Programme of study for KS3 Year 7

Autumn (1st term)	Autumn (2nd term)	Spring (1st term)	Spring (2nd Term)	Summer (1st term)	Summer (2nd term)
Topic / Big Question: **Introduction to science** ***Chemistry:*** Particle model	Topic / Big Question: ***Biology:*** Cells, tissues and organ systems ***Physics:*** Forces and motion .	Topic / Big Question: ***Biology:*** Reproduction in animals	Topic / Big Question: ***Chemistry:*** **S**eparating mixtures **Chemistry:** Atoms, elements and molecules	Topic / Big Question: ***Biology:*** Muscles and bone ***Physics:*** Sound	Topic / Big Question: ***Chemistry:*** Acids and Alkalis ***Physics:*** Space
Skills (students should be able to do): Demonstrate knowledge and understanding of: Scientific ideas, techniques and procedures through -Remembering key facts of any area within Science. -Using appropriate terminology in answers (key words and phrases). -Explaining the relationships between scientific advances, their ethical implications and the benefits and risks associated with them. Apply knowledge and understanding of: Scientific ideas, enquiry, techniques and procedures through -Applying knowledge effectively in a wide range of contexts. -Using theories to make explanations of events.	Skills (students should be able to do): Demonstrate knowledge and understanding of: Scientific ideas, techniques and procedures through -Remembering key facts of any area within Science. -Using appropriate terminology in answers (key words and phrases). -Explaining the relationships between scientific advances, their ethical implications and the benefits and risks associated with them. Apply knowledge and understanding of: Scientific ideas, enquiry, techniques and procedures through -Applying knowledge effectively in a wide range of contexts. -Using theories to make explanations of events.	Skills (students should be able to do): Demonstrate knowledge and understanding of: Scientific ideas, techniques and procedures through -Remembering key facts of any area within Science. -Using appropriate terminology in answers (key words and phrases). -Explaining the relationships between scientific advances, their ethical implications and the benefits and risks associated with them. Apply knowledge and understanding of: Scientific ideas, enquiry, techniques and procedures through -Applying knowledge effectively in a wide range of contexts. -Using theories to make explanations of events.	Skills (students should be able to do): Demonstrate knowledge and understanding of: Scientific ideas, techniques and procedures through -Remembering key facts of any area within Science. -Using appropriate terminology in answers (key words and phrases). -Explaining the relationships between scientific advances, their ethical implications and the benefits and risks associated with them. Apply knowledge and understanding of: Scientific ideas, enquiry, techniques and procedures through -Applying knowledge effectively in a wide range of contexts. -Using theories to make explanations of events.	Skills (students should be able to do): Demonstrate knowledge and understanding of: Scientific ideas, techniques and procedures through -Remembering key facts of any area within Science. -Using appropriate terminology in answers (key words and phrases). -Explaining the relationships between scientific advances, their ethical implications and the benefits and risks associated with them. Apply knowledge and understanding of: Scientific ideas, enquiry, techniques and procedures through -Applying knowledge effectively in a wide range of contexts. -Using theories to make explanations of events.	Skills (students should be able to do): Demonstrate knowledge and understanding of: Scientific ideas, techniques and procedures through -Remembering key facts of any area within Science. -Using appropriate terminology in answers (key words and phrases). -Explaining the relationships between scientific advances, their ethical implications and the benefits and risks associated with them. Apply knowledge and understanding of: Scientific ideas, enquiry, techniques and procedures through -Applying knowledge effectively in a wide range of contexts. -Using theories to make explanations of events.

-Using data to support evidence. -Rearranging equations in calculations. -Analyse information and ideas to: Interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures through -Evaluating information from a wide range of sources systematically to develop arguments and explanations. -Drawing detailed, evidence-based conclusions**.** **-**Spotting causes of error and uncertainty in data or experimental procedures. -Identifying the unit and/or symbol of different quantities. -The correct use of punctuation, spelling of key words, capital letters, sentences and paragraphs.	-Using data to support evidence. -Rearranging equations in calculations. -Analyse information and ideas to: Interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures through -Evaluating information from a wide range of sources systematically to develop arguments and explanations. -Drawing detailed, evidence-based conclusions**.** **-**Spotting causes of error and uncertainty in data or experimental procedures. -Identifying the unit and/or symbol of different quantities. -The correct use of punctuation, spelling of key words, capital letters, sentences and paragraphs.	-Using data to support evidence. -Rearranging equations in calculations. -Analyse information and ideas to: Interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures through -Evaluating information from a wide range of sources systematically to develop arguments and explanations. -Drawing detailed, evidence-based conclusions**.** **-**Spotting causes of error and uncertainty in data or experimental procedures. -Identifying the unit and/or symbol of different quantities. -The correct use of punctuation, spelling of key words, capital letters, sentences and paragraphs.	-Using data to support evidence. -Rearranging equations in calculations. -Analyse information and ideas to: Interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures through -Evaluating information from a wide range of sources systematically to develop arguments and explanations. -Drawing detailed, evidence-based conclusions**.** **-**Spotting causes of error and uncertainty in data or experimental procedures. -Identifying the unit and/or symbol of different quantities. -The correct use of punctuation, spelling of key words, capital letters, sentences and paragraphs.	-Using data to support evidence. -Rearranging equations in calculations. -Analyse information and ideas to: Interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures through -Evaluating information from a wide range of sources systematically to develop arguments and explanations. -Drawing detailed, evidence-based conclusions**.** **-**Spotting causes of error and uncertainty in data or experimental procedures. -Identifying the unit and/or symbol of different quantities. -The correct use of punctuation, spelling of key words, capital letters, sentences and paragraphs.	-Using data to support evidence. -Rearranging equations in calculations. -Analyse information and ideas to: Interpret and evaluate; make judgements and draw conclusions; develop and improve experimental procedures through -Evaluating information from a wide range of sources systematically to develop arguments and explanations. -Drawing detailed, evidence-based conclusions**.** **-**Spotting causes of error and uncertainty in data or experimental procedures. -Identifying the unit and/or symbol of different quantities. -The correct use of punctuation, spelling of key words, capital letters, sentences and paragraphs.
Key Learning Outcomes (students should know): **Introduction to science** -Recognise some common hazard symbols Explain why hazard symbols are necessary -Describe how a Bunsen burner is used.	Key Learning Outcomes (students should know): ***Biology:*** Cells, tissues and organ systems -Recall and describe the life processes -Explain the differences between organisms and non-living things -Identify and locate important plant and animal organs	Key Learning Outcomes (students should know): ***Biology:*** Reproduction in animals -Describe how egg cells are fertilised in animal sexual reproduction -Compare fertilisation and offspring care in fish, birds and mammals -Name the parts of the male and female	Key Learning Outcomes (students should know): ***Chemistry:*** **S**eparating mixtures -Classify mixtures -Describe how insoluble solids can be separated from a liquid. -Describe how soluble substances can form solutions	Key Learning Outcomes (students should know): ***Bology:*** Muscles and bone -Describe how muscles in the gas exchange system allow ventilation -Describe what happens during gas exchange in the lungs. -Describe the role of muscles in the heart	Key Learning Outcomes (students should know): ***Chemistry:*** Acids and Alkalis -Recognise some common acids. -Name examples of indicators made from plants. -Describe how indicators can be used to test for acidic,

-Identify hazards and describe how to reduce risk. -Draw and state what a bar chart shows. -Draw and state what a line graph shows. -Identify and describe what is meant by an independent variable -Identify and describe what is meant by a dependent variable. -Identify and describe what is meant by control variables ***Chemistry:*** Particle model -Name the three states of matter and give examples of each -Describe what the three states of matter are like, based on their properties -Identify materials that are difficult to classify as solids, liquids or gases -Recognise that all matter is made up of particles -Describe, draw and recognise the arrangement of	-Describe the functions of important plant and animal organs -Describe what happens in photosynthesis -Identify and recall named tissues in human and plant organs -Describe the functions of different tissues in an organ -Describe how to prepare a microscope slide -Describe how to use a light microscope to examine a specimen -Identify the main parts of animal cells and plant cells and describe their functions. -Identify and recall the main organs in the plant water transport system -Identify and recall the main organs in the human locomotor, digestive, circulatory, breathing, urinary and nervous systems. ***Physics:*** Forces and motion -Recall the effects of forces on an object	reproductive systems, and their jobs. -Explain how sperm and egg cell are adapted to their functions. -State what happens at the menopause. -Describe how sexual intercourse can lead to the implantation of an embryo Describe how an embryo is protected and cared for in the uterus. -Explain how a pregnant woman should care for her foetus. -Recall the stages of birth and how a newborn baby is looked after. -Describe and explain what happens during adolescence Describe and explain what happens in the menstrual cycle.	-Identify the solute and solvent in a solution. Describe the effects of different variables on solubility. -Describe how solutes can be separated from a solution by evaporation. -Describe differences between evaporation and boiling. -Describe how chromatography can be used to identify substances in a mixture. -Explain how chromatography works. -Explain how distillation can be used to separate a solvent from a solution. -Give examples of where distillation is used. **Chemistry:** Atoms, elements and molecules -Recognise the difference between atoms and molecules Identify elements, mixtures and compounds from descriptions and particle diagrams. -Use chemical symbols for common elements and	-Describe the functions of the different parts of blood and where the different parts are made. -Describe the functions of different bones in the skeleton. Describe some different types of joint. -Explain how antagonistic pairs of muscles operate and are controlled, to allow movement. -Recall how different drugs affect the body. ***Physics:*** Sound -Explain what causes sounds and how to make louder sounds -Explain the link between frequency and pitch -Describe how sound moves through materials -Explain why sounds get fainter further from their source. -Describe the parts of the ear and their functions. -Describe how microphones convert	alkaline or neutral solutions. -Name some common examples of acids and alkalis. Describe the pH scale and how it is useful. Describe how pH can be measured. -Describe what happens during neutralisation. -Write word equations for neutralisation reactions. -Explain the pH changes taking place during neutralisation. -Describe some examples of everyday acids and bases. -Describe and explain some everyday neutralisation reactions. ***Physics:*** Space -Describe some ways of investigating planets. -Compare different models of the solar system. -Use the tilt of the Earth's axis to explain the changes in the seasons -Use a model to explain the pattern of light and dark at the Earth's poles.

particles in solids, liquids and gases -Use particle theory to explain the properties of the three states of matter. -Explain how Brownian motion supports particle theory -Explain how scientific theories evolve -Convert between nanometres and metres -State what is meant by diffusion and recall some of its effects -Use particle theory to explain diffusion in liquids and gases -Use particle theory to explain why diffusion is faster in some materials than others. -Say what is meant by gas pressure and recall some of its effects -Describe the cause of gas pressure using particle theory	Name forces and classify them as contact or non-contact forces -Recall how ro measure forces and masses and their units -Describe how the extension of a spring depends on the force applied. -Recall the effects of friction -Explain some ways in which friction can be changed Identify situations in which friction is helpful or not helpful -Calculate pressure and recall its units Describe the effects of high and low pressure in simple situations. -Identify balanced and unbalanced forces Explain the effects of balanced and unbalanced forces. -Recall the names of different types of force -Explain the effects of balanced and unbalanced forces Explain why moving objects have a top speed.		explain why they are an international code Recall that different elements have different properties and uses -Explain that our resources of elements are limited and can run out. -Describe and identify metals and non-metals by their properties -Relate the use of an element to its properties -Describe changes you might see when compounds are formed. -Identify elements, compounds and mixtures from descriptions and particle diagrams -Name simple compounds. -Use and understand equations for chemical reactions. -Describe examples and uses of decomposition reactions.	sound into electrical signals. -Recall that different animals have different hearing ranges. -Describe some uses of ultrasound. -Explain how sonar and echolocation work. -Compare longitudinal and transverse waves. -Recall that all waves can be reflected.	-Explain how to arrange magnets so they attract or repel each other. -Describe the Earth's magnetic field and how it affects compasses. -Describe how to find the shape of a magnetic field. - Calculate weight -Recall the factors that affect the strength of gravity -Describe how gravity affects objects in space. -Describe stars, galaxies and constellations -Describe the Milky Way. -Explain what a light year is.

	-Recall ways in which energy can be stored and transferred -Recall the law of conservation of energy State the meaning of efficiency -Describe the meanings of speed and mean (average) speed. Use the formula relating speed, distance and time Represent simple journeys on a distance-time graph. -Use the formula relating speed, distance and time Draw and interpret distance-time graphs -Describe how a simple lever can multiply forces or distances Identify the load, effort and pivot on a diagram of a lever. Describe the factors that affect the size of a moment -Explain why something will balance if the moments are equal and opposite. -Describe how simple machines can magnify forces				

	- Describe the factors that affect the total work done.				
Autumn Term – centrally planned, standardised and teacher marked piece(s) of work - Assessed home learning – Particles - Linear assessment		Spring Term – centrally planned, standardised and teacher marked piece(s) of work - Assessed home learning – Forces - Linear assessment		Summer Term – centrally planned, standardised and teacher marked piece(s) of work - Assessed home learning – Reproduction - Assessed home learning task – Ecosystems - End of year Linear assessment	

Building understanding: Rationale / breakdown for your sequence of lessons:

Chemistry

During KS2 pupils have been introduced to solids, liquids and gases focussing on the differences between water (liquid) and sand (solid). They are also able to understand that gases are all around us. They are introduced to the idea that states can change between each other and are introduced to the terms evaporation and condensation. In year 7, knowledge is built on this by introducing the term 'particles'. Pupils will look at how particles are arranged differently within these 3 states of matter and how this affects their properties. Pupils will also be introduced to the terms melting, freezing, boiling and sublimation to explain how these states can interchange between each other. Elements, compounds and mixtures will be introduced which in turn will lead to methods of separating mixtures. Part of these mixtures that are introduced may be classified as acids, alkalis or neutral leading to the introduction of this topic in term 3. Students will familiarise themselves with the pH scale and how this can help in identifying a type of substance as either acid, alkali or neutral.

Biology

During KS2 pupils are introduced to the human body and that the human body is made up of cells. Pupils will have an idea that there is a part within the body that contains genetic information and are introduced to the term DNA. At KS3 we expand on this with our first topic of Cells. Students will have also been provided with summer homework focussing on the history of how cells were discovered so that they start secondary school Science with enhanced background knowledge. Pupils will be looking at different parts of animal and plant cells and explaining the function and differences of each part and specialised cells including their adaptations. This leads onto Reproduction next term which links into the specialised cells of sperm and egg cells. Following on form the topic of cells we look at how cells can be groups into tissues, tissues grouped into muscles leading into the topic of muscles and bones.

Physics

At KS3 we start with the topic of Forces as this is a fundamental part of the course, introducing pupils to contact and non-contact forces. These topics will also build on pupil's investigative skills as pupils are minimally exposed to this at KS2.

Following on from KS2 pupils should be able to describe different kinds of forces, including magnetism, gravity, upthrust and friction, and be able to classify these as contact or non-contact forces. This is revisited at the start of the unit. They should be able to identify the effect of drag forces that act between moving surfaces and describe why moving objects that are not driven tend to slow down. Student then move onto identify forces on stationary and moving

objects, and describe the effects of balanced and unbalanced forces on objects. This allows pupils to build on knowledge and start applying the speed equation in addition to reading graphs.
We conclude with Sound and Space. At KS2 pupils will be able to name a variety of sound sources and have created models for the solar system, understand that the Earth moves on its axis. We build on this looking at how the internal structure of the ear aids with hearing and investigating phases of the moon.

Home – Learning: In addition to students being given the centrally planned home learning tasks as stated above teachers to set their own home learning from the resources provided in the topic folder.	Home – Learning: In addition to students being given the centrally planned home learning tasks as stated above teachers to set their own home learning from the resources provided in the topic folder.	Home – Learning: In addition to students being given the centrally planned home learning tasks as stated above teachers to set their own home learning from the resources provided in the topic folder.	Home – Learning: In addition to students being given the centrally planned home learning tasks as stated above teachers to set their own home learning from the resources provided in the topic folder.	Home – Learning: In addition to students being given the centrally planned home learning tasks as stated above teachers to set their own home learning from the resources provided in the topic folder.	Home – Learning: In addition to students being given the centrally planned home learning tasks as stated above teachers to set their own home learning from the resources provided in the topic folder.

Reading / High Quality Text:

Students are provided with links to resources to encourage prior reading on topics. In lessons students are taught how to construct answers through use of writing frames and exemplar answers where extended writing is required and command words and keywords that are relevant to the topic are consistently assessed in lessons through questioning and exam practice. Spelling tests are conducted on key scientific terms. Example of how to use these scientific terms also taught.
Assessed tasks are included within topics where students are expected to write an extended piece of work.

Numeracy:

Physics:
Manipulation of speed equation triangle
Understanding units
Conversion of units
presenting data graphically.

Chemistry:
Atomic number and mass number of elements
Proton, electron and neutron number of elements and compounds
pH Scale

Understanding units
Conversion of units

Biology:
Total magnification calculation

Enrichment / opportunities to develop cultural capital (including careers, WRL and SMSC):

- Science club
- Trip to Science Museum
- Trip to National History Museum
- Science week outside speakers