

Half term	Unit title Hyperlink to	Description	Level covered	Content	Working Scientifically
7.1	The Human body	In this unit pupils will explore the content of a healthy human diet: carbohydrates, fats, proteins, vitamins, minerals, dietary fibre and water, and why each is needed. They will be required to carry out calculations of energy requirements in a healthy daily diet in addition to studying the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases. Pupils will also study 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). Pupils will also explore the importance of bacteria in the human digestive system. This unit also covers the skeletal and muscular system. Pupils will learn the interaction between skeleton and muscles, including the measurement of force exerted by different muscles.	3 to 8	Food groups / diet (healthy and unhealthy) / digestion / absorption/Skeletal and muscular system/gas exchange and breathing/alveolus/respiration/condense/contract/trachea/biomechanics/ribs/lung volume/ligament.	The aim will be to interpret observations to identify patterns in the data. The energy in food practical will incorporate data analysis from the different food groups and results will be recorded in a table. They will conclude the experiment by using the information from the experiment to suggest different diets. The experiment will be evaluated to describe what could be done to improve it.
7.2	Elements and compounds	Unit covers aspects of fundamental chemistry about atoms, elements, compounds and how to write chemical formulae. They will 'pupils should learn that formulae indicate the (relative) numbers of atoms in a compound. Pupils will represent elements by symbols and compounds by formulae. Students will study about the different materials there. They will explore what elements are made from, the properties and how we get all the other materials. They will study how we can represent the changes when new materials are made.	3 to 8	Atoms/Elements/Compounds/chemical formulae/chemical symbol/periodic table/molecule.	Interpret observations and data, including identifying patterns and using observations. The students will present reasoned explanations based on their observations of the diagrams describing whether they are atoms, elements or compounds. Measurements and data from the research of the structures will be used to draw conclusions.
7.3	Forces 1	Units covers aspects forces which include forces at a distance as well as balanced and unbalanced forces. The students will find out where they can come across forces and how forces can act on objects. – How do things balance. They will study forces and their effects – How do different materials stretch? The unit explores what friction does, Where do we come across forces and why things float. Hooke's law as a special case will be investigated.	3 to 8	Forces/squashing forces/friction forces/gravitational forces/push/pull/non-contact/newtonmeter/weight/deformation/compress/equilibrium.	Collecting data by using a newton metre to measure the forces on different objects. They will use data analysis when investigating Hooke's law and interpretation/collecting data, graphical representation. A prediction will be made to test the effects of friction and design an investigation, record measurements and analyse what the results show.
7.4	Cells	The unit covers components of cells and the differences between plants and animal cells, how cells can be specialised and respiration. They will describe different levels of hierarchical organisation with regards to unicellular and multicellular organisation. They will describe how cells are adapted for different functions. Pupils should learn that plant and animal cells have a cell surface membrane which keeps the cell together and controls what enters and leaves; that cells have a cytoplasm which occupies most of the cell; that cells have nuclei which control activities of the cell. Students will learn how to interpret, observe and record cell structure using a light microscope.	3 to 8	Plant/animal cells/ hierarchical organisation/Multicellular/unicellular/specialised organisms/ aerobic /anaerobic /microscope/respiration/diffusion/ microscope/sperm cell/concentration/root hair cells/euglena/flagellum/sperm cell/egg /light microscope.	Using appropriate techniques in using the microscope as an apparatus for observing the plant and animal cell organelles. Interpretation and observation of the results seen in the diffusion experiment with the agar cube. Working safely in the laboratory during practical work.
7.5	Acids and alkalis	This unit covers acids and alkalis and how to neutralise substances and make salts. Students will learn about acids and alkalis and where to use them. They will learn how acids and alkalis can be identified and distinguished from each other? What happens when an acid is added to an alkali? Where is neutralisation important? Bases should be emphasized and studied in detail.	3 to 8	Acids/alkalis/salts/neutralisation/indicators/Ph scale/hazard/alkaline solution/litmus/universal indicator.	Evaluate risks when testing the different substances to see whether they are acids or alkalis. Observation of difference hazard symbols and the precautions to take when using them. Planning an investigation to determine which indigestion remedy works the best. The results will
7.6	Energy	Pupils will also study the range of fuels used domestically and in industry. Pupils will describe how renewable energy resources can be used to generate electricity and provide heating. Pupils will compare the advantages and limitations of a range of energy resources. In this unit pupils will carry out a number of calculations of fuel uses and costs in the domestic context. They will compare the energy values of different foods and explain data on food intake and energy requirements for a range of activities. They will also compare the amounts of energy transferred in various appliances in watts and evaluate the different power ratings of appliances.	3 to 8	Energy, joule, kilojoule, law of conservation of energy, chemical store, thermal, kinetic, gravitational, potential, elastic, dissipated, equilibrium, conduction, convection, radiation, insulator, convection current, infrared radiation, thermal imaging, energy resource, fossil fuel, non-renewable, thermal power station, renewable, power rating,	evaluate a fair comparison of the energy output of different fuels and foods, including the control of relevant variables • find information from selected secondary sources about fuels and energy devices. • also select secondary sources to provide information about the use of fuels or other energy sources.

7.7	Particles	In this unit pupils study the properties of the different states of matter (solid, liquid, and gas) in terms of particle model, exploring the differences in arrangement, motion and density. Pupils will study the conservation of material and of mass, and reversibility, in melting, freezing, evaporation, sublimation, condensation and dissolving. Pupils will also explore how diffusion in liquids and gases is driven by differences in concentration with specific focus on Brownian motion in gases. Pupils will also use the particle model to explain gas pressure and describe the factors that affect gas pressure. Pupils will delve into a simple atomic model and identify differences between atoms, elements and compounds. Lastly the unit covers the basis of chemical symbols and formulae for elements and compounds.	3 to 8	Material, particle, mixture, substance, property, solid, liquid, gas, states of matter, melting, change of state, freezing, melting point, boiling, boiling point, conserve, evaporation, condensation, sublimation, diffusion, collide, gas pressure.	select effectively information from secondary sources to compare methods of preventing heat loss in houses • collect and interpret temperature data from a substance changing state make systematic measurements of temperature changes with a precision which enables reliable conclusions to be drawn in an investigation of insulators • evaluate different sources of information on domestic heat loss prevention methods • extrapolate from temperature data on change of state
7.8	Pure and impure substances	In this unit pupils will explore the concept of a pure substance. Pupils will classify some solids as soluble or insoluble and explain the meaning of the term 'saturated solution'. Pupils will also describe how mixtures can be separated by distillation and chromatography and will use the particle model to explain what happens when a solid dissolves in water, explaining why mass is conserved. Pupils will also describe how pure water can be obtained from sea water and how different colours can be separated from some inks. Pupils will also explore other simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography.	3 to 8	Mixture, pure, impure, solution, dissolve, solvent, solute, saturated, solution, solubility, soluble, insoluble, filtration, filtering, residue, filtrate, distillation, chromatography, chromatogram.	make measurements of temperature and mass • present experimental results as line graphs, pointing out patterns • describe observations and explain these • identify patterns in data about solubility, and make predictions from these • interpret data from chromatograms • use scientific knowledge and understanding to plan how to separate pure salt from rock salt.
7.9	Waves	In this unit pupils will describe the different types of waves and their features. Pupils will relate changes in pitch and loudness of sounds to changes in vibrations and relate these to the oscilloscope representations of waves. Pupils will recognise that sound needs a medium to travel through and that it travels at different speeds through different media. They will explain simply how the ear works and use a model of the ear to discuss possible causes of hearing impairment. Pupils will be required to give examples of hearing ranges and explain how noise pollution can be reduced. Pupils will also relate pitch to frequency of sounds and loudness to amplitude and use the particle theory to explain how sound travels through materials. Additionally, pupils will discuss the applications of sound waves in medicine and the use of sound waves for navigating.	3 to 8	Oscillation, vibration, energy, undulation, sound, amplitude, frequency, wavelength, peak, crest, trough, transverse, longitudinal, compression, rarefaction, reflection, incident wave, reflected wave, superpose, medium, vacuum, pitch, oscilloscope, hertz, kilohertz, audible range, infrasound, ultrasound, pinna, auditory canal, ossicle, oval window, cochlea, auditory nerve, decibel, diaphragm,	identify patterns in qualitative data about sound and describe sound qualities; frame a question about hearing which can be investigated; identify and control key variables; identify limitations in their data; compare sound levels, and report on a loudness enquiry; describe a current issue related to sound.
7.1	Light	This unit covers the similarities and differences between light and waves in matter. Pupils will explore how light waves travels through a vacuum as well as the transmission of light through materials by investigating absorption, diffuse scattering and specular reflection at a surface. Pupils will explain the origin of colour and the different frequencies of light whilst also studying differential colour effects in absorption and diffuse reflection. Pupils will also make use of the ray model to explain imaging in mirrors, specifically focusing on the pinhole camera, exploring how a camera forms an image and divulging further into the anatomy of the human eye, explaining how light is refracted and focused by the action of convex lenses. Additionally pupils will study how light transfers energy from a source to an absorber and explain how this leads to chemical and electrical effects.	3 to 8	Luminous, non-luminous, transparent, opaque, emit, absorb, reflect, vacuum, specular reflection, diffuse scattering, angle of incidence, angle of reflection, medium, refraction, convex, converging, focal, photoreceptor, optic nerve, retina, cornea, iris, pixels, prism, spectrum, dispersion.	make predictions about the reflection of light at plane surfaces, measure angles with precision and make generalisations from the data; frame a question about light and colour and plan how to investigate it. ; identify patterns in angular measurements of reflected rays of light. make predictions about image formation using the law of reflection or the patterns of behaviour from refraction;
7.11	Plants	This unit covers how plants grow and the role of the leaf in photosynthesis. Students will learn about what happens to the glucose produced in leaves. They will explore why green plants are important in the environment. The unit covers leaves, photosynthesis, dispersal and pollination. Pupils should learn about the products of photosynthesis and how plants respire. They will learn about the role of the root and adaptations of the leaves in photosynthesis.	3 to 8	Plants/chlorophyll/leaves/chloroplasts/photosynthesis/starch/glucose/carbon dioxide/pollination/seed dispersal/chemosynthesis.	Investigative enquiry when observing the structure of the structure of the leaf for stomata, starch etc. Using appropriate equipment when doing the experiment for starch in a leaf and investigating the effect of light on the rate of photosynthesis. A conclusion and evaluation of all experiments. Numeracy will be used to record data accordingly and
7.12	Earth Science	The unit states that in scientific enquiry pupils will consider how evidence from sedimentary layers and from fossils has led to changes in ideas about the development of the Earth. They will study the rock cycle – 'how the rock cycle provides a continuous supply and transformation of Earth materials. The students will learn about the distinguishing features of the three types of rocks and their uses. The unit also covers weathering, erosion, transportation and the rock cycle. A lesson should be focused on changes to the Earth's atmosphere and the carbon cycle. The unit covers human activity and the natural processes can lead to changes in the environment.	3 to 8	sedimentary/igneous/metamorphic/erosion/weathering/compaction/rock cycle.	Investigative enquiry will be used to determine the physical properties of sedimentary, igneous and metamorphic rocks. They will participate in utilising information to make a model of sedimentary rocks. They will review analytical skills when using chocolate to make a model of the rock cycle-The choc cycle.

Half term	Unit title Hyperlink to	Description	Year level covered	Key concepts	Learning objectives
8.1	Space	This unit is all about the environment, earth and the universe – 'astronomy and space science provide insight into the nature and observed motions of the sun, moon, stars, planets and other celestial bodies'.The unit covers some aspects of the solar system.It highlights the major components of the solar system,the different planets and moons.The different seasons and days and nights.	3 to 8	Solar system/moons/asteroid/planets/earth/orbit/axis/day/night/season/stars/sun/luminous/non-luminous/milky way/constellation/terrestrial/asteroid/dwarf planet/gas giant	Understand that scientific methods and theories develop as scientists modify earlier explanations to take account of new evidence and ideas,as they complete the 'what's in the universe'activity sheet'.
8.2	Chemical reactions	This unit covers chemical and physical reactions.Teachers need to emphasise that some physical changes also involve colour changes and gas evolution and that a chemical reaction is distinguished by changes in the ways atoms are bonded together.Pupils should learn to represent and explain chemical reactions by word equations, models or diagrams'.The unit enables the students to write and complete chemical equations.They will study about chemical reactions that take place when fuels burn and how else chemical reactions can be used as energy resourcesThey will explore how fuels burn and complete word and symbol equations on complete and incomplete combustion.Students will explore the processes of different types of reactions like thermal decomposition,exothermic and endothermic reactions.	3 to 8	Physical/chemical/colour/gas/acid/symbol/chemical reaction/catalyst/reactant/product/decomposition/oxidation/conservation of mass/balanced symbol equation/endothermic/exothermic/non-renewable	Use appropriate methods and apparatus for an experiment for doing the 'finding about reactions' worksheet. Students will make accurate observations and perform the following experiments: physical and chemical reactions, reacting elements to complete word equations,burning fuels to investigate whether all fuels release the same amount of energy,testing for carbon dioxide,and thermal decomposition reactions. and categorise the reactions.In all the experiments the the data will be recorded in appropriate tables,patterns will be analysed in the data.
8.3	Reproduction	The unit covers aspects of puberty and growth.The different components and functions of the male and female reproductive systems.Pregnancy and child birth is also explored in this unit.Pupils should learn that harmful substances and viruses can cross the placenta into the foetus and affect development.Pupils should learn that a drug is any substance that changes the way the body or mind works; that drugs alter the way the body works physically or mentally.	3 to 8	Female/puberty/male/sperm/egg/uterus/ovary/oviduct/testes/scrotum/penis/voicebox/adolescence/ejaculation/cilia/cervix/penis/sexual intercourse	Students will use appropriate scientific terminology to identify all parts of the male and female reproductive systems and identifying the important steps in pregnancy and child birth.
8.4	The periodic table	This unit states that pupils will explore the properties of metals and non-metals. They will study what happens when metals react with acids.Students will learn about the chemical reactions between acids and metal oxides. The students will explore the principles underpinning the Mendeleev periodic table.This unit' states that pupils will establish and use a reactivity series for metals.	3 to 8	metals/non-metals/reactivity series/chemical reactions/metals/acids/oxygen/metalloid/acid rain/halogen/density/period 1/transition metals/group 7/displacement	Students will use data and observations from the practical on identifying observations when classifying metals and non-metals.They will also use data and perform experiments to predict and determine the properties of the alkali,halogens and group 0 elements.
8.5	Forces 2	In this unit pupil will study the quantitative relationship between average speed, distance, and time and the relative motion of trains and cars passing one another. They will study representations of a journey on a distance–time graph by interpreting these graphs, calculating speed from the graph and plotting data on a distance time graph accurately. Pupils will learn how to use the quantitative relationship between force, area and pressure. Pupils will explore pressure in fluids by describing and explaining atmospheric pressure in liquids and gases. They will describe the factors that affect gas pressure and explain how atmospheric pressure changes with height. They will also describe how liquid pressure changes with depth and predict how water pressure changes. Additionally, pupils will be required to calculate pressure and apply ideas of pressure to different situations, as well as describing what is meant by 'moments' and calculating the moment of a force.	3 to 8	Speed, meters per second, instantaneous speed, relative motion, distance time graph, acceleration gas pressure, compressed, atmospheric pressure, density, liquid pressure, incompressible, pivot, moment, centre of mass, centre of gravity, law of moments.	plan an investigation into balance, making sufficient observations with precision. • identify a pattern in their results and use this to draw conclusions, relating these to the principle of moments. make systematic observations of balance and use these to draw conclusions. account for anomalies in the observations of balance and evaluate their conclusions by reference to the principle of moments. • describe non-linear relationships between speed and distance travelled • justify appropriate levels of precision in measuring speed • interpret speed–time graphs of falling objects • explain how a technological development contributed to faster travel.
8.6	Chemical reactions 2	In this unit pupils will explore the idea of chemical reactions as the rearrangement of atoms. They will learn how to represent chemical reactions using formulae and using equations. Pupils will study combustion, thermal decomposition, oxidation and displacement reactions. They will also explain conservation of mass in a chemical reaction and calculate masses of reactants and products. This unit also covers exothermic and endothermic chemical reactions. Pupils will be required to describe the characteristics of exothermic and endothermic changes, calculate temperature change and draw conclusions in a range of familiar exothermic and endothermic reactions.	3 to 8	Thermite reaction, displacement reaction, displace, reactivity, state symbol, ore	

8.7	Ecology	In this unit pupils will study the different relationships in an ecosystem. They will explore the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops and will also explain various sampling techniques used to take measurements in an ecosystem. Pupils will look at how organisms affect, and are affected by, their environment, including the accumulation of toxic materials. Furthermore, they will study the importance of plant reproduction through insect pollination.	3 to 8	Food chain, food web, interdependence, population, bioaccumulation, ecosystem, community, habitat co-exist, niche, algae, produce, consumer, minerals, fertiliser.	Suggest what data should be collected to investigate a habitat and choose appropriate apparatus and techniques to make measurements and observations • use a sampling technique to collect data to compare populations in habitats. collect data to investigate a question about a habitat using appropriate apparatus and techniques • use ICT to collect, store and present information. plan how to collect reliable data, taking into account the fact that variables cannot readily be
8.8	Electricity	In this unit pupils will study the concept of static electricity. They will Explain how objects can become charged, describe how charged objects interact and explore the idea of electric field. Pupils will study circuits and will be required to describe what is meant by current and to set up a circuit including an ammeter to measure current. Pupils will learn about potential difference and used this to explain resistance as as the ratio of potential difference (p.d.) to current. Pupils will also study differences in resistance between conducting and insulating components Pupils will develop these ideas when studying series and parallel circuits. They will be required to describe how current and potential difference vary in series and parallel circuits and also identify the pattern of current and potential difference in series and parallel circuits.	3 to 8	Electric charge, positive, negative, attract, repel, atom, proton, electron, neutron, neutral current, lightning, electric field, ammeter, amps, cell, battery, motor, potential difference, voltmeter, volts, rating, voltage, series, parallel, resistance, ohms.	Identify patterns in measurements of voltage and use these to draw conclusions about circuits • identify and control key factors in investigating simple cells and identify patterns in their results, including observations that do not fit the main trends. • measure the voltage of a range of cells • present data as charts or tables. • synthesise information from secondary sources about the development of the electricity supply industry and communicate it clearly • consider whether data is sufficient, and account for anomalies.
8.9	Genetics	This unit covers heredity as the process by which genetic information is transmitted from one generation to the next. Pupils will study a simple model of chromosomes, genes and DNA and will explore the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model. Pupils will also learn how variation between individuals within a species can be continuous or discontinuous and how variation can lead to competition which can drive natural selection. Pupils will study how changes in the environment can leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction. This unit also covers the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material.	3 to 8	Competition, adaptation, interdependence, variation, species, continuous, discontinuous, DNA, chromosomes, gene, evolution, extinct, biodiversity, endangered, gene bank.	use observations to identify questions to investigate about variation between individuals • suggest data to collect to answer the questions; present and analyse the data; identify associations or correlations in their data. • make suggestions about data to be collected to answer questions about variation • with help, present data using ICT and identify patterns or associations. • evaluate graphs and tables of data in relation to sample size.

Literacy and Numeracy

Numerical skills will be used in measuring out the exact volume of liquid 10cm³ in the experiment. They will also measure 15cm from the bottom of the stand. The numerical skills can be extended when the students calculate the energy transferred with the formula - Energy Transferred = Volume of water x C x Δt. Literacy will be incorporated when describing the health issues caused by an unhealthy diet.

Literacy will be used to research the key features of the elements and compounds and make leaflets for presentation. Numeracy will be used to identify the atomic number and mass numbers of the elements.

Numerical skills in collecting data and measuring the forces on different objects, measuring the extension of the spring, by measuring the force needed to keep the force needed. Graphical skills will be used to represent the data from each experiment. Literacy will be incorporated in the representation of the findings.

Numeracy skills will be incorporated in measuring the volumes of the solutions during the practical and using the stopwatches to time the experiments. Literacy will be used to explain the different concepts surrounding cells and movement of substances.

Numerical skills in collecting data when measuring out volumes of acids and alkalis for the experiment and graphical skills. Literacy skills will be implemented when writing up the findings of the experiment and following the procedures.

Numeracy in analysing data and calculating how to calculate the work done and power/literacy.

Literacy and Numeracy

Literacy will form a major part of the Hubble big write task. The students will do a piece of descriptive argumentative writing trying to justify for or against the amount of money spent on the telescope. They will need to emphasize on the basic literacy skills of vocabulary, openers, connectives and punctuation (VCOP). They will include numeracy when they will be calculating the distance of the planets to the earth, rotation of the earth on its axis and orbit. They will also use basic numeracy skills when converting units i.e. converting millimetres to kilometers.

The students will use their numerical skills to make a bar graph using the relative atomic masses of the noble gases and predict the relative atomic mass of krypton.

Literacy will be incorporated when writing descriptions of the terms with adolescence and reproduction.

Numerical skills will be used when using the density of known elements to calculate the density of unknown elements.
