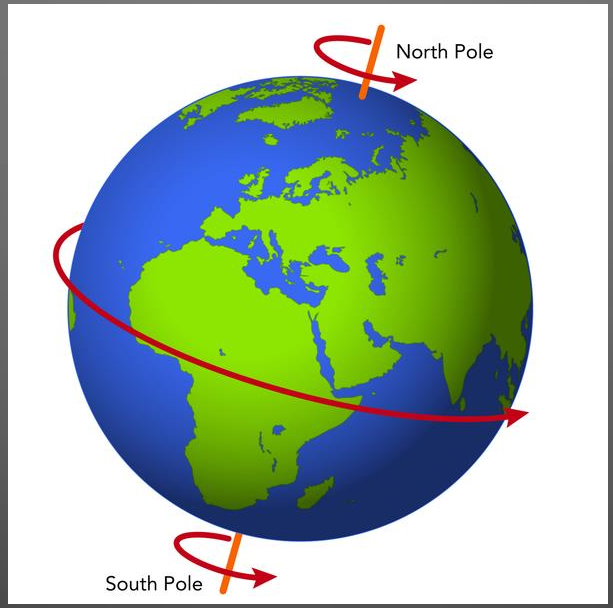
Gravity, Inertia, and Our Solar System

Astronomy #5: I can describe how the planets' gravitational pull keeps satellites and moons in orbit around them

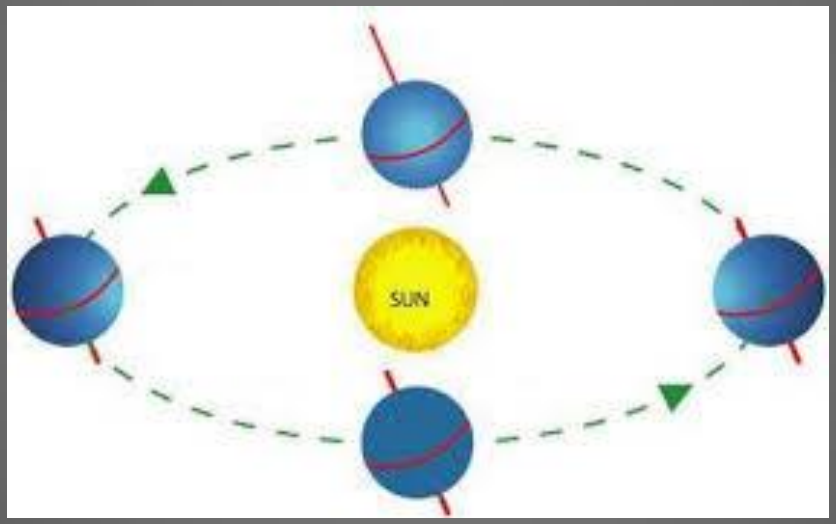
How Earth Moves:

Rotation: The counter-clockwise movement of Earth that causes day and night where the sun appears to move westward across the sky.



How Earth Moves:

Revolution: The counter-clockwise movement of Earth around the sun.



Revolution-the movement of one object around another.

How Earth Moves:

- **Orbit-** the path Earth follows around the sun.
- One revolution = 365.25 days/1 year

QUESTION: What is **GRAVITY**?

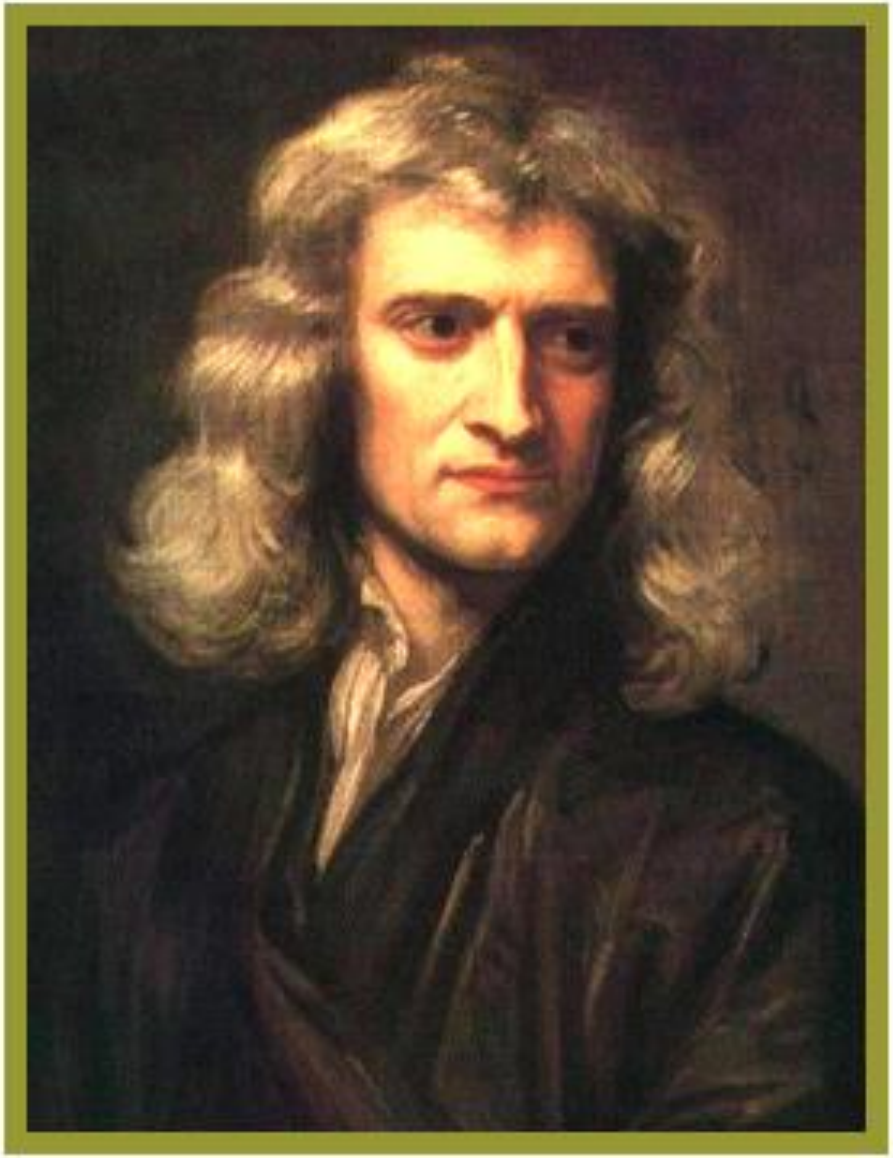
ANSWER: The **force** of **attraction** between any two objects.

Law of Universal Gravitation:

The scientific law that states that every object in the universe attracts every other object.

QUESTION: Who first determined the properties of **gravity**?

ANSWER: **Sir Isaac Newton**

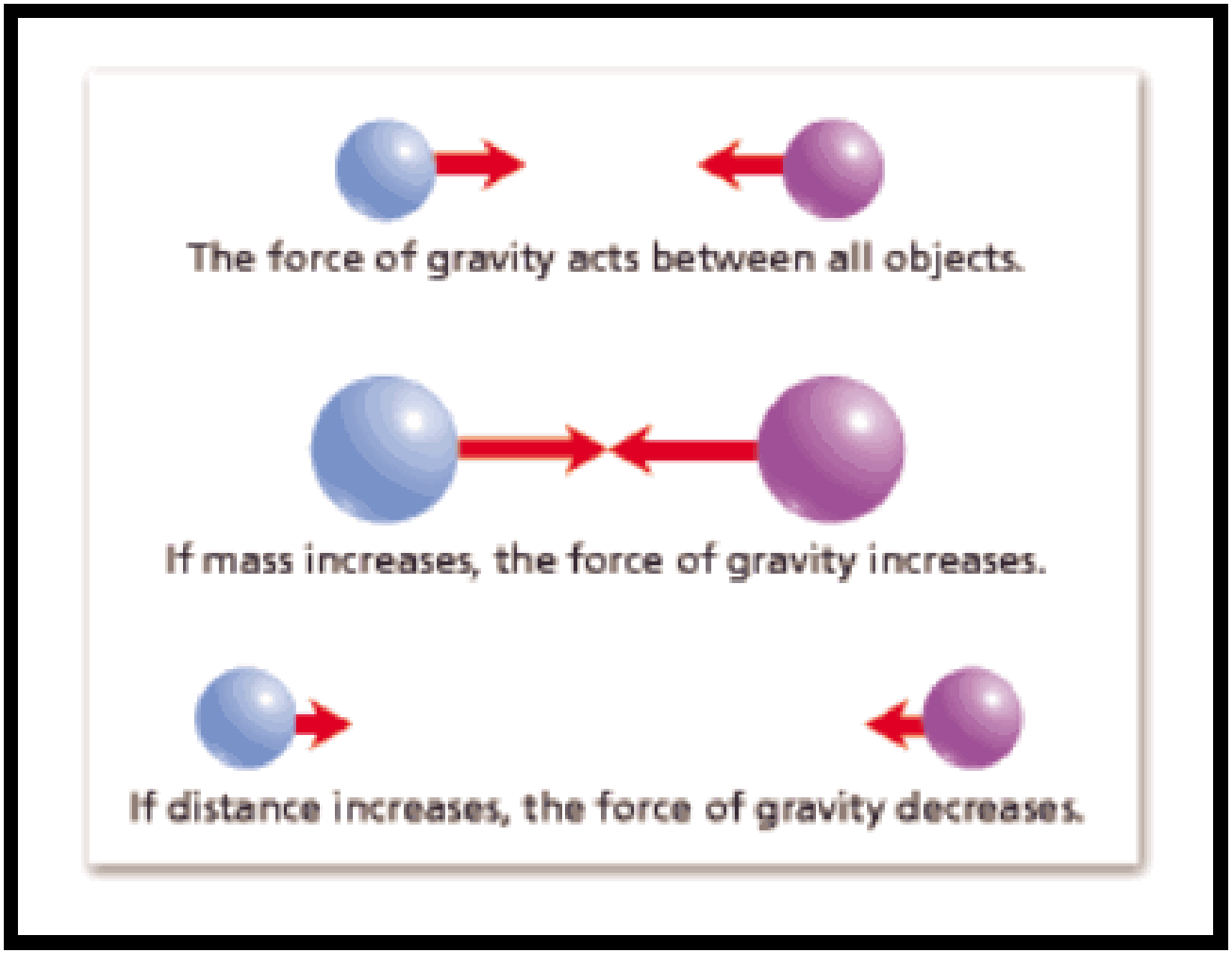


- Mass: the amount of matter in an object
- Weight: the force of gravity on an object
- Force: a push or pull

The force of gravity is measured in units called newtons, named after Isaac Newton. **The strength of the force of gravity between two objects depends on two factors: the masses of the objects and the distance between them.**

QUESTION: What does GRAVITY depend on?

ANSWER: **Mass** and **Distance**



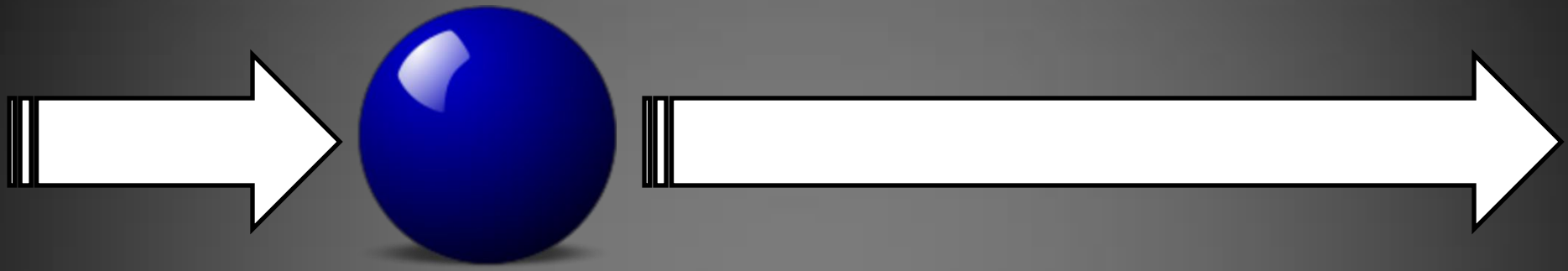
Review, Repeat, Remember!

The FORCE of GRAVITY depends upon MASS and DISTANCE:

The HIGHER the MASS, the more GRAVITY the object will have.

The GREATER the DISTANCE from an object, the less GRAVITY it will have.

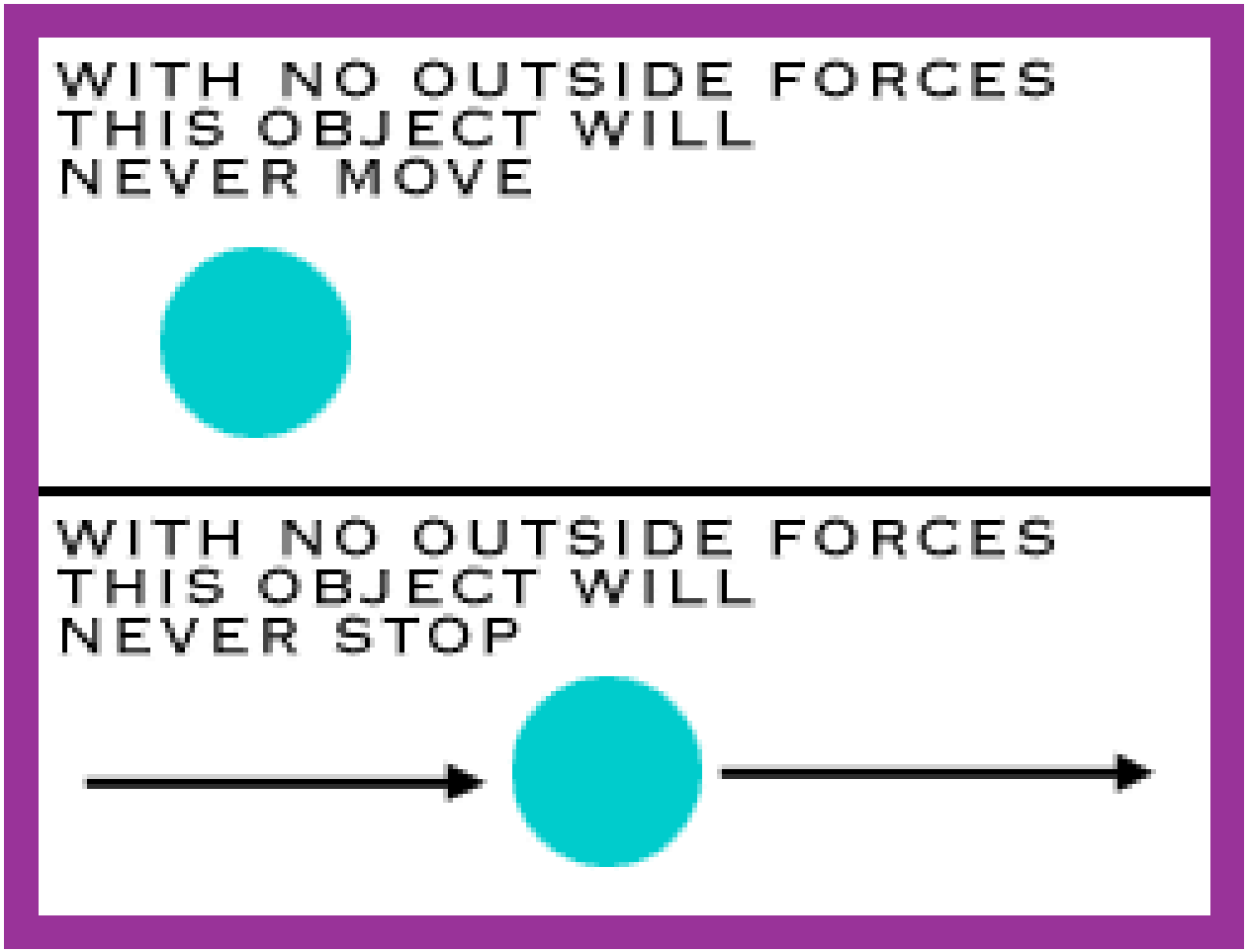
Newton's 1st Law of Motion:



The scientific law that states that an object at rest will stay at rest and an object in motion will stay in motion with a constant speed and direction unless acted on by a force.

Law #1: Inertia

(Law of Laziness)

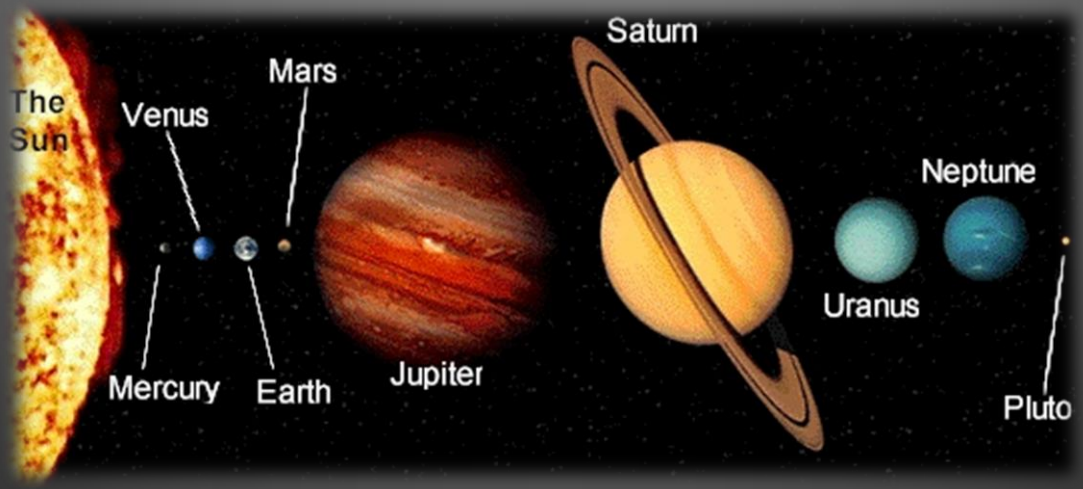


INERTIA

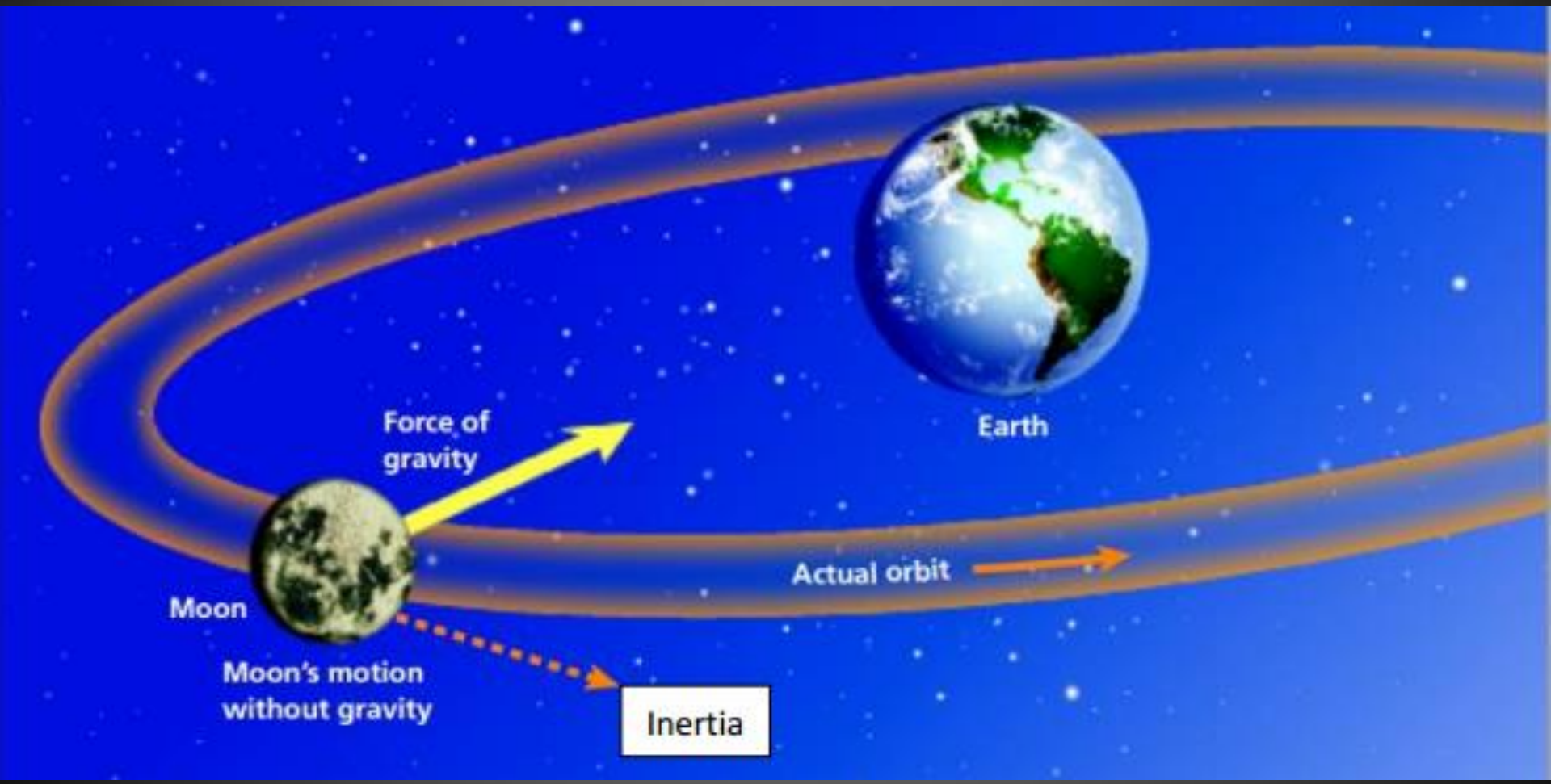
Your truck has brakes...the massive hunk of stone doesn't

Orbital Motion:

Newton concluded that two factors—**inertia and gravity**–combine to keep Earth in orbit around the sun, and the moon in orbit around Earth.



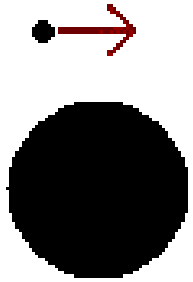
Gravity and Inertia balancing each other out to create an orbit:



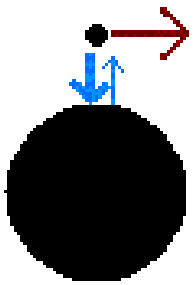
Gravity / Centripetal Force (inward) and **Inertia / Momentum** (outward)

must be **BALANCED**

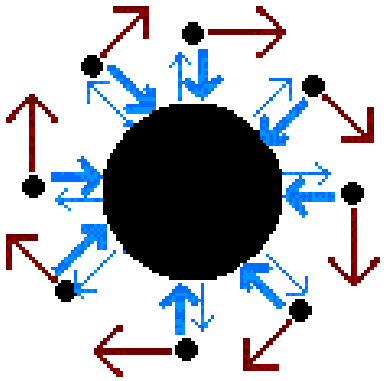
in order for an object to be captured in an **ORBIT** around another object.



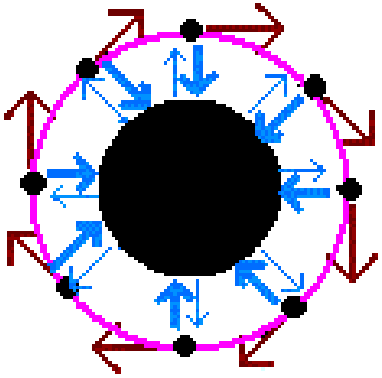
Object speeds by a planet with a lot of momentum



Gravity attracts the object to the planet and vice versa



Object continues to try to move forward, but is pulled down by gravity.



The result is a balance of forces pushing the object out and pulling it in, making a circular orbit.

Why science teachers should not be given playground duty.