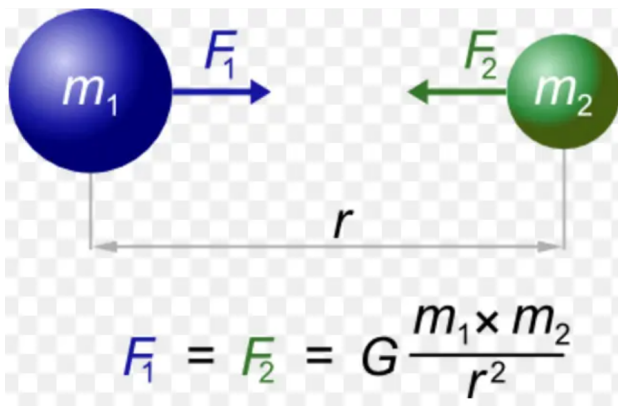


Physics Level 3 Gravity and Orbits Structure

Level 3 Physics Formula Sheet

Orbital Motion



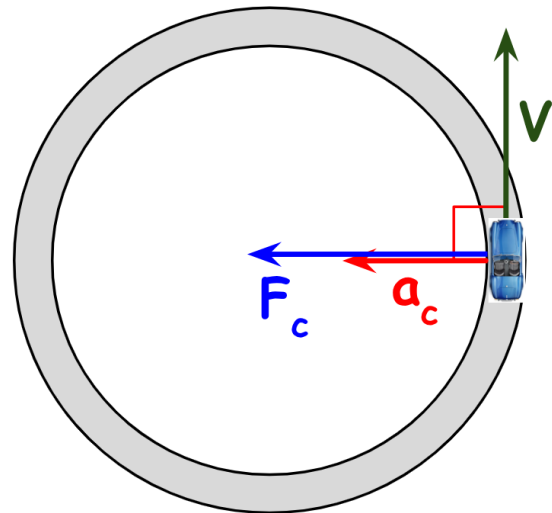
Gravity Force
between two Masses

$$F_g = Gm_1m_2/r^2$$

Centripetal Force

$$F_N = ma$$

$$F_c = mv^2/r$$



Centripetal Force = Weight Force (Gravity)

$$F_c = F_{\text{gravity}}$$

$$m_2 a_c = G m_1 m_2 / r^2$$

$$m_2 a_c = G m_1 m_2 / r^2$$

$$a_c = G m_1 / r^2 \leftarrow \text{Orbital Acceleration}$$

$$v^2 / r = G m_1 / r^2$$

$$v^2 = G m_1 / r$$

$$v = \sqrt{G m_1 / r} \leftarrow \text{Orbital Velocity}$$

$$2\pi r / T = \sqrt{G m_1 / r}$$

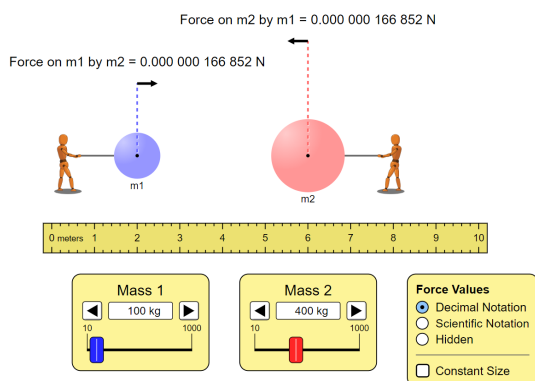
$$(2\pi r / T)^2 = G m_1 / r$$

$$4\pi^2 r^2 / T^2 = G m_1 / r$$

$$r^3 = G m_1 / (4\pi^2) \times T^2 \leftarrow \text{Radius Period Formula}$$

$$\therefore r^3 \propto T^2 \leftarrow \text{Relationship between Radius \& Period}$$

Often written as $T^2 \propto R^3$



PhET Gravity & Orbits

PhET Gravity Force Lab

