Why are tides continually rising and lowering every day?

A. because deep ocean currents are constantly changing
B. because the position of the Moon is constantly changing
C. because rates of evaporation and precipitation are constantly changing
D. because the direction of the wind over the ocean is constantly changing

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Why does the ocean cover different amounts of the beach at different times of the day?

A. because the Moon's gravity pulls the ocean, causing it to rise and fall
B. because Earth wobbles as it rotates, causing the ocean to rise and fall
C. because ocean currents change, adding sand to and removing sand from the beach
D. because the sand is able to absorb more water as the temperature increases, lowering the ocean level

On most ocean shorelines, the water rises slowly and covers the land twice a day. Then it slowly falls back. What is this movement called?
A. current
B. wave
C. tide
D. drift

Ocean Zones: There are three ocean zones (p. 376) depending upon the depth of the water: Surface zone, transition zone, deep zone.

The water column changes as you go down (descend) to the bottom of the ocean.
Temperature (decreases) ↓

Light (decreases) ↓

Pressure (increases) ↑

Currents- like rivers inside the ocean, water flows in surface and deep currents.

Surface currents, which affect water to a depth of several hundred meters, are driven by the **wind.**

As the Earth rotates, the paths of the winds and currents curve. This effect is called the **Coriolis effect**. In the Northern Hemisphere (ours) the current curve to the right (clockwise). In the Southern Hemisphere the currents curve to the left or counterclockwise.

The largest and most powerful surface current in the North Atlantic ocean is the Gulf Stream. It is more than 30 km wide and 300 m deep. The Gulf Stream carries warm water from the Gulf of Mexico and travels by the Caribean Sea and Georgia/ South Carolina Coast. At North Carolina it tranvels North East due to the Coriolis effect.. The Gulf Stream meets up the the North Atlantic Drift current and brings warm waters to the England and Norwegian coasts.

Cold water currents carry water from the poles toward the equator, while warm waters from the equator generally travel toward the poles. The cold or warm water has an effect of warming or cooling the air above the water. As surface currents warm or cool the air above it, this influences

El Nino is an abnormal warm wind and warm current in the Pacific Ocean. It can last for one to two years. Abnormal weather occurs from warm weather, increased storms and flooding.

Deep Currents are caused by differences in density of ocean water. The differences in density are due to temperature and salinity differences. Deep currents flow slowly (1000 years from equator to pole and back). They move and mix water around the world.

Upwelling is the movement of cold water upward from the deep ocean. As the wind blows away warm surface water, cold water will rise to replace it. Tiny ocean organisms, minerals, and nutrients are brought up from below. This increases the amount of fish in the area that come for the food source.

What is the cause of most ocean surface currents?

A. gravity
B. the wind
C. the moon
D. upwellings

When ice forms in the oceans, what happens to the water found directly underneath the newly formed ice?

A. it becomes colder
B. it becomes warmer
C. it becomes denser
D. it becomes more salty

Ocean waves are created by all of the following except one. Which factor creates currents, not ocean waves?

A. the wind
B. earthquakes
C. the moon's gravity
D. density differences

Key ocean p 2

Waves: A wave is the movement of energy through the water.
Waves are caused by wind blowing across the surface of the ocean.

The size of a wave depends upon the strength of the wind, the length of the time it blows. The size of the wave also depends upon the distance that the wind blows. (larger waves in the Pacific- bigger distance, than Atlantic)

- The highest part of the wave, or the crest
- The lowest part of the wave, or the trough

- **Fill in the parts of the wave on the worksheet.**

Wave characteristics:

In deep water, the energy of the wave moves toward shore, but the water stays in one place. Particles in the water just bob up and down, and do not move forward.

Near shore: As a wave approaches shore, the water becomes shallower. The bottom of the wave hits the ocean floor and friction slows it down. Now **wave height increases and wavelength decreases.** When the wave hits a certain height, the crest topples down. The wave crashes on shore making surf. As the wave rushes on shore, gravity stops it. The water pulls back toward the ocean in an **undertow current.** Strong undertow is dangerous for swimmers. When the water comes into shore at an angle, it causes the sand to move gradually along the beach. This is called **longshore drift.** Waves shape a beach as they build up the shoreline and erode in places. This causes **barrier beaches, sand dunes, and groins.** Illustrate below the flow of water on the beach. See Fig 8 pg. 363.

Tsunamis – a special case.
A huge wave caused by an undersea earthquake (below the ocean floor) cause extreme damage and loss of life when the wave comes to shore.
The wavelength can be very long (200 km) long and very shallow wave height. When it comes a shore it builds up very high and can reach up to 20 m or 5 story building height.

CRCT question 4
Which of these BEST describes the cause of waves in the ocean?

A. high and low tides
B. evaporation of water
C. wind blowing across the surface of the ocean
D. ridges and trenches on the bottom of the ocean
Answer: C

Tides: The daily rise and fall of the Earth's waters on coastlines are _____. As the tide comes in and goes out, the level of the water on the beach or salt marsh (estuary) rises and falls gradually. The highest level of water is _____ tide. The lowest level of water is _____ tide. The area between high and low tide is the **intertidal** _____.

Tides are caused by the interaction of the Earth, the moon, and the sun. :

Rotation of the earth from West to East combined with the gravitational pull of the moon and the gravitational pull of the sun.

Gravity is larger between large objects of high mass. Gravity decreases with distance between objects. .

Because the sun (larger object) is very far away (150 million km away), the moon (smaller object) actually has more effect on the pull of the water or tides on Earth. . Most coastal regions have high tides that occur 2 hours and 25 minutes apart. In some places there are two high and two low tides per day.

Monthly Tide Cycle: Changes in the position of Earth, moon, and the sun affect the heights of the tides during the month.

Spring Tide: Twice a month when the sun, earth and moon are lined up during **full or new moon phases**, their combined gravitational pull produces the greatest difference between the heights of the high and low tide. This is called spring tide from "springen" meaning "to jump"

Draw spring tide:

Neap Tide: Twice a month when the sun and moon pull at right angles on the Earth during the **first and third quarter moon phases.**

Draw neap tide: