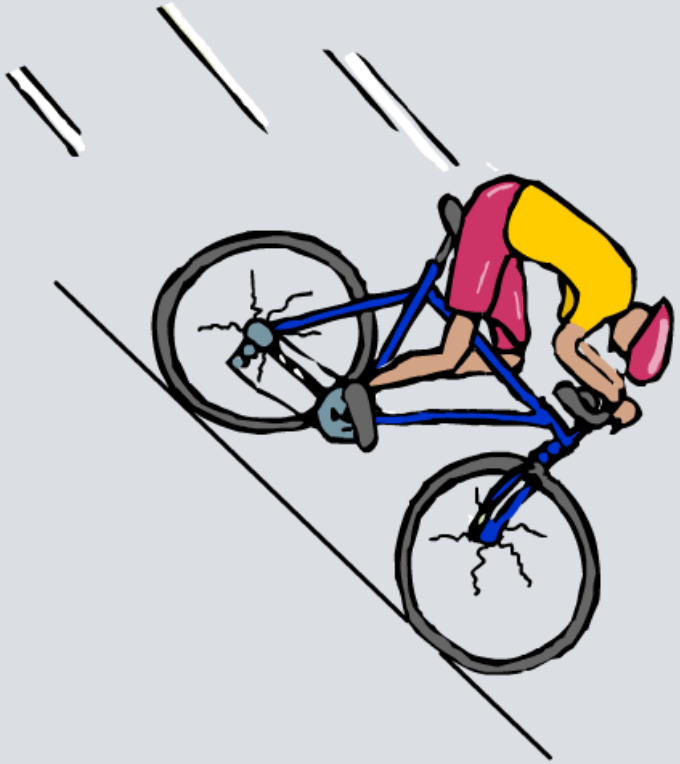
Acceleration



What is acceleration?

The **acceleration** of an object is a measure of how quickly its velocity changes.

A train accelerates in a straight line from rest. As it does, its velocity increases.

The brakes on this motorcycle are causing it to slow down. This is negative acceleration or **deceleration**.

How is acceleration calculated?

The acceleration of an object can be calculated using this equation:

$$\text{acceleration} = \frac{\text{change in speed}}{\text{time taken}}$$

- Change in speed is measured in **meters per second** (**m/s**).
- Time taken is measured in **seconds** (**s**).
- Acceleration is measured in **meters per second per second** (**m/s^2**).

Acceleration problem

A race car accelerates from rest to a speed of 60 m/s in a time of 4 seconds. What is the acceleration of the car?

$$\text{acceleration} = \frac{\text{change in speed}}{\text{time taken}}$$

$$= \frac{60}{4}$$

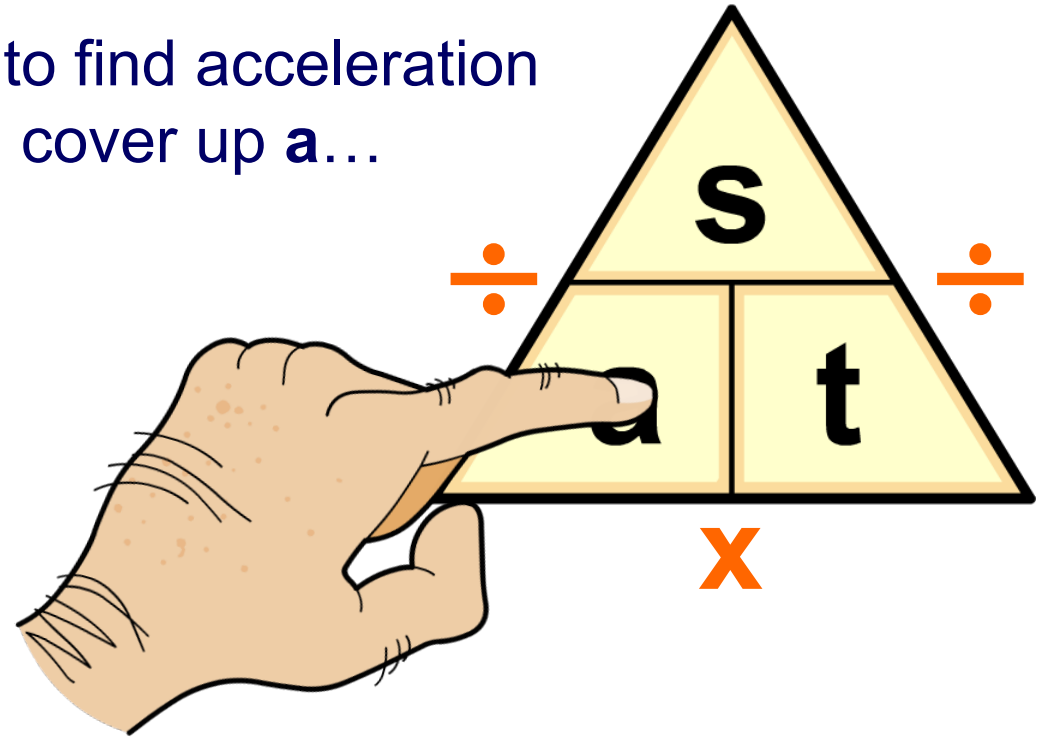
$$= 15\ \text{m/s}^2$$

Using a formula triangle

A formula triangle helps you to rearrange a formula. The formula triangle for **acceleration (*a*)**, **speed (*s*)** and **time (*t*)** is shown below.

Cover the quantity that you are trying to find, which gives the rearranged formula needed for the calculation.

So to find acceleration (**a**), cover up **a**…



…which gives the formula…

$$a = \frac{s}{t}$$

Acceleration problem

A hungry cheetah spots a gazelle and decides to chase it. The cheetah accelerates at 10 m/s^2 from rest until it reaches 20 m/s. How long did this take?

$$\text{acceleration} = \frac{\text{change in speed}}{\text{time taken}}$$

$$\text{time taken} = \frac{\text{change in speed}}{\text{acceleration}}$$

$$= \frac{20}{10}$$

$$= 2\,\text{s}$$

Acceleration problems calculations

You will need this equation to answer the following questions about acceleration, speed and time:

acceleration = change in speed / time

Click "**start**" to begin.

start