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SPELLING GAME

THEME: MATTER AND ENERGY ELECTRICITY AND MAGNETISM

Qn. What is a magnet?

• A magnet is a substance which has the ability to attract other magnetic substances.

Magnetism

Qn. What is magnetism?

• Magnetism is the force of attraction contained in a magnet.

Magnetic and non-magnetic substances

Qn. What are magnetic substances?

• Magnetic substances are substances that can be attracted by a magnet.

Qn. Give four examples of magnetic materials

- Steel
- Iron
- Nickel
- Cobalt

Qn. What are non-magnetic substances?

• Non-magnetic substances are substances that cannot be attracted by a magnet.

Qn. Mention the examples of non-magnetic substances.

- Rubber
- Glass
- Wood
- Plastic
- Clothes
- Aluminium

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- Copper
- Zinc

Types of magnets

Qn. Mention the two types of magnets.

a) Natural magnet
b) Artificial magnets

a) Natural magnets

Qn. What are natural magnets?

• Natural magnets are magnets that exist on their own.

Qn. Identify two examples of natural magnets.

- The earth
- Lode stone (magnetite)

Qn. Give a reason why the earth is called a magnet.

• The earth has the North and South Pole.

b) Artificial magnets.

Qn. What are artificial magnets?

• Artificial magnets are magnets made by people.

Qn. Identify the two groups of artificial magnets.

- Artificial temporary magnets.
- Artificial permanent magnets.

Artificial temporary magnets.

Qn. What are artificial temporary magnets?

• Artificial temporary magnets are magnets that keep their magnetism for a short time.

Qn. Give the examples of artificial temporary magnets.

• Electro magnet.

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A diagram of an electro magnet.

<u>Artificial permanent magnets</u>

Qn. What are artificial permanent magnets?

• Artificial permanent magnets are magnets that keep their magnetism for a long time.

Qn. Give the examples of permanent magnets.

- Bar magnet
- Horse shoe magnet.
- Cylindrical magnet
- Needle magnet

Illustrations

a) Bar magnet

c) Cylindrical magnet

d) Needle magnets

Activity

1. What name is given to the force of attraction contained in magnets?
   ……
2. Give a reason why the earth is said to be a magnet.
   ……
3. What name is given to magnets that lose their magnetism after a short period of time?
   ……
4. Apart from electromagnets, state one other example of an artificial temporary magnet.
   ……
5. Nakabba tried to make a magnet attract a piece of paper and it failed. Why do you think Nakabba was not successful?
   ……

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SPELLING GAME

Properties of magnets

Qn. Identify the different properties of magnets.

a) A freely suspended bar magnet will always rest with its poles facing in the north-south direction.

An illustration

Note:

- It points to the north – south direction because it is influenced by the magnetic forces of the earth.

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b) Magnetic lines of force in a magnetic field run from North pole to South pole.

An illustration

Qn. What is a magnetic field?

• A magnetic field is an area around a magnet where forces of magnetism act.

c) Unlike poles of a magnet attract each other.

Illustrations

d) Like poles of a magnet repel each other.

Illustrations

Qn. What is a neutral Point?

• A neutral point is a point where magnetic force due to two magnets is zero.

e) Magnetism is strongest at the poles.

Illustration

e) Magnetism can pass through non-magnetic materials.

Illustration

f) When a bar magnet is broken, each piece becomes an independent magnet.

Illustration

h) Magnets become weaker with age.

Note:

• This can be prevented by keeping magnets in iron keepers.

Qn. State why magnets are kept in iron keepers.

• To prevent magnets from losing their magnetism.

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An illustration showing magnets in iron keepers

Qn. How do iron keepers prevent magnets from losing their magnetism?

• Iron keepers absorb magnetism.

Activity

1. Identify the property of magnets that enables pilots use compasses to find directions during flight.
   ……
2. Identify the structures where magnets can be stored to protect them from losing magnetism.
   ……
3. What is a magnetic field?
   ……
4. Kyohaire threw a magnet in a tin containing iron fillings, she observed many iron fillings at the edges of the magnet. Why do you think many iron fillings got attracted at the edges of the magnet?
   ……
5. What is a neutral point?
   ……

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SPELLING GAME

Qn. State the law of magnetism.

• Like poles of a magnet repel while unlike poles of a magnet attract each other.

Qn. State the laws of a magnetic field.

- Magnetic lines of force run from the North Pole to the South Pole.
- Magnetic lines of force do not intersect within each other.
- There is no line of force within the magnet itself.

Qn. State the differences between iron and steel as magnetic materials.

- Iron gains magnetism easily while steel takes long to gain magnetism.
- Iron loses magnetism easily while steel takes long to lose magnetism.
- Iron is used to make temporary magnets while steel is used to make permanent magnets.

Magnetisation

Qn. What is magnetisation?

• Magnetisation is the way of making a magnet.

Qn. State the methods of making magnets.

- Stroking or touch method
- Induction method
- Electrical method

1. Stroking method

Qn. What is stroking method?

• Stroking method is a method of making a magnet where a permanent magnet is used to stroke a magnetic material.

Qn. State the two groups of stroking method.

- Single touch method.
- Double touch method.

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a) Single touch method

Qn. What is single touch method?

• Single touch method is a method of making a magnet where one permanent magnet is used to stroke a magnetic substance. **An illustration showing the single touch method**

b) Double touch method.

Qn. What is double touch method?

• Double touch method is a method of making a magnet where two permanent magnets are used to stroke a magnetic substance.

An illustration showing double touch method

2. Induction method.

Qn. What is induction method?

• Induction method is a method of making a magnet where a magnetic substance is attached on a permanent magnet and left to stay for some time.

A diagram showing the induction method

Qn. Name the magnet made by the induction method.

• Induced magnet.

3. Electrical method.

Qn. What is electrical method?

• Electrical method is a method of making a magnet using electricity.

An illustration showing the electrical method.

Qn. Name the magnet made by using the electrical method.

- Electro magnet

Qn. State the factors that determine the strength of an electro magnet.

- The amount of current used.
- The number of turns in a coil.
- The magnetic substance used.

Qn. Give any two ways of increasing the strength of an electro magnet.

- By increasing the voltage.
- By increasing the number of turns in a coil.

Qn. State the use of electro magnets.

- Electro magnets are used in electric bells.
- Electro magnets are used in cranes to lift metal scrap.

Activity

1. Identify two methods of making magnets where permanent magnets are used.
   i) ……
   ii) ……
2. How can you identify the poles of an electromagnet?
   ……
3. Which mineral metal is used to make induced magnets?
   ……
4. State the two methods of stroking magnets.
   i) ……
   ii) ……
5. Identify two appliances that use electromagnets to operate.
   i) ……
   ii) ……

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SPELLING GAME

Demagnetisation

Qn. What is demagnetisation?

• Demagnetisation is a way of making a magnet lose its magnetism.

Qn. Write down the different ways of demagnetising a magnet.

- By hammering a magnet.
- By heating a magnet.
- By leaving a magnet to rust.
- By keeping a magnet with like poles near each other for a long time.
- By keeping a magnet while facing in the East to West direction.
- By passing alternating currents through a magnet.
- By boiling a magnet in water.

Qn. State the ways of keeping a magnet safe.

- Keeping magnets in iron keepers.
- Painting magnets
- Storing magnets with their poles facing in the North – South direction.

Qn. Give the uses of magnets

- Magnets are used in radios.
- Magnets are used in microphones.
- Magnets are used in loudspeakers.
- Magnets are used in generators to produce electricity.
- Magnets are used in dynamos to produce electricity.
- Magnets are used by doctors to remove magnetic substances from delicate body organs.
- Magnets are used by watch repairers to hold tiny nails.
- Magnets are used in doors of refrigerators.
- Magnets are used in cranes to list scrap.
- Magnets are used to hold cutlery on walls.
- Magnets are used in electric bells.

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An Electric Bell

Qn. How does an electric bell work?

- When the switch is pressed, current starts flowing and the soft iron core gains magnetism.
- When the soft iron core gains magnetism, it attracts the soft iron armature.
- The hammer attached to the soft iron armature hits the gong and sound is produced.
- The metal strip is pulled away from the contact screw and the electro magnet becomes demagnetised.

Name the appliances that use both magnets and electricity.

Radios

- Electric bells
- Loud speakers
- Electric motors
- Refrigerators
- Television sets.

Qn. Give examples of appliances that use magnets only

- Magnetic compasses.
- Magnetic tapes

Activity

1. How does the contact of moisture and oxygen with a magnet affect the magnetism of a magnet?
   ……..
2. Identify three groups of people that need magnets in their daily activities.
   i) ……
   ii) ……
   iii) ……
3. In which direction should a magnet face to prevent it from losing its magnetism?
   ……

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4. How can magnets be of importance in the kitchen?
   ……
5. State the use of electro magnets at school.
   ……..
6. How does painting magnets protect them from losing their magnetism?
   ……
7. How do iron keepers protect magnets from protecting losing magnetism?
   ……

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SPELLING GAME

ELECTRICITY

Qn. What is electricity?

• Electricity is the form of energy that involves electric charges.

Qn. What is a molecule?

- A molecule is the smallest part of a substance that can take part in a chemical reaction.

<u>Note:</u>

- Molecules are made up of **<u>atoms</u>**.

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Qn. What is an atom?

• An atom is the smallest indivisible particle of matter.

Qn. Name the particles of an atom.

- Protons
- Electrons
- Neutrons

The structure of an atom

Qn. What are protons?

• Protons are positively charged particles found in a nucleus of an atom.

Qn. What are neutrons?

• Neutrons are uncharged particles found in the nucleus of an atom.

Qn. What are electrons?

• Electrons are negatively charged particles orbiting around an atom.

Types of electricity

Qn. Mention the two types of electricity.

- Current Electricity
- Static electricity

Current electricity

Qn. What is current electricity?

• Current electricity is the type of electricity formed when electrons flow from one source to another through a conductor.

Qn. Mention the two groups of current electricity.

- Direct current Electricity. (D.C)
- Alternating current electricity (A.C)

What is Direct Current Electricity?

Direct current electricity is a type of electricity that flows in one direction.

Qn. Name the sources of direct current electricity.

- Dry cells
- Simple cells / wet cells
- Car batteries.

Note:

• Direct current electricity cannot be **stepped up** or **stepped down.**

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Alternating Current Electricity

Qn. What is alternating current electricity?

- Alternating current electricity is the type of current electricity that flows in both directions i.e. forward and backwards.

Note:

- Alternating current electricity can be **stepped up** or **stepped down**.

Qn. Name the sources of alternating current electricity.

- Fast running water.
- Hot springs
- Fossil fuels
- The sun
- Uranium

Qn. Give the examples of current electricity.

- Hydro electricity.
- Geothermal electricity
- Thermal electricity
- Solar electricity
- Atomic or Nuclear electricity
- Chemical electricity.

a) Hydro Electricity

Qn. What is hydroelectricity?

- Hydro electricity is electricity produced by fast running water.

Qn. Name the common dams where hydroelectricity is generated.

- Nalubaale dam (Owen falls dam)
- Bujjagali dam

Qn. Mention the type of energy possessed by water in the reservoir.

- Potential energy.

Qn. Mention the type of energy possessed by falling water that turns turbines at a water fall.

- Kinetic energy.

Qn. What are turbines?

- Turbines are big wheel like structures which rotate when hit by water.

Note

- Turbines are connected to generators which turn mechanical energy into electric energy.

Qn. How does electricity generated from power stations reach other places?

- Through conducting wires
- Through transmission wires/lines.

b) Geothermal Electricity

What is geothermal electricity?

Geothermal electricity is the type of electricity got from hot springs.

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c) Thermal Electricity

Qn. What is thermal electricity?

• Thermal electricity is the type of electricity got by burning fossil fuels.

Qn. Give examples of fossil fuels that can be burnt to produce electricity

- Coal
- Petrol
- Diesel

d) Solar Electricity

Qn. What is solar electricity?

• Solar electricity is the type of electricity got from the sun.

A diagram showing the different parts of a solar panel

Qn. State the function of the following parts of a solar panel.

i) Solar panel

• The solar panel traps sunlight.

ii) Solar cells

• Solar cells charge sunlight energy into solar electricity.

iii) Solar batteries

• Solar batteries store solar electricity.

Qn. Why is the solar panel painted black?

• To absorb sunlight.

Qn. Why is the solar panel put on the top of a building?

• To trap sunlight.

e) Atomic or Nuclear Electricity

Qn. What is nuclear electricity?

• Nuclear electricity is the type of electricity got by burning uranium.

f) Chemical Electricity

Qn. What is chemical Electricity?

• Chemical electricity is the type of electricity produced by batteries (dry cells and wet cells)

Qn. State the different ways in which mechanical energy is produced.

- By wind turning wind mills.
- By using machines to turn dynamos.

A table showing the examples of alternating current electricity and the sources

Type of electricity	**Source of energy**
• Hydro electricity	• Fast running water
• Thermal electricity	• Fossil fuels
• Geothermal electricity	• Hot springs • Geothermal heat.
• Mechanical electricity	• Wind • Machines
• Atomic electricity	• Uranium
	• Nuclear power
• Chemical electricity (chemo electricity	• Batteries (wet cells and dry cells • Chemicals

Activity

1. Identify the type of energy possessed by the turbines that enables them to produce electricity.
   ……
2. Which form of energy is stored by dry cells?
   ……..
3. Study the table below and match the forms of electricity to their sources correctly.

FORMS OF ELECTRICITY	**SOURCE**
Atomic electricity	Fossil fuels
Hydroelectricity	Hot springs
Geothermal electricity	Uranium
Thermal electricity	Fast running water

   i) Atomic electricity ……..
   ii) Hydroelectricity ……
   iii) Geothermal electricity ……
   iv) Thermal electricity ……
4. What name is given to negatively charged particles orbiting around the atom?
   ……

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5. State two differences between direct current and alternating current.

i) ……
……..

ii) ……
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SPELLING GAME

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Electric current

Qn. What is electric current?

• Electric current is the flow of electrons.

Qn. Name the instrument used to measure electric current.

• Ammeter

Qn. In which units is electric current measured?

• Amperes / amps

A diagram showing the flow of current

A diagram showing the flow of electrons

Electric circuit

Qn. What is an electric circuit?

- An electric circuit is the path followed by electricity.

OR

- An electric current is a path taken by electricity.

Components of an electric circuit and their symbols

Components	**Symbols**
Dry cell	
Switch	
Bulb (load)	
A fuse	
Ammeter	
Voltmeter	
Conductors connected	
Conductor crossing	

BY TR.MUTASEMU

Qn. State the function of each of the parts of an electric circuit.

a) Switch

• The switch breaks and completes the circuit at the user's will.

b) Ammeter

• The ammeter measures electric current.

c) Conductor

• The conductor transmits electricity through the circuit.

d) Dry cells

• The dry cells produce electricity for the appliance.

Qn. Name the form of energy stored in a dry cell.

• Chemical energy

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Qn. What energy charge takes place when the circuit is complete?

e) Bulb

• The bulb gives light.

Qn. Identify the form of energy stored in an electric bulb,

• Electric energy.

Qn. State the energy change that takes place in an electric bulb when the circuit is complete.

• Electric energy changes to light energy.

Qn. State two cases that can make a bulb fail to give out light in a circuit when the switch is pressed.

- Poor arrangement of dry cells.
- When the conductor is not connected properly.
- When the bulb is not fixed properly.

Qn. Identify the instances / factors that can make a bulb to stop giving light even when the circuit is complete.

A diagram showing an electric circuit

- When the dry cells are used up.
- When the filament burns out.
- When the fuse blows.

f) Fuse

• A fuse breaks the circuit in case of too much flow of current.

Qn. How does the fuse work?

• By melting and breaking the circuit in case of too much flow of current.

Qn. How is a fuse adapted to its function?

• A fuse has a low melting point.

Qn. Give the factors that can make a fuse wire to blow.

- When the fuse is too old.
- When there is a short circuit.
- Over loading of the circuit

<u>Note:</u>

- A fuse is made up of an alloy of tin and lead which has a low melting point.

ACTIVITY

1. What is the difference in functionality between the function of a fuse and that of the switch?
   ……
   ……
2. State two forms of energy produced by a bulb when the bulb is complete.
   i) ……
   ii) ……..
3. How can poor arrangement of dry cells affect the working of a circuit even when the switch is pressed?
   ……
4. In the space provide below, draw a simple circuit and show the direction of flow of current.
5. List two sources of direct current.
   i) ……
   ii) ……..

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SPELLING GAME

Electric resistance

Qn. What is electric resistance?

• Electric resistance is the opposition to the flow of current in a circuit.

Qn. Which instrument is used to measure electric resistance?

• Ohmmeter

Qn. In which units is electric resistance measured?

• Ohms

Electric pressure or electromotive force (e.m.f)

• Electric pressure is the force that drives current through the resistance of the circuit.

Qn. Name the instrument that measures electric pressure.

• Voltmeter

Qn. In which units is electric pressure measured?

• Volts

Qn. Why are most electric heaters coiled?

• To increase the electric resistance.

Qn. Write e.m.f in full.

• Electromotive force.

Conductors and insulators

Qn. What are conductors?

• Conductors are materials that allow electricity to pass through them.

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Give the different examples of conductors of electricity.

Silver

- Aluminium
- Tin
- Lead
- Tungsten
- Copper
- Iron
- Wet wood.
- Salt solution
- Acids e.g. hydrochloric acid
- Undistilled water / water containing mineral salts.
- Carbon rod.

Qn. Name the non-metallic conductor of electricity.

• Carbon rod

Note:

• Silver is the best conductor of electricity.

Qn. Why are most overhead conductors of electricity made of copper and not silver?

- Copper is cheaper than silver.
- Copper is readily available while silver is rare.
- Copper is light while silver is heavy.

Qn. State the uses of conductors

- Conductors are used to make electric circuits.
- Conductors are used to make electric wires.

What are insulators?

Insulators are substances that do not allow electricity to pass through them.

Qn. Give examples of insulators.

- Rubber
- Plastics
- Clothes
- Dry wood
- Dry paper
- Porcelain
- Distilled water

Qn. Give reasons why electric wires are covered with rubber during electrical installation.

• To prevent short circuits

Qn. State the uses of insulators

- Insulators are used to cover electric wires during electrical installation.
- Insulators are used to cover handles of electric irons / flat irons.

Short circuit

Qn. What is a short circuit?

• A short circuit is an electric path with low resistance to the flow of current

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- **An illustration of a short circuit**

State the main cause of a short circuit.

A short circuit is mainly caused when two naked wires carrying current meet.

Qn. Give the other causes of short circuit.

- Improper connection of electric wire.
- Overloading of circuit.
- Pushing metallic objects into electric circuits.
- Pouring water in electric appliances.
- Damage done by rat to the insulating wires.
- Bad weather conditions that may lead to damage of electric poles.

Qn. State the dangers of short circuits.

- Short circuits lead to destruction of electric appliances.
- Short circuits lead to destruction of buildings.
- Short circuits lead to death of people and animals.

Qn. Identity the ways of preventing short circuit.

- Electric wires should be well insulated.
- Installation of electricity should be done by experts.
- Repair of electric appliances should be done by experts.
- Old electric wires should be replaced by new ones.
- Avoid overloading of circuits.
- Avoid pushing metallic objects into sockets.

ACTIVITY

1. Why are insulators used to cover electric wires during installation?
   ……
2. Give a reason why distilled water doesn't conduct electricity.
   ……
3. Why should wiring of a factory be done by professional electricians?
   ……
4. State two reasons why copper is commonly used in electric circuits yet silver is the best conductor of electricity.
   i) ……..
   ii) ……..
5. Give a reason why a salt solution is able to conduct electricity.
   ……

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SPELLING GAME

Electric cells

Qn. What is an electric cell?

• An electric cell is a device that stores and produces electricity due to a chemical reaction.

Identify the two types of electric cells

Primary cells

• Secondary cells

a) Primary cells

Qn. What are primary cells?

• Primary cells are cells that cannot be recharged when used up.

Qn. Give the examples of primary cells

- Dry cells
- Wet cells / simple cells

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Dry cell

Qn. How does a dry cell produce electricity?

- A dry cell produces electricity by changing chemical energy to electric energy.

Note:

- A dry cell produces an electromotive force of 1.5 volts.

A diagram of a dry cell

BY SEMU

State the function of each part of a dry cell.

a) Brass cap

• A brass cap is the contact to the positive terminal.

b) Pitch / Top seal

• The pitch prevents the electrolyte from drying up.

c) Insulating cardboard

- The insulating cardboard protects the inside parts of a dry cell.

d) Zinc can

- The zinc can act as the negative terminal.

e) Electrolyte (Ammonium chloride paste) • Electrolyte helps in the transfer of electrons.

f) Powdered carbon and manganese dioxide.

• Powdered carbon and manganese dioxide act as a depolarizing agent.

OR

• Powdered carbon and manganese dioxide prevent bubbles of hydrogen gas from building up around the carbon rod.

g) Carbon rod

- The carbon rod acts as a positive terminal.

Note:

- The carbon rod is a non-metallic conductor of electricity found in a dry cell.
- The carbon rod is made from **graphite.**

Qn. What is depolarization?

• Depolarization is when hydrogen gas bubbles are prevented from building up around the carbon rod.

Qn. State the advantages of using dry cells.

- Dry cells are portable (easy to carry).
- Dry cells are affordable (cheap to buy)
- Dry cells can be used in any position.

Give the disadvantages of using dry cells.

- Dry cells cannot be recharged.
- Dry cells produce electricity for a short time.
- Dry cells produce less current that cannot run big machines.
- Used up dry cells can spoil devices.

Simple cells / wet cells

Qn. What is a simple cell?

- A simple cell is a cell that consists of a copper plate (positive) and zinc plate (negative) dipped into dilute sulphuric acid.

Note:

- Dilute sulphuric acid acts as the **electrolyte**.
- The zinc plate and copper plate act as **electrodes.**

Qn. What is an electrode?

- An electrode is a piece of metal which allows electric current to enter and leave a cell when dipped in an electrolyte. **Or**

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- An electrode is a piece of metal that conducts electricity.

Qn. What is an electrolyte?

- An electrolyte is a liquid that conducts electricity.

Qn. Give examples of electrolytes.

- Lemon juice
- Urine
- Undistilled water
- Salt solution
- Dilute sulphuric acid
- Dilute hydrochloric acid

The structure of a wet / simple cell

Qn. Identify the form of energy stored in a wet cell.

- Chemical energy

<u>Note</u>

- Chemical energy stored in a wet cell is converted to electric energy.

The structure of a home made wet cell.

Qn. State the factors that affect the efficiency of a wet / simple cell.

- Polarization
- Local action

Qn. What is polarization?

- Polarization is the formation of hydrogen gas bubbles on a copper plate of a simple cell.

<u>Note:</u>

- When hydrogen bubbles cover the copper plate, they reduce the e.m.f of the cell and the bulb will stop giving light.

Local action

Qn. What is local action?

• Local action is when hydrogen bubbles are seen coming off from the zinc plate.

Qn. Identify the disadvantages of using wet cells.

- Simple cell produce electricity for a short time.
- Simple cells are bulky (not easily carried).
- Simple cells are only used in an upright position.

b) Secondary cells

Qn. What are secondary cells?

- Secondary cells are cells that can be recharged once used up.

<u>Note:</u>

BY TR.M A SEMU

- Recharging is the process of replacing lost energy in a cell.

Qn. Give the examples of secondary cells.

- Car batteries / lead acid batteries / accumulates.
- Phone batteries / mobile phone batteries.

Qn. State the advantages of using secondary cells.

- Secondary cells can be recharged.
- Secondary cells have a high voltage.
- Secondary cells can be used in running heavy / strong machines.

Qn. State the disadvantages of using secondary cells.

- Secondary cells are expensive.
- Secondary cells are bulky.
- Secondary cells are not easy to maintain.

A car battery

An electric bulb

Qn. What is an electric bulb?

- An electric bulb is a device that changes electric energy into heat and light energy.

BY TR.MS CEMU

A diagram of an electric bulb

Qn. State the energy change that takes place in a bulb?

• Electric energy is converted to heat and light energy.

Qn. State the function of each part of a bulb.

a) Glass envelope

- The glass envelope protects the inside parts of the bulb.
- The glass envelope prevents nitrogen and organ gases from escaping.

<u>Note:</u>

- The glass envelope is transparent.

Qn. Why is the glass envelope transparent?

• To allow light to pass through.

Qn. Why is argon and nitrogen used in bulbs?

- To prevent evaporation of tungsten.
- To prevent oxygen from mixing with the coiled filament.
- To enable the filament burn at a high temperature with out blowing.

Note:

• Oxygen cannot be used in an electric bulb because it leads to melting and blowing of the filament.

b) Brass cap

• The brass cap enables the bulb to be fixed properly in the lamp holder.

c) Coiled filament

• The coiled filament produces light.

Qn. Why is the filament coiled?

• To increase electric resistance.

Qn. From which metal is a coiled filament made? • Tungsten

Qn. Why is the coiled filament made of tungsten?
• Tungsten has a high melting point.
Qn. Name the mineral from which tungsten is made?
• Wolfram

d) Supporting glass stem and filament support.
• The supporting glass stem and filament support hold the filament in position.
g) Lead wire
• Lead wires conduct electricity from the contact to the filament.
h) Sealing tube
• The sealing tube enables air to be removed from the bulb.
i) Contacts
• The contacts transmit electricity from the lamp holder to the bulb.
OR
• The contacts connect the bulb to the source of electricity from the lamp holder.
j) Cement
• The cement provides support to the inside parts of the bulb.
A torch
• A torch is a device that uses dry cells in series arrangement to produce light.
A diagram of a torch

Qn. State the functions of the parts of a torch.
a) Bulb
• The bulb gives out light.
b) Switch
• The switch breaks and completes the circuit at one's will or wish. **c) Dry cells**
• Dry cells produce electricity.
d) Reflector
• The reflector directs light into diverging beam.
e) Glass
• The glass protects the reflector and bulb from damage.

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f) Cover and spring

- The cover and spring keep the dry cells tightly fixed and closed.
- The cover and spring complete the circuit.

Qn. Give the factors that can make a torch fail to give out light.

- Poor arrangement of dry cells.
- When the cover is not fixed properly.
- When the bulb is not fixed properly.
- When some parts of a torch are spoilt / rusted.
- When the switch is faulty.

Qn. Identify the factors that can make a torch stop giving out light.

- When the dry cells get used up.
- When the filament in the bulb burns out.

Types of electric circuit cells arrangement.

Qn. State the two types of electric circuit cells arrangement.

- Series electric circuit cells arrangement.
- Parallel electric circuit cells arrangement.

Parallel electric circuit cells arrangement

- Parallel electric circuit cells arrangement is the type of arrangement where all positive terminals of cells are connected together by one conductor and all the negative terminals to another.

An illustration

Series electric circuit cells arrangement

- Series electric circuit cells arrangement is the type of arrangement where the positive terminal of one cell is connected to the negative

terminal of another cell.

Plugs

Qn. What is a plug?

• A plug is a device that connects an electric appliance to the main source of electricity.

Qn. Mention the types of plugs.

- Two pin plug
- Three pin plug

A two pin plug

• A two pin plug consists of two wires.

i) Neutral wire
ii) Live wire

Qn. State the uses of the following wires in a plug.

a) Neutral wire (Blue or Black)

• The neutral wire takes back current to the source.

b) Live wire (Red or brown)

• The live wire brings current from the source to the appliance.

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An illustration of a two pin plug.

Qn. Give examples of devices that use a two pin plug.

- DVD players
- Telephones
- Electric fans
- Televisions
- Electric radios

A three pin plug

• A three pin plug consists of three wires i.e. I. Neutral wire.

II. Live wire

III. Earth wire

Qn. State the importance of the following wires in a three pin plug.

i) Neutral wire (Black Blue)

• The neutral wire takes current from the appliance back to the source.

ii) Live wire (Red Brown)

• The live wire brings current from the source to the appliance.

iv) Earth wire (Yellow or Green)

- The earth wire takes current in the soil incase of two much flow.
- The earth wire prevents electric shock.

BY MR MUTAKA SE

Note
• The cable grip holds the wires together.

An illustration of a three pin plug.

Qn. Give examples of devices that use a three pin plug.
- Electric flat iron
- Electric kettle
- Water heater
- Refrigerator
- Electric cooker
- Hot plates

Domestic electricity
• The electricity we use in our homes is connected to an electric meter with both the live and neutral wires.

Qn. State the function of the electric meter.
• The electric meter measures electricity used in a house / building.

Qn. In which units is electricity measured?
• Kilowatt hours (KWH).

Devices connected to electricity

Qn. Mention the devices connected to electricity.

- Generator
- Transformer
- Dynamo
- Electric motor

a) Generator

- A generator is a device that produces electricity by changing mechanical energy to electric energy.

Qn. How is a generator able to produce electricity?

- By rotating coils of wires in a magnetic field.

Qn. Identify the types of generators.

- Alternating current generator (A.C Generator)
- Direct Current Generator (D. C. Generator)

Qn. How can a generator be made to produce more electricity?

- By increasing the number of turns in a coil.
- By increasing the magnetic field.
- By increasing the speed of rotation.

b) Dynamo

Qn. How does a dynamo produce electricity?

- By changing mechanical energy to electric energy.

Qn. Give examples of devices that use dynamos.

- Bicycle
- Vehicles

An illustration of a dynamo

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Qn. How does a dynamo work?

- A dynamo works by changing mechanical energy in form of kinetic energy to electric energy.

Qn. State how electric current of a dynamo can be increased.

- By increasing the speed of pedaling. **Qn. State the importance of dynamos.**

- Dynamos in vehicles are used to charge batteries.
- Dynamos are used to produce electricity for lighting.

c) Transformer

- A transformer is a device that steps up or steps down voltage of electricity produced.

Qn. Identify the types of transformers.

- Step up transformers.
- Step down transformers.

d) Electric motor

- An electric motor is a device that changes electric energy to mechanical energy.

Qn. State the uses of electric motors

- Electric motors are used to start car engines.
- Electric motors are used in radios.
- Electric motors are used in sewing machines.
- Electric motors are used in fans.

Electricity transmission in Uganda

Qn. Name the organization that supervises electricity in Uganda.

- Electricity Regulator Authority (ERA).

<u>Note:</u>

- E.R.A replaced Uganda Electricity Board (U.E.B)

Qn. Mention the three companies of E.R.A

- Uganda Electricity Generation Company Limited (UEGCL)
- Uganda Electricity Transmission Company Limited (UETCL)
- Uganda Electricity Distribution Company Limited (UEDCL)

Qn. State the role of UEGCL

- To generate electricity from power station.

Qn. State the roles of UETCL

- To transmit electricity from the power station to different parts of Uganda.
- To buy electricity from generation companies to distribution companies.
- UETCL constructs and maintains sub-stations in Uganda.
- UETCL is responsible for importing and exporting electricity in Uganda.

Qn. State the roles of UEDCL (UMEME)

- UMEME connects and distributes electricity to customers from pole (grid).
- UMEME disconnects electricity from electricity defaulters.

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Qn. Identify the problems faced by UMEME.

- Corruption by UMEME workers.
- Illegal connection by customers.
- Bush burning that may lead to destruction of poles.
- Delayed payments by customers.
- Stealing of electric poles and wires.
- Siphoning of oil from transformers.

Qn. State the roles of ERA

- ERA gives licences to the companies that may wish to generate electricity.
- ERA supervises and monitors the generation transmission and distribution companies.
- ERA controls the quality of electricity in Uganda.

Qn. How does electricity generated from power stations reach the consumer?

• Through transmission lines / wires/cables.

Rural Electrification

Qn. What is rural electrification?

• Rural electrification is the extending of electricity to rural areas.

Qn. Why is the government carrying out rural electrification? • To control the massive cutting down of trees for wood fuel.

Static electricity

Qn. What is static electricity?

- Static electricity is the type of electricity which does not involve the flow of electrons. **Note:**
- Static electricity involves stationary charges.

Qn. Identify the charges of static electricity.

- Positive charges
- Negative charges

Qn. How is static electricity produced?

• Static electricity is produced by friction after rubbing two insulators together.

Qn. State the different ways of creating static electricity in daily life.

- By rubbing a ball point pen with hair.
- By rubbing a plastic ruler against a cloth or hair.
- By rubbing polythene against cloth / hair.
- By rubbing a plastic comb against hair.

BY TR.MUTAKA SEMU

An illustration

Note:

- Static electricity is produced under the law of electrostatics.

Qn. State the law of electrostatics

- Like charges repel each other and unlike charges attract each other.

Qn. State the difference between static electricity and current electricity.

Static Electricity	Current Electricity
• Does not involve the flow of electrons. • Occurs in insulators. • The charges are on the surface of the insulator.	• Involves the flow of electrons • Occurs in conductors. • The charges are inside the conductor

Lightning

Qn. What is lightning?

- Lightning is a huge light seen when positively charged clouds meet the negatively charged clouds during a storm.

Note:

- Lightning is a form of static electricity in nature.

Qn. Why is lightning said to be electricity?

- Lightning involves electric charges.

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Qn. What causes lightning?

• Lightning is caused by charges of static electricity in clouds.

Thunder

Qn. What is thunder?

- Thunder is the sound that is suddenly produced when surrounding air becomes strongly heated, expands and contracts during lightning. **Qn. How is thunder caused?**
- Thunder is caused by the sudden expansion and contraction of air between opposite charged clouds.

<u>Note:</u>

- The continuous noise or sound heard during thunder is due to echoes.

Qn. Why is lightning seen before thunder is heard?

• Light travels faster than sound.

Qn. How is lightning useful in the environment?

• Lightning fixes nitrogen in the soil.

Qn. State the dangers of lightning.

- Lightning strikes people and animals to death.
- Lightning sets buildings on fire.
- Lightning can lead to forest fires.
- Lightning can damage people's property.

Qn. State ways of preventing dangers of lightning.

- Putting lightning conductors on tall buildings.
- Never stand under trees when it is raining.
- Switch off electric appliance when it is raining.
- Always wear rubber shoes when it is raining.
- Avoid swimming in open water when it is raining.
- Never stand in open places when it is raining.

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A diagram showing a lightning conductor

Qn. How does a lightning conductor control lightning?

- A lightning conductor directs electric charges to the metal strip in the ground without damaging the building.

Qn. State the uses of electricity.

- Electricity is used for cooking.
- Electricity is used for ironing clothes.
- Electricity is used for lightning bulbs.
- Electricity is used for washing.
- Electricity is used to run some machines.

Qn. Give the advantages of using electricity.

- Electricity is quick.
- Electricity provides clean work.
- Electricity controls the cutting of trees.
- Electricity does not pollute the environment.

Qn. State the dangers of electricity.

- Electricity shocks and kills people.
- Electricity can burn buildings.

Qn. Identify the safety precautions when handling electricity.

- Never touch an electric socket with wet hands.
- Never push metallic objects in electric sockets.
- Switch off electric appliances when it is raining.
- Never repair electric appliances if you are not an expert.
- Never through objects on electric wires.
- Never touch electric wires that have fallen down.

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- Avoid over loading the circuit.

TOPICAL TEST

1. What is electricity ?

……
……

2. List any three sources of electricity.

i)……..
ii) ……..

3. Mention the two types of electric cells.

(i) ..... (ii) .....

4. Write two examples of primary cells.

(i) ..... (ii) .....

5. Mention two examples of storage cells.

(i) ..... (ii) .....

6. What form of energy is stored in a dry cell ?

……

7. The diagram below is of a dry cell. Use it to answer

(a) Name the parts of a dry cell labelled

L : ..... M : .....

N : ..... O : .....

(b) Identify the part of a dry cell which acts as

(i) Negative terminal : .....

(ii) Positive terminal : .....

(c) Which part of a dry cell is referred to as a non-metallic conductor of electricity ?

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.....

(d) Name the liquid in a dry cell that conducts electricity.

.....

8. Why are dry cells covered with insulating seal ?

.....

9. State the energy change that takes place in a dry cell that is in use.

.....

10. Define the term voltage.

.....

11. State the voltage of a new dry cell.

.....

12. How is carbon rod useful in a dry cell ?

.....

13. Give any one cause of dry cells losing their energy.

.....

14. Valerian's radio uses seven dry cells. How many volts are needed if she is to use it to listen to music ?

15. What is an electrode ?

.....

.....

16. <u>Below is aCopper diagram showing a simple/wet cell. Use it to answer questions.</u>

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(a) Which of the two plates on the above wet cell acts as:

(i) Negative pole : .....

(ii) Positive pole : .....

(b) What does the dilute sulphuric acid act as in a simple cell ?

.....

(c) State two disadvantages of using wet cells.

i) .....

(ii) .....

(d) Why do wet cells light for a shorter time ?

.....

17. State the energy change that takes place in chemical batteries.

.....

18. Give one advantage of using a chemical battery.

.....

19. Identify the form of electricity produced from the following:

(a) Fast running water : .....

(b) (ii) The sun : .....

(c) (iii) Fossil fuels : .....

20. How is the wind able to produce electricity ?

.....

21. Mention the two types of electricity.

(i)..... (ii)…….....

22. Which type of electricity involves the flow of electrons?

.....

23. Name the two types of current electricity.

(i) .....

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(ii) .....

24. How is direct current different from alternating current electricity?

.....

25. List two sources of direct current electricity

(i) ..... (ii) .....

26. Use an arrow on the diagram below to show the f low of electricity / electric current.

27. What type of electricity is commonly used by most urban areas in Uganda?

.....

28. Define conductors of electricity.

.....

29. Write any four conductors of electricity.

(i) .....

(ii) .....

(iii) .....

(iv) .....

30. Why is wet wood said to be a good conductor of electricity ?

.....

31. Why can't pure water conduct electricity ?

.....

32. Silver is the best conductor of electricity but why is aluminium used to make electric wires ?

.....

33. What are insulators of electricity ?

.....

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34. List four examples of insulators of electricity.

(i) ..... (ii) ..... (iii) ..... (iv) .....

35. How does rubber protect one from electric shock ?

.....

36. How do insulators help to prevent short circuits ?

.....

37. Use the materials below to connect a simple electric circuit.

38. What term is used to describe a path through which an electric current flows ?

.....

41. The diagram below shows a simple electric circuit in symbol form. Use it to answer questions.

(a) Name the parts of an electric circuit labelled with letters:

Q : ..... R: .....

S : ..... T : .....

(b) State the function of part labelled

Q : .....

S : .....

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(c) Why is part labelled R called a safety device in the circuit?

……...

(d) Give two conditions that may fail part labelled T to produce light.

(i) .....

(j) .....

(e) How is a fuse adapted to its function?

……...

42. Use the diagram of an electric bulb below to answer questions ?X

(a) Name the parts of a bulb marked with letters:

K : ..... L : ..... M : .....

(b) Why is the part labelled L of the bulb coiled ?

……...

(c) State the function of the insulating material labelled Z.

……...

(d) Give one reason why part labelled K is transparent.

……...

(e) Mention two gases that are commonly used in space marked X.

(i) ..... (ii) .....

43. From which mineral is the filament of a bulb made ?

……..

44. Which part of bulb is made of an alloy ?

……

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45. Mention two forms of energy produced by an electric bulb in use ?

(i) .....

(ii).....

46. (a) What is short a circuit ?

.....

47. (b) List any two causes of short circuits.

(i) .....

(j) .....

(c) State any one effect of short circuits.

.....

(d) In which one way can we prevent short circuits in a home ?C

.....A

.....

48. Below is a diagram of a torch. Use it to answer questions that follow.

(a) Name the parts of a torch labelled A, B, C and D.

A : ..... B : .....

C : ..... D : .....

(b) State the function of the parts marked B, C and D.

B : .....

C : .....

D : .....

(c) What kind of light beam is produced by a torch ?

.....

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49. Which type of electricity does not involve the flow of eletrons ?

……...

50. How is static electricity formed ?

……

……

51. Identify the static static electricity that exists in nature.

……

52. How is lightning produced ?

……

53. Give one advantage of lightning to the soil.

……

54. State one danger of lightning in the environment.

……

55. Give two ways we can prevent effects of lightning in the environment.

(i) ……

……

(ii) ……

……

55. The diagram below is of a living house. Use it to answer questions.

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a) Identify the structure labelled with letter Y on the living house.

.....

b) How does the structure labelled Y protect the living house against the dangers of lightning ?

.....

56. State two differences between static electricity and current electricity.

(i) .....

.....

(ii) .....

.....

57. What is the importance of proper handling of electric appliances ?

.....

58. Give any one way in which the use of electricity can prevent deforestation.

.....

59. State any two importance of electricity.

(i) .....

.....

(ii) .....

.....

60. Write two advantages of using electricity in solving everyday problems.

(i) .....

.....

(ii) .....

.....

61. Suggest any one way in which we can prevent our electric appliances from being destroyed by electricity.

.....

.....

62. Give two disadvantages of using electricity.

(i) .....

.....

(ii) .....

.....

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63. State two safety precautions one can use to safe guard oneself from dangers of electricity.

(i) .....

.....

(ii) .....

.....

64. Why are electric wires carrying electricity from the source raised some metres high from the ground ?

.....

.....

65. How is magnetism different from a magnet ?

.....

.....

66. What do we call materials that can be attracted by a magnet ?

.....

66. List three examples of materials that can be attracted by magnet.

(i) ..... (ii)..... (iii) .....

67. Define non-magnetic materials.

.....

.....

68. Mention any three examples of non-magnetic materials.

(i) ..... (ii)..... (iii) .....

N

69. Name the two main types of magnets.S

(i) ..... (ii) .....

70. Write the name of these artificial magnets.

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71. Mention the two examples of natural magnets.

(i) ..... (ii) .....

72. Why is the earth called a magnet ?

.....

.....

73. Write any three properties of magnets.

(i) .....

(ii) .....

(iii) .....

74. How does a freely suspended bar magnet behave ? magnet

.....magnet

.....

75. State the properties of magnets illustrated below.

(a) (b)

pins

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76. Draw an illustration to show that magnets have magnetic fields around them.

77. What is meant by a magnetic field ?

.....

.....

78. State any two properties of magnetic fields.

(i) ..... (ii) .....

79. Why do people keep magnets using iron keepers ?

.....

.....

80. Mention three methods of magnetization.

(i) .....

(ii) .....

(iii) .....

81. Study the method of making magnets below and answer questions. S

(a) Identify the method of making magnets shown in the diagram.

.....

(b) Name the poles of a magnet gained by the pions at point

X .....

Y .....

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(c) What name is given to magnets made using the method in the above diagram.

.....

82. State one way you can determine the poles of an electro magnets.

.....

.....

83. (a) What does the term to demagnetise a magnet mean ?

.....

.....

(b) List three ways of demagnetizing a magnet.

(i) ..... (ii)

..... (iii)

.....

84. Why is it not advisable to pass alternating current through a magnet ?

.....

.....

85. The diagram below is of a method used to make magnets. Use it to answer questions that follow.

(a) Which method of magnetization is illustrated in the above diagram ?

.....

(b) Show on the diagram with the help of an arrow the direction for the flow of current.

(c) What name is given to the magnet obtained using the above method ?

.....

(d) How can magnets made using the above method be made stronger ?

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.....

.....

86. How can you determine the poles of an electro-magnet ?

.....

.....

87. Give any three uses of magnets in our daily life.

(i) .....

(ii) .....

(iii) .....

88. How are magnets helpful to medical doctors ?

.....

.....

89. State one way a mother in the kitchen can make use of a magnet.

.....

.....

90. How do sailors find magnets useful to them ?

.....

.....

91. List two appliances that:

(a) use only electricity to function.

(i) ..... (ii).....

(b) use only magnetism to function.

(i) ..... (ii).....

(c) use both magnetism and electricity to function.

(i) ..... (ii).....

92. State the energy change that takes place in a dynamo.

.....

.....

93. How is a generator useful in a hospital ?

.....

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BY TR.MUTAKA SEMU

Corrections

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BY TR.MUTAKA SEMU

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DATE ……

SPELLING GAME

THEME: ENVIRONMENT

TOPIC: ENERGY RESOURCES IN THE ENVIRONMENT

Qn. What is energy?

• Energy is the ability to do work.

Qn. What is a resource?

• A resource is anything people use to meet their needs.

OR

• A resource is the component of the environment used to satisfy people's needs.

Qn. Mention the two types of resources.

- Renewable resources.
- Non-renewable resources.

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Qn. What are renewable resources?

- Renewable resources are components of the environment that can be replaced naturally when used up.

Qn. Give the examples of renewable resources.

- Animals
- Plants
- Soil
- Water
- Air / wind
- Sun

Qn. What are non – renewable resources?

- Non – renewable resources are things that cannot be replaced naturally once used up.

Qn. Give the examples of non-renewable resources.

- Minerals
- Rocks
- Fossil fuels

Energy resources

Qn. What are energy resources?

- Energy resources are things that provide people with useful energy.

Qn. Identify the examples of energy resources.

- Plants
- Animals
- Wind
- Sun
- Minerals
- Fossil fuels

Qn. Name the two types of energy resources.

- Renewable energy resources.
- Non-renewable energy resources.

Renewable energy resources.

Qn. What are renewable energy resources?

- Renewable energy resources are things that provide useful energy and can be replaced naturally once used up.

Qn. Give the examples of renewable energy resources.

- Plants
- Animals
- Wind
- Water
- The sun

What are non-renewable energy resources?

Non- renewable energy resources are things that provide useful energy to people and cannot be replaced naturally when used up.

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Qn. State the examples of non-renewable energy resources.

- Minerals
- Fossil fuels

Animals are energy resource

Qn. How are animals used as energy resources?

- Some animals are used for transport.
- Some animals are used for ploughing.
- Animal wastes are used in the production of biogas.

Qn. What are beasts of burden?

• Beasts of burden are animals that provide us with cheap labour.

Qn. Give the examples of beasts of burden.

- Oxen
- Donkeys
- Camels

Qn. Identify the different ways of conserving animals.

- Proper feeding of animals.
- Treating sick animals
- Vaccinating animals
- Gazetting animals in game parks.
- Banning illegal hunting of animals.

Qn. How can animals be replaced naturally once used up.

• Through reproduction.

Plants as energy resources

Qn. How are plants used as energy resources?

- Plants provide us with wood fuel.
- Some plants wastes are used in the production of biogas.

Qn. State the different ways of conserving plants.

- Afforestation.
- Re-afforestation.
- Agro – forestry.
- Using energy saving stoves.
- Using other alternative sources of energy e.g. biogas instead of wood fuel

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A diagram showing an energy saving stove.

Qn. How do energy saving stoves conserve the environment?
• Energy saving stoves use less charcoal.
Qn. Why does energy saving stoves use less charcoal?
• Energy saving stoves keep heat for a long time.
Qn. State the importance of the clay lining found on a charcoal saving stove.
• The clay lining keeps heat for a long time.

Give at least two examples of wood fuel.

Firewood
Charcoal
- Wood shavings
- Saw dust
- Briquettes

Qn. Mention the form of energy stored in charcoal.
• Chemical energy.
Qn. State the energy change that takes when wood burns to ash.
• Chemical energy changes to heat energy.
The sun as an energy resource.
• The sun is the main source of heat and light energy as forms of energy on earth.
Qn. How is the sun used as an energy resource?
- The sun provides us with light that enables us to see.
- Heat from the sun dries washed clothes.
- Heat from the sun helps to generate solar electricity.
- Head from the sun helps to dry harvested crops.
- Light from the sun is used for photography.
- Light from the sun enables plants to make food.

Qn. In which way is solar electricity friendly to the environment?
- Solar electricity reduces the cutting down of trees for wood fuel.
- Solar electricity does hot pollute the environment.

Water as an energy resource.
Qn. How is water used as an energy resource?
- Fast running water helps to generate hydro electricity.

BY TR.MUTAKA SEMU

- Steam from hot springs is used to generate geothermal electricity.
- Tides are used to generate tidal electricity.

Qn. Give the examples of useful energy resources got from water.

- Hydro electricity.
- Geothermal electricity
- Tidal electricity

Qn. What is a tide?

• A tide is a regular rise and fall of water in the sea or ocean.

Qn. What causes a tide?

• A tide is caused by the attraction of the moon and earth.

Wind as energy resource Qn. What is air?

• Air is a mixture of gases.

Qn. What is wind?

- Wind is air in motion or moving air.

<u>Note:</u>

- Wind possesses kinetic energy that makes things move.

Qn. State the ways how wind is used as an energy resource.

- Wind is used in winnowing.
- Wind is used to sail boats.
- Wind is used to turn wind mills.
- Wind is used to fly kites.
- Wind helps to dry washed clothes.
- Wind helps in seed dispersal.

State the dangers of wind.

Strong wind destroys crops.

Strong wind destroys buildings.

• Strong wind capsizes boats.

Qn. How does wind help to dry clothes?

• By speeding up the evaporation process.

A diagram of a windmill.

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Qn. Give the uses of a windmill

- A wind mill is used to generate electricity.
- A wind mill is used to pump water from underground.
- A wind mill is used to grind grains.

Qn. How is wind formed?

• Wind is formed when air in a certain area is heated faster than air in another area.

Qn. Write down different ways of conserving renewable resources.

- Afforastation.
- Re-afforestation
- Agro forestry
- Using energy saving stoves.
- Using other alternative sources of energy e.g. biogas instead of wood fuel.
- Proper feeding of animals.
- Treating animals when they are sick
- Gazetting animals in games reserves
- Banning illegal hunting of animals.

Energy resources from fossil fuels

Qn. What are fossils?

• Fossils are remains of plants and animals that lived thousands of years ago.

Qn. What are fossil fuels?

• Fossil fuels are fuels that were formed from the remains of plants and animals that lived thousands of years ago.

Qn. Give the examples of fossil fuels.

- Petroleum
- Coal

Petroleum / crude oil

Qn. What is petroleum?

• Petroleum is a fossil fuel that was formed from the remains of animals that died many years go.

Qn. Give the examples of products of petroleum.

- Petrol
- Diesel
- Jet fuel
- Paraffin / kerosene
- Natural gas

State the importance of petroleum products.

Petroleum products can generate power that can run big machines. Petroleum products are burnt to produce heat and light.

Qn. Identify the process by which petroleum products or crude oil is separated.

• Fractional distillation.

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Coal as an energy resource.

Qn. What is coal?

- Coal is a hard black material formed from the remains of plants that lived thousands of years ago.

Qn. State the importance of coal.

- Coal is used to generate thermal electricity.
- Coal is used to make tar for surfacing roads.
- Coal is used as fuel in steam engines.

Qn. Give the other products from petroleum.

- Plastics
- Polythenes
- Dye
- Vaseline
- Paint
- Fertilizers

Qn. Give the other products from coal.

- Paint
- Perfumes
- Fertilizers

Minerals as energy resources (uranium)

How are minerals (uranium) used as an energy resource?

Uranium is burnt to produce atomic electricity.

- Uranium is used as fuel in nuclear powered sub-marines.
- Uranium is used to make atomic bombs.

Qn. State the ways of conserving non-renewable energy resources.

- By having controlled mining of minerals.
- By using other alternative sources of fuel e.g. biogas instead of petroleum.
- By walking distances which are not too long to conserve petroleum products.
- By riding bicycles in short distances than driving cars to save fuel.
- By repairing vehicles which are under dangerous mechanical conditions in order to save fuel.

Biogas production

Qn. What is biogas?

- Biogas is a methane that is produced from rotting organic matter.

Qn. What is biomass?

- Biomass is the amount of living matter found in an area.

Qn. Identify the materials used to produce biogas.

a) Plant materials

- Banana peelings
- Sweet potato peelings
- Seed residues

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b) Animal materials

- Cow dung
- Urine
- Chicken droppings
- Human faeces
- Goat droppings

How is biogas produced?

Biogas is produced by putting animal and plant materials in a proper sealed container called biogas digester which is buried underground.

- Plant and animal waste in the biogas digester are broken down by anaerobic bacteria during the process of fermentation.
- During fermentation, methane gas called biogas is produced.

A diagram showing biogas digester.

Qn. State the uses of the parts of a biogas digester.

i) Inlet

• The inlet is used for putting in plant and animal matter.

ii) Inlet pipe

• The inlet pipe allows plant and animal matter into the digester.

iii) Outlet

• The outlet is used for removing old or used up matter from the digester.

v) Emptying tank

- The emptying tank is where used up matter is collected before it is taken to the garden as manure.

vi) Biogas tube

- The biogas tube traps and takes biogas to the heating or lightning equipment.

vii) Biogas digester.

- A biogas digester is where animals and plants waste are put to ferment.

Qn. Why is the biogas digester tightly sealed?

- To prevent the entry of oxygen.

Qn. State the uses of biogas.

- For cooking
- For lighting
- For heating

Qn. Give the advantages of using biogas

- Biogas is cheap.
- Biogas does not pollute the environment.
- Materials for making biogas are readily available.

Qn. State the disadvantages of using biogas.

- Biogas may not be efficient.
- Biogas contains impurities.

Qn. What is an effluent?

- An effluent is a liquid substance obtained after production of biogas.

Qn. What is sludge?

- Sludge are waste materials removed from a biogas digester.

Qn. What is slurry?

- Slurry is a mixture of dung and water that enters a biogas plant in a semi liquid form.

Environmental conservation

Qn. What is environmental conservation?

- Environmental conservation is the protection and preservation of resources in the environment.

Qn. Give reasons for conserving resources.

- For future use.
- To prevent extinction of resources.

Questions

1. How is a resource different from an energy resource ?

.....
.....

2. List any three examples of energy resources in the environment.

(i) ..... (ii).....

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(iii).....

3. State the major source of energy in the environment.

……

4. What form of electricity obtained from the sun ?

……...

5. How does light from the sun benefit plants ?

……

6. In which way does heat from the sun help to dry wet clothes ?

……

7. How does the human skin benefit from the sun ?

……...

8. In which way does sundrying help to preserve some food ?

……..

9. Difine a tide.

……..

10. What form of electricity is obtained from fast flowing water?

……..

11. What causes a tide?

……

12. Give any two importance of water as an energy resource to people.

(i) .....

(ii).....

13. State the two examples of fossil fuels.

(i) ..... (ii) .....

14. List any three fuels obtained from petroleum.

(i) ..... (ii).....

(iii).....

15. By what process are the different fuels obtained from petroleum?

……

16. What kind of electricity is got from burning of coal?

……....

17. Apart from being burnt to produce electricity, give two other uses of coal as a fossil fuel.

(i) .....

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(ii).....

18. Besides fuels, mention three other products obtained from crude oil.

(i) .....

(ii) .....

(iii) .....

19. Write any two ways in which uranium can be used as an energy resource.

(i) .....

(ii) .....

(iii) .....

20. Give three ways animals can be used as energy resources.

(i) .....

(ii) .....

(iii) .....

21. Why is animal transport said to be environmental friendly?

.....

.....

22. List two ways plants are used as energy resources.

(i) .....

(ii) .....

23. State three ways in which plant resources can be conserved.

(i) .....

(ii) .....

(iii) .....

24. How does the use of energy saving stoves help to conserve plants in the environment?

.....

25. Write one alternative source of fuel instead of plants.

.....

26. What is meant by wood conservation?

.....

.....

27. State three ways in which wind is used as an energy resource.

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(i) .....

(ii) .....

(iii) .....

28. How is wind used in the production of electricity?

.....

.....

29. Write one game played by children using the energy of wind.

.....

30. How does wind help in the drying of wet things like clothes?

.....

.....

31. Mention one important plant process that takes place with the help of wind energy.

.....

.....

32. What name is given to the gas produced during biogas production ?

.....

33. List three materials used in the production of biogas.

(i) ..... (ii) .....

(iii) ..... ı

34. Name the bacteria that helps in the production of biogas.

.....

35. Use the diagram below of a biogas digester to answer questions.

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(a) Name the container labelled X

.....

(b) State the use of the following parts on a biogas digester.

(i) inlet pipe : .....

.....

(ii) outlet pipe: .....

.....

(iii) biogas tube : .....

.....

(c) What role do anaerobic bacteria play in a biogas digester?

.....

36. How is sludge as a remain of biogas production useful to crop farmers?

.....

37. Give three uses of biogas.

(i) .....

(ii) .....

(iii) .....

38. State two advantages of using biogas.

(i) .....

(ii) .....

39. How does the use of biogas contribute towards the control of environmental degradation?

.....

.....

40. Give one reason why energy resources should be conserved.

.....

.....

BY TR.MUTAKA SEMU

Corrections

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DATE …….....

SPELLING GAME

THEME: MATTER AND ENERGY

TOPIC 4: MACHINES AND FRICTION

Qn. What is a machine?

• A machine is a device that simplifies work.

Qn. Give the different ways how machines simplify work

- By increasing the speed of doing work.
- By reducing the effort needed to do work.
- By changing the direction of force.

Qn. State the advantages of using machines.

- Machines increase the speed of doing work.
- Machines reduce the effort needed to do work.
- Machines change the direction of force.
- Machines enable us to apply force easily.

Work

Qn. What is work?

• Work is the product of force and distance moved in the direction of force.

Force

Qn. What is force?

- Force is a pull or push on an object.
- Force is measured in Newtons.

Work done

Qn. What is work done?

• Work done is when a force is used to move a load through a distance.

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Qn. When is work done?

• Work is done when force is used to move another force through a distance.

Or.

• Work is done when a force is used to move the load through a distance.

Note:

• Work done depends on two things i.e.

i) The force applied ii) The distance moved

Work done = force x Distance

WD = F x D

Qn. In which unit is work done measured?

• Joules (J)

Qn. What is a joule?

• A joule is the work done when a force of 1Newton is moved through a distance of 1 metre.

Note:

1kg = 10Newtons

Power

Qn. What is power?

• Power is the rate at which work is done.

Qn. In which units is power measured?

• Power is measured in watts (W)

Distance

Qn. What is distance?

• Distance is the length through which an object moves when work is done.

• Distance is measured in metres (M)

Calculations on work done

Examples

1. Find the work done by a man who carries a log of wood of 25N through a distance of 7m.

Solution:

Work done = Force x Distance

WD = F x D

WD = (25 x 7) Joules

WD = 175 Joules

2. A woman carries a baby of 6kg through a distance of 9m.Find the work done.

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Solution

3. If Musa pushed a wheel barrow of 320 Joules through a distance of 8m, how much force did he use?

Solution

$$\text{Force} = \frac{\text{Work done}}{\text{Distance}}$$

$$F = \frac{WD}{D}$$

$$F = \frac{\cancel{320}^{40}}{\cancel{8}_{1}}$$

$$F = 40N$$

4. Find the distance moved by Suzan who carried a basket of 450 joules using an effort of 5kg.

Solution

$$\text{Distance} = \frac{\text{work done}}{\text{force}}$$

$$D = \frac{WD}{F}$$

$$D = \frac{\cancel{450}^{9}}{\cancel{50}_{1}}$$

$$D = 9M$$

Note:
1kg = 10N
5kg = (5 x 10)N
5kg = 50N

Activity:

1. Find the work done by Joshua who lifted a basket of mangoes using a force of 65N through a distance of 5m.

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2. Calculate the work done by Otim who pushed a load of 75kg through a distance of 4 metres.

3. Find the force needed by Aisha to push a box of 280 joules through a distance of 7 metres.

4. Samuel pushed a log of wood of 600 joules through a distance of 10m. Calculate the force he used.

5. Find the distance covered by Shukra if she pushes a load of 30N to do work of 900 joules.

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6. If stone of 80N is lifted through a certain distance, the amount of work done is 720 joules. Find the distance through which the stone is lifted.

Corrections

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SPELLING GAME

Types of machines

Qn. Identify the two types of machines.

- Complex machines
- Simple machines

a) Complex machines

Qn. What are complex machines?

- Complex machine are machines that are made up of many parts and need training to use them.

Qn. Give the examples of complex machines.

- Tractors
- Vehicles
- Sewing machines
- Aeroplane

b) Simple machines

Qn. What are simple machines?

- Simple machines are machines that are made up of few parts and do not need training to use them.

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Qn. Give the examples of simple machines.

- A claw hammer
- A water pump
- A weighing scale
- A see saw
- A pair of scissors
- A bottle openers
- An axe
- Wheel barrow
- Spade
- Trowel
- Razor blade
- Rake
- Hoe
- Panga

Qn. Identify the group / classes of simple machines.

- Levers

Describe these terms:-

- Wedges
- Inclined planes / slopes
- Pulleys
- Screws
- Wheel and axle

LEVERS

• A lever is a stiff / ridged bar that turns freely on a fixed point called a **<u>fulcrum / pivot</u>**.

Parts of a lever

a) **Load**. This is the object to be moved.
b) **Effort**. This is the force needed to move the load.
c) **Pivot / fulcrum**. This is the turning point of a machine.
d) **Load arm**. This is the distance between the load and the pivot.
e) **Effort arm**. This is the distance between the effort and the pivot.

<u>Note:</u>

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• A lever works best when the load arm is shorter than the effort arm.

<u>Use the diagram below to answer the questions that follow:</u>

Qn. Which of the diagram above will help you to do work easily?

• Diagram S.

Qn. Give a reason to support the answer above.

• The effort arm is longer than the load arm.

Qn. John and Mary sat on a see-saw and they were at equilibrium as shown below:

a) Who is heavier?

……

b) Give a reason to support your answer above.

……

c) Who of the two is lighter?

……

d) Give a reason to support your answer above?

……

DATE ……

SPELLING GAME

Classes of levers

Qn. Identify the three classes of levers.

- First class levers.

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- Second class levers
- Third class levers

i) First class levers.

Qn. What are first class levers?

- First class levers are machines where the pivot is in between the load and the effort.

(L.P.E) OR (E.P.L)

Note:

- In the first class, the effort arm is longer than the load arm.

Qn. State the advantage of using machines in the first class levers.

- Less effort is used.

Qn. How do first class levers simplify work?

- The load and effort move in different directions.
- By increasing the effort arm and reducing the load arm.

Qn. Give the examples of machines in the first class.

a) Pair of scissors.

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b) Pliers / Pair of pliers

c) A crow bar

d) A borehole / water pump

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e) Claw hammer

f) A see saw

g) Pincers

h) Weighing scale

i) Lid opener

<u>Activity</u>

1. Write down any two examples of each of the following.

a) 1st class lever

i)._____ ii)._____

b) second class lever

i)._____ ii)._____

2. State any one advantage of using first class lever?

_____

3. Draw any one machine in 1st class lever and show the pivot, effort and load.

4. How are machines important in our life?

_____

5. State any one way of improving the efficiency of a machine.

_____

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DATE ……

SPELLING GAME

2. Second class levers

Qn. What are second class levers?

• Second class levers are levers in which the load is in between the pivot or fulcrum and the effort.

(ELF OR FLE)

<u>Note:</u>

• In the second class levers, the load is closer to the fulcrum than the effort.

Qn. State the advantages of using second class levers.

• Less effort is used compared to the load.

Qn. How do second class levers simplify work?

• By making the load and effort move in the same direction

Qn. Give examples of machines in the second class levers.

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b) **Nut cracker**

a) **A wheel barrow**

c) **Bottle opener**

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d) Human foot

e) Craw bar

Qn. What are third class levers?

- Third class levers are levers where the effort is in between the pivot and the load. (LEP) or (PEL)

Illustration of a third class lever.

Qn. Give examples of machines in the third class levers.

a) Spade

b) Human arm

c) Broom

d) Pair of tongs (sugar tongs)

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e) **A fishing rod**

f) **Stapler**

g) **Tweezers**

g)Table knife

Qn. State the advantage of using machines in the third class levers.

- The effort moves through a short distance.

<u>Note:</u>

- The formula PLE or FLE can be used to determine the class of levers.

Activity

1. What is a machine?
   ……
2. Give two ways in which machines simplify work.
   i)……
   ii) ……
3. Give one advantage of using machines.
   ……
4. Give one disadvantage of using machines.
   ……
5. Name one example of a complex machines.
   ……
6. What are simple machines
   ……
7. Name any two classes of simple machines.
   i)……
   ii……
8. What is a lever?
   ……
9. What name is given to the turning point of a machine?
   ……
10. Why is a pair of scissor called a double lever?
    ……
11. State one characteristic of first class levers.
    ……
12. Identify any one machine that belongs to first class levers.
    ……

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13. Why is less effort used when using first class levers?

……

14. Why is a wheelbarrow grouped under second class levers?

……

15. Why is less effort applied when using second class levers

……

Corrections

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Laws and levers / laws of moments

Qn. State the law of levers / law of moments.

- The law of levers states that load force multiplied by the load arm is equal to the effort force multiplied by the effort arm.

OR

- The law of levers states that the sum of the clockwise moments about any point is equal to the sum of anticlockwise moments. i.e.

Load X load arm = Effort X Effort arm

Or

L X LA = E X EA

Qn. What is a moment?

- A moment is a turning force of a machine.

Calculations on levers

1. James who weighs 60kgf sits 2m away from the fulcrum and balances with Joan who weigh 30kg from a see saw. How far from the fulcrum does Joan sit?

 Joan sits 4 metres away from the fulcrum.

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Solution

Let the effort arm be K.

$$L \times L.A = E \times E.A$$
$$60 \times 2 = 30 \times K$$
$$\frac{120}{30} = \frac{30k}{30}$$
$$4 = K$$

2. Annet is 35kg, if she sits 2cm away from the fulcrum and balances with Opio who sits 5cm away from the fulcrum, what is Opio's weight?

Solution

Let Opio's weight be n.

$$L \times L.A = E \times E.A$$
$$35 \times 2 = 5 \times n$$
$$\frac{70}{5} = \frac{5}{5}$$
$$14 = n$$

- Opio's weight is 14kg

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4. Moses is 50kg. He sits 4m away from the fulcrum to balance with Jane who wighs 25kgs on a see saw. How far is Jane from Musa?

Solution

L x L.A = E x E.A

50 x 4 = 25 x h

200 = 25h

25 25

8 = h

4m + 8m = 12m

Jane sits 12m away from Moses.

4. Find the value of P on the diagram below.

Solution

LXL.A = EXE.A

$30X3\frac{1}{2}$ = PX10

$30X\frac{7}{2}$= 10P

15X7 = 10P

105 = 10P

BY MR TAKASE

10 10
10.5 = P
Therefore **P = 10.5**

5. Calculate the value of Y.

6. Find the value of P.

Solution

L x L.A = E x E. A
P (2 + 5) + (20 x 5) = 80 x 10
2p + 5p + 100 = 800
7p + 100 = 800
7p + 100 - 100 = 800 - 100
$\frac{7p}{7} = \frac{700}{7}$
P 100kg

7. Find the value of R.

Solution:

L x L.A	=	E x E.A
30 x 8	=	(10 x 4) + (20 + R)
240	=	40 + 80 + 20R
240	=	120 + 20R
240	=	120 - 120 + 20R
120	=	20R
20	=	20
6	=	R

- **R = 6M**

Activity:

1. Charity weighs 90kgf. If she sits 3m away from the pivot of a see saw, how far Joel whose weight is 30kgf will sit in order to balance.

2. Darius weighs 50kg andsits 4m away from the fulcrum. Regina weighs 40kg.
   a) How far from the fulcrum will Regina sit in order to balance with Darius.

   b) How far will Regina be from Darius?

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6. Find the value of R.

3. John and Jane sat on a see saw as shown below.

Find Jane's weight.

5. Find the value of P.

7. Using a see saw below, calculate the value of W.

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.....
.....

Corrections

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Mechanical Advantage

Qn. What is mechanical advantage?

- Mechanical advantage is the number of times a machine eases work. **OR**

- Mechanical advantage is the radio of the load to the effort.
- Mechanical advantage = $\frac{\text{Load}}{\text{Effort}}$

M.A = $\frac{L}{E}$

Note:

- Mechanical advantage has no units because it is a ratio of forces.
- If mechanical advantage is greater than I, less effort is used.
- It mechanical advantage is less than I, more effort is used.

Qn. Mention the force that affects the efficiency of the mechanical advantage of a machine.

• Friction

Calculations of mechanical advantage.

1. **Calculate the mechanical advantages of a boy who carries a bucket of water of 400N using a force of 100N.**

Solution

M.A = $\frac{\text{Load}}{\text{Effort}}$

M.A $\frac{400N}{100N}$

M.A = 4

2. **Find the mechanical advantage of the crow bar below.**

Solution:

M.A = $\frac{L}{E}$

M.A = $\frac{80N}{20N}$

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M.A = 4

3. Find how many times a see saw simplifies work given the load of 600N and the effort of 30N.

Solution:

$$M.A = \frac{L}{E}$$

$$M.A \quad \frac{600N}{30N}$$

$$M.A = 20$$

The see saw simplifies work 20 times.

4. What will be the load if the mechanical advantage of a machine is 2 and the effort is 30N?

Solution:

$$M.A = \frac{L}{E}$$

$$2 = \frac{L}{30N}$$

$$2 \times 30N = \frac{L}{30N} \times 30N$$

$$60N = L$$

The load will be 60N

6. A machine with a mechanical advantage of 3 carries a load of 90N. Find the force required to move the load.

Solution

M.A =

$$3 = \frac{90N}{E}$$

$$3 \times E = \frac{90N \times E}{E}$$

$$3E = 90N$$

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3 3

E = 30

The force required is 30N

Activity:

1. Find the mechanical advantage of a woman who pushed a log of wood 120g using 40kg.

2. Calculate the mechanical of the machine below.

3. Find the effort needed by a machine of mechanical advantage 4 that carries a load of 100N.

4. Calculate the load of a machine with mechanical advantage 5 and its effort 3kg.

Efficiency of machines

Qn. What is efficiency of a machine?

• Efficiency of a machine is the ratio of work output to work input of a machine.

Qn. What is work out put?

• Work output is the work done on the load by a machine.

Qn. What is work input?

- Work input is the work done on the effort by a machine?

$$\text{Efficiency} = \frac{\text{work output x 100\%}}{\text{Work input}}$$

Note:

- Efficiency of a machine is expressed in percentage and it is always less than 100%.

Qn. Why is the efficiency of a machine always less than 100%?

- It is due to friction.

Qn. How can the efficiency of a machined be increased?

- By oiling machines to reduce friction.
- By greasing machines to reduce friction.
- By repairing damaged machines.

Calculations of efficiency

1. Calculate the efficiency of a machine whose effort is 30N and move through a distance of 15m to overcome a load of 120N through a distance of 3m.

Solution

$$\text{Efficiency} = \frac{\text{work out put x 100\%}}{\text{Work input}}$$

$$= \left\{ \frac{120N \times}{30N \times} \right\} \frac{3m}{15m} \times 100$$

$$= 4 \times \left\{ \frac{20}{} \right\}$$

$$= 80\%$$

 Efficiency = 80%

Velocity ratio

Qn. What is velocity ratio?

- Velocity ratio is the ratio of the distance moved by the effort to the ratio of distance moved by the load.

$$\text{Velocity ration} = \frac{\text{Distance moved by effort}}{\text{Distance moved by the load}}$$

$$V.R = \frac{D.E}{D.L}$$

Calculation of velocity ratio

1. Calculate the velocity ratio of a lever whose distance of the effort is 12m and that of the load is 3m.

Solution:

$$V.R = \frac{DE}{DL}$$

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V.R = $\frac{13m}{3m}$

V.R = 4

INCLINED PLANES / SLOPES

Qn. What is an inclined plane?

- An inclined plane is a slanting or sloping surface.

An illustration of an inclined

Note

Note:

- The longer the inclined plane, the less effort used to move the load.
- The shorter the inclined plane, the more effort used to move the load.

- Vertical height (RT) – distance moved by the load.
- Slanting surface (RK) – distance moved by the effort TK – Ground level.

Use the diagram below to answer the questions that follow:-

a) Name the simple machine above.

- An inclined plane / a slope.

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b) What is the distance moved by:-

i) Load = 5cm

ii) Effort = 10cm

c) Find the mechanical advantage of the machine.

$$M.A = \frac{L}{E}$$

$$M.A = \frac{80kgf}{40kgf}$$

$$M.A = 2$$

Or

$$M.A = \frac{DE}{DL}$$

$$M.A \quad \frac{10cm}{5cm}$$

$$M.A = 2$$

d) State the ways one can use less effort to raise the load on the diagram above.

- By increasing the distance moved by the effort.
- By decreasing the distance moved by the load.
- By lowering the angle of the inclined plane.

Qn. State the examples of inclined planes.

- Winding roads
- Stair cases / steps
- Ramp
- Ladders

Illustrations

a) A ladder

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b) Winding roads

b) Stair cases

d) A ramp

Qn. Give the uses of inclined planes.

- Inclined planes are used to climb tall buildings.
- Inclined planes are used to load and off load heavy goods on lorries.
- Inclined planes are used to climb tall trees.
- Inclined planes enable vehicles to climb steep hills.
- Inclined planes enable builders to carry building material from a lower level to a higher level.

Qn. State the advantages of using inclined planes.

- Inclined planes reduce the effects of gravity as one raises the load.
- Inclined planes enabled people to use less effort to raise a load from a lower level to a higher level.

Work done on inclined planes.

1. Calculate the work done by an inclined plane below if the load from K to R is as shown.

Solution:

1kg = 10N
10kg = (10 x 10)N
= 100N
Work done = force x Distance
WD =F x D
WD = (100 x 1) Joules

 Work done is 100 Joules

Activity:

1. Calculate the work done by the inclined plane shown below:-

2. Calculate the work done by the inclined plane.

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DATE ……

SPELLING GAME

WEDGES

Qn. What is a wedge?

- A wedge is a tool with a narrow point that gradually becomes wider.

Note:

- A wedge can also be called a double inclined plane.

Qn. Why are wedges said to be double inclined planes?

- Wedges have two sloping surfaces joined together.

An illustration of a wedge.

Qn. Give the examples of wedges

- Razor blades
- Axe
- Hoe

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- Spear
- Knife
- Panga
- Needle
- An arrow
- A bullet

Diagram showing the different examples of wedges.

1. Panga

2. Needle

3. Spear

4. An Axe

5. Razor blade

6. Hoe

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Qn. State the uses of wedges.

- Wedges are used to peel food.
- Wedges are used to cut food.
- Wedges are used to split wood.
- Wedges are used for sewing.

- Wedges are used for trimming hair.
- Wedges are used for cutting firewood.

SCREWS

Qn. What is a screw?

• A screw is an inclined plane wound around a rod.

A diagram of a screw

<u>Note:</u>

• The distance between two successional thread is called pitch.

Qn. Identify the examples of screws.

- Bolts
- Nuts
- Car jack / screw jack
- Engineers vice / clamp
- Screw nail
- Screw driver
- Spiral stair cases

Diagram showing the examples of screws.

1. Nut

2. Bolt

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3. Car jack

4. Screw driver

5. Engineers vice / clamp

6. Spiral stair cases

Qn. Give the uses of screws

- Screws are used to lift heavy vehicles.
- Screws are used to hold things tightly together e.g. bolts and nuts.
- Screws are used to fasten things together e.g. screw nails.
- Screws are used to make movements upstairs easy e.g. spiral stair cases.

DATE .....

SPELLING GAME

PULLEYS

Qn. What is a pulley?

• A pulley is a free rotating wheel with a grooved rim.

Qn. Why are pulleys grooved?

- To prevent the rope /chain from sliding off the rim.

<u>Note:</u>

- A pulley has a rope /chain that is passed over the groove.
- The frame to which the pulley is fixed is called a block.

• **An illustration**

Qn. Identify the two forces overcome by pulleys

- Friction
- Force of gravity

Types of pulleys

Qn. Mention the three types of pulleys

- Single fixed pulleys.
- Single movable pulleys
- Block and tackle pulley e.g. (Fixed movable pulley)

A single fixed pulley

Qn. What is a single fixed pulley?

• A single fixed pulley is a type of pulley which is fixed on a frame and does not move.

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A diagram showing a single fixed pulley.

Qn. State the characteristics of a single fixed pulley.

- A single fixed pulley has a mechanical advantage of 1 (one).
- In a single fixed pulley the load is equal to the effort.
- A single fixed pulley changes direction of force.
- In a single fixed pulley the distance moved by the load is equal to the distance moved by the effort.
- A single fixed pulley is operated from down.

Qn. State the advantage of using a single fixed pulley.

• A single fixed pulley changes direction of force.

Calculations on a single fixed pulley.

1. Find the force required to move the load in the diagram below.

Solution:

M.A = $\frac{L}{E}$

= $\frac{40kgf}{E}$

X E = $\frac{40kgf \times E}{E}$

E = 40kgf

2. Find the effort applied to overcome the load of 50kgf using a single fixed pulley.

Solution

M.A = $\frac{Load}{Effort}$

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$$I = \frac{50kg}{E}$$

$$I \times E = \frac{50kgf \times E}{E}$$

$$E = 50kgf$$

The effort is 50kgf

3. Find the load using the pulley below.

Solution:

$$M.A = \frac{L}{E}$$

$$I = \frac{L}{70kgf}$$

$$70kg \times I = \frac{L \times 70kgf}{70kgf}$$

$$70kgf = L$$

Load = 70kgf

Note:

- A single fixed pulley works as a first class lever.

b) Single movable pulleys.

Qn. What is a single movable pulley?

- A single movable pulley is a type of pulley supported by two ropes.

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A diagram showing a single movable pulley

Qn. State the characteristics of a single movable pulley.

- A single movable pulley has mechanical advantage of 2.
- In a single movable pulley the effort applied is half the load.
- A single movable pulley is operated from up.
- In a single movable pulley, the distance moved by the effort is half the distance moved by the load.

Qn. Give the advantage of using a single movable pulley.

- A single movable pulley uses less effort to overcome the load / less effort is used to move the load.

Calculations of single movable pulleys.

1. Find the force required to move the load using the pulley below.

<u>Solution</u>

$$M.A = \frac{L}{E}$$

$$2 = \frac{50kgf}{E}$$

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$2 \times E = \frac{50kgf \times E}{E}$

$2E = \frac{50kgs}{2}$

E = 25kgf

2. Mark used a single movable pulley to raise a load of 90kgf. what effort did he use?

Solution

$M.A = \frac{Load}{Effort}$

$2 = \frac{90kgf}{E}$

$\frac{2E}{2} = \frac{90kgf}{2}$

E = 45kgf

He used an effort of 45kgf

3. Find the load using the pulley below.

Solution:

$M.A = \frac{L}{E}$

$2 = \frac{L}{60kgf}$

$2 \times 60kgf = L \times 60kgf$

Note:

- A single movable pulley acts as a second class lever.

Qn. State the differences between a single fixed pulley and a single movable pulley.

Single fixed pulley	Single movable pulley
• There is change in direction of force. • Work is done faster • Effort applied is equal to the load.	• There is no change in the direction of force. • Work is slowly. • Effort applied is a half the load.

c) Block and tackle system (Movable fixed pulley)

Qn. What is a block and tackle system?

- A block and tackle system is the type of pulley system which consists of both a fixed and movable pulleys.

Note:

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- The mechanical advantage of a block and tackle system depends on the number of pulleys used.

An illustration showing a block and tackle system

Qn. State the advantages of using block and tackle system or fixed movable pulleys.

- Fixed movable pulleys change direction of force.
- Fixed movable pulleys use less effort to overcome the load.
- Fixed movable pulleys make work to be done faster.

Qn. Identify the uses of pulleys in daily life.

- Pulleys are used in cranes to lift heavy loads.
- Pulleys are used to raise and lower flags on flag poles.
- Pulleys are used for towing vehicles.
- Pulleys are used to move window curtains.
- Pulleys are used to lift heavy loads from one level to another during construction.
- Pulleys are used in lifts and elevators.
- Pulleys are used in scaffolds by painters to paint tall buildings.

Questions.

1. Give any two types of pulleys.
   i)._____
   ii)._____
2. How are pulleys important at school?
   _____
3. What is a pulley?
   _____
   _____

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4. Calculate the mechanical advantage of a machine that needs an effort of 20kgf to overcome a load of 60kgf

5. State one difference between a single fixed pulley and a single movable pulley.
_____
_____

6. Cite any two importance of the rope on a pulley.
i)._____
ii)._____

7. The diagram below shows a type of pulley

AB

a) Identify the type of pulley drawn above
_____

b) Find the MA of pulley marked A

c) Give the advantage of using the above pulleys over other types of pulleys
_____

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d) How does the above pulley simplify work?

_____

_____

8. The diagram below shows a simple machine

a) Name the simple machine

_____

b) Calculate the effort applied

c) State the advantage of using the above pulley.

_____

d) How does the above machine simplify work?

_____

_____

d) Identify one force the above machine overcomes when in use.

_____

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DATE ……

SPELLING GAME

Wheel and axle

Qn. What is a wheel and Axle?

• A wheel and axle is machine made up of an axle and a wheel.

<u>Note:</u>

An axle is a rod on which the wheel turns.

Qn. Give examples of machines that use the wheel and axle.

- Car steering wheel
- Wheels of a bicycle pedal
- Egg beaters
- Sewing machine
- Windlass / winch
- Door knobs
- Brace

Diagram showing machines using a wheel and axle.

a) A windlass winch

b) Car steering wheel

Door knob

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c) Handles of bicycles

d) Egg beater

g) Brace

Give the uses of wheel and axle in daily life.

- A windlass is used to draw water from underground.
- Egg beaters are used for preparing eggs for trying.
- Door knobs are used for opening and closing doors.
- Car steering wheels are used for steering cares while driving.
- Bicycle pedals are used to move bicycles.

- Braces are used to drill holes in wooden material.

Gear wheels / cog wheels / toothed wheels.

- Gear wheels are special machines of wheel and axle.Gear wheels have teeth around them that help to multiply the force. **A** diagram showing gear wheels / toothed wheels

Chain and sprocket of a bicycle

Qn. Gear wheel A has 60 teeth and gear wheel B has 30teeth, how many turns will gear wheel B make in one revolution?

Solution

Number of turns = $\frac{\text{No of teeth of gear wheel A}}{\text{No of teeth of gear wheel B}}$

= $\frac{\text{60 teeth}}{\text{30 teeth}}$

= 2 turns

Qn. State the uses of gear wheels.

- Gear wheels are used to multiply force.
- Gear wheels are used to multiply speed in vehicles.
- Gear wheels are used to change direction of vehicles e.g. making reverse in vehicles.

<u>Belt drives</u>

Qn. What are belt drives?

- Belt drives are special forms of wheels and axle that transmit motion from one wheel to another.

<u>Note:</u>

- Wheels driven by belt drives move in the same direction.

A diagram showing a belt drive

Identify the uses of belt drivers.

- Belt drives are used in factories to transport manufactured goods e.g. in bottling companies.
- Belt drives are used to transfer motion from one wheel to another e.g. bicycles.

Qn. Give the examples of machines that uses gear wheels and belt drivers.

- Bicycles
- Cars
- Vehicles
- Sewing machines
- Motorcycles
- Grinding mills.

FRICTION

Qn. What is friction?

This is the force that opposes motion.

Qn. Write down at least two properties of friction.

- The rougher the surface. The greater the force of friction. • The smoother the surface the less the force of friction
- Friction produces heat.
- Friction occurs in all the three states of matter.
- The greater the load, the greater the force of friction.

Types of friction

Qn. Identify any three types of friction.

- Static friction.
- Viscosity friction

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- Rolling / sliding / kinetic friction.

What is static friction?

- Static friction is the type of friction that occurs in objects fixed in one position.

Qn. State at least two examples of static friction.

- A nail fixed in a wall.
- Children standing on the assemble ground.
- A baby at the mother's back.
- A screw nail fixed in a nut.
- A car packed.
- A book placed on a table.
- A person seated on a chair.

Qn. What is viscosity friction?

- This is the type of friction that occurs in liquid and gases.

Qn. Identify at least two examples or situation where viscosity friction is applied.

- A fish swimming.
- A bird flying.
- An aeroplane flying.

Qn. What is sliding friction?

This is the type of friction that occurs between two objects that are in sliding contact.

Qn. Give example of situations where sliding friction occurs.

- Rubbing both hands together.
- A stone rolling on a hill.
- A ball rolling on the ground.
- A coaster sliding against the table.
- A person sliding down the slide.

State the different ways in which friction is a useful force or advantages of friction.

- Friction enables us to write.
- Friction helps us to walk without sliding.
- Friction helps us to brush teeth.
- Friction helps in lighting match sticks.
- Friction helps to climb mountains.
- Friction helps to stop bicycles when brakes are applied.
- Friction helps grinding millet on a grinding stone.
- Friction helps in sharpening objects e.g. panga, knife etc.
- Friction helped early man to make fire.

Qn. State the ways in which friction is a nuisance force (Disadvantages of friction)

- Friction causes wear and tear of objects e.g. shoe soles, car tyres.
- Friction causes unnecessary noise in machines.
- Friction causes unnecessary heat.
- Friction reduces efficiency of machines.

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- Friction delays work.
- Friction reduces speed of movement.

Qn. Identify the different ways of increasing friction.

- By putting treads on shoe soles and car tyres.
- By making smooth surfaces rough.
- By putting spikes on sports shoes.
- By putting tarmac on road surfaces.
- By putting grips on handles of bicycles.

Diagrams showing materials that increase friction.

a) Spikes on shoes

c) Treads on a tyre.

a) Treads on shoes.

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d) Grips on bicycle handles

Qn. Give the different ways of reducing friction.

- By lubricating i.e. greasing or oiling.
- By use of ball bearings.
- By use of rollers.
- By making rough surfaces smooth.
- By streamlining bodies of objects e.g. aeroplanes cars.

How do ball bearings reduce friction?

• Ball bearings keep the moving parts of a machine separated from each other.

Qn. How do rollers reduce friction?

• Rollers decrease the areas of friction between moving parts.

Qn. Identify the materials used to reduce friction.

- Ball bearings
- Grease
- Oil
- Rollers
- Sand paper

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Diagram showing some objects that reduce friction.

a)Ball bearings

b) Rollers

c) Sand paper

TOPICAL TEST

1. What is a machine?
   ……
   ……
2. How do simple machine simplify work?
   ……
3. What is friction?
   ……
   ……
4. Name any three uses of friction?
   i) ……
   ii) ……
   iii) ……
5. Identify one way in which friction is of a disadvantage.
   ……

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6. Give two ways of increasing friction?
   i) ……
   ii) ……
7. In which two ways is friction a nuisance force?
   i) ……
   ii) ……
8. Identify any two ways of reducing friction.
   i) ……
   ii) ……
9. Why are objects like aeroplanes and boats streamlined?
   ……
   The diagram below shows a pair of scissors

10. With the help of arrows, show the position of the effort, the fulcrum and the load.
11. To what class of levers do scissors belong?
    ……
12. To what group of simple machines does an axe belong?
    ……
13. State the law of moments.
    ……
    ……
14. Eric pushed a wheel barrow using a force of 25Newtons for a distance of 17metres.Calculate the work done by Eric.

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Study the diagram below and answer the questions that follow

Y

X

15. Name pulleys X and Y
    X: .....
    Y: .....
16. Which of the pulleys above needs less effort to raise a load of 60Newtons
    .....
17. Why should ball bearing be put in parts of a bicycle?
    .....
    .....
18. What is the function of an axe as a garden tool?
    .....
19. What would happen to a tool like an axe if left in moist area?
    .....

The diagram below shows a simple machine used to lift a load of 100kf with an effort of 50kgf

20. Name the simple machine shown above.
    .....
21. What distance does
    (a) Load move
    .....
    (b) Effort move
    .....
22. What can you do to use less than 50kgf to pull the same load?
    .....
23. Why are roads constructed with rough surfaces?
    .....
24. Give any one use of a pulley at your school.
    .....

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Corrections

……
……
……

THEME: HUMAN BODY

TOPIC 5: EXCRETORY SYSTEM

Qn. What is an excretory system?

• An excretory system is a system that helps to remove waste products from the body before they become toxic.

Qn. What is excretion?

• Excretion is the removal of waste products from the body before they become toxic.

Qn. Write down the four major examples of excretory organs in the body.

- The kidneys
- The lungs
- The skin
- The liver

Qn. Give at least one example of waste material removed from the body by each of the following excretory organs.

1. Kidneys

• Urine

Qn. Identify the components of urine.

- Excess water
- Excess salts
- Excess sugar
- Urea
- Uric acid

2. The lungs

- Carbon dioxide.
- Water vapour

3. The skin

- Sweat
- Lactic acid

Qn. Mention the components of sweat.

- Excess water
- Excess salts

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4. The Liver

• Bile pigment

The kidneys

- The kidneys belong to the urinary and excretory systems.
- The kidneys are two in the body of a normal human being.
- The kidneys are bean shaped and reddish in colour due to a large number of blood vessels they contain. **Qn. State the functions of the kidneys**
- Kidneys filter blood.
- Kidneys regulate the levels of water, salts and sugar in the body.
- Kidneys excrete urine
- Kidneys regulate body temperature.

Qn. Why is the left kidney located slightly higher than the right kidney?

• The left kidney is found under the spleen while the right kidney is found under the liver which is the largest internal organ of the body.

The structure of the urinary system

The structure of the kidney

Qn. State the function of each part.

i) Kidney wall

• The kidney wall protects the internal parts of the kidney.

ii) Cortex

• It is where filtration of blood takes place.

iii) Medulla

• It is where re-absorption of excess water, salts and sugar takes place.

iv) Pyramids

• Pyramids are the holes through which urine pours to the pelvis.

v) Pelvis

• It is where urine collects before it is taken to the urinary bladder.

vi) Ureter

• The ureter is the passage of urine from the pelvis to the urinary bladder.

OR

• The ureter transports urine from the pelvis to the urinary bladder.

Vii)Renal artery

• The renal artery transports oxygenated blood from the heart to the kidney.

viii) Renal vein

• The renal vein transports de-oxygenated blood from the kidney to the heart.

ix) Urinary bladder

• The urinary bladder stores urine for a short time.

X) Sphincter muscles

- The sphincter muscles control the opening and closing of the urinary bladder. **xi) Urethra**
- The urethra is the passage of urine out of the body.

Qn. Identify the diseases and disorders of the urinary system.

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Bilharziasis
- Gonorrhoea
- Kidney cancer
- Kidney stones
- Kidney failure
- Nephritis or inflammation of the kidneys

Qn. State the different ways of maintaining the proper function of the kidney.
- Doing daily physical exercises.
- Always drink boiled water.
- Avoid holding back urine for a long time.
- Avoid taking a lot of alcohol. • Feeding on a balanced diet.
- Avoid taking a lot of salt in food.
- Avoid dangerous games that may cause harm to the kidneys.
- Go for regular medical check ups.

THE LUNGS

• The lungs are both excretory and respiratory organs.

Qn. Why are the lungs regarded as excretory organs?

• The lungs excrete / remove carbon dioxide and water vapour from the body.

Qn. Why are the lungs regarded as respiratory organs?

• Lungs allow oxygen into the body for the process of respiration.

Qn. What is respiration?

• Respiration is the process by which the body uses oxygen and digested food to produce energy, carbon dioxide and water vapour.

Qn. Mention the raw materials needed by the body for respiration.
- Digested food
- Oxygen

Qn. Identify the products of respiration?
- Energy
- Carbon dioxide
- Water vapour

Summary

Food + Oxygen------Energy + carbon dioxide + water vapour

<u>Note:</u>
- Energy is a useful product.
- Carbon dioxide and water vapour are waste materials.

Qn. Where does respiration take place in the body?

• In the body cells.

Qn. State the role of oxygen during respiration.

• Oxygen burns down food to produce energy.

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OR

- Oxygen oxidizes food for the body to produce energy. **Qn. State the importance of respiration to the body.**
- Respiration enables the body to gain energy.
- Respiration enables the body to release water vapour.

Types of respiration

Qn. Mention the two types of respiration

• Aerobic respiration
Anaerobic respiration.

Qn. What is aerobic respiration?

• Aerobic respiration is the type of respiration that takes place in the presence of oxygen.

Qn. What is anaerobic respiration?

• Anaerobic respiration is the type of respiration that does not use oxygen.

The structure of the lungs.

Qn. State the functions of the parts

a) Nose

- The nose is the passage of air into the lungs.
- The nose contains mucus and tiny hair called cilia.

Qn. State the importance of the cilia in the nose.

- To trap dust and other foreign bodies.
- To trap bacteria.

Qn. Give the function of mucus in the nose.

• Mucus moistens air.

Qn. What happens to air in the nose?

- Air is moistened.
- Air is filtered.
- Air is warmed.

Qn. Why is the nose said to be the best passage of air into the lungs?

• Air through the nose is warmed, filtered and moistened.

Qn. Why is it not advisable to breathe through the mouth?

- Air through the mouth is cold and may chill the lungs.

OR

- Air through the mouth is not warmed, filtered and moistened.

b) Epiglottis

• The epiglottis prevents food and other foreign bodies from entering the trachea.

c) Larynx /Voice box

• The larynx contains vocal cords which vibrate and produce sound.

d) Wind pipe / trachea

• The trachea allows air into the lungs.

Qn. Why is the trachea made of rings of cartilage?

- To keep it open all the time.

OR

- To prevent it from closing.

Qn. Why should the trachea be kept open all the time?

• To prevent it from collapsing which leads to suffocation.

e) Bronchi (two) Bronchus – (one)

The bronchi take air from the trachea to each part of the lungs.

f) Bronchioles

• Bronchioles are tubes which supply air to the air sacs.

g) Air sacs / Alveoli

• It is where exchange of gases takes place.

Qn. How are air sacs adapted to their function?

- Air sacs are many in number.
- Air sacs are thin walled.
- Air sacs are surrounded by a net work of blood capillaries.

Qn. Why are air sacs many?

• To increase the surface area for gaseous exchange.

Qn. Why are air sacs thin walled?

• To allow easy diffusion of gases.

Qn. Why are air sacs surrounded by a network of blood capillaries?

• To supply air sacs with oxygen and digested food.

h) Diaphragm

• The diaphragm separates the chest cavity from the abdominal cavity.

BREATHING

Qn. What is breathing?

• Breathing is the taking in of air rich in oxygen and taking out air rich in carbon dioxide.

Qn. Mention the two types of breathing.

• Breathing in / Inhalation / inspiration

Breathing out / Exhalation / Expiration.

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Qn. What is inhalation?

• Inhalation is the taking in of air rich in oxygen.

Qn. State what happens to the following during inhalation or breathing in:-

a) Lungs

• The lungs expand.

Qn. Why do lungs expand during breathing in?

• To create space/room for the incoming air.

b) The volume inside the chest.

• The volume inside the chest increases.

c) The diaphragm.

• The diaphragm contracts.

d) The ribs

• The ribs move upwards and outwards.

e) Intercostal muscles

• The intercostals muscles contact. **Exhalation / Expiration /**

Breathing out

Qn. What is exhalation?

• Exhalation is the taking out of air rich in carbon dioxide.

Qn. Briefly explain what happens to the following parts during exhalation.

a) The lungs

The lungs return to their original size.

b) The volume inside the chest

• The volume inside the chest decreases.

c) The diaphragm

• The diaphragm relaxes.

d) The ribs

• The ribs move downwards and inwards.

e) Intercostal muscles

• The intercostal muscles relax.

Qn. State one difference between the air we breathe in and that one we breathe out.

- The air we breathe in has more oxygen than the air we breathe out.
- The air we breathe out has more carbon dioxide than the air we breathe in.
- The air we breathe in has more density than the air we breathe out.

Qn. Why does the air we breathe in contain more oxygen than the air we breathe out?

• Part of oxygen is used during respiration.

Qn. Why does the air we breathe out contain more carbon dioxide than the air we breathe in?

• More carbon dioxide is produced during respiration.

Qn. Why does nitrogen remain unchanged during respiration?

• No process in the body uses nitrogen.

BY TR. MUTAKA SEMU

Diseases of the respiratory system

Tuberculosis

It is an airborne disease caused by **mycobacterium**.

Qn. Write down any three signs and symptoms of tuberculosis.

- Chromic cough.
- Coughing and spitting mucus with blood stains.
- Persisted fever.
- A lamp grows on the spine
- Pain in the backbone.

Qn. State the ways of preventing and controlling tuberculosis.

- Immunize children at birth using B.C.G vaccine.
- Isolate infected people.

Diphtheria

• It is a bacterial disease spread through air.

Qn. Write down the signs and symptoms of diphtheria.

- Swollen neck.
- Sore throat
- Prolonged fever

Qn. Give different ways of preventing and controlling diphtheria.

- Immunize children at 6, 10 and 14 weeks using DPT vaccine.
- Isolate infected people.

Whooping cough (Pertussis)

Qn. Name the germ that causes whooping cough.

• Whooping cough is caused by bacteria and it is spread through air.

Qn. State the signs and symptoms of whooping cough.

- Coughing that result into vomiting.
- Runny nose
- Gasp for breathe

Qn. Identify the different ways of controlling and preventing whooping cough.

- Immunize children at 6, 10 and 14 weeks using DPT vaccine.
- Isolate infected people.

5. Pneumonia

Qn. Name the germ that causes pneumonia.

• Pneumonia is caused by bacteria called streptococcus pneumoniae.

Qn. State the sign and symptoms of pneumonia.

- Coughing and spitting mucus with blood stains.
- Difficulty in breathing.
- Chest pain.
- Sudden feeling of coldness.
- Fever

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5. Influenza.

Qn. Name the germs that cause influenza.

• Influenza is caused by a virus and is spread through air.

Qn. State the signs and symptoms of influenza.

- Runny nose
- Congested nose
- Fever
- Muscle pain

Qn. Give the ways of controlling and preventing influenza.

- Avoid staying and living in crowded places.
- Avoid living in very cold places.

Qn. Write down any two smoke related respiratory diseases.

- Lung cancer
  Emphysema
- Bronchitis.

Other respiratory diseases

- Asthma
- Pleurisy

Qn. Identify the different ways of maintaining the proper functioning of the respiratory system.

- Avoid smoking
- Having regular physical exercises.
- Immunize children against childhood killer diseases.
- Avoid staying in crowded places.
- Avoid staying in very cold places.
- Feeding on a balanced diet.
- Always breathe through the nose but not through the mouth.
-

THE HUMAN SKIN

- The skin is an organ that covers the body.
- The skin is the largest body organ.

Qn. What does the skin excrete?

- Sweat
- Lactic acid

Qn. Identify the components of sweat.

- Excess water.
- Excess salts.

Qn. Name the two main layers of the skin.

- Epidermis (outer layer)
- Dermis (Inner layer)

BY TR.MUTAKA SEMU

The structure of the skin

Qn. State the functions of the different parts of the skin.

Epidermis

- The epidermis protects the inner layer of the skin.
- The epidermis prevents dirt, germs and water from entering into the body.

Note:

- The epidermis is further divided into three other layers.

Qn. Name the three layers of the epidermis

- Cornified layer
- Granular layer • Malpighian layer.

a) Cornified layer

The cornified layer is made up of dead cells.

Qn. State the functions of the cornified layer.

- The cornified layer protects the body from fungal, viral and bacterial infections.
- The cornified layer prevents the loss of water from the body by evaporation.

b) Granular layer

- The granular layer is made up living cells which continuously grow to form the malpighian layer.

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c) Malphighian layer

Qn. Name the pigment contained in the malpighian layer.

• Melanin

Qn. State the functions of melanin.

- Melanin determines the skin colour.
- Melanin protects the body from the direct rays from the sun.

Qn. Identify the condition that results from lack of melamin in the body.

• Albinism

2. Dermis

• The dermis is the inner layer of the skin. **Qn. Identify the parts that**

make up the dermis.

a) Hair follicle

• Hair follicles are the pockets from which hair grows.

b) Hair

• The hair controls body temperature.

Qn. How does the hair control body temperature?

- By standing up when it is cold.
- By lying flat on the skin when it is hot.

c) Erector muscle.

• The erector muscle makes the hair stand upright.

d) Sebaceous glands

- The sebaceous gland produces sebum.

<u>Note:</u>

- Sebum is the oil that keeps the skin oily and moist.

e) Sweat glands.

• The sweat glands produce sweat.

f) Sweat duct

• The sweat duct lets out sweat from the sweat glands.

g) Sweat pores

• The sweat pores let out sweat from the body.

h) Nerve endings.

• The nerve endings enable us to feel cold, hot, touch and pain.

i) Blood vessels / blood capillaries.

• Blood vessels /blood capillaries supply the skin with food and oxygen. **j) Fat layer**

The fat layer prevents heat loss from the body.

Qn. State the different ways how the skin controls body temperature on hot days.

- By sweating.

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- By vasodilation
- By the hair on the skin lying flat (the hair on the skin lies flat)

Qn. What is vasodilation?

• Vasodilation is the widening of blood vessels to allow flow of blood to the skin surface.

Qn. Give the different ways the skins controls body temperature on cold days.

- By shivering
- By vasoconstriction.
- By production of goose pimples.
- The hair on the skin stands up right.

Qn. What is vasoconstriction?

• Vasoconstriction is narrowing of blood vessels to reduce flow of blood to the skin surface.

Qn. Why do we urinate more frequently on cold days than on hot days?

• On cold days we lose water by urinating while on hot days we lose water by sweating and urinating.

Qn. Name the cells in the skin that help to produce hair, toes and finger nails.

• Keratin cells

Function of the skin

Qn. Write down the different functions of the skin.

The skin acts as a sense organ.
The skin acts as an excretory organ.

- The skin makes vitamin D by the help of sunshine.
- The skin protects body tissues from harm.
- The skin regulates body temperature.
- The skin stores fats which prevent heat loss from the body.

Diseases of the skin

Qn. Identify the different diseases that affects the skin.

- Ringworm
- Athletes foot
- Leprosy
- Scabies
- Impetigo
- Measles
- Scurvy
- German measles (Rubella)
- Chicken Pox
- Skin cancer
- Syphilis

a) Ring worm

Qn. Name the germ that causes ringworm.

• Fungus / Fungi

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Qn. State the different ways through which ring worm spreads.

- Through close body contact with an infected person.
- Through sharing clothes with an infected person.
- Through sharing sponges with an infected person.
- Through sharing beddings with an infected person.

Qn. Identify the signs and symptoms of ring worm.

- Itching of the skin.
- Red round patches on the skin.
- Hair falls off the affected part.

Qn. Give the different ways of preventing and controlling ring worm.

- Maintain proper personal hygiene.
- Avoid sharing clothes with an infected person.
- Avoid sharing beddings with an infected person.
- Avoid sharing sponges with an infected person.

b) Athletes foot

• Athlete's foot is caused by a fungus / fungi.

Qn. Give the different ways through which athletes foot spreads.

- Sharing stockings with an infected person.
- Sharing shoes with an infected person.

Qn. Identify the signs and symptoms of athletes foot.

- The skin between the toes peels off.
- White cracks between toes.

Qn. Give the different ways of preventing and controlling athletes foot.

- Avoid sharing stockings with infected persons.
- Change stockings and shoes regularly.
- Apply fungal powder between toes.

c) Leprosy

• Leprosy is caused by **<u>bacillus bacteria</u>**.

Qn. How is leprosy spread?

- Through close body contact with an infected person.
- Through air in crowded places.

Qn. State the signs and symptoms of leprosy.

Toes and fingers get eaten away.
The limbs become numb (loss of sense for feeling)

- Large sores develop on the skin.
- Hair falls off from the affected part.

Qn. Give the different ways of preventing and controlling leprosy.

- Avoid close body contact with infected people.
- Isolation of infected people.

d) Scabies

• Scabies is caused by **<u>sarcoptes scabiei</u>** (**<u>itch mite</u>**).

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How is scabies spread?

- Sharing clothes with infected people.
- Sharing bathing sponges with infected people.
- Sharing beddings with infected people.
- Close contact with infected people.

Qn. State the signs and symptoms of scabies.

- Itching of the skin.
- Watery swellings on the skin.

Qn. Give the different ways of preventing and controlling scabies.

- Avoid sharing clothes with an infected person.
- Maintain proper personal hygiene.
- Avoid sharing beddings with infected people.
- Avoid sharing bathing sponges with infected people.

e) Impetigo

• Impetigo is caused by bacteria.

f) Measles

• Measles is caused by a virus.

g) Chicken pox

Chicken pox is caused by a virus.

h) German measles (Rubella)

German measles is caused by a virus.

i) Scurvy

• Scurvy is caused by lack of vitamin C in the diet.

j) Skin cancer

• Skin cancer is caused by too much exposure to dangerous chemicals.

Qn. Mention the disorders of the skin.

- Corns
- Burns
- Scalds
- Cuts
- Wounds

Qn. Give the ways of maintaining the proper functioning of the skin.

- Having regular physical exercises.
- Feeding on a balanced diet.
- Promoting proper personal hygiene.
- Bathing daily.
- Protect the skin from strong sunshine.
- Avoid applying strong cosmetics on the skin.
- Avoid sharing clothes with an infected person.
- Cover wounds and cuts with sterilized bandages.
- Always visit health centres incase of a skin infection.

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THE LIVER

• The liver is the largest internal body organ.

Qn. What does the liver excretes?

• The liver excretes bile pigment.

A diagram showing the liver

Blood circulation in relation to the liver.

i) Hepatic artery

• The hepatic artery transports oxygenated blood from the heart to the liver.

ii) Hepatic vein

• The hepatic vein transports de-oxygenated blood from the liver to the heart.

iii) Hepatic portal vein

• The hepatic portal vein transports blood rich in digested food from the ileum to the liver.

Functions of the liver

Qn. State the various functions of the liver.

- The liver produces bile that breaks down fats.
- The liver is a detoxicating agent.
- The liver produces heat in the body.
- The liver stores important vitamins e.g. vitamin A, vitamin B1, 2 and vitamin B1.
- The liver stores important mineral salts e.g. iron, potassium.
- The liver regulates blood sugar.
- The liver helps in deamination.

Qn. Mention the diseases that affect the liver.

- Hepatitis B
- Liver abcess
- Cirrhosis of the liver
- Liver cancer

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a) Hepatitis B

• Hepatitis B is caused by a virus.

Qn. How is hepatitis spread?

- Hepatitis B is spread through contact with infected blood.
- Hepatitis B is spread through contact with infected semen.

b) Liver abscess

• Liver abscess causes boils on the liver.

c) Cirrhosis of liver

• Cirrhosis of the liver is the hardening of the liver caused by excessive drinking of alcohol.

d) Live cancer

Qn. State the ways of maintaining the proper functioning of the liver.

- Having regular physical exercises.
- Feeding on a balanced diet.
- Avoid excessive drinking of alcohol.

TOPICAL TEST

1. Define the term excretion

   .....
   .....

2. State the main function of the kidney in the body.

   .....
   .....

3. Where does filtration of blood to remove waste products take place in the kidney?

   .....
   .....

4. List down any three components of urine.

   i) .....
   ii) .....
   iii) .....

5. How is the medulla an important part of the kidney?

   .....
   .....

6. State the role of the urinary bladder during excretion.

   .....
   .....

7. Name the water borne disease which attacks the urinary bladder.

   .....

8. Give anyone function of the human skin?

   .....

9. Why do soles of the feet develop thick surfaces after doing heavy manual work?

   .....

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10. State the two main layers of the human skin.
    i) .....
    ii) .....
11. What pigment determines the skin colour?
    .....
12. How is the kidney similar to the skin in terms of function?
    .....
13. Give any two components of the sweat.
    i) .....
    ii) .....
14. Write down any three diseases which attack the skin.
    i) .....
    ii) .....
    iii) .....
15. State the blood vessels which transports digested food materials from the ileum to the liver?
    .....
16. State the main function of the liver in the body.
    .....
17. Why are the lungs considered to be both excretory and respiratory organs?
    .....
18. State the function of the celia found in the nostrils of humans.
    .....
19. Give the value of the epiglottis during digestion.
    .....
20. Why are we advised not to breathe through the mouth?
    .....
21. State the reason why the trachea is made of rings of cartilage.
    .....
22. By what process does gaseous exchange take place in the lungs?
    .....
23. What important process takes place in the lungs?
    .....
24. How are the air sacs adopted to their function?
    .....
25. What happens to the diaphragm when we breathe in?
    .....

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26. Name any two non-infectious diseases of the lungs?
   i) .....
   ii) .....
27. Identify any two ways of maintaining the health of the excretory system.
   i) .....
   ii) .....

Corrections

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