

Long Term Plan: Year 7 (Updated January 2023)

“Science is simply the word we use to describe a method of organising our curiosity.”

The programme for years 7 – 11 has staff teaching a single class, with rotating topics/subjects. There is varied order of topics for classes to allow for the rotation of practical equipment. Students will complete a biology, chemistry and then physics topic followed by an assessment. This process will then repeat again.

Staff are to use the [Curriculum Road Map](#) in the Science Drive to ensure that they rotate at the appropriate times.

Topic	Unit title	Key knowledge/ Content to learn and retain	Essential skills to acquire (subject & generic)	Anticipated misconceptions	Links to previous KS	Links to future KS	Opportunity for stretch & for high prior attainers
One	Scientific Skills	Introduction to practical work at ASA Short series of lessons to embed the requirements of the practical aspects of our programmes Complete the GL Assessment	Naming & drawing equipment Introduction to health & safety in the laboratory Writing Methods Recording Observations Bunsen Burner Licence	Names of equipment Students attempting to draw in 3D	Students will have used very basic equipment at KS2	All our course programmes depend upon this knowledge	Introduction of variables & values Accuracy & validity of results
SMSC & British Values	Working cooperatively Working safely in a laboratory setting						
Cultural Capital	Scientist throughout history						

Career Link	Any science based career will utilise these skills						
Topic	Unit title	Key knowledge/ Content to learn and retain	Essential skills to acquire (subject & generic)	Anticipated misconceptions	Links to previous KS	Links to future KS	Opportunity for stretch for high prior attainers
Two	Forces I	Speed Investigate the variables that affect the speed of a toy rolling down a slope Gravity Explain the way in which an astronaut's weight varies on a journey to the Moon	Carrying out practical work Recording and interpreting results Drawing graphs and using these to generate conclusions Calculations	Moon has no gravity Not recognising all forces as they are not always seen Gravity holds planets in orbit	Basic forces will have been covered at KS2. Students should know about gravity & speed	This information leads into forces 2 topic in Y8 and the forces unit studied at GCSE	Predict changes in speed when forces change Calculate gradients to graphs Changing the subject of equations to calculate a desired amount
SMSC & British Values	History of space travel Man's visit to the Moon						
Cultural Capital	Space missions & the complexity of getting Humans into space/living in space in the future						
Career Link	This is a fundamental physics concept that links to many STEM career opportunities						
Topic	Unit title	Key knowledge/ Content to learn and retain	Essential skills to acquire (subject & generic)	Anticipated misconceptions	Links to previous KS	Links to future KS	Opportunity for stretch for high prior attainers
Three	Matter I	Particle model Relate the features of the particle model to the properties of materials in different states	Use a ball model to explain the difference in properties of the states of matter Accurately draw and label scientific equipment	Not all students will know that mixtures display a range of melting and temperatures rather than a fixed point	Students should know examples of solids, liquids and gases from KS2 and should be able to	This information leads into matter 2 topic in Y8 and the particle model of matter unit studied at GCSE	Produce an explanation for semi solids and plasma Explain why glass is a liquid and not a solid

		<p>Separating Mixtures</p> <p>Devise ways to separate mixtures based on their properties</p>	<p>Design and carry out experiments to separate mixtures</p> <p>Use evidence from chromatograms to identify the components in a mixture</p> <p>Construct and use graphical information to draw conclusions</p>	Density is the same as mass	<p>explain these in terms of particle location.</p> <p>They will also be aware of the terms associated with changing state.</p>		Suggest method steps for separating a complex mixture of more than 2 components
SMSC & British Values	Working collaboratively on practical tasks						
Cultural Capital	How distillation and desalination can be used to support the demand for fresh water in areas of the globe that have little/no rain fall each year Use of chromatography in forensic analysis						
Career Link	This is a fundamental chemistry concept that links to many STEM career opportunities						
Topic	Unit title	Key knowledge/ Content to learn and retain	Essential skills to acquire (subject & generic)	Anticipated misconceptions	Links to previous KS	Links to future KS	Opportunity for stretch for high prior attainers
Four	Organisms 1	<p>Movement</p> <p>Explore how the skeletal system and muscular system in a chicken wing work together to cause movement</p> <p>Cells</p> <p>Identify the principal features of a cheek cell and describe their function</p>	<p>Build an arm activity</p> <p>Microscopy – preparing own slides and viewing more detailed manufactured ones</p> <p>Draw and label accurate scientific diagrams</p> <p>Opportunity for independent research, summarising of information and extended writing</p>	<p>All cells look the same</p> <p>Only one muscle is needed to move a limb</p>	At KS2 students will have learnt about the human body and the basics of keeping it healthy	This information leads into organisms 2 topic in Y8 and the cells unit studied at GCSE	<p>Link the concepts of energy and forces to the movement of the arm</p> <p>Predict how the failure of one organ/organ system would affect the rest of the body</p>

SMSC & British Values	How do drugs affect the body both short & long term Reasons to keep a healthy body and mind
Cultural Capital	Investigate the historical and latest developments in prosthetic limbs Review how medical treatments work based on cells, tissues, organs & systems – both historical and the latest developments
Career Link	This is a fundamental biology concept that links to many STEM career opportunities

Following a full curriculum review, the programme of study for year 7 has been revised and updated. From January 2023 all students in year 7 will follow our newly designed scheme of learning.

Topic	Unit title	Key knowledge/ Content to learn and retain	Essential skills to acquire (subject & generic)	Anticipated misconceptions	Links to previous KS	Links to future KS	Opportunity for stretch for high prior attainers
Five	Principles of Forces	<p>Experimental skills and investigations</p> <p>Select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate</p> <p>Make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements</p> <p>Present observations and data using appropriate methods, including tables and graphs</p>	<p>Practical Skills:</p> <ul style="list-style-type: none"> Using a Newton Metres Identifying equipment Following a plan accurately to collect results Carrying out practical work safely Focusing on Teamwork to collect accurate results <p>Scientific Skills:</p> <ul style="list-style-type: none"> Focus on identifying variables. Drawing tables of results Using Mathematics to solve Scientific problems 	<p>Forces: Students may think that moving objects always have forces acting on them. Their experience makes it hard to accept the idea that an object which is moving will continue with the same speed and direction unless a force acts (Newton's First Law), because on Earth the forces of friction and gravity are always present.</p> <p>Weight and Mass: Students need to</p>	<p>In Key Stage 2, students will have learned that forces can make an object move, that some forces, such as magnetism, act at a distance while others do not, that objects fall to Earth because of a force of gravity from the Earth, and that friction acts on moving objects, including air and water resistance</p>	<p>Year 7 students will use the fundamental principles discovered in this topic when then complete the Application of Forces section at the end of year 7.</p> <p>The key principles will be revisited when students complete the Energy unit in year 9 and the AQA Forces and Magnetism units in years 10 and 11 respectively.</p>	<p>There are lots of opportunities for students to practise using equations, rearranging equations to establish an unknown value.</p> <p>The use of data in standard form and the need to convert values into the standard units used within the physics topics are a good opportunity for the HPA students to tackle.</p> <p>Investigation into the compression properties of materials or substances used to reduce the impact of injuries (air bags,</p>

		<p>Interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions</p> <p>Forces as pushes or pulls, arising from the interaction between 2 objects.</p> <p>Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces.</p> <p>Forces: associated with deforming objects; stretching & squashing – springs; with rubbing & friction between surfaces, with pushing things out of the way; resistance to motion of air and water</p> <p>Other processes that involve energy transfer such as changing motion & dropping an object</p> <p>Work done and energy changes</p>		<p>grasp the idea that weight is a force with the unit Newton, yet when people talk about weight they often mean mass.</p> <p>Elasticity: Students may think that elastic simply means stretchy; elasticity means an object or material returns to its original shape.</p> <p>Free fall: On film, free-fall parachutists can appear to fly upwards when they open their parachute. Students may need help to realise that this is only a dramatic slowing in relation to the camera (which is still in free fall). At terminal velocity all forces are in balance so the object won't get faster.</p> <p>Energy: Students' misconceptions include: energy is 'used up'; we can run out of energy; all energy transfers are useful; energy is a kind of 'stuff', a</p>	<p>Fundamental to physics are ideas about forces and energy to explain phenomena.</p>	<p>flooring in children's play parks, packaging materials for parcels etc)</p>
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				material object; energy and force are the same thing. Potential Energy: Students may think that height can have nothing to do with energy; all fuels have the same energy; all fuels are called petrol.			
SMSC & British Values	Cultural – working like a scientist Community - working collaboratively to complete practical tasks Global importance of using renewable fuels and finding alternative energy sources to support the needs of people across the globe.						
Cultural Capital	Historical investigation – using Newton's original apparatus for the $F = m \times a$ investigation Modern car design uses materials that will quickly “squash” thus allowing for reduced impact forces/injury upon passengers. (e.g. F1 cars are designed to fall apart to protect the driver, collisions look horrific but drivers often appear unscathed)						
Career Link	Engineering Material Scientist Astronaut Biomedical engineering Civil & Structural Engineering Particle Physicist Nanotechnologist						
Topic	Unit title	Key knowledge/ Content to learn and retain	Essential skills to acquire (subject & generic)	Anticipated misconceptions	Links to previous KS	Links to future KS	Opportunity for stretch for high prior attainers
Six	Sound & Hearing	Experimental skills and investigations Select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent	Practical Skills: <ul style="list-style-type: none"> Observing demo of an Oscilloscope Identifying equipment Observing demo of a Bell Jar 	That material objects are not needed to make sounds, pitch and loudness mean the same thing and that ultrasound is simply very loud noise.	In Key Stage 2, students will have learned about how sounds are produced and how they travel to the ear, and ideas	The content delivered in this topic will lead directly into the Light, images and Waves topic which features in year 8 . The AQA units of	Calculation of wave speed using $v = f \times \lambda$ Students will practice the art of converting values into the standard units that are required for calculations in physics.

	<p>and control variables, where appropriate</p> <p>Interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions</p> <p>Frequencies of sound waves, measured in Hertz (Hz), echoes, reflection and absorption of sound</p> <p>Sounds need a medium to travel, the speed of sound in air, water and solids</p> <p>Sound produced by vibrations of objects in loudspeakers detected by their effects on microphone diaphragm and the ear drum. Sound waves are longitudinal</p> <p>Auditory range of humans and animals</p> <p>Pressure waves transferring energy; use for cleaning and physiotherapy by ultrasound; waves transferring information for conversion to electrical signals by microphone.</p>	<p>Scientific Skills:</p> <ul style="list-style-type: none"> ● Analysing Secondary Data to make comparisons ● Understanding ranges when looking at data ● Observing Models to deepen understanding ● Analysing and Interpreting graphs ● Introduced to a Hypothesis and designing an experiment 	<p>That sound travels instantaneously, or is faster than light, and that sound cannot travel through solids and liquids, or can pass through a vacuum.</p> <p>All materials reflect sound equally.</p> <p>The ear is simply the part outside our head that we can see.</p>	<p>relating to pitch and volume of sounds.</p> <p>The content of this topic leads directly on from the Forces and energy topic covered in year 7.</p>	<p>Waves (which includes EM waves) builds on the fundamental knowledge gained in this unit.</p> <p>Aspects of wave travel is also studied in the year 11 topic of Space.</p>	<p>Investigate the impact of ear size on ability to hear a sound</p> <p>Building a speaker in order to observe the vibration of particles needed for sound to travel</p>
SMSC & British Values	<p>Community – working collaboratively to complete practical tasks</p> <p>Moral application - Use of high pitched noise as a deterrent for younger people in community areas that have high rate of anti-social behaviour</p>					
Cultural	<p>Use of infra/ultrasound by other organisms for hearing/communication</p>					

Capital	Use of ultrasound as a medical tool Use of sonar to navigate by fishing industry, navy, whales/dolphins/bats <i>et al</i>
Career Link	Physiotherapist Sound technician Musician or music producer Composer Game & Audio designer Audio Broadcaster Fishing Industry Marine navigator Environmental Scientist Oceanographer Mining & Oil exploration Seismologist Electronic Engineering Medical Imaging

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Severn	Cells, Organs & Systems	<p>The hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms.</p> <p>The structure and function of the circulatory system</p> <p>The tissues and organs of the human digestive system, including adaptations to function and how the digestive system digests food (enzymes simply as biological catalysts)</p>	<p><u>Practical Skills:</u></p> <ul style="list-style-type: none"> • Simple tests for different substances (starch and iodine) • Using pipettes • Using a water bath • Making simple models of organ systems • Simple dissection (chicken wing as an example of a joint) <p><u>Scientific Skills:</u></p> <ul style="list-style-type: none"> • Interpreting results of chemical tests 	<p>That respiration and breathing are the same process</p> <p>That digestion and movement of food through the digestive system are the same process</p> <p>That digestion only takes place in the stomach</p> <p>That the oesophagus and trachea (windpipe) are the same organ</p>	At Key Stage 2, pupils will have learned to describe the simple functions of the basic parts of the digestive system in humans and identify that humans and some other animals have skeletons and muscles for support, protection and movement	<p>Some aspects of this topic (e.g. digestion) link directly with a later year 7 topic on Human Lifestyles and Health where deficiency diseases and malnutrition are discussed.</p> <p>Students will use these fundamentals to develop their understanding of human biology when they reach the</p>	<p>Investigate the link between gut health and mental health that is currently topical within the health industry.</p> <p>Research the latest developments in artificial limbs</p> <p>Investigate how conditions such as cystic fibrosis or crohns disease impact on quality of life</p> <p>Other use for bacteria in</p>

	<p>The importance of bacteria in the human digestive system</p> <p>The structure and functions of the gas exchange system in humans, including adaptations to function</p> <p>The mechanism of breathing to move air in and out of the lungs, using a pressure model to explain the movement of gases, including simple measurements of lung volume</p> <p>The impact of exercise, asthma and smoking on the human gas exchange system</p> <p>The structure and functions of the human skeleton, to include support, protection, movement and making blood cells</p> <p>Biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles and the function of muscles and examples of antagonistic muscles.</p>	<ul style="list-style-type: none"> • Explaining our results using scientific ideas • Using models to represent scientific ideas • Describing and evaluating our models • Extended writing 	<p>That all bacteria are bad for us, and that bacteria and viruses are the same thing</p> <p>That air is mostly made of oxygen</p> <p>That sugar and fat are exclusively bad parts of the diet</p>		<p>Organisations unit and the AQA Bioenergetics unit in year 10.</p>	<p>the food & drink industry</p>
SMSC & British Values	<p>Social – health implications of smoking v vaping</p> <p>Social – how much exercise per week should we be getting & how can we make this more appealing for young people to encourage good habits that will take us through to old age with fewer health issues</p>					
Cultural Capital	<p>Do gut health & your gut bacteria really influence your mental and physical health?</p> <p>How do some people manage hold their breath long enough to free dive to over 100m below the surface of the ocean?</p>					

Career Link	Dietician/Nutritionist Physiotherapist Doctor Osteopath/Chiropractor/Orthopaedist Sports Therapist Personal Trainer Kinesiologist Health Educator Massage Therapist Biomechanical Engineering						
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Eight	Thermal Energy	<p>Comparing amounts of energy transferred (J, kJ, kW hour)</p> <p>Domestic fuel bills, fuel use and costs</p> <p>Fuels and energy resources.</p> <p>Heating and thermal equilibrium: temperature difference between two objects leading to energy transfer from the hotter to the cooler one, through contact (conduction) or radiation; such transfers tending to reduce the temperature difference: use of insulators.</p> <p>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</p>	<p>Practical skills:</p> <ul style="list-style-type: none"> ● Using a thermometer ● Measuring time using a stop clock ● Measuring volumes accurately using a measuring cylinder ● Identifying equipment required ● Following a method ● Carrying out practical work safely <p>Scientific skills:</p> <ul style="list-style-type: none"> ● Carrying out a fair test ● Drawing results tables ● Drawing a line graph or a bar chart (Skills lesson focus) ● Concluding from results ● Calculating temperature changes ● Interpreting Sankey diagrams 	<p>Heat and temperature mean the same.</p> <p>There can be a quantity of 'cold'.</p> <p>Heat rises.</p> <p>Fuels are only liquid fuels, such as petrol for cars.</p> <p>All fuels give out the same amount of energy.</p> <p>Particles themselves get bigger when they are heated.</p> <p>Putting on a coat on makes you warmer or that the coat transfers energy to your body.</p>	<p>In Key Stage 2, students will have observed that some materials change state when they are heated or cooled, and measured or researched the temperature at which this happens in degrees Celsius (°C).</p> <p>They will have also identified that some materials feel hotter than others when heat sources are placed against them.</p>	<p>The content from this topic leads pupils directly in the Energy unit where they can develop the foundations they have built regarding energy stores and transfers.</p> <p>The concepts are further developed with the AQA Particles topic in year 10</p>	<p>There are lots of opportunities for students to practice using equations, rearranging equations to establish an unknown value.</p> <p>The use of data in standard form and the need to convert values into the standard units used within the physics topics are a good opportunity for the HPA students to tackle.</p> <p>Investigate the density changes that occur when materials are heated</p>

		<p>distortions and in chemical compositions.</p> <p>The differences in arrangements, in motion and in closeness of particles explaining changes of state, shape and density, the anomaly of ice-water transition.</p> <p>Changes with temperature in motion and spacing of particles</p> <p>Internal energy stored in materials.</p>			Students have previously studied the Particles topic and have a basic understanding of Energy transfer		
SMSC & British Values	Community – Collaboration in practical work						
Cultural Capital	<p>Comparison of energy costs from different national provider</p> <p>Methods of reducing energy bills in homes</p> <p>National (and Global) issue of people having insufficient access to suitable, and consistent, energy for their homes and the ongoing costs issues that some families are facing</p>						
Career Link	<p>Renewable energy technician</p> <p>Materials Scientist</p> <p>Environmental Engineer</p> <p>Transmission system operator</p> <p>Electrician</p> <p>Survey Technician</p> <p>Industrial Engineer</p> <p>Chemical Engineer</p>						
Topic	Unit title	Key knowledge/ Content to learn and retain	Essential skills to acquire (subject & generic)	Anticipated misconceptions	Links to previous KS	Links to future KS	Opportunity for stretch for high prior attainers
Nine	Human Lifestyle & Health	Content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary	<u>Practical skills</u>	A diet is made up of all the food and drink that a	In Key Stage 2, students will have learned about the	This unit links to other units that are delivered in year 7 and	Students will practice the art of converting values into the standard units that

		<p>fibre and water, and why each is needed</p> <p>Calculations of energy requirements in a healthy daily diet for different people</p> <p>Comparing energy values of different foods (from labels) (kJ)</p> <p>The consequences of imbalances in the diet, including obesity, starvation and deficiency diseases</p> <p>The impact of exercise, asthma and smoking on the human gas exchange system</p> <p>The effects of recreational drugs (including substance misuse) on behaviour, health and life processes.</p>	<ul style="list-style-type: none"> Using a Bunsen Burner Measuring accurately using a stop clock Measuring volumes accurately using a measuring cylinder Identifying equipment Following a method Carrying out practical work safely <p>Scientific skills:</p> <ul style="list-style-type: none"> Drawing Conclusions from graphs Analysing data and drawing conclusions 	<p>person takes in. It does not refer to 'being on a diet' to lose weight, for example.</p> <p>A food group is a set of foods that share similar nutritional properties.</p> <p>A common approach is to group foods as carbohydrates, proteins, fats, vitamins, minerals, fibre and water.</p> <p>A healthy diet includes all the food groups.</p> <p>An 'eatwell plate' gives an indication of the relative proportions of each required.</p> <p>The amount of energy needed from food varies with age, gender and activity.</p> <p>When working out how to meet energy requirements, data about the food groups and the nutrients needs to be looked at to ensure a balanced</p>	<p>basic needs of animals, including humans, for survival (water, food and air), and the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</p> <p>They will have identified that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat.</p> <p>They will have recognised the impact of diet, exercise, drugs and lifestyle on the way their bodies function, and described the ways in which nutrients and water are transported within animals, including humans.</p>	<p>year 8 including "Cells, organs and Systems" and "How organisms get Energy.</p> <p>The content of this topic directly relates to the AQA units on Organisation and Infection & Response.</p>	<p>are required for calculations in science.</p> <p>Use of multiple graph and data formats from which to draw conclusions.</p> <p>Independent research projects on various drugs – potential for small group work & presentations here.</p> <p>Designing a diet and lifestyle that could be promoted to their peers</p>
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				<p>diet and to avoid deficiency diseases.</p> <p>Water is not a food or a food group</p> <p>Foods are made up of only one food group.</p> <p>We only need energy when we are moving.</p> <p>Obesity is linked only with overeating. Hunger and starvation are the same things.</p> <p>Obese people cannot be deficient. Malnutrition does not occur in developed countries.</p> <p>Eating is the same as digestion</p> <p>All microbes cause disease. Microbes cannot make useful products.</p> <p>All drugs are illegal. All drugs are bad for us. You will not be charged by the police for possessing drugs for your own use.</p> <p>Overcoming addiction requires only willpower. If recovery from addiction has</p>			
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				<p>failed in the past, it will never work.</p> <p>Everyone who smokes will get cancer.</p> <p>Non-smokers cannot be harmed by smoking.</p> <p>Smoking cannabis is not as harmful as smoking cigarettes.</p> <p>Cannabis isn't addictive.</p> <p>Only alcoholics damage their bodies with alcohol.</p> <p>All diseases are infectious.</p> <p>All diseases show symptoms.</p>			
SMSC & British Values	<p>Social impact of addiction, use of drugs and obesity (viewed as impact on the individual, families, communities and health services)</p> <p>Social impact of UK recession on the ability for families to obtain sufficient food and what we as a community can do to support these families</p> <p>Moral obligation to ensure that everyone across the world has sufficient food and access to clean drinking water</p> <p>Community – working collaboratively on practical tasks</p>						
Cultural Capital	Impact of pandemics on global health and methods of preventing these from occurring						
Career Link	<p>Dietician or nutritionist</p> <p>Caterer or chef</p> <p>Nurse</p> <p>Doctor</p> <p>Counsellor</p> <p>Personal Trainer</p> <p>Food Technology</p> <p>Medical nutrition therapy</p> <p>Community education officer</p>						

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Ten	The Atom & the Periodic Table	<p>A simple (Dalton) atomic model</p> <p>Differences between atoms, elements and compounds</p> <p>Chemical symbols and formulae for elements and compounds</p> <p>Conservation of mass changes of state and chemical reactions.</p> <p>Chemical reactions as the rearrangement of atoms</p> <p>Representing chemical reactions using formulae and using equations</p> <p>The varying physical and chemical properties of different elements</p> <p>The principles underpinning the Mendeleev Periodic Table</p> <p>The Periodic Table: periods and groups; metals and non-metals</p> <p>How patterns in reactions can be predicted with reference to the Periodic Table</p> <p>The properties of metals and non-metals</p>	<p>Practical skills</p> <ul style="list-style-type: none"> Measuring accurately using a stop clock Measuring mass accurately using a balance Identifying equipment Following a method Carrying out practical work safely Making models of atoms, elements and compounds <p>Scientific skills</p> <ul style="list-style-type: none"> Focus on identifying variables. Carrying out a fair test Recording results in a table 	<p>Elements were 'invented'; they all have symbols with the same letters as their English names; elements and atoms are different substances; atoms are like cells and of a similar size</p> <p>All metals are silver-coloured, magnetic and strong; metals all melt at very high temperatures; non-metals are all solids; air is an element; water is an element;</p> <p>Atoms change when compounds form; atoms change size; when things burn they disappear or are destroyed forever</p>	<p>In Key Stage 2, students will have compared and grouped together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.</p> <p>Particles topic delivered earlier in the year, leads directly into this topic area.</p>	<p>The key concepts learnt in this topic are build directly into the both the acids & alkalis and understanding of chemical reactions topics in year 8.</p> <p>The atomic structure and periodic table unit that students discover in year 9, takes the principles studied here to the next level. The concepts studied also support learning in both the Chemical Changes and Energy Changes units that are present on the Y10 curriculum.</p> <p>Patterns in reactivity resurface in the Rates of Reaction unit at the end of year 10.</p>	<p>Students can practice using chemical symbols and formula in balanced symbol equations.</p> <p>Students can identify an unknown substance when provided by it's properties and comparative information</p>

SMSC & British Values	Community – working in collaboration with others
Cultural Capital	Historical development of atomic structure Predictions regarding the future of particle physics and the discovery of the elusive “God Particle”
Career Link	Particle Physicist Crystallographer Nanotechnology Geochemist Chemical Engineer Materials Technician

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Eleven	Reproductive Biology	<p>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.</p> <p>Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms.</p>	<p>Practical Skills:</p> <ul style="list-style-type: none"> • Simple dissection- flowers to identify different parts including plant reproductive organs • Recording time using stopwatches • Measuring small and large distances using various rulers <p>Scientific Skills:</p> <ul style="list-style-type: none"> • Scientific drawings of observations • Interpreting graphs (bee population decline) • Planning an experiment- identifying independent, dependent and control variables • Making a hypothesis 	<p>Ovulation and fertilisation are the same thing</p> <p>Puberty and adolescence are the same thing.</p> <p>Puberty occurs at the same time and in the same way for everyone.</p> <p>Plant sex cells are the same as sperm and egg cells</p> <p>The terms ‘pollination’ and ‘fertilisation’ describe the same process.</p>	<p>At Key Stage 2, pupils will have learned to describe the life process of reproduction in plants and some animals, including sexual and asexual reproduction in plants, and sexual reproduction in animals.</p> <p>An earlier topic in year 7 has covered cells, specialised cells & DNA which</p>	<p>Students will revisit aspects of this topic during their PSHE lessons.</p> <p>The science content within this topic will provide a starting point for the Cells unit in year 9 as well as the AQA Inheritance unit that is in our Y11 curriculum.</p>	<p>Wider review of reproduction methods of other organisms (e.g. fish, fungi, trees etc) which will allow for a comparison of methods.</p> <p>Literacy opportunity to produce an informative leaflet, aimed at their peers, to share information around puberty & support for mental health at this time.</p> <p>Investigate the shape of wind pollinated flowers using specific species as the basis for looking at the impact of dispersal</p>

			<ul style="list-style-type: none"> • Drawing a conclusion • Evaluating a method 	Pollination and seed dispersal are the same processes	leads directly into the work within this topic area.		methods.
SMSC & British Values	Moral – impact of puberty on health & mental health Moral – complexity of puberty on a young person who is considering gender reassignment or transition. Cultural – awareness of the approaches of different cultures to menstruation and reproduction						
Cultural Capital	Awe & Wonder around the nature of reproduction and the continuation of the Human species. Importance of pollination of plants, by bees and other insects, in ensuring that there is sufficient food to meet the demands of the world population						
Career Link	Nursing Midwife Reproductive Biologist Andrologist Embryology Assistant Wildlife Research Technician						
Topic	Unit title	Key knowledge/ Content to learn and retain	Essential skills to acquire (subject & generic)	Anticipated misconceptions	Links to previous KS	Links to future KS	Opportunity for stretch for high prior attainers
Twelve	Application of Forces	Simple machines give bigger force but at the expense of smaller movement (and vice versa): product of force and displacement unchanged Other processes that involve energy transfer: stretching a spring Moment as the turning effect of a force Forces associated with deforming objects; stretching and squashing – springs; with rubbing and friction	Practical skills: <ul style="list-style-type: none"> • Measuring accurately using a stop clock • Identifying equipment • Following a method • Carrying out practical work safely • Drawing graphs • Measure mass and volume of regular shaped objects • Measure mass and volume of irregular shaped objects • Measure mass and volume of liquids 	Elastic does not mean stretchy; elasticity means an object or material returns to its original shape. Force and energy mean the same thing Force and pressure are the same thing Students may think that there is only air pressure	In the topic “Forces” covered earlier in the year students have described and measured forces in Newtons, and have compared the size of different forces using Newtons.	This unit provides key information that is built upon in the AQA Forces unit that the students will encounter in year 10. The concepts of energy storage and transfer will be revisited in the Energy topic in year 9. States of matter are a	There are lots of opportunities for students to practice using equations, rearranging equations to establish an unknown value. The use of data in standard form and the need to convert values into the standard units used within the physics topics are a good opportunity for the HPA students to tackle.

	<p>between surfaces, with pushing things out of the way; resistance to motion of air and water</p> <p>Forces measured in newton's, measurements of stretch or compression as force is changed</p> <p>Force-extension linear relation; Hooke's Law as a special case</p> <p>Work done and energy changes on deformation</p> <p>Atmospheric pressure, decreases with increase of height as weight of air above decreases with height</p> <p>Pressure in liquids, increasing with depth; up thrust effects, floating and sinking</p> <p>Pressure measured by ratio of force over area – acting normal to any surface.</p> <p>Opposing forces and equilibrium: weight held by stretched spring or supported on a compressed surface.</p> <p>Change depending on direction of force and its size.</p> <p>Similarities and differences, including density differences, between solids, liquids and gases</p> <p>The differences in arrangements, in motion and in closeness of particles</p>	<p>Scientific skills:</p> <ul style="list-style-type: none"> • Focus on identifying variables. • Carrying out a fair test • Skills lesson focusing on evaluating a method • Use Scientific vocabulary to explain a concept • Calculate Pressure, for given force and area values. • Calculate Density 	<p>when it is windy, and that no wind means no air pressure. There is always a pressure caused by the particles that make up the air.</p>	<p>They will have discussed how a force can affect the motion of an object, including friction, air resistance, and water resistance.</p> <p>In this topic they will advance their knowledge by looking at cases where forces do more than change the speed of an object.</p> <p>They will learn how forces can cause an object to change shape, with Hooke's law as an example, and how forces can cause rotation.</p> <p>Students have also learned that energy being transferred by forces as work done. In this topic they will describe how work done in changing the shape of an elastic object</p>	<p>concept that students will develop their understanding of in year 10 when they study the AQA Particles Topic</p>	<p>Investigation opportunity looking at simple machines, both historic and modern uses.</p>
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		explaining density; the anomaly of ice-water transition			like a spring can be stored as elastic potential energy.		
SMSC & British Values	Community – working collaboratively to complete practical investigations						
Cultural Capital	Historical application of war fare – building and firing catapults and trebuchets The use of simple machines through time to make life simpler						
Career Link	Engineering Material Scientist Astronaut Biomedical engineering Civil & Structural Engineering Particle Physicist Nanotechnologist						