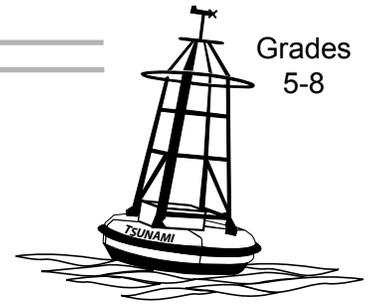


Tsunami Misconceptions

Grades
5-8



Overview:

Students learn that tsunamis reach coastlines as waves of varying heights. At times, the waves have a devastating impact; at other times, they are barely perceptible.

Targeted Alaska Grade Level Expectations:

Science

[7] SB4.3 The student demonstrates an understanding of motions, forces, their characteristics, relationships, and effects by describing the characteristics of a wave (i.e., amplitude, wavelength, and frequency).

[7-8] SG3.1 The student demonstrates an understanding that scientific knowledge is ongoing and subject to change by revising a personal idea when presented with experimental/observational data inconsistent with that personal idea (e.g., the rates of falling bodies of different masses).

Objectives:

The student will:

- graph maximum water height data for various Alaskan tsunamis;
- revise personal ideas about the characteristics of a tsunami as necessary; and
- describe the characteristics of tsunami waves.

Materials:

- Meter sticks (one per group)
- Scissors (one per group)
- Register tape (one large—at least 200 feet—roll per group)
- Masking tape (one roll per group)
- Writing implement as needed
- STUDENT INFORMATION SHEET: “Tsunami Misconceptions”
- STUDENT WORKSHEET: “Tsunami Misconceptions”

Science Basics:

A tsunami is a series of waves with very long wavelengths and long periods generated by a sudden displacement of seawater. Wavelength describes the distance from crest to crest or trough to trough of waves in a series. Period describes the time between waves. Tsunamis can have wavelengths of more than 300 miles and periods of ten minutes to two hours. Not all tsunami waves strike coastlines at devastating proportions. They range in size from inches to over a hundred feet. Tsunamis are significantly altered by local bathymetry and harbor shapes. As tsunamis move into shallow water, the wave height can increase by more than ten times! Whether the waves strike at high or low tide can influence tsunami water height and inundation. Distance from the source of the tsunami is another factor. Worldwide, an average two tsunamis per year inflict damage near the source. About every 15 years, a destructive, ocean-wide tsunami occurs. Alaska is at greatest risk from tsunamis generated locally.

Activity Procedure:

1. Explain that during this activity students will graph the water height of several waves that struck Alaska coastlines since 1900. They will study the graph and identify which of the waves were tsunamis. (NOTE: Do not reveal that all of the waves in the chart are tsunamis until later in the lesson.)
2. Divide students into groups of four. Distribute a meter stick, scissors, register tape, masking tape, and a STUDENT INFORMATION SHEET to each group. Assign each group several water heights to graph.
3. Take students to the gym or hallway and demonstrate how to create a bar graph on the floor. Measure and cut register tape at the appropriate length to represent the water height for one of the waves on the STUDENT INFORMATION SHEET chart. Label the bar by writing the year, location and water height. Establish an X-axis for the class graph. Use a line on the gym floor, or create a tape line in the hallway.
4. Demonstrate how to tape the bar to the floor with its base on the X-axis. Ask groups to create bars for each of the water heights they were assigned, and arrange the bars on the line to create a class graph. Encourage students to arrange the bars from shortest to longest. Some of the water heights (those over 50 meters) in the chart cannot be illustrated using the register tape. Others may be too long for the gym or hallway. For those heights, ask students to roll out the maximum length of tape that will fit in the space, and write "to be continued" on one end of the bar.

Critical Thinking:

Think-Pair-Share Method: When the class graph is complete, ask students if they know which of the waves represented in the graph were tsunamis, and how they know. Ask students to talk about the questions with their group. Ask groups to share their ideas with the class.

5. After all groups have shared their ideas, explain that ALL of the waves in the graph were tsunamis. A tsunami is a series of waves with very long wavelengths and long periods generated by a sudden displacement of water within a large body of water. Review the definitions of wavelength and period as necessary. Tsunamis can have wavelengths of more than 300 miles and periods of ten minutes to two hours. Not all tsunami waves strike coastlines at devastating proportions. They range in size from inches to over a hundred feet.
6. Distribute the STUDENT WORKSHEET: "Tsunami Misconceptions" and ask students to complete the questions.

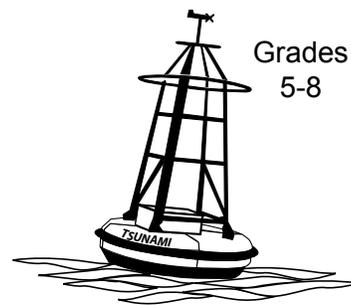
Answers:

1. A) All of them
2. Answers will vary but should indicate that tsunamis have long wavelengths of 300+ miles and long periods of ten minutes to two hours.

Student Information Sheet

“Tsunami Misconceptions”

Grades
5-8

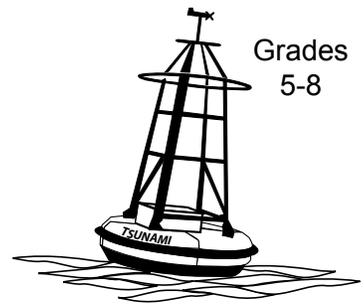


Year	Location	Water Height (meters)
1905	Disenchantment Bay, AK	33.53
1929	Cherni Island, Fox Islands, AK	1.00
1936	Lituya Bay, AK	149.35
1938	Sitka, AK	.08
1946	Unimak Island, AK	35.05
1957	Scotch Cap, AK	15.24
1958	Lituya Bay, AK	524.26
1964	Shoup Bay, AK	67.00
1965	Shemya Island, AK	10.67
1965	Attu, AK	.10
1971	Adak, AK	.04
1972	Juneau, AK	.10
1986	Adak, AK	.88
1987	Yakutat Bay, AK	.06
1988	Yakutat Bay, AK	.19
1989	Sand Point, AK	.10
1991	Unalaska, AK	.30
1994	Skagway, AK	7.62
1996	Adak, AK	.51
1996	Adak, AK	.13

Name: _____

Student Worksheet

“Tsunami Misconceptions” (page 1 of 2)



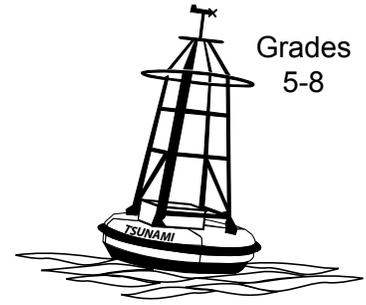
Year	Location	Water Height (meters)	Source Location
1905	Disenchantment Bay, AK	33.53	Disenchantment Bay, AK
1929	Cherni Island, Fox Islands, AK	1.00	Fox Islands, Aleutian Islands, AK
1936	Lituya Bay, AK	149.35	Lituya Bay, AK
1938	Sitka, AK	.08	Shumagin Islands, AK
1946	Unimak Island, AK	35.05	Unimak Island, AK
1957	Scotch Cap, AK	15.24	Andreanof Islands, AK
1958	Lituya Bay, AK	524.26	Southeast Alaska, AK
1964	Shoup Bay, AK	67.00	Prince William Sound, AK
1965	Shemya Island, AK	10.67	Rat Islands, Aleutian Islands, AK
1965	Attu, AK	.10	Rat Islands, Aleutian Islands, AK
1971	Adak, AK	.04	Andreanof Islands, AK
1972	Juneau, AK	.10	Southeast Alaska, AK
1986	Adak, AK	.88	Andreanof Islands, AK
1987	Yakutat Bay, AK	.06	Gulf of Alaska, AK
1988	Yakutat Bay, AK	.19	Gulf of Alaska, AK
1989	Sand Point, AK	.10	Semedi Islands, AK
1991	Unalaska, AK	.30	Bering Sea, AK
1994	Skagway, AK	7.62	Skagway, AK
1996	Adak, AK	.51	Andreanof Islands, AK
1996	Adak, AK	.13	Andreanof Islands, AK

1. Which of the waves on the chart above are tsunami waves?
 - A. All of them
 - B. Those with a water height of more than .10 meter
 - C. Those with a water height of more than 1 meter
 - D. Those with a water height of more than 10 meters

Name: _____

Student Worksheet

“Tsunami Misconceptions” (page 2 of 2)



2. **Directions:** Read the information below and answer the question.

A tsunami is a series of waves with very long wavelengths and long periods generated by a sudden displacement of water within a large body of water. Wavelength describes the distance from crest to crest or trough to trough of waves in a series. Period describes the time between waves. Tsunamis can have wavelengths of more than 300 miles and periods of ten minutes to two hours between waves. Not all tsunami waves strike coastlines at devastating proportions. They range in size from inches to over a hundred feet.

Describe typical characteristics of tsunami waves, including wavelengths and periods. Use complete sentences.
