

Warm-up:

1. What is Gravity? → Force between All objects
2. What causes gravity? → Mass!
3. How is gravity affected? → Distance & Mass
4. Does everything have gravity? → IF it has mass
5. How does the moon cause tides? → Moon pulls on ocean water

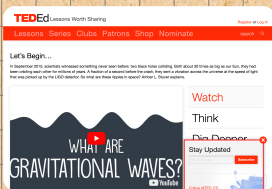
• Newton's Law of Universal Gravitation: all objects have gravity that is dependent on the mass & distance between them

$$\hookrightarrow F_g = G \cdot \frac{m_1 \cdot m_2}{r^2}$$

$m = \text{mass}$
 $r = \text{radius}$
 $G = 6.67 \cdot 10^{-11} \frac{\text{Nm}^2}{\text{kg}^2}$

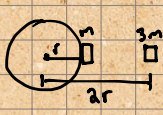
• Gravitational Fields: Certain space surrounding an object that applies a force to any object that enters the field

↳ Gravitational Waves:



Example 1:

Satellite weighs 9,000 N on Earth's surface. How much does it weigh if its mass is tripled and the orbital radius is doubled?



The diagram shows a circle representing Earth with a center point 'c'. A satellite of mass 'm' is shown on the surface. A second satellite of mass '3m' is shown at a distance of '2r' from the center, representing a doubled orbital radius.

$$9,000 \text{ N} = F_g = G \frac{m_1 \cdot m_2}{r^2} \rightarrow \frac{3}{2^2} = \frac{3}{4}$$

$$9,000 \text{ N} \cdot 0.75 = 6,750 \text{ N}$$

Example 2:

Two 75 kg students are 0.95 m apart. What is F_g ?

$$F_g = 6.67 \cdot 10^{-11} \frac{\text{Nm}^2}{\text{kg}^2} \cdot \frac{75 \cdot 75}{(0.95)^2} = 4.2 \cdot 10^{-7} \text{ N}$$