



Upton Court
GRAMMAR SCHOOL

Science Departments:

Biology

Chemistry

Physics

Starting your
GCSEs



**Biology, Chemistry and Physics:
Preparing for your GCSEs
Exam board: AQA**

In Science, we provide students with opportunities to challenge their thinking and develop the skills required to prepare them for their GCSE exams, A levels, further education and their future lives.

In Year 9, students will study the core aspects of the three sciences. The topics we will study are:

In Biology:

Cell Biology (including microscopy), **Diffusion**, **Osmosis**, **Active Transport**, **Stem Cells**, **Organs and Organ Systems**, **Enzymes**, **Digestion**, **Circulation** (Including the heart and blood vessels), **Disease** (including cancers and viral, bacterial and protest diseases), **Immunity**, **Drugs** and **Photosynthesis**.

Many of these topics you will have come across and developed knowledge of in years 7 and 8. You will be studying these topics at a higher level. Other topics you will not be so familiar with, as you will have not learnt them previously during lessons. These topics are shown in italics.

In Chemistry:

Atomic structure and the periodic table – history & structure of the atom, electronic structures, ions and separating mixtures, reactivity of Group 1 and Group 7 elements, transition elements and explaining trends.

Bonding, structure and the properties of matter – ionic, covalent & metallic bonding, fullerenes, grapheme and nanoparticles.

Organic chemistry – hydrocarbons, fractional distillation, cracking, alkanes, alkenes, alcohols, carboxylic acids, esters, addition & condensation polymerization, natural polymers & DNA.

In Physics:

Energy changes in a system and the way energy is stored before and after such changes

Conservation and dissipation of energy

National and global energy resources

Electricity (Current, potential difference and resistance; Serial and parallel circuits; Domestic uses and safety; Energy transfers and Static electricity)

The Particle model of matter (Changes of state and the particle model; Internal energy, energy transfers and particle motions; Particle model and pressure)

Atomic structure (Atoms and isotopes; Atoms and radiation; Hazards and uses of radioactive emissions and of background radiation; Nuclear fission and fusion)

Achieving your Potential

Preparing for exams can seem daunting but the Department provides many tailored revision resources and support to aid learning. Here are some of the ways in which you can make the most of support:

- Ensure you make full use of the many science videos you can find on the topics on the internet – for example on ‘My GCSE Science’.
- Make full use of materials created by the Department and sent to you by email etc.
- Use in-class and homework opportunities to create revision resources such as cue cards, quizzes and podcasts in order to consolidate learning.
- Develop analytical skills by applying learning to real world situations, this is especially important for Physics where many questions are set in a real life context.

Strategies for improving literacy:

- ✓ Green pen checking all written work.
- ✓ Writing for a purpose – using Science key words and ensuring what you write is focussed.
- ✓ Writing up Required Practicals using key scientific terms.
- ✓ Self-assessing work against the assessment criteria/mark scheme.
- ✓ Independent reading of interesting articles on science e.g. on the BBC news website .

Strategies for Learning

Consolidating Learning



Research shows that reviewing information soon after it has been learnt allows students to remember much more. Returning to the learning from a lesson later in the same day will allow you to be much more successful.

Organising Learning



You will complete a significant amount of class-work, homework, independent work and other activities in preparation for your GCSE exams. Successful students find ways to organise their time and learning effectively so that it is of use to them.

COPE Strategies:

- Write a blog to share your learning with others.
- Support KS3 students to strengthen your skills.
- Create a homework timetable.
- Title and date your work clearly.
- Complete exam questions in timed conditions.
- Use banks of practice questions to create a booklet of essay/writing plans.

Preparing Revision Materials

Successful students prepare for revision and revise earlier topics throughout the year – this means creating revision materials throughout the year in preparation for the exam period. They will also revise constantly so they do not become rusty on earlier topics. They use in class assessments and Pre-Public exams to perfect their revision strategies.



Exam Practice

Ultimately, your success will be measured in the public exams at the end of Year 11. Successful students practise many past papers, find effective ways to monitor and improve their exam technique, and are very familiar with the mark scheme and how it will be applied.



Assessment in the Sciences

1. Required Practicals:

Required practicals are integral to the GCSE course and by carrying these out students will:

- Consolidate their knowledge and understanding of scientific concepts.
- Develop investigative skills. These transferable skills include:
 - devising and investigating testable questions
 - identifying and controlling variables
 - analysing, interpreting and evaluating data.
- Build and master practical skills such as:
 - using specialist equipment to take measurements
 - handling and manipulating equipment with confidence and fluency
 - recognising hazards and planning how to minimise risk.

All students must write up these practicals and build up their portfolio of practical work. Although this does not attract any marks, it is essential evidence for the exam board of the work having been carried out and the skills having been developed. The exam board will want to see selected students work to ensure all students are reaching the required level of skills.

If a student does not submit their portfolio, they are not able to pass the GCSEs in Science.

These skills are essential for students wishing to continue to A levels and beyond in Science.

2. Examinations

Biology Paper 1: 50% of total GCSE (100 marks)

1 hour 45 minute exam

Topics 1 – 4: Cell biology; Organisation; Infection and response; and Bioenergetics

Written exam: 1 hour 45 minutes

Questions

- Multiple choice, structured, closed short answer and open response.

Biology Paper 2: 50% of total GCSE (100 marks)

1 hour 45 minute exam

Topics 5 – 7: Homeostasis and response; Inheritance, variation and evolution; and Ecology.

Questions

- Multiple choice, structured, closed short answer and open response.

Look here to see what the exam papers will look like; <http://www.aqa.org.uk/subjects/science/gcse/biology-8461/assessment-resources>

Chemistry Paper 1: 50% of total GCSE (100 marks)

1 hour 45 minute exam

Topics 1 – 5: Atomic structure & the periodic table; Bonding, structure & the properties of matter; Quantitative chemistry; Chemical changes; Energy changes

Written exam: 1 hour 45 minutes

Questions

- Multiple choice, structured, closed short answer and open response.

Chemistry Paper 2: 50% of total GCSE (100 marks)

1 hour 45 minute exam

Topics 6 – 10: The rate & extent of chemical change; Organic chemistry; Chemical analysis; Chemistry of the atmosphere; Using resources

Written exam: 1 hour 45 minutes

Questions

- Multiple choice, structured, closed short answer and open response.

Physics Paper 1: 50% of total GCSE (100 marks)

1 hour 45 minute exam

Topics 1-4: Energy; Electricity; Particle model of matter; and Atomic structure.

- Written exam: 1 hour 45 minutes

Questions

- Multiple choice, structured, closed short answer and open response.

Physics Paper 2. 50% of total GCSE (100 marks)

1 hour 45 minute exam

Topics 5-8: Forces; Waves; Magnetism and electromagnetism; and Space physics.

Questions in paper 2 may draw on an understanding of energy changes and transfers due to heating, mechanical and electrical work and the concept of energy conservation from **Energy** and **Electricity**

Questions

- Multiple choice, structured, closed short answer and open response.

Useful Websites

AQA <http://www.aqa.org.uk/subjects/science/gcse>

Here you will find specifications for the GCSE Sciences, if you go into the older (legacy) GCSE there are past papers and mark schemes to use

DODDLE The **Doddle** website is monitored by teachers. It contains a range of resources and quizzes to support students' learning and teachers use this to set work for classes and individual students to help them improve.

<http://www.doddlelearn.co.uk/>

My GCSE Science

<http://www.my-gcsescience.com/core-science/biology/>

BBC News on Science and Health:

http://www.bbc.co.uk/news/science_and_environment

<http://www.bbc.com/news/uk/health>

You should also make regular use of resources on BBC Bitesize
<http://www.bbc.co.uk/education/subjects/zrkw2hv>

Reading

Biology

The recommended textbook is AQA Biology by Ryan and Fullick (the latest edition is the third edition), which is specific to the AQA specification.

GCSE Bitesize is one of a number of highly useful websites which contain numerous interesting facts, videos and animations.

A number of revision guides are available, including specific ones published by CGP.

For those who are particularly interested in the human body, we would recommend you read The Human Body Book by Steve Parker, of which there are several different versions. The illustrations are particularly impressive.

There are a number of interesting publications on Ecology, including some of the books of David Attenborough, co-written with other authors and linked to his TV series. These include Life In The Undergrowth, the Life Of Mammals and The Blue Planet. I can also recommend The Song Of The Dodo by D Quammen.

Chemistry

The recommended textbook is AQA Chemistry by Lawrie Ryan and Ray Peacock (3rd edition). The publisher is Oxford University Press.

A number of revision guides are available, including specific ones published by CGP.

Physics

The recommended textbook is AQA Physics by Lawrie Ryan and Jim Breithaupt, published by Oxford University Press.

An interesting (and not too difficult) read is $E = mc^2$ by David Bodanis.