

		<i>Curriculum Checkpoints: What do students know and what can they do?</i>		
Unit	Developing	Securing	Flourishing	Excelling
1. Energy	Recall some of the types of energy with some examples of transfers of energy from one store to another. Use some of the simpler equations to calculate energy and power. Discuss how efficiency affects a systems energy transfers. Recall some methods of generating electricty from different energy resources.	State the conservation of energy law and describe how the ten energy types change from one store to another. Be able to calculate the correct variable using the data sheet. State the difference between some renewable and non-renewable energy resources.	Explain how energy is conserved in a moving system and how the efficiency of the system can be improved upon by reducing friction. Be able to rearrange equations with three variables to solve mathematical problems. Be able to explain the advantages and disadvanatges of various energy resources.	Evaluate the energy stores and transfers in different systems and examples with reference to the ten types of energy and identify useful and wasted energy. Be able to rearrange complex equations correctly and solve mathematical problems. Evalute the use of different energy resources with the advantages and disadvanatges to explain the trends of use through history and what may be used in the future.
2. Particle model	State the three types of matter and recall some properties of each state of matter. Recall what is meant by internal energy. Convert units from kilojoules to joules; grams to kilograms. Determine the change in temperature of a material that has been heated. Describe the motion of a gas particle at different temperatures.	Describe the different properties of the states of matter and how they link to the particle arrangements. Be able to calculate the density of a material and convert kg/m^3 to g/cm^3 . Correctly use the specific latent heat equation to calculate the energy needed to change state. Describe the effect of on the speed and energy of particles in a gas at different temperatures.	Use the particle model to explain how matter changes state and explain how the forces between molecules change. Rearrange the equation for density and latent heat with correct units. Describe how the pressure in a gas varies with both temperature and volume, linking the motion of a gas to its pressure.	Explain how to scientifically determine the density of different materials with irregular shapes. Be able to rearrange equations correctly. Explain what is meant by an inverse relationship between pressure and volume and convert celsius to kelvin; explaining what is meant by absolute zero.
3. Atomic Strcuture	Recall the names of the particles within the atom and their location. State the basic ideas within of the plum pudding model and Rutherford's model. Recall the three types of decay. State the number of protons from the atomic number. Give some examples of some safety precautions when using radiation	State the relative mass and charge of each particle in the atom. Calculate the number of neutrons from the atomic mass and number. Describe the results of the alpha scattering experiment. Recall the basic properties of alpha, beta and gamma radiation. State what is meant by contamination.	Explain how Rutherford's experiment produced a new model of the atom and how the electric forces explain the charge of the nucleus. Recall that the activity of a radioactive isotope is measured in Bequerels and decreases over time, dependent on its half-life. Graphically identify the half-life from the decay curve. Describe some uses of radiation in medicine and domestic use. Describe the basics of a nuclear reactor and how fission occurs. Explain the conditions of nuclear fusion	Explain the dangers of each type of radioactive decay and link this to a person being contaminated or irradiated. Explain the factors that affect irradiation and the random nature of decay. Use the half-life of an isotope to determine its future activity or mass. Explain how different radioactive decays are used for different applications. Explain how the reaction inside a nuclear fission reactor can be controlled and change the power output. Explain why nuclear fusion is difficult and why the conditions are needed due to electrostatic forces between protons.
4. Electricity	Identify the components used in circuits. Build circuits to measure the current and potential difference in the circuit. Recall the components of a three pin plug. Describe the difference between AC and DC current. Calculate potential difference and current. Recall the properties of mains electricity.	Draw circuits to measure the resistance or IV characteristic of a circuit. Describe why resistance is present in a circuit. Describe the energy transfers in electrical appliances. Describe how the resistance of a bulb, resistor, diode and thermistor can change. Predict the potential difference of a component. Descirbe how current and potential difference vary in series and parallel circuits. Describe how static electricity can lead to charged objects. Calculate electrical power, resistance and charge. Describe how transformers change potential difference and current.	Know Ohm's law and explain when it applies. Explain why the resistance of a filament bulb changes when the potential difference changes. Explain why increasing the length of a wire will increase the resistance. Describe how static electricity can lead to a force. Explain why transformers are used in the national grid. Explain the use of a thermistor or LDR in a sensory circuit. Describe how resistance varies in series and parallel. Describe the electrical field changes around an object.	Predict the potential difference of a component from their resistance. Calculate the charge passing through a component from its resistance and applied potential difference. Explain how adding components to a cricuit will effect the potential difference and current of other components. Explain how different thermistors or LDRs are better for different tasks. Explain why adding resistors in parallel will change resistance. Explain why high potential difference can lead to sparks. Explain the process of earthing.