**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
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| **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
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| **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
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