AC1: Key Outcomes – Year 9
Curriculum: Science

Section	Knowledge Code:	Outcomes:	How students will demonstrate success:
1	S9.1.1 Energy stores and transfers	SWBAT • State the 9 examples of energy stores • Describe changes in energy stores in terms of the process that causes the change • Explain factors that affect the size of changes in energy stores • State what conservation of energy means • Describe the ways energy can be transferred • Distinguish between useful and non-useful energy transfers • State the energy transfer when two energy stores are involved • Describe the energy stores involved in different situations • Explain how energy can be transferred through energy stores	• Be able to name all 9 of the stores and identify them in context. • Identify different energy transfers in a range of contexts and state whether they are useful or waste. • Understand that energy is never created nor destroyed only transferred to other forms.
3	S9.1.3 Calculating energy	SWBAT • Use the kinetic energy, elastic potential energy and gravitation potential energy equation • Use the correct units • Rearrange and use the equations for the three equations	• Solve a variety of different calculation based problems in a range of contexts • Identify the appropriate equation given the question and rearrange as required. • Use the correct units
4	S9.1.4 Work done	SWBAT • Be able to describe work done in detail • Explain the factors that affect work done • Calculate work done using relevant formula • Explain work done and energy change on deformation	• Give the definition of work done • Name the factors that affect work done and explaining their impact. • Use $W = Fd$ in a range of different contexts • Use $W = 0.5ke^2$
5	S9.1.5 Thermal energy	SWBAT • State that thermal energy depends upon mass, temperature, material • Describe how energy is transferred through different pathways; particles in conduction and convection, and by radiation • Compare how energy is transferred by conduction, convection and radiation • Give examples of some good and bad thermal conductors • Explain how thermal energy travels through a solid during conduction in terms of particle movement • State some effects of convection currents • Explain how thermal energy travels through a fluid during conduction in terms of particle movement	• Explain how the three methods of energy transfer transmit energy • Explain why metals are good conductors

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6	S9.1.6 Heating and thermal equilibrium	SWBAT • Describe materials as good or poor thermal conductors • Describe the changes in the behaviour of the particles in a material as the temperature of the material increases • Justify the choices of a material involved in insulator or conduction	• Look at different objects and state how their thermal equilibrium is reached and what factors affect it.
7	S9.1.7 Specific heat capacity	SWBAT • Describe materials in terms of being difficult or easy to heat up (increase the temperature of) • Calculate the energy required to change the temperature of an object • Measure the specific heat capacity of a material and find a mean value	• Understand that materials with a high SHC need lots of energy to heat up so will take longer to increase in temperature when compared with a material with a lower SHC when supplied with the same energy/power. • Use the $E = mc\Delta T$ equation to solve for a variety of unknowns with multiple stage calculations
8	S9.1.8 Energy costs	SWBAT • State that different foods have different energy values • Identify different foods with high or low energy values • Compare the energy values of different foods and how this links to diet	• Use their practical experience to justify which foods re high/low energy.
9	S9.1.9 Metabolism	SWBAT • State that metabolism is the sum of all reactions in a cell or the body • Describe how the energy transferred by respiration is used by an organism • Explain which molecules are synthesised and broken down using the energy om metabolism	• Describe photosynthesis and respiration reactions and explain their context.