

## SCIENCE – YEAR 7

### AUTUMN TERM

Pupils will have the opportunity to develop the following skills;

Working Scientifically:

- Work with accuracy, precision, repeatability and reproducibility
- Understand that scientific theories develop as earlier explanations are modified to take account of new evidence and ideas
- Evaluate risks in practical work
- Ask questions and develop a line of enquiry based on observations of the real world
- Make a prediction or hypothesis using scientific knowledge and understanding
- Select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables
- Apply sampling techniques
- Present observations and data using appropriate methods, including tables and graphs
- Interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions
- Use SI units (e.g., m, cm, mm) and chemical symbols & formula

Pupils will have the opportunity to develop their knowledge about:

#### **Particles, Atoms and Elements**

- the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure
- Brownian motion in gases
- changes of state in terms of the particle model.
- diffusion in terms of the particle model
- similarities and differences, including density differences, between solids, liquids and gases
- the anomaly of ice-water transition
- a simple (Dalton) atomic model
- atoms and molecules as particles.
- differences between atoms, elements and compounds
- chemical symbols and formulae for elements and compounds
- conservation of mass changes of state and chemical reactions.
- conservation of material and of mass, and reversibility, in melting, freezing, evaporation, sublimation, condensation, dissolving
- the difference between chemical and physical changes.

#### **Fuel and Energy Changes & Transfers**

- comparing energy values of different foods (from labels) (kJ)
- comparing power ratings of appliances in watts (W, kW)
- comparing amounts of energy transferred (J, kJ, kW hour)
- domestic fuel bills, fuel use and costs
- fuels and energy resources
- heating and thermal equilibrium: temperature difference between two objects leading to energy transfer from the hotter to the cooler one, through contact (conduction) or radiation; such transfers tending to reduce the temperature difference: use of insulators
- other processes that involve energy transfer: changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels.

	<ul style="list-style-type: none"> <li>• energy as a quantity that can be quantified and calculated; the total energy has the same value before and after a change</li> <li>• comparing the starting with the final conditions of a system and describing increases and decreases in the amounts of energy associated with movements, temperatures, changes in positions in a field, in elastic distortions and in chemical compositions</li> <li>• using physical processes and mechanisms, rather than energy, to explain the intermediate steps that bring about such changes.</li> <li>•</li> </ul>
<p><b>SPRING TERM</b></p>	
<p>Pupils will have the opportunity to develop the following skills; Working Scientifically for KS3:</p> <ul style="list-style-type: none"> <li>• Work with accuracy, precision, repeatability and reproducibility</li> <li>• Understand that scientific theories develop as earlier explanations are modified to take account of new evidence and ideas</li> <li>• Evaluate risks in practical work</li> <li>• Ask questions and develop a line of enquiry based on observations of the real world</li> <li>• Make a prediction or hypothesis using scientific knowledge and understanding</li> <li>• Select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables</li> <li>• Apply sampling techniques</li> <li>• Present observations and data using appropriate methods, including tables and graphs</li> <li>• Interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions</li> <li>• Use SI units (e.g., m, cm, mm) and chemical symbols &amp; formula</li> </ul>	<p>Pupils will have the opportunity to develop their knowledge about:</p> <p><b>Cells and organisation</b></p> <ul style="list-style-type: none"> <li>• Describe cells as the fundamental unit of living organisms, including how to observe, interpret</li> <li>• Record cell structure using a light microscope</li> <li>• Explain the functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts</li> <li>• Compare the similarities and differences between plant and animal cells</li> <li>• Explain the role of diffusion in the movement of materials in and between cells</li> <li>• Describe the structural adaptations of some unicellular organisms</li> <li>• Consider the hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms.</li> </ul> <p><b>Sexual Reproduction and Asexual Reproduction</b></p> <ul style="list-style-type: none"> <li>• Describe reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta</li> <li>• Explain the effects of recreational drugs (including substance misuse) on behaviour, health and life processes.</li> </ul> <p><b>Pure and Impure Substances (elements, mixtures and compounds)</b></p> <ul style="list-style-type: none"> <li>• Consider the concept of a pure substance</li> <li>• Identify pure substances.</li> </ul>

	<ul style="list-style-type: none"> <li>• Research mixtures, including dissolving</li> <li>• Explain simple techniques for separating mixtures: <ul style="list-style-type: none"> <li>• Filtration</li> <li>• Evaporation</li> <li>• Distillation</li> <li>• Chromatography</li> </ul> </li> <li>•</li> </ul>
<p><b>SUMMER TERM</b></p>	
<p>Working scientifically – pupils will have the opportunity to develop the following skills:</p> <ul style="list-style-type: none"> <li>• Work with accuracy, precision, repeatability and reproducibility</li> <li>• Understand that scientific theories develop as earlier explanations are modified to take account of new evidence and ideas</li> <li>• Evaluate risks in practical work</li> <li>• Ask questions and develop a line of enquiry based on observations of the real world</li> <li>• Make a prediction or hypothesis using scientific knowledge and understanding</li> <li>• Select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables</li> <li>• Apply sampling techniques</li> <li>• Present observations and data using appropriate methods, including tables and graphs</li> <li>• Interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions</li> <li>• Use SI units (e.g., m, cm, mm) and chemical symbols &amp; formula</li> </ul>	<p>Pupils will have the opportunity to develop their knowledge of:</p> <p><b>Human Systems and Health</b></p> <ul style="list-style-type: none"> <li>• Describe the structure and functions of the human skeleton, to include support, protection, movement and making blood cells</li> <li>• Study biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles</li> <li>• Describe the function of muscles and examples of antagonistic muscles.</li> <li>• Analyse the content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water, and why each is needed</li> <li>• Undertake calculations of energy requirements in a healthy daily diet</li> <li>• Consider the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases</li> <li>• 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)</li> <li>• Describe the importance of bacteria in the human digestive system</li> <li>• Explain the structure and functions of the gas exchange system in humans, including adaptations to function</li> <li>• Recognise the mechanism of breathing as moving air in and out of the lungs, using a pressure model to explain the movement of gases, including simple measurements of lung volume</li> <li>• Analyse the impact of exercise, asthma and smoking on the human gas exchange system</li> </ul> <p><b>Earth’s Atmosphere and Rock Cycle</b></p> <ul style="list-style-type: none"> <li>• Describe the composition and structure of the Earth</li> </ul>

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|  | <ul style="list-style-type: none"><li>• Study the rock cycle and the formation of igneous, sedimentary and metamorphic rocks</li><li>• Identify the Earth as a source of limited resources and the efficacy of recycling</li><li>• Consider the composition of the atmosphere and importance of the carbon cycle</li><li>• Link the production of carbon dioxide by human activity and the impact on climate.</li></ul> |
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