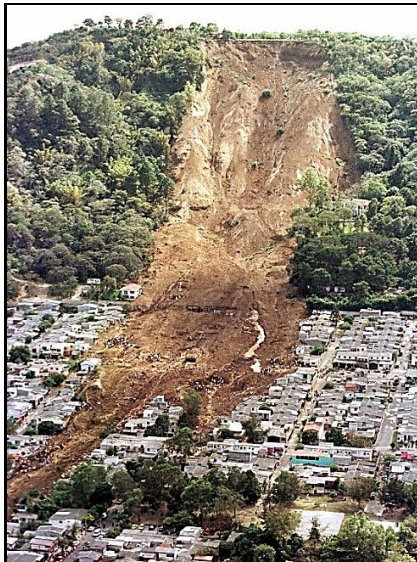


Which natural hazards could damage the area where you live? How safe is your home area?

Many of the world's people live in areas which are liable to be affected by natural hazards, such as landslides, hurricane winds, earthquakes and volcanic eruptions. Even regions which appear to be safer may sometimes suffer from devastating events such as flooding, following unusually heavy rainfall.

Try to identify which possible natural hazards might strike in the future in the area where you live. Use the photographs below and answer the questions to help you to understand your own home region. Even if some of the photographs do not relate to your area, studying them will help you to understand the problems which other parts of the world may experience when a natural disaster hits the headlines.

Landslides



A landslide in El Salvador in 2001

The town was built next to a very steep slope. The landslide was triggered by an earthquake and probably happened without warning. Estimate how many houses were destroyed or badly damaged by the landslide. Note: Landslides may occur in any area with steep slopes and do not need earthquakes to set them off.

Earthquakes



An aerial view of downtown Port Au Prince, Haiti in 2010

What would be the most likely cause of death or injury to the people in the building destroyed by the earthquake? Why would it have been much worse if the roof had been made of concrete tiles or mud bricks, rather than corrugated metal sheets?

Tsunamis



A tsunami in Thailand in 2004

What would you do if you were in this place and you saw the sea go out very quickly, as though the tide had dropped suddenly?

Note: Tsunamis are associated with active tectonic plate margins, but may also occur elsewhere, as shown by the photograph below.

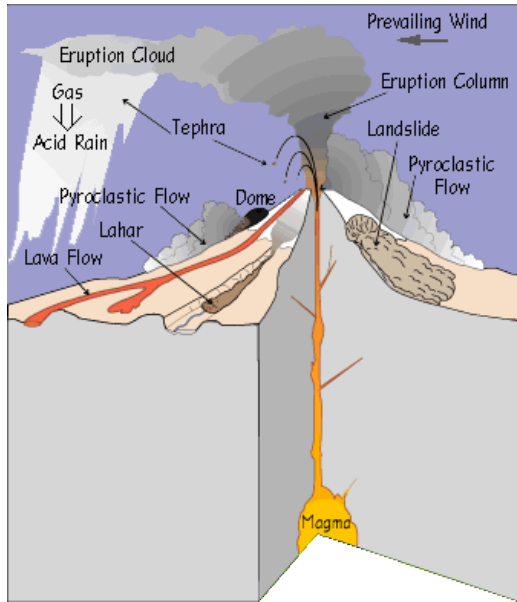


A tsunami deposit in eastern Scotland, caused when a huge underwater slide took place off the coast of Norway about 8,000 years ago (Storegga Slide)

Volcanoes



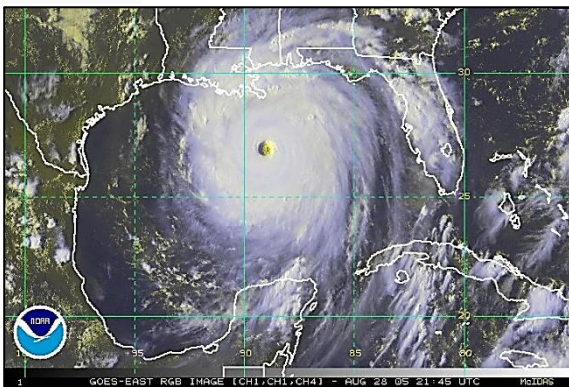
Mayon Volcano in the Philippines, 1984



Possible hazards associated with an "explosive" type of eruption

How many of the hazards shown in the diagram can you spot in the photograph of Mayon Volcano?

Hurricanes



Hurricane Katrina approaching the USA in 2005



Aerial view of houses in the New Orleans area following Hurricane Katrina, August 2005.

We associate hurricanes with damage from very high wind speeds, but what other hazard is shown in the photograph?

Tornadoes



A tornado approaching Elie, Manitoba, Canada in 2007

What would you expect to happen if this tornado passed over a recently ploughed field? (There is some evidence in the photo). What might happen when it reaches the telegraph poles?

Asteroid impacts



Barringer Crater, Arizona, USA, diameter about 1.2km

This crater was created about 50,000 years ago when an asteroid about 50m across crashed into the ground. Millions of tiny bits of space debris hit the Earth every day, but large ones are thankfully very rare. Carry out an online search to see if large asteroids can be predicted, and if it might become possible to steer them away from Earth.

Specific environments

What natural hazards would you expect if you lived in each of the following environments?

- on a low-lying coastal plain near an active plate margin;
- in a deep valley in a mountainous region in the middle of a continent;
- near the steep-sided slopes of a volcano which emitted steam from time to time;
- beside a wide slow-flowing river, distant from an active plate margin.

The back up

Title: Which natural hazards could damage the area where you live?

Subtitle: How safe is your home area?

Topic: Look around your local region to suggest what natural hazards might affect it in the future.

Age range of pupils: 11 years upwards

Time needed to complete activity: 20 minutes

Pupil learning outcomes: Pupils can:

- interpret evidence from photographs;
- become aware of possible natural hazards in their own home region;
- empathise with those who have suffered damage, injury or loss of life because of natural disasters.

Context: Several photographs are used to stimulate discussion about natural hazards in pupils' own home regions. Suggested answers to questions are:

- **Landslide, El Salvador:** About 50 - 60 houses appear to have been destroyed or severely damaged, possibly resulting in the deaths of around 200 people.
- **Earthquake, Haiti:** Falling masonry is usually the major cause of death when an earthquake hits a populated area, accompanied possibly by electrocution from broken power lines. Fire from broken gas mains is a common problem, but not in this photo. Falling heavy roofing materials are a specific problem, although here the lighter corrugated metal roof probably caused less death or injury.
- **Tsunami, Thailand:** When a tsunami wave approaches a shallow sloping coastline, the first indication of its approach is when the sea water draws back far faster than a falling tide. This is the time to run for higher ground or to take refuge in a well-built high-rise property. In the 2004 tsunami in Thailand, many lives were saved when a schoolgirl on holiday recognised the signs and persuaded the lifeguards to clear people from the beach. The tsunami deposit shown in the photograph resulting from the underwater slide off the Norwegian coast (Storegga Slide), happened in prehistoric times, but evidence from the coasts of Northern Europe suggest that it was a "megatsunami").
- **Mayon Volcano, Philippines:** The photograph shows the eruption column (which reached a height of 15km), the eruption cloud and three pyroclastic flows. It might be inferred that rainfall is occurring in the dark cloud to the left, which in turn could generate lahars (mudflows). Volcanic ash fell within about 50 km toward the west. There were no casualties, because more than 73,000 people evacuated the danger zones, as recommended by scientists of the Philippine Institute of Volcanology and Seismology.

- **Hurricane, New Orleans:** Pupils may be familiar with TV pictures of the destructive effects of the very strong winds associated with hurricanes, but in low-lying river flood plains or coastal areas the water can also be moved by the wind and disastrous floods may result.
- **Tornado, Manitoba:** Very localised tornadoes occur when the land below is excessively heated. In this case, the dust cloud suggests that a farmer's bare soil is being carried away. The telegraph lines and poles would probably be brought down and broken.
- **Asteroid crater, Arizona:** Astronomers are now able to predict the path of large asteroids, and it has been suggested that an asteroid which threatened the Earth could be deflected or broken up before it hits, but any such solutions are in the very early stages of development.
- **Specific environments:**
 - a) The low-lying coastal plain might experience earthquakes, tsunamis, flooding, hurricanes if in appropriate latitudes, or volcanic eruptions if existing volcanoes were present.
 - b) The deep valley would probably be remote from most hazards, other than landslide. This might block the valley and lead to the formation of a lake, or if millions of tonnes of rock were to fall into an existing water reservoir, it could cause catastrophic flooding over the dam wall.
 - c) A steep sided volcano is likely to be of the "explosive" type, and people could experience ash fall, pyroclastic flows, lahars, acid rain, lava flows, lateral blasts, earthquakes and/or landslides.
 - d) The slow-flowing river will have built up a flood plain over time, which as the name suggests, is liable to become flooded, even if at irregular unpredictable intervals.

All) An asteroid could strike the Earth at any time, in any place.

Following up the activity: Pupils could assess the likelihood of natural disasters in their own region and search for media reports of earlier events. Several Earthlearningidea activities relate to this topic. See Useful Links.

Underlying principles:

- Most geological processes take place very slowly, but some are rapid enough to cause a human catastrophe.
- Catastrophic events may be repeated at the same site, e.g. earthquakes caused by faults.
- Most catastrophic events take place at former active plate margins, but others may occur in less active areas, such as tsunamis on a coast distant from the earthquake, landslides etc.
- Some countries have set up disaster warning systems to try to alert their population in advance, but many events are virtually

unpredictable, notably as to the time when they will happen.

Thinking skill development: Realising that disastrous events can happen in their own home region is a bridging activity.

Resource list:

- paper copies of these sheets, or the facility to project the images onto a screen.

Useful links: For a range of activities on this topic see:

https://www.earthlearningidea.com/English/Natural_Hazards.html

Source: Written by Peter Kennett of the Earthlearningidea Team.

Sources of images

Landslide in Venezuela: <https://commons.wikimedia.org/w/index.php?curid=1810936> Public Domain

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Tsunami in Thailand: https://upload.wikimedia.org/wikipedia/commons/1/14/Tsunami_Phuket.jpg By FlyAkwa
- This file is licensed under the [Creative Commons Attribution-Share Alike 4.0 International](https://creativecommons.org/licenses/by-sa/4.0/) licence.

Tsunami deposit, Scotland:

https://upload.wikimedia.org/wikipedia/commons/9/96/Storegga_tsunami_deposits%2C_Montrose_basin_%28Maryton%29.jpg (licensed under the [Creative Commons Attribution-Share Alike 3.0 Unported](https://creativecommons.org/licenses/by-sa/3.0/) licence. *Stozy10*)

Mayon Volcano: <https://commons.wikimedia.org/w/index.php?curid=246427> Public Domain

Volcano diagram: <https://commons.wikimedia.org/w/index.php?curid=9771298> Public Domain

Hurricane Katrina: <https://upload.wikimedia.org/wikipedia/commons/d/db/NOAA-Hurricane-Katrina-Aug28-05-2145UTC.jpg> Public Domain

Aerial view of houses in New Orleans: <https://www.britannica.com/event/Hurricane-Katrina> (Paul Morse/The White House)

Tornado https://commons.wikimedia.org/wiki/File:F5_tornado_Elie_Manitoba_2007.jpg (Justin1569 at [English Wikipedia](https://en.wikipedia.org/)) This file is licensed under the [Creative Commons Attribution-Share Alike 3.0 Unported](https://creativecommons.org/licenses/by-sa/3.0/) licence.

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