



High School Science Virtual Learning

Earth Science

Waves, Tides, Breezes

May 13, 2020



High School Earth Science

Lesson: May 13, 2020

Objective/Learning Target:

Students will be able to describe the properties of waves, tides, and ocean breezes.



Let's Get Started:

Read: How Do Tides and Waves Work

[Link to page](#)

Questions:

1. What is the difference between a tidal wave and a tsunami?
2. Can two smaller ocean waves combine together to form a larger wave?



Let's Get Started: **Answer Key**

1. Question 1- **Tidal waves are caused by the interaction between the ocean and the Moon and/or Sun's gravity.**
2. Question 2 - **Yes, during constructive interference two properly aligned waves can combine together to make a larger wave during the moment they meet.**



Lesson Activity: **Ocean Waves**

Directions: Read - “*Waves*” from the National Weather Service *JetStream*

[Link to page](#)

Complete the guided reading questions on the following slide.



1. Describe three factors that affect the size of a wave.
2. Click on the link “Anatomy of a Wave”. Describe the motion of an object floating in the water as waves pass by.
3. How does the size of a wave change as it approaches the shoreline?
4. What are “rogue” waves?



Lesson Activity: **Tides**

Directions: Read “Tides” from the National Weather Service
JetStream

[Link to Page](#)

Complete the guided reading questions on the following slide.



1. What causes tides?
2. Which has a greater effect on tides; the Sun or the Moon?
Why?
3. Describe the two main types of tides and what causes them.



Lesson Activity: **Sea Breezes**

Directions: Read “The Sea Breeze” from the National Weather Service *JetStream*

[Link to Page](#)

Complete the guided reading questions on the following slide.

1. What causes a *sea breeze*?
2. What causes a *land breeze*?
3. Complete the table below.

Type of breeze	Direction of travel	Relative temperature
Sea breeze		
Land breeze		



Answers

1. Describe three factors that affect the size of a wave.
 - Wind strength.** The wind must be moving faster than the wave crests for energy to be transferred.
 - Wind duration.** Strong wind that does not blow for a long period will not generate large waves.
 - Fetch.** This is the uninterrupted distance over which the wind blows without significant change in direction.
2. Click on the link “Anatomy of a Wave”. Describe the motion of an object floating in the water as waves pass by. **It moves in a circular motion.**
3. How does the size of a wave change as it approaches the shoreline? **increase in height up to 1.5 times their height in deep water**
4. What are “rogue” waves? **unusually large waves appearing in a set of smaller waves**

1. What causes tides? Tides result from the pull of gravity; on the earth alone, between the earth and moon and between the earth and the sun.
2. Which has a greater effect on tides; the Sun or the Moon? Why? Because of the close proximity of the moon, when compared to the sun, the tidal pull by the moon is over twice that of the sun.
3. Describe the two main types of tides and what causes them.

Spring tide is a higher than normal high tide that occurs when the Sun, Earth, and Moon are all aligned.

Neap tide is a lower than normal high tide that occurs when the Sun, Earth, and Moon form a right angle.

1. What causes a *sea breeze*? **Rising warm air over land draws in cooler air from over the water.**
2. What causes a *land breeze*? **Rising warm air over the water draws out cooler air from over the land.**
3. Complete the table below.

Type of breeze	Direction of travel	Relative temperature
Sea breeze	Toward the land	Cooler
Land breeze	Toward the water	Warmer

Extensions:

Video “Tides Explained”

[Link to Video](#)

1. Why does the Moon have a greater effect on tides than the Sun?
2. How many tides typically occur each day?

Video “How Do Ocean Waves Work?”

[Link to Video](#)

1. Name three types of waves.
2. Do waves move the water toward the shore?

Extension Answers

1. Why does the Moon have a greater effect on tides than the Sun? **The Moon is much closer to the Earth than the Sun.**
 2. How many tides typically occur each day? **Two high tides and two low tides.**
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1. Name three types of waves. **Wind-driven, tidal waves, tsunami waves**
 2. Do waves move the water toward the shore? **Generally no, the energy moves toward the shore but the water just moves up and down.**