Distance, Time and Speed

Distance, time and speed
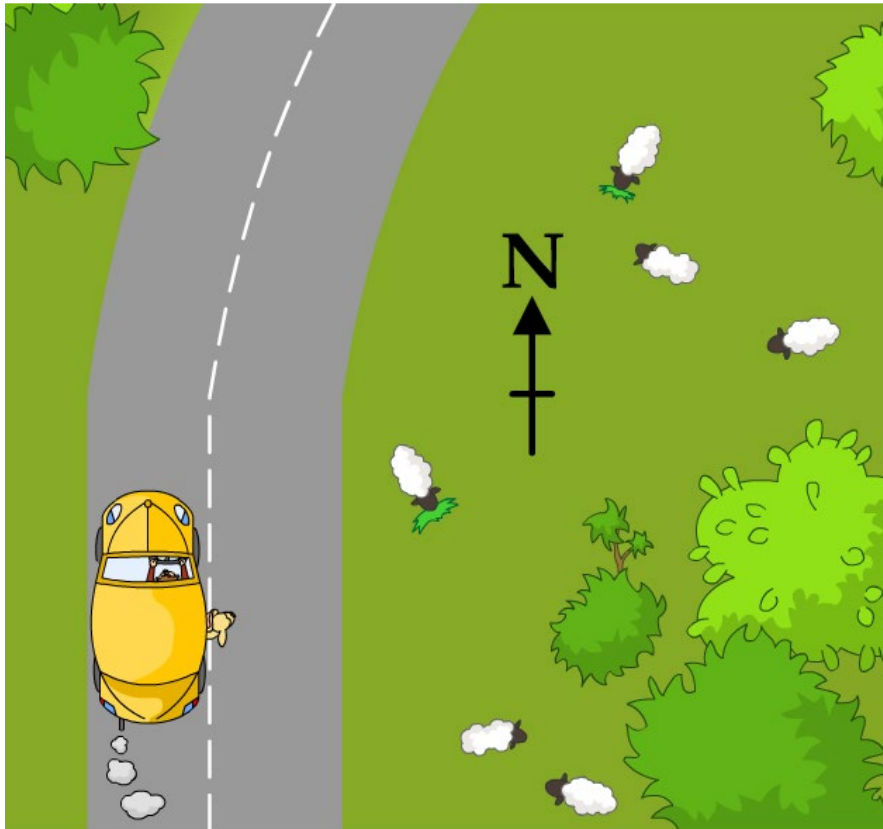
To find the **speed** of an object you need to know:

- the **distance** traveled

- **how long** it took to travel that distance.

AUTHORIZED PERSONNEL ONLY

How is velocity different than speed?

The speed of an object does not depend on the direction in which it is traveling. The **velocity** of an object is the speed **and** direction in which it is moving.
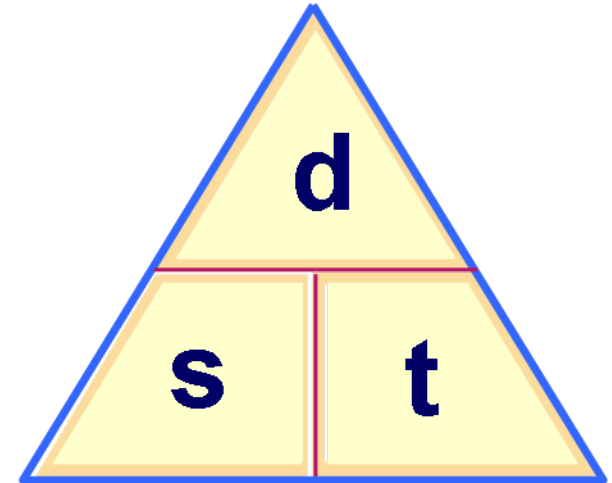
The car is traveling north with a velocity of 10 m/s.

As the car goes around the corner, the speed of the car remains constant, but the velocity changes.

Calculating average speed

Average speed is calculated using this equation:

$$\text{Average speed} = \frac{\text{total distance}}{\text{total time}}$$

formula triangle

Speed can be measured in different units, e.g. m/s, km/h, km/s, miles per hour.

The units of distance and time will determine the units to be used for speed.

Match the speed units to their symbols

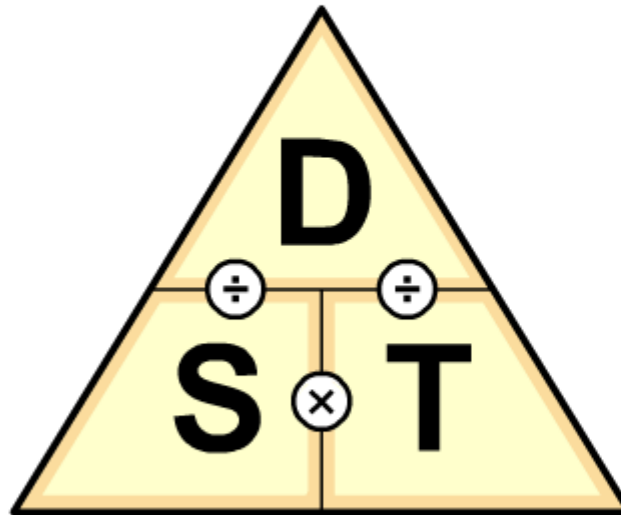|	
meters per second	km/h
kilometers per hour	cm/s
miles per hour	mph
centimeters per hour	cm/h
millimeters per second	mm/s
centimeters per second	m/s

?

solve
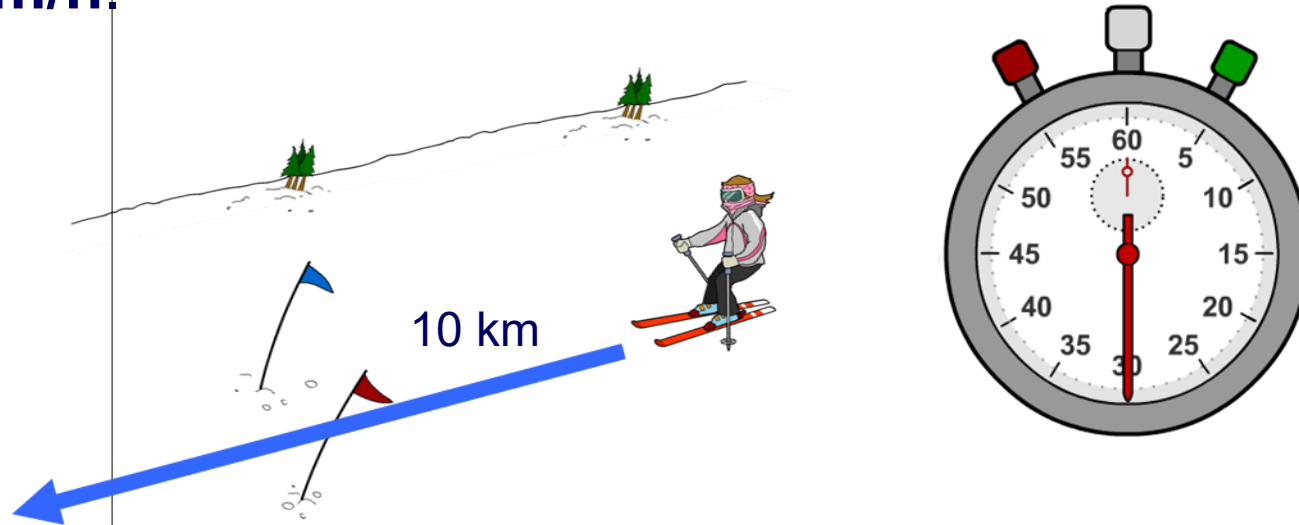
How are speed, distance and time calculated?

How can a formula triangle be used to calculate speed, distance and time?

Click **"play"** to find out.

Speed calculation example

A girl takes 30 minutes to travel around a cross-country ski course: a distance of 10 km. Calculate her average speed in **km/h**.
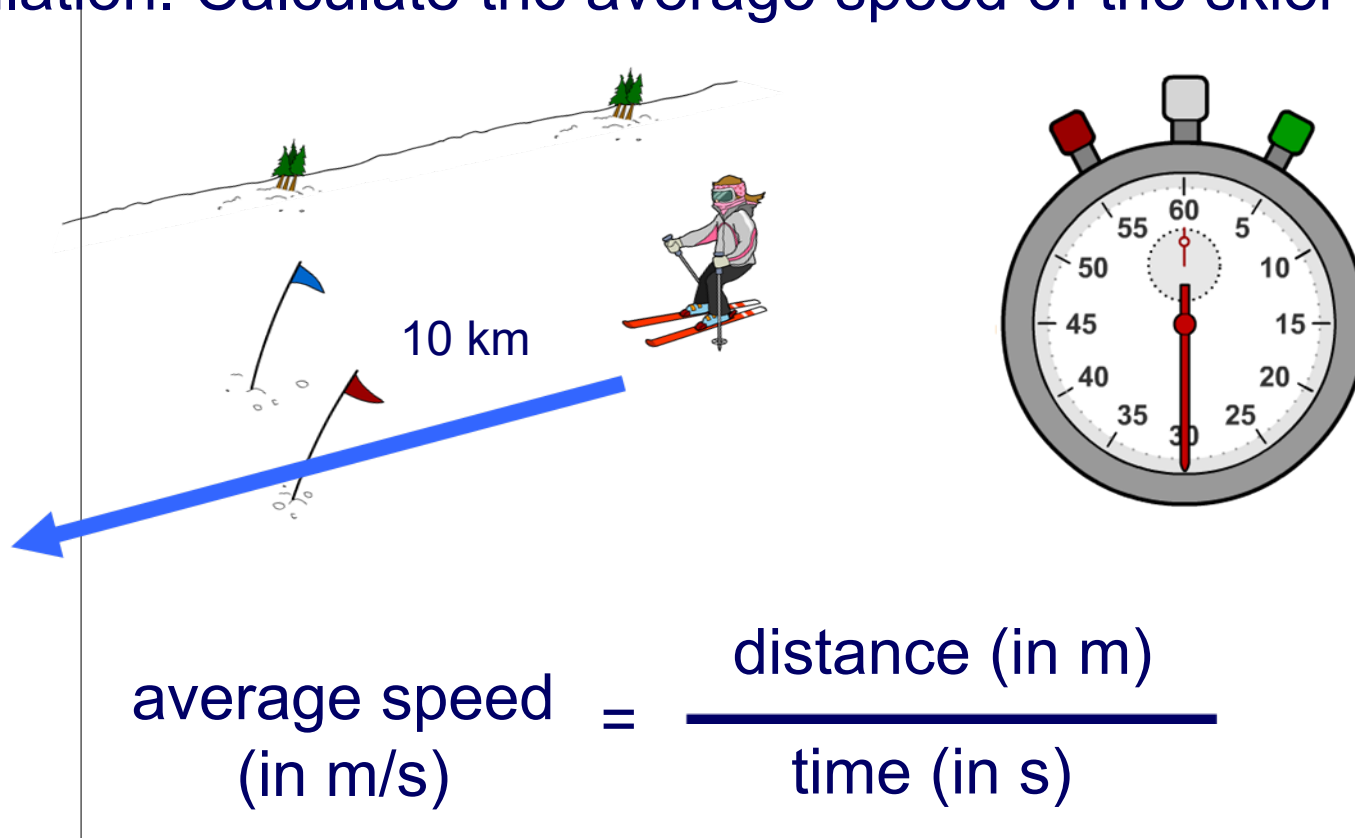
10 km

$$\text{average speed (in km/h)} = \frac{\text{distance (in km)}}{\text{time (in h)}}$$

$$= \frac{10 \text{ km}}{0.5 \text{ h}} = \textbf{20 km/h}$$

Speed calculation example – units

Sometimes the units have to be changed in a speed calculation. Calculate the average speed of the skier in **m/s**.

10 km

$$\text{average speed (in m/s)} = \frac{\text{distance (in m)}}{\text{time (in s)}}$$

$$= \frac{10{,}000 \text{ m}}{3600 \text{ s}} = \textbf{2.8 m/s}$$

Distance calculation

A boy goes for a walk in his neighborhood at an average speed of 3.6 km/h. How far will he travel in 30 minutes?

Give your answer in km.

distance (km) = speed (km/h) × time (h)

= 3.6 km/h × 0.5 h

= **1.8 km**

How long would it take the boy to walk 200 m to his friend's house, if his average speed was 0.8 m/s?

$$\text{time} = \frac{\text{distance}}{\text{speed}}$$

$$= \frac{200\,\text{m}}{0.8\,\text{m/s}}$$

$$= \textbf{250 seconds}$$