

TCS KS4 Science Curriculum

There are two pathways for students offered: Separate Science or Combined Science Trilogy.

Subject and qualification title in full: GCSE Biology

Completion Date: End of year 11

Exam Board	AQA
Course Title	GCSE Biology
QAN	601/8752/9
Examination Dates	End of course (2 exams)
Controlled Assessment Dates	None

Subject and qualification title in full: GCSE Chemistry

Completion Date: End of year 11

Exam Board	AQA
Course Title	GCSE Chemistry
QAN	601/8757/8
Examination dates	End of course (2 exams)
Controlled Assessment Dates	None

Subject and qualification title in full: GCSE Physics

Completion Date: End of year 11

Exam Board	AQA
Course Title	GCSE Physics
QAN	601/8751/7
Examination dates	End of course (2 exams)
Controlled Assessment Dates	None

OR

Subject and qualification title in full: GCSE Combined Science Trilogy

Completion Date: End of year 11

Exam Board	AQA
Course Title	GCSE Combined Science Trilogy
QAN	601/8758/X
Examination dates	End of course (6 exams)
Controlled Assessment Dates	None

It might be necessary for some students to be offered an Entry level qualification that will run alongside their GCSE. See details below.

Subject and qualification title in full: ENTRY LEVEL CERTIFICATE Science

Completion Date: End of year 11

Exam Board	AQA
Course Title	Entry Level Certificate: Science
QAN	601/7522/9
Examination dates	None
Controlled Assessment Dates	Jun 23 (6 units for single award)

Biology

Year 10

	Outline of Course/	Key Assessments	Skill Development
Autumn 1	GCSE B4 (Bioenergetics) Plant tissues Transpiration Photosynthesis	Initial assessment Progress check	B4 builds on KS3 units Ecosystems and Digestion and breathing. Measure photosynthesis in an aquatic plant species. Investigate how glucose is used by plants.
		Respiration Exercise	
Spring 1	GCSE B5 (Homeostasis and Response) Human nervous System Human endocrine system	Initial assessment Progress check	B5 links to some topics in KS3 unit Human Reproduction and Inheritance Describe how nerves and hormones can coordinate and control the human internal environment.
		Progress check End point test	
Summer 1	GCSE B7 (Ecology) Abiotic and biotic factors Adaptations	Initial assessment Progress check	B7 builds on KS3 unit Ecosystems Explain the importance of biodiversity Collect sample data on abiotic factors affecting growth of plants.
		Organisation in an ecosystem	
Summer 2			

Year 11

	Outline of Course	Key Assessments	Skill Development
Autumn 1	<p>GCSE B7 (Ecology)</p> <p>Water and carbon cycle</p> <p>Biodiversity</p>	<p>Progress check</p> <p>End point test</p> <p>PPE</p>	<p>B7 builds on KS3 unit Ecosystems</p>
Autumn 2	<p>GCSE B6 (Inheritance , Variatic and Evolution)</p> <p>Sexual and asexual reproduction</p> <p>Meiosis</p> <p>DNA</p>	<p>Initial assessment</p> <p>Progress check</p>	<p>B6 builds on KS3 unit Human Reproduction and Inheritance, and Variation and Evolution</p> <p>Construct genetic diagrams to explain single gene crosses.</p> <p>Explain the uses of selective breeding and modern biotechnology techniques including ethical arguments for and against.</p>
Spring 1	<p>Genetic inheritance</p> <p>Inherited disorders</p> <p>Variation</p> <p>Evolution</p> <p>Selective breeding and genetic engineering</p>	<p>Initial assessment</p> <p>End point test</p> <p>PPE</p>	<p>Explain the theory of evolution using evidence from fossil records.</p>
Spring 2	<p>Revision</p>		<p>Writing answers to six-mark questions.</p> <p>Reinforcing Required practical activities, analysis of data and experimental techniques used.</p>
Summer			<p>Exam technique.</p>
Summer			

Chemistry

Year 10 **Practical investigation for the unit**

	Outline of Course/ Number of lessons	Key Assessments (End point task)	Skill Development (How does this unit build on prior knowledge?)
Autumn 1	Rates of reaction (Calculating rate, what effects rate, nanoparticles – Sep only) <i>*Volume of gas</i> <i>*Colour change</i> 15 lessons	Initial assessment Progress check End point test	Groups of periodic table, bonding, structure, conservation of mass – KS3 Calculating the rate of chemical reaction Investigating how the rate of a reaction can be changed Explain how the rate of a reaction is affected by external factors
Autumn 2	Energy Changes (Endothermic and exothermic reactions, energy level diagrams, bond energies – H & Sep only) <i>*Energy Changes</i> 11 lessons – Will go into Spring	Initial assessment Progress check End point test	Temperature changes on metal displacement during reactivity series and metals and non-metals – KS3 Compare the energy of reactants and products in a reaction Investigate the energy changes in a reaction
Spring 1	Finish Energy Changes Reversible reactions and Le Chatelier's (Reversible reactions, equilibrium, Le Chatelier's Principle, Haber Process) 10 lessons	Initial assessment Progress check End point test	Describe what reversible reactions and equilibrium are. Use Le Chatelier's Principle to explain how reversible reactions maintain equilibrium
Spring 2	Electrolysis (Electrolysis or molten and aqueous solutions, incl. Aluminium oxide. Fuel cells – Sep only) <i>*Electrolysis of aqueous solutions</i> 8 lessons (sep - 10 lessons)	Initial assessment Progress check End point test	Describe how ionic substances can be separated Investigate the products of electrolysis and the anode and cathode
Summer 1	Quantitative Chemistry (Relative formula mass, concentration of solutions, moles, titration calculation – Sep only) <i>*Titrations – Sep only</i> 17 lessons	Initial assessment Progress check End point test	Mostly new content, but building on chemical equations and acids and bases
Summer 2		Initial assessment Progress check End point test PPE	Calculate relative formula masses of a compound. Use equations to calculate concentration, moles and masses of substances

Year 11 *Practical investigation for the unit*

	Outline of Course/ Number of lessons	Key Assessments (End point task)	Skill Development (How does this unit build on prior knowledge?)
Autumn 1	<p>Chemical Analysis (Formulation and purity, Tests for gases, cations and anions, Spectroscopy – Sep Only) *Chromatography *Identifying ions</p>	<p>Initial assessment Progress check End point test</p>	<p>Groups of the periodic table, metal reactions, acids and bases, separating mixtures</p> <p>Describe, with examples, formulation and purity</p> <p>Use tests for gases, cations and anions to identify unknown substances</p>
Autumn 2	<p>9 lessons (12 – Seps)</p> <p>Organic Chemistry (Fractional distillation of crude oil, alkanes, alkenes, combustion and incomplete. Seps only – Alcohol, carboxylic acids and polymers) 13 lessons (Sep - 21 lessons)</p>	<p>Initial assessment Progress check End point test PPE</p>	<p>Mostly new content but brings back ideas separation techniques for mixtures of substances.</p> <p>Describe how crude oil can be separated into fractions, and the uses of those fractions.</p> <p>Describe what alkanes and alkenes are and how they are used</p> <p>Write word and balanced symbol equations for complete and incomplete combustion</p>
Spring 1	<p>Chemistry of the Atmosphere (Evolution of the atmosphere, climate change, global warming, carbon footprint) 17 lessons</p>	<p>Initial assessment Progress check End point test</p>	<p>Recycling, Geography content, PSHE content.</p> <p>Explain how the atmosphere has changed over time</p> <p>Explain what climate change is, and what is effecting it</p>
Spring 2	<p>Chemical resources – water (Potable and sewage water, fertilisers) *Purifying water 11 lessons</p>	<p>Initial assessment Progress check End point test PPE</p>	<p>Separation techniques for mixtures of substances</p> <p>Describe how water is made potable</p> <p>Describe how sewage water is clean</p> <p>Purify water and test it to check its purity</p>
Summer 1	<p>Revision</p>		<p>Writing answers to six-mark questions.</p> <p>Reinforcing Required practical activities, analysis of data and experimental techniques used.</p>

			Exam technique.
Summer 2			

Physics

Year 10

	Outline of Course/SOW delivery	Key Assessments (End point task)	Skill Development (How does this unit build on prior knowledge?)
Autumn 1	P4 Atomic (extra for separates hazards and uses of emission and background radiation,) (10 lessons)	Initial assessment Progress check	Not studied previously Representing the decay of nuclei as nuclear equations
Autumn 2	P4 Atomic (extra for separates, nuclear fission and fusion) (6 +1 lessons) P5 Forces part 1 (2 lessons)	End Knowledge and Understanding assessment Initial assessment	Interpreting half life graphs
Spring 1	P5 Forces part 1 cont (7 lessons)	Progress check	Building on work done in year 7 and 8 to include mathematical equations
Spring 2	P5 Forces part 1 cont (6 lessons)	End Knowledge and Understanding assessment	Explaining forces as vector quantities Estimating speeds in everyday contexts
Summer 1	P5 forces part 2 (extra for separates change in momentum) (8 lessons)	Initial assessment Progress check	Calculating acceleration and work done
Summer 2	P5 forces part 2 (7 + 1 lessons)	End Knowledge and Understanding assessment PPE	

Year 11

	Outline of Course/SOW delivery	Key Assessments <i>(End point task)</i>	Skill Development <i>(How does this unit build on prior knowledge?)</i>
Autumn 1	P6 waves (extra for separates: Sound waves, waves for detection and exploration, lenses, visible light, black body radiation) (10 lessons)	Initial assessment Progress check	Building on work done in year 7 and 8 to include mathematical equations Describing the uses of the EM spectrum Calculating the speed of waves using standard form Describing the movement of waves through different media
Autumn 2	P6 waves (extra for separates: Sound waves, waves for detection and exploration, lenses, visible light, black body radiation) (8 +1 lessons)	End Knowledge and Understanding assessment PPE	
Spring 1	P7 Magnetism and Electromagnetism Extra for separates loud speakers, induced potential, national grid (7 lessons)	Initial assessment Progress check End Knowledge and Understanding assessment	Building on work done in year 8 to include mathematical equations at H tier Exploring permanent and induced magnetic fields Explaining how solenoids can be used to increase magnetic effects Describe how transformers are used in the national grid
Spring 2	P7 Magnetism and Electromagnetism Extra for separates loud speakers, induced potential, national grid (3 lessons) SEPARATES P8 Space (3 lessons)	Initial assessment Progress check PPE End Knowledge and Understanding assessment Initial assessment Progress check End Knowledge and Understanding assessment	 Building on year 7 work to include other phenomena such as describing the life cycle of stars.
Summer 1	Revision		
Summer 2			