Poole Grammar School - Key Stage 3

(Year 7, Year 8 & Year 9)

SCIENCE

‘Meeting expectations’ criteria, programme of study and curriculum content

Key Stage 3 Science 'meeting expectations' descriptors

	Year 7	Year 8	Year 9
Investigative Skills	Identify the independent and dependent variables. Decide on and follow a valid procedure when provided with suitable equipment Identify risks involved and carry out investigations safely. Record results clearly in a table	Make careful observations and identify patterns Select and use equipment and techniques that are appropriate for the measurements being made Identify control variables Interpret and draw appropriate scientific diagrams	Show awareness of potential sources of random and systematic error and how to deal with them Use 'accuracy' and 'precision' appropriately Determine whether results are reproducible or repeatable Quantify the resolution of different measuring instruments [*Physics]
Mathematical and Data Handling	Substitute values into an equation. Calculate a mean Plot two variables from experimental data to produce a scatter graph or bar chart with correctly labelled axes and plotting. Describe trends from a graph using data.	Use appropriate SI units and chemical symbols. Draw conclusions from data Solve simple formulae	Record data appropriately Calculate a mean taking anomalies into account and repeating readings, if necessary Appreciate the difference between correlation and causation [*Biology] Convert between standard form, prefix notation and normal numbers [*Physics] Solve formulae involving addition, subtraction, multiplication, division and indices using WISE UP format. [*Physics]
Knowledge and Understanding	Consistently recall accepted scientific facts Regularly use subject specific terminology in the correct context Use models and communicate scientific processes	Consistently recall and apply scientific facts Identify links between the three subject disciplines. Explain why theories change over time Use models while appreciating their limitations Link microscope properties with macroscopic effects	Consistently recall scientific knowledge and understanding to present reasoned explanations, including explaining data in relation to predictions and hypotheses Analyse and evaluate methods and approaches, identifying possible improvements Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience Identify the big ideas that underpin scientific knowledge and understanding

* *These skills are used across science, but they are mainly encountered in the subject named, during Y9.*

A prerequisite of reaching 'Meeting Expectations' in Y8 and Y9 is having met the criteria for the preceding years.

The skills build up rather than being separate in each year.

Programme of study for Year 7 Junior Science

Autumn term	Spring term	Summer term
Chemistry – **Material Properties** *(4 weeks)* Physics – **Forces** *(5 weeks)*	Physics – **Space** *(4 weeks)* Chemistry – **States of Matter** *(4 weeks)*	Physics – **Speed** *(3 weeks)* Chemistry – **Acids and Alkalis** *(3 weeks)*
HALF TERM HOLIDAY		
Biology – **Cells** *(5 weeks)*	Biology – **Reproduction** *(5 weeks)*	Biology – **Respiration** *(3 weeks)*

Different classes may do each unit in a different order after the first term

Curriculum content for Year 7 Junior Science

Theme	Content	Assessment
1 **Material Properties**	K of identifying key hazard symbols. K of how to describe different materials. K of the sub-atomic particles in an atom. K & U of the difference between atoms, compounds, elements and mixtures. U & S of how to use the periodic table of elements. K of where metals and non-metals are found on the periodic table. K of the properties of metals and non-metals. U of the difference between alloys, polymers, composites and ceramics. K of why materials are chosen for certain uses.	40-minute test – mixture of short and longer answers
2 **Forces**	K of different forces. K & U of what forces make things do. S for how to draw force diagrams. U of balanced and unbalanced forces. S of how to draw a table and a graph. K & S of how to create a risk assessment. K & S of how to write a method. U of the difference between mass and weight. K & S of identifying independent, dependent and control variables.	40-minute test – mixture of short and longer answers
3 **Cells**	K of the 7 life processes. U of whether something is living or not. K & S of how to complete biological drawings. K of the different parts of a microscope. K, U & S of how to use a microscope. K of different organelles in a plans and animal cell. K & U of unicellular organisms and their advantages and disadvantages. K of specialised cells and how they are adapted to do their job. K of the organs and organ systems in humans and animals. K & U of how cells reproduce.	40-minute test – mixture of short and longer answers
4 **Space**	K of the different planets in our solar system and comparing the size difference of different objects in space. K & U of why we have seasons and day and night. U of why shadows change length throughout the day. K & U of why the moon changes appearance throughout the month. K of why we have eclipses.	40-minute test – mixture of short and longer answers
5 **States of Matter**	K & U of lab safety and using Bunsen burners. K of the three states of matter and how to change between each state. K of how particles are arranged and their movement in each state of matter. K, U & S of drawing a cooling and heating curve. U the use of the terms ‘solute’, ‘solvent’, ‘solution’ and ‘saturation ‘. K of what happens to solute particles when they dissolve. K of how temperature affects solubility. K & S of how to write a method.	40-minute test – mixture of short and longer answers
6 **Reproduction**	K of sexual and asexual reproduction with examples. K of internal and external fertilisation and their advantages. K of the key organs of the male and female reproductive systems and outline their roles. K of the male and female gametes. K of the changes that occur during puberty and U the concerns some teenagers may have. K & U of the term’s ovulation, menstruation and menstrual cycle. K of the changes that take place during the menstrual cycle. S of developing graph drawing skills. K of the key parts of the body involved with pregnancy and linking their structure to their function. K of the risks of certain lifestyles during pregnancy. K of how birth occurs. K of the plant reproductive system and how the plant structure leads to different methods of seed dispersal. K of the importance of different pollinators in food security.	40-minute test – mixture of short and longer answers

7 **Speed**	K & S of using WISE UP to lay out equations. K of how to calculate speed. K, U & S of distance-time graphs. K of rate of change of distance. U of how to calculate speed from a distance time graph and how to calculate average speed for a whole journey. S investigating how weight and drag affect falling speeds.	40-minute test – mixture of short and longer answers
8 **Acids and Alkalis**	K of common acids and alkalis and how to identify them using indicator. U of acids containing (H+) and alkalis containing (OH-). K & S of making an indicator using red cabbage. K & U of what a neutralisation reaction is and how to carry one out. K of how to describe a range of different chemical reactions. U of matter and that it cannot be created or destroyed. K of the reactions of acids with metals, metal oxides and alkalis. K & S of planning an experiment. U the effectiveness of different indigestion remedies.	40-minute test – mixture of short and longer answers
9 **Respiration**	S for applying for and planning a group project. K of aerobic and anaerobic respiration. S for identifying variables. K & U of the mechanism by which air is moved into and out of the lungs. K of the structure of the lungs and relate their structure to their function. K & U of how the lungs are adapted to increase gas exchange. K & U of the chemicals found in cigarettes and the effect of the chemicals inside tobacco smoke on the body. K of the diseases caused by smoking	40-minute test – mixture of short and longer answers

Programme of study for Year 8 Science: Biology

Autumn term	Spring term	Summer term
Theme 1 **Circulation** (7 weeks) *Theme 1 assessment A*	Theme 2 **Nutrition and Digestion** (6 weeks) *Theme 2 assessment A*	Theme 3 **Skeleton and Movement** (2 weeks) *Theme 3 assessment* Theme 4 **Microorganisms** (3 weeks)
HALF TERM HOLIDAY		
Theme 1 **Circulation** (2 weeks) *Theme 1 assessment B* Theme 2 **Nutrition and Digestion** (5 weeks)	Theme 2 **Nutrition and Digestion** (3 weeks) *Theme 2 assessment B* Theme 3 **Skeleton and Movement** (3 weeks)	Theme 4 **Microorganisms** (6 weeks) *Theme 6 assessment*

Curriculum content for Year 8 Biology

Theme	Content	Assessment
1 **Circulation** (9 weeks)	K of parts of a circulatory system. K & U effect of surface area to volume ratio on need for circulatory system. K parts of the heart. S Safely dissect a heart. S Making careful observations of thickness of heart walls and using appropriate SI units. K & U using models and appreciating their limitations. K & U structure of an artery, vein and capillary and relating their structure to their function and influence of pressure. S make careful observations and produce scientific drawings. S link microscope properties with macroscopic effects. K the components of the blood and their functions. S Select and use equipment and techniques that are appropriate for the measurements being made, identify control variables, draw conclusions from data	GCSE style Assessed 6 mark question (with structure help) 40-minute short-answer Topic Test
2 **Nutrition and Digestion** (14 weeks)	K of components of a balanced diet and what the body utilises them for. S Make careful observations using appropriate SI units. S solve simple formula. S identify control variables S draw conclusions from data. K & U the consequences of having an unbalanced diet. S Identify links between the three subject disciplines. K & U of the need for digestion and how it occurs. K & U organs of the digestive system and their functions. S link microscope properties with macroscopic effects	40 minute short answer test + Practical Assessment
3 **Skeleton and Movement** (5 weeks)	K key bones of the skeleton. K & U the functions of the skeleton. K & U structure and function of joints. K & U concept of antagonistic muscles. S Select and use equipment and techniques that are appropriate for the measurements being made, Identify control variables, Use appropriate SI units, Identify links between the three subject disciplines.	Online quiz and Lab Report
4 **Microorganisms** (9 weeks)	K types of microorganism. K & U diseases caused by microorganisms and how your body defends against it. K Uses of microorganisms. K & U Aseptic technique, it's importance and conditions needed for microorganism reproduction. K & U vaccinations and how they work. S Interpret and draw appropriate scientific diagrams, Draw conclusions from data, Explain why theories change over time, Link microscope properties with macroscopic effects, Identify control variables, Select and use equipment and techniques that are appropriate for the measurements being made, calculate a mean.	40 minute test

K = Knowledge / U = Understanding / S = Skills

Programme of study for Year 8 Science: Chemistry

Autumn term	Spring term	Summer term
Theme 1 **Matter: Diffusion, Density and Pressure** (5 weeks) *Theme 1 assessment* Theme 2 **Elements and the Periodic Table** (2 weeks)	Theme 3 **Elements, Compounds and Mixtures** (4 weeks) *Theme 3 assessment* Theme 4 **Chemical Reactions** (2 weeks)	Theme 5 **Atomic and Electronic Structure** (1 weeks) *Theme 5 assessment* Theme 6 **Periodic Table - Groups 1, 2 & 7** (5 weeks)
HALF TERM HOLIDAY		
Theme 2 **Elements and the Periodic Table** (5 weeks) *Theme 2 assessment* Theme 3 **Elements, Compounds and Mixtures** (2 weeks)	Theme 4 **Chemical Reactions** (2 weeks) *Theme 4 assessment* Theme 5 **Atomic and Electronic Structure** (4 weeks)	Theme 6 **Periodic Table - Groups 1, 2 & 7** (1 weeks) *Theme 6 assessment* Theme 7 **Earth Science** (4 weeks)

Curriculum content for Year 8 Chemistry

Theme	Content	Assessment
1 **Matter: Diffusion, Density and Pressure** (5 weeks)	K & U Linking microscopic properties with macroscopic effects of diffusion, density and gas pressure. S: Select and use equipment and techniques that are appropriate for the measurements being made. Identify control variables. Draw conclusions from data. Solve simple formulae and use appropriate SI units.	50-minute short answer topic test.
2 **Elements and the Periodic Table** (7 weeks)	K & U of Mendeleev's development of the Periodic Table and why theories change over time. S: Use appropriate chemical symbols. K & U of the explanation of the differences between metals and non-metals K & U of trends within Groups of the Periodic Table: S: Describe trends from a graph. Draw conclusions from data.	50-minute short answer topic test.
3 **Elements Mixtures and Compounds** (6 weeks)	K & U Linking microscopic properties with macroscopic properties of elements, compounds and mixtures. S: Use appropriate chemical symbols to write formulae for compounds. S: Make careful observations and draw conclusions from collected data. K & U of separation techniques. S: Select and use equipment and techniques that are appropriate to separate a mixture.	50-minute short answer topic test.
4 **Chemical Reactions** (4 weeks)	K & U of chemical reactions, such as: combustion, neutralisation and corrosion. S: Use appropriate chemical symbols to write formula equations and word equations.	50-minute short answer topic test.
5 **Atomic and Electronic Structure** (5 weeks)	K & U of the model of the atom, including electronic structure for the first 20 elements. S: Interpret and draw appropriate scientific diagrams. Use models while appreciating their limitations. K & U of the development of the model of the atom and why theories change over time. K & U of isotopes. S: Use appropriate chemical symbols.	Development of the model of the atom writing project.
6 **The Periodic Table: Groups 1, 2 & 7** (6 weeks)	K & U Linking microscopic properties with macroscopic effects in the context of the electronic structure and trends within Groups 1, 2 and 7. S: Identify patterns.	50-minute short answer topic test.
7 **Earth Science** (4 weeks)	K & U The composition of the Earth and the rock cycle. S: Identify rock types. K & U of the Earth as a source of limited resources and the efficacy of recycling and the carbon cycle. K & U of the Earth's atmosphere and the impact of human activity upon it.	N/A

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Programme of study for Year 8 Science: Physics

Autumn term	Spring term	Summer term
Theme 1 **What is Physics?** (1 weeks) Theme 2 **Electricity** (6 weeks) *Theme 2 Assessment*	Theme 4 **Energy** (6 weeks) *Theme 4 assessment (A)*	Theme 5 **Sound and Light** (5 weeks) *Theme 5 assessment*
HALF TERM HOLIDAY		
Theme 3 **Magnetism and Electromagnetism** (5 weeks) *Theme 3 assessment* Theme 4 **Energy** (2 weeks)	Theme 4 **Energy** (1 week) *Theme 4 assessment (B)* Theme 5 **Sound and Light** (5 weeks)	Theme 6 **Making Careful Measurements** (6 weeks) *Theme 6 assessment*

Curriculum content for Year 8 Physics

Theme	Content	Assessment
1 **What is Physics?** (1 week)	U of how theories develop over time as new evidence emerges.	None
2 **Electricity** (6 weeks)	K of effect that charges have on one another. K & U of current in series and parallel. S: Interpreting and building circuits from circuit diagrams. S: Making careful measurements of current and potential difference and giving appropriate SI units. K & U: Using models while appreciating their limitations. S: Select and use equipment and techniques that are appropriate for the measurements being made.	20-minute Common Assessment Assignment + 40-minute short-answer Topic Test
3 **Magnetism and Electromagnetism** (5 weeks)	K of magnetic field around a bar magnet and its affect on other magnets or magnetic materials. K & U of factors affecting the strength of an electromagnet. S: Plan and carry out an investigation, presenting data using standard conventions. S: Describing trends from data. S: Communicating in the manner of a scientist.	Laboratory Report + Online quiz
4 **Energy** (9 weeks)	K & U of the conservations of energy. S: Calculations to quantify changes in energy stores and solving simple equations to find out what is possible and giving appropriate SI units. K & U of how energy can be wasted and ways to improve efficiency.	20-minute Common Assessment Assignment + 40-minute short-answer Topic Test
5 **Sound and Light** (10 weeks)	K & U of sound as a vibration of particles and the evidence for this. S: Identify patterns (in the context of oscilloscope traces). S: Select and use equipment and techniques that are appropriate for the measurements being made (in the context of speed of sound). S: Interpret and draw appropriate scientific diagrams (ray diagrams). K & U of reflection and refraction of light. K of how colours of light interact with each other and coloured filters and surfaces.	Practical Method + 40-minute short-answer Topic Test
6 **Making Careful Measurements** (6 weeks)	K & U of centre of mass. S: Make careful observations, record data appropriately, identify patterns and drawing conclusions from data (in the context of a pendulum). S: Show awareness of potential sources of systematic and random error.	Practical competency (tick list)

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Programme of study for Year 9 Biology

Autumn term	Spring term	Summer term
Theme 1 **GCSE Bioenergetics: Photosynthesis** (7 weeks) *Photosynthesis Required Practical Assessment*	Theme 3 **Darwin to DNA** (6 weeks) *Alleles Assessment*	Theme 4 **GCSE Cell Biology** (5 weeks) *Observational Drawing Assessment*
HALF TERM HOLIDAY		
Theme 1 (continued) (2 weeks) *Photosynthesis Assessment* Theme 2 **GCSE Bioenergetics: Respiration** (5 weeks) *Bioenergetics Assessment*	Theme 3 (continued) **Darwin to DNA** (6 weeks) *Darwin to DNA Assessment*	Theme 4 (continued) **GCSE Cell Biology** (5 week) *Y9 Review Assessment*

Curriculum content for Year 9 Biology

Theme	Content	Assessment
1 **GCSE Bioenergetics: Photosynthesis** (9 weeks)	K & U of the uses of glucose within plants. K & U of the photosynthesis equation, factors that limit photosynthesis. S of planning practical. S of testing for inverse square law. K & U of how greenhouses affect the rate of photosynthesis. S of writing an evaluation.	35-minute test – mixture of short and longer answers 30-minute test – mixture of short and longer answers
2 **GCSE Bioenergetics: Respiration** (5 weeks)	K & U of metabolism. K of the aerobic respiration. K, U & S of comparing aerobic and anaerobic respiration. K & U of ethical procedures to be considered when conducting tests on human participants. S of planning an investigation into the response to exercise.	40-minute test – mixture of short and longer answers
3 **Darwin to DNA** (12 weeks)	K & U of DNA and genome. S extracting DNA. K & U of the development of genetic inheritance thanks to the work of Gregor Mendel. K & U of dominant and recessive alleles. S of using Punnett square to calculate probability of particular phenotype being expressed. K & U of variation, selective breeding and animal cloning. K & U of natural selection due to the work of Darwin and Wallace. S of oral presentation of evolution a key characteristic of an organism. K & U of speciation extinction and fossils. K, U & S of classification.	30-minute test – mixture of short and longer answers 50-minute test – mixture of short and longer answers
4 **GCSE Cell Biology** (10 weeks)	K & U of use of different types of microscope (light vs electron). S of using microscope, calculating magnification and using appropriate prefixes. K & U of organelles and their functions. K & U of chromosomes, mitosis and the cell cycle. K & U of the development of cancer. K & U of stem cells. S of researching.	35-minute test – mixture of short and longer answers 50-minute test – mixture of short and longer answers

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Programme of study for Year 9 Chemistry

Autumn term	Spring term	Summer term
Theme 1 **Energy Changes** (8 weeks)	Theme 2 (continued) **Reactivity Series** (6 weeks) *Reactivity Series Assessment*	Theme 3 (continued) (2 weeks) *Rates of Reaction Assessment* Theme 4 **Making Salts** (4 weeks)
HALF TERM HOLIDAY		
Energy Changes Assessment Theme 2 **Reactivity Series** (6 weeks)	Theme 3 **Rates of Reaction** (5 weeks) *Catalysts Assessment*	Theme 4 (continued) **Making Salts** (5 weeks) *Making Salts Assessment*

Curriculum content for Year 9 Chemistry

Theme	Content	Assessment
1 **Energy Changes** (8 weeks)	K & U of endothermic and exothermic reactions. S planning investigations and calculating energy transferred. K & U fuels. S oral presentation for advantages / disadvantages of fuels.	Writing 50-minute test – mixture of short and longer answers
2 **Reactivity Series** (12 weeks)	K & U of metal reactions with oxygen, water and acids. K & U of the reactivity series and displacement reactions. K & U of extracting metals from their ores. S of writing symbol equations.	50-minute test – mixture of short and longer answers
3 **Rates of Reaction** (7 weeks)	K & U of factors that affect the rate of reaction. S of measuring rates of chemical reactions.	Writing 50-minute test – mixture of short and longer answers
4 **Making Salts** (10 weeks)	K & U of making salts by reactions involving neutralisation, acids + metals and acids + carbonates. K & U of fertilisers and their importance.	50-minute test – mixture of short and longer answers

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Programme of study for Year 9 Physics

Autumn term	Spring term	Summer term
Theme 1 **Heat & Temperature** (4 weeks) *Heat & Temperature Assessment* Theme 2 **GCSE Measurement Skills** (3 weeks)	Theme 3 (continued) **GCSE Energy** (6 weeks) *Calculations Assessment*	Theme 4 **GCSE Particle Model of Matter** (6 weeks) *Gas Pressure Assessment*
HALF TERM HOLIDAY		
Theme 2 (continued) **GCSE Measurement Skills** (4 weeks) *Measurements Assessment* Theme 3 **GCSE Energy** (3 weeks)	Theme 3 (continued) **GCSE Energy** (5 weeks) *GCSE Energy Assessment*	*Year 9 Review Assessment* Theme 5 **Stars & the Solar System** (4 weeks)

Curriculum content for Year 9 Physics

Theme	Content	Assessment
1 **Heat & Temperature** (4 weeks)	K & U of the particle theory of matter. K & U of the difference between heat and temperature. S of writing about particle movement, particularly ensuring that the subject of the sentence relates to appropriate bulk / microscopic property.	25-minute test – mixture of short and longer answers
2 **GCSE Measurement Skills**(7 weeks)	K of the SI units and prefixes. K & U of key terminology associated with scientific practical work and applied S of making and recording measurements carefully and to an appropriate number of significant figures. K & U of how to measure density. S of reading scientific articles.	40-minute test – mixture of short and longer answers
3 **GCSE Energy** (14 weeks)	K & U of Energy Conservation. S of calculating kinetic, elastic potential and gravitational potential energies and multi-step calculations. S of reading complex scientific texts. S of measuring and calculating specific heat capacity. K & U of methods to reduce unwanted energy transfers. S of calculating efficiency. K & U of advantages and disadvantages of different types of power station. S of presenting information orally. K & U of the climate crisis.	25-minute calculation check 40-minute test – mixture of short and longer answers
4 **GCSE Particle Model of Matter** (6 weeks)	K & U of kinetic theory. S of using y=mx + c graphs to determine a physical quantity. K & U of specific latent heat and state changes. S calculating specific latent heat and interpreting heating and cooling curves. K & U gas pressure. S more complex calculations.	30-minute writing with reference to exemplar material 50-minute test – mixture of short and longer answers
5 **Stars & the Solar System** (4 weeks)	K & U of Solar System and its formation and expected evolution. K & U of life cycle of larger mass stars.	None

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