

# Physics A level: Bridging work

Congratulations on your decision to study physics at A level. Physics is one of the most challenging and important areas of science. You will be studying the universe on every scale from the tiniest quantum phenomena to stars and galaxies, and lots in between.

This bridging work is designed to help you get ready for the course. You will need to sharpen up your maths skills, so please complete the attached work and bring it to your first lesson.

A level lessons will also involve a lot more discussion than at GCSE. To learn more about the subject you should have a look at these YouTube channels (and I'm sure you can find others)

**Minute physics** [www.youtube.com/user/minutephysics](http://www.youtube.com/user/minutephysics)

**PhD comics** [www.youtube.com/user/phdcomics/videos](http://www.youtube.com/user/phdcomics/videos)

You should also join the **Institute of Physics** ([www.iop.org](http://www.iop.org)) as a student member. This is free and gives you access to the digital version of their magazine, Physics World.

We look forward to seeing you in September

***The Physics Department***

# Revision: Physics symbols, formulae and maths skills

1. What are the meanings for these symbols?
<i>a</i>
<i>v</i>
<i>F</i>
<i>t</i>
<i>I</i>
<i>V</i>

2. The wave equation is $= f\lambda$ . What do the symbols refer to?
<i>c</i>
<i>f</i>
$\lambda$

<b>Prefix</b>	<b>Symbol</b>	<b>Meaning</b>	<b>Example</b>
pico	p	$\times 10^{-12}$	1 pF
nano	n	$\times 10^{-9}$	1 nF
micro	$\mu$	$\times 10^{-6}$	1 $\mu$ g
milli	m	$\times 10^{-3}$	1 mm
centi	c	$\times 10^{-2}$	1 cm
kilo	k	$\times 10^3$	1 km
Mega	M	$\times 10^6$	1 M $\Omega$
Giga	G	$\times 10^9$	1 GWh

**3. Convert the following quantities to SI units:**

15 cm	
3 km	
35 mV	
220 nF	
1150 $\mu\Omega$	

**4. Convert the following:**

1 m <sup>2</sup> =	mm <sup>2</sup>
45 000 mm <sup>2</sup> =	m <sup>2</sup>
6 000 000 cm <sup>3</sup> =	m <sup>3</sup>

**5. Convert these numbers to standard form:**

86
381
45300
1 500 000 000
0.03
0.00045
0.0000000782

6. Use your calculator to do the following calculations. Write your answers to three significant figures.

	ANSWER
(a) $\frac{3.4 \times 10^{-3} \times 6.0 \times 10^{23}}{235}$	
(b) $\frac{27.3^2 - 24.8^2}{\sqrt{38}}$	
(c) $1.4509^3$	
(d) $\sin 56.4^\circ$	
(e) Reciprocal of $2.34 \times 10^5$	
(f) $45 \sin 10^\circ$	

7. Rearrange these equations:

Equation	Subject	Answer
$V = IR$	$R$	
$p = mv$	$v$	
$\rho = \frac{m}{V}$	$m$	
$Q = CV$	$C$	

*Formulae with Four Terms*

<b>8. Rearrange these equations:</b>		
<b>Equation</b>	<b>Subject</b>	<b>Answer</b>
$pV = nRT$	$V$	
$E_p = mg\Delta h$	$\Delta h$ ( $\Delta h$ is a single term)	
$V = \frac{-Gm}{r}$	$G$	
$\lambda = \frac{wS}{D}$	$D$	

<b>9. Rearrange these equations:</b>		
<b>Equation</b>	<b>Subject</b>	<b>Answer</b>
$v = u + at$	$t$	
$E = V + Ir$	$r$	