruption:

- Put two heaped teaspoons-full of bicarbonate of soda or baking powder in the yoghurt pot.
- Add a medium squeeze of washing-up liquid.
- Add some washable paint (will not stain hands) or food colouring (may stain hands) – preferably red or orange.
- Pour in white vinegar and watch the eruption.

To make a 'volcano' for your eruption:

- Cut an A3-sized cardboard folder into a circle.
- Cut out a small yoghurt-pot-sized circle in the middle and cut along a straight line from the circumference to the centre.
- Make a shallow cone-shape by overlapping the two sides and sticking with sticky tape.
- Add the yoghurt pot to the centre and your volcano is ready for eruption.

OR

- Make a volcano shape around the yoghurt pot with modelling clay, papier mâché or sand.
- Paint or decorate your volcano before eruption.

Resource list:

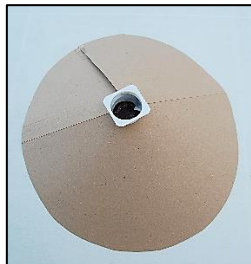
- small yoghurt pot (as used for children's desserts)
- white vinegar
- fresh bicarbonate of soda or baking powder (as used for baking)
- washing-up liquid
- teaspoon

Optional:

- washable paint or food colouring – preferably red or orange
- A3-sized piece of cardboard (as used in folders)
- scissors and sticky tape



Resources



Set up



Eruption! (Photos: C. King)

Blow up your own volcano! – soapsud volcano

- Drill a small hole in the side of a plastic drinks bottle and fix a drinking straw or similar narrow tube into it, using a sealant, or chewing gum.
- Let the sealant set, then half-fill the bottle with soapy water.
- Drill about six small holes in the bottle top and screw it back on.
- Put on safety spectacles, blow through the straw and watch the 'eruption' of frothy soapy water.
- The bottle may be partially hidden inside a paper cone to represent the volcanic structure.

Resource list:

- empty plastic drinks bottle e.g. 500 ml size, and top,
- drinking straw (or two joined together), or similar tube
- sealant, chewing gum, or similar
- water, coloured for effect if possible
- soap solution, e.g. washing up liquid
- paper or cardboard cone to represent the slopes of a volcano
- safety spectacles
- tray to catch the 'eruption', or access to the outdoors



The set-up and a bubble eruption. (Photos E. Devon)

Taken from the Earthlearningidea: Blow up your own volcano! - show how gases blast out material in volcanic eruptions.

Blow up your own volcano! – a volcano in a coke bottle

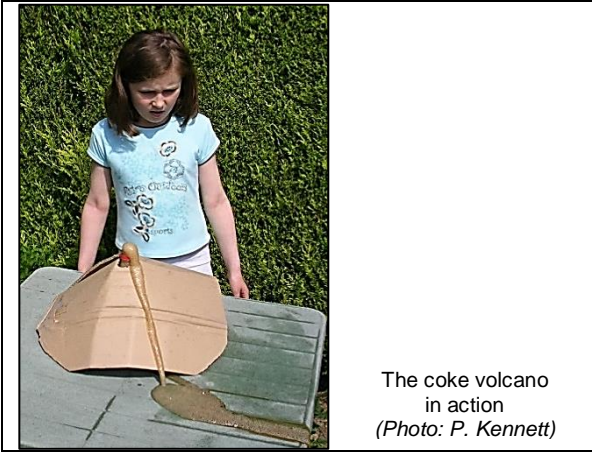
- Take a fresh 500ml plastic bottle of Coca Cola™ (coke) or similar 'fizzy' (carbonated) drink, and have Mentos™ mints or a sugar lump ready, small enough to be easily inserted into the bottle.
- Remove the bottle top and immediately add two mints or the sugar lump.
- Stand well back and watch the frothy liquid 'erupt'.

Resource list:

- 500ml bottle of Coca Cola™ or similar fizzy drink
- Mentos™ mints or sugar cubes
- paper or cardboard cone to represent the volcano slopes

Photo below

Taken from the Earthlearningidea: Blow up your own volcano! - show how gases blast out material in volcanic eruptions.



Champagne eruption

- Remove the foil from a bottle of cheap sparkling wine or champagne.
- Shake the bottle.
- Take off the wire cage holding the cork
- ‘Pop’ the cork and catch the ‘eruption’ in a wine glass.

Resource list:

- bottle of cheap sparkling wine, bucks fizz or champagne
- glass, e.g. wine glass



‘Popping the cork’.
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Demonstrate the different classroom eruptions and then discuss with your class which of them best shows how volcanoes actually erupt. Draw attention to the fact that it is the gases produced that force the liquid out of its container, and ask how these might be produced naturally.

In their discussions, the pupils will note different aspects of the eruptions and argue which is ‘best’.

And the best is ...?

If the ‘best eruption’ is the one that most closely models the role of gas in eruptions, then the champagne eruption is arguably the ‘best’. This is because natural eruptions are caused by volcanic gases dissolved in underground magma coming explosively out of solution when pressure is released. When a volcano blasts out its plug and the pressure is released, the gases force the magma out of the vent explosively as lava, bombs, blocks or volcanic ash.

In each of the other three classroom eruptions, the liquid releases gas, not because of pressure-release, but for other reasons, as described in ‘context’ below.

The back up

Title: Best classroom eruption?

Subtitle: Which type of classroom eruption best shows how volcanoes erupt?

Topic: Evaluating different types of classroom eruptions to gauge which best shows how eruptions are triggered.

Age range of pupils: 9 years upwards

Time needed to complete activity: 30 minutes

Pupil learning outcomes: Pupils can:

- explain that it is the dissolved gas released by magma that causes volcanic eruptions by propelling magma out of vents, explosively;
- explain that the dissolved gas comes out of magma because the pressure on it is released;
- discuss which of the simulations best demonstrates a volcanic eruption;
- discuss the different features of other types of classroom eruption.

Context:

Each of the four demonstrations provides a model of a volcanic eruption caused by gas coming out of a liquid. In the ‘Erupt your own volcano’ activity the gas is caused by the chemical reaction between an acid (vinegar) and an alkali (sodium bicarbonate – which forms the bulk of baking soda). In the ‘Soapsud volcano’, the gas is produced by blowing into the bottle. In ‘Volcano in a coke bottle’, the rough surface of the Mentos™ or sugar lump and the fact that they readily dissolve, causes gas bubbles to form and grow very quickly, forcing the coke out of the bottle. Only in the ‘Champagne eruption’ is the release of gas caused by pressure-release as the cork is ‘popped’ in the same way as volcanoes ‘pop’ their plugs causing volcanic eruptions.

Following up the activity:

The ‘Volcano in a coke bottle’ eruption can be made much higher by purchasing a ‘Geyser Tube’™ from the internet and a 2 litre bottle of diet coke and taking the demonstration outside. The ‘Geyser Tube’™ is charged with six Mentos™ and

then screwed onto the top of the coke bottle. When the trigger is released and the person triggering stands back, the coke dramatically sprays several metres into the air.

Underlying principles:

- Volcanic eruptions are caused by gas in magma coming out of solution explosively, so forcing the magma out of the vent.
- Class eruptions can mimic this by producing gas in several different ways.
- The classroom eruption resulting from pressure-release, the process which causes natural eruptions, is best mimicked by the 'Champagne eruption'.

Thinking skill development:

Though construction, pupils will realise that each type of classroom eruption involves producing gas which expels the liquid from the container.

Discussion of which eruption is 'best' involves cognitive conflict and metacognition. Bridging skills link the classroom eruption experience to natural eruptions.

Resource list:

- given for each individual activity

Useful links:

Earthlearningidea, '*Blow up your own volcano*' at: http://www.earthlearningidea.com/PDF/Blow_up_our_own_volcano_1.pdf
Videos of coke/Mentos™ eruptions are readily available on the internet.

Source: Devised by Chris King of the Earthlearningidea Team based on classroom eruptions previously published as Earthlearningideas, and also elsewhere.

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