Bridging Project

Subject: Physics

2021

Student Name:

Physics Overview

Exams

Paper 1: Modelling Physics (01) assesses content from modules 1,2,3 and 5.

100 marks - 2 hour 15 minutes - 37% of total A level

Paper 2: Exploring Physics (02) assesses content from modules 1,2,4 and 6.

100 marks - 2 hour 15 minutes - 37% of total A level

Paper 3: Unified Physics (03) assesses content from all modules (1-6).

70 marks - 1hour 30 minutes - 26% of total A level

Practical Endorsement

Practical endorsement in physics is achieved by successfully completing a series of practical activities over the two years of the course.

You will be provided with a practical endorsement folder. You will record all practical activities in this folder and each one will be marked and skills recorded by the teacher.

All written assessments are at the end of the two year course. Paper 3 will focus on practical activities you have carried out over the two years.

Outline of Modules

Module 1 – Development of practical skills in physics (taught in combination with modules 2-5)

Module 2 – Foundation in physics

Module 3 – Mechanics

Module 4 – Electrons, Waves and Photons

Module 5 – Newtonian World and Astrophysics

Module 6 – Particle Physics and Medical Physics

What are the main differences between GCSE and A level Physics?

Although there is much overlap in topics and terms, there is quite a lot of new material that you won't have met before. Also, you need to go into more detail regarding the topics you are already familiar with and your level of thinking and explaining has to be deeper.

New material

There will be many more facts and unfamiliar terms to learn and recall in exams than there were at GCSE. Don't be put off by all the complex concepts you will start to come across, they are important for scientists to communicate precisely what they mean, and as you're A Level course progresses you will become more comfortable and confident with using them.

How to achieve at A level

A different approach to your studies is needed at A Level compared to GCSE science. We've already explained that there is much more detail at A level so you will need to work hard in lessons and out of lessons in order to fully grasp the topics. You are expected to do an hour in private study for every hour you spend in the classroom. This is on top of your self-study!
At A Level you need to structure your own personal study. You need to organise yourself! Get yourself a diary, one with plenty of room for writing. Remember you will have 3 different subjects to stay on top of: reading, writing up notes, exam dates, practical dates, homework, revision and so on.

Time Management

Plan your time. Look carefully at when your physics classes are timetabled and plan appropriate times around these that you can write up your class notes and complete homework. Too often, students come to classes having not looked at a topic since the previous week. Try to plan a short session to look over work before the next lesson. If you develop this habit you will find the topic being discussed in the lesson makes much more sense.

Independent Study

- Re-reading your class notes or hand outs as soon after the lesson as possible.
- Highlighting the key points and any areas you did not understand fully (and asking for help on these)
- Reading the relevant section in the textbook and other resources (see the Resources section of this guide)
- Re-writing your notes, include relevant diagrams, keywords and definitions and information that you have found in the other resources.
- Attempting some questions to see how much you really understand.

Remember, A levels in science are considerably harder than GCSE. We expect a much greater commitment from you in order to be successful. It should go without saying that self-study is always completed, on time and to the best of your ability. If you don't understand something in your self-study then you should look it up or ask your teacher for help. Your teacher will also ask to see your class notes on a regular basis.

Students who succeed in their A Level courses are those who developed a routine way of working in their own time so that they were able to add to and enhance their learning. This is independent learning and it makes a real difference.

What you need:

- ✓ Pen
- ✓ Pencil
- ✓ 30mm Ruler
- ✓ Rubber
- ✓ Sharpener
- ✓ Scientific Calculator
- ✓ Leaver Arch File for notes
- ✓ Dividers

What you will get:

- ✓ File Paper
- ✓ Graph Paper
- ✓ Practical Equipment
- ✓ CGP Physics Year 1 Textbook

Revision Guides

In September you will also be given the opportunity to purchase a Physics (Year 1+2) Revision Guide.

Bridging Projects

Please complete all questions on the bridging project. You can answer the questions on file paper or on the bridging project itself.
You must bring your completed bridging project along to your first physics lesson in September.
Incomplete or late bridging projects will receive a sanction.

I'm looking forward to seeing you all in September.

Mr Dewar
Head of Science and Technology

Physics Bridging Project

Below are some topics that are essential foundations for you study of A-Level Physics. Each topic has example questions and links where you can find our more information as you prepare for next year.

Symbols and Prefixes

At A level, unlike GCSE, 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. Complete the table

Quantity	Symbol	Unit
Velocity		
Acceleration		
Time		
Force		
Resistance		
Potential difference		
Current		
Energy		
Pressure		
Momentum		
Power		
Density		
Charge		

Prefix	Symbol	Power of ten
Nano		
Micro		
Milli		
Centi		
Kilo		
Mega		
Giga		

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 be written in standard form, and it is expected that your answers will be too.

This means answers should be written as ….x 10^{y}. E.g. for an answer of 1200kg we would write 1.2 x 10^{3}kg. For more information visit: www.bbc.co.uk/education/guides/zc2hsbk/revision

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

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 = ½ m v^2 to find m
4. E = ½ 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

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

Recording Data

Whilst carrying out a practical activity you need to write all your raw results into a table. Don't wait until the end, discard anomalies and then write it up in neat.

Tables should have column heading and units in this format quantity/unit e.g. length /mm

All results in a column should have the same precision and if you have repeated the experiment you should calculate a mean to the same precision as the data.

Below are link to practical handbooks so you can familiarise yourself with expectations.

http://filestore.aqa.org.uk/resources/physics/AQA-7407-7408-PHBK.PDF

http://www.ocr.org.uk/Images/295483-practical-skills-handbook.pdf

http://www.ocr.org.uk/Images/295483-practical-skills-handbook.pdf

Below is a table of results from an experiment where a ball was rolled down a ramp of different lengths. A ruler and stop clock were used.

1) Identify the errors the student has made.

	Time			
Length/cm	**Trial 1**	**Trial 2**	**Trial 3**	**Mean**
10	1.45	1.48	1.46	1.463
22	2.78	2.72	2.74	2.747
30	4.05	4.01	4.03	4.03
41	5.46	5.47	5.46	5.463
51	7.02	6.96	6.98	6.98
65	8.24	9.68	8.24	8.72
70	9.01	9.02	9.0	9.01

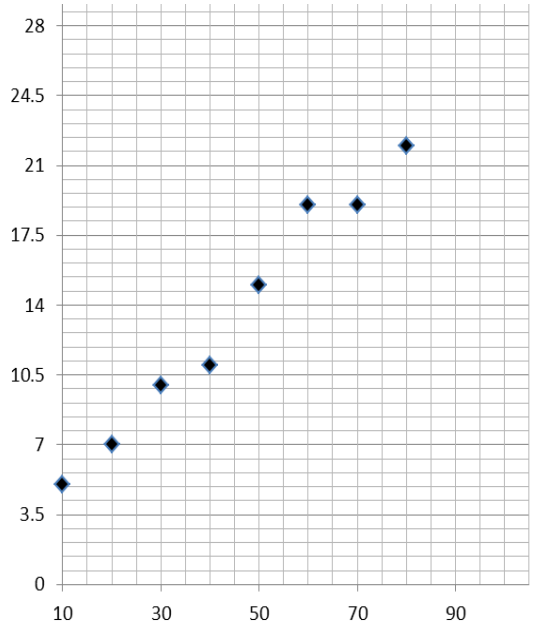
Graphs

After a practical activity the next step is to draw a graph that will be useful to you. Drawing a graph is a skill you should be familiar with already but you need to be extremely vigilant at A level. Before you draw your graph to need to identify a suitable scale to draw taking the following into consideration:

- the maximum and minimum values of each variable
- whether 0.0 should be included as a data point; graphs don't need to show the origin, a false origin can be used if your data doesn't start near zero.
- the plots should cover at least half of the grid supplied for the graph.
- the axes should use a sensible scale e.g. multiples of 1,2, 5 etc)

Identify how the following graphs could be improved

Graph 1



Graph 2