

Programme of study for KS3 Year 7

Autumn (1 st term)	Autumn (2 nd term)	Spring (1 st term)	Spring (2 nd Term)	Summer (1 st term)	Summer (2 nd term)
Other timescale:	Other timescale:	Other timescale:	Other timescale:	Other timescale:	Other timescale:
Topic: Chemistry: Particle model and separating mixtures Biology: Cells	Topic: Physics: Forces 1 Chemistry: Acids and Alkalis	Topic: Physics: Forces 2 Biology: Reproduction and variation	Topic: Physics: Light and Sound Biology: Reproduction and variation	Topic: Chemistry: Metals and non-metals Biology: Interdependence	Topic: Chemistry: Earth Structure Chemistry: Universe

Skills(students should be able to do):

AO1:

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.

AO2:

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.

AO3:

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.

<p>Key Learning Outcomes (students should know):</p> <p>Chemistry: Particle model and separating mixtures</p> <ul style="list-style-type: none"> • Describe what the particle model of matter is • Explain the properties of different materials based on the arrangement and movement of their particles. • Describe the properties of solids, liquids and gases using the particle model • Explain the properties of solids, liquids and gases based on the arrangement and movement of their particles • Describe simply how changes of temperature or state can be described in terms of particles transferring energy • Recognise the state of a substance in relation to its melting and boiling point. -Describe one difference between boiling and evaporation • Use the particle model to explain diffusion • Draw before and after diagrams of particles to explain observations about diffusion 	<p>Key Learning Outcomes (students should know):</p> <p>Physics: Forces 1</p> <ul style="list-style-type: none"> • Describe what forces do <p>State the unit of force</p> <ul style="list-style-type: none"> • Describe what is meant by an interaction pair • Describe what happens when the resultant force on an object is not zero • Use a force diagram to describe situations involving gravity that are in equilibrium • State and use the formula for speed • Describe the link between speed and journey time • Describe how the speed of an object depends on the movement of the observer • State what a straight line or a curved line on a distance-time graph tells you about speed • Calculate speed from a distance-time graph <p>Illustrate a journey with changing speed on a distance-time graph, and label changes in motion</p> <ul style="list-style-type: none"> • State the value of gravity on Earth and on the moon • Describe the difference between mass and weight 	<p>Key Learning Outcomes (students should know):</p> <p>Physics: Forces 2</p> <ul style="list-style-type: none"> • Explain the difference between contact and non-contact forces • Describe what happens to a moving object when the resulting force acting on it is zero • Describe the factors that affect the size of the drag forces and friction, and how friction and drag can be reduced. • Describe how forces deform objects • Explain how solid surfaces provide a support force • Use Hooke's Law • Explain what 'linear relationship' means • Describe what is meant by a moment • Calculate the moment of a force • Describe how fluids exert a pressure in all directions • Calculate fluid pressure • Describe how atmospheric pressure changes with height • State how liquid pressure changes with depth 	<p>Key Learning Outcomes (students should know):</p> <p>Physics: Light and Sound</p> <ul style="list-style-type: none"> • Describe what happens when a light ray meets a different medium • State the speed of light • Draw ray diagrams • Use ray diagrams of eclipses to describe what is seen by observers in different places. • Describe how light is reflected from a mirror • Describe how images are formed in a plane mirror • Use ray diagrams to show how light reflects and forms images • Describe what happens when light enters a medium • Use a ray-diagram model to describe how light passes through lenses and transparent materials • Construct a ray diagram to show how light refracts. • Name parts of the eye • Use ray diagrams to describe how light passes through the lens in your eye • Describe how lenses may be used to correct vision 	<p>Key Learning Outcomes (students should know):</p> <p>Chemistry: Metals and non-metals</p> <ul style="list-style-type: none"> • Name three magnetic elements • Name the only metal and non-metal that are liquid at room temperature • Identify an unknown element from its physical and chemical properties • Name the substances formed when metals and non-metals react with oxygen • Classify the substances formed when metals and non-metals react with oxygen • Describe an oxidation reaction with a word equation and a particle diagram 	<p>Key Learning Outcomes (students should know):</p> <p>Chemistry: Earth Structure</p> <ul style="list-style-type: none"> • Name the three rock layers of the Earth • Compare the layers of the Earth • Describe how sedimentary rocks are formed • Explain why a sedimentary rock has a particular property based on how it was formed • Describe how igneous and metamorphic rocks are formed • Explain why igneous and metamorphic rocks have particular properties based on how they were formed • Construct a labelled diagram to explain the process of rock formation • Describe the properties of ceramics • Explain why a substance has a particular property
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<ul style="list-style-type: none"> • Explain observations about gas pressure in terms of particles • Describe what an atom is • Describe some differences between elements and compounds • Use diagrams to represent atoms and molecules of elements and compounds • State what a mixture is • State why it is possible to separate mixtures • State why filtration works to separate a particular mixture • State why evaporation works to separate a particular mixture • State why distillation works to separate a particular mixture • Choose the most suitable technique to separate a mixture of substances • Describe how chromatography separates substances • Use evidence from chromatography to identify unknown substances in mixtures <p>Biology: Cells</p> <ul style="list-style-type: none"> • Describe what a cell is 	<ul style="list-style-type: none"> • Describe how gravitational force varies with mass and distance • Use the formula to calculate your weight on different planets and • Explain changes in weight <p>Explain why objects stay in orbit</p> <p>Chemistry: Acids and Alkalis</p> <ul style="list-style-type: none"> • Describe the characteristics of chemical reactions • Explain why chemical reactions are useful • Compare chemical reactions to physical changes • Recall the hazards of acids and alkalis and how to handle them safely • Describe the differences between concentrated and dilute solutions of an acid • Compare the properties of acids and alkalis • Identify acids, alkalis and neutral solutions on the pH scale • Identify the best indicator to distinguish 	<ul style="list-style-type: none"> • Explain why some things float and some things sink, and how area affects upthrust • Calculate pressure in liquids in a range of situations • Explain how hydraulic machines work • State what is meant by stress • Explain the effect of solid surfaces on each other using ideas about stress <p>Biology: Reproduction</p> <ul style="list-style-type: none"> • Identify the changes that take place during puberty • State the difference between adolescence and puberty • Describe the main changes that take place during puberty • Name the main structures in the male and female reproductive systems, including gametes • Describe the function of the main structures in the male and female reproductive systems • Describe the structure and function of gametes • State what is meant by fertilisation 	<ul style="list-style-type: none"> • State the difference between different colours in terms of frequency • Use the ray model to describe how objects appear different colours and how light is refracted through a prism • Explain observations where coloured lights are mixed or objects are viewed in different lights. • State the speed of sound and what it can and cannot travel through • Describe how sound is produced and travels • Explain observations where sound is transmitted • Describe the link between amplitude and loudness • Explain observations where sound is reflected or absorbed by different media • Describe the amplitude of a wave from a diagram or oscilloscope picture • Use drawings of waves to describe how sound waves change with volume • Describe the link between frequency and wavelength 	<ul style="list-style-type: none"> • State what is formed when metals react with acids • Compare the reactions of different metals with dilute acids • Describe a metal-acid reaction with a word equation and a particle diagram • Name the substances formed when metals react with oxygen • Compare the reactions of different metals with oxygen • Describe the oxidation reaction with a word equation and a particle diagram • State what the reactivity series is and what it shows • Place an unfamiliar metal into the reactivity series based on information about its reactions with water • Describe an oxidation 	<p>based on how it was formed</p> <p>Chemistry: Universe</p> <ul style="list-style-type: none"> • Describe objects that you can see in the night sky • Describe the structure of the Universe • Describe the model of the solar system • Explain why we see objects in the solar system, and why they appear to move as they do • Explain why places on the Earth experience different daylight hours and seasons • Name some phases of the moon • Describe the appearance of the Moon and planets from diagrams • Explain why you see phases of the Moon
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<ul style="list-style-type: none"> • Explain how to use a microscope to observe a cell • Use a microscope to observe a prepared slide and state the magnification • Identify and compare the similarities and differences between plant and animal cells • Describe the functions of the components of a cell • Prepare and observe cells on a microscope slide safely • Describe examples of specialised animal and plant cells • Suggest what kind of tissue or organism a cell is part of, based on its features • Describe structural adaptations of plant and animal cells, summarising this in a table or as a model 	<p>between solutions of different pH</p> <ul style="list-style-type: none"> • Use data and observations to determine the pH of a solution • Describe what factors affect the pH of a solution • Name three strong acids and two weak acids • Use data and observations to determine the pH of a solution and explain what this shows • State what products are formed in the reaction between an acid and alkali • Explain how neutralisation reactions are used in different situations • Describe a method for making a neutral solution from an acid and an alkali • State what products are formed in the reaction between an acid and a base • Choose the salts that form when acids react with metals or bases 	<ul style="list-style-type: none"> • Describe the process of fertilisation • Describe causes of low fertility in male and female reproductive systems • State what is meant by gestation • Describe what happens during gestation and birth • Explain whether substances are passed between the mother and the fetus • State what the menstrual cycle is • State the length of the menstrual cycle • Describe the main stages of the menstrual cycle • State the causes of variation in species • Explain whether characteristics are inherited or environmental • Describe the difference between continuous and discontinuous variation • Represent variation within a species using graphs • Name the main parts in the skeleton • List the functions of the skeleton 	<ul style="list-style-type: none"> • Describe the frequency of a wave from a diagram or oscilloscope picture • Use drawings of waves to describe how sound waves change with pitch • Name some parts of the ear • Describe how the ear works • Describe how your hearing can be damaged 	<p>displacement, or metal-acid reaction with a word equation</p> <ul style="list-style-type: none"> • Place an unfamiliar metal into the reactivity series based on information about its reactions <p>Biology:</p> <p>Interdependence</p> <ul style="list-style-type: none"> • Describe what food chains and food webs show • Combine food chains to form a food web • State factors that affect the population of a species • Explain how toxic materials can accumulate in a food web and the effect on different populations • Explain the importance of insect pollinators to food supplies • State what is meant by ecosystem, community, 	
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<p>End of term 1 assessment to cover: <i>Linear Progress Exam 1</i> Chemistry: Particle model and Separating mixtures Biology: Cells Physics: Forces 1 (Speed and gravity)</p>	<p>End of term 2 assessment to cover: <i>Linear Progress Exam 2</i> Chemistry: Particle model, Separating mixtures, Acids and Alkalis, Metals and non-metals Biology: Cells, Reproduction and Interdependence</p>	<p>End of year assessment to cover: <i>Linear End of Year Exam</i> Chemistry: Particle model, Separating mixtures, Acids and Alkalis, Metals and non-metals and Earth's structure</p>			

Physics: Forces 1 (Speed and gravity) and Forces 2 (Contact, non-contact forces and pressure)

Biology: Cells, Reproduction and Interdependence
Physics: Forces 1 (Speed and gravity) and Forces 2 (Contact, non-contact forces and pressure), Electromagnets 1 and Energy

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

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 2. 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. As students will have been introduced to atoms when discussing elements, pupils will then move onto identifying metals and non-metals based on position in periodic table and through an investigative task on their properties. Some of these metals are found in their native state i.e. gold whilst some may be found as ores. As these substances can be found on Earth naturally, this leads onto the next topic of The Earth's structure.

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 will link into the specialised cells of sperm and egg cells. As reproduction is a process all living organisms do we lead onto the next topic of interdependence. At KS2 pupils will have been introduced to the classification system and are aware of the terms invertebrate and vertebrate. They will have been shown a food chain and taught how to interpret them and at KS3 pupils will be taught how to construct their own Food chains, Food webs and how any disruption will affect these chains.

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 pupils' investigative skills as pupils are minimally exposed to this at KS2. We then move onto Electromagnets which pupils will have come across at KS2. Pupils will have been introduced to the basic components within circuits and can construct and draw simple series circuit diagrams. At KS3, this is built on by introducing pupils to parallel circuits, ammeters and voltmeters. This in turn allows pupils to measure current and voltage within series and parallel circuits which allows for pupils to further develop investigative skills by making observations and comparisons of these two types of circuits. We then move onto Energy which links on from circuits where pupils will have been introduced to chemical energy stored in batteries. At KS3 we introduce pupils to different forms of energy and also investigate how energy can be released from food. Pupils will not have come across this at KS2. We conclude with Light, Sound and the Universe. At KS2 pupils will have been introduced to light travelling in straight lines and to the term reflection. They will have created models for the solar system and understand that the Earth moves on its axis. We build on this by investigating reflection, refraction and phases of the moon.

Home – Learning:

Centralised home learning tasks to support student understanding for each topic.

Reading / literacy:

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:

Reading Ammeters, voltmeters

Calculating current

Manipulation of speed equation triangle

Understanding units

Conversion of units

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
- Crest club
- Trip to Science museum
- Trip to National History museum
- Science week outside speakers

