

# LITTLE HEATH SCHOOL KS3 ASSESSMENT CRITERIA: Science

Area of Assessment & Link to National Curriculum	Working Scientifically – Applying, Analysing, Interpreting and Evaluating Science	Knowing and Understanding Science: Biology	Knowing and Understanding Science: Chemistry	Knowing and Understanding Science: Physics
<p><b>Higher</b></p> <p>(including foundation and intermediate band)</p>	<p><b>Scientific attitudes</b> Carry out a full risk assessment identifying, the hazard, why it's a hazard, precaution and procedure. Pay attention to objectivity and concern for accuracy, precision, repeatability and reproducibility. Understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas. Analyse information from scientific literature including the risk of bias.</p> <p><b>Experimental skills and investigations</b> Select, plan and carry out the most appropriate types of scientific enquiries to test predictions. Evaluate the reliability of methods. Present reasoned explanations, including explaining data in relation to predictions and hypotheses. Evaluate data, showing awareness of potential sources</p>	<p><b>Structure and function of living organisms</b> Know how some cells are specialised for their function. Recognise the structural adaptations of unicellular organisms. Be able to observe, interpret and record cell structure using a light microscope Explain or describe how antagonistic muscles work together. Explain how the digestive system is adapted to increase digestion. Calculations of energy requirements in a healthy daily diet e.g. energy in food. Explain the role of enzymes simply as biological catalysts. Understand the importance of bacteria in the human digestive system. The mechanism of ventilation, using a pressure model to explain the movement of gases, including simple measurements of lung volume. Explain how seeds and fruit are formed. Explain how the misuse of drugs can affect the body and society.</p> <p><b>Photosynthesis</b></p>	<p><b>Particulate nature of matter</b></p> <p><b>Pure and impure substances</b> Analyse data on boiling and melting points.</p> <p><b>Chemical reactions</b> Representing chemical reactions using formulae and equations. Explain reactions such as combustion, thermal decomposition, oxidation and displacement and neutralisation (representing acid as <math>H^+</math> and hydroxide as <math>OH^-</math>) The symbol equations of acids with metals to produce a salt plus hydrogen. The symbol equations of acids with alkalis to produce a salt plus water.</p> <p><b>Energetics</b> Evaluate experiments to investigate exothermic and endothermic chemical reactions.</p> <p><b>The periodic table</b> The chemical properties of metal and non-metal oxides with respect to acidity.</p> <p><b>Materials</b></p>	<p><b>Energy</b> Explain how conduction, convection and radiation transfer energy reducing the temperature difference. Explain the use of insulators to reduce energy flow using the particle model. Carry out energy efficiency calculations.</p> <p><b>Forces and Motion</b> Be able to calculate speed from straight line graphs. Explain relative motion e.g. trains and cars passing one another. Calculate moments. Non-contact forces: gravity forces acting at a distance on Earth and in space, forces between magnets and forces due to static electricity. Explain that pressure is measured by ratio of force over area – acting normal to any surface. Calculate pressure.</p> <p><b>Waves</b> Waves can be added or cancelled – superposition. Sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum.</p>

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	<p>of random and systematic error. Identify further questions arising from their results. When drawing tables to put labels and units in the correct column NOT written next to data. Round means to the correct number of d.p. Independently draw appropriate graphs where x and y scales may be different. Be able to draw appropriate lines of best fit including curves, not joint the dots.</p> <p><b>Analysis and evaluation</b> Identify anomalies to exclude from mean calculations. Identify a trend or pattern using data and use this to draw conclusions.</p> <p><b>Measurement</b> Be able to rearrange equations to carry out calculations.</p>	<p>Adaptation of leaves for photosynthesis. Describe how photosynthesis maintains levels of oxygen and carbon dioxide in the atmosphere.</p> <p><b>Respiration</b> Understand how the breakdown of organic molecules through respiration enables all other chemical processes.</p> <p><b>Relationships in an ecosystem</b> Explain the importance of insects in human food security. Explain how organisms and food chains are affected by bioaccumulation.</p> <p><b>Inheritance, chromosomes, DNA and genes</b> Explain natural selection. Explain how the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection. Explain how 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.</p>	<p>Simple symbol equations for displacement reactions.</p> <p><b>Earth and atmosphere</b> The carbon cycle linking to combustion, photosynthesis and respiration and decomposition.</p>	<p>Pressure waves transferring energy; use for cleaning and physiotherapy by ultra-sound. Explain the refraction of light and action of convex lens in focusing (qualitative), the lens in 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. Different colour effects in absorption (filters) and reflection (colour enters the eye).</p> <p><b>Electricity and Magnetism</b> Currents add where branches meet. Understand current as flow of charge. The separation of positive or negative charges by a transfer of electrons when objects are rubbed together to create a static charge. Explain the forces between charged objects The idea of electric field, forces acting across the space between objects not in contact. Be able to link electrical current and electromagnetism and interpret data.</p> <p><b>Matter</b> Internal energy stored in materials</p>
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<p><b>Intermediate</b>  (including foundation band)</p>	<p><b>Scientific attitudes</b> Identify ways to prevent accidents occurring. Know the differences between accuracy and precision. Know the differences repeatability and reproducibility. Analyse information from scientific literature.</p> <p><b>Experimental skills and investigations</b> Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience. Make predictions using scientific knowledge and understanding. Identify independent, dependent and control variables, where appropriate. Know to reset scales when measuring mass and how to read a meniscus. Make and record observations and measurements using a range of methods for different investigations.</p> <p><b>Analysis and evaluation</b></p>	<p><b>Structure and function of living organisms</b> Know the functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts. Describe the role of diffusion in the movement of materials in and between cells. Describe the function of some organ systems. Describe how to increase magnification and resolution of a light microscope. The interaction between skeleton and muscles, including the measurement of force exerted by different muscles. Give examples of antagonistic muscles. Describe the role of the digestive organs. The consequences of imbalances in the diet including obesity, starvation and deficiency diseases. Describe the adaptations of the digestive system to aid digesting of food and of the respiratory system to aid gas exchange. Understand the effect of maternal lifestyle on the foetus through the placenta including smoking and alcohol.</p>	<p><b>Particulate nature of matter</b> Use particles and diagrams to explain gas pressure.</p> <p><b>Atoms, elements and compounds</b> Conservation of mass changes and calculations. Describe the difference between a change of state and chemical reaction.</p> <p><b>Pure and impure substances</b> Analyse chromatography chromatographs.</p> <p><b>Chemical reactions</b> Describe reactions such as combustion, thermal decomposition, oxidation and displacement. Reactions of acids with metals to produce a salt plus hydrogen. Reactions of acids with alkalis to produce a salt plus water.</p> <p><b>Energetics</b> Know the energy changes for a change of state (quantitatively).</p> <p><b>The periodic table</b> How patterns in reactions can be predicted with reference to the Periodic Table.</p>	<p><b>Energy</b> Convert W to kW and J to kJ. Use the particle model to explain conduction, convection and radiation.</p> <p><b>Forces and Motion</b> Describe the representation of a journey on a distance-time graph including the significance of the gradient. Describe the effect of balanced and unbalanced forces. Describe moments as the turning effect of a force. Describe the effects associated with deforming objects, stretching and squashing, friction including resistance in fluids. Describe the relationship between forces and extension. Describe the relationship between atmospheric pressure and height above sea level. Describe how that change in the motion of an object depends on the size and direction of an opposing force.</p> <p><b>Waves</b> Waves can be reflected and refracted. Describe how echoes, reflection and absorption of sound occur.</p>

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	<p>Round a mean to the appropriate number of d.p. Describe a trend or pattern supported with data. Suggest possible improvements to methods. Draw a table with multiple columns and a mean column at the end. Draw graphs with appropriate x and y scales. Graph must include labels and units. Attempts at lines of best fit.</p> <p><b>Measurement</b> Be able to convert units for distance, mass, volume and energy.</p>	<p>Describe the difference between wind and insect pollination. Understand the effect of recreational drugs on behaviour, health and life processes.</p> <p><b>Photosynthesis</b> Know the structure of a leaf. The use of sunlight in photosynthesis to build organic molecules that are an essential energy store. Describe how photosynthesis maintains levels of oxygen in the atmosphere.</p> <p><b>Respiration</b> Know the word equation for anaerobic respiration in yeast. Know the similarities and differences between anaerobic respiration between a human cell and yeast. Describe how respiration <b>'releases'</b> energy for metabolic processes e.g. digestion and photosynthesis. DO NOT say 'create', 'made', 'produce', only the word release is acceptable.</p> <p><b>Relationships in an ecosystem</b> Describe the importance of insects in the production of crops. Describe predator / prey relationships.</p>	<p><b>Materials</b> The use of carbon in obtaining metals from metal oxides.</p> <p><b>Earth and atmosphere</b> Link the different formations of rocks together in the rock cycle. The impact of increasing carbon dioxide on climate change.</p>	<p>Describe why sound moves differently in each state of matter. Interpret data on the auditory range of humans and animals. Light waves travelling through a vacuum at speed of light. Describe how light can be absorbed, diffused, scattered and reflected at a surface. Use a protractor to measure angles or reflection and refraction. Describe how different colours of light have different frequencies.</p> <p><b>Electricity and Magnetism</b> Describe what resistance is. Increasing potential difference increases current. Increased resistance decreases current. Describe a magnetic field around a wire with a current flowing. Describe how to make an electromagnet stronger.</p> <p><b>Matter</b> Similarities and differences, including density differences, between solids, liquids and gases. Diffusion in liquids and gases driven by differences in concentration. Changes with temperature in motion and spacing of particles.</p>
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<b>Foundation</b>	<p><b>Scientific attitudes</b>            Identify hazards in the lab and / or an experiment.            To understand how to make an experiment accurate and repeatable.            To be able to retrieve information from scientific literature.</p> <p><b>Experimental skills and investigations</b>            Make simple predictions based upon observations of the real world.            Be able to use lab equipment appropriately and safely.</p> <p><b>Analysis and evaluation</b>            Calculate a mean.            Identify a simple trend or pattern.            Create a simple 2 column table including units.</p>	<p><b>Structure and function of living organisms</b>            Be able to recognise and label a plant and animal cell.            Know the similarities and differences between plant and animal cells.            Know the hierarchical organisation: from cells to tissues to organs to systems to organisms.            Know the structure and function of parts of a microscope.            The structure and functions of the human skeleton, to include support, protection, movement and making blood cells.            Know some common bones and their functions.            Know the function of muscles.            Be able to label the human digestive system.            Content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary</p>	<p><b>Particulate nature of matter</b>            The properties of the different states of matter (solid, liquid and gas) in terms of the particle model.            The arrangements of particles in the states of matter.            Changes of state in terms of the particle model.            Changes of state in terms of simple energy changes.            The difference between chemical and physical changes.            Atoms and molecules as particles.</p> <p><b>Atoms, elements and compounds</b>            Know a simple (Dalton/hard sphere) atomic model.            Differences between atoms, elements and compounds.            Chemical symbols and formulae for elements and compounds.            Writing simple word equations for chemical reactions.</p>	<p><b>Energy</b>            Compare power rating of different appliances W and kW.            Compare amounts of energy transferred J and kJ.            Know different fuels.            Know the fossil fuels            Know which energy resources are renewable and which are not.            Be able to label a lever and know it's a force multiplier.            Know that hotter objects lose energy to cooler objects.            Know how heat energy moves via conduction, convection and radiation.            Know that energy can transfer by changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels.            Know that energy cannot be created or destroyed, must be conserved.</p>

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	<p>Identify the independent variable in the left column and the dependant variable in the following column. To draw simple bar or line graphs including labels and units, using scaffolding and support.</p> <p><b>Measurement</b> Know the common SI units for distance, mass, volume, pressure, area and energy. Be able to read scales. Be able to use equations to complete simple calculations.</p>	<p>fibre and water, and why each is needed. Compare energy values of different foods. Addition of (energy) joules of food groups in a healthy diet. Label the tissues and organs of the human digestive system respiratory system and reproductive systems. The impact of exercise, asthma and smoking on the human gas exchange system. Understand the role of the menstrual cycle (no hormones). Know what gametes are in plants and animals. Know how fertilisation occurs in plants and animals. Understand gestation and birth. Label the structure of a flower and the role in plant reproduction. Know the different methods of seed dispersal. Name some medical and recreational drugs.</p> <p><b>Photosynthesis</b> Know that chloroplast carry out photosynthesis. Know the word equation for photosynthesis. Plants make carbohydrates in their leaves by photosynthesis and gain mineral nutrients and water from the soil via their roots.</p>	<p><b>Pure and impure substances</b> The concept of a pure substance Mixtures, including dissolving terms; solute, solution, solvent, soluble and insoluble. Diffusion in terms of the particle model and molecule movement Simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography The identification of pure substances</p> <p><b>Chemical reactions</b> Chemical reactions as the rearrangement of atoms. Know the numbers and colours which represent pH scale, acids, alkalis and neutral. Know how to use litmus paper and universal indicator to identify pH.</p> <p><b>Energetics</b> Know the changes of state between a solid, liquid and gas. Know the energy changes for a change of state (qualitative).</p> <p><b>The periodic table</b> Know how Mendeleev orders his periodic table. A basic knowledge of the periodic table to include common element symbols, periods, groups, metals and non-metals</p>	<p>Carry out energy conservation calculations.</p> <p><b>Forces and Motion</b> Understand what speed means. Calculate speed. Know that forces are interactions between 2 objects and are pushes and pulls. Know forces are measured in Newtons and be able to use a Newton meter. Forces are represented using arrows. Know what balanced and unbalanced forces are. Calculate force diagrams for balanced and unbalanced forces. Know what work done is. Calculate work done. Pressure in liquids increases with depth. Know how pressure effects up-thrust, floating and sinking. Know that forces are needed for objects to change speed or direction. When forces are balanced objects are stationary or moving at a constant speed.</p> <p><b>Waves</b> Know there are transverse and longitudinal waves. Know that transverse waves are through fluids and longitudinal waves are sound.</p>
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