

Quiz Study Problems

$$F = ma$$

$$a = \frac{F}{m}$$

$$F_{gravity} = mg$$

$$g \approx 10 \text{ m/s}^2$$

$$F_{net} = \sum Forces = F_1 + F_2 + F_3 + ...etc$$

$$\text{When } F_{net} = 0, \text{ then } \sum Forces = 0.$$

$$1 \text{ N} = 1 \text{ kg} \cdot 1 \frac{\text{m}}{\text{s}^2}$$

$$\frac{1 \text{ N}}{1 \text{ kg}} \Rightarrow \frac{1 \text{ kg} \cdot \text{m/s}^2}{1 \text{ kg}} \Rightarrow 1 \text{ m/s}^2$$

1. A particular *force* acts on a 2 kg mass and gives it an acceleration of 3 m/s^2 . What **acceleration** is produced by the same force when acting on a mass of **(a)** 6 m/s^2 and **(b)** 1.5 m/s^2 ?
2. A particular *mass* acquires an acceleration of 3 m/s^2 when acted upon by a force of 9 N ($9 \text{ kg} \cdot \frac{\text{m}}{\text{s}^2}$). What **force** will give the same mass an acceleration of **(a)** 1 m/s^2 and **(b)** 15 m/s^2 ?
3. Acceleration due to gravity is about 10 m/s^2 . What is the **gravitational weight** (force due to gravity) of an object whose mass is **(a)** 2 kg and **(b)** 25 g ?
Reminder, $1 \text{ kg} = 1000 \text{ g}$ and the standard unit for a force is N (Newton) where $1 \text{ N} = 1 \text{ kg} \cdot \text{m/s}^2$. Make sure mass is in kilograms before solving for force, or else you will have to report the answer in a unit other than newtons (which is fine, as long as it is correct).
4. A block hangs at rest from a cord. Find the **mass** of the block if the tension in the cord is 5 N . Gravitational acceleration is 10 m/s^2 .
5. Taking the force of gravity into account, what **upward force** must be exerted on a 2 kg mass to cause it to rise with an acceleration of 1.6 m/s^2 ?