**Subject: Science**

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|  | **Year 7 - Novice** | **Year 7 - Capable** | **Year 7 - Expert** |
| **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:**   * 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:**   * 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:**   * 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 = size of image   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 |