



Science 8

Newton's 2nd Law of Motion

Name: _____

Date: _____

Newton's 2nd Law of Motion

1. Write the word equation for Newton's 2nd Law of Motion:

force = mass x acceleration

2. Write the symbol equation for Newton's 2nd Law of Motion:

$F = m a$

3. Write the correct units for:

mass: kg

acceleration: m/s²

force: kg m/s² or N

4. What three quantities are related in Newton's 2nd Law of Motion? force, mass, and acceleration

How are force and mass related? Force and mass are related directly.

How are force and acceleration related? Force and acceleration are related directly.

How are mass and acceleration related? Mass and acceleration are related inversely.

5. If the net force on an object increases, how does the acceleration change? Acceleration will also increase.

6. If the net force on an object is doubled, how must the mass change to keep the acceleration the same?

To keep the acceleration the same, the mass would also have to be doubled.

7. What is the acceleration due to gravity near the surface of Earth if a 100 kg rock has a weight (force) of 981 newtons? Remember to show the shopping list, the equation used, the substitutions and cancellation with units, and the final answer.

$$\begin{array}{ll} a = ? & F = m a \quad \therefore a = F / m \\ m = 100 \text{ kg} & a = F / m = 981 \text{ kg m/s}^2 / 100 \text{ kg} \\ F = 981 \text{ kg m/s}^2 & a = 9.81 \text{ m/s}^2 \end{array}$$

8. Objects dropped near the surface of the earth experience an acceleration of 9.81 m/s². What force will be required to hold a 37 kg rock steady? Remember to show the shopping list, the equation used, the substitutions and cancellation with units, and the final answer.

$$\begin{array}{ll} a = 9.81 \text{ m/s}^2 & F = m a \\ F = ? & = 37 \text{ kg} \times 9.81 \text{ m/s}^2 \\ m = 37 \text{ kg} & = 363 \text{ N} \end{array}$$