

YEAR 10

Subject Titles:

Combined Science
 Separate Science (Biology, Chemistry, Physics)

What will I study?

We study the 2016 specifications by Edexcel. From September 2016, there are 4 GCSE qualifications in science that students can take:

Separate Science (3 GCSEs)	Combined Science (2 GCSEs)
GCSE (9-1) Biology	
GCSE (9-1) Chemistry	GCSE (9-1) Combined Science
GCSE (9-1) Physics	

There will no longer be a single GCSE Science qualification.

All students whether studying Combined or Separate Science will:

- Develop scientific knowledge and conceptual understanding through the specific disciplines of Biology, Chemistry and Physics.
- Develop understanding of the nature, processes and methods of science, through different types of scientific enquiries that help them to answer scientific questions about the world around them.
- Develop and learn to apply observational, practical, modelling, enquiry and problem-solving skills in the laboratory, in the field and in other learning environments.
- Develop their ability to evaluate claims based on science through critical analysis of the methodology, evidence and conclusions, both qualitatively and quantitatively.

Biology topics:

- Topic 1 – Key concepts in biology
 - Topic 2 – Cells and control
 - Topic 3 – Genetics
 - Topic 4 – Natural selection and genetic modification
 - Topic 5 – Health, disease and the development of medicines
 - Topic 6 – Plant structures and their functions
 - Topic 7 – Animal coordination, control and homeostasis
 - Topic 8 – Exchange and transport in animals
 - Topic 9 – Ecosystems and material cycles
- Within each topic there are additional sub-topic areas only for separate science students (S)*

Biology Core Practical work:

- Investigate biological specimens using microscopes, including magnification calculations and labelled scientific drawings from observations
- Investigate the effect of pH on enzyme activity



- Investigate the use of chemical reagents to identify starch, reducing sugars, proteins and fats (S)
- Investigate osmosis in potatoes
- Investigate the effects of antiseptics, antibiotics or plant extracts on microbial cultures (S)
- Investigate the effect of light intensity on the rate of photosynthesis
- Investigate the rate of respiration in living organisms
- Investigate the relationship between organisms and their environment using field-work techniques, including quadrats and belt transects

Chemistry topics:

Topic 1 – Key concepts in chemistry

Topic 2 – States of matter and mixtures

Topic 3 – Chemical changes

Topic 4 – Extracting metals and equilibria

Topic 5 – Separate chemistry 1 (S)

Topic 6 – Groups in the periodic table

Topic 7 – Rates of reaction and energy changes

Topic 8 – Fuels and Earth science

Topic 9 – Separate chemistry 2 (S)

Topics 5 and 9 are for students studying separate science only (S)

Chemistry Core Practical work:

- Investigate the composition of inks using simple distillation and paper chromatography
- Investigate the change in pH on adding powdered calcium hydroxide or calcium oxide to a fixed volume of dilute hydrochloric acid
- Investigate the preparation of pure, dry hydrated copper sulfate crystals starting from copper oxide including the use of a water bath
- Investigate the electrolysis of copper sulfate solution with inert electrodes and copper electrodes
- Carry out an accurate acid-alkali titration, using burette, pipette and a suitable indicator
- Investigate the effects of changing the conditions of a reaction on the rates of chemical reactions.
- Identify the ions in unknown salts, using the tests for the specified cations and anions
- Investigate the temperature rise produced in a known mass of water by the combustion of the alcohols ethanol, propanol, butanol and pentanol (S)

Physics topics:

Topic 1 – Key concepts of physics

Topic 2 – Motion and forces

Topic 3 – Conservation of energy

Topic 4 – Waves



Topic 5 – Light and the electromagnetic spectrum

Topic 6 – Radioactivity

Topic 7 – Astronomy (S)

Topic 8 – Energy - Forces doing work

Topic 9 – Forces and their effects

Topic 10 – Electricity and circuits

Topic 11 – Static electricity (S)

Topic 12 – Magnetism and the motor effect

Topic 13 – Electromagnetic induction

Topic 14 – Particle model

Topic 15 – Forces and matter

Within each topic there are additional sub-topic areas only for separate science students (S)

Physics Core Practical work

- Investigate the relationship between force, mass and acceleration by varying the masses added to trolleys
- Investigate the suitability of equipment to measure the speed, frequency and wavelength of a wave in a solid and a fluid
- Investigate refraction in rectangular glass blocks in terms of the interaction of electromagnetic waves with matter Investigate how the nature of a surface affects the amount of thermal energy radiated or absorbed (S)
- Construct electrical circuits to: investigate the relationship between potential difference, current and resistance for a resistor and a filament lamp and to test series and parallel circuits using resistors and filament lamps
- Investigate the densities of solid and liquids
- Investigate the properties of water by determining the specific heat capacity of water and obtaining a temperature-time graph for melting ice
- Investigate the extension and work done when applying forces to a spring

How will I be assessed?

Combined Science

There are 6 exam papers at the end of year 11, 2 papers for biology, chemistry and physics, each 1 hour 10mins long and worth 16.7% of the final Combined Science grade.

Separate Science

There are 6 exam papers at the end of year 11, 2 papers for biology, chemistry and physics, each 1 hour 45mins long and worth 50% of the final grade of each separate GCSE, biology, chemistry and physics.

General

There will be a new **9–1** grading system, replacing A*–G. **Foundation tier** will cover grades 1–5. **Higher tier** will cover grades 4-9.

There are **no controlled assessments** in the new qualifications, students will complete core practicals and be questioned on these as part of their written exams.



GCSE Course Information

Questions assessing students' use of **mathematical skills** will make up 15% of the assessments. There will also be some recall of equations required in physics.



YEAR 11

Subject Titles:

Core and Additional Science (Double Science)
 Biology, Chemistry, Physics (Triple Science)

What will I study?

We study the 2011 specifications by OCR 21st Century. You will study either Double Science or Triple Science.

Double Science (2 GCSEs)	Triple Science (3 GCSEs)
Core Science	Biology
Additional Science	Chemistry
	Physics

Comparing Double and Triple Science

Double Science is made up of 2 GCSEs, Core and Additional Science. Core Science includes modules of all three science disciplines, Biology (B123), Chemistry (C123) and Physics (P123). You will also be required to complete two controlled assessments; a data analysis and a case study. Additional Science adds more to each discipline, Biology (B456), Chemistry (C456) and Physics (P456). You will also be required to produce an investigation as an additional piece of controlled assessment.

Triple Science will give you three GCSE's. You will study all modules of Core and Additional Science but with further modules in Biology (B7), Physics (P7) and Chemistry (C7). The controlled assessments take on a different format - instead of a data analysis and case study you will do three investigations, one each for Biology, Chemistry and Physics.

The content of each topic is shown in the following table:

P1 Space Earthquakes The Earth	P2 The Sun Radiation Risks of Radiation	P3 Energy types Energy sources	P4 Forces Motion Safety	P5 Electricity Resistance Current	P6 Radioactive Materials Isotopes Nuclear power	P7 Advanced Astronomy Mapping the universe Lenses
C1 Air quality Pollution Improving air	C2 Polymers Molecules Alkanes and Alkenes	C3 Salts Alkalis Chlorine	C4 The periodic table Alkali Metals Halogens	C5 The Earth and Spheres Bonding	C6 Acids and Alkalis Rate of Reaction Chemical Industry	C7 Esters Chemical Industry Titration Calculations



B1	B2	B3	B4	B5	B6	B7
Genes Inheritance DNA	Vaccines Immunity Diseases	Food Chains Evolution Species	Homeostasis Osmosis Photosynthesis	Mitosis Meiosis Proteins	Behaviour Learning The Brain	Ecosystems Skelton Joints The Heart New Technologies

How will I be assessed?

Double Science

- Core Science is examined through 3 x 1 hour exams worth 25% each (B123, C123, P123), a data analysis controlled assessment worth 12.5%, and a case study style controlled assessment also worth 12.5%.
- Additional science is also examined through 3 x 1 hour exams worth 25% each (B456, C456, P456). In addition to this you will complete a full investigation (in either Biology, Chemistry or Physics) as controlled assessment worth 25%.

Triple Science

- Biology is examined through 3 x 1 hour exams worth 25% each (B123, B456, B7). In addition to this you will complete a full Biology investigation as controlled assessment worth 25%.
- Chemistry is examined through 3 x 1 hour exams worth 25% each (C123, C456, C7). In addition to this you will complete a full Chemistry investigation as controlled assessment worth 25%.
- Physics is examined through 3 x 1 hour exams worth 25% each (P123, P456, P7). In addition to this you will complete a full Physics investigation as controlled assessment worth 25%.

Controlled Assessment Information

- Case Study - A topic is selected and you must argue both sides of the case, finding evidence to support your ideas. Some starting material is given.
- Data Analysis - A mini version of an investigation including partially planning an experiment into a given hypothesis, carrying out the experiment and evaluating results.
- Investigation - A general comment is given from which you fully plan an experiment to investigate, before carrying out the experiment and fully evaluating results.

