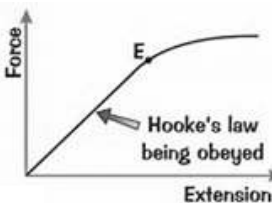


Key points to learn

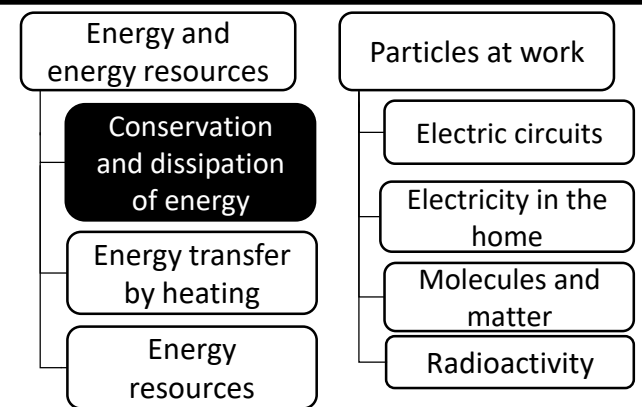
1. Energy stores [J]	<ul style="list-style-type: none"> 8 Stores: Kinetic; Elastic potential; Nuclear; Thermal; Chemical, Magnetic; Gravitational potential; Electrostatic
2. Chemical energy [J]	Transferred during chemical reactions eg fuels, foods, or in batteries
3. Kinetic energy [J]	All moving objects have it $k.e = 0.5 \times \text{mass} \times (\text{speed})^2$ $E_k = \frac{1}{2} \times m \times v^2$ <div>[J] [kg] [m/s]</div>
4 Gravitational potential energy [J]	Stored in an object lifted up $g.p.e = \text{mass} \times g \times \text{height}$ $E_p = m \times g \times h$ <div>[J] [kg] [N/kg] [m]</div>
5. Elastic potential energy [J]	Energy stored in a elastic object $e.p.e = 0.5 \times \text{spring constant} \times (\text{extension})^2$ $E_e = \frac{1}{2} \times k \times e^2$ <div>[J] [N/m] [m]</div> <i>(You are given this equation)</i>
6. Energy pathways	Heating (thermal energy always flows from hot to cold objects) An electrical current flowing A force moving an object (work done) Radiation eg light
7. Useful energy [J]	Energy transferred to the place and in the form we need it
8. Wasted energy [J]	Not useful. Eventually transferred to surroundings

Key points to learn

9. Work done [J]	Equal to the energy transferred When a force moves an object $\text{Work done} = \text{Force} \times \text{distance moved}$ $W = F \times s$ <div>[J] [N] [m]</div>
10. Energy flow diagram	Show energy transfers eg for a torch lamp: Chemical → Light + Heat
11. Conservation of energy	Energy cannot be created or destroyed It can only be transferred usefully, stored or dissipated
12. Dissipated energy [J]	Wasted energy, usually spread to the surroundings as heat
13. Hooke's Law and k the spring constant	The extension of a spring is proportional to the force on it The gradient of this graph is known as k, the spring constant. 
14. Efficiency	Proportion of input energy transferred to useful energy. 100% means no wasted energy. $\text{Efficiency} = \frac{\text{useful energy}}{\text{total input energy}}$
15. Power [W]	Energy [J] transferred in 1 second. $\text{Power [W]} = \frac{\text{Energy [J]}}{\text{time [s]}}$
16. Wasted power [W]	Total power in – useful power out

Topic 3: Energy Knowledge Organiser

Big picture (Physics Paper 1)



Background

Energy is the capacity of something to make something happen.
The Universe and everything in it is constantly changing energy from one form into another.

Maths skills

You should be able to recall, use and rearrange all the equations on this page except number 5.
g is Earth's acceleration due to gravity. It has a constant value of approximately 9.8m/s²
You need to remember the units for each quantity. They are in [] next to equations.
You should be able to calculate the gradient of a Force – extension graph.