

1	Term	1	2	3	4	5	6
1 s t F o r m	<b>Title</b>	Working Scientifically Cells, Tissues, Organs and Systems	Energy Sexual reproduction Acids and alkalis	Electricity Muscles and Bones Particle Model	Forces Ecosystems Atoms, elements and compounds	Sound	
	<b>Prior Knowledge</b>						
	<b>Core Knowledge</b>	<p>Understand and follow lab safety rules to reduce risks. Distinguish between different types of variables. Be able to use a microscope effectively and label most parts.</p> <p>To be able to label an animal and plant cell and be aware of the similarities and differences. Apply how specialised cells relate to their function. What tissues are and be able to name some. Recall the hierarchy of cell organisation.</p>	<p>Compare the temperature rise of water when some fuels are burnt. Identify situations in which an energy is stored and when energy transfer is taking place. Recall the law of conservation of energy. State the names of the types of fuels and the meanings of: fuel, renewable, non-renewable. Describe advantages and disadvantages of different energy resources. State the meaning of climate change and efficiency, and how we can reduce the greenhouse effect.</p> <p>Describe the functions of female and male sex organs and how gametes are adapted to their job and describe the process of fertilisation. Understand the development of a foetus and childbirth.</p> <p>Describe how to tell if a chemical is dangerous and what acids/alkalis are; the difference between an acid and alkali; what an indicator is and what the pH scale shows; what neutralisation reactions are the products produced.</p>	<p>Describe how a circuit can be represented by circuit symbols and that some materials are conductors/insulators. Explain that an electric current is a flow of electrons and how to measure current or volts. Differentiate between parallel and series circuits.</p> <p>Identify the main organs of the human gaseous exchange system.</p> <p>Explain the four functions of the skeleton and what makes bones strong; how our skeleton moves; and how joints work. Recall the short- and long-term effects of commonly abused substances.</p> <p>Describe the three states of matter in terms of shape, volume and compressibility. Explain how chemical changes are different from physical changes and recall some examples of each type.</p>	<p>State what is meant by: contact force, non-contact force. Recall the effects of forces on an object. State what is meant by: friction, air resistance, water resistance. Describe how pressure depends on force and area. Explain the effects of balanced and unbalanced forces in simple situations.</p> <p>Identify the physical environmental factors that make up the environment in a habitat. Describe the adaptations of a range of organisms to their habitats. Explain how changes in a physical environmental factor in a habitat affect populations and communities. Use a food web to identify food sources for different animals and give reasons for identifying organisms as: carnivores, consumers, herbivores, omnivores, predators, prey, producers.</p> <p>Describe what matter is made from and what an element is; the properties and classification of elements; the difference between elements and compounds .</p>	<p>Use a model incorporating the idea of vibrations to explain how sound travels through different materials. State the meaning of pitch, volume, intensity, frequency, amplitude. Describe how fast sound is transmitted by solids, liquids, gases. Describe the functions of the parts of the ear. State the meaning of: absorb, transmit, reflect.</p>	

	<b>Key takeaways for future learning</b>	Describe and record observations and evidence. Know how actions have been taken to control obvious risk. Know how cells are specialised for their jobs	Describe patterns and trends in results. Use key scientific vocabulary and terminology in discussions and written work. Be able to describe energy stores and transfers, the functions of sexual organs and neutralisation reactions.	Be able to name circuit components and make circuits, describe the function of muscles and bones in the human body, describe the states of matter. Recognise and explain the values of using models and analogies to clarify explanations.	Be able to explain how forces interact. Describe and explain the structure of ecosystems. Use the periodic table and explain what atoms, elements and compounds are.	Be able to describe how sound travels using key words.	
<b>2 n d F o r m</b>	<b>Term</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
	<b>Title</b>	Food and nutrition Combustion Fluids	Plants and reproduction The periodic table Light	Breathing and respiration Metals and their uses Energy transfer	Unicellular organisms Sound Genetics and Evolution	Making materials Forces and motion Plant growth Reactivity Force fields and electromagnets	
	<b>Prior Knowledge</b>	Function of organs in the digestive system  Be able to identify reactants and products of combustion.  Understand how pressure depends on force and area.	Know the different organs that make up a plant  Know different parts of an atom. Understand how the model of atom has changed over time.  To know the difference between a luminescent and non-luminescent object. Recall what transparent, translucent and opaque mean. Know how we see	Functions of the main organ systems. Know why we need oxygen  Know that metals are found on the left-hand side of the periodic table  Know the units for energy and names of energy stores.	Know that the cell is the smallest living unit.  Recall the speed equation, have some understanding of how sound travels.  Students should be able to describe the structure of a cell and the function of DNA.	Know that Humans use the Earth's resources to provide shelter, food and transport. Remember that the earth's resources are finite  Know that forces can be push, pull, contact or non-contact  Recall the parts of a plant cell and their functions.  Know what happens in some chemical reactions.	
<b>Core Knowledge</b>	Describe the general uses of carbohydrates, fats (lipids), proteins, vitamins and minerals by the body; the functions of the digestive organs; importance of enzymes for chemical digestion of large molecules into small molecules which can be absorbed; importance of gut bacteria	Explain how organisms are classified, using smaller and smaller groupings of shared characteristics. Correctly use the terms asexual reproduction and sexual reproduction. Describe the functions of the plant organs involved in sexual reproduction, understand process of pollination.	Describe the functions of the organs in the human gaseous exchange system and how breathing movements occur. Explain how gas exchange system is adapted for its function.  Describe how the properties of metals are different to non-metals. Describe the reactions of metals with different substances.	Understand what makes something 'living'. Explain the importance of the seven life processes. Describe and compare bacteria, fungi and protists. Explain the importance of decomposers in an ecosystem.  Calculate the speed of sound. Explain how sounds travel between solids,	Students should be able to distinguish between finite and renewable resources and how materials are made. State examples of natural products that are supplemented or replaced by agricultural/synthetic products.  To be able to describe forces as push or pull. Identify different types of forces as being contact or non-contact.		

		<p>State the meaning of: fuel, combustion. Explain the change in mass seen in reactions. Use the idea of the 'fire triangle' to explain how to extinguish a fire. Explain the products formed by the complete and incomplete combustion of hydrocarbons. Recall some effects of global warming, climate change.</p> <p>Compare densities of materials and link them to the mass of the particles and how closely they pack together. Use the particle model of matter to explain why gas pressure changes with temperature, number of particles and volume. Recall the different types of resistive forces and describe how they affect movement.</p>	<p>Identify the chemical symbols for some common elements and vice versa. Understand the difference between groups and periods in the periodic table. Use observations to decide whether a chemical reaction has taken place. Recall there is usually a regular gradation in physical properties as you go down a group.</p> <p>State the meaning of: reflect, scatter, transmit, absorb, reflection, angle of incidence, angle of reflection, normal, plane mirror. Describe the laws of reflection and refraction. Know how lenses work. Describe how the structure of the eye links to its function. Understand how a prism splits white light into different colours</p>	<p>Understand the energy can be transferred from one store of energy to another. Use Sankey diagrams to compare appliances or processes. Calculate energy efficiencies. Recall ways of reducing energy transfer by conduction, convection and evaporation. Apply the idea of different colours being good or poor emitters or absorbers.</p>	<p>liquids and gases. Apply knowledge of sound to new situations. Describe the functions of the parts of the ear. Describe some uses of ultrasound.</p> <p>Understand the relationship between a cell, the nucleus, the chromosomes and the genes. Tell the difference between and identify examples of continuous and discontinuous variation. Explain how natural selection determines the survival of certain variations of adaptations within a population.</p>	<p>Calculate resultant force using Newtons as a unit, and calculate the effect this will have on an object. Understand Newton's laws of motion.</p> <p>Define the term photosynthesis and identify the reactants and products of photosynthesis. Analyse the factors which impacts the rate of photosynthesis.</p> <p>Use information on the reactivity of metals to place them in an order of reactivity. Describe the chemical reactions of metals. Describe examples of energy being used to start a chemical reaction or keep it going. State the meaning of displacement reaction.</p> <p>Recall the shape and direction of a magnet's magnetic field, and its effect on magnetic materials and other magnets. Define what is an electromagnet Describe how mass and distance affect the strength of gravity. Use ideas about attraction and repulsion to explain electrostatic phenomena involving repulsion between like charges. Understand how to make an electromagnet . Understand that electric motors use force produced b magnetic fields to produce a turning motion.</p>	
	<b>Key takeaways</b>	Explain the use of nutrients in the body and the process of	Explain how flowers are adapted for sexual reproduction.	To be able to describe the journey of an oxygen particle.	Compare and contrast the differences between	Describe how polymers and composite materials are made, and the advantages and	

<p><b>for future learning</b></p>	<p>digestion at a molecular level.</p> <p>Evaluate the advantages and disadvantages of burning fuels and understand how to structure an answer for an evaluation question.</p>	<p>Be able to use the periodic table to identify elements and calculate the number of protons, neutrons and electrons.</p> <p>Use ray diagrams to explain the laws of reflection and refraction and explain dispersion.</p>	<p>Be able to link properties of metals to their uses</p> <p>Evaluate ways of increasing or decreasing energy transfer by conduction, convection, radiation and evaporation. Use Sankey diagrams to compare appliances or processes. Calculate energy efficiencies</p>	<p>organelles found in animal and plant cells</p> <p>Evaluate why the speed of sound is different between solids, liquids and gases. Use quantitative data to compare the speed of sound in solids, liquids, gases.</p> <p>Identify line graphs and scatter graphs, and extract simple information from them. Present data in line graphs and scatter graphs.</p> <p>Explain inherited and environmental variation and natural selection. Evaluate the evidence for suggested theories.</p>	<p>disadvantages of using and recycling materials.</p> <p>Name different forces, such as weight, friction, upthrust, drag. Explain the effects of balanced and unbalanced forces in a range of situations.</p> <p>Recall the process of photosynthesis. Describe the different ways that life on Earth depends on plants (impact of deforestation)</p> <p>Understand the signs of a chemical reaction taking place and how to plan a chemical investigation.</p> <p>Describe the variables that affect an object's gravitational potential energy. Explain the factors which effect the strength of an electromagnet.</p>	
<p><b>By the end of KS3 students are able to:</b></p>	<p><b>WORKING SCIENTIFICALLY</b></p> <ul style="list-style-type: none"> <li>• Undertake risk assessments and work safely during practicals considering lab safety.</li> <li>• Complete practicals following a method, record results and begin to describe trends and explanations for the results.</li> <li>• Use and apply mathematical concepts to measurements, analysis and evaluation.</li> <li>• Be able to analyse graphs and extract appropriate data.</li> </ul> <p><b>BIOLOGY</b></p> <ul style="list-style-type: none"> <li>• Understand the hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms, and thus describe and explain the functions of the organs in the skeleton-muscular, digestive, reproductive and gaseous organ system.</li> <li>• Recall factors that can affect the organ systems and describe the effects of those factors.</li> <li>• Describe the importance and process of photosynthesis, aerobic respiration and anaerobic respiration.</li> <li>• Explain the interdependence of organisms in an ecosystem.</li> </ul>					

- Describe the process by which genetic information is transmitted from one generation to the next, and how variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection.

**CHEMISTRY**

- Describe the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure.
- Describe the energy changes on changes of state, exothermic and endothermic chemical reactions.
- Describe the differences between atoms, elements, compounds and mixtures.
- Use the periodic table to identify elements and the formula of compounds, and explain the varying physical and chemical properties of different elements.
- Explain combustion, thermal decomposition, oxidation and displacement reactions and the law of conservation of mass.
- Describe the composition and structure of the Earth and atmosphere, the rock cycle, the carbon cycle. Describe the production of carbon dioxide by human activity and the impact on climate.

**PHYSICS**

- Be able to complete calculations of fuel uses and the costs in the domestic context.
- Recall, describe and compare renewable and non-renewable energy sources.
- Recall energy stores and transfers and understand energy as a quantity that can be quantified and calculated.
- Understand speed and the quantitative relationship between average speed, distance and time.
- Recall conservation of material and of mass, and reversibility, in melting, freezing, evaporation, sublimation, condensation, dissolving
- Describe the objects in our galaxy and the force of gravity.
- Understand Newton's laws of motion.
- Be able to name the components in a circuit, understand how to set up series and parallel circuits, and describe how current, potential difference and resistance are affected.
- Describe static electricity and magnetism.
- Describe wave diagrams and explain how sound waves and light waves travel.