

Overview:

The height of a tsunami wave can be enormous. In this lesson, students compare their heights to maximum wave run-up heights resulted from the 1964 Alaskan earthquake and tsunami.

Targeted Alaska Grade Level Expectations:

Science

[3] SA1.1 The student demonstrates an understanding of the processes of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating.

[4] SA1.1 The student demonstrates an understanding of the processes of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating.

Math

[3] S&P-1 The student demonstrates an ability to classify and organize data by [designing an investigation and collecting, recording L], organizing displaying, or explaining the classification of data in real-world problems (e.g., literature, self, or family), using bar graphs, and [Venn diagrams L]. (M6.1.1, M6.1.2, & M6.1.5).

[4] S&P-1 The student demonstrates an ability to classify and organize data by [designing an investigation and collecting L], organizing or displaying, using appropriate scale, data in real-world problems (e.g., social studies, friends, or school), using bar graphs, tables, charts, or diagrams with whole numbers up to 25. (M6.2.1 & M6.2.2).

[3] S&P-2 The student demonstrates an ability to analyze data (comparing, explaining, interpreting, or justifying conclusions) by using information from a variety of displays (tallies, tables, pictographs, bar graphs, or [Venn diagrams L]). (M6.1.2)

[3] S&P-3 The student demonstrates an ability to analyze data (comparing, explaining, interpreting, or justifying conclusions) by using the terms “maximum” or “minimum.” (M6.1.3)

[4] S&P-2 The student demonstrates an ability to analyze data (comparing, explaining, interpreting, evaluating; drawing or justifying conclusions by using information from a variety of displays (tables, bar graphs, or Venn diagrams). (M6.2.2)

Objectives:

The student will:

- use a meter stick to measure height;
- record data on a bar graph;
- compare student height to maximum wave heights; and
- analyze data on a graph.

Materials:

- Map of Alaska
- Post-it notes
- Meter sticks
- STUDENT WORKSHEET: “Tall Waves”

Science Basics:

The 1964 Alaskan earthquake set off a chain of events that had disastrous consequences for many communities. Due to the earthquake, a tsunami was generated. The epicenter for this earthquake was in northern Prince William Sound, and the seafloor was thrust upward from there southward near Kodiak Island. Additionally, strong shaking from the earthquake caused five landslides that generated local tsunamis. The five landslides were near Valdez (two), Seward, Whittier and Kachemak Bay. The largest reported wave height occurred in Shoup Bay, close to Valdez. It was 67 meters high!

Activity Procedure:

1. Explain that tsunamis can generate very high waves. Today, students will investigate how high some of the tsunami waves were that hit some communities in Alaska in 1964.
2. Share information from the section "Science Basics," then distribute the STUDENT WORKSHEET: "Tall Waves." Review the information on the worksheet then identify the location of the five communities listed on the worksheet. Mark the locations on the map with Post-it notes. Also mark the approximate epicenter in northern Prince William Sound and explain that this is the closest surface location of where the rupture began. Mark the local community as well for comparison.
3. To create more of a visualization of how high one of the waves was, have students hold six meter sticks together. This represents the height of one of the waves that hit Kodiak.
4. Then show students how to fill in one piece of data on the graph. Pair students up to measure each other with the meter stick then have them continue filling in the worksheet. One column is left blank for the teacher or the students to add additional height comparison. Some ideas for this column include height of the teacher or height of the ceiling.
5. Follow-up questions:
 - A. Of the five communities listed, which one had the maximum height for a tsunami wave? Chenega had the highest wave. It was 27 meters high.
 - B. Of the five communities listed, which one had the minimum height for a tsunami wave? Kodiak had the shortest wave. It was six meters high.
 - C. What was the difference in height between the student and the highest wave in Seward? Answers will vary.
 - D. What was the difference in height between the student and the highest wave in Chenega? Answers will vary.
 - E. Which communities had waves of the same height? Kaguyak, Valdez and Seward all had tsunami waves that were nine meters high.
6. Additional questions:
 - A. What is the average height of the five communities listed? The average height is 12 meters.
 - B. The highest wave in Shoup Bay was 67 meters high. How many meters higher was the Shoup Bay wave compared to the other waves? It was 58 meters higher than the waves in Kaguyak, Valdez and Seward. It was 61 meters higher than the wave in Kodiak. It was 40 meters higher than the wave in Chenega.
 - C. How many times higher was the wave in Shoup Bay compared to the other waves? It was about seven times higher than the waves in Kaguyak, Valdez and Seward. It was about 11 times higher than the wave in Kodiak. It was about twice the height of the wave in Chenega.
 - D. How many times higher was the Shoup Bay wave than the student? Answers will vary.

Answers:

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Height in Meters	Kaguyak	Kodiak	Chenega	Valdez	Seward	My Height	
	Highest Tsunami Waves From 1964						

Name: _____



Student Worksheet

Tall Waves

Directions: Fill in the graph below using the information from the table and your height.
Height of Tallest Recorded Tsunami Waves from 1964. (rounded to nearest meter)

Community	Kaguyak	Kodiak	Chenega	Valdez	Seward
Height	9	6	27	9	9

My height (in meters): _____m

Graph the information:

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Height in Meters	Kaguyak	Kodiak	Chenega	Valdez	Seward	My Height	
	Highest Tsunami Waves From 1964						