Do Now: Label Left and Right Universal Gravitation

- Answer on Left Side
  - Which of the following are part of our system:

Planets
Comets
Distant stars
Galaxies
The Sun (Sol)
Constellations
Moons

Black holes
Nearby stars other than the Sun
Asteroids
Human made satellites
Natural satellites
Universe

Gravity

Questions

- What keeps the planets in orbit around the sun?
- What prevents them from flying off into space?
- Gravity
- Gravity is a relatively weak attractive force that can act across great distances.

Gravity

- Universal force
  - Every object exerts an attractive force on every other object in the universe.

Gravity and Mass

- Mass
  - The amount of matter in an object.

- Gravity is the result of mass.
  - Because all objects have mass, all objects experience an attraction toward all other objects.

Gravity

- Since it is relatively a weak force……the mass of most objects is too small to produce a force large enough to overcome inertia.

- What is inertia?????
  - The tendency for an object at rest to remain at rest or an object in motion to continue moving.

Mass of Objects

- Earth has enough mass to exert a gravitational force that can overcome the inertia of objects on or near its surface.

- The larger an object is, the greater the gravitational force it exerts on objects around it.

Earth's Gravity

- Earth's gravitational force pulls everything toward the center of the Earth.

- Because of this force, every object on Earth's surface stays in place UNLESS an unbalanced force is large enough to overcome Earth's gravitational force.

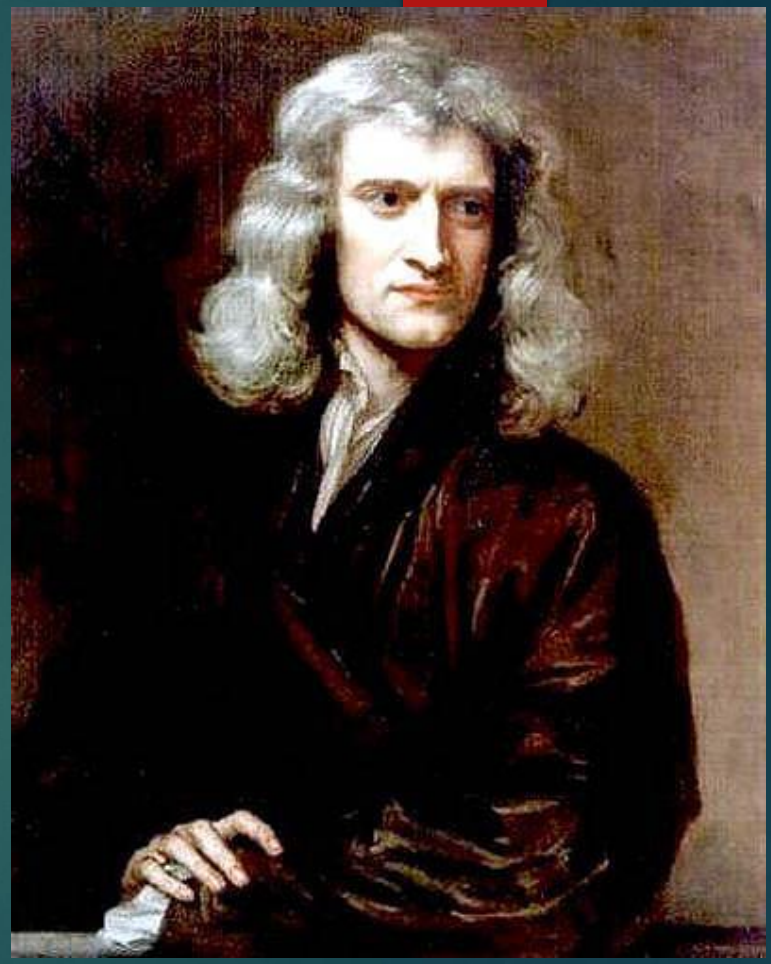
How can you overcome Earth's gravity?

- Lifting an object
- Jumping off the ground

Law of Universal Gravitation

- Isaac Newton realized that a gravitational force causes objects to fall toward Earth and keeps the planets in orbit.

- This law summarizes the relationship between mass, distance, and the force of gravity.



Gravity

- Gravitational attraction increases as mass increases.
- Gravitational attraction decreases as the distance between objects increase.
- Which would have greater gravitational attraction on Earth: Bowling Ball or Ping Pong Ball?????

Weight vs Mass

- Mass is the measure of how much matter is in an object and can be measured using a balance.
  - Your mass is the same on Earth and on the Moon.

- Weight is the measure of the pull of gravity on an object.
  - Your weight would be different on Earth and on the Moon.

Gravity: Earth/Moon

- Gravity and Inertia work together to keep planets/moons moving in a regular orbit or path in space.

- The moon is in an orbit around Earth because at some point it was moving past Earth. The moon was moving in a straight path and its inertia was keeping it going in this path.

Gravity: Earth/Moon

- As it moved closer to Earth, Earth's gravity began to pull hard enough on the Moon to change the Moon's path.

- These forces keep the moon in orbit around the Earth. (inertia of moon…..gravity between Earth and Moon)