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| Flat_BL@2x-100 | Wollaston School: 2023/24 Curriculum Map for (***Science***).  Curriculum Lead: (***Eliot Pugh***) | cid:image001.png@01D52C2F.ED74AF70 |
| **Curriculum Aim and scope**:  *The science curriculum nurtures students’ innate curiosity by providing learners with a range of core scientific knowledge, concepts, and skills that they will be able to choose and apply in their future learning, employment, and life. The curriculum is underpinned by our values of developing knowledgeable, innovative, and ethical scientists.*  *The units are planned to ensure progression of scientific knowledge from Key Stage 3 (KS3) in Year 7 through to A Level Science at Key Stage 5 (KS5). Subject specific vocabulary and skills is mapped out, and every unit has a practical aspect where pupils learn the scientific skills of making predictions, ensuring validity, analysing and evaluating results and drawing conclusions.*  *Our Key Stage 3 curriculum builds on primary science and will enable learners to understand themselves, others, and the World in which they live. Their three-year course is designed by subject specialists to ensure precision of subject specific vocabulary and contextual knowledge and will prepare students for their Key Stage 4 (KS4) Science choices. KS4 and KS5 is the period when students build on their earlier learning and prepare for adult life, higher education, and employment.*  What are your aims for this subject? | | |

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| **Year** | | **Term** | **Unit** | | **Description of what is being taught including end learning goals**  **Clearly outline substantive knowledge required (not just skills)** | | **Links to National Curriculum** | **Subject Specific Terminology and Key Words** | | **Prior knowledge (including previous key stage/retrieval required** | | **Assessment and Homework**  **(How is the learning being checked- how do you know it is is being remembered?** |
| **Year 7** | | 1 | Space | | Details of the properties in our solar system including appearance and position relative to Earth.  Explain what a light year is and why scientists use them.  Explain why the Earth has day, night, seasons, and years.  Explain why places on the Earth experience different daylight hours and amounts of sunlight during the year.  Describe the movement and phases of the moon and why they occur.  Describe the position of the moon, the Earth and the Sun in solar and lunar eclipses using diagrams.  Describe how space exploration and observations of stars are affected by the scale of the universe | | our Sun as a star, other stars in our galaxy, other galaxies  the seasons and the Earth’s tilt, day length at different times of year, in different hemispheres  the light year as a unit of astronomical distance | Light year  Galaxy  Solar system  Waxing  Waning  Gibbous  Crescent  Season  Solar eclipse  Lunar eclipse | | Plants in the solar system.  The Earth rotates on its axis and orbits the sun.  The moon orbits the Earth.  The Sun is a star at the centre of our solar system.  Students should know what we mean by daytime, night time and the different seasons. | | Content knowledge is assessed in the end of unit assessment.  Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  | | 1 | Interdependence | | Use a key to identify organisms and describe the differences between organisms  Explain how adaptations enable organisms to survive.  Use ideas of consumers and producers to explain the order of organisms in a food chain and explain what the arrow represents.  Use a food web diagram to predict and explain effects that a change in the size of a population could have on other populations in the same community.  Explain what pyramids of biomass and number represent.  Explain the effect of bioaccumulation on organisms.  Select and use suitable sampling methods to collect data from a habitat | | 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 | Producer  Consumer  Carnivore  Herbivore  Omnivore  Predator  Prey  Bioaccumulation  Habitat  Species  Organism | | Plants create their own food and Animals must consume food.  Knowledge of common animals and their diets and habitats. | | Content knowledge is assessed in the end of unit assessment.  Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.  Homework tasks based on food webs and classification. |
|  | | 1 | Particles | | Use the particle model to describe the properties of solids, liquids, and gases, including differences in melting points.  Describe how the arrangement and movement of particles alters when a substance changes state.  Describe the difference in energy between a solid, liquid and gas.  Explain what diffusion is using the term concentration. Explain the factors that effect the rate of diffusion.  Explain what causes gas pressure and what factors can effect it.  Explain what density is using the particle model and use volume calculations to calculate the density of a regular object. | | 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 properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure  **Matter**  changes of state in terms of the particle model.  similarities and differences, including density differences, between solids, liquids and gases | Solid  Liquid  Gas  Particle  Intermolecular  Energy  Diffusion  Pressure  Collision  Density  Expand  Contract  Concentration | | Solid, liquid, and gas are the three states of matter. | | Content knowledge is assessed in the end of unit assessment.  Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.  States of matter compare and contrast homework task. |
|  | | 1 | Forces | | One effect of a force is to change an object’s form, causing it to be stretched or compressed.  An unbalanced force acting on an object is called the resultant force.  When the resultant force on an object is zero, it is in equilibrium and does not move, or remains at constant speed in a straight line.  **Skill** Sketch the forces acting on an object and label their size and direction.  Describe what happens to the length of a spring when the force on it changes.  Mass is a property of the object; weight depends upon mass but also on gravitational field strength.  Skill: Use the formula: weight (N) = mass (kg) x gravitational field strength (N/kg).  Compare your weight on Earth with your weight on different planets using the formula. | | 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  Forces measured in newtons, measurements of stretch or compression as force is changed  Force-extension linear relation; Hooke’s Law as a special case  non-contact forces: gravity forces acting at a distance on Earth and in space.  Forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion (qualitative only) | Push  Pull  Compress  Stretch  Deform  Friction  Upthrust  Gravity  Air resistance | | Forces effect the speed or shape of an object.  Gravity is force that we experience on Earth.  Friction and its effects e.g. heating up or slowing down objects. | | Content knowledge is assessed in the end of unit assessment.  Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
| **Year 7** | | 2 | Cells | | Characteristic processes of living organisms (MRS GREN).  The hierarchical organisation of multicellular organisms.  How to use microscopes and calculate magnification.  Know the structure and function of organelles in general and specialised plant and animal cells.  Describe what a unicellular organism is and give examples of how they are adapted to carry out their functions.  Know what stem cells are, what they do, and why they are important. Understand and discuss the social and ethical issues of stem cell research. | | Cells and organisation  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  the structural adaptations of some unicellular organisms  the hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms. | Cell  Organism  Tissue  Organ  Mitochondria  Cytoplasm  Cell wall  Cell membrane  Nucleus  Vacuole  Amoeba  Fungi  Euglena  Bacteria  Algae | | Living things are made up of small units called cells.  Plants and animals have characteristic life processes. | | Content knowledge is assessed in the end of unit assessment.  Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.  Homework task to learn keywords and microscope parts. |
|  | | 2 | Separating mixtures | | Mixtures may be separated due to differences in their physical properties.  Explain how substances dissolve using the particle model and the observed disappearance of a solute in terms of breaking into parts that are too small to see.  How temperature affects solubility in liquids and gases  Suggest a combination of methods to separate a complex mixture and justify the choices.  Describe how to separate immiscible liquids.  Describe the process and carry out chromatography of ink pens  Describe what happens to the particles in distillation and predict the distillate of a simple distillation process. | | The concept of a pure substance  Mixtures, including dissolving  Diffusion in terms of the particle model  Simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography  The identification of pure substances | Solute  Soluble  Solution  Dissolve  Insoluble  Chromatography  Distillation  Miscible  Immiscible  Filtration | | Salt dissolves when added to water and seems to disappear but is still present.  Oil and water do not mix  Ideas of evaporation and condensation from the particles topic. | | Content knowledge is assessed in the end of unit assessment.  Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.  Homework to assess key words and spellings. |
|  | | 2 | Reproduction | | Distinguish between ‘getting bigger’ (an increase in size) and growth (an increase in the number of cells) in multicellular organisms.  Describe the life cycles of different plants and animals (e.g. a flowering plant, a human and a butterfly).  Differentiate between internal and external fertilisation  Evaluate the advantages and disadvantages of fertilisation strategies and relate this to body structure and behaviour  Label and state function of male and female reproductive system  Describe the adaptations of gametes  Describe the process of ovulation and fertilisation  Describe the gestation period and the development of the embryo  Discuss the effect of maternal lifestyle on the foetus through the placenta  Describe the process of labour and birth  Describe the changes that occur in both boys and girls during puberty.  To understand that changes in bodies are caused by hormones  Describe how various forms of contraception reduces fertilisation and pregnancy  Identify and recall the main structures of a flower.  Explain how structures promote insect pollination  Describe differences between wind and insect pollinated flowers.  Explain how structures promote wind pollination  Evaluate insect and wind pollination strategies  Describe the process of fertilisation in plants  Describe variety of plants seeds and dispersal methods | | 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. | Style  Stigma  Petal  Sepal  Filament  Ovule  Pollination  Pollen  Anther  Reproduction  Fertilisation  Internal  External  Sperm  Egg  Ovary  Cervix  Vagina  Vulva  Testes  Penis  Urethra  Hormone  Gestation  Amniotic  Embryo  Foetus | | Sexual and asexual reproduction in plants and animals  Knowledge of the human reproductive system, gestation, fertilisation and maternal lifestyle.  Flower structure, wind and insect pollination, seed dispersal. | | Content knowledge is assessed in the end of unit assessment.  Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
| **Year 7** | | 3 | Heating and cooling | | Explain the difference between heat and temperature.  The thermal energy of an object depends upon its mass and temperature.  When there is a temperature difference, energy transfers from the hotter to the cooler object.  Describe how energy is transferred by conduction.  Use kinetic theory / particle model to explain conduction.  Explain expansion, density change and convection.  Describe which materials radiate the most hear using the idea that heat energy is transferred through a vacuum.  Use particle ideas to describe changes of state and plot a heating/cooling curve.  Explain how insulation works in terms of conduction, convection, and radiation. | | 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 | Conduction  Convection  Radiation  Energy  Transfer  Thermal  Vacuum | | temperature difference between 2 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 | | Content knowledge is assessed in the end of unit assessment.  Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  | | 3 | Geology | | Describe the three rock layers inside Earth; the crust, the mantle and the core.  Explain why a rock has a particular property based on how it was formed.  Predict planetary conditions from descriptions of rocks on other planets.  Describe the process for the formation of sedimentary rock  Explain the properties and uses of sedimentary rock based on it’s formation e.g. clay for ceramics and limestone  Describe the process for the formation of metamorphic rock  Explain the properties and uses of metamorphic rock based on it’s formation  The process of physical and chemical weathering  Sedimentary, igneous and metamorphic rocks can be interconverted over millions of years through weathering and erosion, heat and pressure, and melting and cooling.  Construct a labelled diagram to  identify the processes of the rock cycle.  Describe similarities and differences between the rock cycle and everyday physical and chemical processes. | | The composition of the Earth  The structure of the Earth  The rock cycle and the formation of igneous, sedimentary and metamorphic rocks | Sedimentary  Metamorphic  Igneous  Volcano  Lava  Crystal  Porous  Weathering  Erosion | | Structure of the earth  Different rocks have different physical properties.  How fossils are formed in rocks | | Content knowledge is assessed in the end of unit assessment.  Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
| **Year 8** | | 1 | Skeletal system | | The parts of the human skeleton work as a system for support, protection, movement and the production of new  blood cells.  Explain how a physical property of part of the skeleton relates to its function. Identify simple joints on the skeleton.  Antagonistic pairs of muscles create movement when one contracts and the other relaxes  Explain why some organs contain muscle tissue. Explain how antagonistic muscles produce movement around a joint.  Use a diagram to predict the result of a muscle contraction or relaxation.  Suggest factors that affect the force exerted by different muscles.  Predict the consequences of damage to a joint, bone or muscle.  Consider the benefits and risks of a technology for improving human movement.  Give reasons why oral hygiene is so important. | | The structure and functions of the human skeleton, to include support, protection, movement and making blood cells  biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles  the function of muscles and examples of antagonistic muscles | Skeleton  Skeletal  Tendons  Ligaments  Muscle  Teeth  Bones  Joints  Vertebra  Skull  Relax  Contract  Tissue | | identify that humans and some other animals have skeletons and muscles for support, protection and movement. | | Content knowledge is assessed in the end of unit assessment.  Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  | | 1 | Waves light and sound | | Describe sound as vibrations which travel as longitudinal waves. Explain how particles move in a longitudinal wave  Explain why sound does not travel through a vacuum.  Define frequency, amplitude and wavelength. Describe how changing frequency and amplitude effect sounds.  Suggest a relationship between frequency and wavelength  Identify which state of matter sound travels fastest through  Label the parts of the ear and explain how we hear sounds  Identify causes of hearing loss and compare the hearing range of different animals.  Give the hearing range of humans.  Explain that sound is reflected, transmitted or absorbed by different media  Define an echo and explain how echoes can be used  To name the different types of radiation in the EM spectrum, give the dangers and uses of the different types of radiation  Calculate wave speed  Define transparent, translucent and opaque, explain these in terms of transmission and absorption  Draw ray diagrams, define the ‘normal line’  Describe the relationship between the angle of incidence and the angle of reflection  Describe the relationship between the angle of incidence and the angle of refraction for more and less dense mediums. Explain why light bends  Describe the refraction of light through a prism  Explain how objects appear different colours  Explain how images are formed from a pinhole camera  Explain how lenses work, investigate how lens thickness affects focal length  Suggest how the lens in our eyes change for near and far objects  Label the parts of an eye and explain how the eye forms images | | frequencies of sound waves, measured in hertz (Hz); echoes, reflection and absorption of sound  sound needs a medium to travel, the speed of sound in air, in water, in solids  sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal  auditory range of humans and animals.  the similarities and differences between light waves and waves in matter  light waves travelling through a vacuum; speed of light  the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface Science  use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye  light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras  colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection. | Frequency  Amplitude  Longitudinal  Transverse  Reflection  Refraction  Wavelength  Prism  Vacuum  Pitch  Transmit  Absorb  Electromagnetic  Lens  Convex  Concave | | From KS2:  identify how sounds are made, associating some of them with something vibrating  recognise that vibrations from sounds travel through a medium to the ear  find patterns between the pitch of a sound and features of the object that produced it  find patterns between the volume of a sound and the strength of the vibrations that produced it  recognise that sounds get fainter as the distance from the sound source increases. | | Content knowledge is assessed in the end of unit assessment.  Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  | | 1 | Earths atmosphere | | Draw the carbon cycle. Give equations for photosynthesis and respiration.  Explain the processes of photosynthesis, respiration, and combustion  Describe how human activities affect the carbon cycle.  Explain why the concentration of carbon dioxide in the atmosphere is rising, and why this is an issue.  Describe the composition of gases in the Earth’s atmosphere.  Name the greenhouse gases. Define global warming and climate change.  Describe how global warming can impact on climate and local weather patterns.  Explain how human activity may impact the levels of these gases.  Describe how human activities have contributed to global warming and the impact on the Earth.  Describe how plankton can be used to reduce carbon emissions.  Explain the role of iron fertilisation on reducing carbon emissions. | | the composition of the Earth  the structure of the Earth  the carbon cycle  the composition of the atmosphere  the production of carbon dioxide by human activity and the impact on climate. | Atmosphere  Carbon dioxide  Photosynthesis  Respiration  Combustion  Decomposition  Climate  Greenhouse gas  Global warming | | The air is made up of gases  Some human activities have a negative impact on the earth | | Content knowledge is assessed in the end of unit assessment.  Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
| **Year 8** | | 2 | Respiration | | Describe the role of each part of the respiratory system including adaptations.  Process of breathing to take in oxygen and remove carbon dioxide, this involves muscle action in the ribs and diaphragm.  Explain how changes in volume and pressure inside the chest move gases in and out of the lungs.  Explain observations about changes to breathing rate and volume  In gas exchange, oxygen and carbon dioxide move between alveoli and the blood. The amount of oxygen required by body cells determines the rate of breathing.  Predict how a change in the gas exchange system could affect other processes in the body.  Respiration is a series of chemical reactions, in cells, that breaks down glucose to provide energy and form new molecules. Use word equations to describe aerobic respiration.  Compare aerobic respiration and its distinction from breathing.  The effect of exercise intensity on heart rate.  Respiration is a series of chemical reactions, in cells, that breaks down glucose to provide energy and form new molecules. Most living things use aerobic respiration but switch to anaerobic respiration, which provides less energy, when oxygen is unavailable.  Yeast fermentation is used in brewing and breadmaking.  Suggest how organisms living in different conditions use respiration to get their energy. | | Aerobic and anaerobic respiration in living organisms, including the breakdown of  organic molecules to enable all the other chemical processes necessary for life  A word summary for aerobic respiration  The process of anaerobic respiration in humans and micro-organisms, including  fermentation, and a word summary for anaerobic respiration  The differences between aerobic and anaerobic respiration in terms of the reactants,  the products formed and the implications for the organism | Respiration  Aerobic  Anaerobic  Organism  Breathing  Lungs  Diaphragm  Volume  Exchange  Cells  Oxygen  Carbon dioxide  Glucose  Fermentation | | Breathing is necessary for life and involves the lungs.  When we breathe in we take in air into our lungs, when we breathe out we expel air from our lungs.  Respiration is a process that takes place in cells in our body.  We breathe in oxygen and breathe out carbon dioxide. | | Content knowledge is assessed in the end of unit assessment.  Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  | | 2 | Atoms, elements, and compounds | | Draw and explain the structure of the atom. Recall the charges and masses of protons, neutrons and electrons.  Use the periodic table to find the numbers of protons, neutrons, and electrons in an atom  Draw and write the electronic structure for atoms. Identify patterns in the periodic table  Describe the difference between atoms, elements and compounds. Describe the properties of elements and how they compare to compounds containing the element.  Describe how you can tell if a chemical reaction is happening. Construct word equations for chemical reactions.  Name chemical compounds based on the elements in the compound  Use chemical formula to write symbol equations.  Balance symbol equations  Describe the law of the conservation of mass. | | a simple (Dalton) atomic model  differences between atoms, elements and compounds  chemical symbols and formulae for elements and compounds  conservation of mass changes of state and chemical reactions  chemical reactions as the rearrangement of atoms  representing chemical reactions using formulae and using equations | Atom  Element  Compound  Proton  Neutron  Electron  Nucleus  Conservation  Period  Group | | Substances are made of particles.  Knowledge of some compounds and formula e.g. water and carbon dioxide | | Content knowledge is assessed in the end of unit assessment.  Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  | | 2 | Energy | | Describe energy and list energy stores  Explain energy transfers and categorise these as useful and wasted  Calculate useful and wasted energy from input and output data  Explain how energy is dissipated and why processes cannot go on forever.  Explain the advantages and disadvantages of different energy resources and how they work, including power stations and renewable sources.  We pay for our domestic electricity usage based on the amount of energy transferred.  Calculate the cost of home energy usage, using the formula: cost = power (kW ) x time (hours) x price (per kWh).  Compare the energy usage and cost of running different home devices.  Food labels list the energy content of food in kilojoules (kJ).  Compare the amounts of energy transferred by different foods and activities. | | Comparing energy values of different foods (from labels) (kJ)  Comparing power ratings of appliances in watts (W, kW)  Comparing amounts of energy transferred (J, kJ, kW hour)  Domestic fuel bills, fuel use and costs  Fuels and energy resources. | Renewable  Fossil fuel  Dissipate  Kinetic  Thermal  Gravitational  Nuclear  Chemical  Electromagnetic  Elastic  Joules | | Devices in the home use electricity to work.  Ideas of energy relating to heating and cooling, thermal energy transfers. | | Content knowledge is assessed in the end of unit assessment.  Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
| **Year 8** | | 3 | Digestion | | To describe what makes up our food and to explain what is needed for a healthy diet. Discuss how an unbalanced diet can lead to health problems  The body needs a balanced diet with carbohydrates, lipids, proteins, vitamins, minerals, dietary fibre and water, for its cells.  Describe possible health effects of unbalanced diets from data provided  Calculate food requirements for a healthy diet, using information provided.  To test a variety of foods for starch, protein, sugars and lipids  To describe the tests you carried out and how you know if there is a reaction  To describe the tests for lipids, starch, glucose and protein  To compare foods based on their nutritional content  To describe how food moves through our digestive system and describe the processes our food undergoes  Organs of the digestive system are adapted to break large food molecules into small ones which can travel in the blood to cells and are used for life processes.  Describe how organs and tissues involved in digestion are adapted for their role.  Describe the events that take place in order to turn a meal into simple food molecules inside a cell.  To describe what enzymes are and state the names of the 3 main groups of enzymes. Explain how enzymes digest our food and investigate the effect of temperature on enzymes. To apply knowledge to suggest how pH affects enzymes | | content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins,  minerals, dietary fibre and water, and why each is needed  calculations of energy requirements in a healthy daily diet  the consequences of imbalances in the diet, including obesity, starvation and  deficiency diseases  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)  the importance of bacteria in the human digestive system | Carbohydrate  Lipid  Protein  Vitamin  Mineral  Fibre  Cells  Small intestine  Large intestine  Stomach  Oesophagus  Pancreas  Enzyme  Amylase  Protease  Temperature  Obesity  Deficiency | | Pupils should be introduced to the main body parts associated with the digestive system, for example, mouth, tongue, teeth, oesophagus, stomach and small and large intestine and explore questions that help them to understand their special functions. | | Content knowledge is assessed in the end of unit assessment.  Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  | | 3 | Periodic table | | Use the periodic table to work out atomic structure, draw the electronic structure of atoms and recall the masses and charges of protons, neutrons and electrons  Describe the physical and chemical properties of metals and non-metals  Describe how the modern periodic table is arrange and how this compares to previous versions of the periodic table.  Explain why Mendeleev’s periodic table was readily accepted by scientists.  Describe the trends in reactivity and properties of group 1 elements  Describe the trends in reactivity and properties of group 7 elements.  Describe the properties of group 0 and explain why they are unreactive.  Describe the properties of transition metals and explain how they are different to the metals in group 1. | | the varying physical and chemical properties of different elements  the principles underpinning the Mendeleev Periodic Table  the Periodic Table: periods and groups; metals and non-metals  how patterns in reactions can be predicted with reference to the Periodic Table  the properties of metals and non-metals  the chemical properties of metal and non-metal oxides with respect to acidity. | Mendeleev  Groups  Periods  Trend  Reactivity  Electron  Proton  Neutron  Non-metal  Metal  Transition metal  Octave  Unreactive | | Knowledge of atomic structure and the periodic table from the atoms, elements, and compounds topic. | | Content knowledge is assessed in the end of unit assessment.  Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  | | 3 | Electricity | | Understand how charge can effect the behaviour of objects.  What is an electric circuit. How to safely set up and use and electric circuit. How to draw circuits.  Describe the rules for current in series circuits and parallel circuits and compare.  Describe the rules for potential difference in series circuits and parallel circuits and compare.  Understand how plugs and fuses work.  what is resistance and how can it be investigated. Use Ohms law to describe the relationship between resistance, current, and potential difference. | | electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge  potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current  differences in resistance between conducting and insulating components (quantitative).  separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects  the idea of electric field, forces acting across the space between objects not in contact. | Current  Amps  Potential difference  Voltage  Series  Parallel  Cell  Battery  Wire  Bulb  Ohms  Resistance  Fuse  Plug  Live  Neutral  Earth  Ammeter  Voltmeter | | 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 or not a lamp will light in a simple series circuit, based on whether or  not 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 or  not a lamp lights in a simple series circuit  recognise some common conductors and insulators, and associate metals with being  good conductors. | | Content knowledge is assessed in the end of unit assessment.  Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
| **Year 9** | | 1 | Earths atmosphere | | Draw the carbon cycle. Give equations for photosynthesis and respiration.  Explain the processes of photosynthesis, respiration, and combustion  Describe how human activities affect the carbon cycle.  Explain why the concentration of carbon dioxide in the atmosphere is rising, and why this is an issue.  Describe the composition of gases in the Earth’s atmosphere.  Name the greenhouse gases. Define global warming and climate change.  Describe how global warming can impact on climate and local weather patterns.  Explain how human activity may impact the levels of these gases.  Describe how human activities have contributed to global warming and the impact on the Earth.  Describe how plankton can be used to reduce carbon emissions.  Explain the role of iron fertilisation on reducing carbon emissions. | | the composition of the Earth  the structure of the Earth  the carbon cycle  the composition of the atmosphere  the production of carbon dioxide by human activity and the impact on climate. | Atmosphere  Carbon dioxide  Photosynthesis  Respiration  Combustion  Decomposition  Climate  Greenhouse gas  Global warming | | The air is made up of gases  Some human activities have a negative impact on the earth | | Content knowledge is assessed in the end of unit assessment.  Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  | |  | Respiration | | Describe the role of each part of the respiratory system including adaptations.  Process of breathing to take in oxygen and remove carbon dioxide, this involves muscle action in the ribs and diaphragm.  Explain how changes in volume and pressure inside the chest move gases in and out of the lungs.  Explain observations about changes to breathing rate and volume  In gas exchange, oxygen and carbon dioxide move between alveoli and the blood. The amount of oxygen required by body cells determines the rate of breathing.  Predict how a change in the gas exchange system could affect other processes in the body.  Respiration is a series of chemical reactions, in cells, that breaks down glucose to provide energy and form new molecules. Use word equations to describe aerobic respiration.  Compare aerobic respiration and its distinction from breathing.  The effect of exercise intensity on heart rate.  Respiration is a series of chemical reactions, in cells, that breaks down glucose to provide energy and form new molecules. Most living things use aerobic respiration but switch to anaerobic respiration, which provides less energy, when oxygen is unavailable.  Yeast fermentation is used in brewing and breadmaking.  Suggest how organisms living in different conditions use respiration to get their energy. | | Aerobic and anaerobic respiration in living organisms, including the breakdown of  organic molecules to enable all the other chemical processes necessary for life  A word summary for aerobic respiration  The process of anaerobic respiration in humans and micro-organisms, including  fermentation, and a word summary for anaerobic respiration  The differences between aerobic and anaerobic respiration in terms of the reactants,  the products formed and the implications for the organism | Respiration  Aerobic  Anaerobic  Organism  Breathing  Lungs  Diaphragm  Volume  Exchange  Cells  Oxygen  Carbon dioxide  Glucose  Fermentation | | Breathing is necessary for life and involves the lungs.  When we breathe in we take in air into our lungs, when we breathe out we expel air from our lungs.  Respiration is a process that takes place in cells in our body.  We breathe in oxygen and breathe out carbon dioxide. | | Content knowledge is assessed in the end of unit assessment.  Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  | |  | Periodic table | | Use the periodic table to work out atomic structure, draw the electronic structure of atoms and recall the masses and charges of protons, neutrons and electrons  Describe the physical and chemical properties of metals and non-metals  Describe how the modern periodic table is arrange and how this compares to previous versions of the periodic table.  Explain why Mendeleev’s periodic table was readily accepted by scientists.  Describe the trends in reactivity and properties of group 1 elements  Describe the trends in reactivity and properties of group 7 elements.  Describe the properties of group 0 and explain why they are unreactive.  Describe the properties of transition metals and explain how they are different to the metals in group 1. | | the varying physical and chemical properties of different elements  the principles underpinning the Mendeleev Periodic Table  the Periodic Table: periods and groups; metals and non-metals  how patterns in reactions can be predicted with reference to the Periodic Table  the properties of metals and non-metals  the chemical properties of metal and non-metal oxides with respect to acidity. | Mendeleev  Groups  Periods  Trend  Reactivity  Electron  Proton  Neutron  Non-metal  Metal  Transition metal  Octave  Unreactive | | Knowledge of atomic structure and the periodic table from the atoms, elements, and compounds topic. | | Content knowledge is assessed in the end of unit assessment.  Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  | |  | Electricity | | Understand how charge can effect the behaviour of objects.  What is an electric circuit. How to safely set up and use and electric circuit. How to draw circuits.  Describe the rules for current in series circuits and parallel circuits and compare.  Describe the rules for potential difference in series circuits and parallel circuits and compare.  Understand how plugs and fuses work.  what is resistance and how can it be investigated. Use Ohms law to describe the relationship between resistance, current, and potential difference. | | electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge  potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current  differences in resistance between conducting and insulating components (quantitative).  separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects  the idea of electric field, forces acting across the space between objects not in contact. | Current  Amps  Potential difference  Voltage  Series  Parallel  Cell  Battery  Wire  Bulb  Ohms  Resistance  Fuse  Plug  Live  Neutral  Earth  Ammeter  Voltmeter | | 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 or not a lamp will light in a simple series circuit, based on whether or  not 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 or  not a lamp lights in a simple series circuit  recognise some common conductors and insulators, and associate metals with being  good conductors. | | Content knowledge is assessed in the end of unit assessment.  Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  | | 2 | Inheritance | | heredity as the process by which genetic information is transmitted from one generation to the next  a simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model  the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material  the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection  changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction | | heredity as the process by which genetic information is transmitted from one generation to the next  a simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model  differences between species  the variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation  the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection  changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction  the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material. | DNA  Gene  Chromosome  Inheritance  Sperm  Egg  Hereditary  Natural selection  Darwin  Species  Extinction  Evolution  Variation  Continuous  Discontinuous  Gene bank  Reproduction  Genotype | | 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 their environment in different ways and that adaptation may lead to evolution | | Content knowledge is assessed in the end of unit assessment.  Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  | |  | Magnets and electromagnets | | Some materials are magnetic whilst others are not, magnets cause a force of attraction or repulsion.  The stronger the magnet, and the smaller the distance from it, the greater the force a magnetic object in the field experiences.  Two ‘like’ magnetic poles repel and two ‘unlike’ magnetic poles attract.  Predict how an object made of a magnetic material will behave if placed in or rolled through a magnetic field.  Magnetic materials, electromagnets and the Earth create magnetic fields which can be described by drawing field lines to show the strength and direction.  Field lines flow from the north-seeking pole to the south-seeking pole.  Predict the pattern of field lines and the force around two magnets placed near each other.  Use the idea of field lines to show how the direction or strength of the field around a magnet varies.  You can make an electromagnet by wrapping a wire around an iron bar.  An electromagnet uses the principle that a current through a wire causes a magnetic field. Its strength depends on the current, the core and the number of coils in the solenoid.  The magnetic field of an electromagnet decreases in strength with distance.  Use a diagram to explain how an electromagnet can be made and how to change its strength.  You can make an electromagnet by wrapping a wire around an iron bar.  An electromagnet uses the principle that a current through a wire causes a magnetic field. Its strength depends on the current, the core and the number of coils in the solenoid.  The magnetic field of an electromagnet decreases in strength with distance.  Use a diagram to explain how an electromagnet can be made and how to change its strength.  Explain the choice of electromagnets or permanent magnets for a device in terms of their properties.  Suggest how bells, circuit breakers and loudspeakers work from diagrams | | magnetic poles, attraction and repulsion  magnetic fields by plotting with compass, representation by field lines  Earth’s magnetism, compass and navigation  the magnetic effect of a current, electromagnets, D.C. motors (principles only) | Magnet  Electromagnet  Pole  Magnetic field  Compass  Current  Attraction  Repulsion | | notice that some forces need contact between two objects, but magnetic forces can act at a distance  observe how magnets attract or repel each other and attract some materials and not others  compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials  describe magnets as having two poles  predict whether two magnets will attract or repel each other, depending on which poles are facing | | Content knowledge is assessed in the end of unit assessment.  Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  | |  | Atoms, elements, and compounds | | Draw and explain the structure of the atom. Recall the charges and masses of protons, neutrons and electrons.  Use the periodic table to find the numbers of protons, neutrons, and electrons in an atom  Draw and write the electronic structure for atoms. Identify patterns in the periodic table  Describe the difference between atoms, elements and compounds. Describe the properties of elements and how they compare to compounds containing the element.  Describe how you can tell if a chemical reaction is happening. Construct word equations for chemical reactions.  Name chemical compounds based on the elements in the compound  Use chemical formula to write symbol equations.  Balance symbol equations  Describe the law of the conservation of mass. | | a simple (Dalton) atomic model  differences between atoms, elements and compounds  chemical symbols and formulae for elements and compounds  conservation of mass changes of state and chemical reactions  chemical reactions as the rearrangement of atoms  representing chemical reactions using formulae and using equations | Atom  Element  Compound  Proton  Neutron  Electron  Nucleus  Conservation  Period  Group | | Substances are made of particles.  Knowledge of some compounds and formula e.g. water and carbon dioxide | | Content knowledge is assessed in the end of unit assessment.  Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
|  | |  | Microbes | | Different types of microbes and diseases that can be transmitted by microbes.  How disease can be treated and prevented, how the body defends against microbes and disease.  Describe how Vaccines work and how antibiotic resistance arises.  Health related diseases, including the consequences of vitamin C deficiency.  Describe how microbes e.g yeast can be useful in everyday life. | | the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases | Yeast  Fungi  Bacteria  Vitamin  Deficiency  Microbe  Vaccine  While blood cell  Antibody  Antigen  Immune system  Immune  Disease | | recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function | | Content knowledge is assessed in the end of unit assessment.  Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson. |
| **Year 10** | | 1 | Organisation | | Principles of organisation in living organisms  The human digestive system (including structure, importance of enzymes, food tests and factors affecting enzymes)  The Heart and blood vessels (structure and function)  Use of dissection equipment to dissect a heart  Blood (structure and function)  Coronary heart disease (what it is and how it can be treated)  Other non-communicable health issues and their effects of lifestyle  Cancer (types and treatment)  Plant tissues, organs and systems (including leaf structure, xylem and phloem tissue, roots and the transport of water and sugars around the plant) | | Cell Biology (Point 3,4 & 6)  Transport systems (Points 1&2)  Health, disease and development of medicines (point 3 & 8) | Haemoglobin  Phagocytosis  Gas exchange  Diaphragm  Trachea  Stent  Xylem  Phloem  Transpiration | | KS3 recall of organs and organ systems from digestion, muscles and cells.  Understanding of the organisation of organisms  KS3 recall of non-communicable diseases from microbes topic | | Content knowledge is assessed in the end of unit assessment.  Live marking throughout lessons with retrieval questions built into every lesson  6 mark question available per topic (minimum of one completed per half term) |
|  | |  | Atomic Structure & PT | | Atoms, elements and compounds  Mixtures  Development of the model of the atom  Relative electrical charges of subatomic particles  Size and mass of atoms  Relative atomic mass  Electronic structure  The Periodic table and its development  Metals, Non-metals, Group 0,1&7  Properties of transition metals (Separate chemistry) | | Atomic structure and the Periodic table (point 1,2,3,4,5,6 & 7) | Mendeleev  Alkali Metals  Noble Gases | | KS3 recall of periodic table formation, structure of atoms from atoms, elements and compounds topic  Knowledge of parts of an atom | | Content knowledge is assessed in the end of unit assessment.  Live marking throughout lessons with retrieval questions built into every lesson  6 mark question available per topic (minimum of one completed per half term) |
|  | |  | Bonding | | Chemical bonds  Ionic bonding and compounds  Covalent bonding  Metallic bonding  The three states of matter and state symbols  Properties of ionic compounds  Properties of small molecules and Polymers  Giant covalent molecules  Properties of metals and alloys – including conduction  Structures and bonding of carbon (diamond, graphite, graphene and fullerenes)  Sizes of particles and their properties (Separate chemistry)  Uses of nanoparticles (Separate chemistry) | | Structure, bonding and the properties of matter (point 1,2,3,4 & 5) | Ionic  Covalent  Metallic  Polymer  Sublimation  Deposition  Graphene  Fullerenes | | KS3 recall of atomic structure  Understanding of electrons and structure of the periodic table  KS3 recall of the states of matter | | Content knowledge is assessed in the end of unit assessment.  Live marking throughout lessons with retrieval questions built into every lesson  6 mark question available per topic (minimum of one completed per half term) |
| **Year 10** | | 2 | Electricity | | Circuit symbol diagrams  Electrical charge and current  Current, resistance and potential difference  Resistors  Series and parallel circuits  Direct and alternating potential difference  Mains electricity  Power  Energy transfers in appliances  National grid | | Electricity (point 1,2,3,4,5 & 6)  Energy (point 2)  Magnetism and electromagnetism (point 3) | Series  Parallel  Resistor  Variable Resistor  Thermistor  Ohmic resistor  Transformer | | KS3 recall of electricity topic  Knowledge of circuit symbols, basic series and parallel circuits  Understanding of voltage and current | | Content knowledge is assessed in the end of unit assessment.  Live marking throughout lessons with retrieval questions built into every lesson  6 mark question available per topic (minimum of one completed per half term) |
|  | |  | Atomic Structure | | The structure of an atom  Mass number, atomic number and isotopes  The development of the model of the atom  Radioactive decay and nuclear radiation  Nuclear equations  Half-lives and the random nature of radioactive decay  Radioactive contamination  Nuclear fission (Separate physics)  Nuclear fusion (Separate physics)  Background radiation (Separate physics)  Different half-lives of radioactive isotopes (Separate physics)  Uses of nuclear radiation (Separate physics) | | Atomic structure (point 1,2,3,4,5,6 & 7) | Gamma  Beta  Alpha  Neutron  Proton  Electron  Electromagnetic Wave  Fission (Triple)  Fusion (Triple)  Half Life  Decay | | KS3 recall of atomic structure.  KS4 recall of parts of an atom (neutrons, protons and electrons) | | Content knowledge is assessed in the end of unit assessment.  Live marking throughout lessons with retrieval questions built into every lesson  6 mark question available per topic (minimum of one completed per half term) |
|  | |  | Infection & Response | | Communicable diseases  Viral diseases  Bacterial diseases  Fungal diseases  Protist diseases  Human defence systems  Vaccination  Antibiotics and painkillers  Discovery and development of drugs  Producing monoclonal antibodies (Separate biology)  Uses of monoclonal antibodies (Separate biology)  Detection and identification of plant diseases (Separate biology)  Plant defence responses (Separate biology) | | Health, diseases and the development of medicines (points 1,2,4,5,6 & 7) | Protist  Salmonella  Gonorrhoea  Malaria  Vector  Vaccination  Monoclonal  Antibodies  Antigens  Antibiotics | | KS3 recall from microbes topic and cells  Understanding of difference between animal cell and bacterial cell  Knowing the difference between bacteria, virus and fungus  KS4 recall from Organisation to understand the difference between communicable and non-communicable disease  Recall structure of blood and specifically function of WBC | | Content knowledge is assessed in the end of unit assessment.  Live marking throughout lessons with retrieval questions built into every lesson  6 mark question available per topic (minimum of one completed per half term) |
|  | |  | Quantitative | | Conservation of mass and balanced chemical equations  Relative formula mass  Mass changes when a reactant or product is a gas  Chemical measurements  Moles  Amounts of substances in equations  Using moles to balance equations  Limiting reactants  Concentration of solutions  Percentage yield (Separate chemistry)  Atom economy (Separate chemistry)  Using concentration of solutions in mol/dm3 (Separate chemistry)  Uses of amount of substances in relation to volumes of gases (Separate chemistry) | | Chemical analysis (point 3 & 4)  Chemical changes (point 1 & 2) | Moles  Reactants  Products  Atomic number  Concentration | | KS3 recall of atomic structure and specifically atomic mass  KS4 recall of periodic table and difference between atomic mass and atomic number | | Content knowledge is assessed in the end of unit assessment.  Live marking throughout lessons with retrieval questions built into every lesson  6 mark question available per topic (minimum of one completed per half term) |
|  | |  | Bioenergetics | | Photosynthetic reaction  Rate of photosynthesis  Uses of glucose from photosynthesis  Aerobic and anaerobic respiration  Response to exercise  Metabolism | | Cell biology (point 1 & 5)  Photosynthesis (point 1,2 & 3) | Photosynthesis  Respiration  Aerobic  Anaerobic  Metabolism | | KS3 recall of respiration  Knowledge of what animals need to for respiration. Also what products are made  Ability to link this to photosynthesis  Recall of plant and animal cell structure | | Content knowledge is assessed in the end of unit assessment.  Live marking throughout lessons with retrieval questions built into every lesson  6 mark question available per topic (minimum of one completed per half term) |
| **Year 10** | 3 | | | Chemical changes | Metal oxides  The reactivity series  Extraction of metals and reduction  Oxidation and reduction in terms of electrons  Reactions of acids with metals  Neutralisation of acids and salt production  Soluble salts  The pH scale and neutralisation  Strong and weak acids  The process of electrolysis  Electrolysis of molten ionic compounds  Using electrolysis to extract metals  Electrolysis of aqueous solutions  Representation of reactions at electrodes as half equations  Transitions (Separate chemistry) | Chemical changes (point 1,2,3,4,5,6 & 7) | | | Exothermic  Endothermic  Neutralisation  Electrolysis  Anode  Cathode | | KS3 recall of chemical reactions  Knowledge that there are reactants and products  Recall of difference between acid and alkali | Content knowledge is assessed in the end of unit assessment.  Live marking throughout lessons with retrieval questions built into every lesson  6 mark question available per topic (minimum of one completed per half term) |
|  |  | | | Particle model of matter | Density of materials  Changes of state  Internal energy  Temperature changes in a system and specific heat capacity  Changes of state and specific latent heat  Particle motion in gases  Pressure in gases (Separate physics)  Increasing the pressure of a gas (Separate physics) | Structure, bonding and the properties of matter (point 1) | | | Capacity  Vaporisation  Condensation  Pressure (triple) | | KS3 recall of states of matter  Difference between solid, liquid and gas  Understanding of different particle arrangements  Ability to link to KS4 energy topic | Content knowledge is assessed in the end of unit assessment.  Live marking throughout lessons with retrieval questions built into every lesson  6 mark question available per topic (minimum of one completed per half term) |
|  |  | | | Energy changes | Energy transfer during exothermic and endothermic reactions  Reaction profiles  The energy change of reactions  Cells and batteries (Separate chemistry)  Fuel cells (Separate chemistry) | Energy changes in chemistry (point 1 &2) | | | Exothermic  Endothermic  Activation energy | | KS3 recall to energy topic. An understanding of thermal energy and kinetic energy  Recall states of matter and how they change | Content knowledge is assessed in the end of unit assessment.  Live marking throughout lessons with retrieval questions built into every lesson  6 mark question available per topic (minimum of one completed per half term) |
| **Year 11** | 1 | | | Homeostasis | Homeostasis  The human nervous system  The humane endocrine system  Control of blood glucose concentration  Hormones in human reproduction  Contraception  The use of hormones to treat fertility  Feedback systems  The brain (Separate biology)  The eye (Separate biology)  Control of body temperature (Separate biology)  Maintaining water and nitrogen balance in the body (Separate biology)  Plant hormone control and coordination (Separate biology)  Use of plant hormones (Separate biology) | Transport systems (point 1)  Coordination and control (point 1,2,3,4,5 & 6) | | |  | | KS3 recall of cells, reproduction and digestive system  Recall of specialised cells (nerve, sperm and egg)  Recognition of the reproductive organs and the process of reproduction  PSHE recall of contraception | Content knowledge is assessed in the end of unit assessment.  Live marking throughout lessons with retrieval questions built into every lesson  6 mark question available per topic (minimum of one completed per half term) |
|  |  | | | Rates of reaction | Calculating rates of reactions  Factors which affect the rates of chemical reactions  Collision theory and activation energy  Catalysts  Reversible reactions  Energy changes and reversible reactions  Equilibrium  The effect of changing conditions on equilibrium  The effect of changing concentration  The effect of temperature changes on equilibrium  The effect of pressure changes on equilibrium | Structure, bonding and the properties of matter (point 1)  Rate and extent of chemical change (point 1 & 2) | | |  | | KS3 recall of reactions, acids and alkalis  KS4 recall of chemical changes, formulas and particle model  Recall of kinetic energy in particles and what are products and reactants | Content knowledge is assessed in the end of unit assessment.  Live marking throughout lessons with retrieval questions built into every lesson  6 mark question available per topic (minimum of one completed per half term) |
|  |  | | | Electromagnets | Poles of a magnet  Magnetic fields  Electromagnetism  Flemings left hand rule  Electric motors  Loudspeakers (Separate physics)  Induced potential (Separate physics)  Uses of the generator effect (Separate physics)  Microphones (Separate physics)  Transformer (Separate physics) | Magnetism and electromagnetism (point 1 & 2) | | |  | | KS3 recall of magnets and magnetism.  Recall of magnetic poles, forces of attraction and their applications | Content knowledge is assessed in the end of unit assessment.  Live marking throughout lessons with retrieval questions built into every lesson  6 mark question available per topic (minimum of one completed per half term) |
|  |  | | | Waves | Transverse and longitudinal waves  Properties of waves  Types of electromagnetic waves  Properties of electromagnetic waves  Uses and application of electromagnetic waves  Lenses (Separate physics)  Visible light (Separate physics)  Emission and absorption of infrared radiation (Separate physics)  Perfect black bodies and radiation (Separate physics)  Reflection of waves (Separate physics)  Sound waves (Separate physics)  Waves for detection and exploration (Separate physics) | Wave motion (point 1,2,3,4,5 & 6) | | |  | | KS3 recall of waves and their different types  Knowledge of light and how it reflects and refracts  Different uses of waves | Content knowledge is assessed in the end of unit assessment.  Live marking throughout lessons with retrieval questions built into every lesson  6 mark question available per topic (minimum of one completed per half term) |
| **Year 11** | 2 | | | Inheritance | Sexual and Asexual reproduction  Meiosis  DNA and the genome  Genetic inheritance  Inherited disorders  Sex determination  Variation  Evolution  Selective breeding  Genetic engineering  Evidence for evolution  Fossils  Extinction  Resistant bacteria  Classification of living organisms  Advantages and disadvantages of sexual and asexual reproduction (Separate biology)  DNA structure (Separate biology)  Cloning (Separate biology)  Theory of evolution (Separate biology)  Speciation (Separate biology)  The understanding of genetics (Separate biology) | Evolution, inheritance and variation (point 1,2,3,4,5,6,7,8,9,10, 11 & 12) | | |  | | KS3 recall of inheritance and reproduction  Knowledge of genes and how they get inherited  Understanding of some genetic diseases  Recall of Darwin and the theory of evolution | Content knowledge is assessed in the end of unit assessment.  Live marking throughout lessons with retrieval questions built into every lesson  6 mark question available per topic (minimum of one completed per half term) |
|  |  | | | Organic Chemistry | Crude oil, hydrocarbons and alkanes  Fractional distillation and petrochemicals  Properties of hydrocarbons  Cracking and alkenes  Structure and formulae of alkenes (Separate chemistry)  Reactions of alkenes (Separate chemistry)  Alcohols (Separate chemistry)  Carboxylic acids (Separate chemistry)  Addition polymerisation (Separate chemistry)  Condensation polymerisation (Separate chemistry)  Amino acids (Separate chemistry)  DNA and other naturally occurring polymers (Separate chemistry) | Chemical and allied industries (point 3 & 4)  Earth and atmospheric science (point 4) | | |  | | No clear KS3 recall.  KS4 recall from atoms topic  Understanding of chemical formulas and methods of separation | Content knowledge is assessed in the end of unit assessment.  Live marking throughout lessons with retrieval questions built into every lesson  6 mark question available per topic (minimum of one completed per half term) |
|  |  | | | Forces | Scalar and vector quantities  Contact and non-contact forces  Gravity  Resultant forces  Work done and energy transfer  Forces and elasticity  Describing motion along a line  Distance and displacement  Speed  Velocity  The distance-time relationship  Acceleration  Newton’s first law  Newton’s second law  Newton’s third law  Stopping distance  Reaction time  Factors affecting braking distance  Momentum is a property of moving objects  Conservation of momentum  Changes in momentum (Separate physics)  Moments, levers and gears (Separate physics)  Pressure in a fluid (Separate physics)  Atmospheric pressure (Separate physics) | Forces (point 1,2,3 &4)  Forces and motion (point 1,2,3,4 & 5) | | |  | | KS3 recall of forces  Knowledge of some simple forces and the ways they interact  Understanding of speed, distance and time | Content knowledge is assessed in the end of unit assessment.  Live marking throughout lessons with retrieval questions built into every lesson  6 mark question available per topic (minimum of one completed per half term) |
|  |  | | | Using resources | Using the Earth’s resources and sustainable development  Potable water  Waste water treatment  Alternative methods of extracting metals  Life cycle assessments  Ways of reducing the use of resources  Corrosion and its prevention (Separate chemistry)  Alloys as useful materials (Separate chemistry)  Ceramics, polymers and composites (Separate chemistry)  The haber process (Separate chemistry)  Production and uses of NPK fertilisers (Separate chemistry) | Chemical and allied industries (point 1,2,3 & 5)  Earth and atmospheric science (point 5) | | |  | | KS3 recall is linked to Earth’s atmosphere topic and geology.  Recall of earth’s structure and knowledge of the water cycle  KS4 recall of particle model of matter and, organic chemistry and chemical formulas to help with understanding of different materials | Content knowledge is assessed in the end of unit assessment.  Live marking throughout lessons with retrieval questions built into every lesson  6 mark question available per topic (minimum of one completed per half term) |
|  |  | | | Chemical analysis | Pure substances  Formulations  Chromatography  Test for hydrogen  Test for oxygen  Test of chlorine  Test for carbon dioxide  Flame tests (Separate chemistry)  Metal hydroxides (Separate chemistry)  Carbonates (Separate chemistry)  Halides (Separate chemistry)  Sulfates (Separate chemistry)  Instrumental methods (Separate chemistry)  Flame emission spectroscopy (Separate chemistry) | Chemical analysis (point 1,2,3 & 4) | | |  | | KS3 recall from atoms, elements and compounds and also the periodic table.  Ability to recall different elements and know which ones are the common gases  KS4 recall of the periodic table and knowledge of difference between gas and solid. Understanding of chemical reactions and how elements react when exposed to heat | Content knowledge is assessed in the end of unit assessment.  Live marking throughout lessons with retrieval questions built into every lesson  6 mark question available per topic (minimum of one completed per half term) |
| **Year 11** | 3 | | | Ecology | Communities  Abiotic factors  Biotic factors  Adaptations  Levels of organisation  How materials are cycled  Biodiversity  Waste management  Land use  Deforestation  Global warming  Maintaining biodiversity  Decomposition (Separate biology)  Impact of environmental change (Separate biology)  Trophic levels (Separate biology)  Pyramids of biomass (Separate biology)  Transfer of biomass (Separate biology)  Food production factors affecting food security (Separate biology)  Farming techniques (Separate biology)  Sustainable fisheries (Separate biology)  Role of biotechnology (Separate biology) | Ecosystems (point 1,2,3,4,5,6,7 & 8) | | |  | | KS3 recall of independence topic and earths atmosphere.  Build on previous learning of simple food chains and understanding of the difference between predator and prey  Link to KS4 earths atmosphere topic to understand the importance of forests with regards to global warming | Content knowledge is assessed in the end of unit assessment.  Live marking throughout lessons with retrieval questions built into every lesson  6 mark question available per topic (minimum of one completed per half term) |
|  |  | | | Earth’s Atmosphere | The proportion of different gases in the atmosphere  The Earth’s early atmosphere  How oxygen increased  How carbon dioxide decreased  Greenhouse gases  Human activities which contribute to an increase in greenhouse gases in the atmosphere  Global climate change  The carbon footprint and its reduction  Atmospheric pollutants from fuels  Properties and effects of atmospheric pollutants | Earth and atmospheric science (point 1,2,3 & 4) | | |  | | KS3 recall is linked to Earth’s atmosphere topic and geology.  Recall of earth’s structure  KS4 recall of ecology topic to understand climate change and develop knowledge | Content knowledge is assessed in the end of unit assessment.  Live marking throughout lessons with retrieval questions built into every lesson  6 mark question available per topic (minimum of one completed per half term) |
|  |  | | | Space (Separate Physics) | Our solar system  The life cycle of a star  Orbital motion, natural and artificial satellites  Red shift | Space Physics (point 1) | | |  | | KS3 recall of space topic  Develop understanding of the solar system and difference between stars and planets |  |
| **Year 12** | | 1 | Biology  Chemistry  Physics | |  | |  |  | |  | |  |
| **Year 12** | | 2 | Biology  Chemistry  Physics | |  | |  |  | |  | |  |
| **Year 12** | | 3 | Biology  Chemistry  Physics | |  | |  |  | |  | |  |
| **Year 13** | | 1 | Biology  Chemistry  Physics | |  | |  |  | |  | |  |
| **Year 13** | | 2 | Biology  Chemistry  Physics | |  | |  |  | |  | |  |
| **Year 13** | | 3 | Biology  Chemistry  Physics | |  | |  |  | |  | |  |