Chapter 38: Energy

Def: Energy is the ability to do work and is measured in joules. (J)

Forms of Energy.

1. Potential Energy: This is stored energy which is ready to do work, e.g. Coiled spring.

2. Kinetic Energy: This is the energy that a moving object has.

3. Heat Energy: Heat causes things to move, e.g. Hot air balloon.

4. Light Energy: Light cause things to move or work, e.g. solar powered calculator.

5. Sound Energy: Loudspeaker causes air to move.

6. Electrical Energy: Electrical fans, toasters.

7. Chemical Energy: The energy stored in chemicals like petrol and batteries.

8. Nuclear Energy: The energy stored in the nuclei of atoms.

Law of Conservation of Energy

Def: Energy cannot be created or destroyed, but can be converted from one form to another.

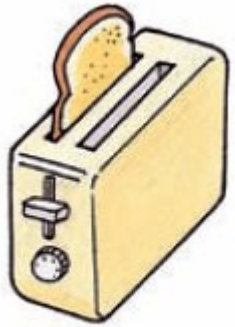
What energy conversations take place in the following??

Jack-in-the-box

Potential to Kinetic

Radio

Electrical to Sound



Toaster

Electrical to Heat

Chainsaw

Chemical to Kinetic

Torch

Chemical to
Light or Heat

Leaf

Light to
Chemical

Light bulb

Electrical to
Light or Heat

Dynamo

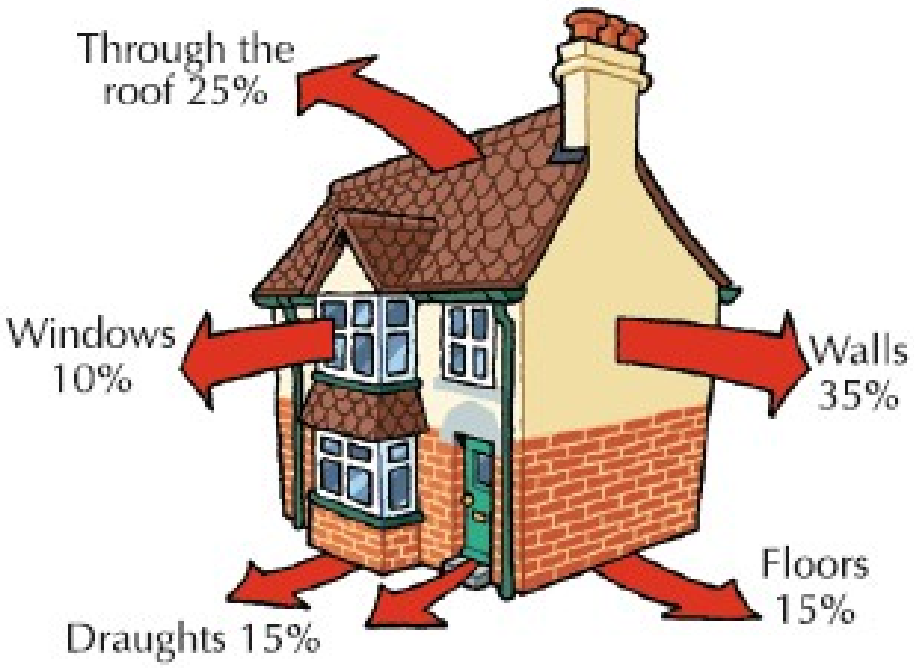
Kinetic to
Electrical

Battery

Chemical to
Electrical

Energy Needs and Heat Loss.

We use energy in our homes by using electrical appliances and for heat.



There are different ways to heat a house.
Coal, turf, electricity, gas, solar panels, geothermal etc. can be used.

But the average house loses a lot of heat energy because of poor insulation. The diagram on the left shows how the heat can be lost from our homes.

Insulation.

An insulator is a substance that does not allow heat to pass through it easily, e.g. glass fibre or air.

Insulation in the home include

1) Air cavity in the walls
2) Lagging jacket on the hot water tank
3) Double glazed windows
4) Glass fibre in the attic.

Sources of Energy.

The sun is the primary source of energy, all other energies can be linked back to it.

Without the sun, we would die. All our food comes from the sun, e.g. The sun gives energy to plants which they use to make food!

Energy Supplies.

There are 2 types of energy, non-renewable and renewable.

Non-Renewable Sources

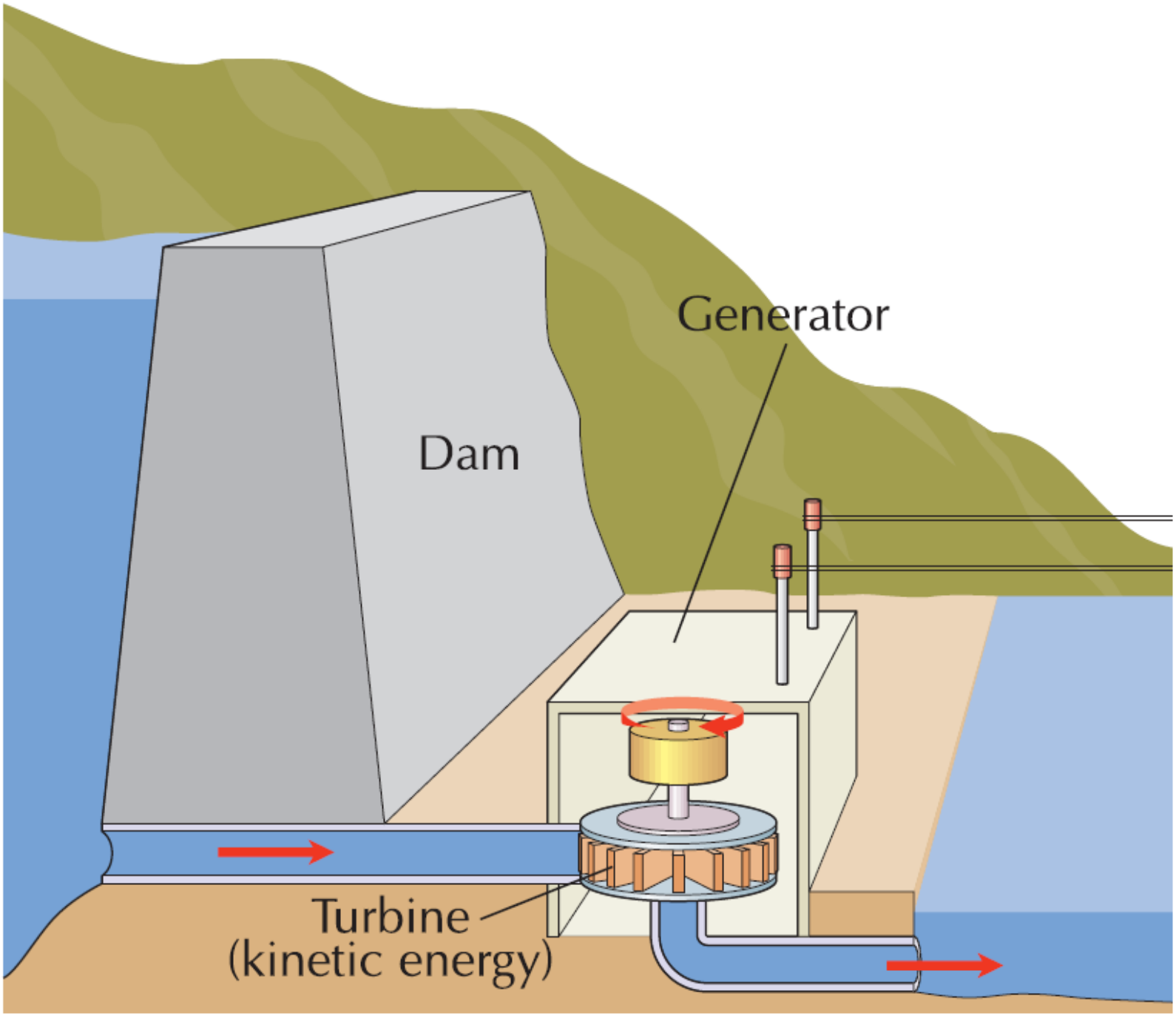
- These are fossil fuels such as coal, turf, oil, gas wood.
- They are made from dead animals and plants and take millions of years to form. Once used, they can't be replaced.
- Fossils fuels are our main source of energy at the moment.
- Fossil fuels are bad for the environment as the produce harmful fumes.

Renewable Sources of Energy

These are sources that can be used over and over again.

1. Solar energy – solar panels to heat water.
2. Hydro-electric energy – water from a dam turns turbines and produces electricity.
3. Wind energy – windmills produce electricity.
4. Wave energy – large floats in the sea move to produce electricity.
5. Biomass energy – some plants produce oil which can make fuels.
6. Geothermal energy – pipes buried in the ground heats water which heats homes.

Renewable sources will never run out and produce very little pollution. They are expensive at the minute but are starting to become more common.


Generator
Dam
Turbine
(kinetic energy)

Nuclear Energy.

When the nucleus of a large atom like uranium is split, large amounts of energy is released. This energy is used to heat water and produce electricity.

However, nuclear energy can be dangerous if an accident occurs, such as Chernobyl.

Advantages of nuclear energy.

1. Can be used to kill cancer cells.
2. Can be used to sterilise food.
3. Can produce electricity.

Disadvantages of nuclear energy.

1. The waste is radioactive which is harmful and takes millions of years to decay.
2. If the energy gets out of control, radioactive material can be released into the environment.