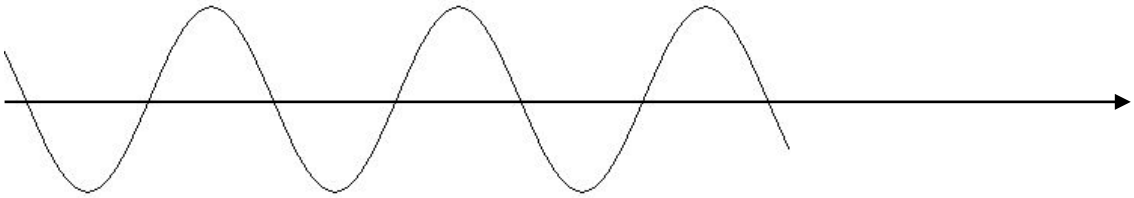
## The wave equation



The wave equation links wave speed, frequency and wavelength.

**wave speed = frequency x wavelength**

e.g. if 10 waves pass in one second (frequency) and each wave has a length of 3m (wavelength), then the speed of the wave is 10x3 = 30m/s

Beware of prefixes:

| *prefix* | *symbol* | *metres* |
|---|---|---|
| micro | μ | 0.000001 |
| milli | m | 0.001 |
| kilo | k | 1000 |
| mega | M | 1000000 |
| giga | G | 1000000000 |

Always get rid of the prefix when using the number in the wave equation.

e.g. A wave has a frequency of 10MHz. It is travelling at a speed of 3km per second. What is its wavelength.

Frequency = 10MHz = 10000000Hz

Speed = 3km/s = 3000m/s

Wavelength = speed/frequency = 3000/10000000 = 0.0003m

**Questions**

1) A wave has a wavelength of 6mm and a frequency of 1kHz. What is its speed?
2) A wave has a speed of 300m/s and a wavelength of 10m. What is the frequency?
3) A wave has a speed of 340m/s and a frequency of 3MHz. What is its wavelength?