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GRAVITATION

SUBJECT-PHYSICS
CHAPTER NUMBER-10

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LEARNING OBJECTIVE

Students will be able

- Define gravity.
- State Universal law of gravitation.

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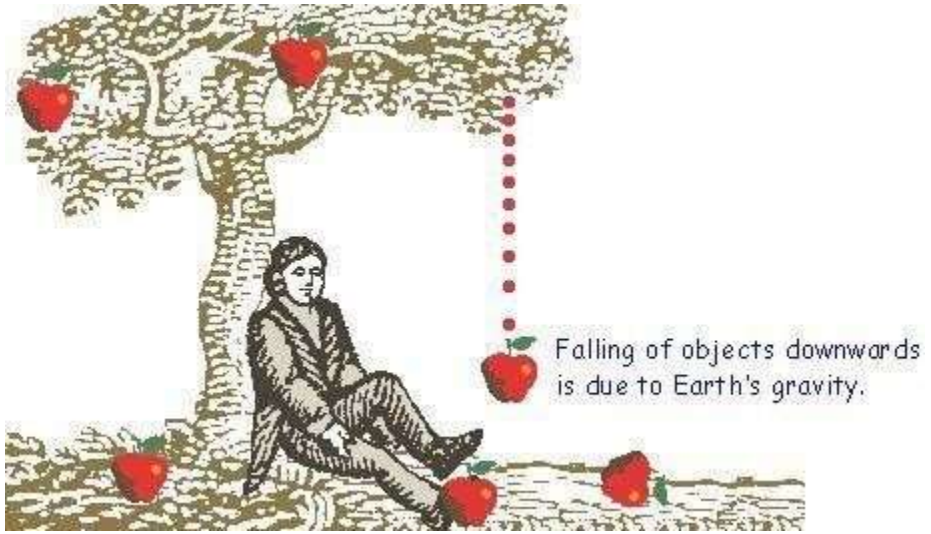
Why does Apple fall on Earth from a tree? – Because the earth attracts it towards itself

Can Apple attract the earth? - Yes. It also attracts the earth as per Newton's third law



Newton thus suggested that all objects in this universe attract each other. This force of attraction is called Gravitational Force.

https://www.youtube.com/watch?v=AFGOzTM0N-A

What Is Gravity?

- Force of attraction exerted by earth on nearby objects is called Force of Gravity.

Example

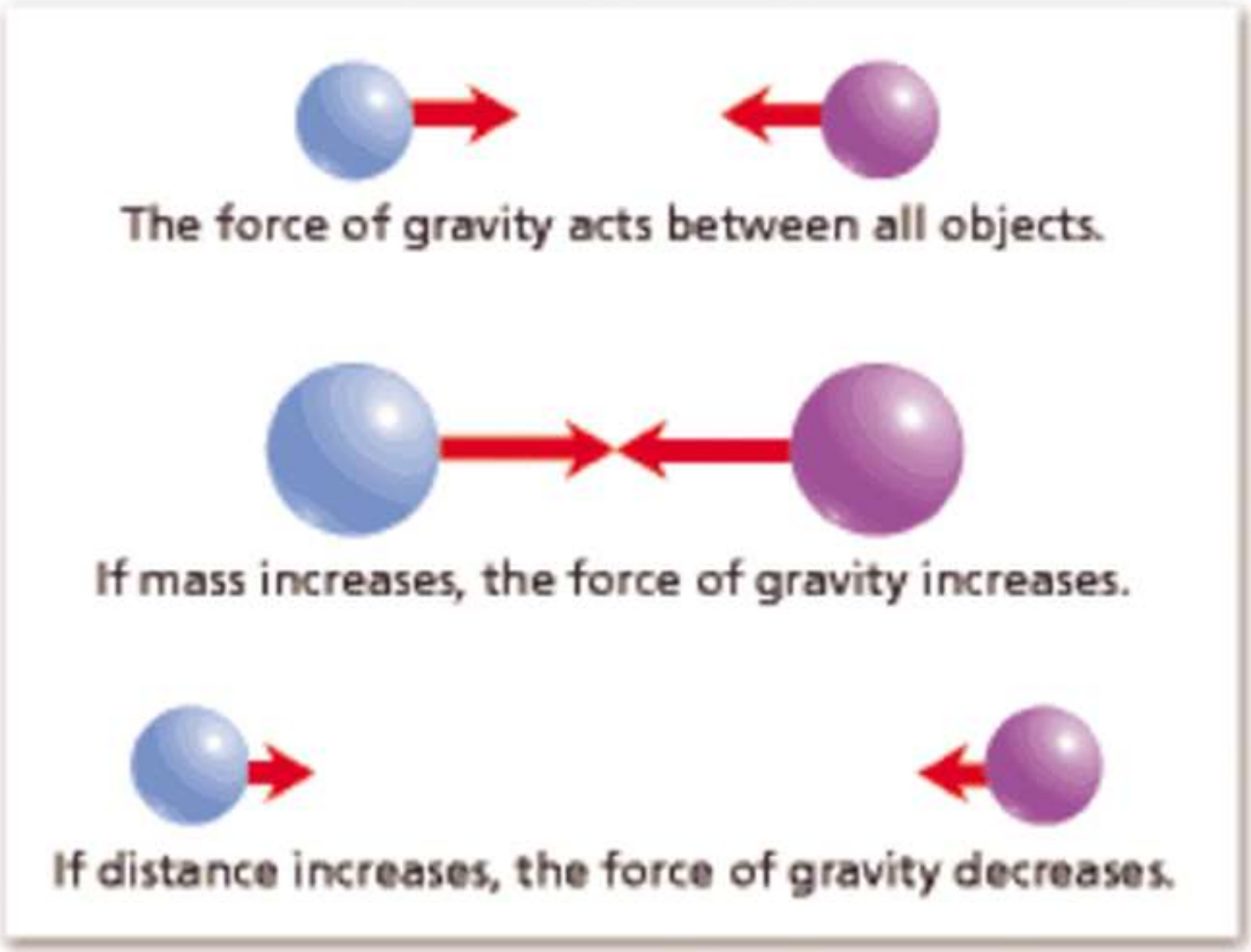
- Moon revolves around earth because of force of gravity of earth on moon

What Is Gravitational Force?

Every object in universe attracts every other object with a force

Example

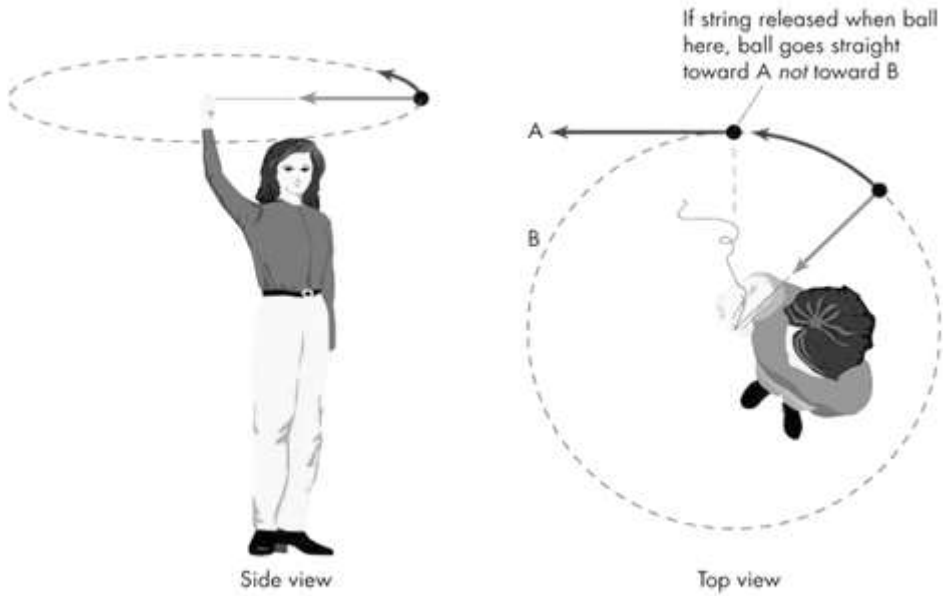
- Earth Revolves around Sun
- This is because of Gravitational Force of sun on earth.



What is the Centripetal Force?

A force called **Centripetal Force** acts upon the object that keeps it moving in a circular path.

The centripetal force is exerted from the center of the path.

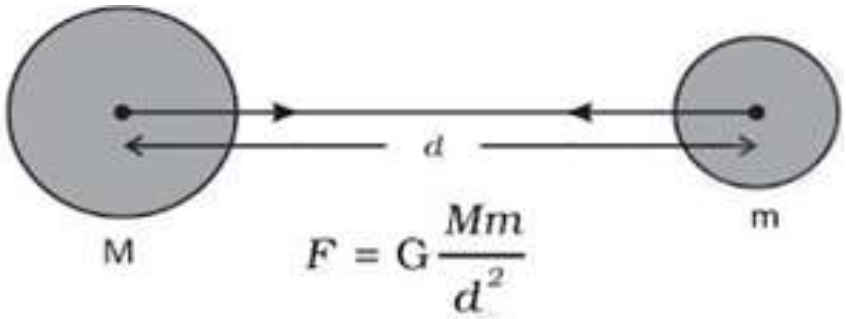


Universal Law of Gravitation by Newton

According to the universal law of gravitation, every object attracts every other object with a force.

This force is directly proportional to the product of their masses

This force is inversely proportional to the square of distances between them



Here, $F \propto M \times m$

Also, $F \propto \frac{1}{d^2}$

$\Rightarrow \quad F \propto \frac{Mm}{d^2}$

Or $\quad F = \frac{GMm}{d^2}$

Where,

G is a constant and is known as Gravitational constant.

Value of $G = 6.67 \times 10^{-11}\ Nm^2/kg^2$

G is called universal gravitational constant.

HOME ASSIGNMENT

- Define gravity.
- State Newton's Universal law of gravitation and find the value of G.
- Write the formula to find the magnitude of the gravitational force between the earth and an object on the surface of the earth

THANKING YOU
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