

Gravity and some of its effects.

Newton's Universal Law of Gravitation states that:

There is a force of attraction among all bodies in the universe. The strength of this attraction depends upon the mass of the bodies and the distance between them.

This means that anything that has mass, from atoms to stars, are attracted to each other and will move toward each other.

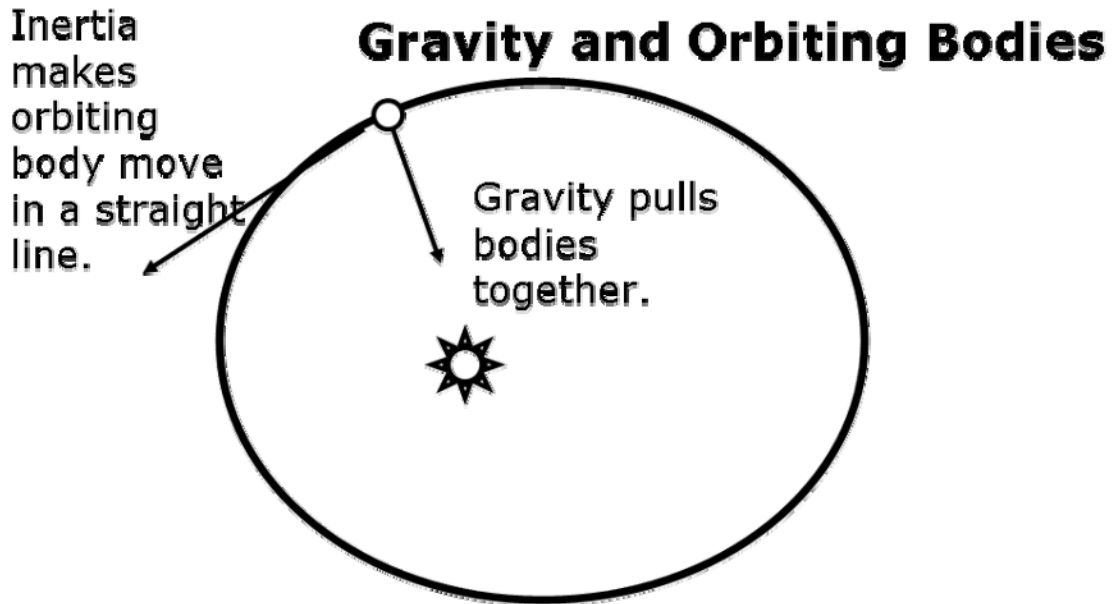
Newton's Laws of Motion!

1. The Law of Inertia:

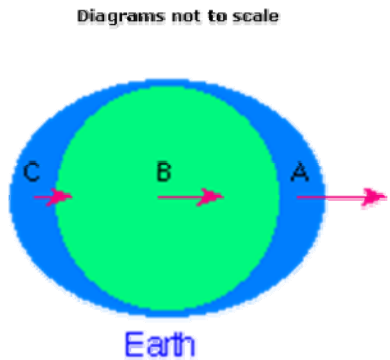
An object in motion will tend to stay in motion in a straight line, at a constant speed until acted upon by an outside force.

2. An object will go in the direction it is pushed!

3. Action/Reaction Law: For every action there is an equal and opposite reaction.



The combined **effect of inertia and gravity** **cause orbiting** bodies (like planets around the sun or satellites around a planet) to move in a path called an ellipse.



Tides on the Earth are caused by the gravity of the Moon attracting the mass of the oceans.

A Tidal Bulge (High Tide) is produced on the side of Earth facing the Moon. Another is produced on the opposite side.

The bulge under the moon is produced due to gravity pulling water toward the moon.

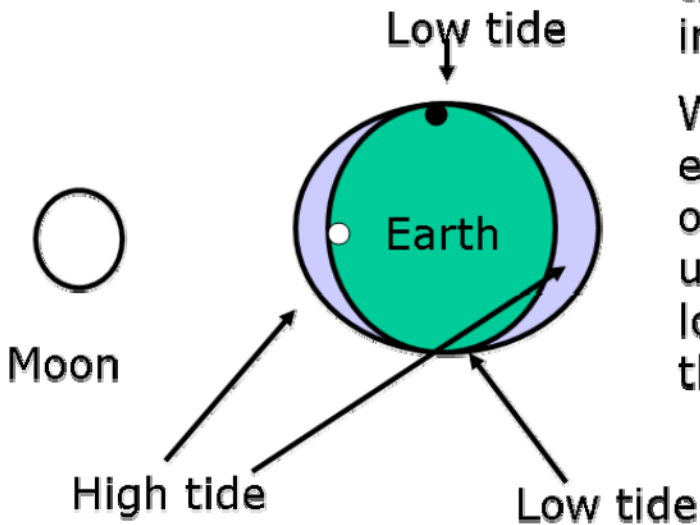
The bulge produced on the opposite side of Earth is a result of Inertia of the water "trying" to "sling" the water off the Earth and the Moon's gravity pulling Earth out from under the water!

As gravity pulls on the large masses of water on the Earth (mainly the oceans) it causes the water to rise. This is called a tide.



Diagrams not to scale

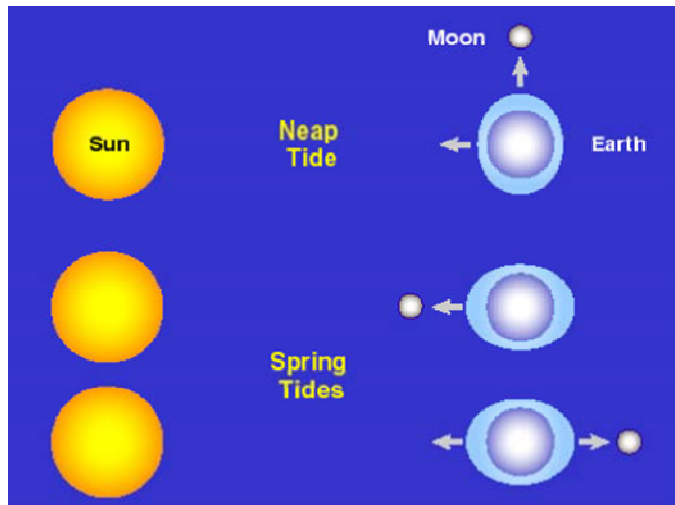
View from above the North Pole looking down on the Earth and Moon.



There are two high tides and two low tides in Delaware everyday.

Whether a location experiences a high tide or a low tide depends upon where the location is compared to the moon.

High tide occurs directly under the moon and on the exact opposite side. Low tide occurs 90 degrees to the location of the moon.



The gravity of the Moon has more of an affect on tides than the Sun because the Moon is closer. BUT!! The Sun DOES have an effect!

During New Moon and Full Moon phases high tides are higher than other phases because the gravity of the Moon and Sun "work together". These are called SPRING TIDES.

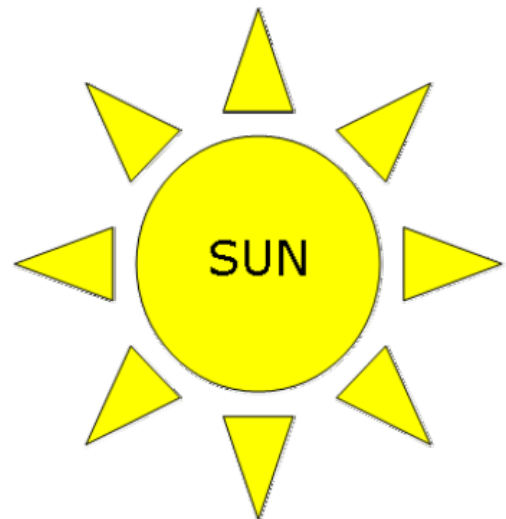
During First Quarter and Third Quarter phases high tides are lower than other phases. These are called NEAP TIDES.

Diagrams not to scale

View from above the North Pole looking down on the Earth and Moon.



Moon

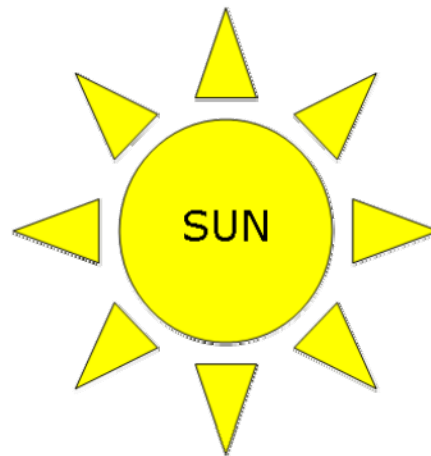


High tide during Spring Tides are higher than other times of the month because the gravity of the Moon and Sun "work together".

Tides during the **Neap tide** are not as high as other times of the month because the moon and the Sun's gravity are "opposed" each other.

Diagrams not to scale

View from above the North Pole looking down on the Earth and Moon.



Moon

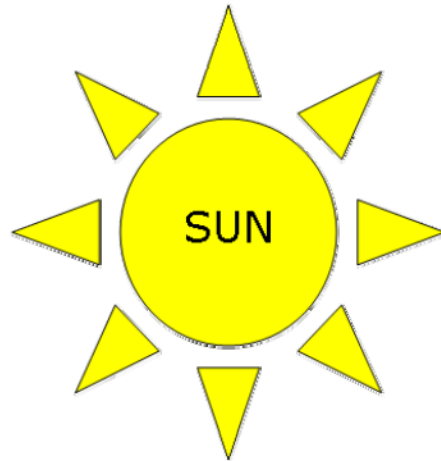
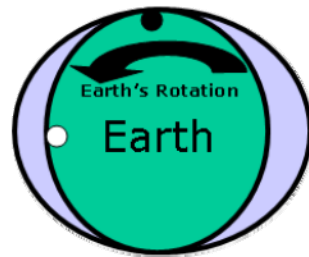
The gravity of the Sun is pulling at a 90 degree angle to the gravity of the moon. This causes the tides to be lower than they would be at other times of the month.

Diagrams not to scale

View from above the North Pole looking down on the Earth and Moon.



Moon

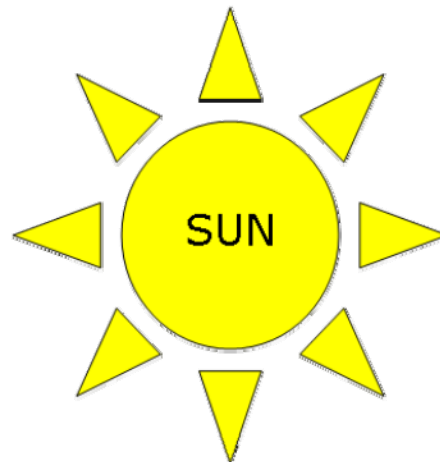


What tide would the location with the black dot experience? What would the name of this tide be?

What tide would the location with the white dot experience? What would the name of this tide be?

Diagrams not to scale

View from above the North Pole looking down on the Earth and Moon.



What tide would the location with the white dot experience? What would the name of this tide be?

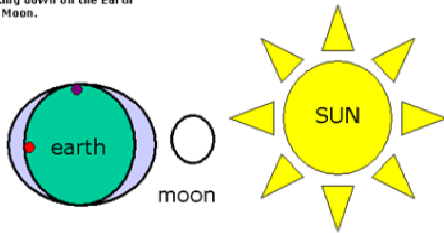


Moon

What tide would the location with the black dot experience? What would the name of this tide be?

tides 5-12-10.notebook

View from the North Pole looking down on the Earth and Moon.



Diagrams not to scale

View from above the North Pole looking down on the Earth and Moon.



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View from above the North Pole looking down on the Earth and Moon.

