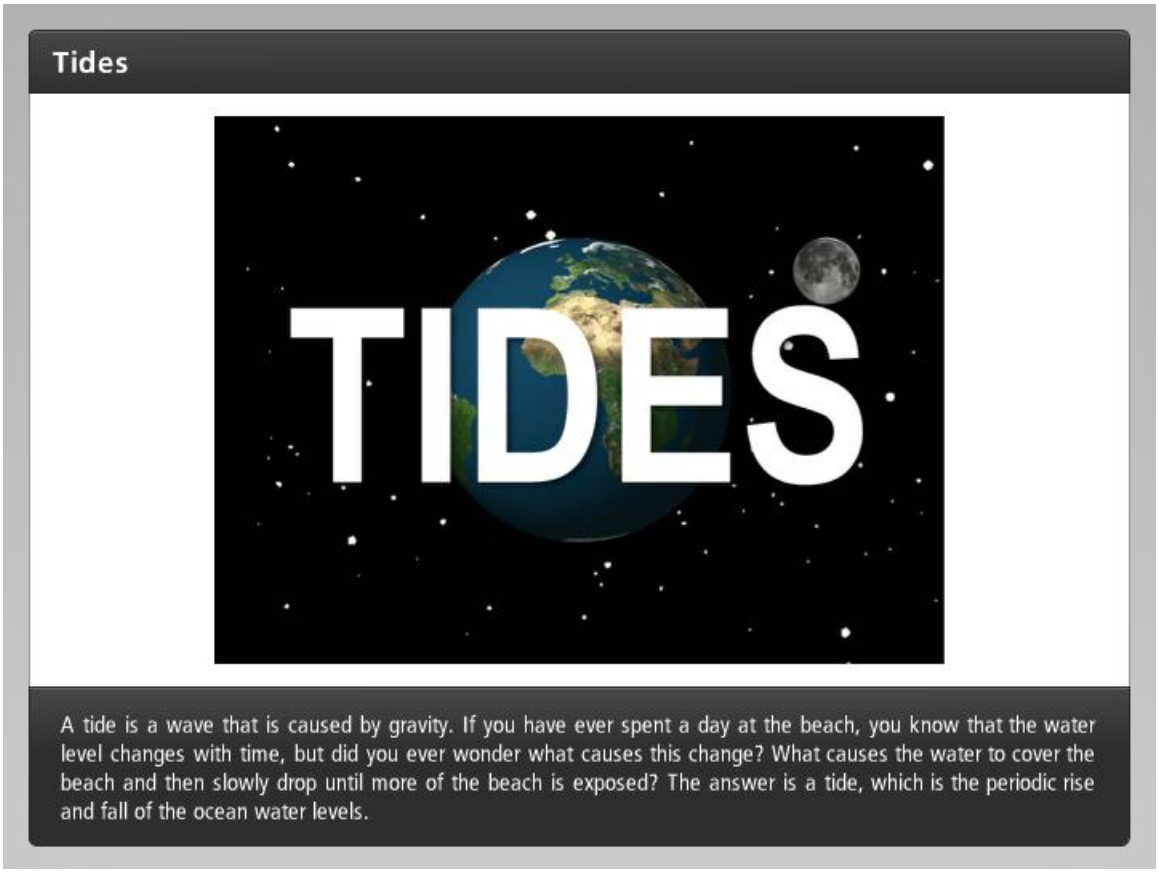
Module 12: Oceanography
Topic 3 Content: Tides Notes



A tide is a wave that is caused by gravity. If you have ever spent a day at the beach, you know that the water level changes with time, but did you ever wonder what causes this change? What causes the water to cover the beach and then slowly drop until more of the beach is exposed? The answer is a tide, which is the periodic rise and fall of the ocean water levels.

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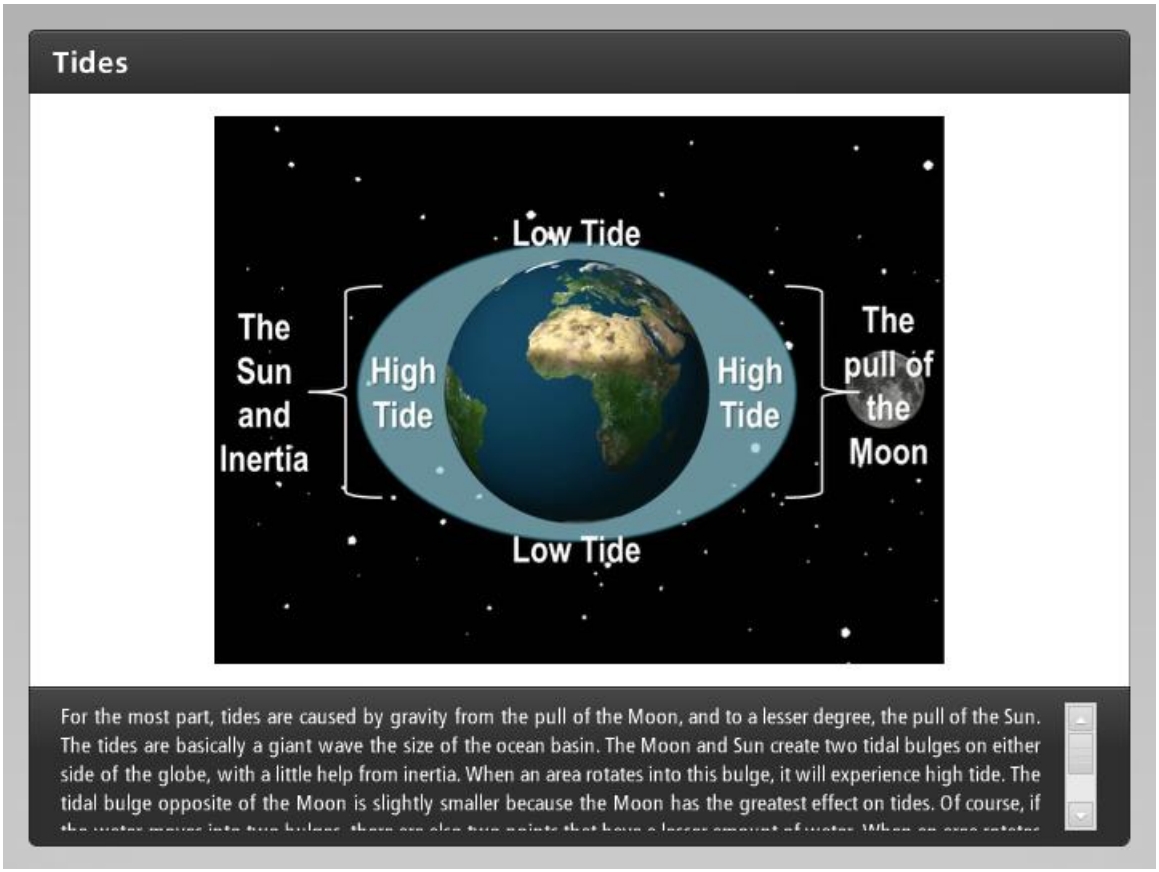

For the most part, tides are caused by gravity from the pull of the Moon, and to a lesser degree, the pull of the Sun. The tides are basically a giant wave the size of the ocean basin. The Moon and Sun create two tidal bulges on either side of the globe, with a little help from inertia. When an area rotates into this bulge, it will experience high tide. The tidal bulge opposite of the Moon is slightly smaller because the Moon has the greatest effect on tides. Of course, if the water moves into two bulges, there are also two points that have a lesser amount of water. When an area rotates out of this bulge, it will experience the wave trough and low tide. The Moon and Sun create the tides, and the Earth rotates into and out of the tides.

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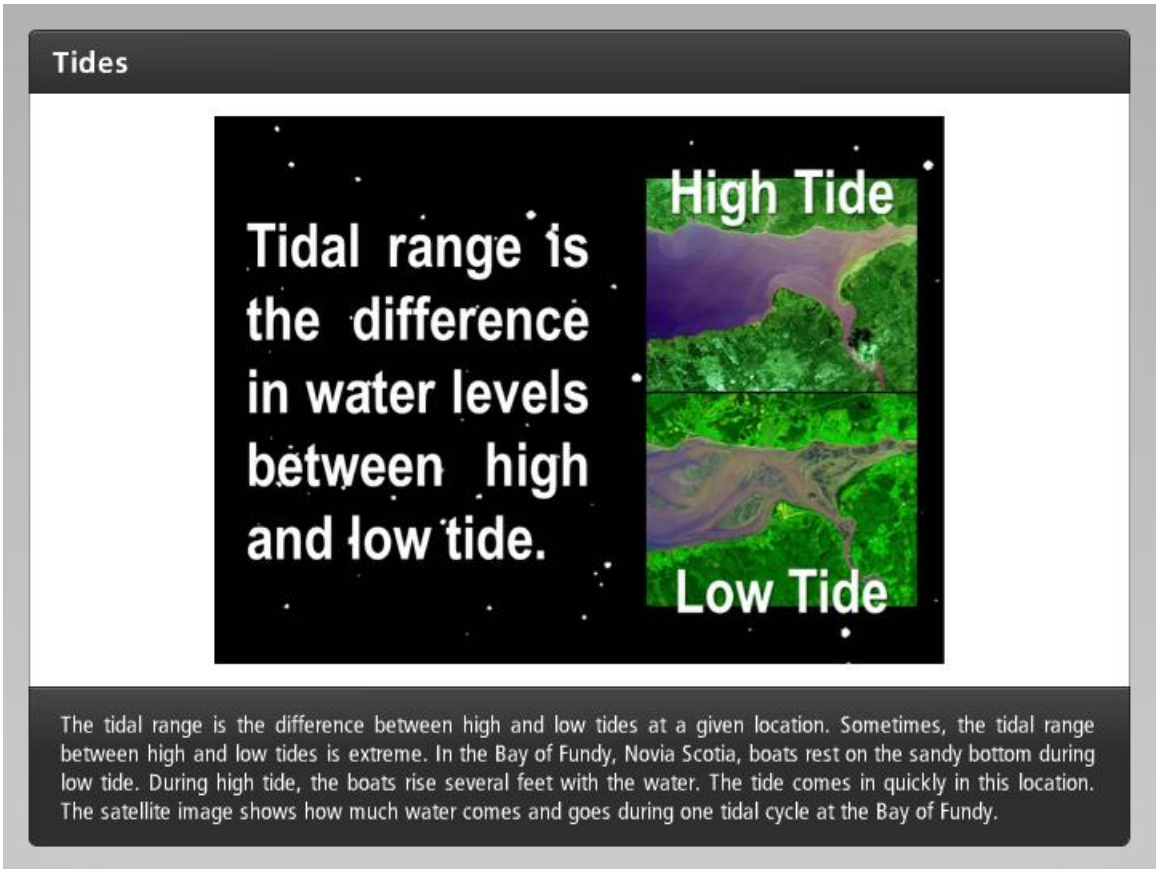

The tidal range is the difference between high and low tides at a given location. Sometimes, the tidal range between high and low tides is extreme. In the Bay of Fundy, Nova Scotia, boats rest on the sandy bottom during low tide. During high tide, the boats rise several feet with the water. The tide comes in quickly in this location. The satellite image shows how much water comes and goes during one tidal cycle at the Bay of Fundy.

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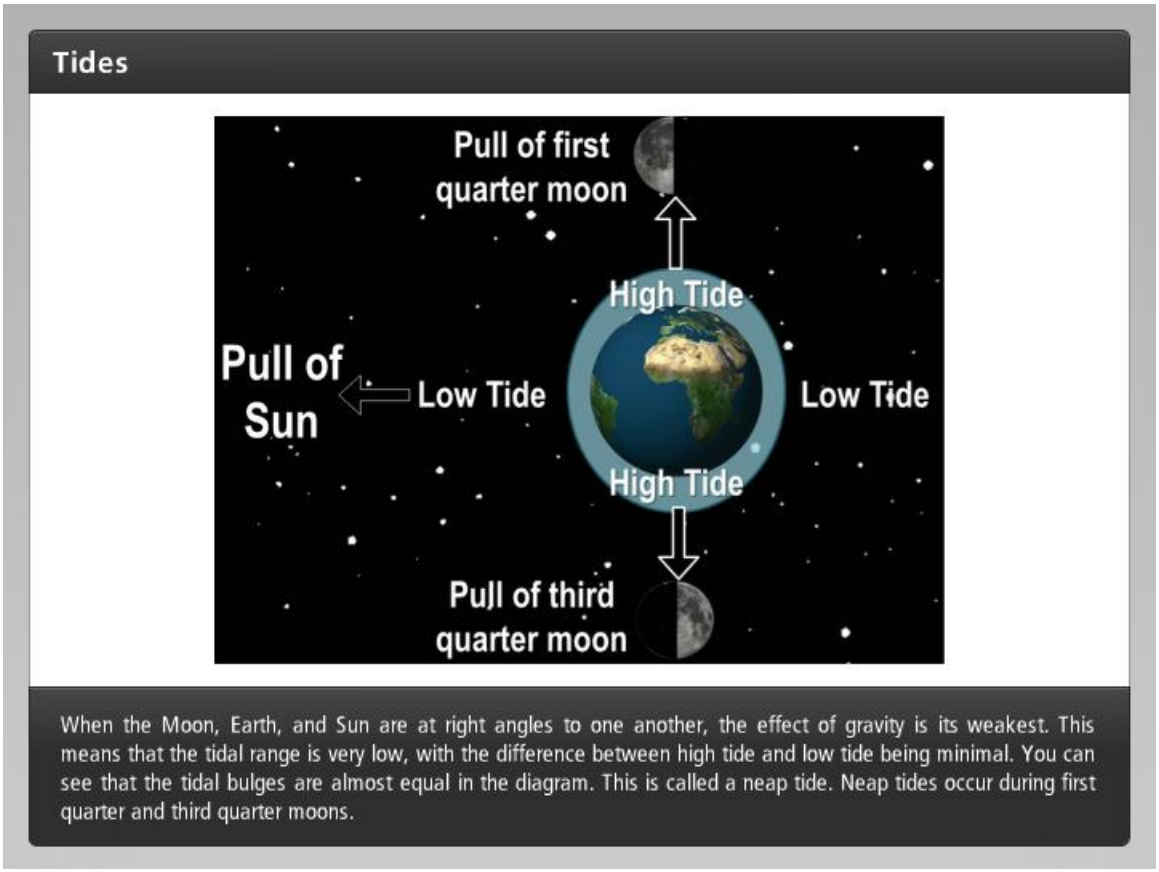

When the Moon, Earth, and Sun are at right angles to one another, the effect of gravity is its weakest. This means that the tidal range is very low, with the difference between high tide and low tide being minimal. You can see that the tidal bulges are almost equal in the diagram. This is called a neap tide. Neap tides occur during first quarter and third quarter moons.

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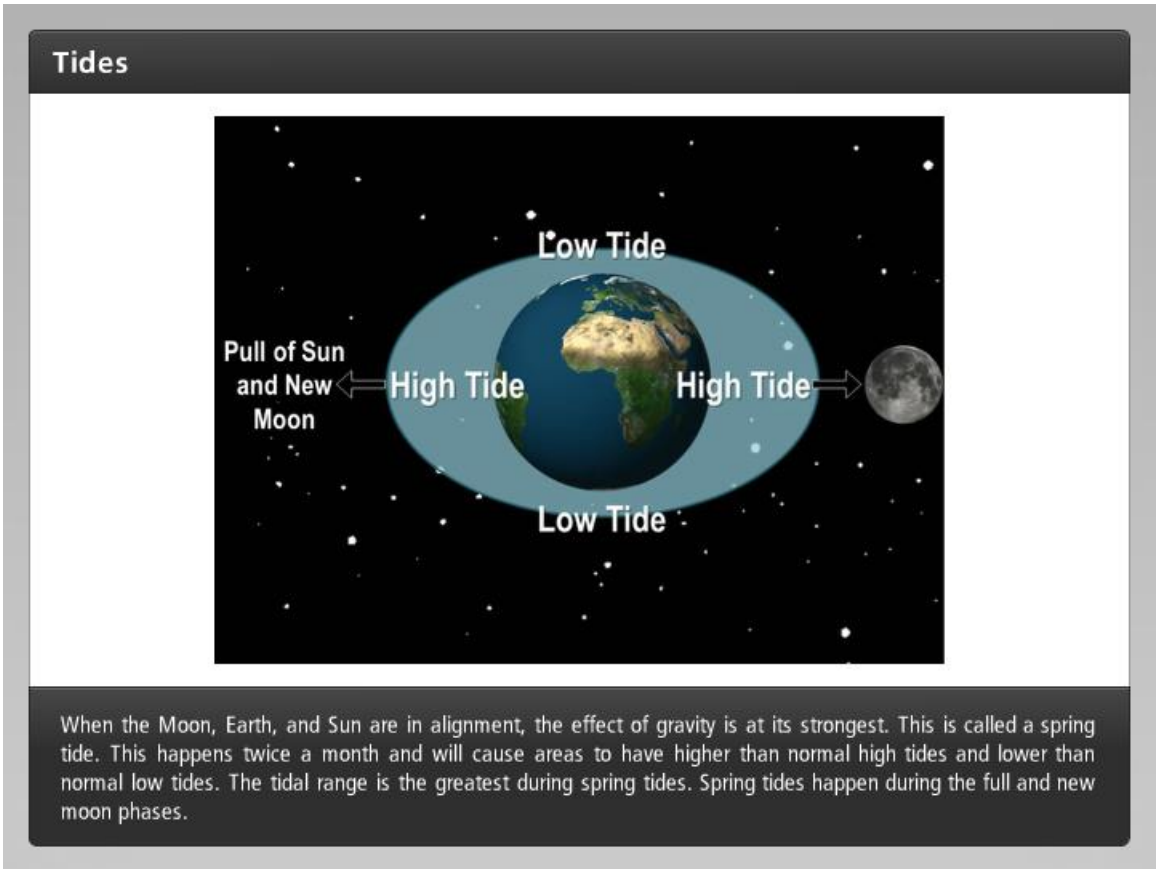

When the Moon, Earth, and Sun are in alignment, the effect of gravity is at its strongest. This is called a spring tide. This happens twice a month and will cause areas to have higher than normal high tides and lower than normal low tides. The tidal range is the greatest during spring tides. Spring tides happen during the full and new moon phases.