CARDINAL NEWMAN CATHOLIC SCHOOL

Cardinal Newman Science Department

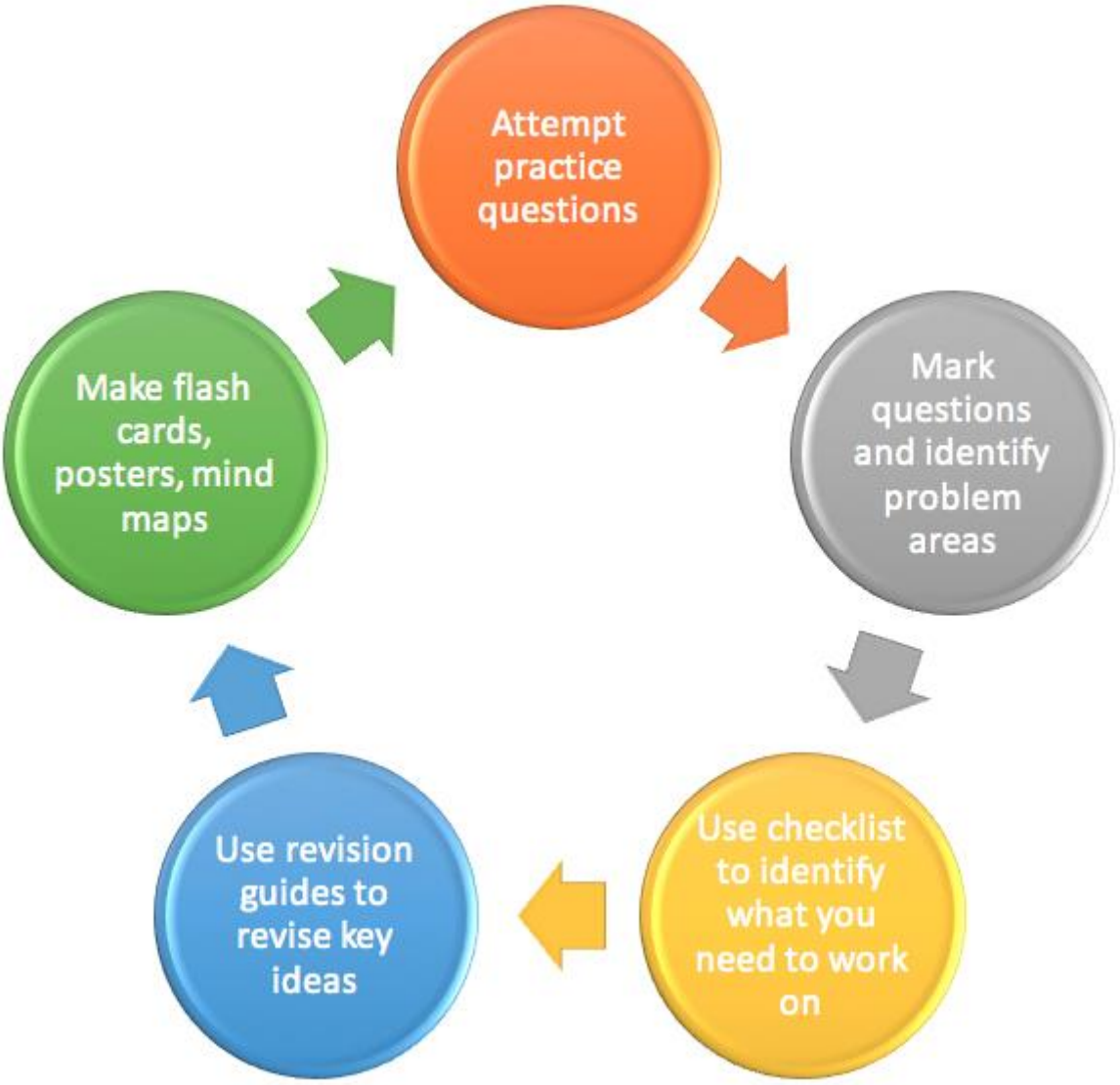
AQA

GCSE Separate Science

Course Handbook

2024

The Revision cycle



AQA GCSE Separate Science

Students study Biology, Chemistry and Physics and are awarded three GCSE grades, one for each separate science.

Specifications

The specifications can be found via a Google search for "AQA GCSE Chemistry, Biology or Physics" and then clicking on download specification, or by using the QR code below

Past Exam Papers

The exam papers from 2018 can be found via a Google search for "AQA Trilogy GCSE Combined Science past papers" or by using the QR codes below.

Exam Papers

Paper	Duration
Biology Paper 1	1hr 45 min
Chemistry Paper 1	1hr 45 min
Physics Paper 1	1hr 45 min
Biology Paper 2	1hr 45 min
Chemistry Paper 2	1hr 45 min
Physics Paper 2	1hr 45 min

Recommended Revision Resources

CGP Books publish a wide range of revision resources for AQA GCSE Separate Sciences. They are widely available.

HIGHER Tier

Revision Guides	ISBN	CGP Code
New GCSE Biology AQA Complete Revision & Practice	9781782945833	BAS46
New GCSE Chemistry AQA Complete Revision & Practice	9781782945840	CAS46
New GCSE Physics AQA Complete Revision & Practice	9781782945857	PAS48

Revision Question Cards		
9-1 GCSE Biology AQA Revision Question Cards	9781789080520	BAF41
9-1 GCSE Chemistry AQA Revision Question Cards	9781789080537	CAF41
9-1 GCSE Physics AQA Revision Question Cards	9781789080544	PAF41

All Courses - Maths Skills	ISBN	CGP Code
Grade 9-1 GCSE Science: Essential Maths Skills - Study & Practice	9781782947042	SMR42

Online Revision

BBC Bitesize

BBC Bitesize has a comprehensive series of revision materials specifically for AQA Separate Science. These include notes, videos and tests. These can be found, for all three sciences by doing a Google search for "BBC Bitesize AQA separate science" or by using the QR codes below.

My-gcsescience

my-gcsescience.com is a website that offers a series of packages of science revision materials. The most basic is free but, still worth signing up for. There are two paid packages. However, there are also a number of AQA specific videos available free on Youtube which you can find by using the QR code below.

Primrose Kitten

Don't be fooled by the name, primrosekitten.com is full of useful resources for science revision. The website is the homepage for a Youtube channel of a science teacher.

Physics and Maths Tutor

Not just a website for Physics and Maths but, Chemistry and Biology too. Go to the homepage physicsandmathstutor.com and click on the science you want to revise. Remember you're doing AQA.

Maths Skills

Up to 20% of the marks on Separate Science exam papers are awarded for the application of maths skills such as drawing and interpreting graphs, percentages, ratios, rearranging equations and significant figures. Edexcel have produced a useful guide that can be obtained by using the QR code below. (It's also relevant to AQA)

Content examined on Biology papers

Topics 1 to 4 are on Paper 1. Topics 5 to 7 are on Paper 2
Separate content is in *underlined italics*.

1. **Cell Biology**
   Eukaryotes and prokaryotes, animal and plant cells, cell division, transport in cells, *culturing microorganisms*
   Required practical activity 1: use a light microscope.
2. **Organisation**
   Principles of organisation, animal tissues, organs and organ systems, plant tissues, organs and systems.
3. **Infection and Response**
   Viral and bacterial diseases, vaccination, antibiotics and painkillers, *monoclonal antibodies*, *plant disease*.
   Required practical activity 2 (biology only): Investigate the effect of antiseptics or antibiotics on bacterial growth using agar plates and measuring zones of inhibition.
4. **Bioenergetics**
   Photosynthesis, respiration.
   Required practical activity 3: investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue.
   Required practical activity 4: use qualitative reagents to test for a range of carbohydrates, lipids and proteins.
   Required practical activity 5: investigate the effect of pH on the rate of reaction of amylase enzyme.
   Required practical activity 6: Effect of light intensity on the rate of photosynthesis
5. **Homeostasis and Response**
   Homeostasis, the human nervous system, hormonal coordination in humans, hormones in human reproduction, *the brain*, *the eye*, *control of body temperature*, *maintaining water and nitrogen balance in the body*, *plant hormones*
   Required practical activity 7: plan and carry out an investigation into the effect of a factor on human reaction time.
6. **Inheritance, variation and evolution**
   Reproduction, variation and evolution, development of genetics and evolution, classification of living organisms, *advantages and disadvantages of sexual and asexual reproduction* , *DNA structure*, *cloning, theory of evolution, speciation, the understanding of genetics*.
   Required practical activity 8 (biology only): Investigate the effect of light or gravity on the growth of newly germinated seedlings.
7. **Ecology**
   Adaptations, interdependence and competition, organisation of an ecosystem, biodiversity, decomposition, Impact of environmental change, trophic levels in an ecosystem, food production,
   Required practical activity 9: measure the population size of a common species in a habitat.

Content examined on Chemistry papers

Topics 8 to 12 are on Paper 1. Topics 13 to 17 are on Paper 2
Separate content is in *underlined italics*.

1. **Atomic Structure and the Periodic Table**
   A simple model of the atom, symbols, relative atomic mass, electronic charge and isotopes, the periodic table, *properties of transition metals*
2. **Bonding, Structure and Properties of Matter**
   Chemical bonds, ionic, covalent and metallic, how bonding and structure are related to the properties of substances, structure and bonding of carbon, *bulk and surface properties of matter including nanoparticles*.
3. **Quantitative Chemistry**
   Chemical measurements, conservation of mass and balanced chemical equations, relative formula mass, use of amount of substance in relation to masses of pure substances, mole (HT only), amounts of substances in equations (HT only), concentration of solutions, *yield and atom economy of chemical reactions*, *using concentrations of solutions in mol/dm^3*, *use of amount of substance in relation to volumes of gases*.
4. **Chemical Changes**
   Reactivity of metals, reactions of acids, electrolysis, titrations
   Required practical activity 1: preparation of a pure, dry sample of a soluble salt.
   Required practical activity 2: (Chemistry only) titration.
   Required practical activity 3: investigate what happens when aqueous solutions are electrolysed.
5. **Energy Changes**
   Exothermic and endothermic reactions, reaction profiles, *chemical cells and fuel cells*
   Required practical activity 4: investigate the variables that affect temperature changes.
6. **Rate and Extent of Chemical Change**
   Rate of reaction, reversible reactions and dynamic equilibrium.
   Required practical activity 5: investigate how changes in concentration affect the rates of reactions.
7. **Organic Chemistry**
   Carbon compounds as fuels and feedstock, crude oil, hydrocarbons and alkanes, fractional distillation, properties of hydrocarbons, cracking and alkenes, *reactions of alkenes and alcohols*, *synthetic and naturally occurring polymers*.
8. **Chemical Analysis**
   Purity, formulations and chromatography, *identification of common gases, Identification of ions by chemical and spectroscopic means*.
   Required practical activity 6: investigate how paper chromatography can be used.
   Required practical activity 7: Use of chemical tests to identify the ions in unknown ionic compounds.
   Required practical activity 8: analysis and purification of water samples from different sources, including pH, dissolved solids and distillation.
9. **Chemistry of the Atmosphere**
   The composition and evolution of the Earth's atmosphere, carbon dioxide and methane as greenhouse gases, common atmospheric pollutants and their sources.
10. **Using Resources**
    Potable water, alternative methods of extracting metals (HT only), life cycle assessment and recycling, *using materials*, *corrosion and its prevention, alloys*, *ceramics and polymers*, *the Haber process and the use of NPK fertilisers*.

Content examined on Physics Science papers

Topics 18 to 21 are on Paper 1. Topics 22 to 24 are on Paper 2.
Separate content is in *underlined italics*.

1. **Energy**
   Energy stores and systems, energy changes in systems, power, conservation and dissipation of energy, national and global energy resources.
   Required practical activity 1: an investigation to determine the specific heat capacity of materials.
   Required practical activity 2 (physics only): Investigate the effectiveness of thermal insulators.
2. **Electricity**
   Current, potential difference and resistance, series and parallel circuits, domestic uses and safety, energy transfers, the National Grid, *static electricity*.
   Required practical activity 3: use circuit diagrams to set up and check appropriate circuits to investigate the factors affecting the resistance of electrical circuits.
   Required practical activity 4: use circuit diagrams to construct appropriate circuits.
3. **Particle Model of Matter**
   Changes of state and the particle model, internal energy and energy transfers, particle model and pressure, *pressure in gases*, *increasing the pressure of a gas*.
   Required practical activity 5: make and record the measurements needed to determine densities of regular and irregular solid objects and liquids.
4. **Atomic Structure**
   Atoms and isotopes, atoms and nuclear radiation, *hazards and uses of radioactive emissions and of background radiation*, *nuclear fission and fusion*.
5. **Forces**
   Forces and their interactions, work done and energy transfer, forces and elasticity, forces and motion, momentum (HT only), *moments, levers and gears*, *pressure and pressure differences in fluids*, *changes in momentum*.
   Required practical activity 6: the relationship between force and extension for a spring.
   Required practical activity 7**:** investigate the effect of varying the force on the acceleration of an object of constant mass.
6. **Waves**
   Transverse and longitudinal waves, electromagnetic waves, *reflection of waves*, *sound waves*, *waves for detection and exploration*, *lenses*, *visible light*, *black body radiation*.
   Required practical activity 8: make observations to identify the suitability of apparatus to measure the frequency, wavelength and speed of waves in a ripple tank.
   Required practical activity 9 (physics only): Investigate the reflection of light by different types of surface and the refraction of light by different substances.
   Required practical activity 10: how the amount of infrared radiation absorbed or radiated by a surface depends on the nature of that surface
7. **Magnetism and Electromagnetism**
   Permanent and induced magnetism, magnetic forces and fields, the motor effect, loudspeakers, induced potential, *transformers and the National Grid*
8. **Space Physics**
   Solar system; stability of orbital motions; satellites, *the life cycle of a star*, *red shift*.

AQA GCSE Science Command Words

These command words tell you what to you need to do when you are doing exam questions.

Balance	Students need to balance a chemical equation.
Calculate	Students should use numbers given in the question to work out the answer.
Choose	Select from a range of alternatives.
Compare	This requires the student to describe the similarities and/or differences between things, not just write about one.
Complete	Answers should be written in the space provided, for example, on a diagram, in spaces in a sentence or in a table.
Define	Specify the meaning of something.
Describe	Students may be asked to recall some facts, events or process in an accurate way.
Design	Set out how something will be done.
Determine	Use given data or information to obtain and answer.
Draw	To produce, or add to, a diagram.
Estimate	Assign an approximate value.
Evaluate	Students should use the information supplied, as well as their knowledge and understanding, to consider evidence for and against when making a judgement.
Explain	Students should make something clear, or state the reasons for something happening.
Give	Only a short answer is required, not an explanation or a description.
Identify	Name or otherwise characterise.
Justify	Use evidence from the information supplied to support an answer.
Label	Provide appropriate names on a diagram.
Measure	Find an item of data for a given quantity.
Name	Only a short answer is required, not an explanation or a description. Often it can be answered with a single word, phrase or sentence.
Plan	Write a method.
Plot	Mark on a graph using data given.
Predict	Give a plausible outcome.
Show	Provide structured evidence to reach a conclusion.
Sketch	Draw approximately.
Suggest	This term is used in questions where students need to apply their knowledge and understanding to a new situation.
Use	The answer must be based on the information given in the question. Unless the information given in the question is used, no marks can be given. In some cases students might be asked to use their own knowledge and understanding.
Write	Only a short answer is required, not an explanation or a description.

Chemistry

Paper 1 (1 hour 45 minutes)

19th May 2025 (AM)

C1: Atomic structure & the periodic table

C2: Bonding

C3: Quantitative Chemistry

C4: Chemical Changes

C5: Energy Changes

Paper 2 (1 hour 45 minutes)

13th June 2025 (AM)

C6: Rates of reaction

C7: Organic chemistry

C8: Chemical analysis

C9: Chemistry of the atmosphere

C10: Energy changes

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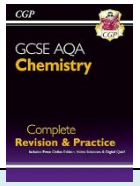
CHEMISTRY PAPER 1

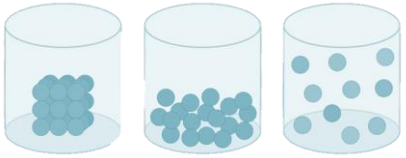


C1
Atomic structure & the periodic table

Areas to revise:	CGP Guide Pages
Atoms, elements, and compounds	16-19
Separating Mixtures	24-28
Atomic Structure	31-33
The periodic table	34-35
Group 1	39-40
Group 7	41-42
Group 0	43
Transition metals	38

C2
Bonding

Areas to revise:	CGP Guide Pages
Ionic bonding	47-50
Covalent bonding	53-56
Metallic bonding	61-62
States of matter	63
Giant covalent structures	58-59
Metals and alloys	62
Nanoscience	66



C3
Quantitative Chemistry

Areas to revise:	CGP Guide Pages
Conservation of mass	70
Relative formula mass	70
Moles	71-74
Limiting reactants	76
% Yield and atom economy (**Higher only)**	82
Concentration and volume (**Higher only)**	80

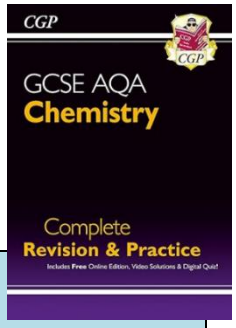
C4
Chemical Changes

Areas to revise:	CGP Guide Pages
Reactivity of metals	94
Reaction of metals with acids	90-91
Acids with bases	87
Soluble salts	92
pH scale and neutralisation	87
Electrolysis	100-104

C5
Energy Changes

Areas to revise:	CGP Guide Pages
Endothermic and exothermic	106-107
Energy profile diagrams	108
Bond calculations (**Higher only)**	108-109

CHEMISTRY PAPER 2



C6 Rates of Reaction

Areas to revise:	CGP Guide Pages
Calculating rates of reactions	120-124
Collision theory	117
Increasing the rate of reaction	118-119
Reversible reactions	127-128
Changing conditions at equilibrium **(Higher only)**	129

C7 Organic Chemistry

Areas to revise:	CGP Guide Pages
Crude oil and alkanes	132-135
Cracking	135
Alkenes	138-139
Alcohols	144-145
Carboxylic acids	146-147
Polymers	141-142, 148

C8 Chemical Analysis

Areas to revise:	CGP Guide Pages
Purity and formulations	152
Chromatography	154-155
Gas tests	153
Flames tests	155-159
Testing for non-metal ions (**Higher only**)	157
Instrumental methods (**Higher only**)	157

C9 Chemistry of the atmosphere

Areas to revise:	CGP Guide Pages
Composition of Earth's atmosphere	163-164
Greenhouse effect	165-166
Carbon footprint and climate change	167-168
Atmospheric pollutants	169

C10 Energy Changes

Areas to revise:	CGP Guide Pages
Earth's resources	172-173
Water treatment	184-185
Life cycle assessments	181-182
Corrosion	174-176
Useful materials	178
The Haber process **(Higher only)**	188-189
NPK fertilisers (**Higher only**)	190-191

Physics

Paper 1 (1 hour 45 minutes)

22nd May 2025 (AM)

P1: Energy

P2: Electricity

P3: Particle model of matter

P4: Atomic structure

Paper 2 (1 hour 45 minutes)

16th June 2025 (PM)

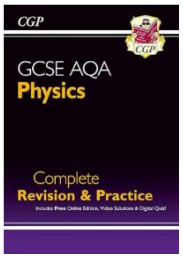
P5: Forces

P6: Waves

P7: Magnetism

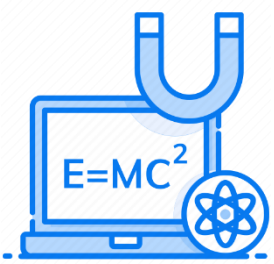
P8: Space

PHYSICS PAPER 1



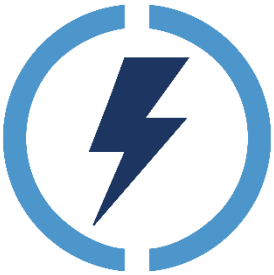
P1 Energy

Areas to revise:	CGP Guide Pages
Energy stores	17
Kinetic and potential energy	19
Specific heat capacity	20-21
Conservation of energy	23
Conduction and convection	24-25
Efficiency	26-28
Renewable and non-renewable resources	31-36



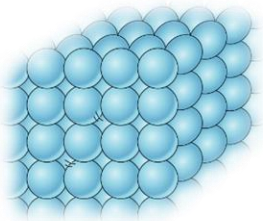
P2 Electricity

Areas to revise:	CGP Guide Pages
Circuit symbols and current	40
Resistance	41
Resistance of a wire practical	42
IV characteristics	43
Series circuits	47-48,50
Parallel circuits	49-50
Power	52-54
National grid	55-56
Static electricity	58-60



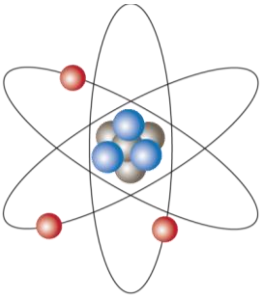
P3 Particle model of matter

Areas to revise:	CGP Guide Pages
Particle model	63
Density	64
RP Density of a regular and irregular object	64
Specific latent heat	66
Particle motion in gases	67
Pressure in gases	68

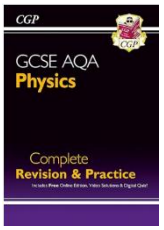


P4 Atomic Structure

Areas to revise:	CGP Guide Pages
Developing the model of the atom	72-73
Isotopes	74
Ionising radiation	75
Nuclear equations	76
Half life	77-78
Background radiation	81
Contamination	82
Uses and risks of radiation	83
Nuclear fission and fusion	84

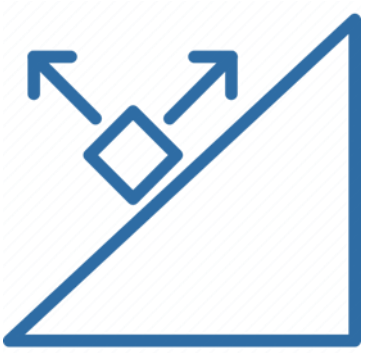


PHYSICS PAPER 2



P5 Forces

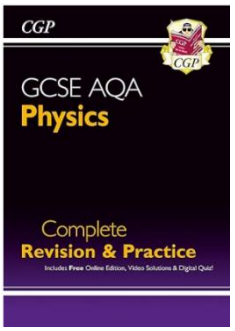
Areas to revise:	CGP Guide Pages
Scalar and vector Quantities	87
Contact and non-contact forces	87
Weight	88
Resultant forces	89
Force and elasticity	93-94
Hooke's Law	95-96
Moments	97
Leavers and gears	98
Fluid pressure	100
Atmospheric pressure	102
Distance and displacement	104
Acceleration	105
Distance time graphs	106
Velocity time graphs	107
Terminal velocity	109
Newton's first and second laws	111
Newtons third law	112
Stopping distance	116-119
Momentum	121



P6 Waves

Areas to revise:	CGP Guide Pages
Transverse and longitudinal waves	126-127
Reflection	130
Refraction	131
EM waves	136
Uses of EM waves	137-139
Dangers of EM waves	140
Lenses (**Higher Only)**	142
Images and ray diagrams (**Higher Only)**	143
Concave lenses (**Higher Only)**	144
Visible light (**Higher Only)**	145
Infrared radiation (**Higher Only)**	148
Black body radiation (**Higher Only)**	150
Sound waves (**Higher Only)**	152-153
Seismic waves (**Higher Only)**	155

PHYSICS PAPER 2



P7 Magnetism		
Areas to revise:	**CGP Guide Pages**	
Magnets	159-160	
Electromagnets	161	
The motor effect (**Higher only)**	163	
Electric motors (**Higher only)**	165	
The generator effect (**Higher only)**	167	
Alternators and dynamos (**Higher only)**	169	
Loudspeakers and microphones (**Higher only)**	170	
Transformers (**Higher only)**	171	

P8 Space		
Areas to revise:	**CGP Guide Pages**	
Life Cycle of a star	174	
The solar system	175	
Orbits/satellites	176	
Red shift and the big bang	177	

Biology

Paper 1 (1 hour 45 minutes)

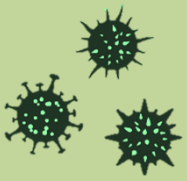
Tuesday 13th May 2025 (PM)

B1: Cell Biology

B2: Organisation

B3: Infection and response

B4: Bioenergetics



Paper 2 (1 hour 45 minutes)

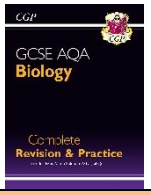
Monday 9th June 2025 (AM)

B5:Homeostasis

B6: Inheritance, variation and evolution

B7: Ecology

BIOLOGY Paper One



B1: Cell Biology

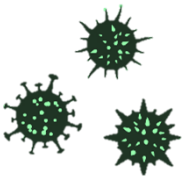
Areas to revise:	CGP Guide Pages
Cells and microscopes	16-21
Cell differentiation & specialisation	22-23
Stem cells	24-25
Chromosomes and mitosis	26-27
Binary fission	28-29
Culturing micro-organisms	30-33
Diffusion	34
Osmosis	35-36
Active transport	37
Exchanging substances	38-44

B2: Organisation

Areas to revise:	CGP Guide Pages
Organisation	45-46
Enzymes	47-51
Food tests	52-55
Lungs	56-57
Circulatory system	58-62
Cardiovascular disease	63-66
Health and disease	67-70
Cancer	71-72
Plant organisation	73
Transpiration and translocation	74-80

B3: Infection and response

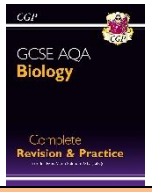
Areas to revise:	CGP Guide Pages
Communicable disease	81-82
Viral and fungal disease	83
Protist and bacterial disease	84
Preventing disease	85-86
Fighting disease	87-91
Developing drugs	92-94
Monoclonal antibodies	95-97
Plant defence and disease	98-100



B4: Bioenergetics

Areas to revise:	CGP Guide Pages
Photosynthesis	101
Measuring the rate of photosynthesis	102-106
Conditions for photosynthesis	107-109
Respiration	110
Metabolism	111
Aerobic and anaerobic respiration	112
Exercise	113-115

BIOLOGY Paper Two



B5:Homeostasis

Areas to revise:	CGP Guide Pages
Homeostasis	116
Nervous system and reflexes	117-121
The brain	122
The eye	123-125
Controlling body temperature	126-129
The endocrine system	130-131
Controlling blood glucose and diabetes	132-134
The kidney and kidney failure	135-138
Puberty and the menstrual cycle	139-140
Controlling fertility	141-143
Adrenaline and thyroxine	144-145
Plant hormones	146-150

B6: Inheritance, variation and evolution

Areas to revise:	CGP Guide Pages
DNA and mutations	151-156
Reproduction	157
Meiosis	158-163
Genetic diagrams and inherited disorders	164-173
Variation	174-175
Evolution	176-179
Selective breeding	180
Genetic engineering	181-182
Cloning	183-185
Fossils	186
Speciation	187
Antibiotic resistance	189
Classification	192-193

B7: Ecology

Areas to revise:	CGP Guide Pages
Competition	194
Abiotic and biotic	195-196
Adaptations	197
Food chains	198-199
Quadrats and transects	200-201
Environmental change	202
Water and carbon cycle	203-206
Decay and biogas	207-211
Biodiversity and waste management	212-213
Global warming	214-215
Deforestation and land use	216-217
Maintaining biodiversity	218-220
Trophic levels and pyramids of biomass	221-223
Food security and farming	225-226
Biotechnology	227-230

Resource Checklist

- 10-minute tests (CGP)
- CGP Workbooks
- CGP Revision Question Cards
- CGP Guides
- Educake (all topics covered)