**Science – Overview of KS3 Curriculum Topics - YEAR 7**

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| **Term** | **Yr 7 Key Performance Indicators** |
| **Autumn 1 Forces and Electromagnets** | **Gravity** -Explain the way in which an astronaut’s weight varies on a journey to the moon.  |
| Draw a force diagram for a problem involving gravity. |
| Deduce how gravity varies for different masses and distances. |
| Compare your weight on Earth with your weight on different planets using the formula. |
| **Speed** - Investigate variables that affect the speed of a toy car rolling down a slope. |
| Illustrate a journey with changing speed on a distance-time graph, and label changes in motion. |
| Describe how the speed of an object varies when measured by observers who are not moving, or moving relative to the object. |
| **Current** - Compare and explain current flow in different parts of a parallel circuit. |
| Describe how current changes in series and parallel circuits when components are changed. |
| Turn circuit diagrams into real series and parallel circuits, and vice versa. |
| Use a sketch to describe how an object charged positively or negatively became charged up. |
| **Voltage and Resistance** - Compare the voltage drop across resistors connected in series in a circuit. |
| Draw a circuit diagram to show how voltage can be measured in a simple circuit |
| Use the idea of energy to explain how voltage and resistance affect the way components work. |
| Given a graph of voltage against current, use the gradient to determine the resistance of a component. |
| Use an analogy like water in pipes to explain why part of a circuit has higher resistance. |

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| **Autumn 2 Energy and Waves** | Energy Costs- Compare the running costs of fluorescent and filament light bulbs. |
|  | Compare the amounts of energy transferred by different foods and activities. |
|  | Compare the energy usage and cost of running different home devices. |
|  | Explain the advantages and disadvantages of different energy resources. |
|  | Draw a diagram to show the energy transfers from a renewable or non-renewable resource to an electrical device in the home. |
|  | Energy Transfer - Explain the energy transfers in a hand-crank torch. |
|  | Describe how the energy of an object depends on its speed, temperature, height or whether it is stretched or compressed. |
|  | Draw diagrams to show how energy is transferred between energy stores in a range of real-life examples. |
|  | Calculate the useful energy and the amount dissipated, given values of input and output energy. |
|  | Explain how energy is dissipated in a range of situations. |
|  | Light - Use ray diagrams to model how light passes through lenses and transparent materials |
|  | Use ray diagrams of eclipses to describe what is seen by observers in different places. |
|  | Explain observations where coloured lights are mixed or objects are viewed in different lights. |
|  | Use ray diagrams to describe how light passes through lenses and transparent materials. |
|  | Describe how lenses may be used to correct vision. |
|  | Sound - Relate changes in the shape of an oscilloscope trace to changes in pitch and volume. |
|  | Explain observations where sound is reflected, transmitted or absorbed by different media. |
|  | Explain observations of how sound travels using the idea of a longitudinal wave. |
|  | Work out the amplitude and frequency of a wave from a diagram or oscilloscope picture. |
|  | Use drawings of waves to describe how sound waves change with volume or pitch. |

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| Spring 1  | Particle Model - Relate the features of the particle model to the properties of materials in different states. |
| Matter and  | Explain unfamiliar observations about gas pressure in terms of particles. |
| Reactions | Explain the properties of solids, liquids and gases based on the arrangement and movement of their particles. |
|  | Explain changes in states in terms of changes to the energy of particles. |
|  | Draw before and after diagrams of particles to explain observations about changes of state, gas pressure and diffusion. |
|  | Separating Mixtures - Devise ways to separate mixtures, based on their properties. |
|  | Explain how substances dissolve using the particle model.Use the solubility curve of a solute to explain observations about solutions.Use evidence from chromatography to identify unknown substances in mixtures.Choose the most suitable technique to separate out a mixture of substances.Explain how substances dissolve using the particle model.Use the solubility curve of a solute to explain observations about solutions.Use evidence from chromatography to identify unknown substances in mixtures.Choose the most suitable technique to separate out a mixture of substances. |
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|  | Acids and Alkalis - Devise an enquiry to compare how well indigestion remedies work. |
|  | Identify the best indicator to distinguish between solutions of different pH, using data provided. |
|  | Use data and observations to determine the pH of a solution and explain what this shows. |
|  | Explain how neutralisation reactions are used in a range of situations. |
|  | Describe a method for how to make a neutral solution from an acid and alkali. |
|  | Metals and Non-Metals - Use experimental results to suggest an order of reactivity of various metals. |
|  | Describe an oxidation, displacement, or metal-acid reaction with a word equation. |
|  | Use particle diagrams to represent oxidation, displacement and metal-acid reactions. |
|  | Identify an unknown element from its physical and chemical properties. |
|  | Place an unfamiliar metal into the reactivity series based on information about its reactions. |

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| **Spring 2 Earth and Organisms**  | **Earth Structure** - Model the processes that are responsible for rock formation and link these to the rock  |
| Explain why a rock has a particular property based on how it was formed. |
| Identify the causes of weathering and erosion and describe how they occur. |
| Construct a labelled diagram to identify the processes of the rock cycle. |
| **Universe** - Relate observations of changing day length to an appropriate model of the solar  |
| Describe the appearance of planets or moons from diagrams showing their position in relation to the Earth and Sun. |
| Explain why places on the Earth experience different daylight hours and amounts of sunlight during the year. |
| Describe how space exploration and observations of stars are affected by the scale of the universe. |
| Explain the choice of particular units for measuring distance. |
| **Cells** - Identify the principal features of a cheek cell and describe their functions. |
| Explain why multi-cellular organisms need organ systems to keep their cells alive. |
| Suggest what kind of tissue or organism a cell is part of, based on its features. |
| Explain how to use a microscope to identify and compare different types of cells. |
| Explain how uni-cellular organisms are adapted to carry out functions that in multicellular organisms are done by different types of cell. |
| **Movement** - Explore how the skeletal system and muscular system in a chicken wing work together to cause movement. |
| Explain how a physical property of part of the skeleton relates to its function. |
| Explain why some organs contain muscle tissue. |
| Explain how antagonistic muscles produce movement around a joint. |
| Use a diagram to predict the result of a muscle contraction or relaxation. |

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| **Summer 1 Ecosystem and Genes** | **Interdependence** - Use a model to investigate the impact of changes in a population of one organism on others in the ecosystem. |
| Describe how a species’ population changes as its predator or prey population changes. |
| Explain effects of environmental changes and toxic materials on a species’ population. |
| Combine food chains to form a food web. |
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| **Plant Reproduction** - Use lab tests on variegated leaves to show that chlorophyll is essential for photosynthesis. |
| Describe ways in which plants obtain resources for photosynthesis. |
| Explain why other organisms are dependent on photosynthesis. |
| Sketch a line graph to show how the rate of photosynthesis is affected by changing conditions. |
| Use a word equation to describe photosynthesis in plants and algae. |
| **Variation** - Graph data relating to variation and explain how it may lead to the survival of a species. |
| Explain whether characteristics are inherited, environmental or both. |
| Plot bar charts or line graphs to show discontinuous or continuous variation data. |
| Explain how variation helps a particular species in a changing environment. |
| Explain how characteristics of a species are adapted to particular environmental conditions. |
| **Human Reproduction** - Relate advice to pregnant women to ideas about transfer of substances to the embryo. |
| Explain whether substances are passed from the mother to the foetus or not. |
| Use a diagram to show stages in development of a foetus from the production of sex cells to birth. |
| Describe causes of low fertility in male and female reproductive systems. |
| Identify key events on a diagram of the menstrual cycle. |