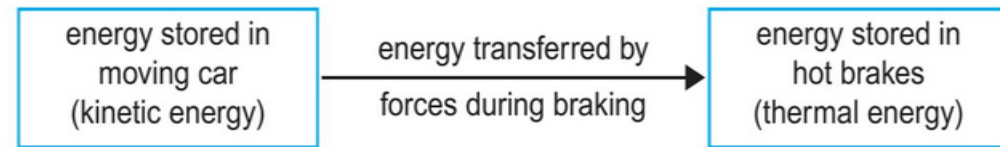
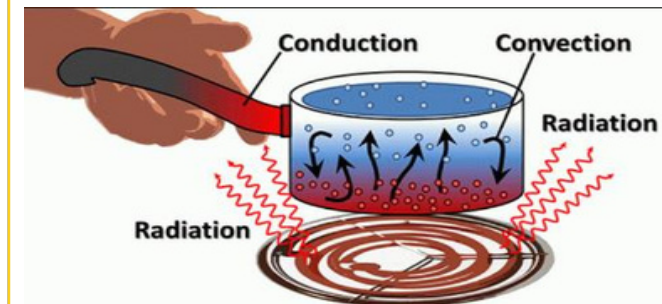
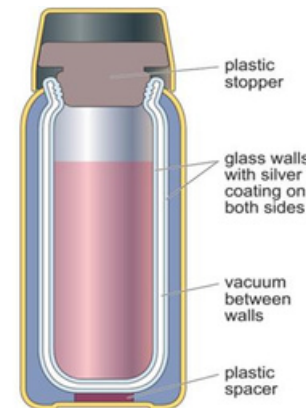
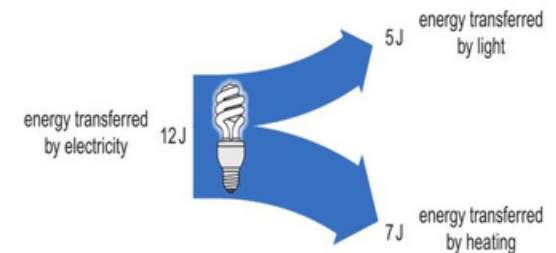


Knowledge Organiser: Physics, CP3a

1	Law of conservation of energy = Energy cannot be created or destroyed , energy can only be transformed from one form to another
2	Energy is measured in Joules (J) Energy stores include thermal energy (hot objects), chemical energy (food, fuels, batteries), kinetic (moving objects), gravitational potential energy (objects higher up in a gravitational field), elastic potential energy (springs), atomic or nuclear energy (radioactive decay)
3	Energy can be transferred mechanically - by a force moving a distance, electrically - by use of an electric current, thermally - because of a difference in temperature, radiation - by waves such as electromagnetic or sound
4	Energy transfer diagrams show the energy stores (boxes) and ways in which energy moves (arrows)
5	Friction is a contact force (two surfaces come into contact) Work done to overcome friction is mainly transferred to thermal energy
6	Lubricants such as oil are used to reduce friction between moving parts
7	Efficiency is how good a machine is at transferring energy into useful forms. Efficiency is written as a percentage e.g. 50% or as a decimal fraction e.g. 0.50.
8	Sankey diagrams show how energy is transferred by the device and show efficiency
9	Energy can be dissipated (spreads out) to the surroundings and cannot be used for other useful energy transfers is said to be wasted .
10	Heat energy can be transferred by conduction , convection or infra red radiation .
11	Conduction (happens in solids) and convection (happens in liquids and gases) need particles , radiation does not need particles therefore it can travel through a vacuum .
12	



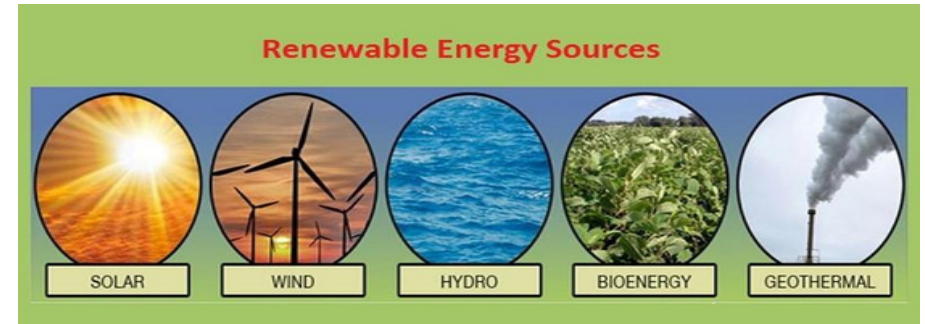
$$\text{efficiency} = \frac{\text{useful energy output}}{\text{total energy input}}$$



13	A vacuum is the where there are no particles such as space
14	Insulation is used to minimise thermal energy transfers from warmer to cooler areas. Most insulation relies on trapped gases or absence of particles e.g. vacuum flask

Knowledge Organiser: Physics, CP3

- 1 Thermal energy is always transferred hot → cold.
- 2 Gravitational potential energy (J) = mass (kg) x gravitational field strength (N / kg) x change in height (m)
- 3 **Kinetic energy (J) = $\frac{1}{2} \times \text{mass (kg)} \times \text{velocity}^2 \text{ (m/s)}$**
- 4 **Non-renewable** resources - a resource that cannot be replaced after it has been used up
Fossil fuels were fuels created millions of years ago and include **oil, coal** and **natural gas**
Combustion (burning) of fossil fuels creates carbon dioxide that causes global warming and oxides of sulphur which cause acid rain.
 Nuclear power stations split large atoms such as **Uranium** releasing large amounts of heat energy this is called **nuclear fission**
- 5
- 6
- 7
- 8 Renewable resources can be replaced in our lifetime e.g. solar, wind, hydroelectricity, biomass and wave
Biomass - plants e.g. trees are grown for burning. This resource is **carbon neutral** - plants absorb carbon dioxide when they are growing but this is released again when burnt.
- 9
- 10 **Wave** - kinetic energy from waves moves a generator
- 11 **Solar** - light energy from the sun creates electricity or infra-red energy heats water.
Hydroelectric the gravitational potential energy of water is turned into kinetic energy that turns a turbine which then turns a generator that creates electricity
- 12
- 13 **Geothermal** - hot rocks under deep in the crust create steam which runs a generator



$$KE = \frac{1}{2}mv^2$$

