

Tracking Tsunamis

On December 26, 2004, scientists at the Pacific Tsunami Warning Center learned of the speed of the Indonesian tsunami and tracked it as it moved across the Indian Ocean. They were able to notify East African officials of the impending disaster. In this activity, you will calculate the approximate speed of three tsunamis and create a time travel map and chart that shows their arrival at specific geographic locations.

Procedure

- 1 Research and label your world map with each of the geographic locations presented in the scenarios.
- 2 Use your drawing compass to draw the wave front at each location as it radiates out from its epicenter. Place the compass tip on the epicenter and the pencil on the landfall location, then make the largest arc possible on the map. Do this for all scenario locations.
- 3 Read each of the scenarios on your "Tsunami Scenarios" handout and apply the formulas to determine the approximate speed of the tsunami and the time it takes for it to reach each location.
- 4 For each scenario, write down the order in which the tsunami will strike each location. List some ways that people, if notified, might prepare for the approaching tsunami.

WAVE SPEED FORMULA

$$\text{speed} = \sqrt{g \times d}$$

where speed (meters/second) = square root of g (acceleration due to gravity, which is $9.81 \text{ meters/second}^2$) $\times d$ (water depth in meters)

Your speed calculation initially will be in meters/second. Convert meters/second to kilometers/hour using the following formulas:

1 hour = 60 minutes = 3,600 seconds

1 kilometer = 1,000 meters

To convert your units to meters/hour, multiply your initial answer by 3,600. Divide the result by 1,000 to convert from meters/hour to kilometers/hour. Round your final answer to the nearest whole number.

TRAVEL TIMES CALCULATION

Calculate travel times by dividing distance by tsunami speed. Remember to convert the decimal part of the number to minutes by multiplying the decimal part by 60. For example, one point four (1.4) hours equals 1 hour and 24 minutes.

