

# Study and revision skills

The Cambridge IGCSE examination is a very highly regarded international qualification. It is not easy! To get a high grade in your final examinations, you will need to work hard throughout your course.

These notes have the following three sections.

- ◆ **Section 1: During your course** – advice on how you can make the most of the time you put in on your physics work.
- ◆ **Section 2: Revising for examinations** – advice on preparing for examinations.
- ◆ **Section 3: Doing well in the examinations** – advice on how to tackle your examination papers.

Your teacher will probably give you tests and examinations at different stages during your course. These will give you experience of examination-style questions. It will help if you read through sections 2 and 3 while preparing for these tests.

## Section 1: During your course

It is important to work hard throughout your course – you are unlikely to do well if you leave all the really hard work and revision to the end.

Your teacher will make sure that you work steadily through all the necessary material throughout your course. You will be given a lot of work to do, and it is essential that you keep up with it. There is a lot to learn, and, if you get behind, it will be difficult to keep up.

### Get a copy of the syllabus, and use it

Your teacher may give you a copy of the physics syllabus. It is important that you know the course that you are taking.

### Visit the Cambridge Students website

There is an excellent Cambridge Students website for IGCSE physics students, at [www.cambridgestudents.org.uk/subjectpages/physics/igcsephysics](http://www.cambridgestudents.org.uk/subjectpages/physics/igcsephysics). Do take a good look at this website. You will find examples of questions from past papers, model answers to past questions, some simulations and revision checklists based on the syllabus. There are tips from examiners, which will help you to do well in the examination. Visit the website regularly, as new items may be added to it.

### Work at understanding the facts and concepts

IGCSE examinations are not just about learning facts. Do make sure that you *understand* each piece of work that you do. In the examination, you will need to be able to answer questions about things you have never met before. You need to be able to transfer your knowledge in a particular area to an example that will be unfamiliar to you. You will only be able to do this well if you have a deep understanding of the facts and concepts in the syllabus.

If there is something you do not understand, then do everything you can to put this right straight away. You could try:

- ◆ discussing it with a friend
- ◆ reading about it in a different textbook
- ◆ looking it up on the internet.

(When using the internet, take care to find a website that is reliable, and deals with the subject at an appropriate level. Your teacher may be able to suggest a good one.)

### Keep reminding yourself of earlier work

Try to go back over topics you covered a few weeks or months ago. This will keep them fresh in your mind, so it will be much easier to learn them when you come to start your revision. It will also help you to make links between different topic areas – a very important skill that will be tested in your final examinations.

### Learn and use the correct vocabulary

It is important to become familiar with all of the technical terms that you will meet, and be expected to use, in the final examinations. These are all introduced and explained in your coursebook. They are also listed in the glossary. You might like to build up a list of these, with their definitions or explanations, in a notebook. You could make yourself a set of flashcards – on your computer, or on pieces of card with the word written on one side and its meaning on the other. Make a new card every time you meet a new technical term in your course. Each day, take out a random five cards and place one with the term on top. Say the definition out loud, and then turn the card over to see if you have got it right. It is best to make your own cards, as the process of making them is a really good learning exercise in itself.

Make a point of trying to use the correct terms in the written work that you do throughout your course.

There are a number of terms whose definitions you need to know for the examination. These are listed in the table below.

Section of specification	Definitions required
Block 1 Core	density speed
Block 1 Supplement	acceleration force newton (N) moment of a force work done by a force joule (J) kilowatt hour (kWh) power watt (W) pressure pascal (Pa)
Block 2 Supplement	specific heat capacity specific latent heat
Block 3 Supplement	frequency wavelength
Block 4 Supplement	potential difference volt (V) current e.m.f.

## Do not forget to work on assessment objectives A02 and A03

Near the front of your syllabus, you will find a list of assessment objectives. There are three of them – AO1, AO2 and AO3. These are what will be tested in your final examinations.

- ◆ **Assessment objective AO1** is about knowing and understanding the facts and concepts listed in the syllabus. Roughly 50% of the marks in the examination will test this.
- ◆ **Assessment objective AO2** is about being able to apply your knowledge in new situations. You will meet examination questions that look completely unfamiliar, and you need to build up the confidence to be able to deal with them calmly, using your knowledge and understanding to work out the answers. The exercises in the workbook give you plenty of practice in doing this, and it is very important that you spend time on it. About 30% of the marks in the final examination will test this.
- ◆ **Assessment objective AO3** is about being able to plan and carry out experiments, record and display the results, draw conclusions from them and evaluate them. Do take every opportunity on offer to do practical work during your course, and give plenty of attention to improving your skills in each area. There are many activities in the coursebook and on the CD-ROM that will give you practice and enable you to develop these skills, and many of the workbook exercises will also help.

## Find what works for you

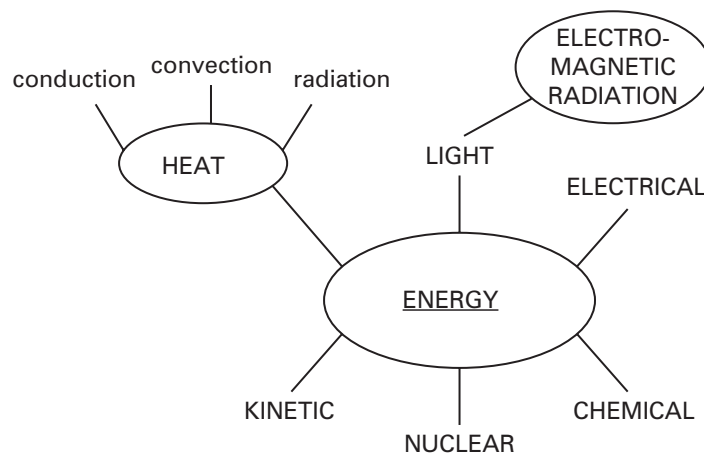
We are all different, and study methods that work for one person may not work so well for another. Try out various ways of studying, and decide what works best for you. Here are some strategies you could try, which will help you to understand and remember your work.

### Make your own summary notes

Making your own written summaries helps you to analyse and understand a topic. Choose a topic, and then pick out what you think are the most essential points. Make a list of bullet points, or construct a table or a flow chart that summarises the topic. Remember to include practical work.

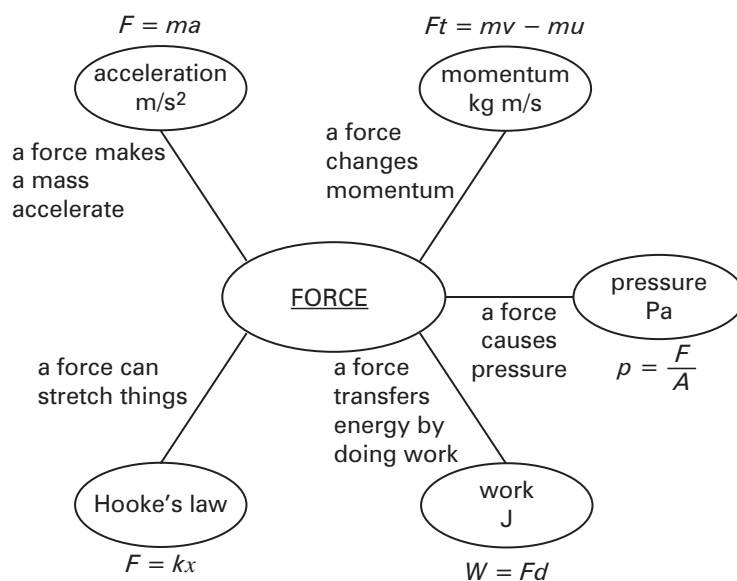
### Construct spider diagrams or mind maps

An example of a spider diagram is shown in Figure 1. It starts with a central idea (the ‘body’ of the ‘spider’), from which you draw links (the ‘legs’) to the facts and concepts that you need to remember.



**Figure 1** An example of a spider diagram for ‘Energy’.

An example of a mind map is shown in Figure 2. It is similar to a spider diagram, but often shows how things are connected.



**Figure 2** An example of a mind map for 'Force'.

If you want to do this on a computer, you can find free mind-mapping software on the internet. However, for many people, it works best to do this with a pencil on a piece of paper.

Many people find that building one of these diagrams helps them to understand how the different parts of a topic – or even different topics – all link together. Using someone else's spider diagram or mind map is not particularly helpful – it is the process of constructing your own that helps your brain to sort out ideas and remember them.

You could put your diagrams up on your bedroom wall, or stick one to the bathroom mirror each day to look at as you brush your teeth.

### Write your own questions

As you go through your course, your teacher will probably give you some practice questions to do, and will show you some Cambridge mark schemes. It is a really useful exercise to try to write and mark some questions yourself. You could work with a friend. Answer two or three examination-style questions, then mark each other's answers. Discuss with your friend whether you agree with each other's marks. This will make you think really hard about the topic, and will show up any holes in your understanding.

## Section 2: Revising for examinations

As you near the end of your physics course, you will start to think about revising. You will have revised for examinations before, so you probably have a good idea of what works for you and what does not.

### Make your revision active

This is the most important rule for making your revision useful. It is true for absolutely everyone. Revision only works if it is active. Your brain is bombarded with information all the time, so you have to convince it to store what you learn in physics in your long-term memory. Research shows that this means making your brain **do** something with the information you are trying to make it remember.

All of the study techniques described in the previous section – ensuring you truly understand each topic, using flash cards, making summaries, constructing spider diagrams and mind maps, marking other students' answers – can help with your revision. Simply reading through your notes or your textbook is nowhere near as useful as these active techniques.

### **Start early**

It takes time for learning to happen. If you leave revision until the day before the examination, you may be able to answer some questions, but what you have learnt may evaporate overnight. You should start revising between one and two months ahead of the examination. This gives time for ideas to consolidate in your mind, and also for you to go back over topics more than once. You are likely to forget at least some things each time you work on a topic, but each time you revisit it, a little more will stay in your brain.

### **Get organised**

Plan a timetable of revision that uses short blocks of time (say ten minutes to one hour) for each subject. People vary in the best length of time for them to work; for many, concentration wanes after 10–15 minutes, while others can concentrate fully for an hour or longer. Go with what is best for you.

Divide your physics work into several fairly short sections to make it more manageable. The timetable should include all of the different sections for all of the different subjects you need to revise, fitted into the time that you have available. In reality, you probably will not be able to stick rigidly to your plan, but it will give you a firm structure within which to do your work. If you do get behind, then you will be able to see this early on, and you should still have time to catch up.

Find one or more places that will be your 'revision patch'. These should have minimum distractions – no television, no easy access to social networking sites or emails, no friends unless you have agreed to revise together. Switch your phone off, unless you are actually using it for your revision. Get into the habit that, in this place, the only thing you do is revise.

### **Make sure you know what you are revising for**

Your teacher should have told you which papers you will be taking in your examination. Make sure you know what the questions on each of these papers are like, and how long you will be able to spend on them. Do some practice questions, trying to complete them at a rate of about one mark's worth of answers per minute. (The number of marks for each question part is shown on the paper, so a question part worth three marks should take you about three minutes to answer.)

Doing these questions will make sure that you do not ignore the assessment objective AO2 and AO3 skills as you revise.

### **Complete a revision checklist**

There is a revision checklist on the Cambridge Students website (described in the previous section), where you can tick off each statement in the syllabus as you feel you have mastered it. There are also revision checklists on this CD-ROM. Choose one of them, and make sure that there is nothing on it that you have missed out.

### Section 3: Doing well in the examinations

Once you are in the examination room, your task is to make the very best use of your knowledge and understanding to get the most marks you can on the examination papers. You need to use good ‘examination technique.’ Good or poor examination technique can easily make the difference of a grade. Here are some things that you should do.

- ◆ **Read the question** – *all* of it – very, very carefully. There may be quite a lot of material at the start of the question, before there are any answer lines. You really do need to read all of this and study any diagram before you start to write any answers. The examiners do not put information there unless you need to use it. Many candidates lose marks by not bothering to read this introductory material.

If it helps you, use a highlighter to pick out any parts of this introduction that you think might be particularly important. Doing this also helps you to concentrate on exactly what it is saying.

- ◆ **Do not just pick the first multiple-choice answer** you see that might be right. Think about each one carefully. You get about one minute on average to answer each question, and that leaves time to go back over any you were not sure about. A minute is actually quite a long time; time yourself to sit still without moving for exactly one minute.
- ◆ **Look carefully at the command term or word** of the question you are answering. Most questions start with a command term, for example ‘Describe’, ‘Explain’, ‘Name’, ‘Discuss’. Each of these has a particular meaning, and it is important that you do exactly what you are asked to do. If you *describe* when you have been asked to *explain*, you are unlikely to get many (perhaps any!) marks for your answer. You must answer the question you have been asked, not the question you would have liked to have been asked.

You can find a list of command terms and their meanings towards the back of your copy of the syllabus, on the CD-ROM and on the Cambridge Students website. Here is a list of the most common command terms, together with what they **do** mean and what they **do not** mean.

Command term	Do ...	But do not ...
Define	... give a formal statement of the meaning of the term; there may be a particular definition in the syllabus, and if so then you should learn this one	... add any explanations
List	... give a simple list of points	... add comments or write long sentences
State	... give a short, concise answer	... add any explanation <b>unless</b> the question says ‘State and explain ...’
Describe	... give the main points of a topic, and include a diagram if this helps	... add any explanation <b>unless</b> the question says ‘Describe and explain ...’
Explain <i>or</i> Give a reason	... give an explanation based on scientific ideas; this means saying how or why something happened	
Outline	... give the main points as briefly as you can, perhaps as a list	... go beyond the essential points

Command term	Do ...	But do not ...
Predict	... give an answer deduced from information in the question	... think you should already know the answer
Deduce	... give an answer you have worked out from information in the question, together with a supporting statement saying how you worked out the answer	
Suggest	... give an answer based on what you have learned (there may be more than one correct answer) or one you have deduced from information in the question	
Find	... calculate, measure or otherwise determine the answer	... forget to base your answer on information in the question
Calculate	... find a numerical answer	... forget to show your working
Estimate	... give an answer that is a reasonable approximation to the correct value, by making sensible approximations	... expect to carry out a precise calculation, because you probably will not have all the information necessary
Sketch	... draw a freehand graph or diagram that shows the important features	... omit important features such as whether the graph has an intercept or slopes in a particular direction

- ◆ **Do not waste time writing out the question** before you start your answer. For example, if this was the question:

Explain what is meant by the statement: ‘The specific latent heat of fusion of ice is  $330 \text{ J/g}$ ’.  
You should not start your answer like this:

The specific latent heat of fusion of ice is  $330 \text{ J/g}$  means that it takes  $330 \text{ J}$  of energy to melt  $1 \text{ g}$  of ice at  $0^\circ\text{C}$ .

You could simply write this:

It takes  $330 \text{ J}$  of energy to melt  $1 \text{ g}$  of ice at  $0^\circ\text{C}$ .

- ◆ **Look at the number of marks** available for the question part that you are answering. This gives you a good idea of how many different points you should try to make in your answer.
- ◆ **Fit your answer into the lines provided.** Remember that it is *what* you write, rather than *how much* you write, that will get you marks. Many candidates waste time writing a lot of things that are not relevant to the question, or saying the same thing several times over.

Where there are three or more marks available for your answer, it is often a good idea to jot down your ideas first, before starting to write the answer. The best answers are usually quite short and very focused answers, which start to get marks in the very first line of writing. Have a look at the model answers on the Cambridge Students website, and read the examiner’s comments on each part of the question.

- ◆ **Use correct technical terms** in your answers. There are no marks in the physics papers for your writing style, or for using grammar correctly. The marks are for how well you know or understand the physics that you have learnt. Your answer should be concise and precise, and contain good scientific language.

- ◆ **Be in control of the time** you have available. Allow yourself an average of one minute for each mark.

On the examination paper, you will probably find that you can answer some one-mark questions in much less than one minute. You may need a little bit more than that on questions where you have to read a lot before you can work out the answer, or where you need to spend time sorting out your ideas before you begin to write.

If you come across a very difficult question, which you think might take you a long time to answer, and where you are not sure you will be able to get many marks, it might be a good idea to leave it for now and move on to the next question. Then, when you have finished all the other questions, you can come back to the difficult one, knowing exactly how much time you can afford to spend on it.

- ◆ **Write legibly.** The examiners will do their very best to understand what you have written, but if they cannot read it, they cannot give you marks. For example, if your answer to a question is 'convection', but it is difficult to tell whether you have written 'convection' or 'conduction', you may not get the mark. If you decide your answer is wrong and you want to change it, do not write over the top of it. Cross it out, and write your new answer alongside, above or underneath it.