

A tsunami through the window - what would you see, what would you feel?

Asking pupils to picture for themselves what a tsunami through the window might look like

Look through the window, or through the doorway, with your class. Ask them to discuss in small groups what they might see and feel if a major tsunami wave hit the view they can see outside. Then ask them what they would do and why. Use the photo below to trigger their thinking.

You could ask questions like these:

- If a big tsunami wave came from the left, what would it look like?
- How high up the buildings/trees you can see would the wave come?
- How fast would it be flowing?
- What colour would it be?

- Would it be carrying anything? What?
- Could you get out of the way?
- How would you feel as the wave came?
- What would you do?
- What would you get your friends to do?
- What might have caused the wave?
- Can we find out when waves like these are coming?

Explain that tsunamis only badly affect low lying coastal areas, so if they are in a higher or inland area, they are quite safe!



A tsunami strikes - the 2004 tsunami strikes the coast of Thailand at Ao Nang. Photo by David Rydevik: skylark292@gmail.com



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The back up

Title: A tsunami through the window - what would you see; what would you feel?

Subtitle: Asking pupils to picture for themselves what a tsunami through the window might look like

Topic: A 'thought experiment' imagining how a tsunami would affect the view through the window.

Age range of pupils: 8 – 18 years

Time needed to complete activity: 15 – 30 minutes

Pupil learning outcomes: Pupils can:

- describe a tsunami as a large wave or waves;
- explain how a tsunami might affect a built up area and its population;

- describe how they might be able to save themselves and others if a tsunami struck the area where they were;
- explain the causes of tsunamis.

Context:

The class is asked a series of questions about what a tsunami is like, as they look through the window or doorway (having looked at a photo or photos first). They are asked discuss the answers in groups to provide a better 'feel' for what it might actually be like to be there. Note: the wave doesn't necessarily have to come 'from the left' (it could be from the right, or straight ahead) but it is useful if the pupils all use the same scenario. Some possible responses, for discussion, are given below.

If a big tsunami wave came from the left, what would it look like?	If you saw it across the beach, it would be a white breaking wave a couple of metres or so high. By the time it reaches the buildings, it will probably be less than a metre high – but it moves forward inexorably, sweeping away things in its path. It looks spectacular in this photo because it has probably hit a barrier. Although tsunami waves of 30m high have been recorded, they are very unusual.
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How high up the buildings/trees you can see would the wave come?	If it is funnelled between buildings, it may be at house height, if not, it is often just a metre or so high.
How fast would it be flowing?	It flows across the ground a lot faster than people can run – at up to 30 kmh^{-1} – since it often sweeps them away.
What colour would it be?	It is a white breaking wave at sea, but inland, it is often brown from the mud it has picked up.
Would it be carrying anything? What?	It will have picked up anything that floats, including cars, people, branches of trees and parts of buildings.
Could you get out of the way?	Not if you were too near the coast and had no warning.
How would you feel as the wave came?	Like the people in the photo – you would be very afraid.
What would you do?	If you are in a solid building – run upstairs. If not, try to hang on to a tree or something similar. If you had been warned beforehand, you should have gone inland to some higher ground. Contact the Emergency Services.
What would you get your friends to do?	Your friends should do the same, without too much panic, if possible.
What might have caused the wave?	Most tsunami waves are caused by earthquakes. The Indian Ocean tsunami on Boxing Day 2004 was caused by an undersea earthquake where the seabed moved by several metres. The wave produced at the surface of the water above the earthquake epicentre was a series of low waves, but these became higher as they moved towards the shore on gently shallowing coasts, and caused devastation as they moved inland. A web search will reveal many photos of the devastation caused. Tsunamis can also be caused by some sorts of volcanic eruptions, by major landslides and by large meteorite impacts on the ocean.
Can we find out when waves like these are coming?	The first local indication that a tsunami is approaching a beach may be that the water suddenly <u>withdraws</u> , like a rapidly dropping tide (when the trough of the wave arrives before the crest – there is a 50/50 chance of which arrives first). If recognised, this can give enough time for the authorities to clear the beach. There is a tsunami warning system around the Pacific Ocean where major earthquakes are monitored and sensors can detect the passing of a tsunami wave. Since they travel across the deep ocean at a known speed of nearly 1000 kmh^{-1} , the time when they will reach shore at coastal areas hundreds of kilometres away can be predicted and the people can be warned. In these areas, it is important not only to warn people, but also to educate them about what to do if a warning sounds. See http://wcatwc.arh.noaa.gov/book05.htm for an example of a booklet for children and their parents. At present, there is no systematic warning network around the Indian or Atlantic Oceans, where tsunamis are less common.

Explain that tsunamis only badly affect low lying coastal areas, so if they are in a higher or inland area, they are quite safe! Also, they are most common in the Pacific Ocean, less common in the Indian Ocean and uncommon in the Atlantic Ocean. However, even in oceans where tsunamis are uncommon – there is evidence of major tsunamis in the past (sometimes within living memory).

Following up the activity: Ask the pupils to think of the information they would include in a tsunami-warning booklet or poster for people in the area. They should explain what people should look for and what they should do.

Underlying principles:

- Tsunamis are waves caused by Earth activity (or a meteorite impact).
- Most are caused by earthquakes and occur in the active plate margin areas of the Earth.

- They are not felt in the deep ocean but become higher as they cross shallowing shorelines.
- When large tsunamis hit coastal towns and villages, they can sweep away all poorly built buildings in their path.
- The only safe places are upstairs in well built buildings or inland and in higher land areas.
- Large tsunamis can cause great damage and many lives to be lost.
- When proper warning systems are in place and people are educated on what to do if a tsunami strikes, many lives can be saved.

Thinking skill development:

Pupils are asked to translate their understanding from different situations and trigger photographs into the 'through the window' situation (bridging).

Resource list: No resources required – apart from a window/doorway and imagination!

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Useful links: If they have internet access, ask pupils to look at websites beforehand showing tsunami photographs, videos or information, such as:

- <http://wcatwc.arh.noaa.gov/physics.htm>
- www.3mfuture.com/.../tsunami-alarm-system.htm
- www.asiantsunamivideos.com/
- <http://www.tsunami.noaa.gov/kids.html>

- <http://geolsoclive.soukdev.com/webdav/site/GSL/shared/pdfs/education%20and%20careers/Tsunami.pdf>

Source: This activity was devised by Chris King of the Earthlearningidea team. Thanks to David Rothery of the Open University for his helpful comments.

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