Notes 3.2 Tides

What Causes Tides?

Tides are the daily rise (high tide) and fall (low tide) of water along coastlines.

Gravity and Tides

Tides are caused by the gravitational interaction between the Earth, the moon and, the sun. Gravity is the force where one object pulls on another object.

The pull of the moon on Earth's waters causes a tidal bulge on the side of the Earth facing moon. The opposite side has the least amount of force pulling on its water, so there is a bulge there as well.

The Daily Tidal Cycle

The rotation of the Earth through these bulges causes most coastlines to experience two high tides and two low tides each day.

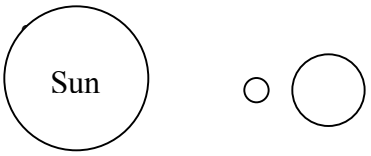
The difference in water level between high tides and low tides varies from place to place. This can be due to the landforms present in an area.

Example: An area like Cook Inlet with a narrow channel will see a larger difference between tides.

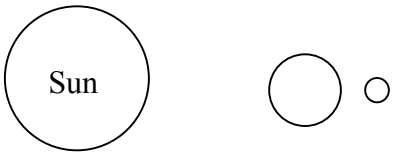
The Monthly Tidal Cycle

The position of the sun, moon, and Earth in relation to one another affects tidal levels on a monthly basis.

<u>Spring tides</u> occur during full and new moons, when the sun, moon, and Earth are arranged in a straight line. Spring tides have the largest difference between high and low tides.

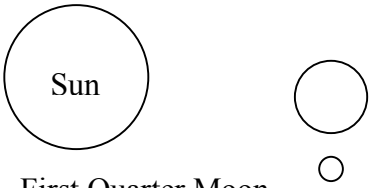


New Moon

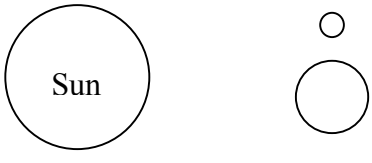


Full Moon

<u>Neap tides</u> occur during first and third quarter moons, when the sun, Earth, and moon are arranged in a ninety degree angle to one another. Spring tides have the smallest difference between high and low tides.



First Quarter Moon



Third Quarter Moon

Tide Tables

Tide levels can be predicted accurately and are published as tide tables.

Energy from Tides

Systems have been designed to take advantage of tidal changes in order to produce electricity. The limitation for this “clean” energy is the need for tidal differences of 12 to 16 feet.