

10:38A TIDES

Tides are extremely long waves caused by the gravitational attraction of the Moon and the Sun on Earth. They are also affected by the:

1. shape and depth of the ocean floor
2. latitude (greater pull at equator)
3. volume of water



The Earth and Moon revolve around each other and rotate on their axes.

Earth's rotation = 24 hours (one day)

Moon's rotation = 24 hours and 50 minutes (lunar day)

Tides occur 50 minutes later every day because of the rotation time difference.

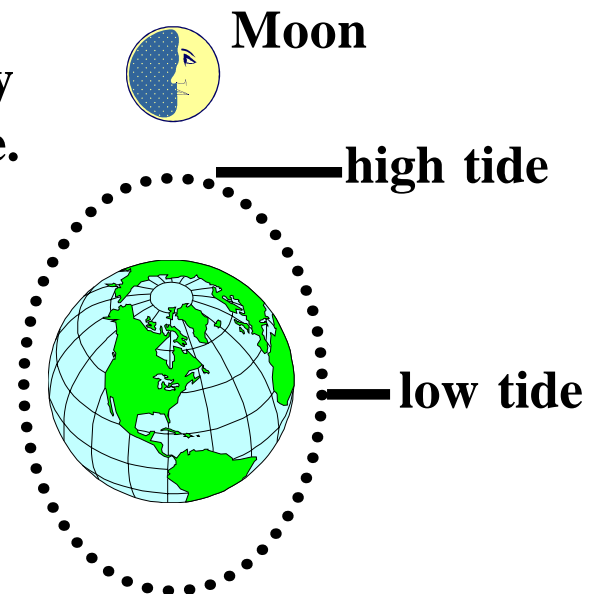
At high tide (flow), the Moon pulls water out toward it. Centrifugal force pulls water out on the opposite side - causing a tidal bulge.

As the Earth turns, locations move out of the center of gravity and low tides (ebb) result.

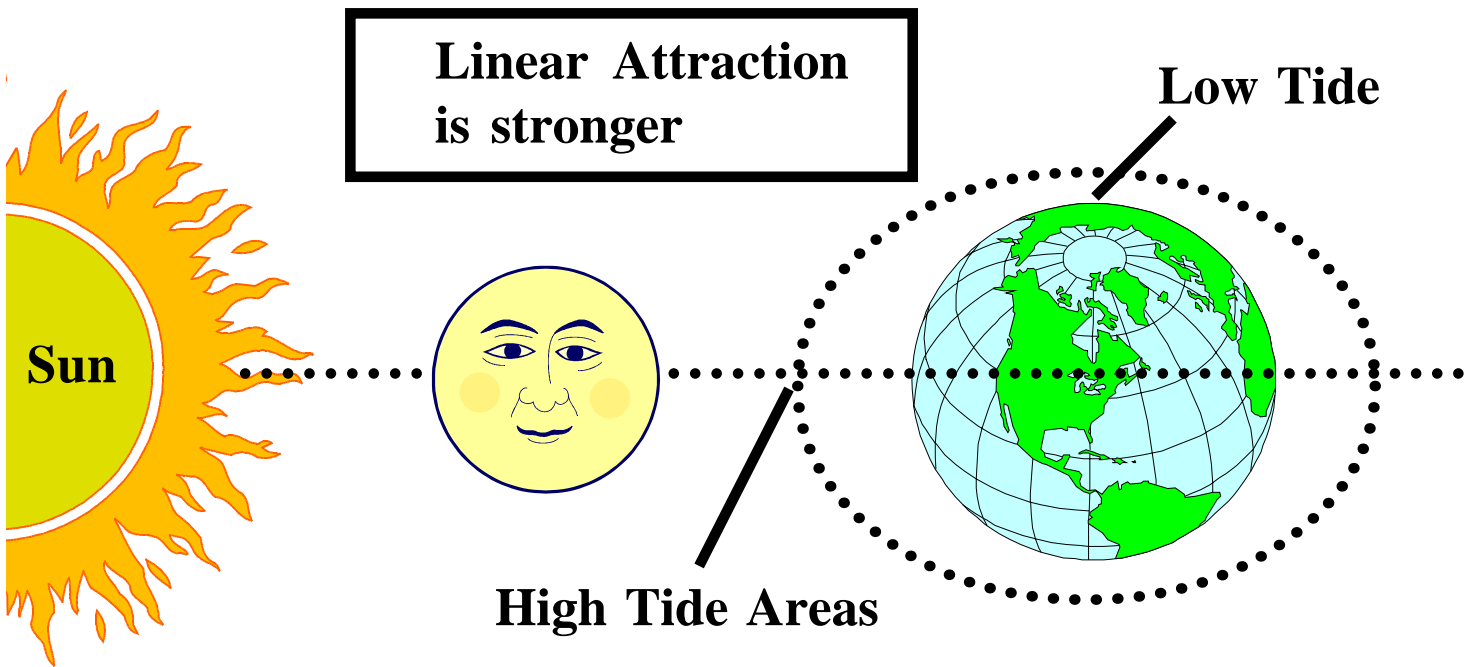
Tidal range - difference between high and low tide volume

ex: high tide = 25 feet and low tide = 20 feet

Tidal range is 5 feet

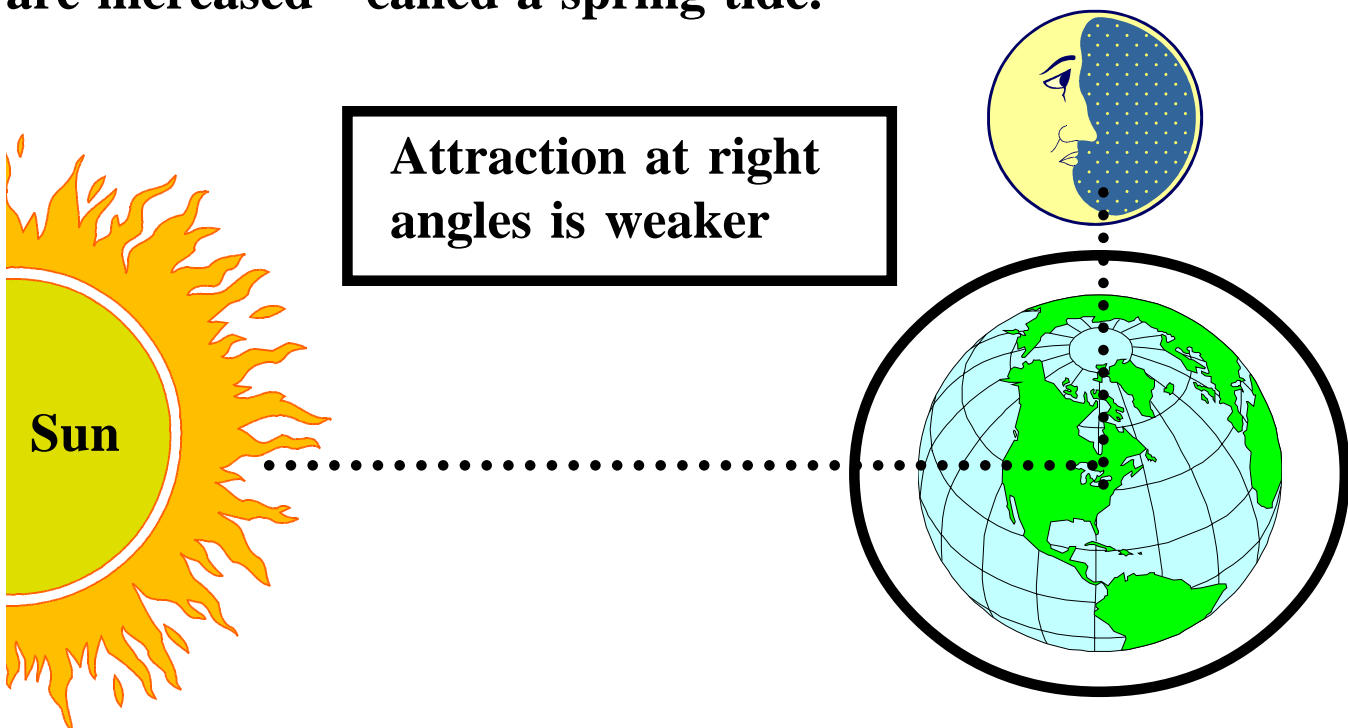


10:38B Tidal Monthly Events



When the Earth, Moon and Sun are orbiting in a linear arrangement, the Moon is in either the new or full stage.

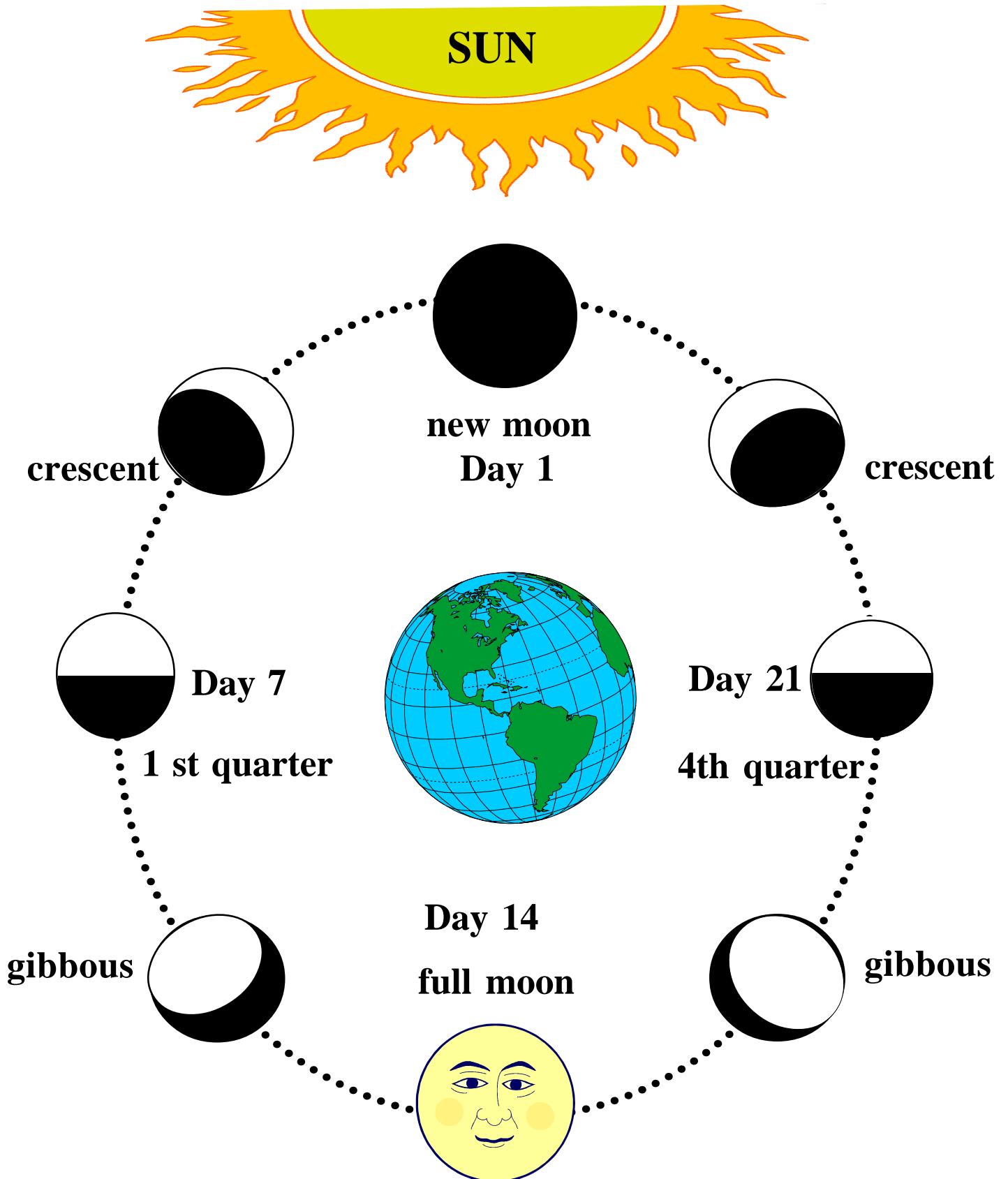
With the Sun and Moon pulling together on the water, tides are increased - called a spring tide.



At quarter phases, the Moon pulls opposite and equal to the Sun - resulting in lower tides called neap tide.

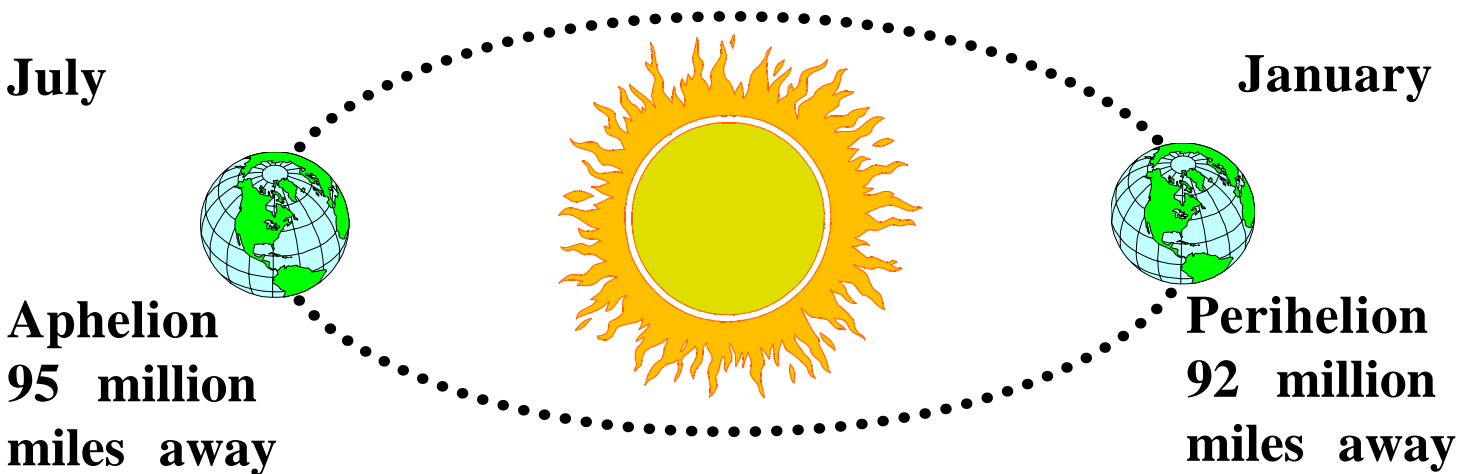
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This shows the different views of the Moon from Earth during a lunar month's revolution of 28 days.



10:38D

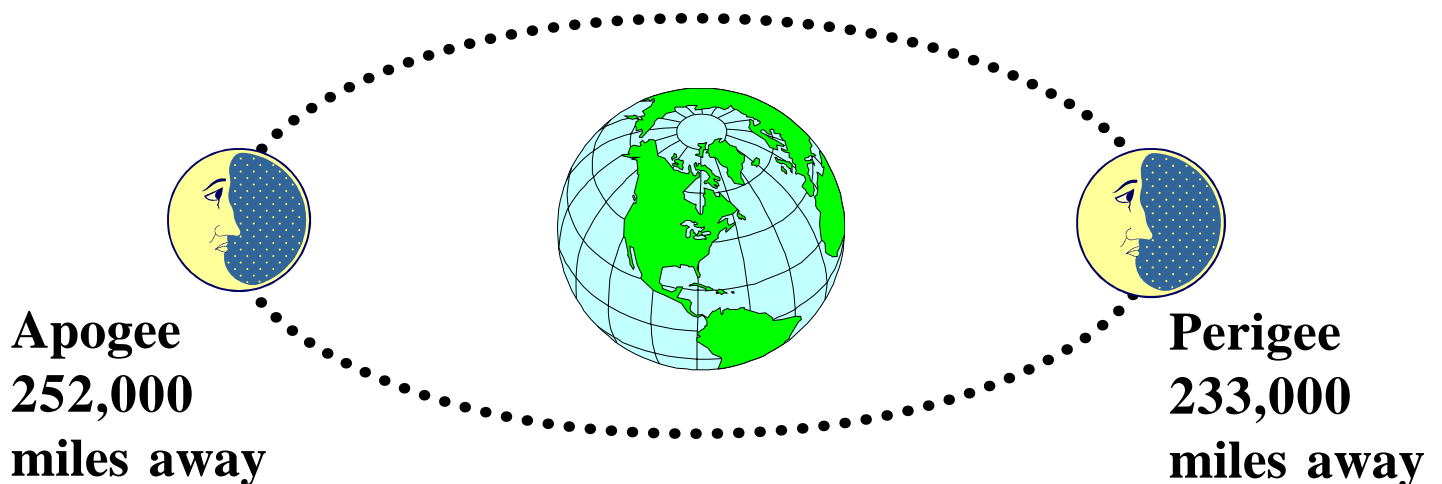
Tides are greater in North America in the winter because the Earth is slightly closer to the Sun in winter.



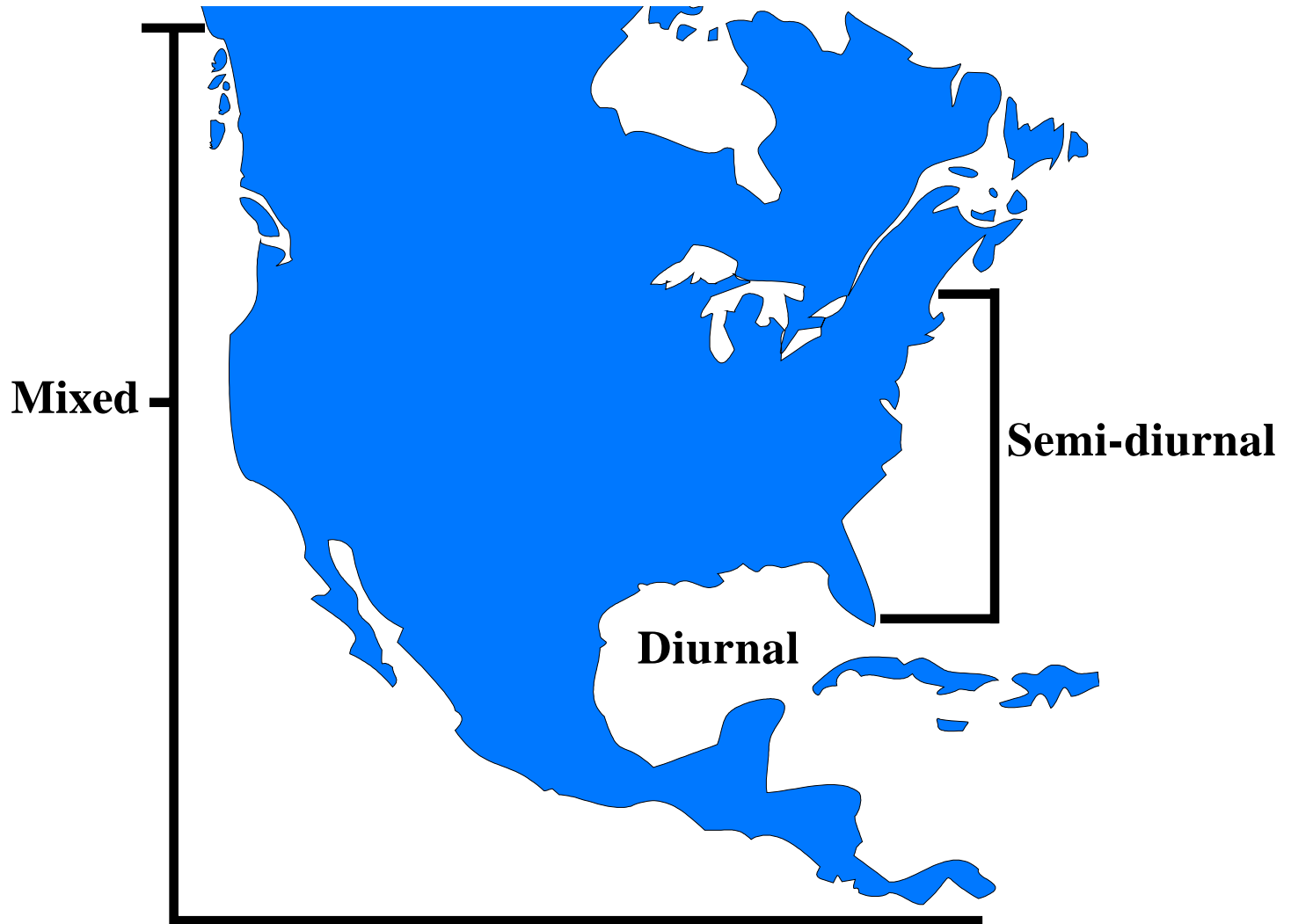
Annual revolution of Earth around the Sun

Tides are also greater at times during the month when the moon and earth are closer together.

Monthly revolution of Moon and Earth



10:38E



Frequency is how often tides occur. There are some exceptions but basically there are 3 types:

1. semi-diurnal = 2 equal high and low tides per day each 6 hours and 12 1/2 minutes apart ex: east coast of U.S.
2. Diurnal = 1 high and 1 low tide per day each 12 hours and 25 minutes apart ex: Gulf of Mexico, S.E. Asia
3. Mixed = 2 high and 2 lows of unequal range at 6 hrs. and 12 1/2 minutes apart ex: west coast of U.S.