

P.7 SCIENCE

Magnets have the following properties.

1. A freely suspended bar magnet will rest pointing in the North - South direction.
2. The poles are the strongest parts of the magnets.
3. Like poles of a magnet repel each other while unlike poles attract each other.
4. Magnetism can pass through non magnetic materials.

Draw diagrams to represent properties of magnets stated above.

ref:

- a) Comprehensive integrated science bk 7
- b) Mk integrated science bk 7
- c) Any other text book of science book 7

Activity

1. When a freely suspended magnet is left to rest, in which direction does it point?
2. By what means can iron fillings be separated from sand.
3. Differentiate between a magnet and magnetism.
4. How is a magnet important to pilot?
5. Which property of magnet is used by pilot to show direction.

6. Give the example of a magnet that is used by pilots to show direction.

MAGNETISATION

1. Magnetisation means making magnets or turning magnetic materials into magnets.
2. Magnets can only be made from magnetic materials.
3. Alloys when magnetised become strong magnets that do not easily lose magnetism.
4. Steel is one example of an alloy that can be magnetised.

How magnetic materials become magnets?

- a) Magnetic materials have particles known as domains.
- b) Before magnetic materials become magnets, the domains are disorganised in arrangement.

Domains before magnetising Domain after magnetising

- c) Once materials get magnetised the domains get arranged in order facing one direction.

Methods of making temporary magnets

There are two methods of making temporary magnets. These are;-

- a) Electrical methods (electro-magnetisation)
- b) Induction method.

Induction method

- 1) This is a method of making magnets by letting a piece of magnetic material to be in attached to a permanent magnet.
- 2) When other materials are brought near the magnetic material they become attracted.
- 3) The magnetic material now becomes an induced magnet.
4. The induced magnet can lose its magnetism when removed from the permanent magnet.
5. Sometimes however, if left there for long or when the magnet used is very strong, it will come a permanent magnet.
- 6) During the induction method the part of the magnetic material attached to the magnet gets the opposite pole to that of the magnet where it is attached.

The part at the end of the induced magnet gets a similar pole to that at the pole of attachment.

ELECTRIC METHODS

1. This is the method of making magnets using electricity.
2. Electric method involves making a coil of insulated wires by winding them around a magnetic material.
3. This coil of insulated wires is called a solenoid.
4. This coil of wires is then connected to a strong source of electricity.

5. A piece of magnetic material will get magnetised when the circuit is completed.
6. The magnet formed is known as an electro magnet. This magnet will lose its magnetism once the circuit is broken. This is therefore, shows that an electro magnet is a temporary magnet.

FINDING POLES OF AN ELECTRO MAGNET

When using the four fingers and the thumb of the right hand we can get the pole.

If we make the small fingers to point to the direction of current the opened thumb will point to the direction of North Pole.

INCREASING THE STRENGTH OF AN ELECTRO MAGNET

The strength of an electro magnet can be increased by; -

- i) Increasing the number of coils of insulated wires on the magnetic materials.
- ii) Increasing the number of dry cells (increasing the voltage)

USES OF ELECTRO MAGNETS

- i) Electro magnets are used when making electric bells.
- ii) They are used in cranes that lift heavy magnetic materials i.e. metal scrap to blast furnace.
- iii) Electro magnets are also used to make electric clocks and watches.

MAKING PERMANENT MAGNETS

Permanent magnets can be made using either induction method or stroking method.

Stroking method

Stroking may be done in two ways;-

- i) Divided touch or double touch method.
- ii) Single touch method.

Single touch method

1. This is done by stroking a magnetic material using a permanent magnet. It is done several times in the same direction with one pole of a magnet.

2. When the end is reached the magnet is lifted high above and the stroking begins again.
3. The pole got at the end of the magnetic material is opposite to that of the stroking.

Double touch method or divide touch method

- i) This is a method of stroking a magnetic material using two magnets.
- ii) This stroking starts from the middle moving to opposite poles.
- iii) The pole of each magnet not used for stroking will appear at the end where each magnet ends its stroking.

ACTIVITY

1. Write down any two properties of magnets.
2. How can one make a magnet?
3. Why is an electro magnet referred to as a temporary magnet.
4. List four examples of;-
 - a) Magnetic substances
 - b) Non-magnetic substances
5. Mention three methods of making a magnet.

DEMAGNETISATION

1. This is a method of making the magnet lose its magnetism.
2. Methods that can cause demagnetisation include;-
 - a) Repeated hammering or dropping of the magnet.
 - b) Strong heating of the magnet until it turns red hot and allowing it to cool facing East-West direction.
 - c) Putting a magnet in a coil of wire with alternating current flowing through it .
 - d) Keeping two like poles together for along time.

KEEPING MAGNETS

1. Magnets should be kept when unlike poles are near each other.
2. They should be separated by a piece of wood (insulator)
3. The two like poles should be connected by a piece of iron called iron keeper.

USES OF MAGNETS IN OUR DAILY LIFE

- a) Magnets are used in the making of loud speakers and microphones. For radios, TVs etc
- b) Magnets are used in electric bell.
- c) Doctors and health workers use magnets to remove small magnetic pieces that have gone into people's eyes.
- d) In generators magnets are used to produce electricity.
- e) Magnets are used in electric motors to produce mechanical energy.
- f) Powerful electro magnets are used to lift heavy magnetic metals in factories using cranes.
- g) They are used to separate magnetic materials from non-magnetic materials or to pick magnetic materials.

ENERGY RESOURCES IN THE ENVIRONMENT

A RESOURCE

This is anything that people use to satisfy their needs.

ENERGY RESOURCE

These are resources that provide people / man with useful energy.

TYPES OF RESOURCES

There are two types of resources namely;

- i) Renewable resources
- ii) Non renewable resources

RENEWABLE RESOURCES

These are resources that can be replaced by natural means once used up.

EXAMPLES

- Plants
- Animals
- Land (soil)
- Water
- Sun
- Air

NON-RENEWABLE RESOURCES

These are resources that cannot be replaced when used up.

EXAMPLES

- Minerals
- Rocks

-fossil fuels

ENERGY RESOURCES

EXAMPLES

- Sun
- Water
- Mineral
- Air (wind)
- Plants
- Animals

THE SUN

The sun is the main source of heat and light as forms of energy on earth.

IMPORTANCE OF THE SUN AS AN ENERGY RESOURCE TO PEOPLE.

- The sun helps in rain formation

- Preserves our food by sun drying
- Helps the humans skin to make vitamin D
- helps to disinfect beddings
- Light from the sun helps us to see.
- Light from the sun is used to make solar electricity
- Light from the sun enables plants to make food
- Dry our clothes.

WATER AS AN ENERGY RESOURCE

It helps people to get the following forms of energy.

a) Hydro electricity

It is the form of electricity produced by the power of running water at a fall.

When waterfalls at a greater height, potential energy is changed to kinetic energy.

Kinetic energy turns turbines connected to a generator with powerful magnetic field and a coil of wire.

b) Steam

Steam with kinetic energy helps to power steam engine.

c) Tidal energy

This is the form of energy got from water tides on the sea shores

Tides : Are periodic rises and falls of large bodies of water.

The tides are caused by gravitational interaction between the earth and the moon.

IMPORTANCE OF WATER AS AN ENERGY RESOURCE TO PEOPLE.

- Fast running water at a fall turns turbines to produce HEP.
- Used to cool machines in industries.
- Used for bathing and drinking
- Tidal energy is used to produce electricity

FOSSIL FUELS (COAL, PETROLEUM, URANIUM) AS ENERGY RESOURCE

EXAMPLES

- Coal
- Petroleum

PETROLEUM /CRUDE OIL

It is an energy resource from the ground formed from animals that died many years ago.

The changes in the earth created a lot of pressure on them hence turning into petroleum.

EXAMPLES OF PETROLEUM

- Petrol, diesel, lubricating oil, jet fuel, paraffin.

These fuels are got from crude oil by the process called fractional distillation

IMPORTANCE OF PETROLEUM PRODUCTS

- used to generate power that can run machines and vehicles
- they are burnt to produce thermal electricity
- it is used to make petroleum
- it is used to make tar for surfacing roads,
- other products from petroleum
- plastic , polythene paper, ta, dye, detergents, Vaseline, mattresses, grease, paint, fertilisers, polish, shoes, soles etc

PRODUCTS FROM COAL

- Paints, fertilisers, perfumes

Uses of uranium

- It is used to make atomic bombs
- It is used as fuel in nuclear powered sub marines
- is burnt to produce atomic electricity.

GEOTHERMAL ENERGY

It is got from hot springs / thermal springs where steam is trapped to turn turbines to produce electricity.

Animals as energy resources

Animals like oxen are used to plough land

Some animals like donkeys are used for transport.

Some animals are a source of food.

Some animals like oxen are used to pull carts.

Plants as energy resource

- they are sources of food
- plants are a source of wood fuel
- they are a source of building materials
- they provide shelter to some animals.

How to conserve plant resources

- through afforestation

- use fuel saving stoves
- use other /alternative source of fuel like biogas
- educate people about the advantages of plant in the environment.

Wind /air as energy resource

Importance

- used for winnowing
- used to turn wind mills to produce electricity
- used to sail boat
- help to disperse seeds
- used in pollination of plants
- used to fly kites
- speeds up evaporation , hence increases the speed to dry things

Biogas production from plants

What is biogas?

It is methane that is produced from the rotting organic matter.

THE WASTE PLANT MATERIALS

- i) cow dung
- ii) Plant materials
- iii) Animal urine

Steps of making biogas digester

The above materials are put into an air-tight container called a biogas digester. Where they are worked on by anaerobic bacteria to ferment and biogas is formed. When the gas formation stops, the remains can be used as manure.

USES OF PARTS

INLET: for inserting in plant and animal matter.

INLET PIPE: allow plant and animal matter into the digester

OUTLET: for removing old used up matter to the garden

EMPTYING TANK: it is where used up matter is collected before it is taken to the garden.

BIOGAS TUBE: it traps biogas and takes it to the heating or lighting equipment.

USES OF BIOGAS

- for cooking
- for lighting
- for heating

ADVANTAGES OF USING BIOGAS

- it is cheaper than using natural gas
- it does not pollute the environment

- the materials are readily available in the environment

ACTIVITY

- 1a) What is a resource?
- b) What are energy resources?
- 2a) Write down the two types of resources
- b) Give two examples of each type of resource
3. In which one way do plants depend on;
 - a) Cattle
 - b) human beings
 - c) Goats
- 4a) Mention any one advantage of using biogas over firewood.
- b) How is a biogas digester important in the production of biogas?
- c) Cite any one material used in production of biogas.
5. Write down any three ways animals depend on non-living things in the environment.
6. In what way a farmer make use of the residue left after making biogas?
 - b) State any two uses of biogas to human beings.
7. How does use of biogas contribute towards the control of environmental degradation.
8. Why is wind said to be a form of energy?

9. What danger is caused when biogas containers are kept near the reach of young children?
10. How are the following energy resources important to people;
 - i) Sun
 - ii) wind/air
 - iii) Water
 - iv) Fossil fuels
11. How important is coal to people?
12. Write down any two products from petroleum.