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ALL RIGHTS RESERVED. No part of this book may be reproduced in any form by any electronic or mechanical means (including photocopying, recording, or information storage and retrieval) without prior permission in writing from the authors / publisher.
Foreword
Numerous books have been written, but each brings with it an unique touch. This could either be in terms of its approach, content or even timing. This guide is that ONE book with such qualities, a book whose output is based on many hours of research and analysis. It is designed to assist both the teachers and the pupils in getting prepared to move from one level to the other and to embrace life with knowledge and skills. The guide is also meant to bridge the gap for the learners who might have drifted while in lower levels of learning.

The authors prepared this guide based on integrated-objective-approach while being guided by primary school science revised syllabus. The guide is organized with a logical flow, starting from the objectives, followed by revision notes, model revision tests and answers under respective units. In total, there are 12 units which are covered to meet the needs of respective classes, namely Standards 6, 7 and 8. As such, teachers and pupils in upper classes will find the guide quite resourceful.

Anthony M. Wanjohi
Managing Director
Kenya Projects Organization (KENPRO)
Acknowledgement

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UNIT 1
HUMAN BODY

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<tr>
<td>By the end of this topic, the learner should be able to:</td>
</tr>
<tr>
<td>• Identify some of the reproductive systems</td>
</tr>
<tr>
<td>• Describe physical changes during adolescence</td>
</tr>
<tr>
<td>• Identify parts of the circulatory system</td>
</tr>
<tr>
<td>• Describe the components of blood and their functions</td>
</tr>
<tr>
<td>• Identify the types of blood vessels and their functions</td>
</tr>
<tr>
<td>• Describe the structure of and functions of the heart</td>
</tr>
<tr>
<td>• Explain fertilization, development of foetus and birth process</td>
</tr>
<tr>
<td>• Identify the main excretory organs and their waste products</td>
</tr>
</tbody>
</table>

Revision Notes 1

1.1 Reproductive System
This part presents two kinds of reproductive system, namely female and male reproductive systems.

a) Female Reproductive System
The system by which human beings are enabled to produce young ones is called reproductive system. As shown by Figure 1.1, the system consists of different parts. These include: Vagina, Cervix, Uterus, Ovaries and Fallopian tubes.

Ovary: There are two ovaries in the female body. There are several eggs in each ovary called ova. At puberty, that is 12-16 years the ova mature monthly and set free from the ovary into the oviduct. This is called ovulation.
b) Parts of Male Reproductive System

Male Reproductive System consists of various parts. These include penis, testis, urethra, prostrate and bladder.

Penis: tube like structure through which sperms are released. Also in this structure urine is passed outside the body.

Testis: Male human beings have two testes they are called testis in plural. They are enclosed in a bag called scrotum.

Urethra: a tube passing through the centre of penis. The sperms and urine pass through here.
1.2 Changes during Adolescence
The period in a person's life when developing from a child into an adult is referred to as adolescence. The stage is usually between the age of 12 and 19 years. During this time, many changes take place in terms of growth and physical changes.

a) Physical Changes in Boys
- Broader chest and shoulders
- Breaking voice to become deeper
- Growing of hair in part of the body (around sex organs, pubic hair, chest hair, beards on the face and armpits.
- Sperms mature in the testis experiences ejaculation, which is release of sperms through penis. At times this can happen during the night and is called wet dreams.
- Boys eat more because height and weight are increasing and becoming muscular
- At times development of pimples on the face may occur.

b) Physical Changes in Girls
- Growth of breasts,
- Hair grows in the armpits and around sex organs (pubic hair)
- Hips become broader,
• Release an egg by ovaries after 28 days (ovulation). This happens if the egg (ovum) is not fertilized. The lining that had been formed in the uterus along with the egg breaks down and flows out of the body through vagina as blood. This process is called **menstruation**. It occurs once a month and may last 4-5 days,
• Pimples may appear on the face,
• Rapid increase of weight and heights and may cause them to eat more.

1.3 The Circulatory System

The heart, blood and the blood vessel make up the circulatory system

**a) The Heart**

*Figure 1.3: External view of the human heart*

This is the organ that pumps blood through out the body. It is muscular and placed between the lungs somewhere slightly to the left side of the body. The strong muscles of the heart can relax or contract when contracting the heart pumps blood with force. When the heart relaxes, the blood flows into chambers of the heart.
The contracting and relaxing of the heart is what is known as the **heart beat**.

b) **Blood**
When we are cut or injured there is a liquid which is red that flows out of the cut or injured part of the body. This is blood which contains water, blood cells, digested food, waste products and hormones which control growth and the other body activities.

c) **Blood Tissues**
The tubes that contain the blood are called **blood vessels**. They carry blood to all parts of the body.

1.4 **Components of Blood**
Blood is made up of the following components:
- Plasma
- Red blood cells
- White blood cells
- Platelets

a) **Plasma**
This is the liquid part of the blood and most of it is water. Plasma of the blood of human beings and other mammals is pale-yellow. It is made up of the following: Hormones, Urea, Salts, Food substance, Digested food, Carbon dioxide.

*Functions of Plasma*
- To transport red blood cell, white blood cells, digested food, hormones and waste products to all around the body.

b) **Red Blood Cells**
They contain red pigments giving them the red color. They are disc-shaped and are smaller than the white blood cells because of their red pigments, they give the blood color.
Functions of Red Blood Cells
Main function of the red blood cell is to carry oxygen from the lungs to all other parts of the body. In them is chemical called hemoglobin which carries oxygen within the red blood cells. Oxygenated blood is the blood rich in oxygen and is bright. Blood with little or without oxygen is dull red and is said to be deoxygenated blood.

c) White Blood Cells
They do not have a fixed shape since they keep on changing their shapes. They have no color but do have a dark part at the centre called nucleus. In size are larger than red blood cells. They are fewer than red blood cells.
Functions
The main function is protection of body from germs. They move to the attacked body part and fight the germs. They change the shape while fighting the germs and this way are able to engulf and destroy the germs.

d) Platelets
These are tiny cell fragments found in the blood. They are smaller than either white or red blood cells.
Functions
These help in the clotting of the blood. They prevent further loss of the blood from the part that was injured. They help to stop bleeding from cuts and wounds.

Table 1.1: Summary of blood components and their functions

<table>
<thead>
<tr>
<th>Components</th>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plasma</td>
<td>Carry blood cells, digested food and hemoglobin around the body</td>
</tr>
<tr>
<td>Red blood cells</td>
<td>Carry oxygen from lungs to the rest of the body</td>
</tr>
<tr>
<td>White blood cells</td>
<td>Protect the body from germs</td>
</tr>
<tr>
<td>Blood platelets</td>
<td>Help in clotting of blood</td>
</tr>
</tbody>
</table>
1.5 Types of Blood Vessels and their Functions

There are three main types of blood vessels. These include:

- Arteries
- Veins
- Capillaries

a) Arteries

Function
Arteries carry oxygenated blood from the heart to all parts of the body. An exception case is for the **pulmonary artery** which carries deoxygenated blood from the heart to the lungs for purification (to receive oxygen).

b) Veins
They carry blood towards the heart and they have thin elastic walls. They have valves to prevent blood from flowing backwards into the heart. They are found near the body surface.
Valve A shows a vein with **open valve** to allow blood to pass through it while valve B shows a vein with **closed valve** to prevent blood from flowing backwards.

*Functions*

All except pulmonary vein carry deoxygenated blood from the lungs to the heart.

c) **Capillaries**

These are the smallest blood vessels whose walls have tiny holes (pores). They are narrow and thin and form network in every organ and tissue in the body. They are link between veins and arteries.

*Figure 1.6: Network of capillaries*

*Functions*

Capillaries thin walls let food and oxygen leave blood and enter the tissues. This way waste material leaves the tissues and enters the blood to be transported to the excretory organs.
Table 1.2: Blood vessels and their functions

<table>
<thead>
<tr>
<th>Blood vessel</th>
<th>Structure</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arteries</td>
<td>Have thick walls, Have no valves</td>
<td>Carry blood rich in oxygen from the heart to all parts of the body but the pulmonary arteries.</td>
</tr>
<tr>
<td>Veins</td>
<td>Have thin walls and elastic, Have valves</td>
<td>Carry blood with little or no oxygen from the blood to the heart except pulmonary veins.</td>
</tr>
<tr>
<td>Capillaries</td>
<td>Have thin walls, Are very narrow, Form network in every organ and tissue</td>
<td>They connect the veins to the arteries, Allow digested food substances and oxygen to leave the blood and enter tissues.</td>
</tr>
</tbody>
</table>

1.6 The Structure and Functions of the Heart

The heart consists of various components. Figure 1.7 shows the various parts.

*Figure 1.7: Structure of the Heart*
**Parts of the Heart**

*Auricles and ventricles:* The heart is divided into four parts called **chambers**. The upper chambers are called *auricle* while the lower chambers are called *ventricles*. On the left side of the heart are found left auricle and left ventricle while on the right side of the heart are found right auricle and right ventricle.

*Auricles:* Auricles pump blood to the ventricles, which in turn pumps the blood to all parts of the body. They therefore must have thick walls to provide the extra force needed.

**Table 1.3: Functions of Auricles and Ventricles**

<table>
<thead>
<tr>
<th>Structure</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Auricles</strong></td>
<td></td>
</tr>
<tr>
<td>The walls of the auricles are thinner</td>
<td>Auricles pump blood to the ventricles.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The left auricle gets oxygenated blood from the body while the right auricle receives deoxygenated blood from the body.</td>
</tr>
<tr>
<td><strong>Ventricles</strong></td>
<td></td>
</tr>
<tr>
<td>They are larger than the auricles and have strong muscular walls.</td>
<td>Blood to the lungs is pumped by the right ventricle and the left ventricle pumps the blood to all parts or the pump body. Thicker walls of the left ventricle help to pump blood longer distance while right ventricle pumps to a shorter distance i.e. to the lungs.</td>
</tr>
</tbody>
</table>

**Blood Vessels of the Heart**

The main blood vessels in the heart include: Pulmonary artery, Pulmonary veins, Vena cava and Aorta.
### Table 1.4: Main blood vessels of the heart

<table>
<thead>
<tr>
<th>Part</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulmonary artery</td>
<td>Pulmonary artery carries deoxygenated blood from the right ventricle to the lungs.</td>
</tr>
<tr>
<td>Pulmonary vein</td>
<td>Pulmonary vein carries blood oxygenated blood from the lungs to the left auricle.</td>
</tr>
<tr>
<td>Vena cava</td>
<td>This is the main vein in the body which carries deoxygenated blood from all parts of the body to the heart.</td>
</tr>
<tr>
<td>Aorta</td>
<td>Aorta is the main artery in the body. It carries oxygenated blood from the left ventricle to all parts of the body</td>
</tr>
<tr>
<td>Valves</td>
<td>The work of the valves in the heart is to prevent back flow of the blood. They ensure that the blood goes from the heart only through the pulmonary artery and does not come back through the pulmonary vein.</td>
</tr>
</tbody>
</table>

### 1.7 Fertilization, Development of Foetus and Birth Process

#### a) Fertilization Process

Sperms produced by testis which travel through the epididymis, sperm duct and then urethra and they are deposited in the vagina of the female by the penis during coitus. Ova (eggs) in woman are produced at intervals by the ovaries. Only one ovum is produced in turn by every ovary. This cycle lasts 28 days with every cycle the uterus undergoes major cyclical changes. The eggs are released onto the oviduct and then they move down to the uterus and to the outside after passage through vagina if not fertilized. Sperms deposited swim up the cervix into the uterus and **oviduct** where fertilization takes place.
b) Development of Foetus
After fertilization in the oviduct, a zygote is formed by fusion of male and female nuclei. The zygote then moves down to the uterus and attaches to the walls of the uterine lining. The zygote develops into a foetus which is connected to the placenta (baby container) by an umbilical cord. Through this, food is provided to the foetus by the mother and waste products are removed from the other end.

NB. By the end of 40 weeks all organs of the foetus have developed. The foetus is suspended in a fluid filled sac. It turns around so that the head is lying next to cervix. Birth is started by hard (vigorous)
contraction of the uterus muscles which expels the foetus out of the uterus via the vagina (parturition).

c) Process of Birth
During pregnancy the breasts of woman increase in size and by the time of birth (parturition) are capable of producing milk for the breast milk for the nourishment of the baby. All nutritional requirements of the baby for the first months are met by the breast milk. The birth of human foetus is accompanied by loud cry and this reflex initiates spontaneous breathing by the lungs.

1.8 Excretory Organs and Waste Products
The working of our bodies produces unwanted substances (excreta). These unwanted substances are got rid off by a process known as **excretion**. Below are examples of excretory organs and the waste products they get rid of.

a) Skin

The skin covers the body and prevents dust and germs to enter the body. When the skin is broken by cut, scratch or bite, germs can enter. Skin also protects the body from drying up. The skin is made up of two layers namely: Epidermis (top layer) and Dermis (underneath layer).

**Epidermis**
This is the upper layer of the skin. It is made up of the dead cells on the top and below is living cells. The living cells contain pigment (colouring) which is different in different areas. This colour of the pigment determines the colour of our skin. The cells die to replace the worn out cells.

**Dermis**
This is the lower part of the skin which contains many things
Table 1.5: Parts of Skin and Their Functions

<table>
<thead>
<tr>
<th>Part</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tiny blood vessels</td>
<td>For the supply of food and oxygen to the living parts of the skin.</td>
</tr>
<tr>
<td>Nerves</td>
<td>There are a number of nerves: e.g. for feeling cold, pain, touch, and pressure.</td>
</tr>
<tr>
<td>Oil glands</td>
<td>These make oil to oil the hair and keep the skin soft.</td>
</tr>
<tr>
<td>Glands</td>
<td>These are responsible for secreting sweat as a waste product.</td>
</tr>
</tbody>
</table>
Table 1.6: General Functions of Skin

<table>
<thead>
<tr>
<th>Functions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Excretion</td>
<td>Waste products from the blood are excreted from the capillaries surrounding the gland in form of sweat via pores.</td>
</tr>
<tr>
<td>Feelings</td>
<td>There are millions of nerve ends in the skin. There are different nerve ends for feeling e.g. touch, cold, pain and pleasure.</td>
</tr>
<tr>
<td>Maintaining Constant body temperature</td>
<td>The body vessels expand when the body is hot. This allows more heat to escape by radiation. Sweat glands produce sweat and when this sweat evaporates, cooling is produced. The blood vessels contract when the body is cold and glands secret less sweat. This way, the skin looses less heat.</td>
</tr>
</tbody>
</table>

Model Revision Test 1

1. Which one of the following is not a function of placenta?
   A. To allow passage of dissolved food materials to the embryo
   B. To protect the embryo from shock
   C. To prevent harmful materials from reaching the baby
   D. To allow exchange of gases between the mother and the embryo

2. Which one of the following statements is NOT true about all arteries?
   A. They carry blood away from heart
   B. They have thick walls
   C. Blood pressure in them is high
   D. They carry blood rich in oxygen
3. Digestion of food does not take place in the?
   A. Small intestines
   B. Large intestines
   C. Stomach
   D. Mouth

4. The diagram below represents a human heart.

Which one of the following is represented by blood vessels W, X, Y, and Z?
   A. Aorta (W)  Vena cava (X)
       Pulmonary vein (Y)  Pulmonary artery (Z)
   B. Pulmonary artery (W)  Aorta (X)
       Vena cava (Y)  Pulmonary artery (Z)
   C. Pulmonary vein (W)  Pulmonary artery (X)
       Vena cava (Y)  Aorta (Z)
   D. Vena cava (W)  Pulmonary artery (X)
       Aorta (Y)  Pulmonary artery (Z)

5. Which of the following is a function of rectum?
   A. Absorbs digested food
   B. Stores undigested matters
   C. Completes digestion of food
   D. Absorbs water
6. The function of haemoglobin in the blood is to?
   A. Cause clotting of blood
   B. Fight germs
   C. Transport food substances
   D. Combine with oxygen

7. Which one of the following is formed first after fertilization?
   A. Sex cell
   B. Embryo
   C. Zygote
   D. Foetus

8. Which one of the following waste materials is not a product of excretion?
   A. Carbon dioxide
   B. Urine
   C. Sweat
   D. Feaces

9. The diagram below represents a section of heart.

Which one of the following statements is true?
A. K has valve while L has no valves
B. carries blood into the heart whereas L takes it out
C. carries deoxygenated blood whereas L carries oxygenated blood
D. has no valves whereas L has valves
10. Which one of the following correctly shows the path taken by urine from kidney?

- A. Urethra → Bladder → ureter
- B. Ureter → urethra → bladder
- C. Ureter → bladder → urethra
- D. Urethra → bladder → ureter

11. Sweat gland in the skin of human body are located in the?
   A. Oil glands
   B. Dermis
   C. Pores
   D. Epidermis

12. Which of the following parts of human body produces urine?
   A. Urethra
   B. Ureter
   C. Kidney
   D. Bladder

13. The shown diagram represents the reproductive system of a female human body.

   Fertilization takes place in part labeled?
   A. N
   B. L
   C. M
   D. K
14. The following are some of the physical changes that take place during adolescence.
   i. Hips become broader
   ii. Chest and shoulders become broader
   iii. Pimples may appear on the face
   iv. Voice breaks
   v. Pubic hair grows

Which one of the changes takes place in girls?
A. (i) (ii) (v)
B. (i) (iii) (v)
C. (ii) (iv) (v)
D. (i) (ii) (iv)

15. Which one the following is NOT CORRECTLY matched with its function?

<table>
<thead>
<tr>
<th>Part</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oesophagus</td>
<td>passage of food</td>
</tr>
<tr>
<td>Small intestines</td>
<td>completes digestion of food</td>
</tr>
<tr>
<td>Stomach</td>
<td>mixes food with enzymes</td>
</tr>
<tr>
<td>Large intestines</td>
<td>completes digestion of food</td>
</tr>
</tbody>
</table>

16. Which one of the following is not correct statement about reproduction in human beings?
   A. Fertilization takes place in uterus
   B. Menstruation stops during pregnancy
   C. The blood of mother and foetus do not mix
   D. The zygote gets implanted in the walls of uterus

17. The blood vessel through which deoxygenated blood flows to the heart is called?
   A. Pulmonary artery
   B. Aorta
   C. Vena cava
   D. Pulmonary vein
18. Which of the following changes takes place during adolescence in boys only?
   A. Release of sex cells
   B. Fast body growth
   C. Chest and shoulders become broader
   D. Growth of pubic hair

19. Absorption of water in human being alimentary canal takes place in the?
   A. Duodenum
   B. Small intestines
   C. Stomach
   D. Large intestines

20. Which of the following is not an excretory organ?
   A. Lung
   B. Skin
   C. Kidney
   D. Rectum

21. When breathing in, the
   A. Diaphragm flattens
   B. Volume of chest decreases
   C. Lungs shrinks
   D. Diaphragm becomes dome shaped

22. Which of the following components of blood is involved in clotting after injury?
   A. Plasma
   B. Red blood cells
   C. White blood cells
   D. Platelets
23. Which of the following shows the correct order of the blood flow in the heart?

A. Vena cava → pulmonary artery → pulmonary vein → aorta  
B. Aorta → pulmonary vein → vena cava → pulmonary artery  
C. Pulmonary vein → aorta → pulmonary artery → vena cava  
D. Pulmonary artery → vena cava → pulmonary vein → aorta

24. Which of the following is not correct statement about foetus?
   A. Waste product are removed through the placenta  
   B. The blood of the mother and of foetus mix  
   C. Receives blood through placenta  
   D. Receives food substances through mother blood

25. The diagram below represents a model that can be used to demonstrate breathing of human beings.

![Diagram of breathing model]

The part labeled X represent

A. Ribs  
B. Lungs  
C. Chest  
D. Diaphragm

26. Bile mixes with food in the?
   A. Small intestine  
   B. Duodenum  
   C. Large intestine  
   D. Stomach
27. The table below shows parts of human digestion system and their functions.

<table>
<thead>
<tr>
<th>Part</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small intestine</td>
<td>Absorption of water</td>
</tr>
<tr>
<td>Stomach</td>
<td>Y</td>
</tr>
<tr>
<td>X</td>
<td>Absorption of water</td>
</tr>
</tbody>
</table>

Which one of the following represents X and Y?

X   Y
A. Oesophagus   passage of food
B. Large intestines digestion of food
C. Rectum   storage of undigested food
D. Mouth   taking in food

28. Which one of the following about blood circulation is TRUE?

A. Aorta receives oxygenated blood from the left auricle
B. Pulmonary vein takes oxygenated blood to the lungs
C. Pulmonary artery receives deoxygenated blood from the right ventricle
D. Oxygenated blood from lungs is received by aorta
## Answers to Model Revision Test One

<table>
<thead>
<tr>
<th>Model Revision Test 1 Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
</tbody>
</table>

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1 Human Body Unit 1 Answers
UNIT 2
HEALTH EDUCATION

Specific Objectives
By the end of this topic, the learner should be able to:

- Describe causes, signs, symptoms and prevention of common communicable diseases
- Describe immunizable diseases
- Describe the immunization schedule for infants
- State the importance of HIV testing and the effects of HIV/AIDS infection on an individual, family and nation
- Dispel myths and misconceptions about HIV/AIDS
- Identify control measures for HIV/AIDS.
- Explain the meaning of sexually transmitted infections, describe causes and prevention of some sexually transmitted diseases
- Explain what is a drug, drug misuse and drug abuse
- Describe health and social effects of drug abuse

Revision Notes 2

2.1 Communicable Diseases and Immunizable Diseases
2.1.1 Communicable Diseases
Communicable diseases are those diseases that can be transferred from one person to another. Examples of these diseases are malaria and tuberculosis.

Tuberculosis
Tuberculosis is caused by a germ called bacterium in singular and bacteria in plural. Coughs and spits of an effected person have droplets which contains the germs that are released in the air. Another person breathing in those droplets he/she becomes infected.
**Signs and symptoms**
The following are signs and symptoms:
- Difficulty in breathing
- Simple coughs for a start and then persists
- Chest pains
- Person lose weight and becomes thin and weak
- Infected person may cough out blood
- The person can develop fever.

**Table 2.1: Prevention of Tuberculosis**

<table>
<thead>
<tr>
<th>Considerations</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immunization</td>
<td>This is where people especially young babies are given a vaccine which prepares the body to fight and defeat the diseases causing germs when they attack</td>
</tr>
<tr>
<td>Air</td>
<td>Tuberculosis likes where fresh air does not flow quickly e.g. In crowded places with poor ventilation. For prevention, we should always allow air to flow freely into the room.</td>
</tr>
<tr>
<td>Treatment</td>
<td>The infected person should be treated quickly to avoid further spread.</td>
</tr>
<tr>
<td>Health worker (Doctor/clinical officer)</td>
<td>If coughs are noted to persist, the person should be advised to see a doctor or a clinical officer.</td>
</tr>
<tr>
<td>Separation</td>
<td>The infected ones should be advised to be away from other people for sometime until they are well.</td>
</tr>
<tr>
<td>Cleanliness</td>
<td>Always keep our environment clean and dust free</td>
</tr>
<tr>
<td>Proper hygiene</td>
<td>Practice proper hygiene by use of handkerchief when sneezing, coughing and cleaning the nose.</td>
</tr>
</tbody>
</table>
Malaria
Malaria is a vector based disease and is considered highly communicable meaning it can be spread though not directly from human to human.
The disease is caused by plasmodium. Plasmodium is a parasite carried by female anopheles mosquitoes. This mosquito bites a person with malaria and sucks the parasites when this mosquito bites another healthy person, the parasites are passed into his/her blood and becomes sick.

Signs and symptoms
- Dizzy feelings
- Loss of appetite
- Feeling weak
- Fever
- Cold and shivering feelings
- Headache
- Joint pains
- Sweating excessively

Prevention
The main prevention of malaria is destruction of places where mosquitoes live through the following methods:
- Removal of stagnant water from containers and getting rid of them. The places where we live should be free from stagnant water.
- Tall grasses and bushes should be cut around the houses we live.
- Cutting and disposing litters
- Spraying of oil on stagnant water
- Sleeping under mosquito nets – i.e. nets dipped into special chemicals that kill mosquitoes and so stop the spread of malaria parasite
- Taking of anti malaria drugs
- Burning mosquito coils to repel mosquitoes and spraying insecticides
• Applying mosquito repellants on the body. These are special chemicals that keep mosquitoes away, e.g. Doom

Other examples of communicable diseases are: Common cold, Hepatitis A to D, Chicken fox, Mumps, STDs and Measles.

2.1.2 Immunizable Diseases

The diseases that a person may need to be immunized against include the following: Tetanus, Typhoid, Yellow fever and Hepatitis B.

*Table 1.2: Immunizable diseases*

<table>
<thead>
<tr>
<th>Disease</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetanus</td>
<td>Although this was vaccinated in the infant immunization schedule, it can still be done when a person suffers from an open wound. This prevents the person to get tetanus disease through the open wound.</td>
</tr>
<tr>
<td>Typhoid</td>
<td>The vaccine against typhoid can be administered any time there is an outbreak to protect people from getting the disease.</td>
</tr>
<tr>
<td>Yellow Fever</td>
<td>The vaccine protects people from getting the disease and those who did not get at infancy will need to get it before traveling to countries outside.</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>Persons given vaccine against hepatitis B will not get the disease and those who did not get at infancy need to get</td>
</tr>
</tbody>
</table>

*Note: Infant immunization against common childhood diseases ensures that the child’s body is capable of fighting and defeating diseases. There is available schedule to strictly be followed. Other diseases like typhoid, yellow fever, tetanus and hepatitis B can be immunized against if need be.*
2.2 HIV/AIDS

2.2.1 Testing
So important is the activity of finding out whether a person has HIV by testing the blood. A special blood test is done and this can detect the presence of the virus in the blood. If the virus is detected, the person is said to be HIV-positive. If the virus is not detected the person is said to be HIV-negative.

Importance of HIV testing
Testing of HIV is important for all people, whether they are HIV-positive or negative. Incase one turns HIV-negative, one should still avoid activities which may lead to HIV infection.

If a person is HIV-positive, he/she should:
• Be careful not to infect others
• Avoid more infection from other HIV-positive people
• Be helped to continue living positively with HIV
• Know what type of food to eat and which type of drugs to use

Important also is to go for HIV test before engaging in marriage or having a baby.

2.2.2 Myths and Misconception about HIV and AIDS
Although many people know about HIV/AIDS, and the ways in which it is spread, there are many stories which are not true about HIV and AIDS. These untrue stories and misconceptions are referred to as myths. Myths are stories that many people believe but these stories are untrue.

Misconception: This is a wrong or untrue idea which people believe because they do no have enough information or facts.
Table 2.3: Myths and misconception

<table>
<thead>
<tr>
<th>Myths and misconception</th>
<th>The truth</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV/AIDS is a curse and not a disease. It is as a result of breaking taboo in a community.</td>
<td>Aids is a disease caused by a virus called HIV</td>
</tr>
<tr>
<td>Aids is caused by witch craft</td>
<td>Aids is caused by HIV</td>
</tr>
<tr>
<td>Aids do not exist</td>
<td>Aids is real</td>
</tr>
<tr>
<td>Aids can be cured</td>
<td>AIDS has no cure as of now</td>
</tr>
<tr>
<td>Once one is affected by HIV/AIDS he/she dies immediately</td>
<td>People with HIV do not die immediately if they get proper care and medication.</td>
</tr>
<tr>
<td>Having sex with a young girl or boy can cure AIDS</td>
<td>Having sex with any age does not cure AIDS. It only spreads it</td>
</tr>
<tr>
<td>Healthy looking people cannot be suffering from HIV/AIDS</td>
<td>Many infected people with HIV/AIDS look unhealthy</td>
</tr>
<tr>
<td>Shaking hands with a person suffering from AIDS can spread HIV.</td>
<td>Shaking hands with infected person cannot spread HIV/AIDS. HIV is only spread through contact with body fluids which has the virus</td>
</tr>
</tbody>
</table>

NB: Learn about HIV/AIDS. This will help to drive away the myths and the misconception about it!!
2.2.3 Effects of HIV/AIDS infection

On Individual
people infected by HIV/AIDS have weak body and the person is sick most of the time. The person is not able to work properly and so this may lead to loss of job. A lot of money is spent on buying medicine. The person feels unwanted and ashamed, may find it very difficult to work with others and feels angry which may lead to self destruction. Due to anger the person may go out to infect others. Poor concentration is also another effect of HIV/AIDS infection.

On the Family
The effects here will depend on the number of family members affected. The following are some of the effects:

- Use of a lot of money for the family due to frequent illness.
- If the affected family member is the breadwinner i.e. the parent he/she will not get money to help the family and the family will likely face the following: move to a cheaper house, lack money for food, clothes, medical cover and school fees. The family will have no labour force to work on the farm and miss money to carry out farm activities such as buying seeds, fertilizers, animal feeds etc.

On children
Children of effected parent(s) may be affected in the following ways:

- Lack of someone to encourage them as they grow.
- Lack of someone to correct them in case need be.
- Feel insecure.
- Suffer from diseases caused by lack of proper nutrition.
- Older children drop out of school to look for younger brothers and sisters. They work for the family upkeep, wash and cook, and perform various other duties.
- Parents are frustrated in losing children to HIV/AIDS.

On Nation
The economy of the nation is affected by HIV/AIDS as follows:

- Medicine spends a lot of money.
• A lot of time is spend in hospital by people who would be working.
• A lot of money is spent by the nation on educating its people e.g. carpenters, teachers, doctors, nurses, engineers etc and when these die of HIV/AIDS, the nation will have lost the money used in their training.
• The HIV/AIDS affected are too weak to work and this affects the nation in terms of reduced labour force.

2.2.4 Care and Support of People Infected with HIV/ AIDS
Those who are infected with HIV/AIDS can live for many years if only they get proper care and support. It is possible for people with HIV/AIDS to live longer and normal lives. We can assist them by ensuring that they get the following from us:

- Love and care
- Adequate diet
- Good hygiene
- Medical care

Love and Care
People infected with HIV may feel isolated and may suffer shock, anger, loneliness, fear, and depression. We should make them feel they are loved and wanted as follows:

- Giving them company and kind talk.
- Visit them often.
- Allow them to express themselves and listen to them carefully and patiently.
- Feeding and keeping them company as they eat.
- Encourage them to keep on working or carrying out their normal business if they are able.
- Accept them in their places of work or school.

Adequate Food
- People with HIV/AIDS should always take balanced diet.
- Food given should be well cooked. This makes digestion easier.
• If unable to eat solid food, they should be given soft food.
• They should be provided with plenty of fluids e.g. milk, porridge, and soup.
• If the patients are too sick, they should be given small meals frequently.

Poor Hygiene
Persons with HIV/AIDS are prone to infections by other diseases. This is because body immunity is weakened.
The HIV/AIDS patients should:
• Stay in a clean environment.
• Have their hands washed properly before eating food and after visiting the toilet.
• Have their beddings and clothes changed frequently.
• Take bath everyday.

Medical Care
• Those infected with HIV/AIDS have weak immune system and therefore can suffer from opportunistic diseases from time to time. They therefore need medical care.
• They should be reminded to take medicine as directed by the health worker.
• They should be taken to hospital on the appointed time and date given by the doctor.
• They should be advised to visit the nearest health centre to be advised to take special drugs such as anti-retro virals (ARVs)

NB: Aids so far has no cure but there are medicines to help those infected to live longer!

2.2.5 Control Measures for HIV/AIDS
Control measures for HIV/AIDS may include:
• Creating public awareness on HIV/AIDS
• Campaigns through media
• mass education
Table 2.4: Control Measures of HIV and AIDS

<table>
<thead>
<tr>
<th>Measure</th>
<th>Description (How)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creating public awareness on HIV/AIDS</td>
<td>Through peer education on HIV/AIDS</td>
</tr>
<tr>
<td></td>
<td>By training of VCT counselors</td>
</tr>
<tr>
<td></td>
<td>Establishment and launching of VCT centres</td>
</tr>
<tr>
<td></td>
<td>Provision of VCT (Counseling and Testing Services)</td>
</tr>
<tr>
<td>Campaign through media</td>
<td>Talking about it</td>
</tr>
<tr>
<td></td>
<td>Creating a supportive and enabling environment promoting HIV/AIDS services</td>
</tr>
<tr>
<td></td>
<td>Educating and entertaining</td>
</tr>
<tr>
<td>Mass education</td>
<td>HIV/AIDS prevalence among youth in Kenya</td>
</tr>
<tr>
<td></td>
<td>Kenya music and behaviour change communication. Musician can serve as promoters of responsible sex</td>
</tr>
</tbody>
</table>

2.3 Sexually Transmitted Infections

Sexually transmitted infections are the infections whose ways of infecting involves sexual contacts, hence the term sexually transmitted infections (STI’s). The germs enter the body through urinal passages. Some of these germs can not survive outside the body and therefore are only transmitted through sexual intercourse.

Examples of sexually transmitted infection are:

- Syphilis,
- Gonorrhea and
- Chancroid.
Table 2.5: Causes and prevention of STDs

<table>
<thead>
<tr>
<th>Disease</th>
<th>Cause</th>
<th>Prevention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syphilis</td>
<td>Syphilis is caused by bacteria called treponema, normally killed by soap and ordinary antiseptics. Indirect transmission therefore is not possible so the only way is sexual contact.</td>
<td>Since sexual contact is the only mode of transmission we should abstain from sexual contacts with those who are infected.</td>
</tr>
<tr>
<td>Gonorrhea</td>
<td>Gonorrhea is caused by diplococcus bacteria called gonorrhea. It is transmitted only through sexual contacts.</td>
<td>To stop sexual contacts with those already infected.</td>
</tr>
<tr>
<td>Chancroid</td>
<td>It is transmitted in two ways: Sexual transmission through skin to skin contact with open pores. Non-sexual transmission when pus like fluids from the infected are moved to the other parts of the body or to another person</td>
<td>Being a bacteria infection that is spread by sexual contact with an infected person, avoid all forms of sexual activities. It is the only way absolute to prevent sexually transmitted diseases.</td>
</tr>
</tbody>
</table>

2.4 Drugs

Meaning of a Drug
Any substance taken into the body and affects the working of the body is called a drug. A drug can change e.g. the way of thinking, feeling, behaviour and actions. Some drugs can be used to prevent or treat diseases while others are taken to please people. 
*NB: All medicines are drugs but NOT all drugs are medicines.*
Misuse of Drugs
Using drugs wrongly can as well mean using medicine wrongly. Drugs that are meant to prevent a disease or treat a disease are called medicines.

Ways of misusing medicines are as follows:
- Not following instructions given by a doctor e.g. taking more/less than instructed. Taking little amount is called under dose which can lead to germs to become resistant to an extent that the same medication can not cure a disease. Taking more amounts is called over dose which can cause poisoning or even death.
- When taking medicine not prescribed by a doctor.
- Share or take prescribed medicine meant for other people.
- If not complete taking all medicine given by a doctor.
- When taking medicine given to us, some other time in thought we are suffering from the same disease as before.
- Taking medicine not stored under the required conditions.
- Taking medicine when not sick.

Drug Abuse
Drug abuse is taking drugs for the wrong reason. Medicines can be misused as well. Misuse of drugs is as well drug abuse. Many other drugs are many times abused for the following reasons:
- To get pleasure.
- To forget problems.
- To become stronger.
- Because of peer pressure.
- To be like others i.e. to imitate.
- To become brave or courageous.

Continuous drug abuse can lead to drug addiction. One addicted to drugs cannot do without them and so never abuse any drug for what so ever reason. Drugs commonly abused include: Alcohol, Tobacco, Khat (miraa), Madrax, Cocaine, Heroine, Bhang, Petrol, glue called inhalants.
### Table 2.6: Effects of drugs on health and society

<table>
<thead>
<tr>
<th>Health effects</th>
<th>Social effects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tobacco</strong></td>
<td></td>
</tr>
<tr>
<td>• Smoking of tobacco may lead to problems and diseases that affect the breathing system</td>
<td>• Misuse of money meant for other things (needs)</td>
</tr>
<tr>
<td>• Smoke from tobacco can cause lung cancer</td>
<td>• Addiction</td>
</tr>
<tr>
<td>• Tobacco smoking lead to condition for high blood pressure</td>
<td>• Smoking can cause fire</td>
</tr>
<tr>
<td>• Smoking slows digestion system. May increase stomach acids</td>
<td>• Smoking is bad to others who do not smoke</td>
</tr>
<tr>
<td>• Children born to smoking mothers are small and underweight</td>
<td>• Smoke from cigarettes is unpleasant on clothes and pollutes the environment</td>
</tr>
</tbody>
</table>

NB: NEVER SMOKE, IT CAN KILL

<p>| <strong>Alcohol</strong> | |
| ------------ | |
| • Loss of appetite may lead to poor health as a result of poor feeding | • Essential family needs e.g. food, clothing and shelter may miss because the money has been spent on alcohol |
| • Causes stomach ulcers, dehydration making one to be thirsty all the time | • Family disputes and fighting likely to occur |
| • Causes diseases of the liver called liver cirrhosis | • Drunk drivers cause accidents due to poor vision and judgment |
| • Affects the brain and the nervous system | Drunkards find it easy to get into bad activities e.g. stealing and poor sexual behaviour. This may lead to getting HIV/AIDS and other sexually transmitted diseases |</p>
<table>
<thead>
<tr>
<th><strong>Bhang</strong></th>
<th><strong>Khat (Miraa)</strong></th>
<th><strong>Madrax</strong></th>
</tr>
</thead>
</table>
| • Loss of memory and inability to think well  
• Feeling confused and depressed  
• Mental disability  
• Feeling drowsy | • A person taking bhang is usually unfriendly  
• Quarrels and fights easily  
• Refuses to work or to go to school  
• has a false feeling of well being | • Lots of money is spent to buy miraa at the expense of other needs  
• Chewing miraa encourages idleness making people unproductive  
• Discolouring of teeth  
Damage of the reproduction system | • A person becomes depressed  
• A person may easily get into irresponsible sexual behaviour which can lead to getting infected with HIV/AIDS  
• Waste family income leading to family suffering |
| Use of miraa affects one’s health and may cause:  
• Loss of appetite to lead to malnutrition  
• Lack of sleep |  
• Lots of money is spent to buy miraa at the expense of other needs  
• Chewing miraa encourages idleness making people unproductive  
• Discolouring of teeth  
Damage of the reproduction system |  
|  
• A person becomes depressed  
• A person may easily get into irresponsible sexual behaviour which can lead to getting infected with HIV/AIDS  
• Waste family income leading to family suffering
• Chewing miraa makes people to spit now and then spitting is unhygienic. |  

It gives false feeling of relaxation. And after a long use the user is affected in many ways:  
• Walk unsteadily as if drunk  
• Unable to speak clearly  
• Breathing difficulties  
Develop convulsions when the drug is not taken
### Cocaine

Can lead to:
- Problems in breathing
- Heart problems
- Loss of appetite
- Nervousness

- Cocaine users are violent and can fight anyone without a reason
- Cocaine is very expensive. The users spend a lot of their money on it leaving them with no money for other needs

### Inhalants

Prolonged use of inhalants can lead to:
- Forgetfulness
- Not to think clearly
- Disorders of nervous system
- Damage of internal organs e.g. liver and kidneys
- Poor vision
- Uncontrolled body movements e.g. staggering
- Poor speech e.g. stammering

- Those who get addicted to inhalants result to bad behaviours
- Stealing e.g. money to buy inhalants
- Idling and therefore depend other people
- Dirty, unkempt and smelling bad
- Fighting other people and among themselves

#### 2.5 Effects of Drug Abuse

As we have studied from the table above, drug abuse has effects on health and social life.

**Effects of drug abuse on health**

People who abuse drugs suffer several effects:
**Table 2.7: Effects of drug abuse**

<table>
<thead>
<tr>
<th>Effect</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Disease</strong></td>
<td>People who abuse smoke can suffer from lung cancer. Those who abuse alcohol may suffer cirrhosis.</td>
</tr>
<tr>
<td><strong>Poor health</strong></td>
<td>Those abusing drugs suffer from malnutrition because of poor feeding.</td>
</tr>
<tr>
<td><strong>Lack of concentration</strong></td>
<td>Persons abusing drugs do not concentrate on their work and school. Drivers who drive when drunk cause accidents because of lack of concentration.</td>
</tr>
<tr>
<td><strong>Impaired judgment</strong></td>
<td>Drugs affect the brain and make one not able to make accurate judgment.</td>
</tr>
<tr>
<td><strong>Loss of consciousness</strong></td>
<td>Taking too much of the drug may lead to loss of consciousness. The person becomes totally unaware of his/her surrounding, this is called blackout.</td>
</tr>
<tr>
<td><strong>Addiction</strong></td>
<td>Usually abuse of drugs lead to addiction or reliance.</td>
</tr>
<tr>
<td><strong>Fits</strong></td>
<td>Fits are sudden body movements whereby the body twitches and shakes without control or violently. This is caused by the drug affecting the brain</td>
</tr>
<tr>
<td><strong>Withdrawal</strong></td>
<td>If a person addicted to a drug fails to take the drug, he/she suffers problems such as irritation, sudden change of mood, being too sensitive, sweating and trembling. All these changes are called withdrawal symptoms</td>
</tr>
<tr>
<td><strong>Comma/ death</strong></td>
<td>Drugs can lead to comma or death.</td>
</tr>
<tr>
<td><strong>Poor health of the unborn</strong></td>
<td>Babies born to mothers who abuse drugs when they are pregnant are in many cases:</td>
</tr>
<tr>
<td></td>
<td>More likely to be infected by diseases</td>
</tr>
<tr>
<td></td>
<td>usually small at birth and underweight</td>
</tr>
<tr>
<td></td>
<td>prematurely delivered</td>
</tr>
</tbody>
</table>
Table 2.8: Social Effects of Drug Abuse

<table>
<thead>
<tr>
<th>Effect</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marital conflicts</td>
<td>Abuse of drugs can lead to unnecessary fights, quarrels, separation and divorce.</td>
</tr>
<tr>
<td>Drug induced accidents</td>
<td>Drunk drivers are likely to cause accidents due to poor vision and judgment.</td>
</tr>
<tr>
<td>Dropping out of school</td>
<td>Those pupils who abuse drugs perform poorly on school due to lack of concentration, poor memory and poor mission. This way the pupils lose interest in studies and eventually drop out of school</td>
</tr>
<tr>
<td>Truancy</td>
<td>Staying out of school without permission is termed as truancy. Pupils who take drugs will fail to go to school for no good reason. Being out of school for long may lead to poor performance and this as well may lead to dropping out of the school</td>
</tr>
<tr>
<td>Fighting</td>
<td>Some drugs make the users easily annoyed, irritable and quarrelsome which leads to fighting</td>
</tr>
<tr>
<td>Loss of income</td>
<td>Those who abuse drugs may be absent from work and perform poorly when at work. If in business, they fail to pay serious attention or serious effort in the business. This way the business collapses and they lose the income</td>
</tr>
<tr>
<td>Rape</td>
<td>Those who abuse drugs easily become victims of rape or become violent and attack others. This may lead to the spread of HIV/AIDS and other sexually transmitted diseases. Rape may also lead to unwanted pregnancy and hurts the victim emotionally</td>
</tr>
</tbody>
</table>
1. Which of the following contains a weakened form of disease causing germs?
   A. Stimulant
   B. Vaccine
   C. Herbal extract
   D. Depressant

2. Which of the following is NOT an effect of cigarette smoking?
   A. Air pollution
   B. Restlessness
   C. Discoloured teeth
   D. Heart attacks

3. Which one of the following is NOT a drug abuse?
   A. Taking prescribed drugs for a long time
   B. Taking less of prescribed drugs
   C. Using the drug for a wrong sickness
   D. Taking an overdose of a prescribed drug

4. Which one of the following is NOT an effect of abusing alcohol?
   A. Loss of memory
   B. Social and family problems
   C. Hallucinations
   D. Poor health

5. Which one of the following drugs is a stimulant when used in small quantities but depressant when used in large quantities?
   A. Khat
   B. Coffee
   C. Tobacco
   D. Alcohol
6. Which one of the following groups of drugs are harmful but may be legal in some countries?
   A. Tobacco, khat, beer
   B. Heroin, bhang, beer
   C. Bhang, heroin, beer
   D. Tobacco, madrax, khat

7. Vaccines are?
   A. Pain relievers
   B. Preventive drugs
   C. Curative drugs
   D. Stimulants

8. Choose a pair where any of the methods can be used for making water safe for drinking?
   A. Filtration, decantation
   B. Decantation, boiling
   C. Addition of chemicals, filtration
   D. Addition of chemicals, decantation

9. Which one of the following drugs consists of a stimulant and a depressant?
   A. Bhang and caffeine
   B. Cocaine and alcohol
   C. Khat and tobacco
   D. Cobbler’s glue and heroine

10. Which one of the following statements is NOT true about bhang and khat? Both
    A. Affect the nervous system
    B. Are addictive drugs
    C. Are prohibited drugs
    D. Are from plant materials
11. Which one of the following drugs causes drowsiness when abused?
   A. Khat  
   B. Heroine  
   C. Tobacco  
   D. Cocaine  

12. Which one of the following is NOT important to consider when taking medicine?
   A. How to store the medicine  
   B. The date of manufacture  
   C. Duration of complete dose  
   D. Advise from my friends  

13. Which one of the following drugs has similar effects to miraa (khat) when abused?
   A. Heroine  
   B. Excessive alcohol  
   C. Tobacco  
   D. Madrax  

14. Which one of the following lists consists of only drugs of abuse that are prohibited in some countries, e.g. Kenya?
   A. Cobbler’s glue, khat, beer  
   B. Cocaine, heroine, madrax  
   C. Bhang, beer, tobacco  
   D. Khat, tobacco, cocaine  

15. Which one of the following is NOT a reason why drugs should be stored in their properly labeled containers? To avoid
   A. Wrong usage  
   B. Getting expired  
   C. Contamination  
   D. Spoiled
16. Which of the following groups consists of only diseases that are immunisable?
   A. Whooping cough, tuberculosis, tetanus
   B. Bilharzias, yellow fever, cholera
   C. Measles, malaria, Diphtheria
   D. Dysentery, Hepatitis B, poliomyelitis

17. The following are stages of HIV infection.
   i). Widow stage
   ii). Symptoms
   iii). Full blown
   iv). Incubation
Which of the following is the CORRECT order of the stages?
   A. (i), (ii), (iii) (iv)
   B. (ii), (iii), (iv) (i)
   C. (i), (iv), (iii) (ii)
   D. (i), (iii), (iv) (ii)

18. The following are effects of drug abuse
   (i) rape (ii) Addiction (iii)Lack of concentration (iv) Truancy (v) Impartial judgments
Which of them are all health effects?
   A. (i), (iv) (v)
   B. (ii) (iii), (iv)
   C. (i), (ii), (iv)
   D. (ii), (iii), (iv)

19. Which one of the following practices will help to prevent the spread of cholera?
   A. Drinking filtered water
   B. Spraying chemical in stagnant water
   C. Wearing protective shoes when walking in dirty water
   D. converting pit latrine after use

20. The following signs and symptoms were observed in a certain child.
   (i) Thin and weak
   (ii) Wrinkled face
   (iii) Pot bellied
   (iv) Hungry and crying a lot
The child was mostly likely to have suffered from?
A. Kwashiorkor
B. Anemia
C. Rickets
D. Marasmus

21. Which of the following groups consists of foodstuffs that protect the body from diseases?
A. Lemon, cabbage, carrot
B. Maize, orange, spinach
C. Maize, potatoes, rice
D. Meat, orange, spinach

22. The most likely reason why some expectant mothers crave soil is to?
A. Increase appetite
B. Increase breast milk production after delivery
C. Lack of sufficient minerals
D. Provide sufficient mineral nutrients

23. One of the following is TRUE about HIV and AIDS.
A. It is not spread during the asymptomatic phase
B. During the widow stage a person may test negative
C. All HIV positive people have AIDS
D. It can be spread by sharing utensils

24. One of the following is NOT a communicable disease?
A. Measles
B. Tetanus
C. Whooping cough
D. Tuberculosis
25. A child suffering from kwashiorkor should be given food rich in?
   A. Vitamins
   B. Fats
   C. Carbohydrates
   D. Proteins

26. Wearing protective clothing while walking in stagnant water can prevent one from contracting?
   A. Bilhazia
   B. Bilhazia and cholera
   C. Typhoid
   D. Typhoid and cholera

27. Which one of the following statements is correct according to immunization schedule of infant?
   A. DPT and measles vaccines are given at 14 weeks
   B. The first dose of polio is given at 6 weeks
   C. DPT vaccines is given at birth and at 10 years
   D. Polio and BCG vaccines are given at birth

28. The following are some methods of preserving food;
   (i) Smoking (ii) Drying (iii) Freezing (iv) Salting (v) Canning
   Which methods are traditional?
   A. (i) (iii) and (iv)
   B. (ii) (iv) and (v)
   C. (ii) (iv) and (v)
   D. (i) (ii) and (iv)

29. Which of the following groups of foods consists only of foodstuffs that are used for body building and repair?
   A. Wheat, fish, maize
   B. Rice, oranges, meat
   C. Beans, potatoes, groundnuts
   D. Eggs, peas, milk
30. The function of fibre in the human diet is to
   A. Help in digestion of food
   B. Provide body with nutrients
   C. Prevent constipation
   D. Transport digested food

31. Which of the following information is usually given when obtaining medicine from a pharmacy?
   A. How to store medicine
   B. Expiry date
   C. The dose
   D. Disposal methods of containers

32. Which of the following is true about HIV and AIDS?
   A. Premarital sex is the only mode of transmission
   B. People living with HIV are thin
   C. HIV and AIDS is a curse
   D. People living with HIV are advised to eat small amounts of food at a time

33. A child with thin and brown hair, swollen hands, feet and face is also likely to:
   A. Have a faster heart beats
   B. Appear weak and inactive
   C. Have knock knees
   D. Have face that of an old person

34. Which one of the following animals belongs to the same group as a weevil
   A. Crab
   B. Mite
   C. Spider
   D. Termite

35. Draining of stagnant water can prevent the spread of?
   A. Cholera and bilharzias
   B. Bilharzia and malaria
C. Cholera and typhoid
D. Typhoid and malaria

36. Which of the following effects of drug abuse consists only of social effects?
   A. Drug addiction and loss of concentration
   B. Drug induce accidents and truancy
   C. Rape and withdrawal symptoms
   D. Theft and lack of concentration

37. A lactating mother needs food rich in iron in order?
   A. To increase milk production
   B. For the formation of strong bones in the body
   C. To protect the body against diseases
   D. To replace blood lost during birth

38. Which pairs of the following consists only of social effects of drug abuse?
   A. Rape and truancy
   B. Impartial judgment and loss of awareness
   C. Accident and withdrawal
   D. Lack of expectations and concentration

39. Which one of the following is TRUE about the incubation stage of HIV infection?
   A. The body can not fight diseases
   B. There is the first stage of infection
   C. There is no visible signs
   D. If the HIV test is carried on, the result is negative

40. Which one of the following pairs of infection consists only of those that are sexually transmitted?
   A. Chancroid and HIV
   B. Syphilis and typhoid
   C. Gonorrhea and tuberculosis
   D. Gonorrhea and bilharzias
41. Which of the following diseases can be prevented by wearing gumboots and gloves?
   A. Malaria  
   B. Typhoid  
   C. Bilharzias  
   D. Cholera  

42. Which of the following is a modern method of preserving food?
   A. Canning  
   B. Drying  
   C. Smoking  
   D. Salting  

43. Drugs taken to treat diseases are?
   A. Pain relieve  
   B. Preventive  
   C. Stimulant  
   D. Curative  

44. Which of the following is prohibited in Kenya when used as a drug?
   A. Beer  
   B. Cobbler’s glue  
   C. Tobacco  
   D. Khat  

45. Which of the following is the MAIN reason to breastfeed the baby by the mother?
   A. The milk produced by the mother is easily digested  
   B. Milk from the mother helps the baby to grow  
   C. Milk from the mother helps the baby to build body immunity  
   D. Milk from the mother helps the baby to have strong bones
46. Which of the following substances is commonly used by street boys in Kenya?
   
   A. Beer  
   B. Khat  
   C. Tobacco  
   D. Glue

47. Some curative drugs are also called?

   A. Antibiotics  
   B. Vaccines  
   C. Stimulants  
   D. Painkillers

48. Which of the following groups of foodstuffs constitute a balanced diet?

   A. Potatoes, beans, eggs  
   B. Rice, chapati, beef  
   C. Chicken, cabbage, beans  
   D. Peas, ugali, spinach

49. The MAIN reason why a baby needs to be breastfed by the mother is that the Milk produced?

   A. Helps to build the baby’s immunity  
   B. Helps the baby to grow fast  
   C. Helps the baby’s bones to be strong  
   D. Is easily digested
# Answers to

## Model Revision Test Two

<table>
<thead>
<tr>
<th>Model Revision Test 2 Answers</th>
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<tbody>
<tr>
<td>1</td>
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<td>10</td>
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</tbody>
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2 Heath Education Unit 2 Answers
Specific Objectives
By the end of this topic, the learner should be able to:

- State the meaning of environment and major components of the environment
- Describe the meaning and effects of soil pollution on the environment
- Explain soil conservation methods
- Describe how air gets polluted
- State effects of air pollution
- Identify ways in which air pollution can be controlled

Revision Notes 3

3.1 The Meaning and Major Components of Environment
Environment describes all the things and conditions that make up our surroundings on earth.

The major natural components of environment consist of living things and non-living things i.e. **Water, Soil, Air, Plants and Animals**

**Water**

Water is a very important component of the environment in that all living things depend on water. Water forms part of the environment for fish as fish get oxygen from the water and feed on water plants or some other fish found in the water. All other living things that live in water get oxygen from the water.

Other water sources found in the environment is a dependent for other living things on the land e.g. animals get water from rivers, lakes, rain and dams. People also use rain water for domestic purposes. They
harvest the water using tanks and drums. They also fetch water from rivers and wells.

Without water plants can not grow well. We already know that the conditions necessary for germination are: water, air and warmth. During photosynthesis, plants use water to make their own food.

**Soil**

Another important component of environment is soil which makes the homes of some small animals. Plants get nutrients from the soil so as they can grow well, get water from the soil through absorption and are finally held by the soil. Also soil is important to animals in that they feed on plants that grow on the soil e.g. zebra, cows and goats. They are called herbivorous because they feed on green plants and vegetable materials that grow on the soil. Human beings cultivate the soil to produce food crops that they eat.

Many small animals live in the soil like ants, termites, moles, groundhogs and some bacteria which decompose dead plant and animal materials.

**Air**

One of the major components of the environment is air which all living things cannot survive without. We already know that air is a composition of many gases; oxygen which makes 21% of the air is needed for respiration.

Note that living things breath in oxygen and those animals that live in water get their oxygen from the dissolved oxygen in the water. Carbon dioxide in air is 0.03% which is used by plants in making their own food in presence of sunlight, a process called photosynthesis. These plants give out carbon dioxide. It is from the atmosphere where the plants and animals on the land get their oxygen and those in water get theirs in the water.

Animals take in oxygen through breathing and give out carbon dioxide. On the other hand plants take in carbon dioxide during photosynthesis
and give out oxygen. Leguminous plants e.g. beans, ground nuts and peas use nitrogen which makes 78% part of the air to make proteins.

**Plants**

Another major component of the environment is plants. Trees provide shelter for some animals such as monkeys and insects. Animals get their food from plants either directly or indirectly. Plants do also hold soil together thus preventing soil erosion.

Plants give out oxygen to the atmosphere during photosynthesis and animals take in oxygen during breathing. Dead plants decay and decompose releasing nutrients to the soil making it fertile.

**Animals**

Some animals help in pollination such as bees and butterflies. They help in cross pollination of flowers in plants. Animals also help in seed dispersal. Waste matters from animals add nutrients to the plants and this way soil becomes fertile. Small animals like bacteria decompose materials in the environment to release nutrients to the environment. Animal breath out carbon dioxide into the atmosphere which in turn is used by plants to make food.

### 3.2 The Meaning and Effects of Soil Pollution

Soil pollution is the presence of substances that affect the quality of the soil also known as land pollution. It affects the usual use of soil and is dangerous to the health of human beings, other animals and plants. In other words, soil pollution means making soil impure. We say that when certain substances are present in the soil they pollute it. Substances that make soil or other components of the environment impure are called pollutants (contaminant). Some of examples of such pollutants are plastics, polythene papers, fertilizer, pesticides and herbicides.

**NB:** *Pesticides kill pests while herbicides kill weeds.*
If oil is spilled on the soil it pollutes it. The following are some causes of soil pollution:

- Domestic waste disposal improperly
- Improper disposal of raw industrial waste
- Excess use of fertilizers, herbicides and pesticides in the activities of poor agriculture
- Spilling oil on the soil
- Mining activities destroys the soil structure and leave excess minerals on the top soil.

**Effects of Soil Pollution**

When soil is polluted, its fertility is affected and this too affects the soil productivity leading to the living components of the environment i.e. plants and animals getting affected as well.

**Effects of soil pollution on plants**

**Dumping**

Most materials such as plastics and polythene papers do not decay. If such materials are not properly dumped, they may cause damage to leaves and stems of plants when deposited on the soil as they decay. Through this way, they interfere with growth of the plants as follows:

- Absorption of water and mineral salts.
- Growth of roots of the plants since they block the roots.
- Air circulation in the soil.
Negative Effects of Soil Pollution on Animals

Soil being homes of many small animals, such as worms, ants and termites, they are negative affected when soil is affected (polluted). Some small animals like bacteria make soil to be rich by decomposing dead vegetable and animal materials. This is the way humus is added into the soil making it more productive. Other small animals like earthworms and millipedes dig in the soil and this allows air and water circulation in the soil. The improved soil aeration and drainage of the soil allows the roots of the plants to penetrate into the soil easily.

The presence of oil, chemicals in the soil such as herbicides and pesticides and other harmful pollutants make it difficult for the small animals to survive and when they die the soil loses its quality and lowers productivity.

NB: Small animals in the soil improve soil air aeration and drainage.

3.3 Methods of Soil Conservation

Animals and plants depend on soil. Plants grow on the soil while animals feed on the plants hence they need to conserve soil. To conserve soil means to protect it from losing its natural properties and productivity. There are various methods of conserving soil. This section briefly discusses these methods.
**Table 3.1: Summary of the main methods used in soil conservation**

<table>
<thead>
<tr>
<th>Soil conservation methods</th>
<th>Planting trees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controlled use of agricultural chemicals</td>
<td></td>
</tr>
<tr>
<td>Ensuring proper disposal of waste</td>
<td>Afforestation</td>
</tr>
<tr>
<td>Avoid burning vegetable cover</td>
<td>Contour farming</td>
</tr>
<tr>
<td>Mulching</td>
<td>Building gabions</td>
</tr>
<tr>
<td>Planting ground cover</td>
<td>Proper stocking or controlled grazing</td>
</tr>
<tr>
<td>Terracing</td>
<td></td>
</tr>
</tbody>
</table>

**a) Control use of agricultural chemicals**

Agricultural chemicals include the following: fertilizers, pesticides and herbicides. If used uncontrollably they can lead to soil pollution and even water pollution. Their use can also be harmful to crops and those who consume the crop which include animals and human beings.

Farmers should strictly follow the manufacturer’s instructions while using the agricultural chemicals. The instructions which come with agricultural chemicals clearly advise on the following:

- Type of the chemical to use.
- Purpose of the chemical.
- Direction of use i.e. the amount to use and mode of application.
- Precautionary measures to observe.
b) Ensuring proper disposal of waste

A lot of waste is produced by domestic and industries. Both wastes can be harmful or useful. So that soil is not polluted by these wastes it is important to have good ways of disposing them. This is called waste management.

i) Domestic Waste

Domestic waste means the garbage people discard from their homes. This may be of organic refuse or inorganic refuse.

*Organic refuse:* This refers to those that can rot and includes food remains, vegetables, and fruit peelings.

*Inorganic refuse:* This does not rot and some may take long time to decay. Examples of such are plastics, broken glasses, metal parts and cans. Domestic waste should not be dumped on the soil surface.

Methods of disposing domestic waste

**Converting waste into compost manure**

A compost pit should be dug at home for all garbage that can rot e.g. food leftovers. This can be made into compost manure.

**Using local authority service**

Waste in urban areas is deposited into the garbage bins provided by the local authorities who arrange for its collection and thereafter proper disposal.
Table 3.2: Common methods of waste disposal

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incinerator</td>
<td>this is burning the inorganic refuse at very high temperatures in a machine</td>
</tr>
<tr>
<td>Recycling</td>
<td>This is the most effective method. It involves collecting waste e.g. papers, plastics, broken glasses and food cans, treating them with chemicals and reusing them to make more of the same products</td>
</tr>
<tr>
<td>Depositing in pit latrines</td>
<td>Inorganic waste should be thrown into a pit latrine or buried deep in the soil. Also, it can be burnt in an improvised incinerator as shown below.</td>
</tr>
<tr>
<td>Reusing</td>
<td>Reusing means using an item more than once or for a different function from the one it was meant for at the beginning. Many such as cooking fat and oils, honey and jam are packed in reusable jars and cans. These can be used at home to store other products e.g. salt, sugar or small foods. Honey jars can be used as drinking glasses.</td>
</tr>
</tbody>
</table>

**ii) Industrial Waste**

A lot of waste is produced in the industries. Such wastes include oil, contaminated acids and metal waste. Water is contaminated with chemicals, waste rubbers and waste papers. Some of these chemicals are not only hazardous to the soil but to the living components in the environment.
Table 3.3: Various ways to manage industrial waste

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-site treatment</td>
<td>This is where waste is treated harmless at an industry at the point where it is produced. This in turn reduces the danger of polluting the environment during the transportation process to the point where it is appropriate to be disposed.</td>
</tr>
<tr>
<td>Reusing</td>
<td>Some industries use some products more than once or for different function from the initially meant for e.g. commercial industries, the solvent they use such as petrol to dry clean garments is not thrown away but filtered and reused.</td>
</tr>
<tr>
<td>Recycling</td>
<td>Companies that make bottles do not throw broken bottles away but recycle them to make new ones. There are other companies that buy waste paper and recycle them to make tissues e.g. toilet rolls, facial tissues and serviettes.</td>
</tr>
<tr>
<td>Waste Exchange Programme</td>
<td>One industry may produce waste that can or may be needed by another industry for its raw materials. This can be considered as useful waste. To explain this lets look at furniture manufacturer where the saw dust is produced and wood shaving as waste products. These can be used by a company that manufactures papers.</td>
</tr>
<tr>
<td>Treating hazardous waste</td>
<td>This is where the new methods are used to treat hazardous waste to make them non-hazardous. Harmful pollutants are destroyed so that they do not pose any danger to the environment.</td>
</tr>
<tr>
<td>Substituting raw materials</td>
<td>This is the process where the raw materials that produce harmful wastes are replaced with other that produces less harmful waste.</td>
</tr>
</tbody>
</table>
Changing Manufacturing process: A process or stage which produces waste during the manufacturing process may be changed or eliminated so that the waste is no longer produced.

Incineration: This is the process of burning waste using machines such as incerators and furnaces.

Reducing its generation: This is the best method of reducing waste. It involves simply preventing waste generation.

Government regulation: In this, government has put in place laws to control the disposal of waste. Such control aims at preventing illegal dumping of harmful waste.

c) Avoid burning vegetable cover

When we want to clear land for farming, we should slash or uproot the unwanted vegetations but not burning them. This is because cleared vegetation left to rot increase humus and adds nutrients to the soil.

NB: Vegetation cover guards soil against exposure to the agents of soil erosion.

When we burn vegetation, we kill the living organisms in the soil and no humus goes into the soil. Vegetation cover also prevents soil from agents of soil erosion such as wind, water and animals.

d) Mulching

This is covering the soil with dead plant materials such as dry grass and leaves. This prevents excess loss of water from the soil through evaporation. This also reduces splash erosion. The mulch decays afterwards and adds humus to the soil.

e) Planting ground cover

It is advisable to plant ground cover since land should not be left bear. Ground cover may include ground cover crops that spread out over the
soil surface and cover it. Examples of such cover crops include grass and sweet potatoes. These crops or plants hold the soil firmly with their roots helping or preventing the soil from being carried away by agents of soil erosion such as wind and rain. Cover crops also trap soil as water flows through the garden thus conserving soil.

f) Terracing
Terraces dug along the contours on the slopes reduce the speed of run-off water. This reduces soil erosion and this way soil is conserved.

g) Planting trees
Planting of trees can be either afforestation or re-afforestation.

h) Afforestation
This is planting of trees in areas where none has been planted.

i) Re-afforestation
This is planting trees where forests have been cleared. Trees are important in preserving soil:

- Reduce wind erosion by breaking the wind
- The roots hold soil particles firmly together. This helps the soil from being carried away by agents of soil erosion.
- They provide shade thus reducing the amount of water evaporation.
- They reduce the speed of running water. This reduces the strength of water to erode the soil.
- The leaves fall off and decompose thus increasing the amount of humus in the soil.
j) **Contour farming**

In this crops are planted along the contours on ridges. This helps reduce soil erosion thus conserving the soil.

k) **Building gabions**

As already known, gulley erosion where running water forms V or U-shaped channels. These gullies can be blocked by building structures called gabions across them. Gabions are heavy boxes made of wire mesh that are filled with stones. As water flows through the gabion, soil is trapped thus reducing soil erosion and repairs the soil structure.

l) **Proper stocking or controlled grazing**

Farmers should keep livestock that a piece of land can hold. This is called proper stocking which leads to soil conservation. When animals overgraze they uproot the vegetable cover e.g. grass. This way the soil becomes exposed to agents of soil erosion such as wind and water.

3.4 **Air Pollution**

Air is an important component of the environment. Pure air is a mixture of 21% oxygen, 78% nitrogen, 0.03% carbon dioxide and 0.97% rare gases, water vapour, and dust particles. Presence of harmful substances in the air is called air pollution. The substances are called pollutants. Pollutants endanger human health and also affect other living components in the environment i.e. plants and animals. Others which are indirectly affected by air pollution are water and soil.

3.4.1 **Major causes of air of Pollution**

a) **Tobacco smoking**

This is one of the major forms of air pollution. It is normally smoked as cigarettes. In addiction to nicotine and tar, tobacco contains carbon monoxide as well which is a highly poisonous gas as it interferes with the ability of the blood to transport oxygen to the body organs. Smoke from cigarettes does not only affect the active smoker but also the passive smoker i.e. any one who inhales the cigarette smoke (polluted
air) unintentionally.

b) Burning tyres and plastic materials

The combustion of tyres and plastic materials produces harmful emissions and poisonous gases and especially when they do not completely burn. Incomplete combustion produces gases such as carbon monoxide which poses threat to humans health and to the survival of animals and plants. Similarly, carbon dioxide is a product of incomplete combustion. As we already know the normal carbon dioxide in the air is 0.03% excess carbon dioxide in the air as pollutant. Other pollutants from combustion are tiny particles of smoke and soot.

Rubber and plastics when burnt produces black sooty flame and emits smoke that makes the air smoggy and also emits a foul smell. Charcoal burning is also a threat to the environment.

c) Emission of Gases from Vehicle Exhaust

Vehicles use fuels like petrol and diesel to run. The combustion of these fuels in the engine of the vehicles produces harmful gases e.g. carbon dioxide, carbon monoxide and other gases. These gases produced by vehicles contain poisonous gases then contribute to pollution of the air. Exhaust gases from vehicles thus contribute to pollution of air and especially in cities and big towns where traffic is heavy.

Another harmful substance that may be contained in burning fuels is lead which is dangerous to human health.

d) Spraying Farm Chemicals

Agricultural or otherwise farm chemicals include the following:
Herbicides, Acaricides and Pesticides

Farm chemicals are dissolved in water and sprayed to either crops or animals using a sprayer. As spraying farm chemical is done, wind blows some of the chemicals thus polluting the air. The person spraying the chemicals should take the following precaution measures to avoid inhaling the chemicals:
• Wearing protective clothes such as gas mask, gloves and protective coats.

• Spraying in the same direction the wind is blowing to and not against the wind.

e) Aerosol sprays

These are packed in cans or other containers from which liquid is forced out in form of a fine mist. The perfume or pesticide is dissolved in solvent which remains in the atmosphere after spraying and pollutes it. The solvent may contain harmful chemical substances which interfere with the ozone layer.

NB: Ozone is a gas in the upper part of the atmosphere. It forms a protective blanket known as the ozone layer which protects the earth from harmful rays from the sun. Harmful gases result in thinning of the ozone layer. When this is depleted, the survival of human being, animals and plants is at a threat.

f) Industrial Waste Gases

Most industries release waste gases into the air which may be harmful. Some of these industries produce excess carbon dioxide which can pollute the air. Some other industries produce a gas called sulphur dioxide which is also harmful. Other industries too produce dust and small particles which are harmful. These waste industrial gases must be treated so that they are made safe.

3.4.2 Effects of Air Pollution on Living Things and Non-Living Things

Polluted air is a threat to human, animals and plant life. Also it is dangerous to nonliving components of the environment e.g. water and soil. It corrodes materials such as corrugated iron sheets and marble.
a) Effects of air pollution on living things

i) Effects of air pollution on plants

In order to grow healthy, plants need clean air. Polluted air affects plants in the following ways:

- Leaves are covered with dust particle and thus blocking the sunlight and so affecting photosynthesis, the process by which plants make their own food. Soot and dust block the stomata this may affects plants.

- Some waste gases such as sulphur dioxide dissolve in water droplets to form acidic solutions which damage leaves of plants. Presence of these gases in the air could also lead to formation of acid rain which make the soil to be acidic thus affecting the availability of nutrients to plants. High acidity on the soil may interfere with the survival of organisms that are very important to plants growth. When absorbed through root s, acid rain interferes with proper development of plant and it may wither and die. When deposited in water sources like pond, lakes and oceans, water plants that feed on water animals are affected.

ii) Effects of air pollution on animals

Air pollution is a threat to humans, domestic and wild animals through the following ways:

- Causes respiratory problems. When animals inhale dust and other harmful gases, they can develop respiratory such as coughing and sneezing which may result to respiratory diseases.

- May cause allergies resulting in coughing, sneezing, irritation of eyes and breathing problems.

- When acid rain gets deposited into water sources like lakes, ponds, and oceans, water animals e.g. fish are affected.
b) Effects of air pollution on non living things

- Sulphur and carbon dioxide are among gases that cause air pollution when dissolved in the rain water. They form acid rain which corrodes metals such as corrugated iron sheets and stones like marble.

- Acid rain causes weathering of rocks.

- The view of environment is also destroyed by smoke and smog which are a mixture of gas particles.

- Smog destroys materials made of rubber too.

- Dust particles soil our clothes and settle on surface of tables, window sills and furniture thus making them dirty.

3.4.3 Ways of Controlling Air Pollution

Air pollution is controlled in several ways: These include

- Avoid smoking cigarettes

- NOT burning tyres and plastic materials

*Table 3.4: Air Pollution Control Measures*

<table>
<thead>
<tr>
<th>Measure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoid smoking cigarettes</td>
<td>In an effort to control air pollution banning of cigarette smoking in public places e.g. hospitals, schools, and in public transport vehicles has been done. These areas have been declared smoking free zones and billboards displaying the ban in these areas have been erected.</td>
</tr>
<tr>
<td>NOT burning tyres and plastic materials</td>
<td>Polythene papers and tyres plus other plastics should be recycled or buried deep in the soil. They should not be burnt</td>
</tr>
</tbody>
</table>
1. Which one of the following waste products DO NOT require processing before recycling?
   A. Dirty used water  
   B. Scrap metal  
   C. Waste paper  
   D. Rice husks  

2. Which of the following is most polluted when farmer uses pesticide in excess?
   A. Water  
   B. Crop  
   C. Soil  
   D. Air  

3. Which two components make up to about 78% of the volume of air?
   A. Rare gases and nitrogen  
   B. Nitrogen and oxygen  
   C. Carbon dioxide and nitrogen  
   D. Oxygen and carbon dioxide  

4. An indicator from a flower turned pink when mixed with drops of clover extract. Which of the following would have similar result when mixed with the indicator?
   A. Chalk powder  
   B. Lemon juice  
   C. Wood ash  
   D. Baking powder  

5. Which one of the following will help to conserve the environment?
   A. Using commercial fertilizers to increase crop yield  
   B. Burying plastic in the soil  
   C. Using ash from wood to kill pests  
   D. Burning heaps of sawdust
6. Which of the following will LEAST pollute the environment?
   A. Smoke from burning charcoal
   B. Gases from industries
   C. Exhaust gases from vehicles
   D. Rotting plant and animal matters

7. Which one of the following would least pollute the environment?
   A. Gases from industries
   B. Exhaust gases from vehicles
   C. Smoke from burning charcoal
   D. Rotting plants and animals materials

8. Fruits that are dispersed by water;
   A. Are small with hooks
   B. Are small and hairy
   C. Are hollow and fibrous
   D. Are small with hooks

9. A certain animal has body temperature varying with the environment, lays eggs and has scales. The animal is likely to be
   A. Snake
   B. Platypus
   C. Toad
   D. Duck

10. Which one of the following ways is not accepted way of stopping monkeys from destroying crops?
    A. Laying a trap for the monkey
    B. Putting fence around the farm
    C. Seeking assistance from game reserve
    D. Guarding the farm

11. The component of the air in the atmosphere which changes from time to time is?
    A. Oxygen
    B. Water vapour
    C. Carbon dioxide
    D. Nitrogen
12. One of the following DOES NOT help to conserve water. Which one?
   A. Drip irrigation
   B. Using oil to kill mosquitoes larvae
   C. Treating from factories
   D. Mulching

13. A suitable way of handling plastics materials to avoid pollution is?
   A. Dumping in water
   B. Burning
   C. Burying in the soil
   D. Reusing

14. Which one of the following materials can be recycled?
   A. Ash
   B. Cowdung
   C. Coffee husks
   D. Scrap metals

15. Which one of the following consists of renewable sources of energy?
   A. Firewood and kerosene
   B. Waterfalls and petrol
   C. Biogas and charcoal
   D. Wind and coal

16. Which one of the following explains why smoke rises?
   A. Has hot air in it and has particles suspended in the air
   B. Has particles suspended in the air and is cloudy
   C. Is less dense and cloudy
   D. Has hot air in it and cloudy

17. Which one of the following processes involves absorption of heat from the surrounding?
   A. Condensation and evaporation
   B. Freezing and condensation
C. Melting and heating
D. Evaporation and melting

18. The chart below represents percentage of components of air.

Which portion represents the gas that is necessary for burning
A. P
B. Q
C. R
D. S

19. Which of the following materials CANNOT be recycled?
A. Rubber tyres
B. Glass bottles
C. Candle wax
D. Saw dust

20. Which of the following practices is used for controlling pollution in the soil, water and air?
A. Avoiding dumping cans and plastic materials
B. Treating chemical waste from factories
C. Burning rubbish in metallic or concrete
D. Avoiding excess use of fertilizers

21. A fish is able to move in water easily because
A. Has fins
B. Has hard scales
C. Is streamlined
D. Has gills

22. Which one of the following will pollute water only?
A. Untreated sewage
B. Used oil
C. Farm chemicals
D. Factory water
23. The main reason why the government conserves wild life is to have?
   A. Meat from animals
   B. Plants and animals product
   C. A balance of nature
   D. Animals for export

24. The best way of handling tin cans after using the content is by?
   A. Burying them deep in the soil
   B. Smelting and moulding them into other products
   C. Throwing them into pit latrine
   D. Throwing them in the river

25. Which tool is made by following the steps below?
   i. Flattering one end on nail
   ii. Fixing the flattened end into a piece of wood
   iii. Cutting off the head of the nail
   iv. Flattening and sharpening the exposed nail
   A. Hammer
   B. Chisel
   C. Drill
   D. Saw

26. Which of the following does not pollute air?
   A. Exhaust gases from aeroplanes
   B. Carbon dioxide from plants
   C. Smoke from burning domestic waste
   D. Smoke from burning charcoal

27. The main reason why it is advisable to spray on in the direction of the wind is to avoid?
   A. The chemical getting into contact with the sprayer
   B. Wastage of chemicals
   C. Polluting the air
   D. Inhaling the chemicals
28. In which of the following practices is water reused?
   A. Using dirty water from kitchen for watering plants
   B. Collecting water from the roof for domestic purposes
   C. Getting clean water from dirty water by boiling and cooling the steam
   D. Storing water in dams to be used in irrigation

29. Which of the following components is found in all environments?
   A. Plants
   B. Soil
   C. Air
   D. Animals

30. Which of the following are percentages of carbon dioxide and nitrogen in the air?
   A. 1% and 21%
   B. 0.03% and 78%
   C. 21% and 78%
   D. 0.03% and 1%

31. Which of the following LEAST conserves soil?
   A. Mulching
   B. Contour ploughing
   C. Terracing
   D. Planting cover crops

32. The chart below represents a simple classification of pollutants.

![Pollutant Classification Diagram]
The pollutant represented by X and Y are:

<table>
<thead>
<tr>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factory waste</td>
<td>Acid rain</td>
</tr>
<tr>
<td>Herbicides</td>
<td>Oil spillage</td>
</tr>
<tr>
<td>Oil spillage</td>
<td>Acid rain</td>
</tr>
<tr>
<td>Herbicides</td>
<td>Factory waste</td>
</tr>
</tbody>
</table>

33. Which one of the following is the BEST method of managing plastic waste?
   A. Burning
   B. Burying
   C. Recycling
   D. Reusing

34. Which of the following practices is an advantage to the soil?
   A. Ploughing across contours
   B. Disposal of vegetable waste
   C. Burning of crop remains
   D. Use of herbicides

35. Corrugated iron sheets can be damaged when they come into contact with?
   A. Oil spillage
   B. Herbicides
   C. Industrial gases
   D. Dust
Answers to Model Revision Test Three

<table>
<thead>
<tr>
<th>Model Revision Test 3 Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
</tbody>
</table>

3 Environment Unit 3 Answers
UNIT 4
PLANTS

Specific Objectives
By the end of this topic, the learner should be able to:

- Describe pollination and fertilization
- Draw and label different parts of a flower
- Draw and label parts of a seed and Investigate conditions necessary for germination
- Explain interdependence between plants, interdependence between plants and animals and explain what is food chain
- Explain meaning of crop pests, identify some crop pests, their effects and control measures
- Explain how plants are adapted to their environments
- Identify signs of unhealthy crops
- State effects of crop diseases

Revision Notes 4

4.1 Parts of a Flower Notes on functions of the parts

Functions of parts of flower

Stalk – the stalk supports the flower.

Sepals – The sepals protects parts of the flower at early stages of development called bud stage. The collective name for the sepals is the calyx.

Petals – petals are the brightly coloured part of the flower. They attract insects to the flower for pollination. They are collectively called corolla.
Male reproductive parts

This is the male part of a flower which is called stamen. Filaments are joined together in some and in others they are separate. Anthers contain pollen grains.

Table 4.1: Male Parts of a Flower and Their Functions

<table>
<thead>
<tr>
<th>Part</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filament</td>
<td>It is the stalk that supports the anthers.</td>
</tr>
<tr>
<td>Anthers</td>
<td>The anther is the part that contains pollen grains.</td>
</tr>
<tr>
<td>Pollen grains</td>
<td>These are male sex cells and they fuse with ovules during fertilization to form seeds</td>
</tr>
</tbody>
</table>
Female reproductive parts

*Figure 4.3: Female parts of a flower*

<table>
<thead>
<tr>
<th>Parts</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stigma</td>
<td>The stigma is the part of a flower which receives pollen grains</td>
</tr>
<tr>
<td>Style</td>
<td>It supports the stigma and allows pollen grains to pass through to ovary from stigma.</td>
</tr>
<tr>
<td>Ovary</td>
<td>It is the part which later becomes the fruit.</td>
</tr>
<tr>
<td>Ovules</td>
<td>become seeds later after fertilization</td>
</tr>
</tbody>
</table>

*Table 4.2: Types of Pollination*

<table>
<thead>
<tr>
<th>Types of pollination</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self pollination</td>
<td>It is the transfer of pollen grains from the anthers to the stigma of the same flower in the same plant.</td>
</tr>
<tr>
<td>Cross pollination</td>
<td>This is transfer of pollen grains from the anthers to the stigma of different flower but of the same species.</td>
</tr>
</tbody>
</table>

4.2 Description of pollination and fertilization

Pollination

*Agents of pollination*

The transfer of pollen grains from the anthers to the stigma is done by wind or insects. Wind and insects are therefore agents of pollination.
**Fertilization**

After pollination what follows is known as fertilization as explained below.

Pollination takes place when pollen grain germinates on the stigma. Each pollen grain develops a tube through the style. At the top of the pollen grain is a male sex cell.

Once the pollen tube reaches the ovule, the tip breaks and the male sex cell is released. The male sex cell enters the ovule through a small opening and fuses with the female sex cell. This fusion of male and female sex cells is called **fertilization**.

After fertilization, other parts of flower wither and fall off. The ovary enlarges and becomes a fruit. The ovules become seeds.

**4.3 The Seed**

**Types of seeds**

There are two types of seeds, namely dicot and monocot.

The difference between the two is based on the number of cotyledons.

<table>
<thead>
<tr>
<th>Part</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epicotyl</td>
<td>It develops into shoot.</td>
</tr>
<tr>
<td>Hypocotyl</td>
<td>It develops into root</td>
</tr>
<tr>
<td>Cotyledon</td>
<td>It stores food for epicotyls and hypocotyls</td>
</tr>
<tr>
<td>Seed coat</td>
<td>It protects the inner parts of the seed.</td>
</tr>
<tr>
<td>Hilum</td>
<td>Allows water to pass through</td>
</tr>
</tbody>
</table>
Table 4.3: Types of seeds

<table>
<thead>
<tr>
<th>Types of seeds</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dicot</td>
<td>This is a seed with two cotyledons. The best example is a bean seed.</td>
</tr>
<tr>
<td>Monocot</td>
<td>This kind of seed has one cotyledon. A good example is a maize seed.</td>
</tr>
</tbody>
</table>
## Germination of seed

**Table 4.5: Experiment on conditions necessary for germination**

<table>
<thead>
<tr>
<th>Steps</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity</td>
<td>Investigating conditions necessary for germination</td>
</tr>
<tr>
<td>Apparatus</td>
<td>Maize and bean seeds, transparent container, water, paper, oil and cotton wool.</td>
</tr>
<tr>
<td>Procedure</td>
<td>Place some dry seeds on dry cotton wool or sawdust in one container and label A.</td>
</tr>
<tr>
<td></td>
<td>Place soaked seeds on wet cotton wool or wet sawdust in second container and label B.</td>
</tr>
<tr>
<td></td>
<td>Boil some water in a container, cover the water with oil. Allow the water to cool. Put some seeds and label C.</td>
</tr>
<tr>
<td></td>
<td>Put soaked seeds in wet cotton wool or wet sawdust and place them inside a container and label D. place the container in cool place e.g. in a refrigerator (charcoal cooler).</td>
</tr>
<tr>
<td>Results</td>
<td>After about a week each container to be observed will be found that:</td>
</tr>
<tr>
<td></td>
<td>Seed in A did not germinate as there was no water.</td>
</tr>
<tr>
<td></td>
<td>Seeds in B germinated as there was air and water.</td>
</tr>
<tr>
<td></td>
<td>Seeds in C did not germinate. There was no air because boiling water makes air escape and oil prevents oxygen from getting into the water.</td>
</tr>
<tr>
<td></td>
<td>Seeds in D germinated slowly. They lacked warmth. If the seeds were put in refrigerator, they will not germinate due to low temperatures.</td>
</tr>
<tr>
<td>Conclusion</td>
<td>Conditions necessary for germination are therefore <strong>Water, air and warmth</strong>.</td>
</tr>
</tbody>
</table>
4.4 Interdependence between Animals to plants and plants to plants

Plants and animals do depend on each other in various ways.

Table 4.6: Interdependence between animals and plants

<table>
<thead>
<tr>
<th>Areas</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>Animals get food from plants and plants get manure necessary for well growth of the plants</td>
</tr>
<tr>
<td>Oxygen</td>
<td>Plants get carbohydrates from animals for photosynthesis (process by which plants makes food) and animals breath in oxygen from plants for respiration.</td>
</tr>
<tr>
<td>Shelter</td>
<td>Plants provide shade for the animals and mammals’ e.g. man takes care of young by providing protection by mulching, seed beds e t c.</td>
</tr>
<tr>
<td>Pollination</td>
<td>Plants e.g. black jack will depend on the animals to transfer seeds to a place for germination</td>
</tr>
<tr>
<td>Medicine</td>
<td>Animals healed from medical plants and animals provide manure for healthy plants</td>
</tr>
<tr>
<td>Nutrients</td>
<td>Plants mostly depend on animals to maintain soil fertility. An animal on the other hand needs nutrients from plants to keep them alive.</td>
</tr>
<tr>
<td>Animal waste</td>
<td>Animal waste like feaces and urine, increases the amount of humus in the soil.</td>
</tr>
<tr>
<td>Decomposition of dead animals</td>
<td>bodies of dead animals increases humus in the soil thus supporting plant growth</td>
</tr>
</tbody>
</table>
Food Chain

Food chain is a linear sequence of links in food web starting from a tropical species that eats no other species in the web and ends with species that is not eaten by any other.

Examples are:

- Grass → grasshopper → birds → man
- Plants → worms → birds → cats
- planktons → fish → birds → eagle
- Grass → deer → lion → vulture

Some plants do also depend on other plants for the following:

- Support for creeping plants growing next to a big tree climbs up.
- Place of living (habitat) some plants live on others for food
- Shade that weak plants get shelter from big plants

4.5 Crop Pests effects, Types and control measures

These are organisms responsible of destroying crops.

Effects of Pests on Crops

- Lowers the yields
- Reduce quality of the produce
- Transmits diseases to crops
- Cause diseases to consumers
### Types of pests

**Table 4.7: Types of crop pests**

<table>
<thead>
<tr>
<th>Type</th>
<th>Example</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Pests</td>
<td>Aphids</td>
<td>They are very small and attack mostly kales, cabbages sucking the juice and destroying the plants</td>
</tr>
<tr>
<td></td>
<td>Cut worms</td>
<td>They cut the stems of young plants this destroying the plants</td>
</tr>
<tr>
<td></td>
<td>Stalk borers</td>
<td>They attack the plants’ stalk stem e.g. maize</td>
</tr>
<tr>
<td></td>
<td>Weevil birds</td>
<td>They eat the green maize in the garden this opening the green covering of the maize.</td>
</tr>
<tr>
<td>Storage Pests</td>
<td>Rodents</td>
<td>Like rats eat the grains in the granary or the store</td>
</tr>
<tr>
<td></td>
<td>Weevils</td>
<td>They are very tiny they make holes in the grains such as maize, wheat etc. while in the store or granary.</td>
</tr>
<tr>
<td></td>
<td>White ants</td>
<td>They attack the timbers unless treated with chemicals</td>
</tr>
</tbody>
</table>

### Control Measures

These are ways and means to reduce or eradicate crop-pests. Below are some of them:
Table 4.8: Measures of Controlling Pests

<table>
<thead>
<tr>
<th>Measure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trapping</td>
<td>It is done by poisoning what they like e.g. use of “red cat” in sugary solution to kill mites.</td>
</tr>
<tr>
<td>Hand picking</td>
<td>guarding then you catch and kill</td>
</tr>
<tr>
<td>Weeding</td>
<td>Involves clearing weeds in farm so that pests have no hiding places, because they don’t like to be seen in the open space.</td>
</tr>
<tr>
<td>Spraying</td>
<td>Use pesticides to eradicate them</td>
</tr>
<tr>
<td>Pruning</td>
<td>Involves removal of unwanted parts of the plants that can attract or affected by the pests to reduce their rate of spreading.</td>
</tr>
</tbody>
</table>
1. Which one of the following make up the female part of a flower?
   A. Stigma
   B. Anthers, style and ovary
   C. Stigma, filament and ovary
   D. Stigma, style and ovary

2. Which one of the following DOES NOT describe pollination?
   A. The transfer of pollen grains from anthers to ovary of the same flower
   B. Transfer of pollen grains from the stigma to the anthers
   C. Fussion of the pollen grains to the ovary
   D. Movement of pollen in the style

3. Which of the following plants stores food in the roots?
   A. Onion
   B. Cassava
   C. Ground nut
   D. Irish potato

Which of the following shows the CORRECT method of their dispersal?

<table>
<thead>
<tr>
<th></th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>Water</td>
<td>Animal</td>
<td>Animal</td>
<td>Wind</td>
</tr>
<tr>
<td>B.</td>
<td>Animal</td>
<td>Self</td>
<td>Water</td>
<td>Wind</td>
</tr>
<tr>
<td>C.</td>
<td>Self</td>
<td>Animal</td>
<td>Wind</td>
<td></td>
</tr>
<tr>
<td>D.</td>
<td>Water</td>
<td>Wind</td>
<td>Animal</td>
<td>Self</td>
</tr>
</tbody>
</table>

5. The diagram below shows parts of a flower.

![Flower Diagram](image)

Which parts are represented by X, Y and Z?

<table>
<thead>
<tr>
<th></th>
<th>X</th>
<th>Y</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>Anthers</td>
<td>Style</td>
<td>Sepal</td>
</tr>
<tr>
<td>B.</td>
<td>Stigma</td>
<td>Filament</td>
<td>Petal</td>
</tr>
<tr>
<td>C.</td>
<td>Anther</td>
<td>Filament</td>
<td>Sepal</td>
</tr>
<tr>
<td>D.</td>
<td>Stigma</td>
<td>Style</td>
<td>Petal</td>
</tr>
</tbody>
</table>

6. The following are functions of roots.
   i) Holding plants in the soil
   ii) Storage of food
   iii) Absorption of water
   iv) Breathing

Which of the following are performed by all roots?

A. (i) and (iii)
B. (iii) and (iv)
C. (i) and (ii)
D. (ii) and (iv)
7. Which one of the following features would help a student tell that a plant structure is a fruit?
   A. Having a line of weakness
   B. Presence of two scars
   C. Being freshly
   D. Having one cotyledon

8. The set up below was used to investigate a certain process in plants.

   ![Image of a plant with a polythene bag over the leaves]

   The process investigated was?
   A. Saturation
   B. Transpiration
   C. Condensation
   D. Evaporation

9. The characteristics below are observed in wind and insect pollinated flower.
   i. Sticky stigma
   ii. Smooth pollen grains
   iii. Sticky pollen grain
   iv. Scented
   v. Large quantity of pollen grains

   Which of the above characteristics are for insect pollinated flowers?
   A. (i) (iii) (iv)
   B. (i) (ii) (iv)
   C. (ii) (iv) (v)
   D. (iii) (ii) (v)
10. The diagram below represents parts of a flower. The function of the part labeled P is to?

A. Lead pollen grains to the ovary  
B. Receive pollen grains  
C. Produce nectar  
D. Produce pollen grains

11. The diagram below represents parts of germinating seed.

The part labeled K
A. Serves as the first leaves  
B. Gives rise to shoot  
C. Becomes root  
D. Absorbs water for the young plants

12. Which of the following pairs of plants has root nodules?
A. Maize and potatoes  
B. Tomatoes and beans  
C. Cabbage and millet  
D. Groundnuts and beans

13. Which one of the following parts of a passion plant is modified for climbing?
A. Leaf  
B. Brach  
C. Stem  
D. Bud
14. Which one of the following describes cross-pollination?
   A. The transfer of pollen grains from the anther to the stigma of the same plant
   B. The transfer of pollen grains from anthers to the stigma on another flower of the same plant
   C. The transfer of pollen grains from anthers to the stigma of a different flower on plants of different kind
   D. The transfer of pollen grains from the anther to the stigma of a different flowers on plants of the same kind

15. Which one of the following is part of the embryo of a seed?
   A. Cotyledon
   B. Microphyle
   C. Raddicle
   D. Endosperm

16. Which of the following part of a flower is correctly matched with its function?

<table>
<thead>
<tr>
<th>Part of flower</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Stigma</td>
<td>Produces pollen grains</td>
</tr>
<tr>
<td>B. Pollen grains</td>
<td>Fertilizes ovules</td>
</tr>
<tr>
<td>C. Style</td>
<td>Supports stigma</td>
</tr>
<tr>
<td>D. Filament</td>
<td>Supports anthers</td>
</tr>
</tbody>
</table>

17. Which of the following groups consists only plants with fibrous roots?
   A. Cow peas, rice carrot
   B. Rice, millet, maize
   C. Cow peas, maize, wheat
   D. Carrot, millet, wheat

18. The component of air used in making plants foods is:
   A. 0.03%
   B. 0.97%
   C. 21%
   D. 78%
19. Fertilization in plants takes place when?
   A. A pollen grain enters the ovule
   B. Reproductive cells in the pollen grains and ovule fuse
   C. A pollen grain falls on the stigma and germinates
   D. A pollen tube enters the ovary

20. Which of the following plants have the same type of root system?
   A. Millet, cassava, carrot
   B. Bean, black jack, cabbage
   C. Tomato, maize, peas
   D. Ground nuts, rice, sugarcane

21. The diagram below is a type of weed.

![Diagram of a weed]

The weed is?
A. Black jack
B. Pig weed
C. Mexican marigold
D. Oxalis

22. Which of the following plant is green and non-flowering?
   A. Sisal
   B. Onion
   C. Mould
   D. Moss

23. Which of the following plants is a cereal?
   A. Maize
   B. Peas
   C. Sunflower
   D. Coffee
24. Which of the following consists of plants that CAN NOT make their own food?
   A. Cedar and yeast
   B. Ferns and pine
   C. Puff balls and mould
   D. Toad stool and moss

25. The diagram below shows parts of a flower

   ![Diagram of flower parts]

   Which of the labeled parts of flower is NOT correctly matched with the function?

<table>
<thead>
<tr>
<th>Part</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>receives pollen grains</td>
</tr>
<tr>
<td>X</td>
<td>produces pollen grains</td>
</tr>
<tr>
<td>Y</td>
<td>develops into a seed after fertilization</td>
</tr>
<tr>
<td>Z</td>
<td>protects the inner parts of a flower</td>
</tr>
</tbody>
</table>

26. Which of the following parts of maize grain correctly matched with its function?

<table>
<thead>
<tr>
<th>Part</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Radicle</td>
<td>Develops into shoot</td>
</tr>
<tr>
<td>B. Endosperm</td>
<td>Stores food</td>
</tr>
<tr>
<td>C. Endosperm</td>
<td>Makes food</td>
</tr>
<tr>
<td>D. Plumule</td>
<td>Develops into root</td>
</tr>
</tbody>
</table>

27. Which of the following consists of characteristics of insects pollinates flowers

   A. Sweet scented, large number of pollen grains
   B. Brightly coloured petals, sticky pollen grains
   C. Large pollen grains, sweet scented
   D. Brightly coloured petals, light pollen grains
28. Which of the following stores food in the same part of the plant as Irish potato?
   A. Onion
   B. Sweet potato
   C. Sugarcane
   D. Cassava

29. The embryo of a seed is made up of;
   A. Cotyledon and radicle
   B. Plumule and testa
   C. Raddicle and plumule
   D. Cotyledon and plumule

30. The main reason why black jack weed should be protected from vegetable farm when they are still young is?
   A. To avoid loss of soil nutrients
   B. Because it is easy to uproot the weed
   C. To reduce loss of water
   D. To control spread of the weed

31. The chart below shows a classification of plants.

Which one of the following pairs represents X and Y?

X
   A. Fern       Algae
   B. Wheat      Cypress
   C. Bean       Maize
   D. Moss       pawpaw

Y
32. The percentage of the component of air that is fixed by bacteria in the root nodules to make nutrients for the plant is?
   A. 0.03%
   B. 0.97%
   C. 21%
   D. 78%

33. Which of the following plants has separate male and female flower?
   A. Sorghum
   B. Maize
   C. Oranges
   D. Sisal

34. The leaf of a cactus plant
   A. Reduces water loss
   B. Makes plant food
   C. Stores water
   D. Allows gaseous exchange

35. Which one of the following is a leguminous plant?
   A. Cabbage
   B. Maize
   C. Ground nut
   D. Tomato

36. Which one of the following groups consists of non-flowering plants?
   A. Pine, cedar, cypress
   B. Sugarcane, sisal, onion
   C. Cedar, moses, kale
   D. Carrot, cassava, cactus
### Answers to Model Revision Test Four

<table>
<thead>
<tr>
<th>Model Revision Test 4 Answers</th>
</tr>
</thead>
</table>

---

4 Plants Unit 4 Answers
Specific objectives

By the end of this topic, learners should be able to:

- Name the eight planets in the solar system
- Make a model of planets

Revision Notes 5

5.1 The Solar System

The word solar means the sun. The solar system comprises of the sun at the centre, eight planets and other heavenly bodies.

The Sun

The sun is the star at the centre of solar system. It accounts for 86% of the system’s mass.

Planets

*Table 5.1: List of Planets*

<table>
<thead>
<tr>
<th>Planets</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mercury</td>
<td>5</td>
<td>Jupiter</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Venus</td>
<td>6</td>
<td>Saturn</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Earth</td>
<td>7</td>
<td>Uranus</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Mars</td>
<td>8</td>
<td>Neptune</td>
<td></td>
</tr>
</tbody>
</table>
Planets are celestial bodies orbiting a star or Stella remnants. A planet is massive enough to be rounded by its own gravity, but not too massive to cause thermonuclear fusion. It must also have cleared its neighbouring region of planetesimals.

**Figure 5.1: The Solar System showing the eight planets**

| Pluto is no longer a planet since 2007 |

**NB.**  
(i) Pluto NOT there since 2007.  
(ii) The order of the solar system begins with one closest to the sun.
Model Revision Test 5

1. Below is the diagram of the solar system. The planet marked X is?
   A. Mercury
   B. Venus
   C. Mars
   D. Earth

2. The diagram below shows a weather instrument. The instrument is used for measuring?
   A. Direction and strength of wind
   B. Pressure and strength of wind
   C. Speed and pressure of wind
   D. Speed and direction of wind
3. The below diagram shows the position of moon as it goes around the earth.

![Diagram of moon phases]

Full moon is observed at position?
A. P  
B. S  
C. R  
D. Q

4. Some students made a weather record that was represented as in the diagram below.

<table>
<thead>
<tr>
<th></th>
<th>Morning</th>
<th>Afternoon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>☀️</td>
<td>☁️</td>
</tr>
<tr>
<td>Tuesday</td>
<td>☁️</td>
<td>☀️</td>
</tr>
<tr>
<td>Wednesday</td>
<td>☀️</td>
<td>☁️</td>
</tr>
<tr>
<td>Thursday</td>
<td>☀️</td>
<td>☁️</td>
</tr>
<tr>
<td>Friday</td>
<td>☁️</td>
<td>☁️</td>
</tr>
</tbody>
</table>

![Weather Key]

Which one of the following statements about the weather is correct?
Whenever it
A. Was windy in the morning, it rained in the afternoon
B. Was windy, there was rain
C. Rained, it was windy
D. Was sunny, it was windy
5. The planet with a ring around is?
   A. Jupiter
   B. Saturn
   C. Mercury
   D. Pluto

6. The planet that takes the longest time to move around the sun once is?
   A. Uranus
   B. Saturn
   C. Mars
   D. Venus

7. Which one of the following weather instruments DOES NOT work on the fact that matter occupies space?
   A. Air thermometer
   B. Rain gauge
   C. Wind sock
   D. Wind vane

8. In the solar system, which one of the following pairs consists of the smallest and the largest planet in the solar system?
   A. Pluto and Saturn
   B. Mercury and Jupiter
   C. Venus and Uranus
   D. Earth and Mars

9. Weather record for four days is represented by the chart below.

<table>
<thead>
<tr>
<th></th>
<th>Morning</th>
<th>Afternoon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuesday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Key**
- Sunny
- Cloudy
- Rainy
- Windy
- Calm
On which day did it rain after being cloudy?
A. Thursday
B. Tuesday
C. Wednesday
D. Monday

10. Which of the following planets are in the SECOND, FIFTH, and EIGHTH positions respectively from the sun?
A. Earth, Saturn, Uranus
B. Uranus, Jupiter, Venus
C. Venus, Jupiter, Neptune
D. Pluto, Venus, Mars

11. On one evening, Elizabeth noticed a bright heavenly body that was not twinkling. The heavenly body was most likely?
A. Neptune
B. Saturn
C. Venus
D. Uranus

12. Which one of the following is true about the planet Mars?
A. Nearest to the sun
B. The smallest planet
C. Nearest to the earth
D. The brightest planet

13. The temperature at which substance freezes is the same temperature at which the substance?
A. Condenses
B. Melts
C. Boils
D. Evaporates

14. Planets appear bright because they?
A. Reflect light
B. Are large
C. All twinkle
D. Produce light
15. Which one of the following pairs of process is as a result of increase in temperature?
   A. Melting and evaporation  
   B. Condensation and evaporation  
   C. Condensation and freezing  
   D. Melting and freezing

16. Which one of the following is the largest planet?
   A. Earth  
   B. Mercury  
   C. Jupiter  
   D. Saturn

17. Which of the following shows the 4th and 7th planets from the sun?
   A. Venus and Neptune  
   B. Jupiter and Uranus  
   C. Mars and Uranus  
   D. Jupiter and Saturn

18. One of the following is not a source of light?
   A. Moon  
   B. Stars  
   C. Sun  
   D. Firefly

19. The presence of thick white and mountain shaped clouds are signs of?
   A. Low temperatures  
   B. Strong winds blowing  
   C. Fine weather  
   D. Heavy rain falling soon

20. The following are activities followed when modeling the solar system, but not on their correct order.
   i. Draw circles on manila paper to show orbits
   ii. Model the planets and the sun using clay
iii. Put name tag on models of planets and the sun
iv. Fix model of planets to orbits and the model of the sun at the centre
v. Paste manila paper on soft board.

Which one of the following is the CORRECT order in which the activities are carried out?
A. (i) (iii) (ii) (iv) v)
B. (i) (iii) (ii) (v) (iv)
C. (ii) (iv) (iii) (i) (v)
D. (ii) (v) (i) (iv) (iii)

21. Which one of the following pairs of planets consists of a planet that takes the shortest time and the longest time to go round the sun?
A. Venus and Neptune
B. Mercury and Neptune
C. Earth and Saturn
D. Jupiter and Mars

22. Clothes on a cloth line took too long to dry. The weather was most likely:
A. Dry and cold
B. Cold and dry
C. Dry and calm
D. Cold and calm

23. Which of the following bodies produce light?
A. Mars
B. Venus
C. Star
D. Moon

24. A jar used to measure rainfall should be?
A. Narrow
B. Wide
C. Short
D. Long
25. The diagram below shows an improved weather instrument. Which one of the following DOES NOT affect the accuracy of the instrument?
   A. The diameter of the funnel
   B. The diameter of the collecting jar
   C. The distance between the marking
   D. The material used to make the container

26. The diagram represents a weather instrument constructed by a group of pupil who made a mistake while constructing it. The mistake made during the construction was?
   A. Having scale reading from he bottom
   B. Closing the mouth of the bottle
   C. Having the container with coloured water open
   D. Using little amount of water

27. The following are features of a certain type of clouds;
   i. White in colour
   ii. Appear like bundles of cotton
   iii. Dark grey in colour
   iv. Mountainous in shape
Which pair of features is for nimbus clouds?
A. (i) and (ii)
B. (i) and (iv)
C. (ii) and (iii)
D. (iii) and (iv)

28. Which one of the following statements about a wind sock is true? A wind sock
A. Measures speed of wind
B. Shows the direction of wind
C. Shows the strength of wind
D. Works the same way as wind vane

29. The diagram below represents a windsock constructed by pupils.

A suitable material that can be used to make the part labeled Q is?
A. Sheet of metal
B. Manila paper
C. Polythene sheet
D. Piece of mosquito net
## Answers to
Model Revision Test Five

<table>
<thead>
<tr>
<th>Model Revision Test 5 Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
</tbody>
</table>
Specific Objectives
By the end of this topic, the learner should be able to:

• Identify types of feeds for livestock, different grazing methods and list the composition of balanced diet in animal feeding
• Name some internal and external parasite, state their effects on livestock and control of some livestock parasites and some human intestinal worms
• Explain how animals adapt to the environment
• Identify signs of ill health in livestock and state effects of ill health

Revision Notes 6

6.1 Animal Feeds and Methods of Grazing

There are many different types of animals starting from simplest with only a single cell to most highly develop like man. Animals are found in many places e.g. above and underground, in the soil and water etc. What animal is found where is determined by climate and food supply and geographical conditions

Types of feeds for livestock
Domestic animals kept for commercial purposes are called livestock. Examples of livestock are: Cows, Goats, Pigs etc. Their feeds include:

• Pastures
• Fodder crops
• Commercial feeds concentrates
a) *Pastures*

A pasture is a land set aside for grazing animals. Animals feed mainly on grass in pastures.


b) *Fodder Crops*

Fodder crops are crops grown in the garden for feeding animals. Examples are:

- Beef rots
- Mangoes
- Lucerne and Napier grass

c) *Concentrates of a Balanced Diet in Livestock*

A diet is said to be balanced when it contains: **protein, carbohydrates, vitamins, fats and oils.** The table below explains the food giving classes above.

*Table 6.1: Types of Concentrates*

<table>
<thead>
<tr>
<th>Type of food (Feeds)</th>
<th>Nutrients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lucerne, Disodium</td>
<td>Proteins</td>
</tr>
<tr>
<td>Beef roots, Mango</td>
<td>Carbohydrates</td>
</tr>
<tr>
<td>Cabbages, Maize stalk</td>
<td>Vitamins</td>
</tr>
<tr>
<td>Egg shells, Salt</td>
<td>Minerals</td>
</tr>
<tr>
<td>Sunflower</td>
<td>Fats and Oils</td>
</tr>
<tr>
<td>Green grass, Tough of water</td>
<td>Water</td>
</tr>
</tbody>
</table>
Methods of Grazing

Zero grazing/spall feeding
This is where the livestock is fed in confinement, food and water is given to the animal in stalls and tanks respectfully. Diagram

Herding
It is one of the traditional methods of grazing where by a person moves after the livestock controlling the areas of feeding. It is both tedious and uneconomical and coming to extinct.

6.2 Parasites, Effects and Control Measures
Parasites depend on others for food. Many worms are parasites.

Table 6.2: External and internal types Livestock Parasites

<table>
<thead>
<tr>
<th>Classification</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>External livestock parasites</td>
<td>Ticks, fleas and tsetse flies</td>
</tr>
<tr>
<td>found outside the bodies of animals</td>
<td></td>
</tr>
<tr>
<td>Internal</td>
<td>Roundworms, tapeworm and liver flukes</td>
</tr>
<tr>
<td>(found inside the bodies of animals)</td>
<td></td>
</tr>
</tbody>
</table>

Effects of Parasites on Livestock
- Loss of blood
- Loss of weight
- Low production
- May cause diseases e.g. sweating in calves
- Anemia brought by blood being sacked by these parasites
- May lead to death of the animal.

NB: it is very important to prevent our animals from being infected with parasites both internal and external as they have adverse effects on animals.
Control of Parasites

a) Control of Parasites in Livestock

Much is the need to control the livestock parasites if we are to benefit from these animals kept for commercial purposes.

Table 6.3: Methods and Activities involved in Controlling Parasites

<table>
<thead>
<tr>
<th>Method</th>
<th>Activity involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotational grazing</td>
<td>It involves grazing in an area then shifting to another where parasites are minimal or none at all and after sometime.</td>
</tr>
<tr>
<td>Dipping/spraying</td>
<td>Occasional spray or dip the animals to kill the parasite attached to the skin of the animals. This is done mostly after every 7 days by use of chemicals known as acaricides in water proportionally</td>
</tr>
<tr>
<td>Deworming</td>
<td>It involves administration of dosage of anti parasite chemicals through the mouth into the body of the animals to kill internal parasite such as: round worms, and tapeworm etc.</td>
</tr>
</tbody>
</table>

b) Control of Human Intestinal Worms

These walls of human intestines are more or less invested with worms which should be drenched out. Following are some of the methods of controlling human intestinal worms:

- Proper sanitation
- Flash the toilet
- Aerated latrine
- Wash raw food before eating
- Proper cooking
- Regular deworming
### 6.3 Adaptations of Animals and Birds

**Table 6.4: Adaptation of Animals on Feeding**

<table>
<thead>
<tr>
<th>Type of animal</th>
<th>Adaptation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herbivores e.g.</td>
<td>They feed on plant and have diastema (they lack lower front teeth). They have strong tongue to hold firmly leaves and small branches into their mouth.</td>
</tr>
<tr>
<td>cattle, goats &amp;</td>
<td></td>
</tr>
<tr>
<td>sheep</td>
<td></td>
</tr>
<tr>
<td>Carnivores e.g.</td>
<td>They feed only on flesh. They have strong jaws and canines to enable them to tear flesh.</td>
</tr>
<tr>
<td>dog &amp; lion</td>
<td></td>
</tr>
<tr>
<td>Omnivores e.g.</td>
<td>They feed on both animals and plants.</td>
</tr>
<tr>
<td>man</td>
<td></td>
</tr>
<tr>
<td>Birds</td>
<td>They feed on grains and others on flesh.</td>
</tr>
<tr>
<td>Earthworm</td>
<td>They feed on both dead plants and animals.</td>
</tr>
</tbody>
</table>

**Table 6.5: Adaptation of Feeding of Birds**

<table>
<thead>
<tr>
<th>Type of bird</th>
<th>Diagram</th>
<th>Adaptation to Feeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grain eaters</td>
<td><img src="image" alt="Chicken" /></td>
<td>They have short and pointed beak for peaking grains e.g. maize, wheat, and millet etc.</td>
</tr>
<tr>
<td>e.g. Chicken</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filter eaters</td>
<td><img src="image" alt="Duck" /></td>
<td>Their beak made for shoving or sieving what is in the water or mud which can be eaten.</td>
</tr>
<tr>
<td>e.g. duck</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flesh eaters</td>
<td><img src="image" alt="Eagle" /></td>
<td>They have sharp and strong beaks for cutting and tearing the flesh.</td>
</tr>
<tr>
<td>e.g. eagle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nectar feeder</td>
<td><img src="image" alt="Sunbird" /></td>
<td>They have slender, sharp and long beak such that it can go through the flower stalk to collect the nectar.</td>
</tr>
<tr>
<td>e.g. sun bird</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 6.4 Signs and effects of ill health in Livestock

**Table 6.6: Signs and Effects of Ill-health in Livestock**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signs</td>
<td>• Stagnant growth</td>
</tr>
<tr>
<td></td>
<td>• Loss of weight brought about by inability to eat</td>
</tr>
<tr>
<td></td>
<td>• The expected yields is drastically reduced</td>
</tr>
<tr>
<td></td>
<td>• The skin coat becomes rough</td>
</tr>
<tr>
<td></td>
<td>• Dry coughing</td>
</tr>
<tr>
<td></td>
<td>• Blood stains found in the stool</td>
</tr>
<tr>
<td>Effects</td>
<td>• Evident of low yields e.g. milk production in case of daily cows</td>
</tr>
<tr>
<td></td>
<td>• Reduced quality of products e.g. in case of beef cattle the quality of meat and hides is poor</td>
</tr>
<tr>
<td></td>
<td>• Diseases may be transmitted from sick animals to the human beings.</td>
</tr>
<tr>
<td></td>
<td>• Another load effective would be death of both human and animals</td>
</tr>
</tbody>
</table>
1. Which one of the following is TRUE about ALL insects?
   A. Have wings
   B. Breath through spiracles
   C. Have proboscis
   D. Have no limbs

2. Which of the following is TRUE about reptiles and amphibians?
   They have
   A. Scales
   B. Gills
   C. Varying body temperature
   D. External fertilization

3. The diagram below shows a beak of a certain bird.
   The bird MOST LIKELY feeds on?
   A. Fish
   B. Seeds
   C. Nectar
   D. Insects

4. One of the following insects DOES NOT undergo the stages of egg, larva, pupa and adult
   A. Bee
   B. Mosquito
   C. Housefly
   D. Locust
5. Below is a chart showing classification of some animals. Which of the following were used in classification?

A. Body covering and food chain
B. Food eaters and type of food
C. Body covering and type of food
D. Number of legs and type of movement

6. Which one of the following insects undergoes stages of egg, nymph and adult?
   A. Wasp
   B. Tsetse fly
   C. Butterfly
   D. Cockroach

7. Most birds raise their feathers on cold days. The possible reason for this is?
   A. Generate heat
   B. Allow air to escape from their bodies
   C. Avoid losing heat from their bodies
   D. Allow distribution of heat

8. Birds that feed on grains have beaks that are;
   A. Short, strong and cupped
   B. Short, strong and curved
   C. Long, sharp and pointed
   D. Strong, short and straight
9. Which one of the following is not a correct statement about adaptation in animals?
   A. Crocodiles have saw-like teeth to help them hold their prey firmly
   B. Cheetahs have sharp curved claws to help them catch their prey
   C. Eagles have strong, curved beaks to help them catch their prey firmly
   D. Snakes have fangs to hold their prey firmly

10. In the feeding relationship, mice belong to the same group as
   A. Lions
   B. Snakes
   C. Antelopes
   D. Vultures

11. The below diagram shows a beak of a certain bird.
   The bird MAY LIKELY feed on?
   A. Insects
   B. Flesh
   C. Nuts
   D. Grain

12. The diagram below represents a foot of a certain bird?
   Which of the following beaks belong to the same bird?
13. Which one of the following insects DOES NOT undergo the stages of egg, larva, pupa and adult?
   A. Wasp
   B. Locust
   C. Bee
   D. Moth

14. Which one of the following destroys wool in sheep?
   A. Mites
   B. Lice
   C. Fleas
   D. Ticks

15. The toothless gap in the lower jaw of herbivores is for?
   A. Turning plant materials in the mouth for proper chewing
   B. Allowing space for more food
   C. Holding food materials
   D. Preventing the animals from biting their tongue

16. Which one of the following has the same number of legs as ticks?
   A. Cockroach
   B. Crab
   C. Scorpion
   D. Weevil

17. Which one of the following is filter feeder?
   A. Sunbird
   B. Hawk
   C. Duck
   D. Kingfisher
18. Which one of the following is not an immediate sign of ill-health in livestock?
   A. Blood in stool
   B. Coughing
   C. Rough coat
   D. Loss of weight

19. A student gave the following reason as to why dairy cattle are given commercial feeds.
   i). To increase milk production
   ii). Given to cattle under zero grazing
   iii). To supplement other feeds
   iv). Only when fodder crops and pastures are not available.
Which two reactions are correct?
   A. (i) and (ii)
   B. (ii) and (iii)
   C. (i) and (iv)
   D. (ii) and (iv)

20. Which of the following is true for both chicken and frogs? Both
   A. Feed on insects only
   B. Have scales
   C. Breath by lungs
   D. Have constant blood temperature

21. Which of the following is NOT a rotation as method of grazing?
   A. Strip
   B. Herding
   C. Tethering
   D. Paddocking

22. Birds which feed on nectar have;
   A. Long slender pointed beaks
   B. Strong curved beaks
   C. Short pointed beaks
   D. Long slender curved beaks
23. Which of the following description of beaks would be for a bird that MOST likely feeds on nectar?
   A. Long and straight  
   B. Long and curved  
   C. Short and curved  
   D. Short and straight

24. Which of the following is NOT a rotational grazing?
   A. Herding  
   B. Strip  
   C. Tethering  
   D. Paddocking

25. Which one of the following pairs consists of only animals that have webbed feet?
   A. Hippopotamus and toad  
   B. Turkey and crocodile  
   C. Kingfisher and flamingo  
   D. Frog and duck

26. Which of the following is NOT a mammal?
   A. Hippopotamus  
   B. Bat  
   C. Whale  
   D. Shark

27. Which one represents the correct order of stages in the life cycle of a butterfly?
   A. Adult to Egg to Larva to Pupa  
   B. Egg to Pupa to Larva to Adult  
   C. Egg to Larva to Pupa to Adult  
   D. Adult to Egg to Pupa to Larva

28. Some small animals were observed and grouped by standard five pupils. Which one of the following was correctly grouped?
   A. Ant, tick, spider  
   B. Beetle, moth, ant  
   C. Spider, weevil, beetle  
   D. Tick, moth, weevil
29. Which one of the following statements about vertebrates is true?
   A. Fish and amphibians have scales
   B. Amphibians and reptiles lay their eggs on land
   C. and birds have constant body temperature
   D. Reptiles and birds lay fertilized eggs

Answers to
Model Revision Test Six

Answers to Model Revision Test 6

|   |   |   |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 1 | B | 6 | C | 11 | A | 16 | C | 21 | B | 26 | D |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 2 | C | 7 | C | 12 | D | 17 | C | 22 | D | 27 | C |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 3 | A | 8 | D | 13 | B | 18 | D | 23 | B | 28 | B |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 4 | D | 9 | D | 14 | A | 19 | A | 24 | A | 29 | D |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 5 | B | 10 | C | 15 | A | 20 | C | 25 | D |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

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6 Animals Unit 6 Answers
Revision Notes 7

7.1 Causes, Symptoms and Preventive Measures of Waterborne Diseases

- Waterborne Diseases are brought about by taking contaminated water Examples are: Cholera, Typhoid, Bilharzias.
- Waterborne Diseases are caused by tiny living things (bacteria, virus, protozoa, and amoeba) in contaminated water.

Signs and Symptoms of Waterborne Diseases

Table 7.1: Signs and Symptoms of Waterborne Diseases

<table>
<thead>
<tr>
<th>Waterborne Disease</th>
<th>Signs and Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholera</td>
<td>Stomachache, vomiting, muscle pains, loose stool, diarrhea.</td>
</tr>
<tr>
<td>Typhoid</td>
<td>Fever, weakness, stomach, headache, constipation, low heart beat.</td>
</tr>
<tr>
<td>Bilharzias</td>
<td>Abdominal pain, diarrhea, coughs, fever, fatigue.</td>
</tr>
</tbody>
</table>
**Measures to Prevent Waterborne Diseases**

*Table 7.2: Measures of Preventing Water-borne Diseases*

<table>
<thead>
<tr>
<th>Measure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiling water</td>
<td>Drinking water should be boiled to kill tiny living things called germs which may be in the water.</td>
</tr>
<tr>
<td>Use of chemicals</td>
<td>Water must be properly treated for safe use in homes holds and towns e.g. use of waterguard or chlorine.</td>
</tr>
<tr>
<td>Proper protective devices</td>
<td>They must be worn while handling stagnant water which is in most cases contaminated</td>
</tr>
</tbody>
</table>

7.2 Water pollution, its effects and control measures

**Water pollution**

Water pollution may mean interference with the make up of water by foreign bodies. There are many ways in which water can be polluted e.g. by:

- Inorganic matter, Organic matter, Waste water, Oil, Silt etc.

**Effects of Water Pollution**

*Table 7.3: Effects of Water pollution*

<table>
<thead>
<tr>
<th>Effect</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>On plants</td>
<td>Soil from eroded areas is brought to the surface of the oceans by the rivers. This muddy water kills marine plants e.g. mangroves, and polyps which form <strong>corals</strong></td>
</tr>
<tr>
<td>On aquatic organisms</td>
<td>Untreated sewage containing organic matter at times is channeled into the rivers. It is composed by bacteria. The bacteria use much oxygen such that there is not enough for the fish and other aquatic organisms for they suffocate and die.</td>
</tr>
<tr>
<td>On soil</td>
<td>Fertile soil for crops is washed away into the rivers and oceans. This can be termed as soil erosion.</td>
</tr>
</tbody>
</table>
7.3 Water Conservation and its Importance

**Water Conservation**

Even though water is much on earth, only one percent is there as fresh water. No life is possible without water hence the need to conserve water.

*Table 7.4: Ways of conserving water*

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harvesting</td>
<td>It involves collecting rain water falling on sloping sheets (<em>mabati</em>) and then reserved e.g. stored water in tanks. Earth dams are constructed on seasonal rivers to trap water to be used during famine.</td>
</tr>
<tr>
<td>Recycling</td>
<td>Water from factories can be recycled to make it safe for some other good use e.g. through distillation.</td>
</tr>
<tr>
<td>Proper utilization</td>
<td>Use of mulching and shading, around the plant to avoid much evaporation. Watering plants individually, not sprinkling the whole area. Also water should be stored in dams during the rainy season so that if it can be used later when it is dry.</td>
</tr>
<tr>
<td>Re-using</td>
<td>It involves utilizing used water in another activity that is favourable to our environment e.g. using water used for washing clothes to water plants.</td>
</tr>
</tbody>
</table>

7.4 Soft and Hard Water

- Water which is natural contains no mineral salts and is hardly found because most of the common sources of water i.e. rain, dams, rivers, boreholes or wells, lakes and oceans have mineral salts. When rain water gets into the soil, mineral salts dissolves in addition to what had been already dissolved during the
rainfall i.e. gases and dust particles present in the air.

- Water that contains large amounts of salts is **hard water** while that contains little or no dissolved salts is called **soft water**. So, content of mineral salts in water differentiate soft water from hard water.

- Another difference between hard and soft water is that soap lathers easily in soft water than hard water. Hard water can be softened by chemicals and in some cases by boiling. Main disadvantages of hard water is that it cannot do pass through the filter.

**Disadvantages of Hard water**

- It is wasteful to use hard water in laundry work because a lot of soap is used since soap does not lather easily. This leads to a lot of energy and time wastage.
- It discolourises white garments and also can deposit whitish particles on the coloured garment. This because scum is formed during washing and even when rinsing garments after washes with hard water.
- Water boilers and kettles get discoloured in the inside when used to boil water.
- It causes clogging of pipes. Pipes especially those used to transport hard water get blocked in areas of hard water especially when in long time, mineral salts in the hard water react with the inside of the pipe to form a chemical substance that is deposited on the inside of the pipe. This substance is called **scale** which appears as a coat inside the pipe. Scale clogs the pipe and so interferes with the water heating system of a building. The water thus takes long to be heated and this way a lot of heat is wasted.

**Softening Hard Water**

It is the activities in which mineral salts are removed from water are called softening. The mineral salts contained in water contain various chemical substances.
Some of these substances cause permanent hardness while others temporary hardness of water.

**Methods**
There are several methods involved in softening of hard water and what each method does is basically to remove the mineral salts. These methods include:
- Boiling hard water
- Distillation
- Lime softening

*Softening hard water by boiling*

Softening of hard water by boiling may be illustrated by the activity below.

**Table 7.5: Softening Hard Water by boiling**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Apparatus</strong></td>
<td>• Some water from a hard water source e.g. bore hole or a well.</td>
</tr>
<tr>
<td></td>
<td>• Source of heat</td>
</tr>
<tr>
<td></td>
<td>• A container e.g. aluminum sufuria</td>
</tr>
<tr>
<td></td>
<td>• A bar of soap</td>
</tr>
<tr>
<td></td>
<td>• Two basins</td>
</tr>
<tr>
<td><strong>Procedure/method</strong></td>
<td>• The water is divided into two equal amounts and some put in the aluminum sufuria and the other into the basin.</td>
</tr>
<tr>
<td></td>
<td>• The water in the aluminium sufuria is boiled, then poured into the other basin and allow it to cool. The sufuria is used to boil is observed inside.</td>
</tr>
<tr>
<td></td>
<td>• Use soap to lather with cool boiled water and the unboiled water. Observations recorded.</td>
</tr>
</tbody>
</table>
Observations
It may have been observed that the inside of the sufuria used to boil the water is stained. This is scale.

Conclusion
When water is boiled, the mineral salts present in the water are broken and are deposited in the container used for boiling as scale and this way the water becomes soft. This is why it was found that it was easier to form lather with cool boiled water. This shows that boiling is a simple method of softening hard water.

Model Revision Tests 7

1. The diagram below represents a set up that can be used to demonstrate a certain process.

   ![Diagram of a set up with a heat source, sand, and water in a glass jar.]

   The process that was demonstrated is?
   A. Convection
   B. Radiation
   C. Diffusion
   D. Condensation

2. Students were provided with liquids P, Q, R, S and T that were either neutral or acidic. They were asked to mix two liquids at a time and use hibiscus flower juice to test whether the mixture was acidic or not. The results obtained are as shown in the table.
3. Mixture Change

<table>
<thead>
<tr>
<th>Mixture</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>P + Q</td>
<td>Red</td>
</tr>
<tr>
<td>P + R</td>
<td>No change</td>
</tr>
<tr>
<td>R + S</td>
<td>Red</td>
</tr>
<tr>
<td>R + T</td>
<td>No change</td>
</tr>
<tr>
<td>P + T</td>
<td>No change</td>
</tr>
<tr>
<td>Q + T</td>
<td>Red</td>
</tr>
<tr>
<td>Q + R</td>
<td>Red</td>
</tr>
</tbody>
</table>

Which two liquids were acidic?
A. R and T
B. Q and S
C. T and S
D. P and Q

4. A solid was immersed in water in an overflow can. The water that overflowed was collected in a container as shown in the diagram below.

The amount of water collected in the container represented the solids’?
A. Weight
B. Density
C. Mass
D. Volume

5. Using a base as an indicator, the strength of an acid can be determined by
A. The time it takes the indicator to change colour
B. The colour of the indicator
C. The density of the colour change with the indicator
D. The number of drops required to change the indicator
6. Below is a diagram representing a can which can be used to raise water from a well.

Which of the following should be done to reduce the number of turns made by the handle to raise water to the same height? Increase the
A. The diameter of the axle
B. Number of coils
C. Length of the handle
D. Width of the rope

7. A funnel was tightly fixed onto the mouth of a bottle using plasticine. Water was then poured into the funnel. The set up is shown in the diagram below.

Which of the following will make the water flow into the bottle smoothly?
A. Making a hole in the plasticine
B. Adding more water in the funnel
C. Shaking the bottle
D. Stirring the water in the funnel

8. The diagram below shows set up that was used to investigate conditions necessary for rusting.

P

Q

R

S
After some days, rusting occurred in
A. P and S
B. Q and R
C. P and R
D. S and P

9. Some amount of water was put in a tin can and was heated to boil. The tin can was used, then closed and left to cool. The experiment was used to demonstrate that air?
A. Contracts on cooling
B. Exerts pressure
C. Occupies space
D. Has weight

10. Liquid X is denser than liquid y. liquid X is less dense than liquid Z. The three liquids do not mix. Which of the following diagrams below correctly represents what will be observed when equal amount of the three liquids are mixed in a jar?

![Diagrams]

11. Which one of the following factors DOES NOT affect the rate of evaporation of a liquid?
A. Amount of liquid
B. Temperature
C. Surface area
D. Air movement
12. A burning candle was fixed onto the plate and some water added to the plate in the experiment. A glass jar was then inverted over the burning candle. The set up is as shown in the diagram below.

Which one of the following will eventually happen?
A. Water will enter the jar
B. Amount of air inside the jar will increase
C. Pressure in the jar will increase
D. Amount of carbon dioxide in the jar will decrease

13. Identical containers containing water and labeled P, Q, and R were balanced as shown in the diagram below.

Which of the following statements is correct?
A. Q and R each contains half as much water as P
B. P, Q and R contains the same amount of water
C. P contains three times the amount of water in Q
D. Q and R contains twice as much water as P
14. A student immersed a small container filled with soil into a basin of water. Bubbles were observed. Which of the following explains the observation made?
A. Small animal in the soil
B. Soil reacts with water
C. Soil contains air
D. Water contains air

15. A group of pupils wanted to compare the rate at which water rises up in the soil. They set up their apparatus as shown in the diagram below.

From the results observed by the students, the correct conclusion could not be made because students;
A. Placed tubes in the same basin
B. Used identical biro pens
C. Used equal amounts of soil in both biro tubes
D. Used same type of soil

16. Which of the following explains why flowing water moves objects?
A. Has energy of movement
B. Is a liquid
C. Has potential energy
D. Carries less dense objects only
17. Which of the following aspects of a given object DOES NOT affect
sinking or floating of the object?
A. Shape  
B. Size  
C. Material  
D. Weight

18. A purple flower extract was added to substance K, L, M and N to
find out whether they were acids or bases. The results are shown in
the table below.

<table>
<thead>
<tr>
<th>Substance</th>
<th>Colour change</th>
<th>Which two substances react to form a salt and water only?</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>Pink</td>
<td>A. L and M</td>
</tr>
<tr>
<td>L</td>
<td>Blue</td>
<td>B. K and M</td>
</tr>
<tr>
<td>M</td>
<td>No change</td>
<td>C. K and L</td>
</tr>
<tr>
<td>N</td>
<td>Pink</td>
<td>D. M and N</td>
</tr>
</tbody>
</table>

19. The below diagram represents an instrument which has been
improvised so that it can be used to measure room temperature.

The working of the instrument is based on fact that:
A. Liquids rise in narrow tubes  
B. Gases exert pressure  
C. Liquids expand when heated and contract when cooled  
D. Gases expand when heated and contract when cooled
20. A bottle made of plastic material was placed in a carton as shown in the diagram below. The bottle was filled with hot water. Which one of the following would help keep the water hot for a longer time?

A. Using a metal box instead of a cotton  
B. Putting a lining of aluminium foil around the carton  
C. Using black insulting material  
D. Using insulating material with large air spaces

21. Equal amounts of liquids were put in pairs in four identical containers to perform an experiment as follows:
   i. Kerosene and pure water.  
   ii. Salty water and kerosene  
   iii. Pure water and engine oil  
   iv. Methylated spirit and engine oil

A flesh egg was then placed in each container. In which container would the egg not sunk too the bottom?

A. (i)  
B. (ii)  
C. (iii)  
D. (iv)

22. Which of the following is of most important to consider when choosing a method to separate a mixture of a liquid and solid  
A. Mass  
B. Volume  
C. Shape  
D. Density
23. Which of the following is NOT a definite for liquids?
   A. Shape
   B. Density
   C. Mass
   D. Volume

24. One metre of a piece of wood floats on water while one centimeter long piece of iron rod sinks. This is because of difference in?
   A. Length
   B. Materials
   C. Weight
   D. Shape

25. Below is an improved liquid thermometer.

   Which of the following improvements would make the instrument measure smaller changes in temperature?
   A. Making the straw narrower
   B. Using a larger bottle
   C. Using a plastic bottle
   D. Colouring the water

26. Which of the following activities is correct when comparing the strength of acids in fruit juices to ash solution add;
   A. Indicator and then fruit juice drop by drop
   B. Equal amounts of juice and indicator
   C. Equal amounts of fruit juice and then indicator drop by drop
   D. Fruit juice and then indicator drop by drop
27. The diagram below represents a set up that is used to demonstrate certain property of air.

The demonstration shows that air:
A. Exerts pressure
B. Has weight
C. Occupies space
D. Absorbed in water

28. A glass containing ice cubes was placed in the open, after sometime the outer surface of the glass become wet. This shows that;
A. Air contains water vapour
B. Air can be cooled
C. Ice melts to form water
D. Air is a mixture of gases

29. Which one of the following is not required when finding the density of a regular solid?
A. Spring balance
B. Ruler
C. Overflow can
D. String

30. Which of the following statements about water is true?
A. Water has definite size
B. Water mixes with all liquids
C. Water has definite shape
D. Water is a good conductor of heat

31. Which one of the following DOES NOT affect floating and sinking of objects?
A. Shape
B. Size
C. Density
D. Weight
32. Which of the following substances will form salt and water only when mixed with an acid?
   A. Ash solution
   B. Chalk powder
   C. Cloves juice
   D. Magadi salt

33. Which one of the following is a method of softening hard water?
   A. Sieving
   B. Boiling
   C. Decanting
   D. Filtering

34. Which ONE of the following liquids mix?
   A. Cooking fat and milk
   B. Water and milk
   C. Kerosene and water
   D. Milk and kerosene

35. Which one of the following is the last step when separating a mixture of sand and salt?
   A. Decanting
   B. Dissolving
   C. Evaporating
   D. Filtering

36. The following are liquids added together in glass bottles labeled P, Q, R and S by some pupil.
   i. P - kerosene and cooking oil
   ii. Q - water and cooking oil
   iii. R - milk and water
   iv. S - milk and kerosene
Which glass bottle contains liquids that cannot be separated by
decanting?
A. P  C. R
B. Q  D. S

37. A bucket made up of steel weighing 100g floats on water while a
nail made up of iron weighing 50g sinks. This is because of
difference in;
A. Mass  C. Type of material
B. Shape  D. Volume

38. Which one of the following materials will NOT be required in an
experiment to show that pressure in liquids increases with increase the
depth?
A. Water
B. Tin can
C. Nail
D. Collecting jar

39. A farmer noticed small and shallow channels forming in the soil in
the garden due to raining water. This type of soil erosion is called:
A. Gulley
B. Rill
C. Splash
D. Sheet

40. The reason why coloured liquid in the construction of thermometer
is to
A. Make it visible
B. Decrease density
C. Make it absorb heat
D. Make it expand faster

41. Which of the following factors will NOT affect sinking and floating
of materials in water? the
A. Shape of the material
B. Mass of the material
42. When sand particles are put in a glass of cold water and heated at the bottom. The particles are seen to rise and fall. This is because sand particles
   A. Are carried by hot water which comes down on cooling
   B. And water rise when heated and come down on cooling
   C. Become lighter than water when heated
   D. Rise when heated and come down on cooling

43. The MOST appropriate method of separating a mixture of sand and salt after addition of water is
   A. Evaporating
   B. Sieving
   C. Filtering
   D. Decanting

44. The following are methods of separating mixtures.
   i. Picking
   ii. Filtering
   iii. Decanting
   iv. Sieving
   Which two methods are suitable for separating a mixture of water and sand?
   A. (ii) and (iv)
   B. (I) and (iv)
   C. (ii) and (iii)
   D. (i) and (iii)

45. Which one of the following is away of controlling water pollution?
   A. Recycling sewage water
   B. Using water sparingly
   C. Reusing domestic water for irrigation
   D. Storing water in dams
46. Which of the following activities can be used to demonstrate rill erosion?
   A. At different positions of a slanting soil surface
   B. On a flat surface using a tin with many holes
   C. In channels of soil on a slanting surface
   D. On flat surface of soil

47. Which one of the following will make a aluminium foil that was floating on water sink?
   A. Making holes on the aluminium foil
   B. Rolling the aluminium foil into a tube
   C. Increasing the amount of water
   D. Crushing the aluminium foil into a ball

48. A bowl made of iron may float when placed on water because of its
   A. Shape
   B. Size
   C. Weight
   D. Density

49. The diagram below shows how a liquid flows out of a can with holes at the bottom.

Which of the following will make the liquid flow out smoothly?
   A. Making another hole at the top
   B. Shaking the can
   C. Increasing the size of the hole
   D. Raising the container to a higher level
50. The chart below represents a simple classification of liquids.

Which liquids are represented by P and Q?

<table>
<thead>
<tr>
<th></th>
<th>P</th>
<th>Q</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Methylated spirit</td>
<td>Milk</td>
</tr>
<tr>
<td>B</td>
<td>Engine oil</td>
<td>Methylated spirit</td>
</tr>
<tr>
<td>C</td>
<td>Cooking oil</td>
<td>Milk</td>
</tr>
<tr>
<td>D</td>
<td>Turpentine</td>
<td>engine oil</td>
</tr>
</tbody>
</table>

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**Answers to**

**Model Revision Test Seven**

<table>
<thead>
<tr>
<th>Model Revision Test 7 Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td>9</td>
</tr>
<tr>
<td>10</td>
</tr>
</tbody>
</table>

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7 Water Unit 7 Answers
UNIT 8
SOIL

Specific Objectives
By the end of this topic, the learner should be able to:

- Explain soil erosion and identify types of soil erosion
- Explain the meaning of fertilizers and classify two types
- Explain the meaning of manures and different types
- State the advantages and disadvantages of manures and fertilizers.

Revision Notes 8

8.1 Soil Erosion and Types

- Soil being so important to us, let’s see what it is meant by the term soil erosion and the agents/types of soil erosion. Many animals live in the soil and human beings grow food crops on soil.
- Soil erosion is the washing away of the covering top soil by agents like water and wind.
- Agents of Soil Erosion include wind, water and animals.

Types of Soil Erosion

There are different types of soil erosion.
Table 8.1: Types of Soil erosion

<table>
<thead>
<tr>
<th>Types</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Splash soil erosion</td>
<td>This is caused by the falling water droplets making small holes.</td>
</tr>
<tr>
<td>Sheet soil erosion</td>
<td>This is the removal of the thin uniform layer off the top by either wing or water</td>
</tr>
<tr>
<td>Rill soil erosion</td>
<td>Running water removes top soil to form small channels called <strong>rills</strong>.</td>
</tr>
<tr>
<td>Gulley soil erosion</td>
<td>This occurs when more water run carrying soil from the rills thus widening the channels to form gullies as shown in the diagram below.</td>
</tr>
</tbody>
</table>

8.2 Meaning of Fertilizers and Types

Soil fertility is the ability of soil to produce high yields for a long time. It is affected by soil erosion. The fertility of the soil must be improved by use of either fertilizers or manures.

The soil has to be fertile to maintain high production of crop i.e. the soil has to be rich in nutrients to be absorbed by the plants through roots.

Soil that have lost their fertility are improved by adding organic or inorganic substances known as fertilizers which are grouped into natural fertilizers or artificial (chemical) fertilizers.

Types of Fertilizers

Fertilizers are artificial manures. They are manufactured chemicals which supply nutrients into the soil to be absorbed by the plants through roots. They are classified according to the nutrients they supply supply as follows:

- Straight fertilizers
- Compound fertilizers
a) **Straight fertilizer**
Straight fertilizers contain only one macronutrient which may be nitrogen, phosphorous, or potassium. Note that the fertilizers is named according to the nutrient it contains.

<table>
<thead>
<tr>
<th>Fertilizer</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen fertilizers</td>
<td>Nitrogen nutrients.</td>
</tr>
<tr>
<td>Potassium fertilizers</td>
<td>Potassium nutrients.</td>
</tr>
<tr>
<td>Phosphoric fertilizers</td>
<td>Phosphorus nutrients.</td>
</tr>
</tbody>
</table>

**Table 8.2: Examples of Straight Fertilizer**

b) **Compound fertilizers**
Compound fertilizers contain two or three macronutrients. They are also called mixed fertilizers.

### 8.3 Meaning of Manures and Different Types
Manures are added to the soil to provide plant nutrients. Manures are also known as **natural** or **organic fertilizers**. They are classified according to the method of preparation and the materials used in the preparation. Different types of manures include the following:

a) Green manure
b) Farm manure (FYM)
c) Compost manure
d) Organic manure
a) Green manures
Green manures are prepared from green plants such as crops mainly grown for this purpose are cut before flowering, chopped into the smaller pieces and ploughed into the soil where they decompose and rot in the soil.
The plants used to prepare green manures must have a lot of leaves i.e. they must be leafy and they include the following: maize, sorghum, nappier grass and plants that are leguminous e.g. cowpeas, beans, sunflower and lucern which are able to grow quickly, rot quickly and contain a high amount of nitrogen.

b) Farm/ animal manures (FYM)
This type of manure is made from animal waste such as urine, dung, poultry dropping and animal beddings e.g. layers of grass, wood shavings or sawdust are a good source of plant nutrient since they add organic matter to the soil. These type manures should not be exposed to the direct rain or sunshine because this way they lose the nutrients.

c) Compost manure
This is a mixture of plants i.e. decayed leaves and peeling from vegetables from kitchen before and leftovers and animal waste. This manure is used to improve soil fertility preparation of compost manure is by pilling plant materials in heap or pit in areas which are not wet. The compost heap is decomposed by activities of bacteria. Fast decomposition is encouraged by:
- Keep the heap moist but not wet
- Add layer of decayed materials rich in bacteria e.g. farm yard manure
- Add a layer of top soil to introduce decomposers in the heap
- Cover the heap at least for three or four weeks so that air can circulate freely.
8.4 Advantages and Disadvantages of using Manures and Fertilizers

Advantages
Since plants need both inorganic and organic manures, below is a list of advantages in the use of organic manures and fertilizers:

- High rate of crop growth results.
- High quality of crop yields.
- Leads to growth of plants that are deep green in colour.
- Increase in size of seed, grain and fruit.
- Strengthen the plant stem that supports the plant.
- Provide necessary nutrients for growth and development of crops.
- Leads to quick ripening of fruits.
- Encourages vegetative growth of crops e.g. kale, cabbage and lettuce where the leaves are harvested.
- Improved the circulation of the air in the soil.
- Releases nutrients to the soil.
- Builds the soil particles.
- Improves the ability to hold water.

Disadvantages

- The leaves get burnt by the fertilizers when they fall on them when meant to be applied on the soil.
- Green manure is expensive to prepare. Most of the farmers grow food crops in their farms and would not like to cut down the crops before maturity so that they can plough them into the soil.
- Green and compost manures take time to decompose thus a delay in planting.
- Bacteria decomposing the materials when preparing manure use the nutrients from the decaying materials and they release these nutrients when they die.
- Crops grown for green manures use most of the water in the soil and leave little for the plants to be planted.
- If the plants do not use them immediately, inorganic manures will pollute the environment.
• If applied in large quantities, some of manures and fertilizers burn (scorch) plants.
• Some fertilizers absorb water in the atmosphere if exposed and stick together.
• Some fertilizers are corrosive and so can affect the hands of users if handled with bare hands.
• Some fertilizers evaporate and escape into the atmosphere when exposed to the sunlight.

Model Revision Test 8

1. Which one of the following determines the rate at which water drains through the soil?
   A. Size of soil particles
   B. Air content of the soil
   C. Mass of the soil
   D. Humus content of the soil

2. The below set ups were set to determine capillarity of soil samples E, F, G and H.
The correct conclusion can not be drawn from the results of this experiment because
A. Soil types are different
B. Tubes were of different sizes
C. Tubes were placed in different troughs
D. Troughs were of different sizes

3. Which of the following has ALL the necessary conditions for germination of a seed?
   A. Water, warmth and light
   B. Air, warmth and water
   C. Soil, water and air
   D. Warmth, light and soil

4. A group of pupils wanted to compare the rate at which water rises up in soils. They set up apparatus as shown below.

From the results obtained by the pupils, the correct conclusion could not be made because pupils
A. Used identical biro tubes
B. Used equal amounts of soil in both biro tubes
C. Placed both tubes in the same basin
D. Used same type of soil
5. Which of the diagrams below represents the correct set up that is used to compare drainage of water in different types of soils?

![Diagram A]

A. Water
B. Soil
C. Cotton wool

6. The soil that drains water faster?
   A. Has smooth texture
   B. Has small air spaces
   C. Has poor capillarity
   D. Cracks when dry

7. The soil that can be used to make long ribbons?
   A. Cracks when dry
   B. Low capillarity
   C. Has large air spaces
   D. Rough texture

8. When a transparent bottle filled with garden soil and water is added and shaken then left to settle (stand). The layers are formed according to?
   A. Density of components
   B. Mass of components
   C. Size of components
   D. Amount of water
9. Which of the following NEED NOT to be the same when investigating drainage of different types of soil?
   A. Amount of water added to the funnels
   B. Size of the funnels
   C. Size of the bottle collecting the draining water
   D. Amount of soil in the funnel

10. The following are effects of soil erosion.
    i. Small holes on the ground
    ii. Top layer of the soil missing
    iii. Small and shallow channels in the ground
    iv. V-shaped trenches on the ground
    Which effects are as a result of splash and rill types of erosion?
    A. (i) and (iv)  
    B. (i) and (iii)  
    C. (ii) and (iii)  
    D. (ii) and (iv)

11. The texture of a soil type depends on?
    A. Organic matter in the soil
    B. Amount of water in the soil
    C. Amount of mineral particles in the soil
    D. Size of particles in the soil

12. Class six pupils added equal amounts of water to three equal amounts of soil samples J, K and L in the funnels as shown in the diagrams below.

![Diagrams showing water draining through different types of soil samples J, K, and L.](image-url)
After 10 minutes, the pupils measured the amount of water that had drained through each soil sample.

<table>
<thead>
<tr>
<th>Soil sample</th>
<th>J</th>
<th>K</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount of water collected (cm³)</td>
<td>28</td>
<td>19</td>
<td>33</td>
</tr>
</tbody>
</table>

Which one of the following statements is a CORRECT conclusion from the results obtained?
A. K has larger particles than L
B. J has larger particles than L
C. K has larger particles than J and L
D. L has larger particles than J and K

13. Which one of the following statements is NOT true about manures?
   They
   A. Improve the ability of soil to hold water
   B. Bind soil particles together
   C. Release nutrients fast to the soil
   D. Improve air circulation in the soil

14. Which of the following ways of improving soil fertility will take the longest time for plants to get nutrients? When using
   A. Compost manure
   B. Compound fertilizers
   C. Farm yard manure
   D. Green manure

15. Which of the following was being investigated by the pupils when they carried out an activity of feeling samples of soil using their figures?
   A. Texture
   B. Soil capillarity
   C. Presence of water in the soil
   D. Presence of small animals in the soil
16. Which one of the following practices helps to conserve soil by preventing soil erosion?
   A. Crop rotation
   B. Use of manure
   C. Mulching
   D. Planting cover crops

17. Which one of the following NEED NOT to be the same when comparing capillarity in different types of soil?
   A. Diameter of the tubes
   B. Amount of each type of soil
   C. Time allowed for the experiment
   D. Amount of water used

18. Which one of the following soil components is LEAST affected when soil in a container is heated?
   A. Air
   B. Water
   C. organic matter
   D. Mineral salts
Answers to

Model Revision Test Eight

<table>
<thead>
<tr>
<th>Model Revision Test 8 Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
</tbody>
</table>

8 Soil Unit 8 Answers
Specific Objectives
By the end of this topic, the learner should be able to:

- Describe traditional and modern methods of preserving food:
  - Smoking, Salting, Drying, Use of honey
  - Use of low temperatures, Canning
- Name causes of food poisoning and how to prevent food poisoning
- Identity nutritional requirements for special groups

Revision Notes 9

9.1 Traditional and Modern Methods of Preserving Food

Food is any thing taken by an organism to yield energy, growth, and repair without harming it. There are traditional and modern methods that are used to preserve food (especially for human consumption) to avoid contamination by germs.

Traditional Methods of Preserving Food

These are methods that were used earlier before much of advancement in society to keep food in a way that it will not go bad.
Table 9.1: Traditional Methods of Preserving Food

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking</td>
<td>This is done to keep e.g., meat and fish stay longer without going bad. These methods remove water from the food.</td>
</tr>
<tr>
<td>Drying/salting/use of honey</td>
<td>Food was dried by these methods and kept in granaries. Drying removes water preventing things to spoil food. It was also smeared honey to avoid rotting. This way it stayed for long period without going bad.</td>
</tr>
</tbody>
</table>

Modern Methods of Preserving Food
These are methods developed with the advancement of science and technology.

Table 9.2: Modern Methods of Preserving Food

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of low temperatures (fridges)</td>
<td>Food is kept in very low temperatures where it stays longer because germs bacteria are killed by the cold and so rotting does not take place.</td>
</tr>
<tr>
<td>Canning</td>
<td>Canned and boiled foods are preserved by adding small amounts of special chemicals called preservatives which kill bacteria.</td>
</tr>
</tbody>
</table>

Both traditional and modern methods lead to proper storage of food because the places foods are kept are free from dirt, filth and darkness.

9.2 Causes and Prevention of Food Poisoning

Causes of Food Poisoning
- Not cooking food at right temperature
- Not chilling food to the correct temperature
• Not maintaining proper hygiene when handling food
• Eating expired food
• Spraying crops with chemicals e.g. pesticides and herbicides
• The general cause of food poisoning is microorganisms like bacteria

Ways of Preventing Food Poisoning
• Cooking food at the right temperature
• Proper storage of food e.g. in refrigerator
• Maintaining good hygiene when handling food
• Taking caution when while handling packed or canned food.
• In general food poisoning can be prevented by keeping food free from germs

9.3 Nutritional needs for special groups
Special groups like pregnant and lactating mothers, infants and the sick (HIV/Aids) need balanced food for growth and development.

*Table 9.3: Categories of special groups and their requirements*

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnant mothers</td>
<td>Balanced diet for the well growth and proper development of the child in the womb.</td>
</tr>
<tr>
<td>Lactating mothers</td>
<td>Food rich in calcium to share with the sucking baby for the formation of strong bones, nails and teeth.</td>
</tr>
<tr>
<td>Infants</td>
<td>Infants are those aged from 0-4 years. They should be breast fed for at least six months after birth because they are unable to digest food.</td>
</tr>
<tr>
<td>HIV/Aids Patients</td>
<td>They need balanced diet to increase their immunity.</td>
</tr>
</tbody>
</table>
1. Digestions of food DOES NOT take place in?
   A. Mouth
   B. Large intestines
   C. Stomach
   D. Small intestine

2. Which of the following is likely to happen if a disease gradually affects antelopes grassland inhibited by vultures?
   Grass    Lions    Vultures
   A. Increase  Decrease  Increase
   B. Decrease  Increase  Increase
   C. Increase  Increase  Increase
   D. Increase  Decrease  Decrease

3. A food chain in grassland is as shown below.

   \[ \text{Grass} \rightarrow \text{grasshopper} \rightarrow \text{frog} \rightarrow \text{snakes} \rightarrow \text{secretary birds} \]

   Which of the following would most likely to happen immediately all snakes are killed?
   A. Frogs would decrease in number
   B. Grasshoppers would increase in numbers
   C. The amount of grass would increase
   D. Secretary birds would decrease in number

4. Which one of the following groups consists of foodstuffs that protect the body against diseases?
   A. Lemon, cabbage, carrot
   B. Beans, groundnuts, fish
   C. Maize, potatoes, rice
   D. Meat, orange, spinach
5. The purpose of salt in the food preservation is to;
   A. Remove water
   B. Add flavor
   C. Remove air
   D. Lower the temperature

6. Which one of the following is a possible food chain that could be found in a grassland inhabited by hawks, frogs, snakes, mice and grasshoppers?
   A. Grass → grasshoppers → frogs → snakes
   B. Grass → grasshoppers → frogs → mice
   C. Grass → grasshoppers → mice → hawks
   D. Grass → grasshoppers → hawks → snakes

7. Which one of the following groups of only foodstuffs is used for body building and repair?
   A. Rice, oranges, meat
   B. Wheat, fish, maize
   C. Beans, potatoes, groundnuts
   D. Eggs, peas, milk

8. The function of fibre in the human diet is to?
   A. Provide the body with nutrients
   B. Transport digested food
   C. Prevent constipation
   D. Help in digestion of food

9. Absorption of water in the elementary canal of human beings takes place in the?
   A. Stomach
   B. Duodenum
   C. Small intestines
   D. Large intestines
10. A child with thin and brown hair, swollen hands, feets and face is likely to?
   A. Have knock knees
   B. Appear weak and inactive
   C. Have a face like that of an old man
   D. Has a faster heartbeat

11. Which one of the following is a function of fibre in the diet?
   A. Helps in getting rid of undigested food
   B. Helps in absorption of digested food
   C. Adds nutrients to the body
   D. Helps in digestion of food

12. A lactating mother needs food rich in iron in order?
   A. To protect the body against diseases
   B. For formation of strong bones in the baby
   C. To increase milk production
   D. To replace blood lost during birth

13. Which one of the following is the main nutrient of balanced diet obtained by animals when they feed on lucern?
   A. Carbohydrates
   B. Proteins
   C. Vitamins
   D. Minerals

14. Which of the following is a CORRECT food chain?
   A. Grass → rabbit → eagle → leopard
   B. Maize → grasshopper → lizard → snake
   C. Grass → grasshopper → eagle → rabbit
   D. Kales → aphids → weaver birds → rabbit

15. Which of the following groups of foodstuffs constitute a balanced diet?
   A. Potatoes, beans, eggs
   B. Chicken, cabbage, beef
C. Rice, chapatti, beef
D. Peas, ugali, spinach

16. The main reason why a baby needs to be breastfed by the mother is that the milk produced?
A. Helps to build baby’s immunity
B. Helps the baby to grow fast
C. Helps the baby’s bone to be strong
D. Is easily digested

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Answers to
Model Revision Test Nine

<table>
<thead>
<tr>
<th>Model Revision Test 9 Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
</tbody>
</table>

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9 Food and Nutrition Unit 9 Answers
UNIT 10
ENERGY

Specific objectives
By the end of this topic, the learner should be able to:

- Describe how light travels, identify transparent, translucent and opaque materials,
- Demonstrate reflection of light and investigate refraction of light
- Name sources of electricity and make simple circuit and investigate good and poor conductors of electricity
- Identify electrical appliances found at home and their uses and safety measures when dealing with electricity and safety measures when there is lighting
- Explain what energy is and different types of energy
- Explain what energy is and different types of energy
- Describe transformation of energy,
- State methods of conserving energy and the need to conserve energy

Revision Notes 10

10.1 Light

Traveling of Light

One of the properties of light is traveling in a straight line. But how can we know light travels in a straight line. This can be demonstrated using a set of simple apparatus like a candle and wood blocks with holes at the center.
To investigate whether light travels in a straight line, see the following diagram.

Figure 10.1: Light travel through straight line

Transparent, Translucent and Opaque materials

Various materials are classified under three categories depending on the extent to which light passes through them.

Table 10.1: Transparent, translucent and Opaque materials

<table>
<thead>
<tr>
<th>Material</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transparent materials</td>
<td>Light passes through some materials</td>
<td>Glass</td>
</tr>
<tr>
<td>Translucent materials</td>
<td>These allow only a small amount of light to pass through</td>
<td>Glass used in toilet and shower rooms.</td>
</tr>
<tr>
<td>Opaque</td>
<td>materials which do not allow any amount of light to pass through</td>
<td>Wood and stone</td>
</tr>
</tbody>
</table>
**Reflection and Refraction of Light**

**Reflection**
Light is reflected when it falls on shiny surfaces. It is reflected at the same angle of incidence.

![Figure 10.2: Reflection of light](image)

**Refraction**
It is the apparent bending of light when passing through different transparent mediums e.g. Air to water, Glass to water, Air to glass

![Figure 10.3: Demonstration of apparent bending of light in water](image)
10.2 Electricity

Electricity is a form of energy that is used for lighting, boiling, heating and driving machines in homes, industries and factories.

Sources of electricity

This is the major source of energy. Its sources of include the following:

- Hydro-electric power
- Geothermal electricity
- Wind driven turbines
- Solar energy (panels)
- Petrol diesel driven generators
- Thermal electricity
- Batteries e.g. torch and car batteries. They store electricity and simple to carry and can be used to charge small electrical devices
- Bicycle dynamos
- Hydrogen

Demonstration of a simple Electric Circuit

Figure 10.4: Demonstration of Simple Electric Circuit

NB.

As demonstrated by the simple circuit, a copper wire (or any other good conductor) is used to connect the battery and the bulb. It conducts energy from the battery (source of energy). The energy is transformed into light energy.

Good and poor conductors of electricity

Conductors: materials that allow electricity to pass through them. All metals are conductors. The best of all the conductors being:

- Silver
- Copper and Aluminum
**Insulators:** these are materials which do not allow electricity to flow through them. They are called **non conductors.** Most non-conductors materials that fall in this class are: Rubber, wood, glass, silk and cotton.

**Electricity Appliances at Home and their uses**

- Iron box: used to remove creases in clothes
- Radio/television: give latest news
- Cooker: for cooking food
- Electric kettle: for boiling water/tea

**Safety When Dealing With Electricity**

- Do not touch switches with wet hands
- Do not put sticks, pencils, wires in sockets
- Do not overload sockets
- Avoid naked wires
- Incase of a fault consult a specialist

**Lighting and Safety Measures**

- Fitting lighting arresters
- Do not walk in the open fields when it is raining
- Do not shelter under trees when it is raining

**10.3 Meaning and Types of Energy**

For many kind of work to be done, an effort must be applied. We apply some effort when we dig and the source of this energy comes from the food we eat i.e. food stored in the muscles.

Energy can be defined as the ability to do work.

There are various types of energy. These are as tabulated.
Table 10.2: Various Types of Energy

<table>
<thead>
<tr>
<th>Type of energy</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical energy</td>
<td>Chemical energy is also called stored energy. It is found in such substances such as food and fuel like firewood, charcoal and kerosene. Chemical energy is released when these substances burn or when food is digested.</td>
</tr>
<tr>
<td>Heat energy</td>
<td>Some of heat energy sources are: Electricity and burning fuels like gas, fire wood, charcoal and biogas. The main source of heat is sun. the difference in temperature makes the heat to travel from one region to another i.e. from region of high temperature to region of low temperature.</td>
</tr>
<tr>
<td>Light energy</td>
<td>Following are some identified sources of light which may be either natural or artificial sources. These sources include: the sun, stars, fire flies, glow worms, candles, fires, electric light bulbs and paraffin lamps.</td>
</tr>
<tr>
<td>Magnetic energy</td>
<td>Magnets are able to push or pull thus causing movement. This is called magnetic force. This magnetic force is only applied to magnetic materials. We say that magnets have the ability to do work and so magnetism is a form of energy.</td>
</tr>
<tr>
<td>Sound energy</td>
<td>This form of energy is produced when heat energy to light an object vibrates e.g. blowing, hitting or plucking an object produces sound. Musical instruments produce sound energy.</td>
</tr>
</tbody>
</table>

10.4 Transformation of Energy

Energy can be transformed from one state to another. When energy changes from one form to another, this is called transformation of energy.
**Figure 10.5: Transformation of Energy in an Electric Circuit**

This is a closed path which allows electric current to flow. In this the electric current flows through wire and makes the bulb to light and produces some heat. The chemical energy is converted to electrical energy. When the bulb lights, the electrical energy is converted to heat and light energy.

Energy transformation in the circuit can be represented as follows:

Chemical Energy ➔ Electrical Energy ➔ Heat Energy ➔ Light Energy

**Transformation of Food into Energy**

Food stores energy. This stored energy is transformed into chemical energy during digestion and further into heat and kinetic energy. This keeps the body temperature constant and the kinetic energy work and to remain active. The surplus (excess) energy is stored inform of fat and is ready to be used where the need arises.

Below is a representation of how food is changed into energy.

**Figure 10.6: Transformation of Food into Energy**

<table>
<thead>
<tr>
<th>Chemical Energy ➔ Kinetic Energy ➔ Heat Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Produced by food</td>
</tr>
</tbody>
</table>

**Transformation of energy in a radio**

Sound from a broadcasting studio is picked by the aerial of the radio in form of electric signal and amplified by electric circuits in the radio. The dry cells in the radio provide the electric energy for amplification. In the speaker of the radio, electric signal is transformed into magnetic
energy and moves the diaphragm in the speaker in the way it receives signal. This magnetic energy changes to kinetic (vibration) in the round speaker producing sound energy.

**Figure 10.7: Transformation of Energy in a Radio**

![Energy Transformation Diagram](image)

10.5 Methods of Conserving Energy and the Need to Conserve

There are a number of methods of conserving energy. These include:

- a) Where possible use public means of transport
- b) When traveling in the same direction share the means of transport
- c) Use of low fuel consumption vehicles
- d) Where possible it is good to use trains for transport of goods and people
- e) Walk or cycle for short distances
- f) Improvement of road network in the country
- g) Light to be switched off when not in use
- h) Make use of energy efficient devices like:
  - Improved charcoal jikos, stoves
  - Low fuel consumption vehicles

**The Need to Conserve Energy**

Energy needs to be conserved for the basic reason that there is energy that cannot be renewed. Once used, it is gone. This brings us to classification of energy into renewable and non-renewable energy.

**Renewable sources**

These are sources of energy that cannot be exhausted. Its source can be recycled or reused.
Table 10.3: Examples of Renewable Energy Source

<table>
<thead>
<tr>
<th>Renewable source of energy</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar energy from the sun</td>
<td>It is a natural source of energy. It’s used to provide heat instead of wood fuels and petroleum e.g. diesel and paraffin</td>
</tr>
<tr>
<td>Wind energy</td>
<td>It is used to turn wind driven pumps. It also serves as an alternative to diesel and petrol. Wind can be used to generate electricity as well.</td>
</tr>
<tr>
<td>Biogas</td>
<td>It is produced from animal dung and is used instead of fire wood and kerosene</td>
</tr>
</tbody>
</table>
| Planting trees             | We need to plant trees since they are good sources of renewable energy. Planting trees improves through:  
  • Wood energy source  
  • Water catchment areas which boosts hydro electric power production and conserves the environment too. |

Non-renewable sources
These are sources of energy that cannot be recycled or recovered i.e. once used up, it cannot be recovered.

Examples
Kerosene, petrol, and other petrol fuels

It is recommended that we use renewable sources of energy in order to be able to conserve energy. Unfortunately, most of developing nations still rely heavily on non-renewable sources of energy.
1. Which of the following DOES NOT have chemical energy?  
   A. Lemon  
   B. Kerosene  
   C. Charcoal  
   D. Dynamo

2. The Shown diagrams were drawn by different groups of pupils to show how images are formed in a pinhole camera. Which one is CORRECTLY drawn?

   A.  
   B.  
   C.  
   D.

3. The diagram below represents a circuit with four bulbs labeled W, X, Y and Z. what would happen to bulb X, Y, and Z if W is removed?

   A. X, T and Z would become dim  
   B. X, Y and Z would go off  
   C. X would go off, Y and Z would become brighter  
   D. X would become dim, Y and Z would become brighter
4. Which of the following is a chemical change?
   A. Melting of candle wax
   B. Rusting of iron nails
   C. Evaporating spirit
   D. Water changing to ice

5. The diagram below represents a person warming by fire.

Which one of the following shows how heat reaches hands and feet?

   Hands    Feet
   A. Convection  Radiation
   B. Radiation   Conduction
   C. Conduction  Convection
   D. Radiation   Convection

6. In a geothermal power station, steam is lead through pipes to
   generate a form of energy which enables people to see. The energy
   transformation involved are?

   A. Chemical→electrical→mechanical→heat→light
   B. Heat → mechanical → electrical → heat → light
   C. Heat → chemical → mechanical → light → heat
   D. Chemical → electrical → mechanical → light → heat
7. Which of the following occurs when rays of light pass from air into water?
A. Reflection  
B. Dispersion  
C. Refraction  
D. Absorption

8. Which one of the following factors DOES NOT affect how high or low sound produced by stringed instrument is?
A. Length of the string  
B. Thickness of the string  
C. Tightness of the string  
D. Force used to pluck the string

9. In which of the following would bulb light brightest?

10. A pupil standing in front of a mirror observed image of a clock on the wall behind him. The image of the clock appeared as shown in the diagram below. Which one of the following diagrams shows the real time on the clock?
11. A stick was placed behind a bottle half filled with water as shown in the diagram below.

![Diagram of a stick placed behind a bottle half filled with water]

The part of the stick below the level of the water appeared to be larger than the part above level of water because rays of light were

A. Absorbed  
B. Refracted  
C. Dispersed  
D. Reflected

12. Which one of the following ways of producing light involves energy changes from chemical to electrical and lastly to heat and light? Using a

A. Bicycle  
B. Hydroelectric generator  
C. Solar system  
D. Torch

13. Below represents a periscope and the position of the image at point V.

![Diagram of a periscope]

The correct is at position?

A. S  
B. T  
C. U  
D. V
14. If the hole in a pin hole camera is widened. The image
A. Becomes blurred
B. Becomes larger
C. Is upright
D. Is not formed on the screen

15. The diagram below represents a set up that can be used to demonstrate a certain effect of electricity.

The effect demonstrated is made use of in making
A. Electromagnets
B. Light bulbs
C. Switches
D. Conductors

16. The diagram below represents a circuit. Which is true about the circuit?

A. The bulb uses power from the three cells
B. The bulb uses power from one cell
C. The cells are connected in series
D. The cells are connected in parallel
17. Which of the following pairs consists of renewable sources of energy?
A. Firewood and kerosene
B. Water falls and petrol
C. Biogas and charcoal
D. Wind and coal

18. The SHOWN diagram represents a set up used by pupils to compare the rate at which heat is conducted in metals.

Pupils made wrong conclusions if they used
A. Metals of different thickness
B. Metals of different length
C. Different types of pins
D. Different types of metals

19. Steam can be used to drive a wheel as in the set up shown in the diagram below.

Which of the following CANNOT increase the speed of the rotating wheel?
A. Using blades from lighter material
B. Increasing the size of blades
C. Increasing the size of the small holes
D. Increasing the amount of heat
20. Which one of the following pairs of forms of energy can be transformed only when there is a medium?
   A. Heat and light
   B. Sound and electricity
   C. Sound and light
   D. Heat and electricity

21. Which one of the following sources of energy is non-renewable?
   A. Kerosene
   B. Firewood
   C. Solar
   D. Biogas

22. Which one of the following sources of energy is renewable?
   A. Kerosene
   B. Biogas from cow dung
   C. Coal
   D. Cooking gas from crude oil

23. Which one of the following is the MAIN reason why the inside of a solar drier is painted black?
   A. To prevent rusting
   B. To make it last longer
   C. To make it absorb heat
   D. To decorate it

24. Below is an energy transformation.

   Chemical Energy → Electrical Energy → Heat Energy → Light Energy

   In which of the following does the energy transformation shown take place when used to produce light?
   A. Geothermal
   B. Car battery
   C. Electric bulb
   D. Bicycle dynamo
25. The diagram below represents a set up that can be used to demonstrate heat transfer in air.

![Diagram of heat transfer demonstration](image)

For the demonstration to work the candle must be placed at

A. P  
B. Q  
C. R  
D. S

26. The diagram below shows a stone being thrown using a catapult.

![Diagram of catapult](image)

The form of energy on the rubber before the stone is released is

A. Kinetic  
B. Potential  
C. Chemical  
D. Sound

27. Which one of the following is CORRECT about a solar heater?  
A solar heater changes

A. Heat energy $\rightarrow$ chemical energy  
B. Light energy $\rightarrow$ electrical energy  
C. Kinetic energy $\rightarrow$ heat energy  
D. Light energy $\rightarrow$ heat energy
28. Which of the following energy transformation takes place when a radio that uses cells is operating?

A. Chemical → electrical → magnetic → kinetic → sound
B. electrical → chemical → kinetic → magnetic → sound
C. Kinetic → chemical → electrical → magnetic → sound
D. Magnetic → electrical → kinetic → chemical → sound

29. Which of the following sources of energy DOES NOT contain chemical energy?
A. Car battery
B. Bicycle dynamo
C. Food
D. Fire wood

30. Heat reaches the feet of seated person by the side of the fire by
A. Conduction
B. Radiation only
C. Convection only
D. Radiation and convection

31. The reason why an ordinary jiko without a clay lining is not recommended for use is because
A. It pollutes the environment
B. Of the large amount of charcoal used
C. It takes long time when cooking
D. It gets too hot to hold

32. The diagram below represents a circuit that can be used to make a temporary magnet.

The energy transformation that occurs on the section marked P is?
A. Electrical to Magnetic
B. Chemical to Electrical
C. Heat to Electricity
D. Chemical to Magnetic
33. The following are forms of energy:
   i. Heat
   ii. Electricity
   iii. Light
   iv. Sound

The two forms of energy that DO NOT require a medium for transmission are
A. (ii) and (iv)
B. (i) and (iii)
C. (i) and (ii)
D. (iii) and (iv)

34. The following practice help to conserve energy.
   i. Using improved firewood jikos
   ii. Switching off lights that use hydroelectric power when not needed
   iii. Using public transport whenever possible
   iv. Using biogas for cooking

Which two practices concern non-renewable sources of energy?
A. (i) and (ii)
B. (ii) and (iii)
C. (ii) and (iv)
D. (iii) and (iv)

35. Which of the following is a recommended practice to avoid being struck by lightning?
A. Sheltering under a tree
B. Using an umbrella in an open field
C. Sheltering while leaning on a wall
D. Wearing rubber shoes with thick soles
36. Which of the following DOES NOT function the same as a bicycle dynamo when used to produce electricity?
   A. Hydro electric generator
   B. Car battery
   C. Diesel generator
   D. Wind driven turbines

37. Which of the following consist of materials of only materials that are ALL non-magnetic?
   A. Aluminium foil, a shilling coin
   B. Iron nails, staple pins
   C. Metal scissors, steel wool
   D. Piece of glass, sewing needle

38. Which of the following consists of magnetic materials only?
   A. Tin, aluminium, copper
   B. Iron, steel, cobalt
   C. Tin, iron, copper
   D. Aluminium, steel, cobalt

39. Which of the following DOES NOT produce electricity?
   A. Bicycle dynamo
   B. Batteries
   C. Water dams
   D. Solar panels

40. The diagram below represents a set up that is used to investigate a certain property of light.
The property investigated is that light
A. Is refracted
B. Travels in a straight line
C. Is dispersed
D. Does not pass through opaque materials

41. Which one of the following groups of sources of energy consists of only renewable sources?
A. Firewood
B. Wind, charcoal, biogas
C. Diesel, waterfalls, wind
D. Biogas, kerosene, firewood

42. Which one of the following is NOT a reason for lighting a house?
A. For safety purposes
B. To discourage pests
C. To feel warm
D. To read comfortably

43. The diagram below represents a set up that can be used to demonstrate a certain aspect of heat.

The aspect demonstrated is that
A. Solids melt when heated
B. Metals expand when heated
C. Solids conduct heat
D. Metals bend when heated
44. Which of the following materials allows light to pass but one cannot see through it clearly?
A. Toilet glass window pane
B. Mirror
C. Clean water
D. Iron sheet

45. Which of the following DOES NOT explain why an improved jiko conserves energy? It has
A. Cone shape
B. Walls made of clay
C. A small space for holding charcoal
D. An outer cover made of metal

46. Which one of the following circuit diagrams will the bulb not light?

47. Which one of the following pairs consists only of materials that are non-magnetic?
A. Copper and aluminium
B. Steel and zinc
C. Silver and steel
D. Iron and aluminium
48. The following are activities involved in demonstrating that light travels in a straight line.
   i. Light a candle and place it at the opposite end of the cardboard
   ii. Thread a string through the holes
   iii. Observe the candle through the holes
   iv. Make a hole at same level in the three cardboards
   v. Cut three similar squares of cardboard and fix each cardboard to a piece of wood.

Which of the following is the correct order of the activities?
A.  (v), (i), (iv), (ii), (ii)
B.  (v), (iv), (ii), (i), (iii)
C.  (v), (i), (iv), (ii), (iii)
D.  (v), (iii), (iv), (i), (i)

49. Which of the following is true about heat transfer by convection? It takes place in
A. Solids only
B. Liquids and gases only
C. Gases only
D. Solids and gases

50. Force is measured in?
   Grams
   Grams per cubic centimeters
   Cubic centimeters
   Newtons

51. After the incubation period, the chick comes out of shell by?
A. The mother cracking the shell to open using its beak
B. Cracking the shell to open using its beak
C. Growing bigger then force the shell to break
D. The shell cracking by its own
52. Which of the following DOES NOT increase the strength of an electromagnet? Increasing the
A. Number of coils  
B. Amount of current  
C. Size of soft iron  
D. Length of connecting wire

53. A change in force of gravity on an object will change its?
A. Mass  
B. Weight  
C. Volume  
D. Pressure

54. If the size of the hole of pi-hole camera increases, the image formed is?
A. Enlarged  
B. Blurred  
C. Upright  
D. Not real

55. A stone at the bottom of a pond appears to be near the surface due to?
A. Refraction  
B. Dispersion  
C. Defraction  
D. Reflection

56. Which of the following shows the correct order of the parts in the human eye through which light passes?
A. Cornea → pupil → lens → retina  
B. Pupil → lens → cornea → retina  
C. Pupils → cornea → lens → retina  
D. Cornea → lens → pupil → retina
57. Coins are arranged in a pile as shown in the diagram below. When the coin at the bottom was knocked out suddenly using a ruler, it moved out leaving the pile intact. The pile remained intact because of?
A. Friction
B. Gravity
C. Inertia
D. Weight

58. The image of a pin-hole camera is?
A. Upright and smaller than the object
B. Upside down and formed on the screen
C. Upside down and same as object
D. Upright and formed on the screen

59. When an object is thrown up in the air it falls because it?
A. Is pulled by the earth
B. Exerts pressure
C. Is raised by air
D. Is as heavy as air

60. Which two of the following processes involve loss of heat to the surrounding?
A. Melting and freezing
B. Evaporation and condensation
C. Freezing and condensation
D. Melting and evaporation
# Answers to

## Model Revision Test Ten\(^{10}\)

**Model Revision Test 10 Answers**

<p>| | | | | | | | | | | |</p>
<table>
<thead>
<tr>
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<td>40</td>
<td>B</td>
<td>50</td>
<td>D</td>
<td>60</td>
</tr>
</tbody>
</table>

\(^{10}\) Energy Unit 10 Answers
Specific Objectives
By the end of this topic, the learner should be able to:

• The components of air and uses.
• Identify solids that dissolve and those that do not dissolve in water.
• Identify liquids that mix and those do not mix.
• Identify magnetic and non-magnetic materials.
• Separate mixtures.

Revision Notes 11

11.1 Components of Air and uses

There are various gases in the air, at varied percentage.

Figure 11.1: Composition of Air

Air is made up of various gases as listed:

• Nitrogen (78%)
• Oxygen (21%)
• Carbon dioxide (0.03%)
• Inner gas (0.97%)
Table 11.1: Uses of Air

<table>
<thead>
<tr>
<th>Gas</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen</td>
<td>Burning, Breathing, Germination</td>
</tr>
<tr>
<td>Carbon Dioxide</td>
<td>Used during: photosynthesis in plants, respiration in animals and as fire extinguisher,</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>Used in making proteins by leguminous plants and animal bodies.</td>
</tr>
</tbody>
</table>

11.2 Solids

Some solids dissolve in water while others do not.

Examples of solids that dissolve in water are:
  - Sugar
  - Salt

Example of solids that do not dissolve in water are:
  - Sand
  - Flour

11.3 Liquids

Some liquids can be mixed with other liquids while others can not.

Examples of liquids that do mix are:
  - Water and fresh milk

Examples of liquids that do not mix are:
  - Water and kerosene
  - Kerosene and cooking oil

11.4 Magnetic and Non-magnetic materials

Magnets are capable of attracting only some materials and not others.
Those which attracts are called magnetic and those which do not are called non-magnetic.

**Table 11.2: Examples of magnetic and non-magnetic materials**

<table>
<thead>
<tr>
<th>Magnetic materials</th>
<th>Non-magnetic materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can of tin</td>
<td>Pen, paper, set square</td>
</tr>
<tr>
<td>Spoon</td>
<td>Copper, Zinc</td>
</tr>
<tr>
<td>Safety pin</td>
<td>A shilling coin</td>
</tr>
<tr>
<td>Paper clips</td>
<td>Rubber</td>
</tr>
<tr>
<td>Metals (Iron, Nickel, alloys (Magnelium, Brass, Bronze, Stainless steel)</td>
<td></td>
</tr>
</tbody>
</table>

11.5 Separating mixtures

There are many different methods of separating mixtures depending on the mixtures. The methods are summarized in a table.

**Table 11.3: Separation of Mixtures**

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winnowing</td>
<td>It is used when separating solids where one is lighter than the other can be blown by wind e.g. husks from beans.</td>
</tr>
<tr>
<td>Sieving</td>
<td>It is used when separating insoluble solids from a liquid using a sieve e.g. sieving tea leaves from tea before taking it after preparation.</td>
</tr>
<tr>
<td>Picking</td>
<td>It is used when separating two solids e.g. small stones from maize grains or beans by use of hands.</td>
</tr>
<tr>
<td>Method</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Filtering</td>
<td>It is used when separating tiny insoluble solids from a liquid. It may involve a funnel, filter paper and the liquid e.g. muddy water.</td>
</tr>
<tr>
<td>Decanting</td>
<td>Used when separating an insoluble substances settling at the bottom the solvent. When the solvent is poured, the substance remains at the bottom of the container.</td>
</tr>
<tr>
<td>Use of magnets</td>
<td>Used in separation of magnetic materials from non-magnetic materials e.g. a mixture of iron-fillings with sand may be separated by use of a magnet</td>
</tr>
<tr>
<td>Evaporation</td>
<td>Used when separating a solution formed by mixing soluble solute and a solvent. e.g. dissolving salt in water, then heating the solution and cooling the vapour. Both water and salt are obtained separately in their original form without any chemical change.</td>
</tr>
</tbody>
</table>
1. Some pupils were provided with liquids P, Q, R, S and T that were either neutral or acidic. They were asked to mix two liquids at a time and use hibiscus flower juice to test whether the mixture was acidic or not.

The results obtained were tabulated.

<table>
<thead>
<tr>
<th>Mixture</th>
<th>Change</th>
<th>Which two liquids were acidic?</th>
</tr>
</thead>
<tbody>
<tr>
<td>P + Q</td>
<td>Red</td>
<td>A. Q and S</td>
</tr>
<tr>
<td>P + R</td>
<td>No change</td>
<td>B. T and S</td>
</tr>
<tr>
<td>R + S</td>
<td>Red</td>
<td>C. R and T</td>
</tr>
<tr>
<td>R + T</td>
<td>No change</td>
<td>D. P and Q</td>
</tr>
<tr>
<td>P + T</td>
<td>No change</td>
<td></td>
</tr>
<tr>
<td>Q + T</td>
<td>Red</td>
<td></td>
</tr>
<tr>
<td>Q + R</td>
<td>Red</td>
<td></td>
</tr>
</tbody>
</table>

2. A solid was immersed in water in an overflow can. The water that overflowed was collected in a container as shown in the diagram below.

The amount of water collected in the container represents the solid’s?

A. Mass  
B. Density  
C. Weight  
D. Volume  

3. Using an indicator, the strength of a acid is determined by;
   A. The intensity of the colour change with indicator
   B. The time it takes the indicator to change the colour
   C. The number of drops required to change colour of the indicator
   D. The colour of the indicator
4. Which one of the following DOES NOT affect the rate of evaporation of a liquid?
   A. Amount of liquid
   B. Surface area
   C. Temperature
   D. Air movement

5. Which of the following materials is magnetic?
   A. Copper
   B. Brass
   C. Steel
   D. Aluminium

6. Which of the following mixtures cannot be separated by dissolving, filtering and evaporation?
   A. Sand and sugar
   B. Maize flour and sugar
   C. Maize flour and sand
   D. Salt and sugar

7. The diagram below represents an instrument that was used to demonstrate that solids expand when heated.

   Which of the following should be done to make the instrument more efficient?
   A. Using thinner pointer
   B. Reducing the length between support Q and pivot
   C. Using a thicker wire
   D. Increasing the length between P and pivot
8. Pupils placed a little methylated spirit in a tin can and lit it. After a short while, they placed the tin can upside down over soft mud as shown in the diagram below.

The tin can sank into the soft mud. Which one of the following explains why the tin can sank into the mud?
A. The tin is denser than soft mud
B. Air pressure on the tin can forced the tin can into the soft mud
C. There was no air in the soft mud
D. Force of gravity forced the tin into the soft mud

9. A purple flower was added to substance K, L, M and N to find out whether they were acids or bases. The results were as shown in the table below.

<table>
<thead>
<tr>
<th>Substance</th>
<th>Colour change</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>Pink</td>
</tr>
<tr>
<td>L</td>
<td>Blue</td>
</tr>
<tr>
<td>M</td>
<td>No change</td>
</tr>
<tr>
<td>N</td>
<td>Pink</td>
</tr>
</tbody>
</table>

Which two of the substances react to form salt and water only?
A. K and M
B. M and N
C. K and L
D. L and M

10. Which one of the following aspects of an object cannot be changed?
A. Mass
B. Density
C. Weight
D. Volume

11. Which of the following should not be the same when comparing rates of melting in substances?
A. Quantity of substance
B. Amount of substance
C. The surfaces
D. Duration of heating
12. Which one of the following pairs consists of substances which have definite volume?
   A. Water vapour and ice
   B. Stone and air
   C. Sand and water
   D. Ice and air

13. The mass of 1 centimetre cubed of a substance is its
   A. Volume
   B. Density
   C. Weight
   D. Surface area

14. In which of the following method of separating would only one substance be removed from a mixture of two substances?
   A. Evaporation
   B. Filtration
   C. Decanting
   D. Distillation

15. The diagram below represents a straw fitted in an airtight glass bottle containing a liquid.

   The sucking of the liquid is difficult because
   A. The straw does not reach the bottom
   B. The liquid does not fill the bottle
   C. The air inside the straw prevents the liquid from rising
   D. Air pressure does not act on the liquid
16. A plastic cup was inverted over water in a basin as shown in the diagram below.

It was observed that water did not enter the cup.
Which of the following would be done to make the water enter the cup?

A. Pushing the cup to the bottom
B. Adding more water to the basin
C. Reducing the size of the cup by cutting
D. Making a hole at the bottom of the cup

17. In which of the following activities can correct conclusion be drawn about evaporation of equal amounts of water and spirit?
   A. Putting the liquids in bottle tops and placing both in the sun
   B. Putting one liquid in a bottle top and the other in a shoe polish lid then placing them in the sun
   C. Putting the liquid in bottle tops then placing one in the sun and heat the other with a candle
   D. Putting one liquid in a bottle top and the other in polish tin lid then heat them with a candle

18. Which of the following is NOT TRUE about pressure in liquids increases when the
   A. Amount of liquid is increased
   B. Diameter of the container is educed
   C. Depth of liquid is increased
   D. Container with liquids is raised
19. Which one of the following is the difference between solids and gases?
   A. Solids have mass whereas gases do not
   B. Solids have definite shape whereas gases do not
   C. Solids have definite shape whereas gases take shape of the container
   D. Solids can change to liquids whereas gases cannot change to liquids

20. When lime powder was mixed with juice obtained from hibiscus flower it changed colour. Which of the following substances would NOT make hibiscus flower juice change to the same colour?
   A. Wet wood ash
   B. Sour milk
   C. Baking powder
   D. Chalk dust

21. Below are the activities carried out when separating a mixture of salt, iron fillings and sand but not in their correct order.
   i. Filter the mixture through a sieve
   ii. Add water to the mixture
   iii. Leave mixture in the sun
   iv. Pass a magnet through the mixture

   The correct order of the activities is
   A. (iv) (ii) (i) (iii)
   B. (ii) (iii) (i) (iv)
   C. (ii) (iii) (iv) (i)
   D. (iv) (i) (ii) (iii)

22. Which of the following properties of clay soil would greatly contribute to flooding in an area?
   A. High capillarity
   B. Poor drainage
   C. Fine texture
   D. Stickiness
23. The reason why sandy soil is mixed with cement in building is because it
   A. Drains well
   B. Has large air spaces
   C. Has large particles
   D. Mixes easily with cement

24. When choosing a method of separating a mixture of a liquid and solid it is important to consider the
   A. Density of the liquid
   B. Size of particles of the solid
   C. Density of the solid
   D. Solubility of the solid

25. Which of the following is NOT definite for liquids?
   A. Shape
   B. Volume
   C. Mass
   D. Density

26. Which one of the following is NOT important when comparing solubility of solids in liquids?
   A. Amount of the solid
   B. Size of the container used
   C. Temperature of the liquid
   D. Amount of liquid

27. The following are the activities which are carried out when comparing the strength of acids in fruit juice.
   i) Adding the different juices drop by drop in each of the bottle tops
   ii) Adding equal amounts of indicators in each of the bottle tops
   iii) Putting equal amount of wood ash solution into different bottle tops. Which one of the following is the correct order of the activities?
   A. (iv) (iii) (ii) (i)
   B. (iv) (ii) (iii) (i)
   C. (iii) (ii) (iv) (ii)
   D. (ii) (iii) (i) (iv)
28. The diagram below represents a set up that can be used to demonstrate a certain property of air.

Which property of air is demonstrated by the set up?
A. Air exerts pressure in all directions
B. Air occupies space
C. Part of air used in burning
D. Air expands when heated

29. Which of the following pairs of substances will give the same colour when mixed with flower extract?
A. Lemon juice and lime extract
B. Asprin solution and actal solution
C. Lemon solution and asprin solution
D. Lime solution and actal solution

30. Sifting, picking and sieving are some of the methods of separating mixtures. Which of the following mixtures can be separated by all the three methods?
A. Maize and beans
B. Sand and rice
C. Maize flour and small pieces of iron fillings
D. Sugar and tiny pieces of iron

31. The SHOWN diagram represents a set up that can be used to demonstrate a certain property of metals.
32. Which of the following consist only of substances that have no definite volume?
   A. Stone, kerosene, carbon dioxide
   B. Oil, tooth paste, glue
   C. Clay, cement, flour
   D. Nitrogen, oxygen, water vapour

33. The component that makes up 0.97% of air is used in
   A. Rusting
   B. Electric bulbs
   C. Preservation of soft drinks
   D. Making proteins

34. The diagram below shows a set up that was used to demonstrate a certain property of matter.

   The coloured water rises up the straw because?
   A. Liquids expand when heated
   B. Liquids occupies space
   C. Air occupies space
   D. Air expands when heated
35. Which of the following groups of methods can be used to separate solid mixtures only?
   A. Sieving, winnowing, picking
   B. Picking, use of magnet, decanting
   C. Winnowing, sieving, filtration
   D. Use of magnet, filtration, decanting

36. The processes I, ii, iii and iv in the chart below bring about changes in states of matter.

   ![](chart.png)

   The processes that requires increase in temperature are?
   A. I, ii, iv
   B. I, ii
   C. I, iii
   D. I, iv

37. The diagram below shows a set up that was used to investigate certain property of air.

   ![](setup.png)

   Which of the following would not be observed if the tin can was heated gently?
   A. Bubbles in the basin
   B. Drops of ink moving water in the basin
   C. Water level in the basin decreasing when heating is stopped
   D. Water level in the glass tube decreasing when heating is stopped
38. The diagram below represents a set up that was used to demonstrate a certain property of matter.

The property demonstrated was
A. Air occupies space
B. Water exerts pressure
C. Air has mass
D. Water occupies space

39. The diagram represents a set up that can be used to demonstrate a certain process involved in the change of state of matter.

The process that takes place at point labeled Q is?
A. Boiling
B. Condensation
C. Evaporation
D. Freezing
40. The chart below represents a simple classification of liquids.

41. Choose a group of substances where all three are acidic.
   A. Tooth paste, clover, wood ash
   B. Wood ash, sour milk, vinegar
   C. Lemon juice, tooth paste, baking powder
   D. Clover, vinegar, sour milk

42. In which of the following processes is oxygen NOT used?
   A. Making plant’s food
   B. Burning
   C. Breathing
   D. Germination of seed

43. The following are liquids added together in glass bottles labeled P,Q, R and S by some pupils.
   P - kerosene and cooking oil
   Q – water and cooking oil
   R – milk and water
   S – milk and kerosene

   Which glass bottle contains liquids that cannot be separated by decanting?
   A. P  B. Q  C. R  D. S
44. The following are some uses of air.
   i. Manufacture of electric bulbs
   ii. Supporting burning
   iii. Germination of seeds
   iv. Putting off fires

Which of the following uses are for carbon dioxide?
A. (i) and (ii)
B. (ii) and (iv)
C. (i) and (iv)
D. (iii) and (iv)

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Model Revision Test Eleven

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Properties of Matter Unit 11 Answers
UNIT 12
MAKING WORK EASIER

Specific Objectives
By the end of this topic the learner should be able to:

- Move objects and stop moving objects
- State what is force and investigate friction and state advantages and disadvantages of friction
- Demonstrate ways of reducing and increasing friction
- Identify positions of fulcrum, load, and effect in different levers,
- Investigate how inclined planes and single fixed pulley make work easier

Revision Notes 12

12.1 Ways of Moving and Stopping Objects

Figure 12.1: A man pushing a wheelbarrow

Ways of making objects move:
- Pushing
- Pulling
- By use of simple machine e.g. wheel barrow, as shown

Moving objects can also be stopped. For in stance:
- Stopping a rolling bell
- Stopping a rolling wheel
• Stopping an object pulled with a tied string

12.2 Force, Friction and advantages and disadvantage

• Force can be defined as push or pull.
• Force is measured in units called Newton (N in short form).
• We use a balance to measure force

Friction

• Two surfaces rub together creating a motion force called friction that comes in to stop the motion.

Disadvantages and Disadvantages of Friction

Advantages

• Walking: if no friction between our soles and the floor, walking would not be possible
• Causes a match to light: heat generated by the match head and the match box helps light the matchstick. The early man made fire by rubbing two dry pieces of wood together.
• Operation on brakes depends on friction.
• Friction between tyre of a car and road makes the car to move

Disadvantages

• Hinders work
• Cause tear and wear
• Friction causes heat ion car engines which if too much may lead the parts to seize up.

Ways of Reducing Friction

Friction can be reduced through the following ways:

• Rubbing surfaces to make the smooth
• Oiling/greasing places between the surfaces
• Using rollers and ball bearing to reduce friction
Use of Levers, inclined plane and simple fixed pulleys

Use of Levers
Lever is one example of a simple machine. How levers can be used to make work easier is as illustrated.

Figure 12.2: A man uses lever

A man uses lever to roll a stone. The lever shows the position of fulcrum, load and effort.

A wheel barrow is also a good example of a simple machine which is used to make work easier.

Use of Inclined Planes

Figure 12.3: Using a plank to load

Heavy objects pushed up a sloping plank of wood when being loaded, for instance onto lorries or carts are easily done. We note here that the sloping plank of wood makes work easier. Other examples of inclined planes include ladder, stair case and a road winding up a hill.
**Simple Fixed Pulley**

A pulley is a wheel having a grooved tin and which can rotate freely about an axle through its centre.

One typical example of a simple pulley is a flag post. See the illustration.

*Figure 12.4: Simple Pulley*

![Simple Pulley Diagram](image)

The single fixed pulley merely changes the direction of the force thus making the working convenient without increasing the force e.g. raising the Kenya National Flag up the flag post.

---

**Model Revision Test 12**

1. The diagram below shows the positions of fulcrum, effort and load in a lever.

![Lever Diagram](image)

Which of the pairs of the levers has the same arrangements as that of the lever shown above?

A. Pair of scissors and wheelbarrow  
B. Pliers and nutcrackers  
C. Spade and fishing rod  
D. Bottle opener and claw-hammer
2. The diagram below represents a single movable pulley used to lift a load.

Which one of the following statements is true about what happens when the effort moves up?

A. The distance the load moves is equal to the distance effort moves
B. The effort applied is equal to the load
C. The distance the effort moves is twice the distance the load moves
D. Work done on the load is equal to work done by the effort

3. In which of the following parts of a bicycle is friction NOT required?
   A. Seat
   B. Axle
   C. Handle
   D. Pedal

4. The shown diagram represents a winch which can be used to raise water from well.

Which of the following should be done to reduce the number of turns made by the handle to raise water to the same height?

A. Diameter of the axle
B. Width of the rope
C. Number of coils
D. Length of the handle
5. The diagram below represents a simple machine in use.

![Diagram of a simple machine with labels W, X, Y, Z]

The load is represented by?
A. W
B. X
C. Y
D. Z

6. A staircase is an example of a simple machine called?
A. A wedge
B. An inclined plane
C. A screw
D. A lever

7. The diagram below shows an arrangement of pulleys used to lift a load.

![Diagram of a pulley system with labels S, R, load]

The purpose of the pulley S is to reduce the
A. Effort required to raise the load
B. Weight of the load
C. Distance the load moves
D. Distance the effort moves
8. The diagram below shows an improvised set up that was used to drop a box from a tall building.

![Diagram of a box with a cloth and rope]

The speed at which the box drops could be reduced by
A. Reducing the length of the rope
B. Making small holes on the cloth
C. Increasing the surface area of the cloth
D. Using light cloth

9. Which of the following levers has the same position of load, effort and fulcrum as wheelbarrow?
   A. Pair of scissors
   B. Nutcracker
   C. Fishing rod
   D. Crowbar

10. Objects P, Q, R and S were balanced on a beam as shown in the diagram below.
The correct order from the heaviest to the lightest object is?

A. S Q R P
B. Q R P S
C. R S Q P
D. Q P S R

11. The diagram below represents a certain lever being used to open a tin.

Which of the following works the same way as the lever shown above?

A. Carrying load using a wheelbarrow
B. Cutting hair using scissors
C. Scooping sand using a shovel
D. Catching fish using fishing rod

12. The diagram below represents an arrangement of bottle tops to show the working of gears.

In which direction will F, G and H turn when E is turned clockwise direction?

F
A. Anticlockwise anticlockwise clockwise
B. Clockwise clockwise anticlockwise
C. Clockwise anticlockwise anticlockwise
D. Anticlockwise clockwise anticlockwise
13. The diagram below represents a simple machine that is used to draw water from a river.

The effort distance is?
A. XY
B. WX
C. VW
D. YZ

14. The following are activities involved in making an improvised hammer.
   i. Making a hole
   ii. Fitting a bolt
   iii. Shaping a piece of wood
   iv. Making the handle smooth
   v. Fixing the nut.

The correct order is:
A. (iii) (iv) (i) (ii) (v)
B. (i) (ii) (v) (iii) (iv)
C. (iii) (i) (ii) (v) (iv)
D. (v) (ii) (iii) (iv) (i)
15. The diagram below represents a simple machine.

![Diagram of a simple machine]

The machine is an example of?
A. Gear  
B. Lever  
C. Inclined plane  
D. Wheel and axle

16. In which of the following pairs of levers is the arrangement of the positions load, fulcrum and effort the same?
A. Craw bar and wheelbarrow  
B. Pair of scissors and nail cutter  
C. Fishing rod and beam balance  
D. Nut cracker and spinners

17. Which of the following is a correct statement about the pulleys?
Pulleys
A. Increase friction  
B. Reduce the weight of the load  
C. Change direction of force  
D. Increase speed

18. Which of the following is an example of force?
A. Weight  
B. Energy  
C. Pressure  
D. Work

19. Which one of the following is NOT an example of an inclined plane?
A. Crow bar  
B. Staircase
20. The diagram below represents a lever in use.

![Diagram of a lever](image)

The load would be moved with the least effort if the distance is increased between the points?
A. J and M  
B. K and L  
C. K and M  
D. J and K

21. In which of the following machines is the effort equal to the load distance?
A. Inclined plane  
B. Wheel and axle  
C. Lever  
D. Single fixed pulley

22. The diagram below represents a fishing rod with points labeled P, Q, R and S.

![Diagram of a fishing rod](image)

When in use the fulcrum is at point?
A. P  
B. Q  
C. R  
D. S
23. Which one of the following pairs of machines consists of lavers only?
   A. Pliers and wedge  
   B. Crow bar and nutcracker  
   C. Screw and scissors  
   D. Bottle opener and knife

24. In which of the following is friction both an advantage and disadvantage?
   A. Dragging a heavy box along the floor  
   B. Moving part of a machine  
   C. Climbing up a hill  
   D. Drawing water from a well using a rope

25. An inclined plane makes work easier by?
   A. Changing the direction of effort  
   B. Increasing effort distance  
   C. Decreasing load distance  
   D. Decreasing the load

26. The diagram below represents a simple machine in use.

![Diagram of a simple machine](image)

Machine is an example of?
   A. An inclined plane  
   B. A wheel and axle  
   C. A lever  
   D. Pulleys

27. The reason for using rollers when moving heavy objects on the floor is to?
   A. Make objects lighter  
   B. Avoid damaging the floor  
   C. Increase the speed of moving objects  
   D. Reduce force that opposes movement
28. The diagram below represents a loaded wheelbarrow.

![Diagram of a wheelbarrow with labels P, Q, R, S, T]

The effort needed to push the wheelbarrow can be reduced by increasing the length of part between
A. P and R
B. Q and R
C. R and S
D. S and T

29. The diagram below represents an arrangement of gear wheels.

![Diagram of gear wheels with labels F, G, H, J and tooth counts]

When wheel H is rotated once in clockwise direction
A. Wheel G rotates three times anticlockwise and J twice anticlockwise
B. Wheel G rotates three times anticlockwise while J rotates twice clockwise
C. Wheel F rotates once clockwise and G three times clockwise
D. Wheel F rotates once anticlockwise and J twice anticlockwise

30. The reason of using a biro pen cap as a pivot in construction of improvised wind vane is to make the arrow.
A. Rotate freely
B. Balance the stand
C. Tail show the direction of wind
D. Head heavy
31. Which on of the following levers when in use the position of the effort between the load and fulcrum?
   A. Spade  
   B. Wheelbarrow  
   C. Claw hammer  
   D. Crowbar

32. A single fixed pulley
   A. Changes direction of force  
   B. Increase effort distance  
   C. Reduces effort required  
   D. Reduces load distance

33. The SHOWN diagram represents a tyre of a vehicle.

   The purpose of threads in the vehicles tyres is to?
   A. Make them last longer  
   B. Increase grip on the road  
   C. Reduce surface area  
   D. Make them lighter

34. The following are activities carried out when making a beam balance but not in the correct order
   i. The arm to find the balance point and mark
   ii. Suspend Make base, a stand and the arm
   iii. Fix the stand to the base
   iv. Suspend tins on both sides of the arm

Which one of the following is the correct order in which the activities are carried out?
   A. (iii) (i) (ii) (iv)  
   B. (ii) (i) (iii) (iv)  
   C. (iii) (ii) (iv) (i)  
   D. (ii) (i) (iv) (iii)
35. The diagram below represents a set up that is used to lift a load.

To investigate the force required to lift the load a spring balance must be at?

A. P  
B. Q  
C. R  
D. S

36. Which one of the following is NOT true about the force that opposes movement? The force
A. Can be reduced by streamlining  
B. Makes the load heavier  
C. Increases effort required to move the load  
D. Produces heat

37. The diagram below represents a simple machine.

Which of the positions labeled P, Q and R would represent the load, effort and fulcrum when the machine is in use?

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<th>Effort</th>
<th>fulcrum</th>
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<td>R</td>
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<td>D. R</td>
<td>Q</td>
<td>P</td>
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38. In which of the following activities is friction LEAST needed
   A. Writing  
   B. Riding a bicycle  
   C. Walking  
   D. Using pulleys

39. Which one of the following statements about a single fixed pulley is true?
   The effort
   A. Moves shorter distance than the load  
   B. And the load moves the same distance  
   C. Moves twice the distance the load moves  
   D. Required is half the load

40. A person intends to push a drum full of oil along an inclined plane on a platform. Decreasing slope of the inclined plane would
   A. Decrease effort applied  
   B. Decrease effort distance  
   C. Decrease load distance  
   D. Not affect the effort applied

41. Which one of the following examples of levers has the position of effort between the position of load and fulcrum when in use?
   A. Spade  
   B. Wheelbarrow  
   C. Claw hammer  
   D. Crowbar

42. In which one of the following is work made easier by changing the direction of force applied?
   A. Ladder  
   B. Flag post  
   C. Staircase  
   D. A road winding up a hill
43. Which one of the following in not a practice for maintaining simple tools?
   A. Oiling
   B. Using them for right purpose
   C. Sharpening
   D. Storing them in a safe place

44. Newton is a unit for?
   A. Mass
   B. Force
   C. Pressure
   D. Volume

45. Which of the following pairs of machines belong to the same group as a ladder?
   A. Claw hammer and bottle opener
   B. Spade and fishing rod
   C. Staircase and road
   D. Handcart and wheelbarrow

46. The following are ways of maintaining tools except?
   A. Cleaning after use
   B. Greasing
   C. Sharpening
   D. Using them regularly
## Answers to Model Revision Test Twelve

### Model Revision Test 12 Answers

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\(^{12}\text{Making Work Easier Unit 12 Answers}\)