Better Planet Education

Family Home Learning Pack

DRAMATIC EARTH

Notes for parents and carers:

These home learning packs have been compiled by Better Planet Education to support you whilst your children are at home during the Covid-19 lockdown.

Each week, we will include suggestions for activities you can do alongside your children, as well as those that they can do independently, whilst you are working from home.

We will attempt to suggest activities which require no special materials other than those you may find around the house. It may be possible to pick up some resources during your occasional shop for essentials but please do not aim to shop specifically for listed supplies! We will also attempt to minimise the need to print out any materials.

In your pack each week:

* Open ended project ideas and research topics
* Activities to explore independently or together
* Games to play
* Ideas for science experiments
* Art and craft ideas
* Links to other learning resources
* A use each week for toilet roll tubes...

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ACTIVITY IDEAS

Make your own volcanic 'eruption':

The following activities will allow you to make some 'eruption'-like reactions using common household materials that should be easy to pick up in a supermarket, or that you may already have at home. Where possible, these have been linked to the actual science of volcanoes, though children need to realise that these substances don't actually occur inside real volcanoes! When referring to lava, it's known as 'magma' while still under the Earth's crust, and 'lava' once it breaks through - but is still the same substance.

You might like to find out more about what causes volcanoes first (Youtube clip, supervision recommended) :
https://www.youtube.com/watch?v=0u3IyeYRzmA

Vinegar volcano:

You will need:

- A container such as an egg cup or similarly sized lid. The top of a recycled drinks bottle cut off and turned upside down works well.
- Some vinegar
- A couple of tablespoons of bicarbonate of soda
- Paper or a toilet roll tube to make your 'volcano' design.
  (You can also add a bit of food colouring or paint and some washing up liquid for an extra colourful or frothy eruption!)

First, design your volcano. It will get very wet during the activity, so do warn children that their art may not survive! A piece of paper rolled into a cone works well. Cut an opening to allow the 'lava' to escape.

Put your egg cup or container inside the tube and pour in approximately 2 tablespoons of bicarbonate of soda. Add the food colouring and washing up liquid at this stage.

Next, get ready to pour in the vinegar and stand back! More vinegar will cause more of a reaction, pour a splash in straight from the bottle.

This reaction between vinegar and bicarbonate of soda produces a gas (carbon dioxide) and because the gas is less dense than the surrounding liquid, it travels upwards, taking some of the liquid with it! This is rather like what happens inside a volcano, when gases escape from the earth's crust taking molten rock with them.

This week's use for a toilet roll tube:

You can use a toilet roll tube to form your volcano as seen in these awesome pictures from Henry and Charlie in St. Albans!

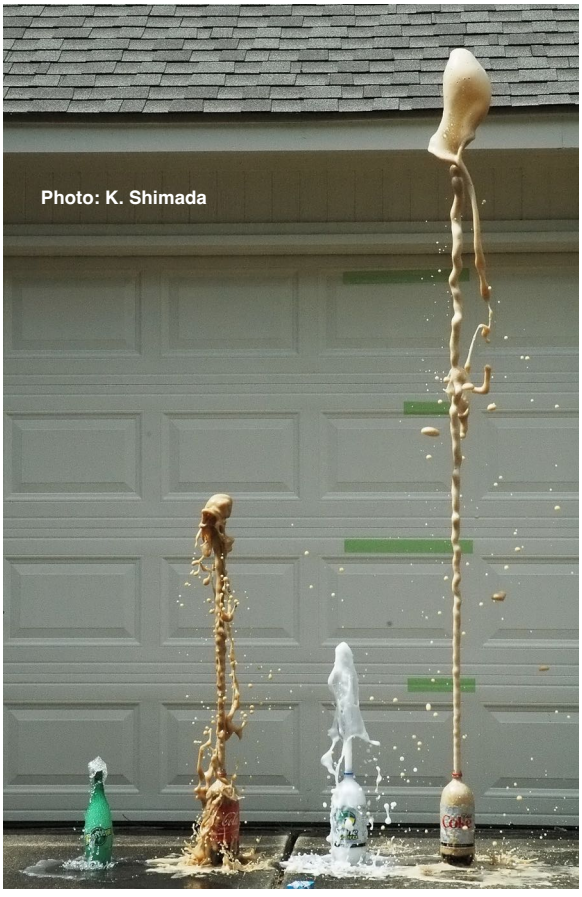
Fizzy mentos eruption:

For a more dramatic eruption, try putting around 5 mentos mints into a bottle of fizzy drink. Any drink will do, though diet colas are the most dramatic as they are less sticky. You could turn this into an experiment by trialling different types of drink.

Place the bottle of drink somewhere that can get messy (outside) as the eruption can reach several metres high!

Roll up a tube of paper with the mentos inside so you can get them into the bottle quickly.

Dropping the mentos into the fizzy drink releases the gases that are dissolved in it and they travel upwards in a similar way to what happens when the gases dissolved in magma try to escape from the earth.

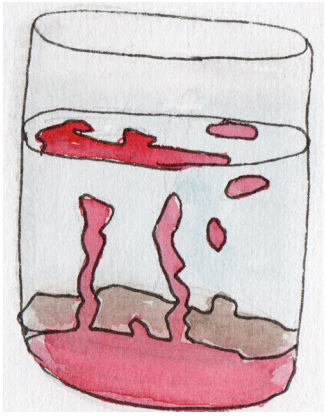


You could make the bottle into a volcano shape by piling up soil or sand around it first, like in this great Lego scene! (see photo, left)

Hot waxy lava:
This activity requires less obvious materials but, if you do have them, it's a great way to show how a melting substance (in this case wax, modelling magma / lava) can move through the earth's crust.

You will need:
A heat resistant beaker, such as a pyrex cup or jug
Candles (or the wax wrapping from Babybels works well!)
Sand
Water

First, melt the wax to about a 1 cm layer at the bottom of the cup. Leave this to cool, then add about another 1 cm covering of sand. Top up the container to approximately 3/4 full of very cold water (chill it in the fridge for a while) then place the container on to a hob at a medium to high heat and watch the wax.



As it melts, it will become hotter and less dense than the sand and the water and will start to rise. It may also spread out over the top of the water, just like lava sometimes does.

Biscuits and chocolate tectonic plates:

This activity will help children to understand the way that the Earth is covered in tectonic plates and that it is the movement of these against each other that created mountain ranges millions of year ago and continues to create earthquakes.

An explanation of the way that tectonic plates 'work' can be found here (Youtube link, supervision recommended)

https://www.youtube.com/watch?v=_Ugwf6IaE_k

First, print out a copy of a map that shows the generalised edges of the world's tectonic plates. It can be interesting to cut this up and explore the 'fault lines' where earthquakes are more likely to happen. A link to a downloadable map can be found here:

http://allfreeprintable.com/cont/mp/pdf/mp-pt-1.pdf

Next, you will need:

* a plate
* some biscuits or crackers
* chocolate spread, jam or icing

Having explored the map of the tectonic plates, you can make a tasty demonstration of plates pushing up against each other over the top of the earth's molten core, using the biscuits to represent the plates as they push up and overlap each other, or break away and separate!

Thank you so much to Dylan and Felix from Devon for trying this activity and sending in some amazing photos. If you' like to feature in a future learning pack, we are always keen to hear from new activity testers!

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Hard boiled egg tectonic plates:

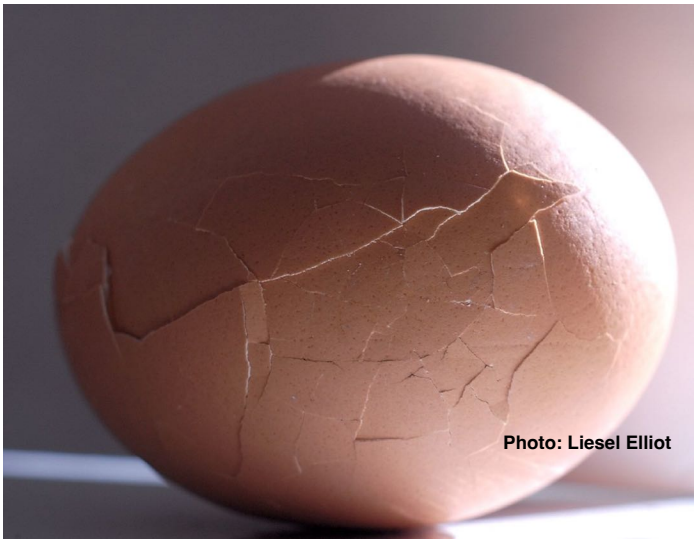

Photo: Liesel Elliot

Another way to explore the idea of tectonic plates covering the Earth, is to hard boil an egg and leaves it to cool.

Once it is cool enough to handle, roll the egg on a surface so that the shell is covered in cracks. Each piece of shell represents a tectonic plate, and the cracks are the fault lines where earthquakes and rifts can occur!

Make an earthquake resistant building:

Houses and other buildings built in areas at risk of earthquakes have to be engineered so that they don't crack and fall apart. Instead, the buildings sway with the movement of the earthquake and don't break.

Photo: Stephen Matthews Photography

Photo: Stephen Matthews Photography

You can experiment with different types of structure using cocktail sticks (or spaghetti, though this is more brittle) held together with marshmallows or raisins.

Photo: Stephen Matthews Photography

Photo: Steven Matthews Photography


Photo: Stephen Matthews Photography

Make up a wobbly floor made of jelly in a large dish and you can shake the buildings to see which are the strongest!

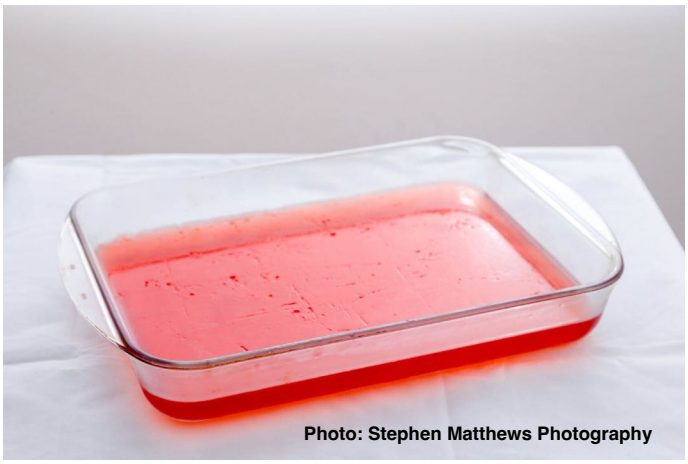
Photo: Stephen Matthews Photography


Photo: Stephen Matthews Photography

Does the height of the building make a difference? Are there some shapes that are stronger than others?


Photo: Stephen Matthews Photography

Thanks so much to Alex and Ryan from Durham for these superb buildings.

Photo: Stephen Matthews Photography

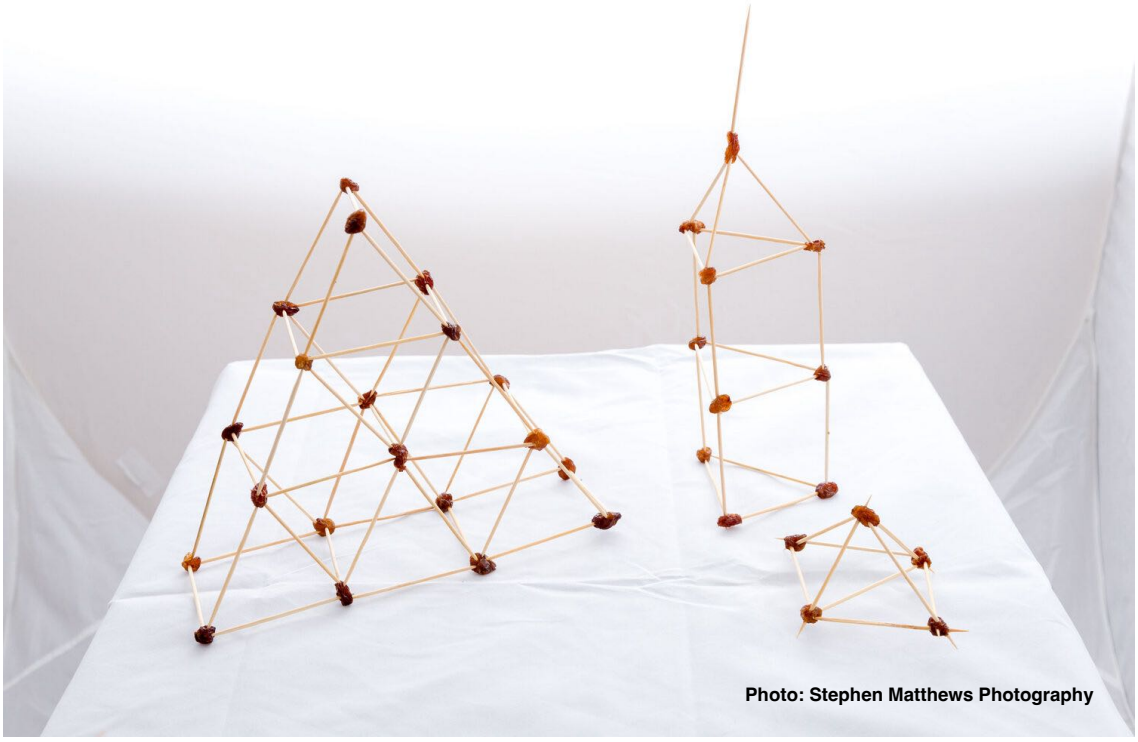

Photo: Stephen Matthews Photography

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RESEARCH IDEAS

Find out about some volcanic eruptions that have happened in the past.

(Not recommended if lockdown is causing anxiety or stress!)

In 79AD Mount Vesuvius erupted in Pompeii. The ancient Romans wrote about what happened and the ruins of the town and even the remains of people who were living there at the time can still be seen today.

Find out about what happened in Pompeii, or research one of these more recent volcanic eruptions.

- **Mount Tambora** (Indonesia) in 1815
- **Krakatoa** (Indonesia) in 1883
- **Mount Pelée** (Martinique) in 1902
- **Mount St Helens** (Washington, USA) in 1980
- **Mount Pinatubo** (Philippines) in 1991
- **Eyjafjallajokul**l (Iceland) in 2010

Did you know…

scientists now have ways to predict when an earthquake or a volcano is about to happen?

Find out about the work of:

* **a volcanologist**
* **a seismologist**

What sorts of tools do they use to make their predictions?

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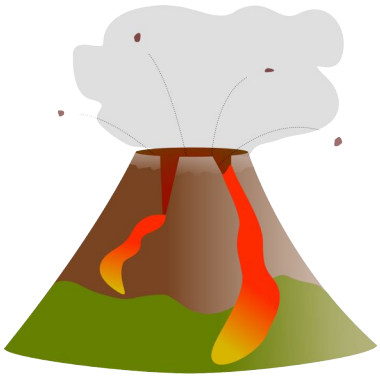
MATHS CHALLENGE

Along a fault line, there are three volcanoes. They always erupt at the same intervals.



Wikimedia Commons

The first volcano erupts for 3 seconds, then stops for 3 seconds.

pixabay

The second volcano erupts for 4 seconds, then stops for 4 seconds.

freesvg.org

The third volcano erupts 5 seconds, then stops for 5 seconds.

All the volcanoes have just erupted together.

When is the first time that all three volcanoes will have stopped together?

When is the next time that all three volcanoes will erupt at the same moment again?

Question adapted from Mathematical Challenges for Able Pupils, DFE, 2000.
Solution at end of the pack!

WORD CHALLENGES

Postcards from the Edge:

Imagine that you have gone on holiday to visit a volcano and you are writing home to tell your family all about it! What would you say? If you'd like to use a postcard template, you can find those here: https://www.planbee.com/blank-postcard-templates

Image: Wikimedia Commons

Volcano crossword:

Find out some facts about volcanoes and use them to complete this free crossword puzzle (Solutions can be downloaded at the same time, but are in a separate document, so remember to check for both!) https://www.puzzles-to-print.com/crossword-puzzles-for-kids/volcanoes.shtml

My Diary from Pompeii:

Imagine that you were alive in 79AD and that you lived in Pompeii. You might like to find out about the lives of people living at that time, so that you can include more detail in your writing. One night, you receive news that Vesuvius seems to be smoking... how do you feel? What would you write in your diary for the night? (Not recommended for children already feeling anxious during lockdown).

Image: pixabay

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ART AND CRAFT

Molten Lava paintings:

Use very runny paint to make your volcano picture erupt!

Paint your volcano first using grey or brown paint. Make some very watery paint in fiery colours of red, orange and yellow. Drop a blob of each colour at the top of the volcano and blow through a short tube of paper to make the flames 'explode'!

You may also want to add some paint flicked on with a brush... just hold the loaded brush and tap it gently with your other hand to make blobs of falling molten lava.

Don't forget to do this activity in an area that can get messy, such as the garden.

Copy a drawing of a volcano:

Here's a quick volcano drawing tutorial for children to copy along with. There are lots of other subjects covered too. This can be a really calming activity for when children want to do something relaxing that doesn't take much thought. (Youtube clip, supervision recommended)
https://www.youtube.com/watch?v=nNQRKHpTF7Y

Build a cut out model of a volcano:

Construct 4 different models with these detailed paper templates (requires a printer, scissors, glue and patience!
https://www.bgs.ac.uk/discoveringGeology/hazards/volcanoes/models/home.html

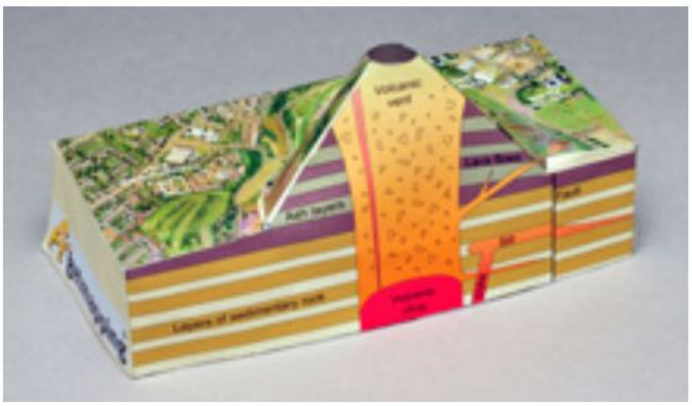


Photo: BGS

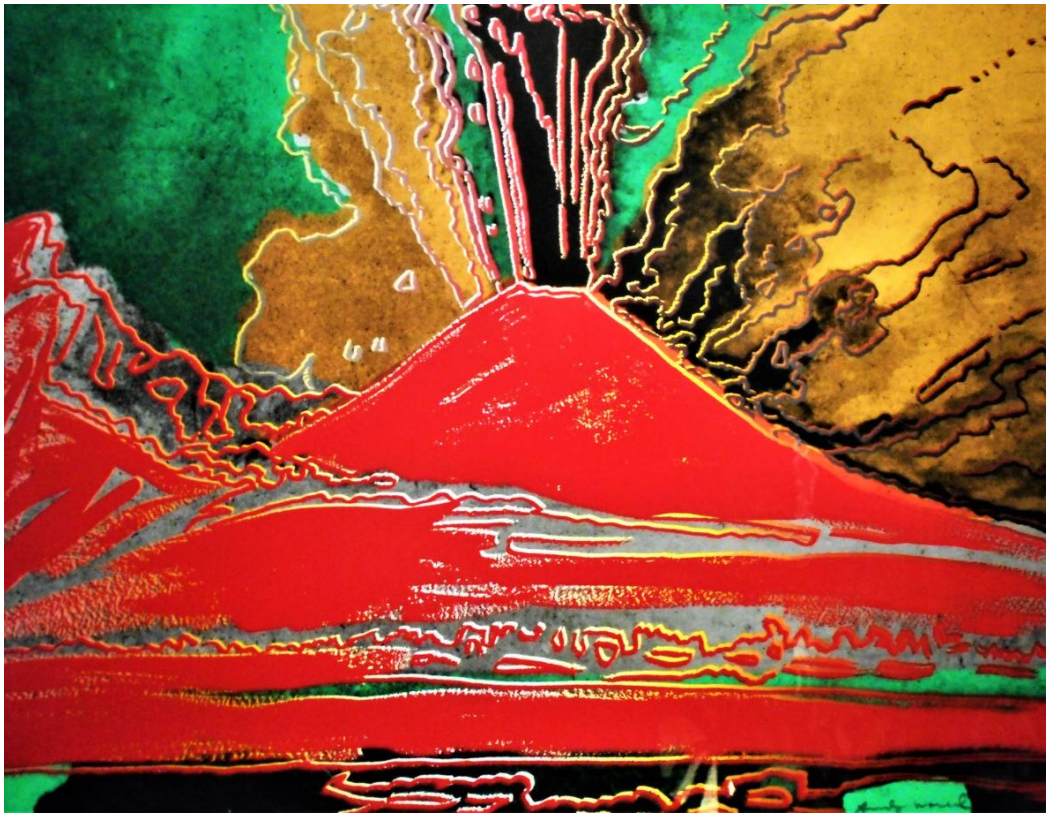
Volcanoes in art

Artists have been fascinated by the idea of volcanos for centuries, even though many of them had never seen one erupting (and couldn't look at a video!) so they had to make them up from descriptions. Have a look at some of these pictures and use them as inspiration for your own pictures. We'd love to see what you create!

JMW Turner, The Eruption of Vesuvius, 1817.

Joseph Wright of Derby, Vesuvius in Eruption, with a View over the Islands in the Bay of Naples, c.1776

(Pictures: wikimedia commons)



Andy Warhol, Vesuvius Red, 1985

Photo by Carlo Raso

Pierre-Jacques Volaire, View of the Eruption of Mount Vesuvius,

c.1770s

Picture: wikimedia commons

GAMES

Build a volcano cooperation game:

For this game, you'll need paper cups, an elastic band and 4 clothes pegs. The aim of the game is to build a stack of the paper cups (a 'volcano') by working cooperatively in a pair. Each child has two pegs and uses these as 'pincers' to stretch the elastic band outwards and move it over the top of a cup, capturing it with the band and lifting it up into place.

For a demonstration of a similar activity, follow this link:
https://www.pinterest.co.uk/pin/839710293007827108/

The floor is made of lava:

In this classic game the children must leap from safe base to safe base without touching the ground as the floor is made of molten lava and will melt them on contact. Can be played outside or inside in any space big enough and what constitutes 'the floor' is up for debate - does a rug count?

Pass the molten rocks of lava:

This game is ideal if you have a large collection of play pit balls but you can use any suitable items as 'lava rocks' from cushions to soft toys. Stretch a sheet or a towel between two chairs to make a barrier. The aim of the game is to pile all of the molten lava rocks on to your opponent's side of the wall. They are picking them all up and dumping them back over the wall as fast as they can. This is a never ending game that has no winner, but can burn off a lot of energy...

Flowing lava target game:

If you have tennis balls, ping pong balls or ball pit balls available at home, they are the ideal size for being rolled through tunnels made out of A4 paper. Use a sheet of paper taped to any hard floor with masking tape or sticky tape in an arch. These become tunnels in the 'rock'. Children need to roll or dribble the ball and make sure it passes through the tunnels. They might like to make it more challenging by setting up a course of tunnels, or by numbering the tunnels so that the 'lava' has to flow through in the right order.

Lava rock scoops:

Cut the bottoms from two recycled plastic milk bottles, retaining the section with the handle. Turn these upside down and they become 'catching scoops' for throwing a ball (or lava rock...) between players. They can be made more shallow or more deep to make either the throwing or the catching easier.

LEARNING LINKS

There are a large number of resources available for online learning at this time. We'd always recommend that you support your child with this and only follow links from reputable names. **Any links provided here have been checked for suitability.**

Explore this link from Cambridge University to see how much of your neighbourhood would have been obliterated by the Holuhraun lava flow (The eruption from Iceland in 2014):
http://holuhraun-lavaflowextent.co.uk/mainpage.html

Play this Volcano Island game and try to predict when an eruption will occur (requires flash player):

www.cfa.harvard.edu/earthscope/volcano_island

Explore active volcanoes and earthquakes worldwide with this real time link:

earthquakes.volcanodiscovery.com

Discover details of Icelandic volcanoes with details on their locations, activity level and most recent eruptions:

http://futurevolc.vedur.is

Learn about what causes Earthquakes with the BBC clip aimed at Key Stage 2:
https://www.bbc.co.uk/bitesize/topics/z849q6f/articles/zj89t39

Answers to Maths Challenge:

All three volcanoes will stop erupting after 5 seconds.

All three volcanoes will next erupt together after 120 seconds.