

Year 9 Curriculum Overview

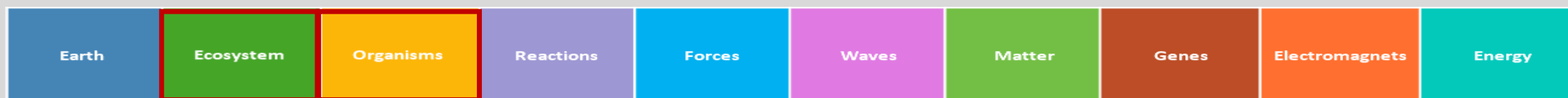
Subjects and qualifications: GCSE Separate Sciences – Biology, Chemistry and Physics

GCSE Biology, Chemistry and Physics:

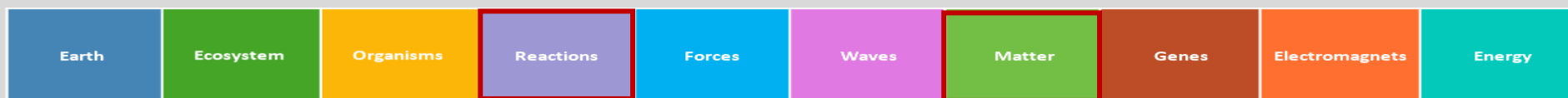
The Big Idea Principle.

Our KS4 Science curriculum at ICC builds on our KS3 approach, using AQA's big ideas principle so that the generalisations, principles and models which connect Scientific concepts are at the heart of student learning. We believe this is how students learn to see the world analytically, to explain phenomena and make predictions – all skills they need for their next stage of scientific learning. Content across KS4 is colour coded and mapped against the big idea principles from our key stage 3 curriculum so that students can clearly recognise the progression in their learning and as a result are more confident in applying the transferable skills that they have developed in their prior learning to new and unfamiliar ideas in their GCSE studies.

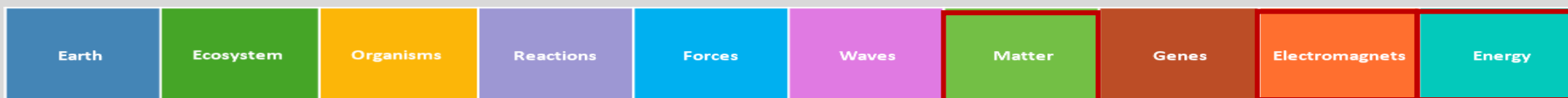
The Big Idea's studied in **Biology** lessons: Organisms and Ecosystem



The Big Idea's studied in **Chemistry** lessons: Matter and Reactions



The Big Idea's studied in **Physics** lessons: Energy, Electromagnets and Matter





GCSE Biology		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 9	Unit(s):	Cell Biology	Cell Biology and Bioenergetics	Bioenergetics	Organsiation	Organsiation	Organisation
	Key Skills:	HSW: Analysing patterns, drawing conclusions, collecting data, comparing equipment, using apparatus, biological drawing Maths: Calculations, rearranging equations, standard form, orders of magnitude, standard units and conversions Literacy: Labelling diagrams, discussion, debate, long answer questions, using articles	HSW: Using apparatus, collecting data, presenting data, interpreting data, applying practical to real life situations, draw conclusions Maths: Balancing equations, drawing graphs, calculating light intensity (HT Only), calculating rate of change Literacy: Labelling diagrams, discussion, debate, long answer questions, using word equations, justification	HSW: Using apparatus, collecting data, presenting data, interpreting data, applying practical to real life situations, draw conclusions Maths: Rearranging equations, standard form, balancing equations, rate of change Literacy: Labelling diagrams, discussion, debate, oracy, long answer questions, using articles, using word equations,	HSW: Using models, discuss limitations, draw conclusions, collect data, plan variables, test hypothesis Maths: Graphs, calculating percentages, using the mean, median and mode, significant figures, analysing correlation, make estimations of results, decimals Literacy: Using qualitative data, labelling diagrams, defining keywords, discussion, long answer questions, justification, comprehension	HSW: Evaluating models, discuss limitations, presenting data, interpreting data, using and selecting apparatus, Maths: Graphs, calculating percentages, mean, median and mode, significant figures, analysing correlation, make estimations of results, decimals Literacy: Using qualitative data, labelling diagrams, defining keywords, debate, long answer questions, justification, comprehension	HSW: Discuss limitations, draw conclusions, collect data, plan variables, test hypothesis, presenting data, interpreting data, Maths: Graphs, calculating percentages, mean, median and mode, significant figures, analysing correlation, make estimations of results, decimals Literacy: Using qualitative data, labelling diagrams, defining keywords, discussion, debate, long answer questions, justification,

	Assessment: Extended Response: 1. Explaining movement of particles between cells. Practical: RP1 Microscopes: Use a light microscope to observe, draw and label a selection of plant and animal cells. Magnification scale must be included. RP2 Osmosis: Investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue. Homework: Cell Biology MCQ and Seneca, Organisms retrieval questions	Extended Response: 1. Evaluating stem cells 2. Comparing the effectiveness of different antibiotics at killing different bacteria. 3. Describe and Explain factors that affect the rate of photosynthesis. End of unit test: Cell Biology Practical: N/A Homework: Bioenergetics Seneca, Cell Biology retrieval questions	Extended Response 1. Explaining how to investigate the effect of light intensity on the rate of photosynthesis. 2. Use information from graphs to explain changes in heart rate during exercise. End of unit test: Bioenergetics Practical: RP5 Photosynthesis: Investigate the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed. Homework: Bioenergetics MCQ, Cell Biology retrieval questions	Extended Response: N/A Cumulative assessment: Cell Biology Bioenergetics Practical: RP3 Food tests: 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. Homework: Organisation MCQ, Cell Biology retrieval questions	Extended Response 1. Explaining how the villi are adapted to maximise the rate of absorption. 2. Explain how starch in a vegetable is produced. Cumulative assessment: Cell Biology Bioenergetics Organisation Practical: RP4 Enzymes: Investigate the effect of pH on the rate of reaction of amylase enzyme. Homework: Organisation Seneca, Bioenergetics retrieval questions	Extended Response 1. Use the information from a table and explain why beta blockers change breathing rate during exercise. End of unit test: Organisation Practical: N/A Homework: Organisation retrieval questions
	Retrieval: Living organisms, cells, inheritance of genes	Health and disease, transport of substances in cells, function of mitochondria and chloroplasts	Living organisms, nutrients within food, diffusion, osmosis and active transport	Animal and Plant cells, transport of substances in cells	Aerobic and anaerobic respiration, photosynthesis	Living organisms, Animal and Plant cells, transport of substances in cells, inheritance of genes



GCSE Chemistry		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	Unit(s):	Atomic structure and the periodic table	Bonding structure and the properties of matter	Bonding, structure and the properties of matter and Quantitative chemistry 1	Energy Changes	Chemical Changes	Chemical Changes
	Key Skills:	HSW: Predicting reactions and properties, using models, separating mixtures Maths: Balancing equations, percentages, fractions, SI units and orders of magnitude Literacy: long answer questions, historical timelines	HSW: Predicting HSW: Models and analogies, model drawings Maths: 3D models, Equations Literacy: Long answers questions, researching uses of substances, using articles	HSW: Models and analogies, model drawings Maths: 3D models, Equations, Percentages, writing and balancing equations, chemical measurements, uncertainty Literacy: Long answer questions, using articles, researching uses of substances, Writing equations	HSW: Temperature changes experiment, drawing energy profiles Maths: Thermometer readings, calculating means, measuring differences Literacy: Using chemistry in everyday life work	HSW: Chemical reactions practical's, electrolysis, making salts Maths: pH scales and orders of magnitude, concentrations, equations Literacy: Writing chemical equations, deducing products	HSW: Chemical reactions practical's, electrolysis, making salts Maths: pH scales and orders of magnitude, concentrations, equations Literacy: Writing chemical equations, deducing products

	Assessment:	Extended Response: Describe the practical techniques for separating mixtures. Explaining the plum pudding model End of unit test: Atomic structure and the periodic table Practical: N/A Homework: Atomic structure and the periodic table Seneca / Matter retrieval questions	Extended Response: - Use information to explain conclusions for metal oxides. Describe what happens magnesium and iodine react and Explain why a high temperature is needed to melt magnesium iodide. Cumulative assessment: Atomic structure and the periodic table and Bonding, structure, and the properties of matter Homework: Bonding, structure, and the properties of matter Seneca and MCQ / Atomic structure and The periodic table retrieval questions	Extended Response: Compare ionic and covalent bonding Calculate relative formula mass and explain the law of conservation of mass End of unit test: Bonding, structure, and the properties of matter Practical: N/A Homework: Quantitative chemistry 1 Seneca / Bonding, structure, and the properties of matter retrieval questions	Extended Response: Explain reaction profiles End of unit test: Energy changes Practical: RQP 10 endothermic and exothermic reactions: Investigate the variables that affect temperature changes in reacting solutions. Homework: Energy changes MCQ and Seneca / Quantitative chemistry 1 retrieval questions	Extended Response: Plan an experiment to test reactivity of metals Cumulative assessment: Bonding, structure, and the properties of matter Quantitative chemistry 1 Energy changes Chemical changes Homework: Chemical changes Seneca, Quantitative chemistry 1 and Energy changes retrieval questions	Extended Response: Describe how to make pure crystals End of unit test: Chemical Changes Practical: RQP 8 soluble salts: Preparation of a pure, dry sample of a soluble salt from an insoluble oxide Homework: Chemical changes Seneca and MCQ / Quantitative chemistry 1 and Energy changes retrieval questions
	Retrieval:	Separating mixtures, atomic structure	Periodic table, elements, reactions and equations	Atomic structure, drawing ions, properties of metals and non-metals, Elements, electronic configuration	Atomic structure, bonding, drawing ions, properties of metals and non-metals, Chemical reactions and equations, element and periodic table	Chemical equations, neutral substances, elements vs compounds, states of matter	Metals and non-metals, pH, periodic table, bonding, chemical equations, reactions, experimental procedure



GCSE Physics		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 9	Unit(s):	Energy	Energy	Electricity	Electricity	Particle Model	Particle Model
	Key Skills:	HSW: Development of scientific thinking; Analysis and evaluation; Scientific vocabulary; quantities, units, symbols, and nomenclature Maths: Arithmetic and numerical computation; Handling data; Algebra Literacy: Oracy via discussion; Written equations	HSW: Development of scientific thinking; Scientific vocabulary; quantities, units, symbols, and nomenclature Maths: Arithmetic and numerical computation; Algebra; Graphs Literacy: Evaluating; Understanding key vocabulary; Written equations	HSW: Development of scientific thinking; Analysis and evaluation Maths: Arithmetic and numerical computation; Algebra; Graphs Literacy: Written equations; Sequencing information	HSW: Development of scientific thinking; Scientific vocabulary, quantities, units, symbols, and nomenclature Maths: Arithmetic and numerical computation; Algebra; Graphs Literacy: SECC; Dialogic lesson	HSW: Development of scientific thinking; Scientific vocabulary, quantities, units, symbols, and nomenclature Maths: Arithmetic and numerical computation; Algebra; Graphs Literacy: Oracy via discussion; Written equations	HSW: Development of scientific thinking; Scientific vocabulary, quantities, units, symbols, and nomenclature Maths: Arithmetic and numerical computation; Algebra; Graphs Literacy: Understanding key vocabulary; Evaluating

	Assessment:	Extended Response: Stating advantages and disadvantages of the two methods of generating electrical energy. Practical: RQP 14 Specific Heat Capacity: An investigation to determine the specific heat capacity of one or more materials. Homework: Energy Seneca	Extended Response: N/A End of unit test: Energy Homework: Energy Seneca / Energy MCQ	Extended Response: Describe how to determine resistance from simple circuit Cumulative assessment: Energy Electricity Practical: RQP 15 Resistance: Use circuit diagrams to set up and check appropriate circuits to investigate the factors affecting the resistance of electrical circuits. Homework: Electricity Seneca / Energy MCQ	Extended Response: N/A End of unit test: Electricity Practical: RQP 16 I-V characteristics: Use circuit diagrams to construct appropriate circuits to investigate the I-V characteristics of variety of circuit elements including a filament lamp, a diode and a resistor at constant Temperature. Homework: Electricity Seneca / Energy, Electricity MCQ	Extended Response: Compare properties of solids and gases Cumulative assessment: Energy Electricity Particle Model Practical: RQP 17 Density: Use appropriate apparatus to make and record the measurements needed to determine the densities of regular and irregular solid objects and liquids Homework: Particle Model and Atomic Structure Seneca / Energy, Electricity and Particle Model MCQ	Extended Response: Describe method for determining density of irregular shape End of unit test: Particle Model Practical: N/A Homework: Energy, Electricity, Particle Model MCQ
	Retrieval:	KS2 and 3 Energy	Energy and KS3 Electricity	Energy and Electricity	Energy and Electricity	Energy, Electricity and KS3 Particle Model	Energy, Electricity and Particle Model