

# Speed

Name: \_\_\_\_\_

Use the formula  $speed = \frac{distance}{time}$  to work out the speed of each object.

*You may use a calculator*

Felix Baumgartner recently set a number of records by jumping out of a balloon 39km above the ground. At one point he was travelling faster than the speed of sound. Altogether he took about 10 minutes to reach the ground. **What was his average speed, in km per minute?**



Bloodhound SSC plans to set a new land-speed record. It is a rocket- and jet-powered vehicle which expects to cover the length of the 1 mile test track in around 3.5 seconds. **How fast is this, in miles per second?**



According to the 1998 Guinness Book of World Records, the winner of the 1995 world snail racing championships was a garden snail named Archie which completed the 33cm racecourse in exactly 2 minutes. **What was the speed of the snail, in cm per minute?**



Voyager 1 is a space probe which is currently the fastest thing ever built. Launched in 1977, its primary function was to take pictures of the outer planets, but, having passed Jupiter in 1979, a total of 546 days after take-off, it is now heading out into deep space, and will leave the solar system in the near future. The distance it had to travel between the Earth and Jupiter was roughly 630 million kilometres.



**What was its average speed, in kilometres per day?**

The earth is hurtling through space in its orbit around the sun. Since we're all travelling with it at the same speed (relative to the sun) we don't notice the effect, but every year (around 365 days) we accompany our planet on a 940 million km journey around the sun.

**What speed is this, in kilometres per day?**



*Can you put these 5 things in order, from slowest to fastest? Take care converting speeds with different units.*

# Speed SOLUTIONS

Felix Baumgartner:

$$\text{speed} = \frac{39}{10} = 3.9 \text{ km per minute}$$

Bloodhound SSC:

$$\text{speed} = \frac{1}{3.5} \approx 0.286 \text{ miles per second}$$

Snail Race:

$$\text{speed} = \frac{33}{2} = 16.5 \text{ cm per minute}$$

Voyager 1:

$$\text{speed} = \frac{640,000,000}{546} \approx 1,153,846 \text{ km per day}$$

Earth:

$$\text{speed} = \frac{940,000,000}{365} \approx 2,575,342 \text{ km per day}$$

*In order, from slowest to fastest, by converting all speeds to km/h:*

Felix Baumgartner:

$$\begin{aligned} \text{speed} &= \frac{39}{10} = 3.9 \text{ km per minute} \\ 3.9 \times 60 &= \mathbf{234 \text{ km/h}} \end{aligned}$$

Bloodhound SSC:

$$\begin{aligned} \text{speed} &= \frac{1}{3.5} = 0.2857 \dots \text{ miles per second} \\ 0.2857 \dots \times 60 \times 60 &\approx 1029 \text{ mph} \\ 1 \text{ mile} \approx 1.6 \text{ km} &\Rightarrow 1029 \times 1.6 \approx \mathbf{1650 \text{ km/h}} \end{aligned}$$

Snail Race:

$$\begin{aligned} \text{speed} &= \frac{33}{2} = 16.5 \text{ cm per minute} \\ 16.5 \div 60 &= 0.275 \text{ cm/s} \\ 0.275 \times 60 \times 60 &= 990 \text{ cm per hour} = 9.9 \text{ metres per hour} = \mathbf{0.0099 \text{ km/h}} \end{aligned}$$

Voyager 1:

$$\begin{aligned} \text{speed} &= \frac{640,000,000}{546} = 1153846.154 \text{ km per day} \\ 1153846.154 \div 24 &= \mathbf{48077 \text{ km/h}} \end{aligned}$$

Earth:

$$\begin{aligned} \text{speed} &= \frac{940,000,000}{365} = 2575342.466 \text{ km per day} \\ 2575342.466 \div 24 &\approx \mathbf{107306 \text{ km/h}} \end{aligned}$$

**In order, from slowest to fastest:**

Snail (0.0099), Felix (234), Bloodhound (1650), Voyager (48077), Earth (107306)