

Science

Year 7 Curriculum Intent 2022-2023

Year 7 – Curriculum

Big topics	Topic Name	Outcomes	Skill Components	Assessment Points	from Key Stage 2 to Key Stage 4
Enquiry Processes	Introductio n to Science	 evaluate risks and alter practice accordingly ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience make predictions using scientific knowledge and understanding select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate use appropriate techniques, apparatus, and materials during laboratory work, paying attention to health and safety make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest improvements apply mathematical concepts and calculate results present observations and data using appropriate methods, including tables and graphs 	 Recall key terminology. Identify hazard symbols and describe ways to reduce risks Choose appropriate lab equipment to complete practical activities Draw labelled scientific diagrams of equipment Use a Bunsen burner safely Make observations for chemical and physical changes Draw tables to hold data Draw bar graphs to show discontinuous data Draw line graphs to show continuous data Plan a method to test one variable Complete a practical to obtain valid results Analyse data gained 	Knowledge Organiser Test SA (cw) Recall key terminology Team Satchel Quiz (hw) Identify equipment Identify suitable graphs Making conclusions from data Practical Write up TA (cw/hw) Hypothesis Chosen suitable equipment Labelled diagrams A logical method Hazards and risks Conclusion 	 planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs using test results to make predictions to set up further comparative and fair tests reporting and presenting findings from enquiries, including conclusions, causal relationships and

		 interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions present reasoned explanations, including explaining data in relation to predictions and hypotheses evaluate data, showing awareness of potential sources of random and systematic error identify further questions arising from their results. undertake basic data analysis including simple statistical techniques 	 Calculate means Produce extended writing through practical write ups Answer old SAT style exam questions Collaborate and communicate in completion of practicals Use a calculator 	 Evaluation Exam Questions PA (cw) Identify hazard symbols Identify variables Draw a graph Interpret a graph 	explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations KS 4 – All required practicals
Matter	States of Matter	 the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure changes of state in terms of the particle model. the concept of a pure substance mixtures, including dissolving diffusion in terms of the particle model simple techniques for separating mixtures: filtration, evaporation, chromatography, and distillation Identifying pure substances 	 Recall key terminology Make and record measurements for heating curves Use a model to show the movement of particles Use a substance melting and boiling point to determine its state in different temperatures Apply knowledge of particles to changes in state Apply knowledge of particles to describe dissolving Apply knowledge of particles to describe diffusion Apply knowledge of particles to describe physical separation techniques and apply these techniques Determine how density effects whether an object will float or sink Apply knowledge of particles to describe density 	Journey of an ice cube extended writing TA (cw) Recall key terminology Describe changes of state Knowledge organiser test SA (cw) Recall key terminology Team satchel quiz (hw) Properties of solids, liquids, and gases Use a model to show the movement of particles Apply knowledge of particles to changes in state Describe the energy changes involved in state changes Exam questions (cw not formally assessed) Separating techniques	 compare and group materials together, according to whether they are solids, liquids, or gases observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution use knowledge of solids, liquids, and gases to decide how mixtures might be separated, including through filtering, sieving, and evaporating

Forces	Forces	 forces as pushes or pulls, arising from the interaction between two objects using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water moment as the turning effect of a force The size of the turning effect depends on the size of the force and on its (perpendicular) distance from the pivot forces measured in newtons, measurements of stretch or compression as force is changed non-contact forces: gravity forces acting at a distance on Earth and in space, forces between magnets and forces give bigger force but at the 	•	Recall key terminology. Experimentally determine the effect of forces on a spring and how this can be used to measure a force Use a force-meter to measure forces Draw diagrams to model forces on an object Experimentally determine how shape effects floating and sinking Use appropriate equipment in practicals Determine hazards and ways to reduce risks Apply moment calculation Research how machines help to reduce effort	Knowledge organiser test SA (cw) • Recall key terminology Friction practical write up TA (hw) • Prediction • Identifying variables • Using force meter • Method • Risks • Presenting results • Conclusion • Evaluation SMH quiz (hw) • Apply moment calculation • Force effects on	 demonstrate that dissolving, mixing and changes of state are reversible changes KS4 – Chemistry and Physics – atom structure, chemical analysis notice that some forces need contact between 2 objects, but magnetic forces can act at a distance explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object identify the effects of air resistance, water resistance and friction, that act between moving surfaces recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect KS4 – Physics - Forces
		 magnets and forces due to static electricity. simple machines give bigger force but at the expense of smaller movement (and vice versa): product of force and displacement unchanged 	•	Research how machines help to reduce effort	 Force effects on movement 	KS4 – Physics - Forces
Organisms	Organ systems, organs and cells	 cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope the functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria, and chloroplasts the similarities and differences between plant and animal cells the role of diffusion in the movement of materials in and between cells 	•	Recall key terminology. Accurate labelling of diagrams (cells and microscope). How to focus and correctly use a microscope to view cells. Carry out basic magnification calculations. Begin to develop the skills required for cell drawing (Make and record observations)	 Knowledge organiser test (cw) SA Recall key terminology Exam questions (cw) PA Plant and animal cell structures and functions Diffusion in cells Specialised cells questions TA (cw) 	KS 4 – Biology – Cell Biology

		 the hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms 	 Apply knowledge of diffusion to red blood cell structure Relate structure to function of cells 	 The functions of organelles Function and structure of cells 	
Space	Our Universe	 gravity force, weight = mass x gravitational field strength (g), on Earth g=10 N/kg, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (qualitative only) our Sun as a star, other stars in our galaxy, other galaxies the seasons and the Earth's tilt, day length at various times of year, in different hemispheres the light year as a unit of astronomical distance. Ideas about the nature of the solar system have changed over time Describe natural and man-made satellites Describe the phases of the moon 	 Recall key terminology. Use rulers Calculate weight on different planets using the formula: weight = mass x gravitational field strength. Use a light year as a unit of astronomical distance. Explain how the Earth's tilt causes seasons. Explain why seasons are different in the northern and southern hemispheres. Describe how day length varies at different times of year. Determine how theories of how the Universe began have developed over time Research the phases of the moon 	Knowledge Organiser test SA (cw) • Recall key terminology Team Satchel quiz (hw) • Components of the solar system • Satellites • Seasons • Apply gravity equation	 identifying scientific evidence that has been used to support or refute ideas or arguments describe the movement of the Earth and other planets relative to the sun in the solar system describe the movement of the moon relative to the Earth describe the sun, Earth, and moon as approximately spherical bodies use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky KS4 – Triple Physics
Earth		 the composition of the Earth the structure of the Earth the rock cycle and the formation of igneous, sedimentary, and metamorphic rocks Earth as a source of limited resources and the efficacy of recycling Properties of ceramics Magnetic poles, attraction, and repulsion magnetic fields by plotting with compass, representation by field lines Earth's magnetism, compass, and navigation 	 Recall key terminology. Use models to represent an idea or structure. Making accurate observations during salol experiment Application of the ideas within the rock cycle Keep to a budget in "cookie mining" Contrast advantages and disadvantages of processes 	Knowledge Organiser test SA (cw) • Recall key terminology Team satchel quiz TA (hw) • The rock cycle • Types and properties of rocks Rock cycle PA (cw) • Rock cycle and properties of rocks	 compare and group together distinct kinds of rocks based on their appearance and simple physical properties describe in simple terms how fossils are formed when things that have lived are trapped within rock recognise that soils are made from rocks and organic matter compare and group together everyday materials based on their properties

			•	Apply the idea that 'like' poles will repel and 'unlike' poles will attract Plot the fields lines around a bar magnet using a plotting compass.		KS4 - electricity and magnets
Organisms	Reproducti on	 reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation, and birth, to include the effect of maternal lifestyle on the foetus through the placenta reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms. 	•	Recall key terminology Apply knowledge of how changes in puberty lead to reproductive maturity Accurately label diagrams Relate modes of contraception to how they prevent pregnancy Complete a dissection of a flower safely Experimentally investigate a seed dispersal method of plants	Menstrual cycle exam questions PA (cw) • PPQ practice • Menstrual cycle Plants effect on the environment comprehension task TA (cw) • Literacy Puberty SMH quiz (hw) • Puberty	 explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal describe the life process of reproduction in some plants and animals describe the differences in the life cycles of a mammal, an amphibian, an insect, and a bird describe the changes as humans develop to old age KS4 – Biology - Homeostasis, Inheritance and Evolution
Matter	Periodic Table (in Reactions)	 the Periodic Table: periods and groups; metals and non-metals the properties of metals and non-metals 	•	Recall key terminology. Navigate the periodic table to find elements and determine the group they are in Using correct symbols for elements from the periodic table Distinguish between the properties of metals and non- metals	 Team Satchel Quiz (hw) Navigate periodic table Use elements symbols Identify properties of metals and non- metals 	 Properties of materials including metals KS 4 – Chemistry – Periodic Table
Reactions	Chemical Reactions	 defining acids and alkalis in terms of neutralisation reactions the pH scale for measuring acidity/alkalinity; and indicators reactions of acids with metals to produce a salt plus hydrogen 	•	Using a wider range of more complex laboratory apparatus when carrying out experiments and paying attention to health & safety.	 Knowledge Organiser test SA (cw) Recall key terminology Making sodium chloride extended writing TA (cw) 	 explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda

		 reactions of acids with alkalis to produce a salt plus water 	•	Making and recording accurate observations and using them to draw conclusions Use of acids and alkali to make neutral solutions Use indicators to determine pH of a solution Know how to make cabbage indicator		KS4 – Chemistry – Chemical Changes
Energy	Energy	 other processes that involve energy transfer: changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels energy as a quantity that can be quantified and calculated; the total energy has the same value before and after a change comparing the starting with the final conditions of a system and describing increases and decreases in the amounts of energy associated with movements, temperatures, changes in positions in a field, in elastic distortions and in chemical compositions Identify useful and wasted energy pathways using physical processes and mechanisms, rather than energy, to explain the intermediate steps that bring about such changes fuels and energy resources. 	•	Recall key terminology. Identify which energy stores are changing for a variety of situations. Compare the amount of energy in different stores before and after a change. Apply mathematical concepts to determine amount of energy in different stores to conserve energy Apply knowledge of machines to energy	 Knowledge organiser test SA (cw) Recall key terminology Ping pong ball write up TA (cw) Exam Questions PA (cw or hw) GCSE low level qns Energy pathways Energy stores Renewable and non- renewable energy sources 	KS4 – Physics - Energy
Electricity	Electricity	 How electricity is made making circuits 	•	Recall key terminology Create series and parallel circuits Identify components from the symbols Problem solve if a circuit will not work measure current and potential difference	 Team satchel quiz (hw) Circuit symbols Knowledge organiser test SA (cw) Recall terminology Exam questions TA (cw) Series and parallel circuits Identify components 	 observe how magnets attract or repel each other and attract some materials and not others compare and group together a variety of everyday materials based on whether they are attracted to a magnet, and identify some magnetic materials describe magnets as having 2 poles

			Determine the effects of switches in parallel and series circuits	Problem solve to determine if a circuit will work	 predict whether 2 magnets will attract or repel each other, depending on which poles are facing use recognised symbols when representing a simple circuit in a diagram identify common appliances that run on electricity construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches, and buzzers identify whether a lamp will light in a simple series circuit, based on whether the lamp is part of a complete loop with a battery recognise that a switch opens and closes a circuit and associate this with whether a lamp lights in a simple series circuit recognise some common conductors and insulators, and associate metals with being good conductors KS4 – Physics – Electricity
Genes	Genes	 heredity as the process by which genetic information is transmitted from one generation to the next differences between species the variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete 	 Analysis of organisms to identify variation Application of knowledge of sexual reproduction to inheritance Relate adaptations to environment Research animals that have gone extinct and why this happened 	 Team Satchel Quiz (hw) Variation Adaptations Natural selection 6-mark question TA (cw) PPQ practice Natural selection 	 recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents identify how animals and plants are adapted to suit

 Ecosystems the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops how organisms affect, and are affected by, their environment, including the accumulation of toxic materials apply sampling techniques. Recall key terminology Construct food chains, food webs and pyramids of number, to scale Interpret graphs showing the accumulation of toxic materials Apply sampling techniques. Interpret graphs showing the accumulation of toxic materials Apply sampling techniques. Interpret graphs showing the accumulation of toxic materials Apply sampling techniques Use mathematical concepts to process data from sampling methods Use appropriate techniques, apparatus, and materials during fieldwork Use appropriate techniques, apparatus, and materials during fieldwork 		 successfully and reproduce, which in turn may lead to extinction the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection 			their environment in different ways and that adaptation may lead to evolution KS4 – Biology - Cell Biology, Inheritance and Evolution
KS4 – Biology- Ecology	Ecosystems	 the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops how organisms affect, and are affected by, their environment, including the accumulation of toxic materials apply sampling techniques. 	 Recall key terminology construct food chains, food webs and pyramids of number, to scale Interpret graphs showing predator-prey cycles. Interpret graphs showing the accumulation of toxic materials Apply sampling techniques Use mathematical concepts to process data from sampling methods use appropriate techniques, apparatus, and materials during fieldwork 	Population Change graphs TA (cw)	 recognise that environments can change and that this can sometimes pose dangers to living things construct and interpret a variety of food chains, identifying producers, predators, and prey describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro- organisms, plants, and animals give reasons for classifying plants and animals based on specific characteristics

Cultural and skills lessons:

- Throughout the year students will also complete lessons to improve their cultural capital and skills such as problem solving. These themes will include:
 - Forensics Halloween Problem solving
 - Bonfire Night Making sparklers
 - How to revise
 - o Christmas mix up Using Chemical Tests to analyse substances
 - Valentines Hormones
 - o Macclesfield silk
 - \circ How to revise
 - How to use textbooks
 - o How to use Seneca learning and BBC bitesize to aid independent learning

Assessment: Year 7 students will be assessed throughout the year through summative and formative assessments

- Formative assessments are more diagnostic than evaluative and allows to monitor pupil learning style and ability, to provide ongoing feedback and allow us to improve and adjust our teaching methods to help students progress. These may take the form of, but are not limited to:
 - Questioning in class
 - o Impromptu quizzes
 - o Prepare for Learning and Review Activities
 - Monitoring of class work and homework
 - o Peer Review
 - o Self-Assessment
- Our summative assessments aim to evaluate student learning and academic achievement. These assessments will also allow us to provide feedback and help improve the students progress throughout their education at All Hallows. These assessments in year 7 will take the form of:
 - Two synoptic assessments made using past SAT and GCSE style questions. One will be completed in March and one in June
 - A portfolio of data taken from the activities mentioned in the "Assessment Points" column below

March Synoptic Assessment

- The March synoptic assessment will focus on:
 - o Introduction to Science Practical, mathematical and analytical skills
 - o Matter
 - \circ Forces
 - $\circ \quad \text{Organisms}$
 - Human Reproduction

June Synoptic Assessment

- The June synoptic assessment will focus on:
 - Human and plant reproduction
 - o Our Universe
 - o Our Earth
 - o Reactions
 - o Introduction to Science