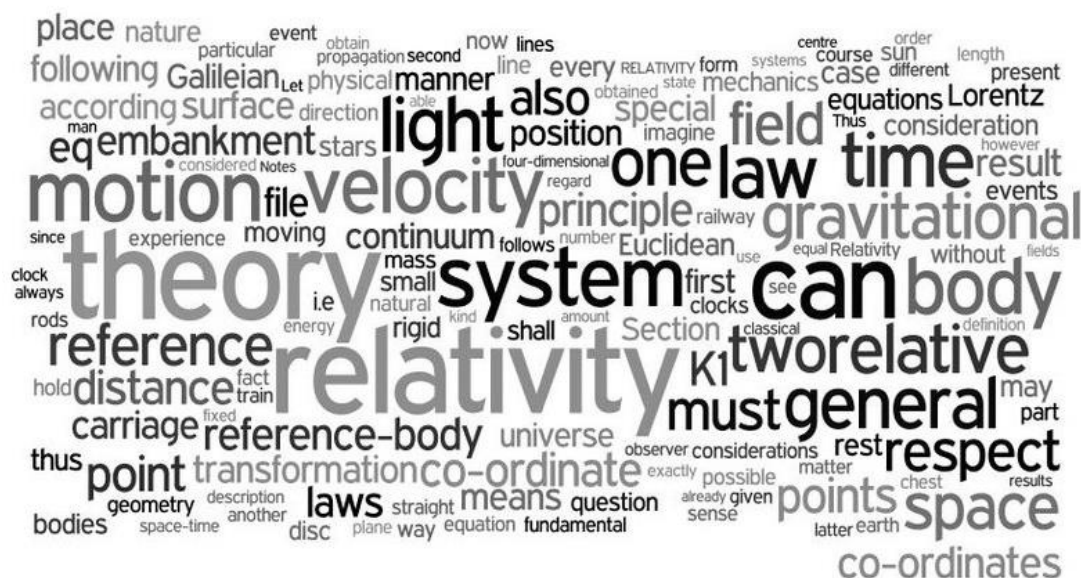


Course outline with key assessment details – AQA physics A – year 1 & 2.....	3
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Year 1 topics

Physics is a linear course. This means that all topics studied in year 1 will be assessed at the end of year 2.

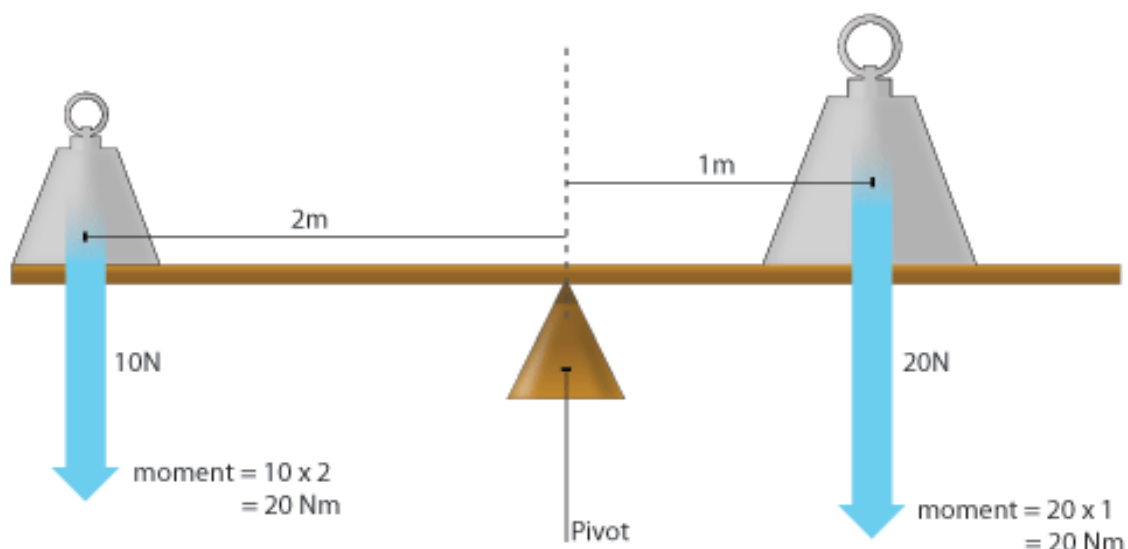
<i>First year topics</i>	
Topic	Content
1	Measurements and their errors , including the use of SI units and their prefixes, limitations of physical measurement, estimation of physical quantities.
2	Particles and radiation , including constituents of the atom, particle interactions, collisions of electrons with atoms.
3	Waves , including progressive waves, interference, diffraction.
4	Mechanics and energy , including projectile motion, Newton's laws of motion.
5	Electricity , including current/voltage characteristics, circuits, electromotive force and internal resistance.

Year 2 topics and assessments

A level pupils will study new topics in year 13. These will be assessed in June, along with the year 12 topics.

<i>A level year 2 topics</i>	
Topic	Content
6	Further mechanics and thermal physics , including periodic motion, thermal energy transfer, molecular kinetic theory model.
7	Fields , including Newton's law of gravitation, orbits of planets and satellites, magnetic flux density, capacitors and electric fields.
8	Nuclear physics , including evidence for the nucleus, radioactive decay, nuclear instability.
Option Topic	Astrophysics , including classification of stars by luminosity, Doppler effect, detection of exoplanets.

Paper 1	+	Paper 2	+	Paper 3
Content - Topics 1 – 5 - and periodic motion		Content Topics 6 – 8		Content - Practical skills - Data analysis - Optional topic
Assessment - Written exam: 2 hours 85 marks 34% of A-level		Assessment - Written exam: 2 hours 85 marks 34% of A-level		Assessment - Written exam: 2 hours 80 marks 32% of A-level
Questions 60 marks: a mixture of short and long answer questions 25 marks: multiple choice questions		Questions 60 marks: a mixture of short and long answer questions 25 marks: multiple choice questions		Questions 45 marks: questions on practical experiments and data analysis 35 marks: questions on optional topic

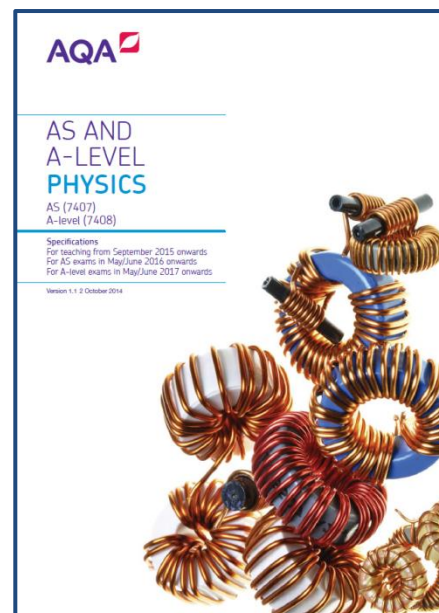


Syllabus details

A copy of the specification can be found here:

<http://www.aqa.org.uk/subjects/science/as-and-a-level/physics-7407-7408>

You should print off a copy and store it in your folder with your class notes. It should also be used for revision purposes as you move through the course.



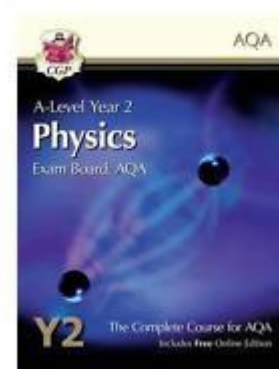
Course text (and other resources)

As part of the course you will be expected to purchase a revision guide. We can purchase these at a reduced price of £11, so there is no need to buy one before you arrive in September.

ISBN-13: 978-1-78908-032-2

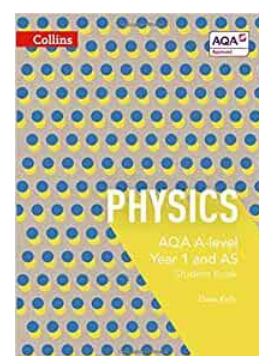
Publisher: CGP

Price: RRP £19.99



We can also suggest other course texts that you may wish to purchase.

We will talk through these with you in September.



Physics at The Gryphon

You will be taught 9 lessons of physics, by two teachers, every two weeks.

As a minimum, you will be expected to study at home for a further 9 hours. Do not underestimate the importance of this extra study.

You have chosen physics and should therefore show complete commitment to your success. As a result, the physics department will show complete commitment to help you achieve your targets.

As a sixth form student, we expect you to show a mature approach to your studies. We expect full attendance in lessons and all homework to be handed in on time. If you're struggling with any aspect of the course you will need to seek out help from one of your teachers and ensure that you read around the subject in time for a deadline or assessment. Lesson notes should be consolidated on a lesson-by-lesson basis; your teacher will show you how this can be done.

You will be assessed regularly and these grades will be collated and included in reports home.

You will also be expected to arrive with note taking materials, properly divided by subject AND teacher.

And finally:

We are thrilled that you have chosen to study physics at The Gryphon and we are really looking forward to meeting you in September. We cannot wait to take you through the A level course with enthusiasm and dedication, which will hopefully allow you to see why we feel that our subject is the best!

Have a well-earned break after your GCSE exams and we will see you in the new term with your summer task.

A Level Physics - Induction homework task

Please do these tasks over the summer to prepare you for the A level content.
If you're unsure of a task, you need to research the process.
There are 2 challenge tasks at the end.

*There are the rushing waves
mountains of molecules
each stupidly minding its own business
trillions apart
yet forming white surf in unison*

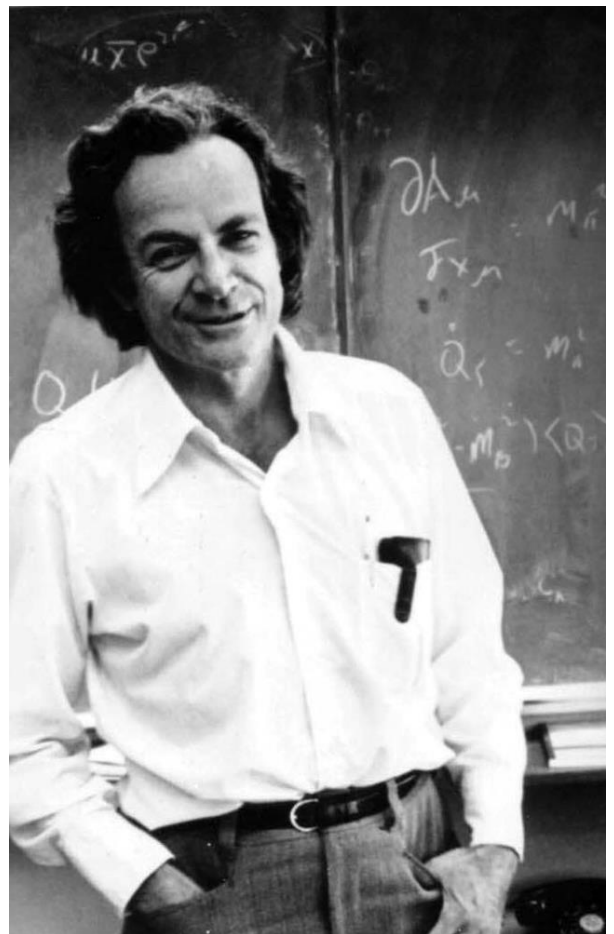
*Ages on ages
before any eyes could see
year after year
thunderously pounding the shore as now.
For whom, for what?
On a dead planet
with no life to entertain.*

*Never at rest
tortured by energy
wasted prodigiously by the Sun
poured into space.
A mite makes the sea roar.*

*Deep in the sea
all molecules repeat
the patterns of one another
till complex new ones are formed.
They make others like themselves
and a new dance starts.
Growing in size and complexity
living things
masses of atoms
DNA, protein
dancing a pattern ever more intricate.*

*Out of the cradle
onto dry land
here it is
standing:
atoms with consciousness;
matter with curiosity.*

*Stands at the sea,
wonders at wondering: I
a universe of atoms
an atom in the Universe.*



Poem by Richard Feynman.

Skills	Prefixes
Gryphon physics	

In Physics we have to deal with quantities from the very large to the very small. A prefix is something that goes in front of a unit and acts as a multiplier. This sheet will give you practice at converting figures between prefixes.

Symbol	Name	What it means		How to convert		
P	peta	10^{15}	1000000000000000		↓ x1000	$\times 10^{15}$
T	tera	10^{12}	1000000000000	↑ ÷ 1000	↓ x1000	$\times 10^{12}$
G	giga	10^9	1000000000	↑ ÷ 1000	↓ x1000	$\times 10^9$
M	mega	10^6	1000000	↑ ÷ 1000	↓ x1000	$\times 10^6$
k	kilo	10^3	1000	↑ ÷ 1000	↓ x1000	$\times 10^3$
			1	↑ ÷ 1000	↓ x1000	
m	milli	10^{-3}	0.001	↑ ÷ 1000	↓ x1000	$\times 10^{-3}$
μ	micro	10^{-6}	0.000001	↑ ÷ 1000	↓ x1000	$\times 10^{-6}$
n	nano	10^{-9}	0.000000001	↑ ÷ 1000	↓ x1000	$\times 10^{-9}$
p	pico	10^{-12}	0.000000000001	↑ ÷ 1000	↓ x1000	$\times 10^{-12}$
f	femto	10^{-15}	0.000000000000001	↑ ÷ 1000		$\times 10^{-15}$

Convert the values to SI of Amps.

Value	/A	Value	/A
15 kA		200mA	
4mA		2.6 μA	
5MA		1.2kA	
4.3fA		2.45nA	
1.9GA		25.3pA	
4.2mA		1.75 μA	
1.8TA		4.56kA	
2.5MA		300MA	
14pA		21.4fA	
2.34 μA		204 μA	
17.2kA		4.2GA	
16.9GA		12.45mA	
19.4fA		1.6TA	
15.3mA		26.45MA	

Skills	Significant Figures
Gryphon physics	

For each value state how many significant figures it is stated to.

Value	Sig Figs	Value	Sig Figs	Value	Sig Figs	Value	Sig Figs
2		1066		1800.45		0.07	
2.0		82.42		2.483×10^4		69324.8	
2.00		750000		2.483		0.0063	
0.136		310		5906.4291		9.81×10^4	
0.34		3.10×10^2		200000		6717	
54.1		3.1×10^2		12.711		0.91	

Add the values below then write the answer to the appropriate number of significant figures.

You should give answers to the minimum value of significant figures in the data.

Value 1	Value 2	Value 3	Total Value	Total to correct sig figs
51.4	1.67	3.23		
7146	-32.54	12.8		
20.8	18.72	0.851		
1.4693	10.18	-1.062		
9.07	0.56	3.14		
739762	26017	2.058		
8.15	0.002	106		
132.303	4.123	53800		

Multiply the values below then write the answer to the appropriate number of significant figures

Value 1	Value 2	Total Value	Total to correct sig figs
0.91	1.23		
8.764	7.63		
2.6	31.7		
937	40.01		
0.722	634.23		

Divide value1 by value 2 then write the answer to the appropriate number of significant figures

Value 1	Value 2	Total Value	Total to correct sig figs
5.3	748		
3781	6.434		
91×10^2	180		
5.56	22×10^{-3}		
3.142	8.314		

Rearranging Equations

Question 1.

Rearrange the following equations to make **x** the subject. .

$2x + 4 = 14$	$5x - 1 = 9$	$3x + 2 = 17$	$4x + 2 = 18$
$x + 9 = 12$	$x + 3 = 8$	$5 + 2x = 15$	$10 + 2x = 30$

Question 2.

Rearrange the following equations to make the **variable** in brackets the subject.

- (i) $4a + 3q = 10z$ (a)
- (ii) $5a + 2q = 4b$ (a)
- (iii) $10q + 2p = 8p$ (q)
- (iv) $2r + 4ab = 10ab$ (r)
- (v) $4a + 2q = 10q$ (a)

Question 3.

Rearrange the following equations to make the **variable** in brackets the subject.

- (i) $4a + 3 = 11$ (a)
- (ii) $5a + 2 = 12$ (a)
- (iii) $10q + 2 = 7$ (q)
- (iv) $2p + 4 = 10$ (r)
- (v) $2 + 4a = 10q$ (a)

Working with Fractions.

Question 4.

Rearrange the following equations to make **a** the subject.

$p = \frac{3}{4}a$	$T = \frac{5}{4}a$	$F = \frac{1}{4}a$	$3 = \frac{1}{2}a$	$F = \frac{6}{8}a$
$B = \frac{2}{4}a$	$5 = \frac{3}{4}a$	$\frac{2}{5}a = R$	$\frac{3}{6}a = B$	$\frac{2}{9}a = T$

More rearranging equations

1. $a = b c \rightarrow b =$

5. $a = b c^2 \rightarrow b =$

9. $x = \frac{1}{2} y z^2 \rightarrow z =$

2. $a = \frac{b}{c} \rightarrow b =$

6. $a = b c^2 \rightarrow c =$

10. $y = m x + c \rightarrow c =$

3. $a = \frac{b}{c} \rightarrow c =$

7. $a = \frac{b}{c d} \rightarrow d =$

11. $y = m x + c \rightarrow x =$

4. $a = b c d \rightarrow b =$

8. $x = y + z^2 \rightarrow z =$

1. $E = m c \Delta \theta \rightarrow c =$

6. $E_k = \frac{1}{2} m v^2 \rightarrow m =$

11. $\Delta M = m v - m u \rightarrow v =$

2. $v = u + a t \rightarrow u =$

7. $E_a = \frac{1}{2} k e^2 \rightarrow e =$

12. $\Delta M = m v - m u \rightarrow u =$

3. $v = u + a t \rightarrow t =$

8. $\underline{v^2} = u^2 + 2 a s \rightarrow v =$

13. $\Delta M = m v - m u \rightarrow m =$

4. $P = I^2 R \rightarrow R =$

9. $\underline{v^2} = u^2 + 2 a s \rightarrow a =$

5. $P = I^2 R \rightarrow I =$

10. $\underline{v^2} = u^2 + 2 a s \rightarrow u =$

A level equations

1. $s = u t + \frac{1}{2} a t^2 \rightarrow u$

5. $F = \frac{Q q}{4 \pi \epsilon_0 r^2} \rightarrow q$

2. $s = u t + \frac{1}{2} a t^2 \rightarrow a$

6. $F = \frac{Q q}{4 \pi \epsilon_0 r^2} \rightarrow r$

3. $F = \frac{G M m}{r^2} \rightarrow m$

7. $T^2 = \left(\frac{4 \pi^2}{G M} \right) r^3 \rightarrow r$

4. $F = \frac{G M m}{r^2} \rightarrow r$