Revision topics for P1

Energy stores and systems	Define energy as the capacity to do work. Define a system as a group of objects that interact. When work is done, energy changes stores within a system. What are the stores of energy? The changes in energy store that occur in certain systems when certain events occur and how do we represent them in diagrams. To include: • an object projected upwards a moving object hitting an obstacle • an object accelerated by a constant force • a vehicle slowing down • bringing water to a boil in an electric kettle. Use of the idea that some stores of energy reduce, others increase and mention of the bodies that possess the energy store.	Green	Amber	Red
Energy changes in systems	Calculations of energy using the following equations: Define work: **Work done = Force x distance moved (in the direction of the force)** **units = joules** **kinetic energy = 0.5 × mass × speed ^{2}** elastic potential energy = 0.5 × spring constant × extension ^{2} **GPE = mass × gravitational field strength × height** change in thermal energy = mass × specific heat capacity × temperature change **Elastic potential energy = 0.5 x spring constant x extension^2** SI units of all the above **(Recall the equations in bold).** Calculate the changes in energy store using these equations. Define heat as being a form of energy that travels between regions of high temperature to regions of lower temperature. Identify where and how thermal energy is generated (as work is done against friction/drag) as part of the energy transfer and is dissipated to the surroundings as heat to become more dilute and less useful.	Green Green	Amber Amber	Red Red
Required practical activity 1:	Investigation to determine the specific heat capacity of one or more materials.	Green	Amber	Red
Power	**Power = energy transferred/time or** Power = work done/time: units the Watt = 1J/s	Green	Amber	Red
Energy conservation and transfers including heat loss.	• Energy cannot be created or destroyed, only transferred into other stores. • Some energy is always dissipated to the surroundings as heat. • Appreciation that the thermal conductivity of a material affects how quickly heat travels through a material with a temperature gradient.	Green	Amber	Red

	• Discussion of situations where energy loss can be reduced or increased using materials with high/low thermal conductivity in the case of heat, or lubrication for moving machine parts. • Interpreting data on thermal conductivity/insulation and thickness etc.			
Required practical activity 2	**(**physics only): investigate the effectiveness of different materials as thermal insulators and the factors that may affect the thermal insulation properties of a material.	Green	Amber	Red
Efficiency	The energy efficiency for any energy transfer can be calculated using the equation: efficiency = useful output energy transfer/total input energy transfer Efficiency may also be calculated using the equation: efficiency = useful output power /total input power How to increase the energy efficiency of a machine (HT only) – lubricating moving parts to reduce friction and hence reduce work done against friction and thermal energy production (dissipated as heat).	Green	Amber	Red
National and global energy resources	Define non-renewable resources as once that cannot be replenished as they are used: Fossil fuels and nuclear fuel. Define renewable resources as ones that can be replenished as it is used. Renewable sources of energy to include: ***biofuel, wind, hydro-electricity, geothermal, the tides, the Sun and water waves***. Describe: • Environmental impact of resource use (e.g., global warming, other social and environmental impacts potentially caused by increased CO_2 emissions and SO_2 and N_xO_y emissions). • Reliability • Compare its transport, electricity generation and heating. • Explain patterns and trends in its use (from data). • Social, political and financial implication of energy resources. Questions will focus on dealing with data and applying ideas using general knowledge.	Green	Amber	Red