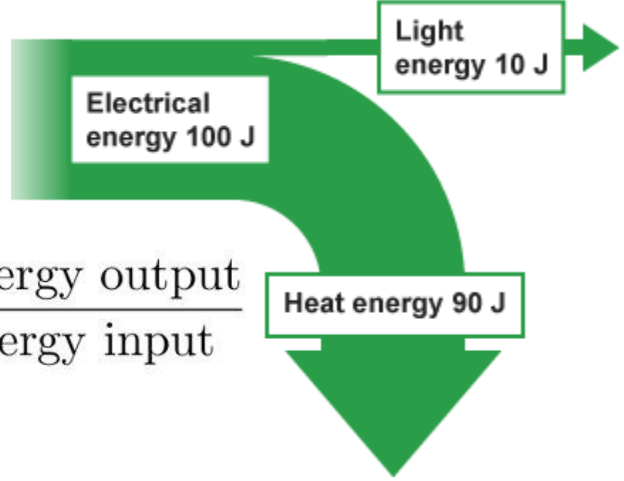
Physics Curriculum Overview Year 9 2024-25

Unit Title	P1. Energy	P2. Electricity
Approximate Number of Lessons	14	12
Curriculum Content	- Ways in which energy can be stored and transferred - Calculating the work done by a force - The energy transfers that happen when an object falls - The energy transfers that happen when an elastic object is stretched - Calculating the power and efficiency of an appliance - Comparing different energy resources	- The concept of electric current as the rate of flow of electric charge - How current relates to resistance and potential difference - Investigating thermistors and light-dependent resistors - How parallel circuits differ from series circuits - The characteristics of the UK mains supply, plugs, and cables - Calculating the energy transferred by electrical appliances
Links to prior learning	Learners should already be able to: - Name the different energy stores - Recall that energy is always conserved - Give examples of energy transfers	Learners should already be able to: - Recall the main circuit symbols - Draw and construct simple circuits - Make predictions about bulb brightness in series and parallel circuits
Cultural Capital Opportunities	• Visit Drax Power Station • Energy and Resources News -- ScienceDaily • Majority of offshore workforce 'in low carbon energy roles by 2030' - BBC News • Conservation of Energy | Physics – Wonders of Life • All of AQA Energy explained in 7 minutes - GCSE Physics REVISION	• Circuit Construction Kit: DC - Virtual Lab (colorado.edu) • Hot Wires - John Adams • Electricity's spark of life | Science News for Students • Oxford Electric Bell: The battery that's outlived queens and presidents - BBC News • Electricity: Crash Course History of Science #27 • All of AQA Electricity Explained - GCSE Physics REVISION
Assessment Focus	Year 9 transition assessment (by 22nd October) Energy end of topic test	Electricity end of topic test
Name of Knowledge Organiser		

Energy is the capacity to do work.

"Energy cannot be created or destroyed; only changed from one form to another"



kinetic, chemical, internal (thermal), gravitational potential, elastic potential, magnetic, electrostatic, nuclear

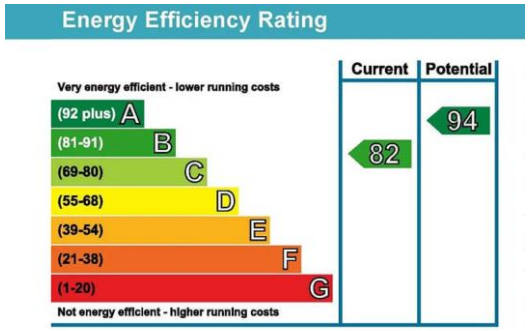
Specific heat capacity

This is the amount of energy required to raise the temperature of 1Kg of substance ***by 1°C***

P1 Energy

$$\text{efficiency} = \frac{\text{useful energy output}}{\text{total energy input}}$$

Fuel is burnt → Water heated to generate steam → Steam turns the turbine → Turbine turns a generator → Generator converts kinetic to electric



Resource*	Advantage of this method	Disadvantage of this method
Fossil fuels	Reliable	Limited supply. Pollutants released when burned.
Nuclear	Reliable	Will run out. Produces hazardous waste
Wind	Clean. Cheap to run.	Not always windy. Expensive to set up.
Solar	Clean and cheap to set up.	Not always sunny. Initial costs may take a long time to be paid back.
Hydroelectric	Clean and cheap to set up.	Could be affected by drought.
Biofuel	Growing them takes in carbon dioxide	Causes pollutants to be released when burned.
Tidal	Clean. Generates lots of electricity.	Very costly to set up.
Wave	Clean.	Expensive to set up.

Energy loss can be prevented. This improves the efficiency of an energy transfer.
Insulation can prevent heat loss.

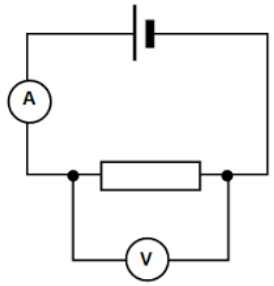
Kinetic energy = ½ X mass X $(\text{speed})^2$

Elastic potential = ½ X spring constant X $(\text{extension})^2$

Gravitational potential = Mass X gravitational field strength X height

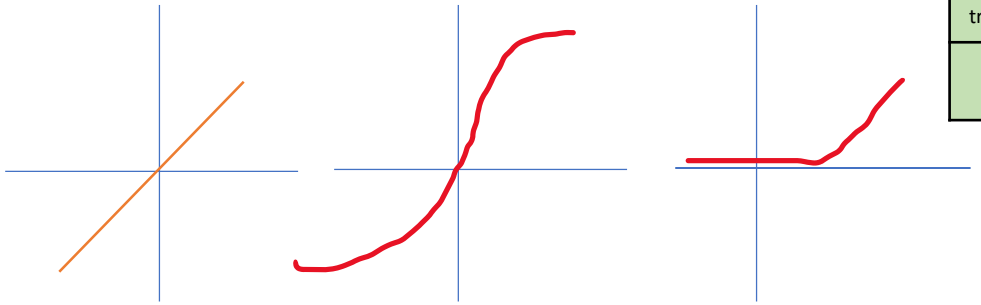
P2 Electricity

Term	Meaning
Ammeter	Measures the current in a circuit (A). This is the rate of flow of electrons.
Voltmeter	Measures the potential different in volts (V) in a circuit
Resistor	A component that slows the current flow
Series circuit	A circuit where the current is the same all the way round. The potential difference is shared between components.
Parallel circuit	A circuit where the current is shared between the branches and the potential difference is the same all the way around.
Alternating current	The current changes direction
Direct current	The current flows in only one direction



Ammeters are placed in series with the components in a circuit. Voltmeters are placed in parallel to the components.

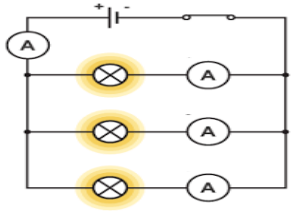
Quantity	Equation	Unit
Charge flow	Q=IT	C
Potential difference	V = IR	V
Power	P = E/t	W
Power	P= IV	W
Energy transferred	Energy = power x time	J
Energy transferred	E = QV	J



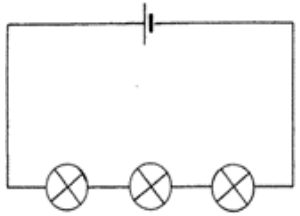
Ohmic resistor

Filament lamp

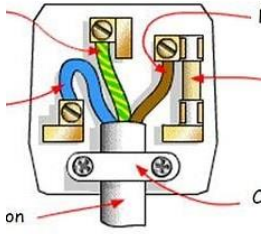
Diode



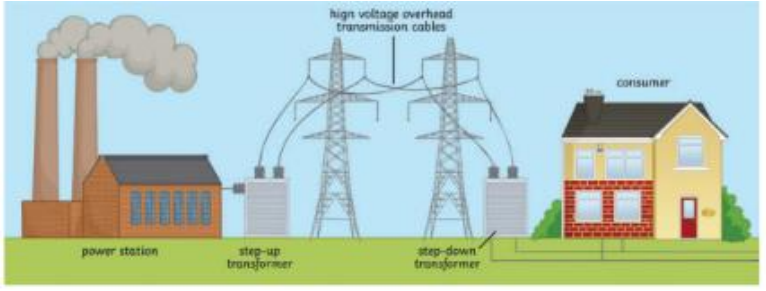
Parallel circuit



Series circuit



Brown = live
Blue = neutral
Yellow and green = earth.



Diode	LED	LDR	Fuse	Resistor	Switch	Ammeter	voltmeter	Variable resistor	Thermistor	cell	Battery	Lamp