Rosary School – Marj Elhamam

Study sheet 2 - 9Ib Energy for Movement

Name: _____ Date: ____ /____ / 2025

Grade: 8 ( ) Subject: Physics

Energy transfers and stores

- Everything around us needs energy to move.
- The unit for measuring energy is the **joule** (**J**). 1000 J = 1kJ.
- Energy can be **transferred** by:

  1- Heat 2- Waves (light, sound) 3- Electricity 4- Forces.
- Energy can be **stored** in the form of:

Commonly called…	**Energy stored in…**
1. Chemical energy	the **chemicals** in food (plant and animal based), muscles, fuels and batteries.
2. Kinetic energy	moving objects.
3. Thermal energy	the **movement of partic**les. There is more of it in **hot** objects.
4. Strain energy or elastic potential energy	objects that are **stretched**, **squashed** or **twisted**.
5. Gravitational potential energy	objects moved to **high** places.
6. Nuclear energy or atomic energy	inside the particles (the **nuclei** of atoms) that everything is made up from and the Sun.

- **Law of conservation of energy**: Energy is not used up. It can be transferred and stored in different ways, but it cannot be created or destroyed.

  Total energy input = total energy output (useful + wasted)

Efficiency:

- Not all energy is transferred **usefully**.
- **Wasted** (dissipated) energy is most often transferred by **heating** and some is wasted as **sound**.

- The **percentage of useful energy** produced by something is known as its **efficiency**.

Renewable and non-renewable energy resources

- **Non- renewable energy resources:** Energy resources that will run out because they are being used at a higher rate than they are produced.

  Examples of non-renewable energy resources:

  1. **Fossil fuels:** fuels formed of the remains of organisms over millions of years (e.g. coal, oil and natural gas). The chemical energy stored in fossil fuels is released by *burning* for heating and to generate electricity.
  2. **Nuclear fuels** (Uranium): uranium is mined from the ground, and it will eventually run out. Nuclear energy is released from uranium by *a reaction* in nuclear power station and is transferred for either heating or to generate electricity.

- **Renewable energy resources:** energy resources that can be replaced quickly and will never run out.

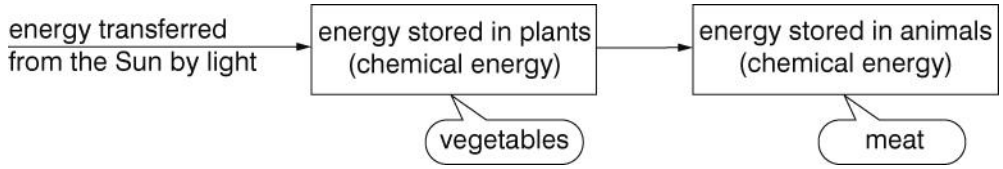
  Examples of renewable energy resources:

  1. **Solar energy**: solar *panels* use energy transferred by heat from the Sun to heat water. Solar *cells* (photovoltaic cells) use energy transferred by light from the Sun to generate electricity.
  2. **Wind power**: wind turbines transfer the kinetic energy stored in the moving wind to electrical energy.
  3. **Biofuels**: they are made from plants or the wastes from animals.
  4. **Hydroelectricity**: energy stored in water in dams (gravitational potential energy), waves and tides (kinetic) can also be transferred to generate electricity.
  5. **Geothermal**: rocks under the ground are hot. Water can be heated by pumping it through the rocks.

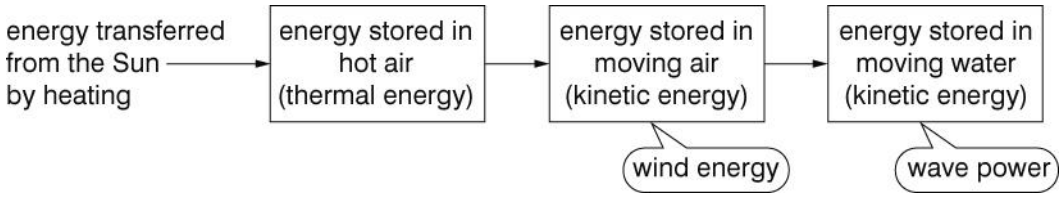
Energy from the Sun

Most of the energy resources we use store energy that originally came from the Sun. **Only geothermal power, nuclear power and tidal power** (tides form because of the gravity between the Earth and the moon) **do not depend on energy from the Sun.**

How solar energy is transferred to our food:



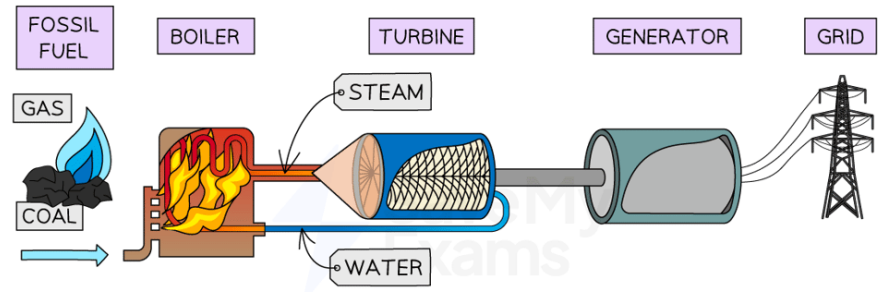
How solar energy is stored in the wind and in waves:



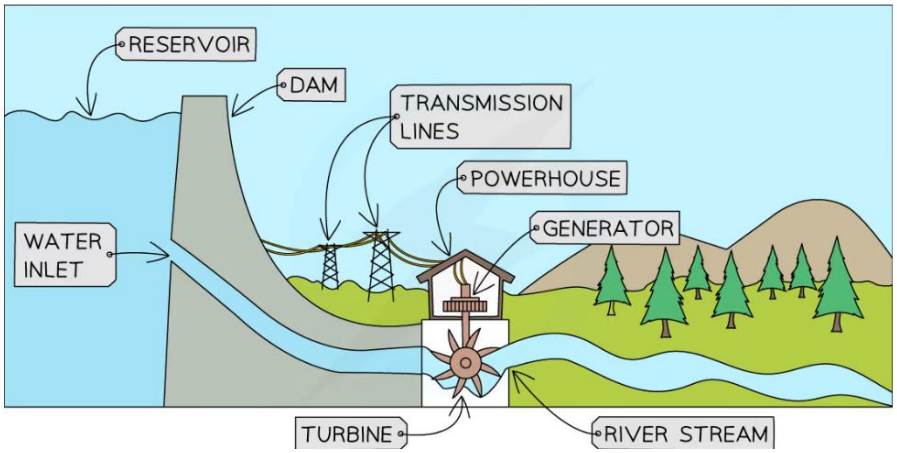
Generating electricity from energy resources

- Electricity is generated in very similar ways, no matter what energy resource is used.
- A **turbine** is turned, which turns a **generator**, which generates electricity.
- The element that differs is **how** the turbine is made to turn.

Fossil fuel electricity generation



Hydroelectric dam



Coursebook questions: 1 – 9 pages 112, 113

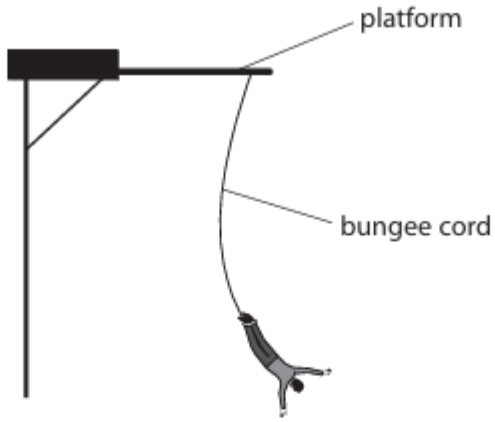
Workbook questions: page 78

Achievement test questions:

Question 1:

Bungee jumping is an activity that involves jumping from a tall structure or platform while connected to a bungee cord.

The diagram below shows a person performing a bungee jump off a platform.



(a) Name the force that pulls the bungee jumper towards the ground.

(1)

.....

(b) The box contains the names of six different types of energy.

chemical	elastic	electrical
gravitational potential	kinetic	sound

Use words from the box to complete the following sentences.

(3)

When the bungee jumper falls from the platform his .....

energy is transferred as ..... energy.

As the jumper falls the bungee cord will stretch.

When the bungee cord is stretched the energy is stored as

..... energy.

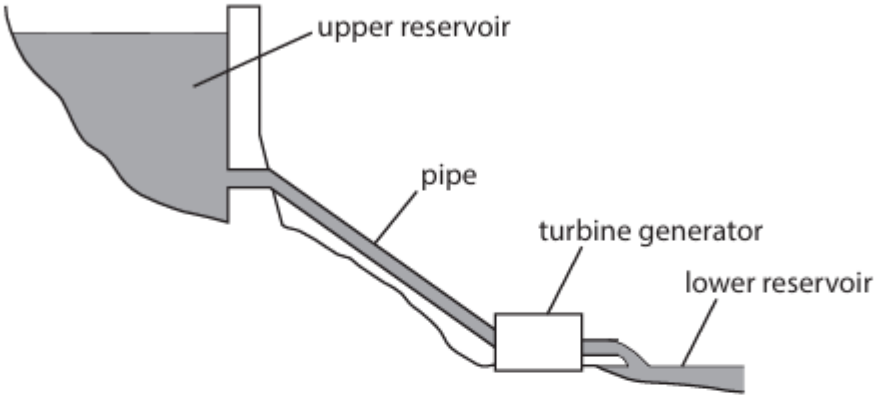
(Total for Question 7 = 4 marks)

Question 2:

The diagram represents a hydroelectric power station.

The upper reservoir is connected to the turbine generator through a pipe.

The turbine generator uses the energy stored in the water and transfers it electrically.



Which **two** statements about the energy transfers that occur are true?

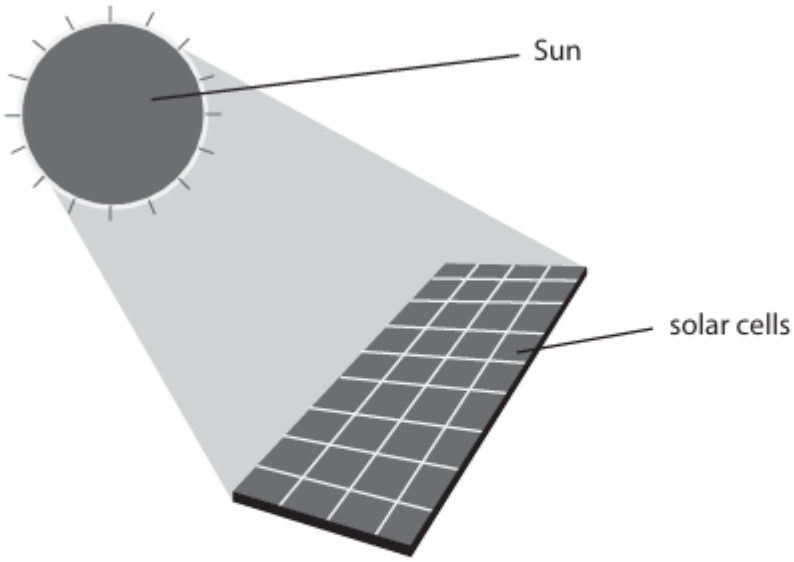
Tick (✓) **two** boxes.

Statement	True
in the upper reservoir energy is stored in the kinetic energy store of the water	
in the upper reservoir energy is stored in the gravitational potential energy store of the water	
as the water moves through the pipe it loses gravitational potential energy and gains kinetic energy	
as the water moves through the turbine generator it loses gravitational potential energy and gains electrical energy	
as the water moves through the turbine generator it gains gravitational potential energy and loses kinetic energy	

(Total for Question 12 = 2 marks)

Question 3:

Solar cells absorb energy from the Sun.



How is this energy transferred from the Sun to the solar cells?

- ☒ **A** by electricity
- ☒ **B** by heating
- ☒ **C** by forces
- ☒ **D** by light waves