



## GCSE Separate Sciences - Biology

### Cell Biology

- Animal and plant cells
- Eukaryotic and prokaryotic cells
- Diffusion and osmosis
- Active transport
- Cell division
- Stem cells

### Cell organisation

- Human digestive system
- Chemistry of food
- Enzymes and factors affecting enzyme action
- Digestive enzymes
- Blood and vessels
- The Heart
- Breathing and gas exchange
- Tissues and plant organs
- Transport in plants

### Disease

- Disease and pathogens
- Human defence responses
- Plant disease and defence responses
- Vaccination and antibiotics
- Discovering and developing drugs
- Cancer/smoking and alcohol

### Ecology

- Carbon cycle
- Sampling of plant and animals
- Required practical- decay

### Bioenergetics

- Photosynthesis
- Rate of photosynthesis
- Respiration

### Homeostasis and response

- Structure of the nervous system
- Reflex actions
- The brain and eye
- Hormones and diabetes
- Reproduction and the menstrual cycle

<ul style="list-style-type: none"> <li>• Fertility and infertility treatments</li> <li>• Plant hormones</li> <li>• Homeostasis</li> </ul>	
<b>Reproduction</b> <ul style="list-style-type: none"> <li>• Types of reproduction</li> <li>• Mitosis and meiosis</li> <li>• DNA</li> <li>• Gene expression</li> <li>• Inheritance</li> <li>• Inherited disorders</li> <li>• Screening</li> </ul>	
<b>Variation and evolution</b> <ul style="list-style-type: none"> <li>• Natural selection</li> <li>• Evolution</li> <li>• Selective breeding</li> <li>• Genetic engineering</li> <li>• Cloning</li> <li>• Ethics</li> </ul>	
<b>Genetics and evolution</b> <ul style="list-style-type: none"> <li>• History of genetics</li> <li>• Theories of evolution</li> <li>• Speciation</li> <li>• Evidence and fossils</li> <li>• Extinction and antibiotic resistance</li> <li>• Classification</li> </ul>	
<b>Advice to students for independent study</b>	<ul style="list-style-type: none"> <li>• Students can access Sam Learning and BBC Bitesize to support learning and revision. They could also consider purchasing revision books from the following site: <a href="https://www.cgpbooks.co.uk/Student/books_ks4_science">https://www.cgpbooks.co.uk/Student/books_ks4_science</a></li> <li>• Students should read about Science in everyday life; newspapers often have interesting stories.</li> </ul>



## GCSE Separate Sciences - Chemistry

### Energy Changes

- Endothermic and Exothermic reactions- examples
- Uses of exothermic and endothermic reactions
- Reaction profiles diagrams of exothermic and endothermic reactions
- Bond energy calculations
- Chemical cells and batteries
- Uses of fuel cells – hydrogen fuel cell

### Chemical analysis

- Pure substances and mixtures
- Use of chromatography
- Testing for the presence of gases – hydrogen, oxygen, carbon dioxide and chlorine
- Testing for the presence of positive and negative ions
- Importance of instrumental analysis

### Organic Chemistry

- Hydrocarbons and the importance of fractional distillation
- Burning hydrocarbons
- The cracking process
- Reactions of alkenes
- Carboxylic acids and esters
- Polymerisation – addition and condensation
- Structure and bonding of DNA

### Earth's resources

- Finite and renewable resources – examples and differences
- Making water safe to drink – processes
- Life cycle assessment and recycling

### Using our resources

- Rusting and alloys
- Structure, uses and properties of polymers
- Importance of glass, ceramics and composite materials
- Haber cycle
- Making fertilisers in the lab and in industry

### Rates and equilibrium

- Measuring and calculating the rate of chemical reactions
- Factors affecting the rate of reaction such as temperature, surface area and concentration
- Collision theory to explain changes in the rate of reaction
- Reversible reactions
- Dynamic equilibrium
- Altering conditions such as temperature and pressure to improve the yield of product
- Measuring the rate of reaction- methods and calculations

<ul style="list-style-type: none"> <li>• Use of catalysts in chemical reactions</li> </ul>	
<b>Chemical changes</b> <ul style="list-style-type: none"> <li>• Reactivity series and displacement reactions</li> <li>• Extracting metals</li> <li>• Making salts from metals and bases</li> <li>• Making salts from insoluble bases</li> <li>• Neutralisation and the PH scale</li> <li>• Strong and weak acids</li> </ul>	
<b>Electrolysis</b> <ul style="list-style-type: none"> <li>• Electrolysis theory and key words – molten substances</li> <li>• Ionic equations</li> <li>• Electrolysis of aqueous solutions</li> <li>• Electrolysis of aluminium</li> <li>• Electrolysis of brine</li> </ul>	
<b>Chemical calculations</b> <ul style="list-style-type: none"> <li>• Relative masses and moles</li> <li>• Equations and calculations</li> <li>• Atom economy and percentage yield</li> <li>• Titration and concentration</li> <li>• Volume of gases</li> </ul>	
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## GCSE Separate Sciences - Physics

### Radioactivity

- Atoms and radiation
- Discovery of the nucleus
- Changes in the nucleus with alpha, beta and gamma radiation
- Types of radiation
- Activity and half life
- Nuclear fission and fusion
- Nuclear radiation in medicine

### Forces in balance

- Vectors and scalars
- Forces between objects
- Resultant forces
- Moments and equilibrium
- Resolution of forces
- Levers and gears
- Centre of mass
- Parallelogram of forces

### Motion

- Speed and distance graphs
- Velocity and acceleration
- Analysing graphs

### Forces and motion

- Force and acceleration
- Weight and terminal velocity
- Forces and braking
- Momentum and conservation of momentum
- Impact forces
- Force and elasticity

### Forces and pressure

- Pressure and surfaces
- Pressure in a liquid
- Atmospheric pressure
- Upthrust and flotation

### Space

- Formation of the solar system
- History of a star
- Planets, satellites and orbits
- Expanding universe

- Beginning and future of the universe

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