

An eruption through the window

How could an eruption transform your view? – lava, ash, lahar or something worse

Picture a large volcano to the left of the window – how would your view be affected by an eruption of the volcano? Different volcanoes erupt differently and the view could be transformed in different ways depending on the type of eruption. For each type of eruption, ask yourself:

- What would I see – and how would this change as the eruption continued?
- What else might I sense – by hearing, smelling, tasting or in other ways?
- How might I be feeling?
- Would I be safe? Would my friends and family be safe?
- What might the view be like after the end of the eruption?

Lava eruption

If the volcano erupted fast-flowing lava – what effects might this have? Use these pictures to give you some clues.



Volcanic eruption on Hawaii – 2004

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August 2004 eruption of the Piton de la Fournaise volcano on Réunion Island. The lava sets fire to anything it reaches that will burn.



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Ash eruption

If the volcano erupted great ash clouds so that the ash rained down on the view outside – what would that be like? Use these pictures to help you.



This spectacular eruption of Mount St. Helens on July 22nd 1980, sent pumice and ash 6 to 11 miles (10-18 kilometers) into the air, and was visible 100 miles (160 kilometers) away.

USGS Cascades Volcano Observatory - courtesy of the U.S. Geological Survey



Aerial view of part of Clark Air Base, Luzon Island, the Philippines. Buildings and vegetation were damaged by ash fall from the eruption of Mt Pinatubo on 15 June, 1991.

U.S. Geological Survey photograph taken on June 24, 1991, by Willie Scott - courtesy of the USGS.

Lahar – a mudflow of volcanic ash

After a volcanic ash eruption, heavy rainfall may cause flows of mud down the volcano side that can travel at great speeds (60 - 100 km per hour) and for tens of km. How might this affect the view through your window?



An explosive eruption of Mount St. Helens on March 19, 1982, sent pumice and ash 14 km into the air, and produced a laha (the dark deposit on the snow) flowing from the crater into the North Fork Toutle River valley. Most of the flow reached the Cowlitz River, 80 km downstream

http://vulcan.wr.usgs.gov/Volcanoes/MSH/SlideSet/ljt_slideset.html - courtesy of the USGS.



This bus was heavily damaged by the March 18, 1980 eruption of Mount St. Helens and partially buried by a mudflow on the North Fork Toutle River.

Photo courtesy of the US Geological Survey

Blast or pyroclastic flow

If your view was hit by a volcanic blast or a pyroclastic flow (a 'glowing cloud' of white hot volcanic ash flowing downhill), it is unlikely that you would survive to tell the tale or describe the view.



Pyroclastic flows descend the south-eastern flank of Mayon Volcano, Philippines. There were no casualties from the 1984 eruption because more than 73,000 people were evacuated from the danger zones as recommended by scientists of the Philippine Institute of Volcanology and Seismology.

Photo courtesy of the US Geological Survey

The back up

Title: An eruption through the window.

Subtitle: How could an eruption transform your view? – lava, ash, lahar or something worse.

Topic: Pupils are asked to try to picture and describe how the view through the window (or doorway) might be changed by different types of volcanic eruption.

Age range of pupils: 8 – 18 years

Time needed to complete activity: 15 – 30 mins

Pupil learning outcomes: Pupils can:

- describe the effects of different types of volcanic eruption;
- describe how these might affect the surrounding area;
- relate how they might feel and what they might do under these circumstances.

Context:

Pupils are given different eruption scenarios to consider, in the context of the view through the window of their classroom.

Following up the activity:

Investigate how lava viscosity can be changed through the Earthlearningidea 'See how they run - investigate why some lavas flow further and more quickly than others'. Try the other volcanic Earthlearningideas as well – 'When will it blow? – predicting eruptions - how a simple tiltmeter can demonstrate the bulging of a volcano before eruption', and 'Blow up your own volcano! - show how gases blast out material in volcanic eruptions'.

Underlying principles:

- Fast-flowing lavas, like the basalt flows of oceanic ridges (eg. Iceland) or Hawaii are relatively safe. Although they flow inexorably downhill, you can usually get out of the way – however they do set fire to and overwhelm anything that can't move or be moved.
- In volcanoes where lavas are much more viscous, the lavas often solidify in the volcanic vent and the eventual eruption is a powerful explosion of ash and other debris. The volcanic ash can be blown high into the atmosphere and then carried by winds many kilometres away – raining down on anything beneath. This can cause darkness and breathing problems for anyone caught in the falling ash, whilst build up of ash on roofs can cause them to collapse.
- If volcanic ash deposits on the sides of volcanoes become waterlogged (by the thunderstorms often associated with eruptions, by water from a crater lake or by melting ice) they can produce mudflows called lahars that flow downhill at great speeds and for long distances – wiping out anything in their paths.

- The volcanic explosions caused by viscous lavas can sometimes blast sideways – destroying anything in the way.
- Viscous lava eruptions can also produce pyroclastic flows (nuées ardentes or glowing clouds) of white hot volcanic ash that can flow in bubbling clouds downhill at speeds of more than 500 km per hour, incinerating anything that they touch, as in this sequence of photographs.



A series showing the movement of a small pyroclastic flow from the Montserrat volcano in 1997.

The photos were taken only a few seconds apart. The flow looks like ground-hugging grey smoke, but consists of a mixture of gas, ash, and dense hot lava blocks.

Photos by M. Stasiuk. Geological Survey of Canada. Information on this site (<http://www.nrcan-rncan.gc.ca/com/index-eng.php>) has been posted with the intent that it be readily available for personal and public non-commercial use and may be reproduced, in part or in whole and by any means, without charge or further permission from Natural Resources Canada.

Thinking skill development:

Pupils have to 'bridge' between their understanding of different forms of volcanic eruption and the likely effects on the surrounding area.

Resource list:

- a view and a vivid imagination

Useful links:

Try accessing Volcano World (<http://volcano.und.edu/>) for a wide range of volcano information and activities. The Montserrat Volcano Observatory has produced a Teacher's Pack with rock samples, CDs etc. for US\$30 - see <http://www.mvo.ms> or contact cheri@mvo.ms for details.

Source: Chris King of the Earthlearningidea team. Thanks to Steve Sparks of Bristol University for his helpful comments.

Earthlearningidea

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