Subject: Year 7 Science

	Year 7 - Emerging	Year 7 - Secure	Year 7 - Exceeding
Term 1	**Students should be able to:** • Identify a simple pattern in data • Identify possible hazards in an experiment • Identify the variable being investigated • Identify a weakness of an investigation • Identify a source of error in an investigation • Identify values for energy in our food • Name some energy stores • Name some renewable and non-renewable energy resources • Calculate power using given formula	**Students should be able to:** • Describe and explain a trend in data • Classify risks as low, medium, high • Identify variables using technical language (independent/dependent) • Evaluate the effectiveness of a method • Classify errors as random or systematic and explain how to minimise them • Analyse our diet for energy content • Identify energy stores in a closed system • Explain the advantages and disadvantages of some renewable and non-renewable energy resources • Calculate the cost of home energy usage, power and energy efficiency using given formula	**Students should be able to:** • Explain complex trends in data, considering the limitations of the data • Suggest better ways to control variables • Suggest alternative methods to an investigation • Research other possible scientific explanations for a conclusion • Identify further questions arising from an investigation • Evaluate our diets in relation to energy requirements • Apply the law of conservation of energy to a closed system • Evaluate the social, economic and environmental consequences of using a resource to generate electricity, from data • Rearrange given formulae to calculate other components of the cost of home energy usage, power and efficiency
Term 2	**Students should be able to:** • Recall contact and non-contact forces • Identify balanced and unbalanced forces • Recall that objects to slow down due to friction. • Recall the equation - speed = distance / time • Interpret and draw distance - time graphs • Recall the equation - weight = mass x gravity • Recall the equation - Pressure = force / area • Recall Hooke's law • Describe how objects balance when the clockwise and anticlockwise moments are equal • Describe the properties of solids, liquids and gases • Draw particle diagrams for solids, liquids and gases • Name changes of state • Know that substances do not disappear when they dissolve • Use simple separation techniques to separate mixtures • Describe pure and impure substances • Identify elements, compounds and mixtures from particle diagrams • Describe how the periodic table is arranged • Name some simple compounds	**Students should be able to:** • Draw and label force diagrams. • Be able to calculate resultant forces. • Identify that different surface have different amounts of friction. • Apply the equation for speed. • Analyse distance - time graphs to describe the motion of an object. • Define the difference between mass and weight. • Explain how forces can change the shape of objects. • Design an investigation based on Hooke's law. • Explain how the size of a moment is dependent on two factors • Explain the properties of solids, liquids and gases based on the arrangement and movement of their particles. • Explain changes in state in terms of changes to the energy of the particles • Explain how substances diffuse and dissolve using the particle model • Choose a suitable technique for separating a mixture of substances • Define an element, compound, mixture and molecule • Represent atoms, molecules and elements, mixtures and compounds using particle diagrams • Describe the trends in physical and chemical properties of groups 1 and 7 of the periodic table • Name compounds using their chemical formulae	**Students should be able to:** • Explain the motion of an object using ideas about forces. • Analyse resultant forces in real life situations • Carry out an investigation analysing friction on different surfaces. • Apply the equation for speed using conversions between units and rearranging the equation. • Analyse distance - time graphs to calculate the speed of an object. • Calculate weight and use data to predict forces and draw force diagrams. • Predict the force that will be exerted by a pressure and be able to interpret how objects are designed to counteract pressure. • Analyse data explaining how extension is proportional to the force applied and be able to draw graphs representing this data. • Link calculating moments to real life situations, such as balancing cranes. • Make predictions about what will happen during unfamiliar physical processes, in terms of particles and their energy • Apply understanding of changes of state to explain heating and cooling curves • Analyse and interpret solubility curves • Suggest a combination of methods to separate a complex mixture and justify the choices • Evaluate the use of particle diagrams as a model for elements, compounds and mixtures • Predict the position of an unfamiliar element in the periodic table based on its physical and chemical properties
Term 3	**Students should be able to:** • Draw simple circuit diagrams to represent a number of different circuits and components • Describe simply what is meant by current in a circuit • Describe how to measure voltage in a circuit and predict values in series and parallel circuits • Describe the link in an electrical component between current, resistance and energy transfer to the surroundings • Calculate current, potential difference, charge and resistance given data and equations • Name some structures found in animal and plant cells • Name some specialised types of cells • Recall the main organ systems of the human body and some of their organs • Use a light microscope to observe and draw cells • Name the reactants and products of respiration • Name the structures of the respiratory system and the pathway air takes. • Describe the process of breathing • Recall factors which affect breathing and gas exchange • Record measurements and observations from an investigation	**Students should be able to:** • Analyse circuit diagrams in order to describe their arrangement or identify faults • Link ideas about the nature of current to energy, resistance, conductors and the properties of different electrical components • Use ideas about energy to predict how changing electrical components in a circuit such as batteries, bulbs or resistors may affect values in a circuit • Use an appropriate strategy to manipulate values in equations in order to calculate values that are not the subject of the equation • Explain the relationship between current and voltage for different electrical components • Compare and contrast the structure of an animal and plant cell • Describe the function of the different structures found in animal and plant cells • Describe the hierarchical organisation of the human body, cells, tissues, organs, organ systems, organism • Explain how to use a microscope to identify and compare different types of cells • Recall the word equation for respiration • Describe the function of the structures of the respiratory system. • Describe the mechanics of breathing and gas exchange. • Explain how exercise, smoking and asthma affect the gas exchange system. • Record repeat data and select suitable ranges and intervals	**Students should be able to:** • Construct circuit diagrams in order to collect data for different components • Link ideas about the nature of current to ideas about static charge, electrons and conventional current flow • Use ideas about energy transfers to link voltage in a circuit and across components • Carry out conversions, then use an appropriate strategy to manipulate values in equations in order to calculate values that are not the subject of the equation • Explain how the structures of specialised animal and plant cells are related to their function • Explain how cells, tissues and organs of a system are adapted to carry out their specific function • Suggest how damage to, or failure of, an organ would affect other body systems. • Calculate magnification using the formula: magnification = $\frac{\text{size of image}}{\text{size of real object}}$ • Link diffusion and respiration to the respiratory system • Explain how the structure of the respiratory system is adapted to its function and how diffusion is involved • Predict how a change in the respiratory system could affect other processes in the body • Explain why errors may have occurred and how to minimise their impact on results