

# What Causes A Tsunami?

Throughout history, a frequently occurring phenomenon on Japanese shores.

# Tsunami

'tsu' meaning 'harbour'

'nami' meaning 'wave'

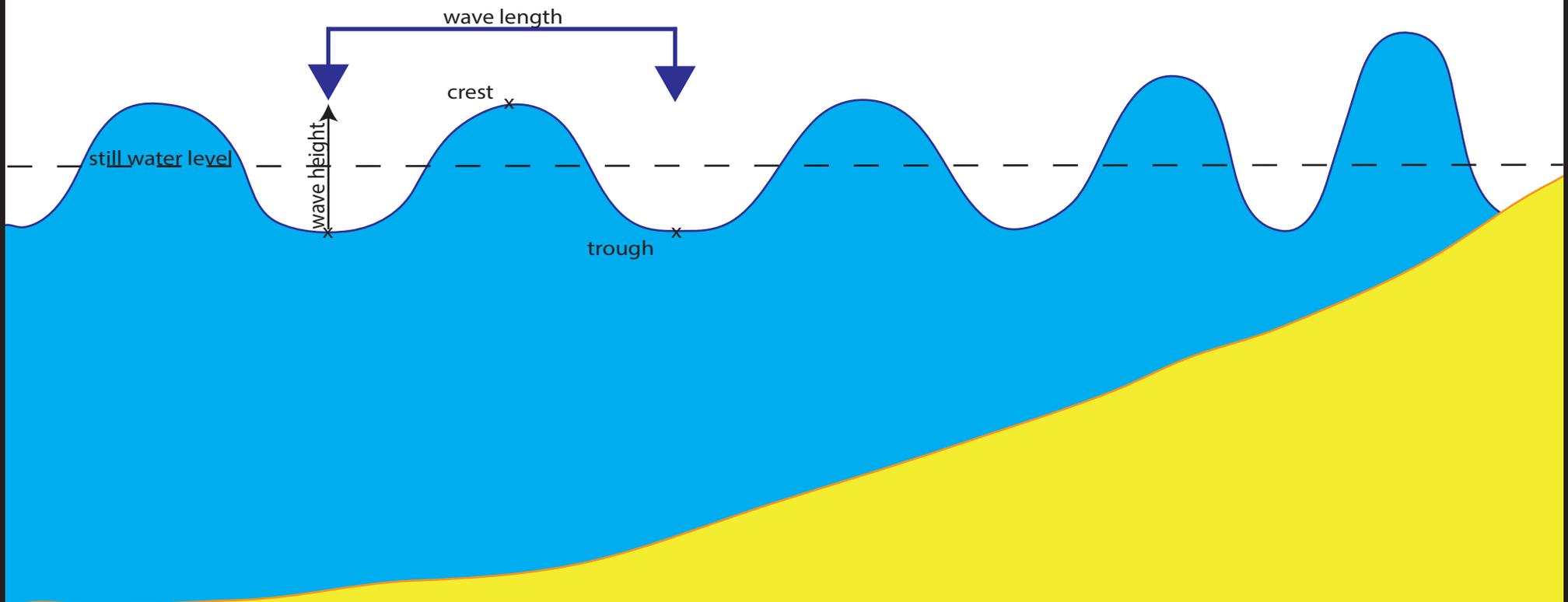


Moving water is powerful.



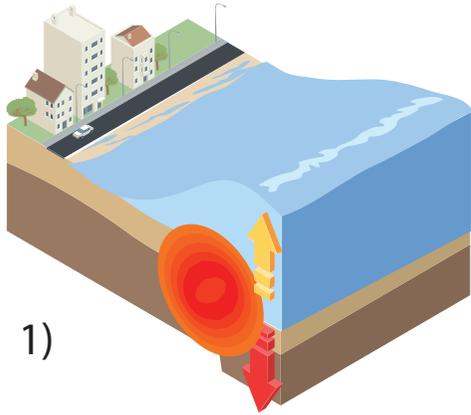
In deep water, wave length remains constant.

As waves enter shallow water the wave height increases and the wave length decreases.



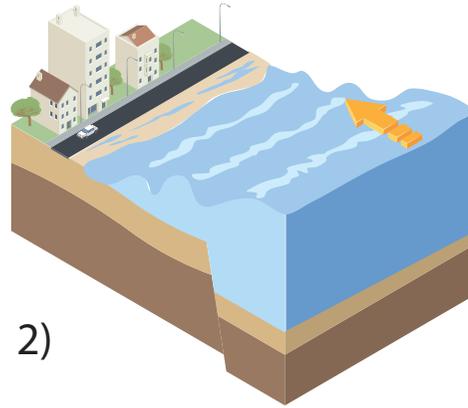
# How Waves Form

# How a Tsunami Forms



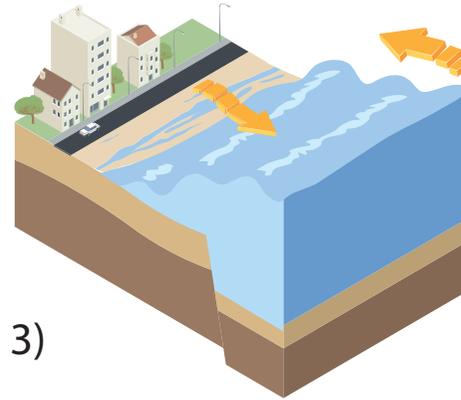
1)

1) An earthquake or underwater volcanic eruption causes a sudden vertical displacement of the sea bed. Waves are set into motion from the epicentre of the event, moving at high speed across the surface of deep water.



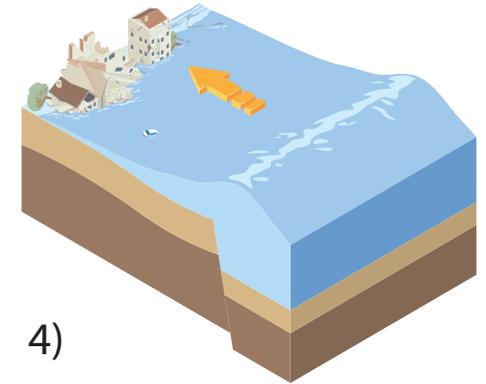
2)

2) As the waves approach the shallower water of the shore, the wavelength decreases and the height of the waves increase.



3)

3) If the trough of the wave hits the shore first, drawback occurs. This is where the water on the shore recedes toward the ocean, followed shortly by the crest of the large wave.



4)

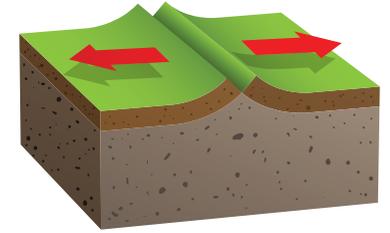
4) The large wave surges forward flooding the shore at great speed. Tsunamis often have more than one wave surge which can be hours apart.

# Movement of Tectonic Plates Around the Earth's Crust

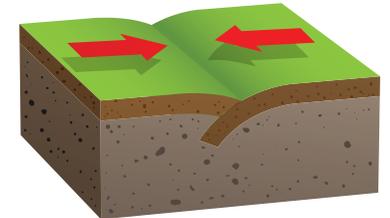
The surface of the Earth is ever changing. New rock is formed by volcanoes along Divergent Plate boundaries (many of which are under the sea). Some plates are forced down into the mantle along Convergent Plate Subduction Zones. Earthquakes occur when the pressure that has built between two plates is suddenly released. This extremely slow process is called Continental Drift.



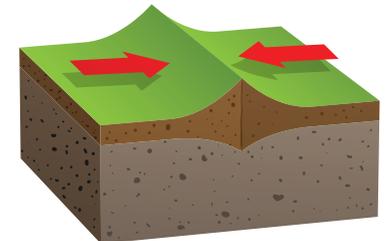
**Divergent Plates**  
(two plates move away from each other.)



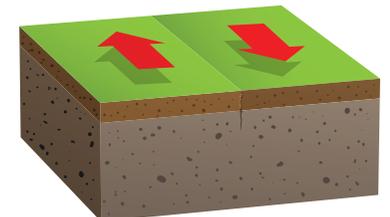
**Convergent Plates**  
**Subduction zone**  
(one plate moves under another and sinks into the mantle)



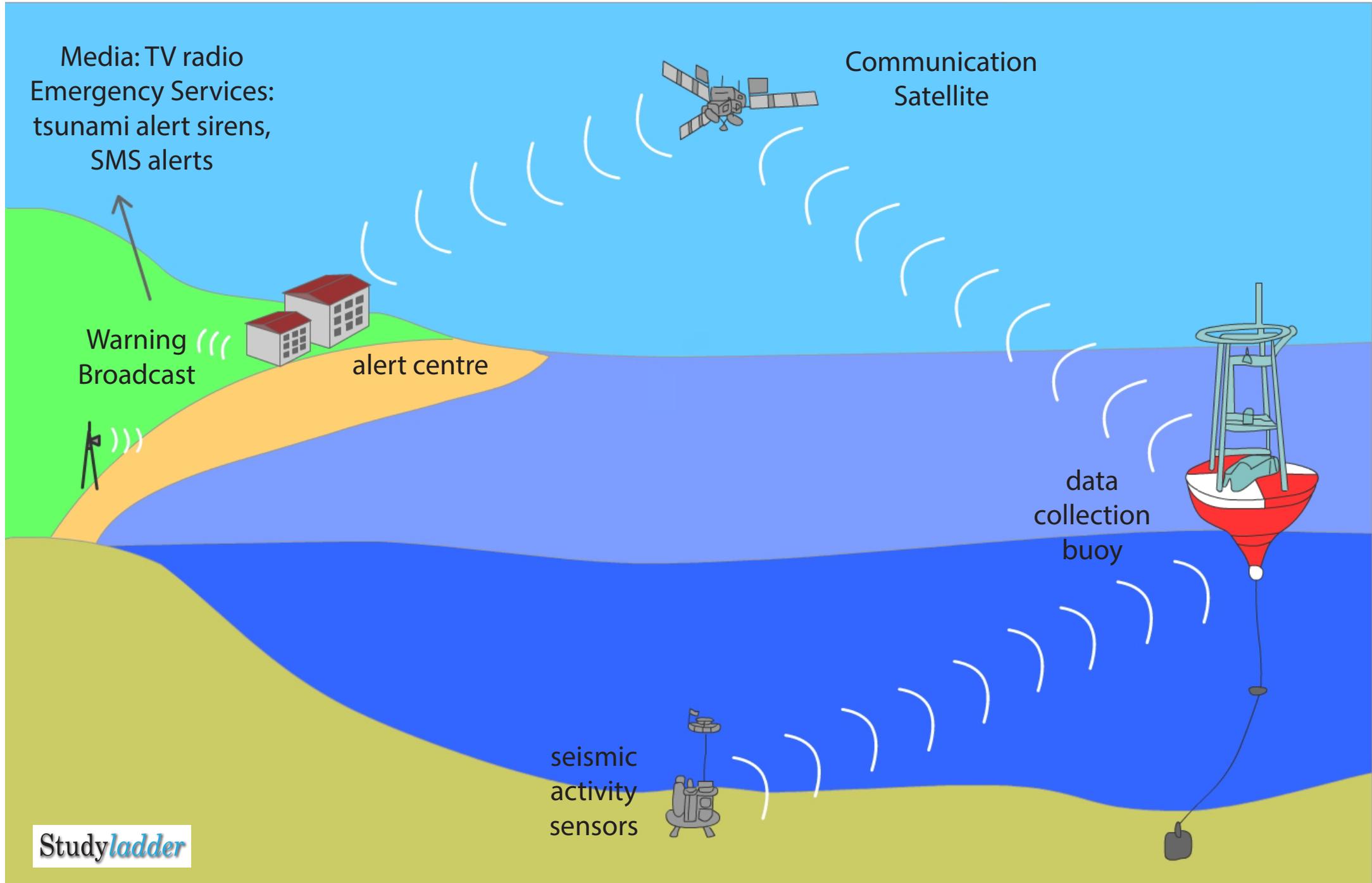
**Convergent Plates**  
(plates push toward each other, forcing upward movement and mountain building)



**Transform Plates**  
(plates slide along beside each other in opposite directions)



# Tsunami Early Warning System





## Discussion Points:

- 1) Where does the name 'tsunami' come from?
- 2) Why have tsunamis been so frequent in Japanese history?
- 3) What causes a tsunami?
- 4) When and where have the most destructive tsunamis occurred?
- 5) What warning systems do we have in place?