

Physics Revision Notes – Energy

1. The nine main types of **energy** are as follows:
 - Thermal energy (heat).
 - Electrical energy.
 - Light energy (and other forms of electromagnetic radiation).
 - Chemical energy.
 - Kinetic energy (motion).
 - Nuclear energy.
 - Sound energy.
 - Elastic potential energy (EPE).
 - Gravitational potential energy (GPE).
2. Energy can neither be created nor destroyed, it can only be **changed from one form into another**.
3. The formula for **efficiency**:

$$\text{Efficiency} = \frac{\text{Useful energy transferred by the device}}{\text{Total energy supplied to the device}}$$

4. The formulae for **power**:

$$\text{Power (W)} = \frac{\text{Work done or energy transfer (J)}}{\text{Time taken (s)}} - P = \frac{W}{t}$$

$$\text{Power (W)} = \text{Voltage (V)} \times \text{Current (A)} - P = VI$$

5. The formula for **work done**:

$$\text{Work done (J)} = \text{Force (N)} \times \text{Distance moved in direction of force (m)} - Wd = F \times d$$

6. The formula for **kinetic energy**:

$$\text{Kinetic energy (J)} = \frac{1}{2} \times \text{Mass (kg)} \times \text{Velocity (m/s)}^2 - KE = \frac{1}{2} mv^2$$

7. The formula for **potential energy**:

$$\text{Potential energy (J)} = \text{mass (kg)} \times g \times \text{Height (m)} - PE = mgh$$

8. For a falling object, the kinetic energy gained is equal to the potential energy lost.
9. **Conduction** is where heat is passed from one vibrating molecule to the next. All metals are good conductors of heat, but water is a poor conductor and air is a very poor conductor indeed.
10. **Convection** is where hot liquids or gases are less dense and so rise above cooler ones, while the cooler liquids or gases fall to take its place. This is called a **convection current**.
11. **Radiation** is where energy is emitted from a hot object as infra-red radiation (i.e. it can travel through a vacuum at the speed of light). Black, matt surfaces are good radiators and absorbers, whereas bright, shiny surfaces reflect the radiation and so are poor radiators and absorbers.
12. The **vacuum flask** is a good example of using all three types of radiation.
13. The energy used in a home is measured in **kilowatt-hours**, and can be used to calculate **electricity bills**:

$$\text{Energy (kWh)} = \text{Power (W)} \times \text{Time (h)}$$

14. Buildings can be **kept warm** using various methods (e.g. various types of **insulation**).