
OCEANS IN MOTION
SOL 5.6
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CSES

OCEANS

The basic motions of the ocean water are:

- waves
- currents
- tides

Waves and tides are powerful, active forces that change the landscape along a coast several times each day.

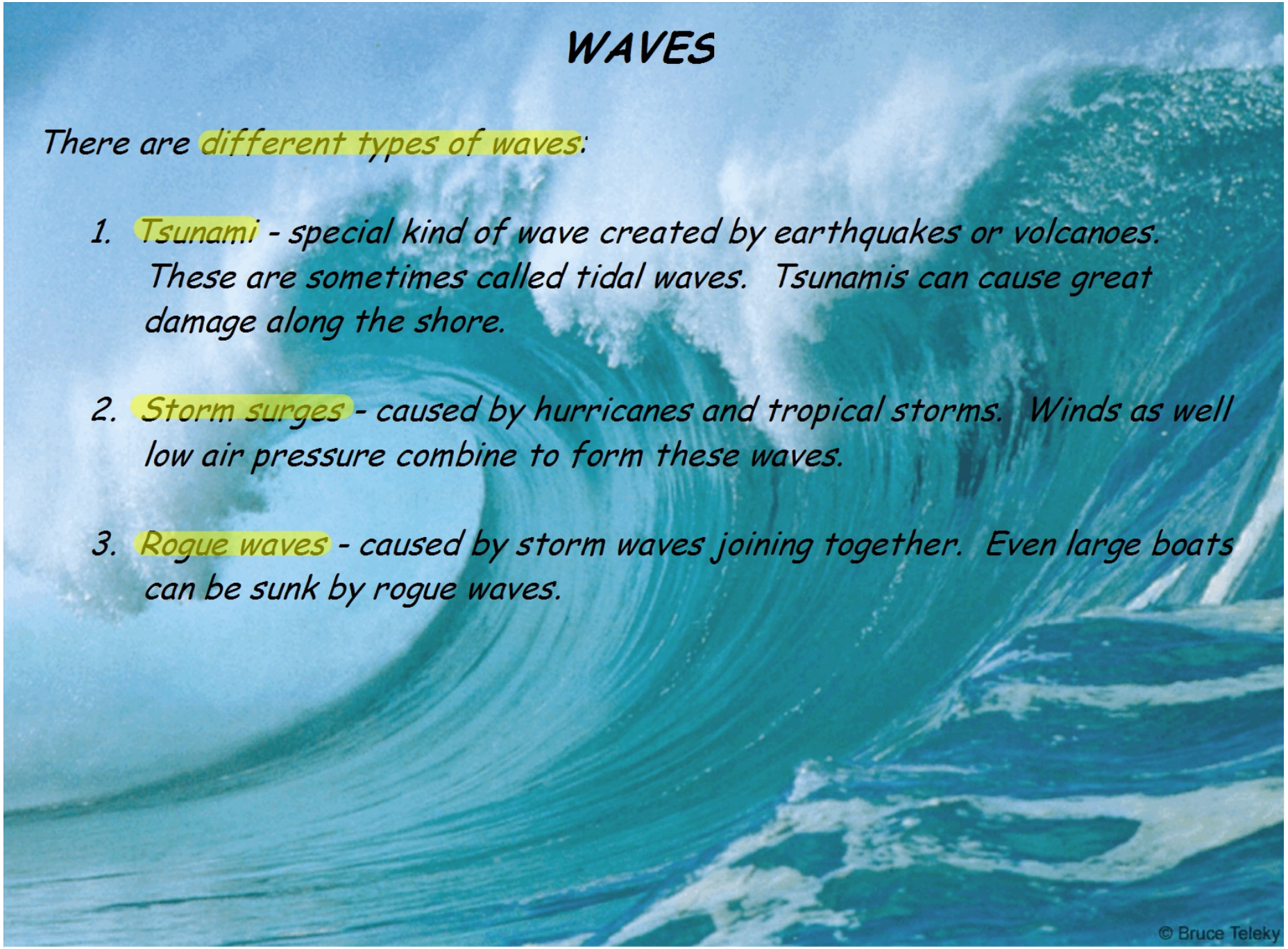
WAVES

Waves are the up and down movement of surface water. Very little water moves forward in a wave. What moves across the ocean's surface is energy.

Winds create waves. There are 3 factors which affect the size of waves.

1. the speed of the wind
2. the length of time the wind blows
3. the distance over which the wind blows

Most waves are created as winds blow across the surface of the ocean and pick up some of the water. The water particles help the wave energy to move along, but they don't travel with the wave. In the open ocean, waves affect the water only for a few meters below the surface. When the water in a wave reaches the shore, it acts differently. The water at the bottom of the wave drags along the shore, causing the crest of the wave to swell. Eventually, the wave topples over, forming a breaker. Even small waves eventually can weather and erode a coastline.


WAVES
There are different types of waves:
1. Tsunami - special kind of wave created by earthquakes or volcanoes. These are sometimes called tidal waves. Tsunamis can cause great damage along the shore.
2. Storm surges - caused by hurricanes and tropical storms. Winds as well low air pressure combine to form these waves.
3. Rogue waves - caused by storm waves joining together. Even large boats can be sunk by rogue waves.
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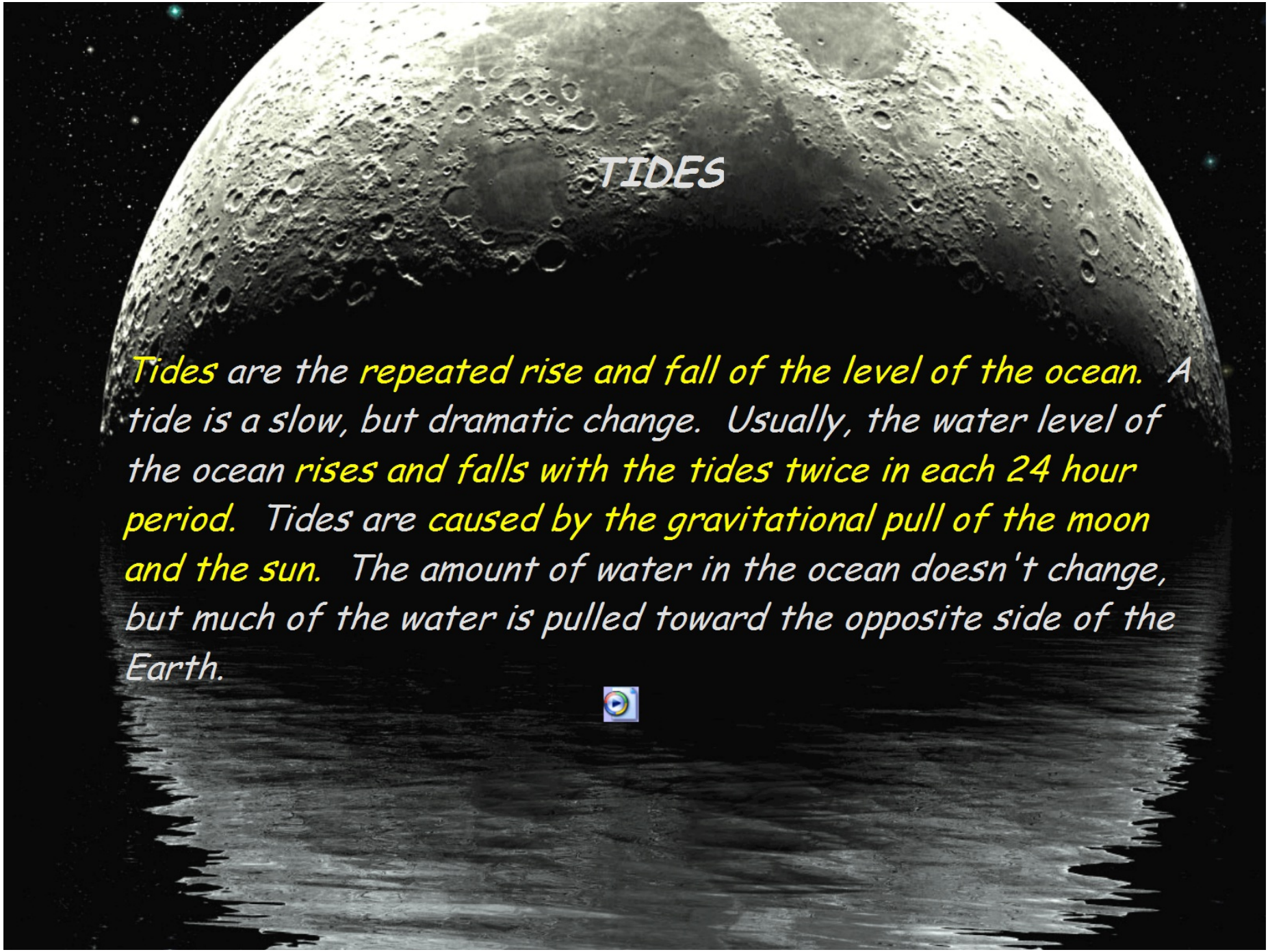

TIDES
Tides are the repeated rise and fall of the level of the ocean. A tide is a slow, but dramatic change. Usually, the water level of the ocean rises and falls with the tides twice in each 24 hour period. Tides are caused by the gravitational pull of the moon and the sun. The amount of water in the ocean doesn't change, but much of the water is pulled toward the opposite side of the Earth.

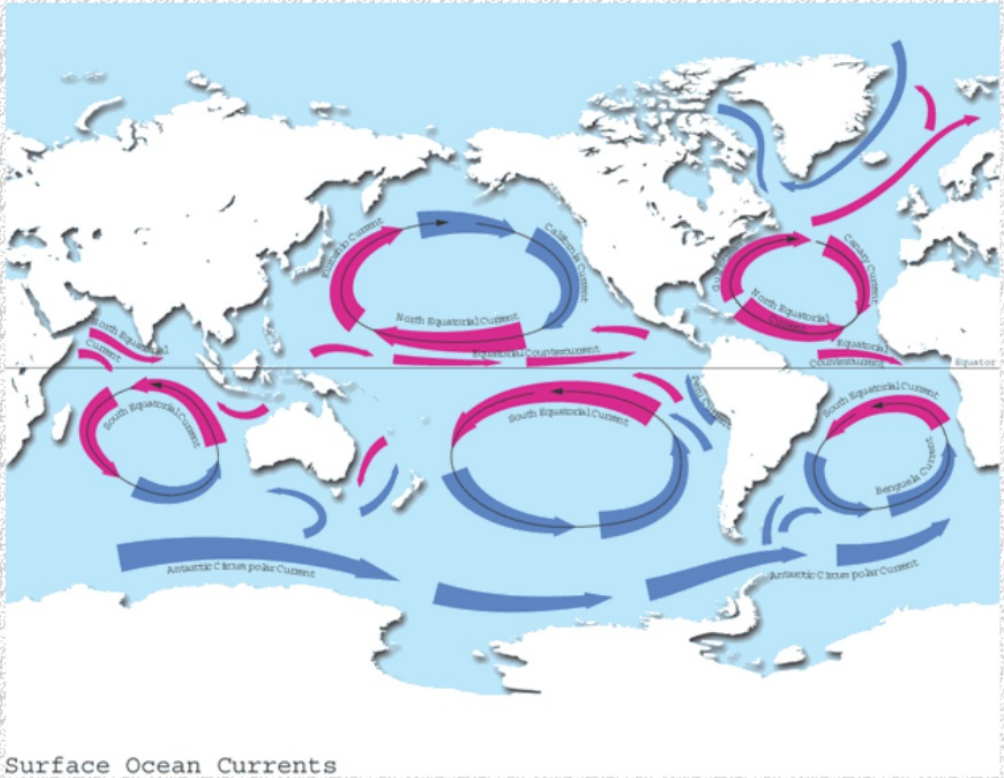
OCEAN CURRENTS

Currents are rivers of water that move through the oceans. They actually move water forward. There are different kinds of currents:

1. Surface currents - large ocean currents caused by the prevailing winds. Some can be hundreds of kilometers wide and hundreds of meters deep. One surface current is the Gulf Stream which carries warm water from the south along the East Coast of the U.S. to the North Atlantic. The California current carries cold water from the north down the West Coast of the U.S. Surface currents can affect the temperature and weather on land.
2. Deep ocean currents - caused by differences in water temperatures and/or differences in the salinity of the water.
3. Shoreline currents - local currents that run along the coast caused by local winds and shifting beach materials
4. Rip current - shoreline current that flows away from the beach

Although winds create the currents, they don't continue moving in the direction of the wind. The rotation of the Earth causes them to move in giant circles.

OCEAN CURRENTS



Surface Ocean Currents

This diagram shows how surface currents move. The red arrows show warm water, and the blue arrows show cold water.

The constant movement of surface and deep-water currents circulates water throughout the world's oceans. As a result, what happens in one of Earth's oceans eventually affects the others.

OCEANS IN MOTION

The up and down movement of surface water in the ocean is

A. waves
B. tides
C. currents

[redacted]

Rivers of waters moving through the ocean are

A. waves
B. tides
C. currents

[redacted]

The repeated rise and fall of the level of the ocean is

A. waves
B. tides
C. currents

[redacted]

Why don't the currents move in a straight line?

A. gravitational pull of the moon
B. surface of the ocean floor
C. rotation of the Earth

[redacted]

OCEANS IN MOTION

Surface currents are caused by

A. gravitation pull of the moon
B. winds
C. changes in temperature or salinity

[redacted]

Tides are caused by

A. gravitation pull of the moon
B. winds
C. changes in temperature or salinity

[redacted]

Deep ocean currents are caused by

A. gravitation pull of the moon
B. underwater earthquakes and volcanoes
C. changes in temperature or salinity

[redacted]

True or False. Very little water moves forward in a wave.

A. True
B. False

[redacted]

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