

Physics: Energy

Content	RAG
What is meant by a system and how changes in a system can change how energy is stored.	
Calculate how much (kinetic) energy is in a moving object by KNOWING and using the equation: $E_k = \frac{1}{2} m v^2$	
Calculate how much (elastic potential) energy is in a stretched spring by using the equation: $E_e = \frac{1}{2} k e^2$	
Calculate the amount of (gravitational potential) energy is in an object raised above the ground by KNOWING and using the equation: $E_p = m g h$	
Calculate the energy stored or released from a system when there is a temperature change, using the equation: $\Delta E = m c \Delta\theta$	
Know what is meant by specific heat capacity.	
Know what is meant by 'work' and that a force does work on an object when the force causes the object to move.	
Calculate the work done when an object is moved by KNOWING and using the equation: $W = F s$	
Know what is meant by the term 'power' and give examples that illustrate this.	
Calculate Power by KNOWING and using the equations: $P = \frac{E}{t}$ and $P = \frac{W}{t}$	
Know that 1 watt = 1 Joule of energy transferred per second (1W = 1J/s)	
Be able to explain why energy can be TRANSFERRED USEFULLY, DISSIPATED or STORED	
Describe ways in which unwanted energy transfers can be reduced.	
Describe ways that the rate of cooling in buildings is affected.	
Calculate the energy efficiency of an energy transfer using the equation: $efficiency = \frac{useful\ output\ energy\ transfer}{total\ input\ energy\ transfer} \text{ OR } efficiency = \frac{useful\ power\ output}{total\ power\ input}$	
(HT ONLY) Be able to describe ways to increase the efficiency of an energy transfer	

List the main energy resources available for use on Earth & describe whether they are renewable or non-renewable	
Compare ways that different energy resources are used, the uses to include transport, electricity generation and heating	
Explain why some energy resources are more reliable than others	
Describe the environmental impact arising from the use of different energy resources	
Explain patterns and trends in the use of energy resources	

Physics Electricity triple

Content	RAG
Know all the standard circuit diagram symbols and draw and interpret diagrams	
Define electrical charge and calculate it by recalling and using the equation: charge flow = current x time ($Q=It$)	
Define current, potential difference and resistance.	
Recall and apply the equation: potential difference = current x resistance ($V = IR$)	
REQUIRED PRACTICAL: Describe how to investigate the factors affecting resistance of electrical circuits including length of a wire and resistors in series and parallel	
Recognise current-potential difference graphs for a resistor, filament lamp and diode.	
REQUIRED PRACTICAL: Describe how to investigate current-potential difference characteristic of a filament lamp, diode and resistor at constant temperature	
Describe what happens to current, potential difference and resistance in a series circuit	
Describe what happens to current, potential difference and resistance in a parallel circuit	
Draw series and parallel circuit diagrams	
Know that mains electricity supply has a frequency of 50Hz and is about 230V	
Explain the difference between direct and alternating potential difference	
Explain what each of the wires in a 3 core cable does.	
Relate power in a circuit to potential difference and current	
Recall and apply the equations: power = potential difference x current ($P = VI$) and power = current ² x resistance ($P = I^2 \times R$)	
Describe the energy transfers of different domestic appliances	
Recall and apply the equations: Energy transferred = Power x time ($E = Pt$) and Energy transferred = charge flow x potential difference ($E = QV$)	
Explain how the national grid transfers electrical power	

Content	RAG
<i>PHYSICS ONLY: Describe how static electricity is created and transferred</i>	
<i>PHYSICS ONLY: Draw the electric field pattern for an isolated charged sphere.</i>	
<i>PHYSICS ONLY: Explain the concept of an electric field</i>	

Particle Model of matter: Content	End
Define density and calculate it by recalling and applying the equation: density = mass/volume	
Draw simple diagrams to model a solid, liquid and gas and use these to explain the difference in density.	
REQUIRED PRACTICAL: Explain how to record the density of regular and irregular shaped objects.	
Describe the different changes of state	
Describe what is meant by internal energy	
Be able to explain the effect of changing temperature on a system and how this relates to the specific heat capacity.	
Describe what is meant by specific latent heat and be able to calculate it.	
Be able to distinguish between specific latent heat and specific heat capacity	
Interpret heating and cooling graphs for state changes	
Explain how changing the temperature of a gas can change its pressure	
<i>PHYSICS ONLY: Explain how increasing the volume of a gas can decrease the pressure</i>	
<i>PHYSICS ONLY: Apply the equation: pressure x volume = constant</i>	
<i>PHYSICS ONLY (HT): Explain how doing work on a gas leads to an increase in the temperature of the gas, in given situations</i>	

Physics – Atomic Structure Combined

Content	RAG
Describe the structure of an atom	
Define an isotope and state the differences in numbers of subatomic particles between isotopes and atoms.	
Describe and compare the plum pudding and atomic models of the atom	
Describe the alpha scattering experiment	
Describe properties of alpha, beta and gamma radiation	
Be able to complete nuclear equations of alpha and beta decay	
Define the term 'Half-life'	
Calculate the half-life of a radioactive isotope from graphs or given information	
HT ONLY: Calculate the net decline in emission after a certain number of half-lives, expressed as a ratio	
Describe the difference between contamination and irradiation	
Compare hazards with contamination and irradiation and suggest suitable precautions	
TRIPLE ONLY: Explain what is meant by background radiation and give some examples	
TRIPLE ONLY: describe and evaluate the use of radiation in medicine	
TRIPLE ONLY: Evaluate the risks of using radiation	
TRIPLE ONLY: Describe and explain nuclear fission	
TRIPLE ONLY: Describe and explain nuclear fusion	