



GCSE Biology, Chemistry and Physics (Separate Science)

Study support

What qualification am I working towards?

You are working towards three separate qualifications in science and will achieve a qualification in GCSE Biology, GCSE Chemistry and GCSE Physics.

How many GCSEs will I achieve from studying this qualification?

Three.

What exam board are we following?

You are following the AQA exam board, which has a different specification to Edexcel, OCR, WJEC etc. When you are revising online or using revision guides, you must make sure you are using AQA approved resources.

Where can I find a copy of the exam specification?

You can download a copy of the specifications by following the links below:

- GCSE Biology: <https://filestore.aqa.org.uk/resources/biology/specifications/AQA-8461-SP-2016.PDF>
- GCSE Chemistry: <https://filestore.aqa.org.uk/resources/chemistry/specifications/AQA-8462-SP-2016.PDF>
- GCSE Physics: <https://filestore.aqa.org.uk/resources/physics/specifications/AQA-8463-SP-2016.PDF>

How many exams will I have?

You will sit six exams in the summer term of Year 11. There are no exams in Year 10.

- Biology Paper 1
- Biology Paper 2
- Chemistry Paper 1
- Chemistry Paper 2
- Physics Paper 1
- Physics Paper 2

How long are my exams and how will they be structured?

Each of the six exams will be a written paper with a time-limit of 1 hour 45 minutes. Foundation and higher tier papers are available, and your teacher will work with you to make sure you are entered for the most appropriate tier that will help you achieve the highest grade possible. Each paper is out of 100 marks, and the questions will be a mixture of multiple choice, structured, closed short answer and open response. Paper 1 and paper 2 have the same weighting, and contribute equally to the overall qualification in each science:

GCSE Biology	GCSE Chemistry	GCSE Physics
Biology Paper 1 = 50%	Chemistry Paper 1 = 50%	Physics Paper 1 = 50%
Biology Paper 2 = 50%	Chemistry Paper 2 = 50%	Physics Paper 2 = 50%



Will I need to complete any coursework?

There is no coursework element to this qualification, although you will complete 'required practical' activities and record work undertaken to demonstrate the knowledge, skills and understanding that you have gained.

What are the required practical activities?

There are specific practical activities that you will complete that will help you develop key techniques and investigative approaches; these are in addition to other science practical activities that your teacher will plan for you to learn new content and build your competence with working scientifically skills.

Biology required practical activities:

1. Use a light microscope to observe, draw and label a selection of plant and animal cells. A magnification scale must be included.
2. Investigate the effect of antiseptics or antibiotics on bacterial growth using agar plates and measuring zones of inhibition. (Separate Science only)
3. Investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue.
4. Use qualitative reagents to test for a range of carbohydrates, lipids and proteins. To include: Benedict's test for sugars; iodine test for starch; and Biuret reagent for protein.
5. Investigate the effect of pH on the rate of reaction of amylase enzyme. Students should use a continuous sampling technique to determine the time taken to completely digest a starch solution at a range of pH values. Iodine reagent is to be used to test for starch every 30 seconds. Temperature must be controlled by use of a water bath or electric heater.
6. Investigate the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed.
7. Plan and carry out an investigation into the effect of a factor on human reaction time.
8. Investigate the effect of light or gravity on the growth of newly germinated seedlings. Record results both as length measurements and as accurate, labelled biological drawings to show the effects. (Separate Science only)
9. Measure the population size of a common species in a habitat. Use sampling techniques to investigate the effect of a factor on the distribution of this species.
10. Investigate the effect of temperature on the rate of decay of fresh milk by measuring pH change. (Separate Science only)

Chemistry required practical activities:

1. Preparation of a pure, dry sample of a soluble salt from an insoluble oxide or carbonate, using a Bunsen burner to heat dilute acid and a water bath or electric heater to evaporate the solution.
2. Determination of the reacting volumes of solutions of a strong acid and a strong alkali by titration. (Separate Science only). Determination of the concentration of one of the solutions in mol/dm³ and g/dm³ from the reacting volumes and the known concentration of the other solution. (Higher tier only)
3. Investigate what happens when aqueous solutions are electrolysed using inert electrodes. This should be an investigation involving developing a hypothesis.
4. Investigate the variables that affect temperature changes in reacting solutions such as, eg acid plus metals, acid plus carbonates, neutralisations, displacement of metals.
5. Investigate how changes in concentration affect the rates of reactions by a method involving measuring the volume of a gas produced and a method involving a change in colour or turbidity. This should be an investigation involving developing a hypothesis.
6. Investigate how paper chromatography can be used to separate and tell the difference between coloured substances. Students should calculate R_f values.



7. Use of chemical tests to identify the ions in unknown single ionic compounds covering the ions from sections Flame tests through to Sulfates
8. Analysis and purification of water samples from different sources, including pH, dissolved solids and distillation.

Physics required practical activities:

1. An investigation to determine the specific heat capacity of one or more materials. The investigation will involve linking the decrease of one energy store (or work done) to the increase in temperature and subsequent increase in thermal energy stored.
2. Investigate the effectiveness of different materials as thermal insulators and the factors that may affect the thermal insulation properties of a material. (Separate Science only)
3. Use circuit diagrams to set up and check appropriate circuits to investigate the factors affecting the resistance of electrical circuits. This should include: the length of a wire at constant temperature and combinations of resistors in series and parallel.
4. Use circuit diagrams to construct appropriate circuits to investigate the I–V characteristics of a variety of circuit elements including a filament lamp, a diode and a resistor at constant temperature.
5. Use appropriate apparatus to make and record the measurements needed to determine the densities of regular and irregular solid objects and liquids. Volume should be determined from the dimensions of a regularly shaped object and by a displacement technique for irregularly shaped objects. Dimensions to be measured using appropriate apparatus such as a ruler, micrometer or Vernier callipers.
6. Investigate the relationship between force and extension for a spring.
7. Investigate the effect of varying the force on the acceleration of an object of constant mass and the effect of varying the mass of an object on the acceleration produced by a constant force.
8. Make observations to identify the suitability of apparatus to measure the frequency, wavelength and speed of waves in a ripple tank and waves in a solid and take appropriate measurements.
9. Investigate the reflection of light by different types of surface and the refraction of light by different substances. (Separate Science only)
10. Investigate how the amount of infrared radiation absorbed or radiated by a surface depends on the nature of that surface.

How do I know what topics will be on each exam?

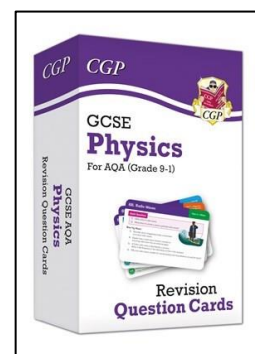
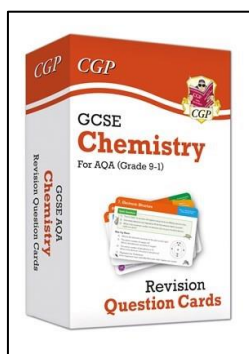
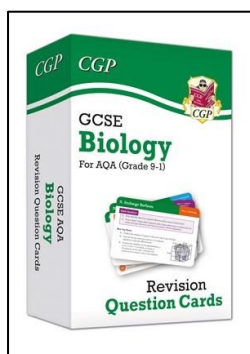
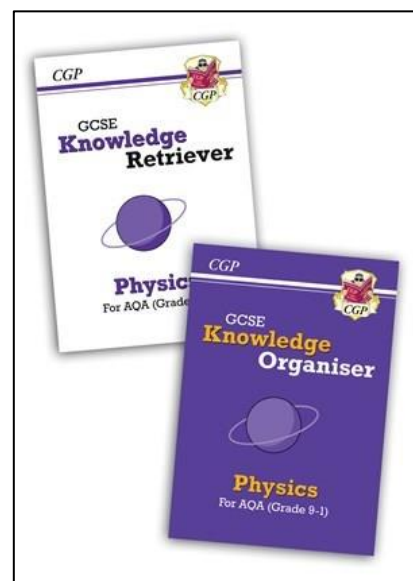
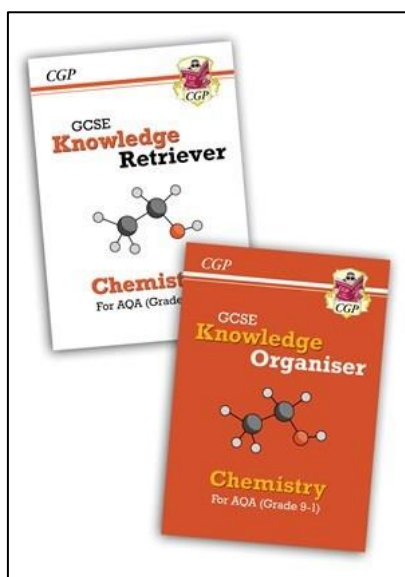
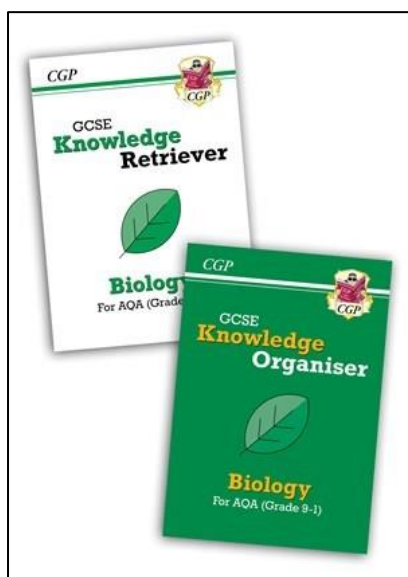
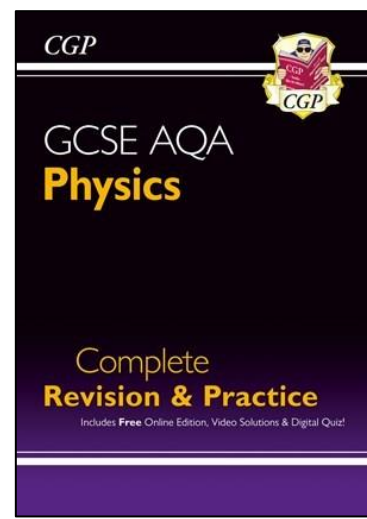
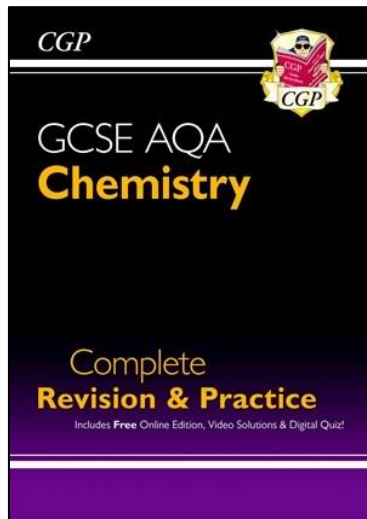
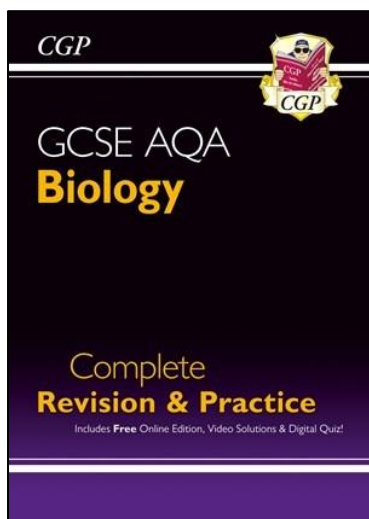
The specifications outline exactly what is covered in each topic, and which topics will be on an exam. To summarise:

Biology Paper 1	Chemistry Paper 1	Physics Paper 1
Cell Biology; Organisation; Infection and response; and Bioenergetics.	Atomic structure and the periodic table; Bonding, structure, and the properties of matter; Quantitative chemistry; Chemical changes; and Energy changes.	Energy; Electricity; Particle model of matter; and Atomic structure
Biology Paper 2	Chemistry Paper 2	Physics Paper 2
Homeostasis and response; Inheritance, variation and evolution; and Ecology.	The rate and extent of chemical change; Organic chemistry; Chemical analysis; Chemistry of the atmosphere; and Using resources.	Forces; Waves; Magnetism and electromagnetism; and Space Physics (Separate Science only) .

What resources are available to help me outside of school?

CGP Revision materials

We recommend the CGP Revision materials: <https://www.cgpbooks.co.uk/secondary-books/gcse/science> ; a selection can be purchased through school at a discount via ParentPay. The complete revision guide and practice is a particularly useful resource and can accelerate progress made both in and out of the classroom. Other popular resources are the knowledge organisers and retrievers and the revision flash cards.





YouTube

There are several YouTube channels and creators that are helpful to watch from home when studying independently, including:

- Primrose Kitten
- Fuse School
- Cognito
- Free Science Lessons
- Amoeba Sisters



BBC Bitesize

BBC Bitesize is a free online study support resource designed to help with learning, revision, and homework.

- Biology: <https://www.bbc.co.uk/bitesize/examspecs/zp9cbk7>
- Chemistry: <https://www.bbc.co.uk/bitesize/examspecs/z8xtmnb>
- Physics: <https://www.bbc.co.uk/bitesize/examspecs/zsc9rdm>



Seneca

Seneca is a platform that students can use to study independently, or complete assignments set by their teachers.

<https://senecalarning.com/en-GB/>

