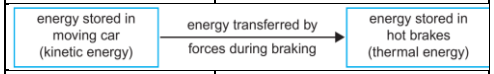
CP3 Conservation of Energy

1. Energy stores and transfers

Energy	The capacity to do work.
Joules	The units of energy, symbol = J
Kilojoules	1000 J, symbol = kJ
Thermal energy	Energy stored in hot objects.
Kinetic energy	Energy stored in moving objects.
Chemical energy	Energy stored in chemicals such as fuels.
Nuclear energy	Energy stored in the nucleus of atoms. Also called atomic energy.
Gravitational potential energy	Energy stored in objects based on how high they are.
Elastic potential energy	Also called strain energy. Energy stored in bent or stretched objects.
Energy stores examples	Light, thermal(heat), sound, electrical, kinetic (movement)

Law of conservation of energy	Energy cannot be created or destroyed, just transferred from one energy store to another.
Energy transfers	Say from what store the energy starts as *and* what its new store is.
	
Sankey diagram	Shows energy transfers. The thickness of the arrow relates to the amount of energy.

2. Energy efficiency

Dissipation	The way energy spreads out into the surroundings, becoming less useful as it does.
Wasted energy	Energy that is transferred into stores that aren't useful.
Friction	Causes thermal energy loss as heat when two surfaces rub together.
Lubrication	Allows surfaces to move smoothly, reduces energy loss from friction.
Electrical resistance	Causes wires to heat up, wasting electrical energy.

Calculating efficiency	$\text{efficiency} = \frac{\text{(useful energy transferred by the device)}}{\text{(total energy supplied to the device)}}$ Efficiency is expressed as a decimal.
Energy efficiency numbers	Efficiency is between 0 and 1. 1 = no energy wasted 0 = all energy wasted

3. Keeping warm

Convection	Heat transfer caused when hot fluids (gas or liquid) rise because they are less dense.
Conduction	Heat transfer through solids caused by vibrating particles bumping into each other.
Radiation	Heat transfer by infrared radiation which heats objects up when they absorb it.
Radiation and surfaces	Infrared radiation is absorbed (taken in) and emitted (given out) easily by dull, dark surfaces. Radiation is absorbed and emitted poorly by shiny, light surfaces.
Insulation	Materials that contain lots of tiny air pockets that prevent heat loss by conduction.

Thermal conductivity	A measure of how well a material conducts heat.
Reducing the rate of energy transfer	Increase thickness of material Decrease thermal conductivity Decrease temperature difference

4. Non-renewable energy resources

Non-renewable resource	A resource that will one day run out because it is being used faster than it is being made.
Fossil fuels	Coal, oil, natural gas. All are non-renewable.
Nuclear power	Electricity generated from non-renewable nuclear fuels such as uranium.
Climate change	Changes that happen to global weather patterns as a result of global warming.

5. Renewable energy resources

Renewable resource	A resource will not run out.