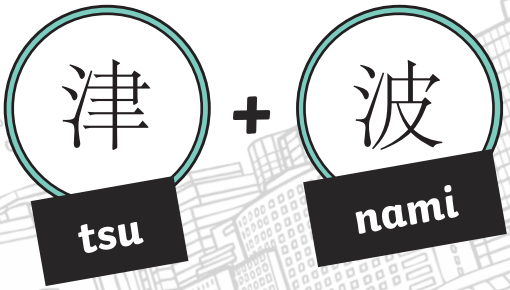
Tsunamis

Tsunamis are one of the most powerful and destructive natural forces on planet Earth.

Origin of the Name

The word tsunami is pronounced 'soo-nah-mee'. It originates from two Japanese words: 'tsu' meaning 'harbour' and 'nami' meaning 'wave'. The name means 'harbour wave' because tsunamis only seem to become visible when they are near the coast.



Tsunami or Tidal Wave?

Often, tsunamis are mistakenly called 'tidal waves'. However, they are not related to the tides, which are controlled by the Moon and the Sun.

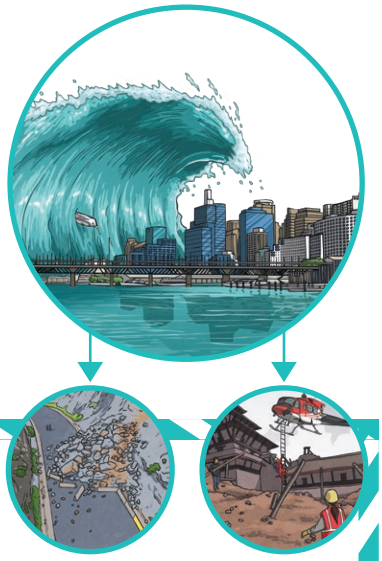
Tidal waves are shallow water waves which can be large in size but are always controlled by the Moon and the Sun. The waves are shallow and the energy moving within them comes from the wind. Tidal waves can only ever reach a limited size and speed.

A tsunami is a series of much larger waves. These waves are caused by the movement of a large amount of energy through the water, but this energy does not come from the wind. Instead, the energy is caused by an underwater volcanic eruption, an underwater landslide or, most commonly, an earthquake on the ocean's floor.

How a Tsunami Is Formed

A huge amount of energy under the water tries to travel to the ocean's surface. As it does, it pushes water up with it and this causes the sea level to rise. However, **gravity** pulls this water back towards Earth. This spreads the energy out to the sides. Water begins to race towards the land at speeds of up to 500 miles per hour, which is faster than an aeroplane can travel. The waves can cross an entire ocean in less than one day without losing energy.

When the tsunami is far away from the shore, it can be hard to spot. This is because the energy is moving through the entire depth of the water and the waves of the tsunami can be as small as one metre tall. However, as the tsunami gets closer to shore and the water becomes shallower, there is less water for the huge amount of energy to move through. This causes the waves to slow down and the water to become much taller.



Destructive Power

It is not always possible to spot a tsunami due to their quick yet barely noticeable journey across the ocean.
As humanly constructed defences cannot to stand up the sheer power of the tsunami, immediate devastation occurs. Boulders are lifted, buildings are destroyed and vehicles are swept away as the water races up to one mile inland before retreating back away from the coast.

A tsunami is not just one wave; it is a series of waves commonly known as a 'wave train'. It is not always the first wave of a tsunami which is most destructive. As tsunami waves are very long, they can reach the shore as far as one hour apart. This can give survivors a false sense of security.

How Science Can Help

As trying to stop a tsunami is impossible, scientists focus on developing ways of spotting tsunamis earlier so that people can be safely **evacuated**. They use advanced systems to monitor underwater activity which may show that an earthquake or eruption is imminent. They also invest time and effort into making sure that global communication systems are quick, effective and extensive.

Glossary	
evacuated	When something is removed from a dangerous place and taken to a safer place.
gravity	The force that pulls an object towards the centre of Earth.
originates	Originally comes from.

Questions

1. **This can give survivors a false sense of security.**
   What does this sentence mean? Tick one.
   - ○ Survivors feel safe and secure because the tsunami is over.
   - ○ Survivors contact security services at the wrong time.
   - ○ Survivors feel as though the danger is over when it isn't.
   - ○ Survivors evacuate from the area at the correct time.

2. From which language does the word 'tsunami' originate? Tick one.
   - ○ English
   - ○ Chinese
   - ○ Swahili
   - ○ Japanese

3. What does the word tsunami translate into English as?

   _____

4. Look at the section called **Tsunami or Tidal Wave?**
   Find and copy one word which means that it is an error to call a tsunami a tidal wave.

   _____

5. Which event most commonly causes the energy found in a tsunami's waves?

   _____

6. Summarise what happens when a tsunami's waves reach shallow water.

   _____

   _____

   _____

7. Explain why a tsunami is difficult to spot when it is far away from the shore.

   _____

   _____

   _____

8. What do you think scientists' main focus should be: underwater monitoring or communication systems? Give a reason for your answer.

9. Give **two** common misconceptions about tsunamis and correct them.

Answers

1. **This can give survivors a false sense of security.**
   What does this sentence mean? Tick one.
   - ◯ Survivors feel safe and secure because the tsunami is over.
   - ◯ Survivors contact security services at the wrong time.
   - ⊘ **Survivors feel as though the danger is over when it isn't.**
   - ◯ Survivors evacuate from the area at the correct time.
2. From which language does the word 'tsunami' originate? Tick one.
   - ◯ English
   - ◯ Chinese
   - ◯ Swahili
   - ⊘ **Japanese**
3. What does the word tsunami translate into English as?
   The word tsunami translates into English as 'harbour wave'.
4. Look at the section called **Tsunami or Tidal Wave?**
   Find and copy one word which means that it is an error to call a tsunami a tidal wave.
   mistakenly
5. Which event most commonly causes the energy found in a tsunami's waves?
   The energy is most commonly caused by an earthquake on the ocean's floor.
6. Summarise what happens when a tsunami's waves reach shallow water.
   Pupils' own responses, such as: When a tsunami's waves reach shallow water, there is less water for the energy to move through so the waves slow down and the water becomes much taller.
7. Explain why a tsunami is difficult to spot when it is far away from the shore.
   Pupils' own responses, such as: It is difficult to spot a tsunami when it is far away from the shore because the energy is moving through the entire depth of the water and the waves of the tsunami can be as small as one metre tall.
8. What do you think scientists' main focus should be: underwater monitoring or communication systems? Give a reason for your answer.
   Pupils' own responses, such as: I think that underwater monitoring should be the main focus of scientists. Without this, there will be no point having communication systems if no one knows that there is a message to pass on.
9. Give **two** common misconceptions about tsunamis and correct them.
   Pupils' own responses, such as: One common misconception is that tsunamis and tidal waves are the same but tsunamis are not controlled by the Moon or the Sun. Secondly, it is a misconception that a tsunami is a single wave when they are actually a series of waves.