

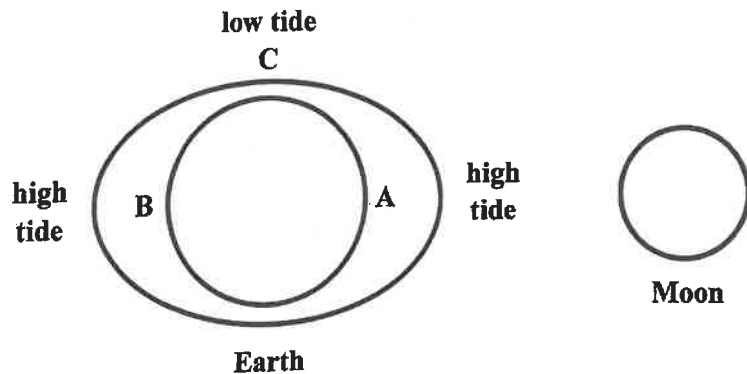
What Causes Tides?

Tides

At low tide, a beach may be very wide. Six hours later, the beach may be very narrow. At high tide, ocean waves may cover the beach.

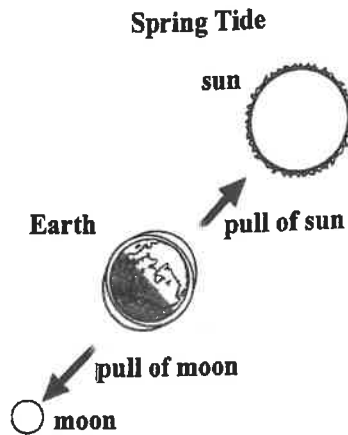
A tide is a daily change in the level of the ocean along a coast. Every seashore in the world is affected by tides. Tides are caused mainly by the moon's gravity. The moon is much smaller than Earth. But it still has gravity that pulls on Earth's oceans. The pull of the moon's gravity, with the pull of the sun's gravity, causes tides to rise and fall.

Tides cause the ocean to stick out, or bulge, on the sides of Earth facing toward and away from the moon. Each is called a tidal bulge. As Earth rotates, different parts of its surface are under tidal bulges. The pull of the moon's gravity is strongest on a tidal bulge that is facing the moon. The pull is weakest on the side of Earth farthest away from the moon.

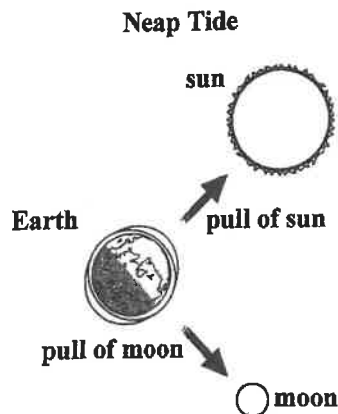


Most ocean shores have two high tides and two low tides. Two times each day, the water along the shore rises. Two times each day, the water falls. During ebb tides, the water level drops from high to low. During flood tides, the water level rises from low to high. The times of high tides and low tides are different each day.

The cycle of tides changes in other ways, too. Sometimes the sun, the moon, and Earth are all in a line. When this happens, the sun and the moon pull on Earth in the same direction. This causes a spring tide. Spring tides usually have higher high tides and lower low tides than normal. Spring tides happen during the full moon and new moon phases.



Sometimes the moon and the sun pull on Earth from different directions. When the sun and the moon are at right angles to Earth, tidal bulges become smaller. This causes a neap tide. Neap tides occur during the first quarter and third quarter phases of the moon.



Tracking the Tides

The tidal range is the difference between the water level at high tide and the water level at low tide. The shape of the land and the depth of the water affect a place's tidal range.

The Bay of Fundy, in Canada, has the greatest tidal range on Earth. The bay is shaped like a funnel. This shape gives the Bay of Fundy its tidal range of 50 feet. Each day, the water level at high tide is 50 feet higher than the water level at low tide.

Other places have lower tidal ranges. Grand Isle, Louisiana, has a tidal range of only 1 foot. It has only one high tide and one low tide each day. People who live or work near the coast must be aware of the tide cycle. Tide charts tell them when high tides and low tides will occur.

Name _____

Date _____

What Causes Tides?

Write answers to the questions on the lines below.

1. What are the bulges of the oceans at the sides of Earth facing toward and away from the moon called?

2. How often do most ocean shorelines experience two high tides and two low tides?

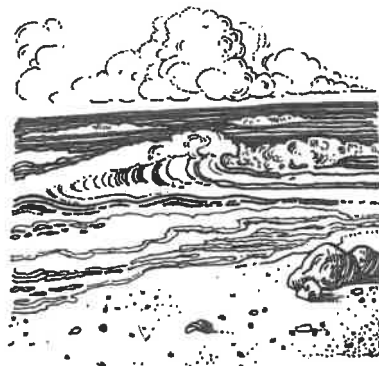
3. What tides are produced when the sun, the moon, and Earth are all in a line?

4. What tides are produced when the sun and the moon are at right angles to each other relative to Earth?

5. What is the difference in the water level between high tide and low tide called?

6. What two things affect a location's tidal range?

7. **Main Idea** What are tides and how are they caused?



Name _____ Date _____

8. Vocabulary Write a sentence using the terms *tidal range*, *spring tides*, and *neap tides*.

9. Reading Skill: Cause and Effect Sometimes, an area experiences extra-high tides and extra-low tides. What causes this?

10. Critical Thinking: Apply The moon's mass is about 1.2 percent of Earth's mass. If the moon were less massive, what would the effect be on Earth's tidal bulges?

11. Inquiry Skill: Compare Is the difference between high and low tides greater for spring tides or neap tides? Explain.

12. Test Prep Tides that are receding from high tide to low tide are

- A ebb tides.
- B flood tides.
- C spring tides.
- D neap tides.