HARROW COLLEGE & UXBRIDGE COLLEGE (HCUC)

A-LEVEL PHYSICS

STUDY PACK

HCUC

A merger between Uxbridge College and Harrow College

Harrow COLLEGE

UXBRIDGE COLLEGE

A-Level Physics Transition Activities

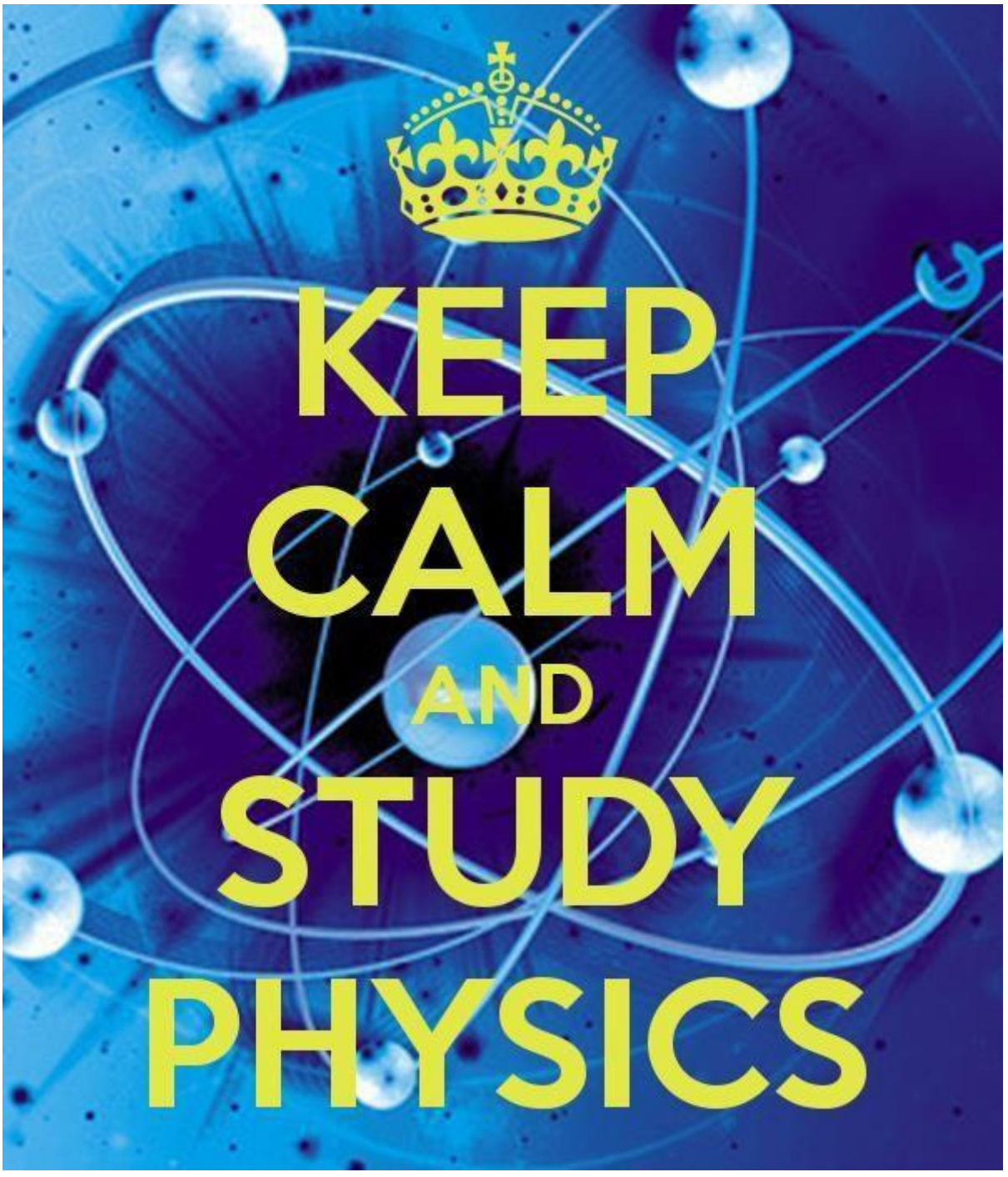
Congratulations for choosing one of the most challenging and rewarding courses to study at A-Level! In September, you'll be working towards a qualification in science that is both worthwhile and highly respected by employers and universities.

A- Level physics is a **big step up** from GCSE. The secret to learning physics is to spend lots of time solving problems and answering questions. While you might have been able to get by in your GCSE's by reading though your notes and revision guides and just letting the information soak into your brain, for A-Level you'll have to adopt a much more active learning style.

The tasks below give you the opportunity practice some of the basic skills that you'll need to be successful on the course. You'll need to have worked though these tasks before September. At the end of these tasks there's a list of (optional) books and websites that you might find useful for developing your general appreciation of physics and if you're already thinking about studying physics or maths at university then these will help you with your UCAS personal statement and university interviews.

Best wishes

Jack Harris
Physics Teacher
Uxbridge
College



Task 1 – Joining the Institute of Physics

Free IOP membership for 16- 19 students.

Join the Institute of Physics for free and receive:

- Regular updates on what's new in physics
- Exam and university guidance
- Information about careers from physics
- The chance to interact with other young physicists

By joining the IOP not only will you become part of the UK's largest physics community, but you will also get full access to *Physics World* online and physicsworld.com.

http://www.iop.org/education/student/youth_membership/page_41684.html

Task 2 – Standard form

You'll find that quite often in physics we use a prefix in front of a unit when we want to express very large or very small values. It would be a good idea to learn the information in the table on the right. The exercise below will help with this.

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.

Multiple	Prefix	Symbol
10^{12}	tera-	T
10^{9}	giga-	G
10^{6}	mega-	M
10^{3}	kilo-	k
10^{-3}	milli-	m
10^{-6}	micro-	μ
10^{-9}	nano-	n

Task 3 – Maths skills

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-avariable

www.youtube.com/watch?v=_WWgc3ABSj4

Rearrange the following:

1. E=m x g x h to find **h**

2. Q= I x t to find **I**

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

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

5. v = u + at to find **u**

6. v = u + at to find **a**

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

8. $v^2 = u^2 + 2as$ to find **u**

Task 4 – 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
2. 40.691
3. 0.838991
4. 1.0247
5. 59.972

Calculate the following to a suitable number of significant figures:

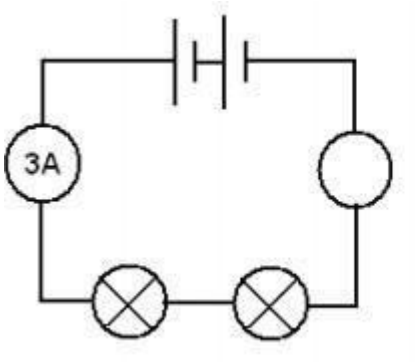
6. 63.2/ 78.1
7. 39+78+120
8. (3.4+3.7+3.2)/3
9. 0.0256 x 0.129
10. 592.3/0.1772

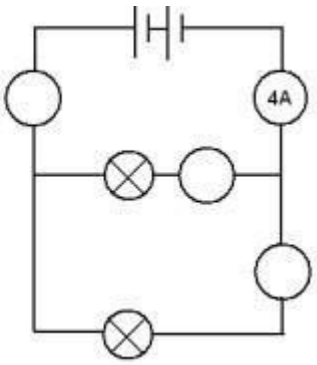
Task 5 – Electricity

At A level you will learn more about how current and voltage behave in different circuits containing different components. You should be familiar with current and voltage rules in a series and parallel circuit as well as calculating the resistance of a device.

http://www.allaboutcircuits.com/textbook/direct-current/chpt-1/electric-circuits/
http://www.physicsclassroom.com/class/circuits

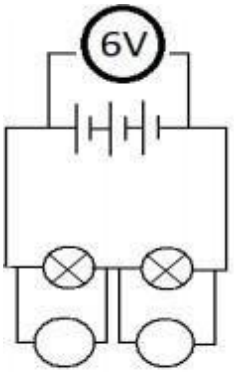
1. Add the missing ammeter readings on the circuit below

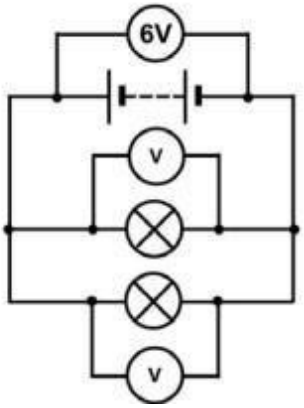




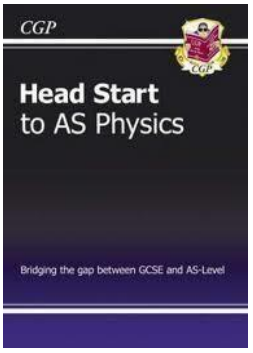
2. Explain why the second circuit has more current flowing in it than the first circuit.

3. Add the missing potential differences to the following circuits





Task 6 – Head Start to AS Physics



Work through 'Head Start to AS Physics'. ISBN: 978 1 84762 115 3

Available from Amazon quite cheaply.

In September we'll be starting with particle physics. You'll find things much easier if you have gained some familiarity with some of the important new words before we get started. Particle physics will require us to use many words that are not familiar, so the more practice we get the better! You can use the text book, the internet or whatever source of information you choose to answer the following questions.

1. In a sentence describe what is meant by the term *FUndamental particle*.

2. There are two families of fundamental particle. What are they?

3. Particles such as protons and neutrons are made up of even smaller particles. Write down the names of each of the three particles that are inside a proton.

4. Write down the names of the three particles that make up a neutron.

5. Protons and neutrons are just two members of a much larger family of particles. All of the particles in this family are made up of three smaller particles. What is the name of this family?

Further Reading

Read any, all or none of these. It's up to you! You won't be disadvantaged by not reading these, but if you think you might want to go on to study physics or maths at university then picking up at least one of these at some point would be a good idea. Hawking's book is probably the most accessible one on the list so you might want to start there. Most of these can be picked up quite cheaply second hand.

Close, F. (2004) Particle Physics: A Very Short Introduction, ISBN: 0192804340. An excellent introduction into this fascinating subject.

Feynman, R. (1996) Six Easy Pieces, ISBN: 0201408252 - A serious but accessible book. First published many decades ago, this reference is for a more recent reprint.

Allday, J. (2001) Quarks, Leptons and the Big Bang, ISBN: 0750308060 – This book contains lots of modern physics and should provide you with plenty to think about.

CONTACT US:

UXBRIDGE COLLEGE

Uxbridge Campus

Park Road,
Uxbridge,
Middlesex
UB8 1NQ

Hayes Campus

College Way,
Coldharbour Lane,
Hayes,
Middlesex
UB3 3BB

T +44 (0)1895 853333
www.uxbridgecollege.ac.uk

HARROW COLLEGE

Harrow-on-the-Hill Campus

Lowlands Road,
Harrow,
Middlesex
HA1 3AQ

Harrow Weald Campus

Brookshill,
Harrow Weald,
Middlesex
HA3 6RR

T +44 (0) 020 8909 6000
www.harrow.ac.uk

HCUC

A merger between Uxbridge College and Harrow College