

# A Level Physics Transition Task 2:

## Prefixes and Conversions, Equations and Calculations

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

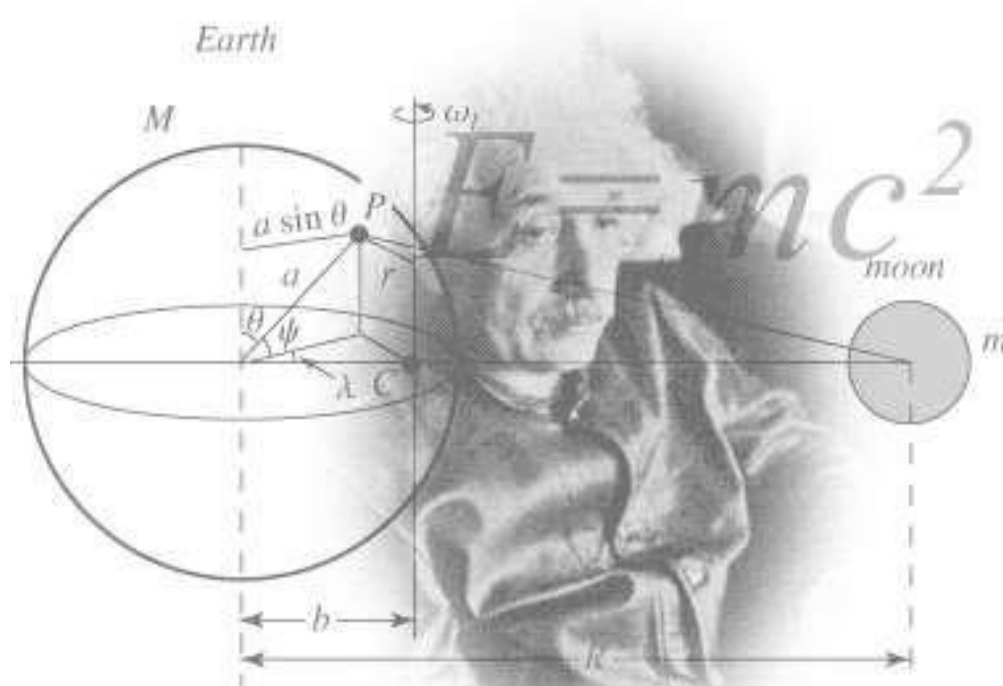


Figure 1 <http://scienceworld.wolfram.com/physics/images/main-physics.gif>

This pack contains a programme of activities and resources to prepare you to start an A level in Physics in September. It is aimed to be used after you complete your GCSE, throughout the remainder of the summer term and over the summer holidays to ensure you are ready to start your course in September.

**This should be handed in to your Physics teacher when you start the A level course in September.**

## Symbols and Prefixes

Prefix	Symbol	Power of ten
Nano	n	$\times 10^{-9}$
Micro	$\mu$	$\times 10^{-6}$
Milli	m	$\times 10^{-3}$
Centi	c	$\times 10^{-2}$
Kilo	k	$\times 10^3$
Mega	M	$\times 10^6$
Giga	G	$\times 10^9$

At A level you need to remember all symbols, units and prefixes. Below is a list of quantities you may have already come across and will be using during your A level course

Quantity	Symbol	Unit
Velocity	v	$\text{ms}^{-1}$
Acceleration	a	$\text{ms}^{-2}$
Time	t	S
Force	F	N
Resistance	R	$\Omega$
Potential difference	V	V
Current	I	A
Energy	E or W	J
Pressure	P	Pa
Momentum	p	$\text{kgms}^{-1}$
Power	P	W
Density	$\rho$	$\text{kgm}^{-3}$
Charge	Q	C

Solve the following:

1. How many metres in 2.4 km?
2. How many joules in 8.1 MJ?
3. Convert 326 GW into W.
4. Convert 54600 mm into m.
5. How many grams in 240 kg?
6. Convert 0.18 nm into m.
7. Convert 632 nm into m. Express in standard form.
8. Convert 1002 mV into V. Express in standard form.
9. How many eV in 0.511 MeV? Express in standard form
10. How many m in 11 km? Express in standard form.

### **Standard Form**

At A level quantity will often be written in standard form, and it is expected that your answers will be too.

This means answers should be written as  $\dots \times 10^y$ . E.g. for an answer of 1200kg we would write  $1.2 \times 10^3$ kg. For more information visit: [www.bbc.co.uk/education/guides/zc2hsbk/revision](http://www.bbc.co.uk/education/guides/zc2hsbk/revision)

- |                                      |  |
|--------------------------------------|--|
| 1. Write 2530 in standard form.      | 7. Write $2.4 \times 10^2$ as a normal number.     |
| 2. Write 280 in standard form.       | 8. Write $3.505 \times 10^1$ as a normal number.   |
| 3. Write 0.77 in standard form.      | 9. Write $8.31 \times 10^6$ as a normal number.    |
| 4. Write 0.0091 in standard form.    | 10. Write $6.002 \times 10^2$ as a normal number.  |
| 5. Write 1 872 000 in standard form. | 11. Write $1.5 \times 10^{-4}$ as a normal number. |
| 6. Write 12.2 in standard form.      | 12. Write $4.3 \times 10^3$ as a normal number.    |

## Rearranging formulae

This is something you will have done at GCSE and it is crucial you master it for success at A level. For a recap of GCSE watch the following links:

[www.khanacademy.org/math/algebra/one-variable-linear-equations/old-school-equations/v/solving-for-a-variable](http://www.khanacademy.org/math/algebra/one-variable-linear-equations/old-school-equations/v/solving-for-a-variable)

[www.youtube.com/watch?v=WWgc3ABSj4](http://www.youtube.com/watch?v=WWgc3ABSj4)

Rearrange the following:

1.  $E = m \times g \times h$  to find  $h$

2.  $E = \frac{1}{2} m v^2$  to find  $m$

3.  $E = \frac{1}{2} m v^2$  to find  $v$

4.  $v = u + at$  to find  $u$

5.  $v = u + at$  to find  $a$

6.  $v^2 = u^2 + 2as$  to find  $s$

7.  $v^2 = u^2 + 2as$  to find  $u$

### Rearranging formulae – More practice

Rearrange each equation into the subject shown in the middle column.

Equation		Rearrange Equation
$V = IR$	$R$	
$I = \frac{Q}{t}$	$t$	
$\rho = \frac{RA}{l}$	$A$	
$\mathcal{E} = V + Ir$	$r$	
$s = \frac{(u + v)}{2}t$	$u$	

Equation	Subject	Rearranged Equation
$hf = \phi + E_K$	$f$	
$E_P = mgh$	$g$	
$E = \frac{1}{2}Fe$	$F$	
$v^2 = u^2 + 2as$	$u$	
$T = 2\pi\sqrt{\frac{m}{k}}$	$m$	

## Significant figures

At A level you will be expected to use an appropriate number of significant figures in your answers. The number of significant figures you should use is the same as the number of significant figures in the data you are given. You can never be more precise than the data you are given so if that is given to 3 significant your answer should be too. E.g. Distance = 8.24m, time = 1.23s therefore speed = 6.75m/s

The website below summarises the rules and how to round correctly.

<http://www.purplemath.com/modules/rounding2.htm>

Give the following to 3 significant figures:

1. 3.4527      4. 1.0247

2. 40.691      5. 59.972

3. 0.838991

Calculate the following to a suitable number of significant figures:

6.  $63.2/78.1$

7.  $39+78+120$

8.  $(3.4+3.7+3.2)/3$

9.  $0.0256 \times 0.129$

10.  $592.3/0.1772$