college press

New Curriculum

Ventures Primary
Science and Technology

4

T. Sibanda
G. Mujajati
R. Mbiriyakura
C. Verenizhu

Learner's Book

Contents

Topic 1 Health and safety **1**
Unit 1 Human body 1
Unit 2 Diet 10
Unit 3 Diseases and prevention 17
Unit 4 Safety at school and in the community 23

Topic 2 Materials and structures **31**
Unit 5 Characteristics of materials 31
Unit 6 Elements, mixtures and compounds 35
Unit 7 Tools 39
Unit 8 Structures 44

Topic 3 Energy and fuel **49**
Unit 9 Energy 49
Unit 10 Fuel 57
Unit 11 End of term 1 assessment 65

Topic 4 Electricity and electronics **69**
Unit 12 Electricity 69

Topic 5 Design and technology **83**
Unit 13 Elements of design 83

Topic 6 Water **91**
Unit 14 Properties of water 91
Unit 15 Sources of water 94
Unit 16 Water and the Environment 102
Unit 17 End of term 2 assessment 106

Topic 7 Weather and climate **112**
Unit 18 Weather and climate 112
Unit 19 Seasons 120
Unit 20 Weather and climate hazards 123

Topic 8 Soil, plants and animals **128**
Unit 21 Soil 128
Unit 22 Plants 132
Unit 23 Animals 138

Topic 9 Landforms and maps **146**
Unit 24 Landforms and maps 146

Topic 10 Sustainable resource management **151**
Unit 25 Sustainable resource management 151
Unit 26 Forms of waste 157
Unit 27 End of year assessment 163

Topic 1 Health and safety

Unit 1 Human body

In this unit you will:

1. identify different types of teeth and their functions.
2. describe causes and prevention of tooth decay.

Flashback

The body has different parts and needs to be taken care of. These include the teeth, hair, hands, eyes and ears, armpits and pubic area.

Key words

acid, bacteria, cavity, decay, dentist, digest, enamel, gum disease, plaque, swallowing

There are different types of teeth found in the mouth and they have different functions. Teeth are an important part of the human body, as such they should be taken care of to avoid tooth decay. Tooth decay can be caused by what we eat and drink. What one eats or drinks is known as a diet. A balanced diet is eating food which contains all the food nutrients. Eating food that lacks these nutrients may result in the body catching deficiency diseases. A disease is a particular illness in the human body. People should also take care of themselves to avoid getting injured. Accidents can occur at home or school at any time. It is important to be aware of such dangers in order to keep safe. Safety can be achieved by following rules both at home and school.

Teeth and their functions

Below is a model of human teeth. Observe it well. It will help you to know more about a human's teeth.

Figure 1.1 Model of human teeth

Types of teeth

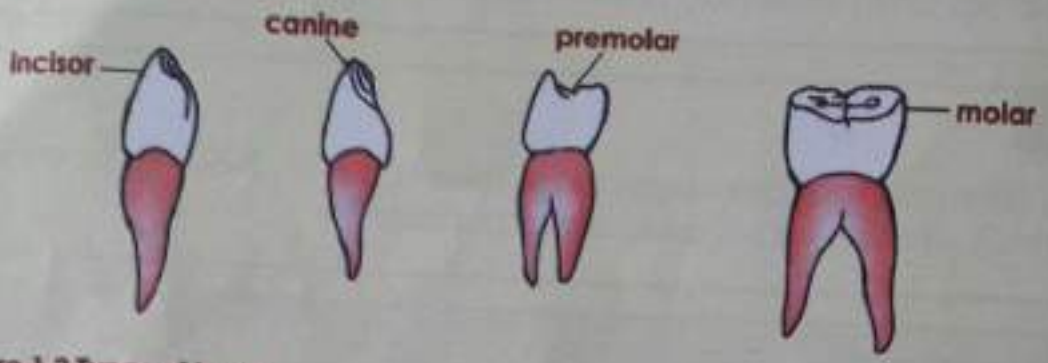


Figure 1.2 Types of teeth

There are four different types of teeth in human beings. These are the incisors, canines, premolars and molars. They do not look the same and they have different functions. An adult or a grown up human being has a total of 32 teeth. Teeth are very important because they help us to chew food and make it easier to digest. To **digest** is to break down food into smaller pieces.

Incisors

The incisor teeth are eight. They are found in front and at the centre of your mouth. Four are on the top and four are at the bottom. They are shaped like small chisels with flat but sharp ends. The incisors are used to chop, cut or bite your food. When a young one is growing, the incisors are the first to grow.

Canines

These are the four pointed teeth on either side of your incisors, two on top and two at the bottom. They are the sharpest teeth in your mouth. They are used for tearing and ripping food apart.

Premolars

The premolars are eight and they are next to the canines. Four are on the top and four are at the bottom. They are also called bicuspids. They are found on the

side of the mouth. The premolars have a different shape from the incisors and the canines. These teeth are bigger and stronger and they have ridges. They are used to crush and grind food.

Molars

These teeth are called primary molars but they are also known as deciduous molars. Adults have twelve molars. Six are at the bottom and six are at the top. The molars are stronger and wider than the premolars and they are stronger. These teeth are the toughest. They work with your tongue at the back of the mouth. They grind and mash up food so that it becomes ready for swallowing. **Swallowing** food is passing food from mouth to stomach.

By the age of twenty (20), adults develop more molars in the back of the mouth. There will be one in each corner of the mouth. These four are called the wisdom teeth and are used to chew tough foods. Some people have them pulled out by dentists to avoid crowding of the teeth. A **dentist** is a person who cares for diseases of the teeth.

Exercise A

1. Draw one of the incisors, canines, premolars and molars teeth.
2. Describe where the teeth are found in the mouth.
3. What are these teeth used for?
   (a) incisors (b) canines (c) premolars (d) molars

Activity 1

Work in pairs.

1. Take turns to play the dentist and patient roles.
2. Do the following activity without touching each other.
3. Imagine that you are a dentist and you want to look at the teeth of your patient. One of you is a dentist and one of you is the patient.
4. Ask the patient to open his or her mouth so that you can see the teeth in his or her mouth.
5. Ask each other any question you like about the teeth.

Activity 2

Debate

1. The teacher will divide your class into four groups. Each group is called by the names of the teeth. Group 1 is called Incisors, Group 2 Canines, Group 3 Premolars and Group 4 Molars.

2. Each group will imagine that it is the most important group of teeth in the mouth. Explain why you think your group of teeth is the most important.
3. Write your reasons in your rough book and use them to present in a debate session.
4. The debate session is done after group discussions.
5. Your teacher will give you marks for each group at the end of the debate.

Fill in the table below about the human teeth that you have learnt.

Name of teeth	How many are they?	Where are they found?	What are they used for?
Incisors			
Canines			
Premolars			
Molars			

Exercise B

1. An adult has a total of _____ teeth.
   A. 42 B. 32 C. 22 D. 52
2. The following teeth are found at the centre of the mouth.
   A. premolars B. molars C. canines D. incisors
3. Why are the molars used to grind and mush up food?
   A. because they are sharp
   B. because they are long and white
   C. because they are stronger and wider
   D. because they are different from others
4. The following teeth are also called bicuspids and they are found on the side of the mouth.
   A. incisors B. canines C. premolars D. molars
5. Why are the molars teeth sometimes pulled out by the dentist?
   A. it is done to improve the mouth
   B. it is done to avoid over-crowding of teeth
   C. it is done to allow other teeth to grow again
   D. it is done to allow food to be swallowed.
6. Which teeth are used to chop, cut or bite your food?
7. What are canine teeth used for?
8. Give a reason why the molars are the largest teeth in your mouth?
9. Draw the premolar teeth and the molar teeth in your book. Explain why these two types of teeth are not the same.

Activity 3

Demonstrations

1. The teacher will invite a local health officer to teach you about human teeth.
2. Ask any question and the health officer will help to explain clearly.
3. The teacher is to bring human teeth types- video and magazines for learners found on for example.
   For learners to watch, enjoy and learn. Available from: https://www.youtube.com/watch?v=XdkOQTei6c
4. Write a short poem explaining what would happen if one has no teeth at all.

Tooth Decay

Our teeth look very strong, but if we do not take good care of them, they can decay. **Decay** is when something goes bad. If our teeth decay, we must visit a dentist who will help us to stop tooth decay. We use our teeth to eat food, so we must look after them well. If we fail to look after our teeth, they will decay and we can end up losing them. When a tooth decays it ends up having a **cavity** which is a hole in the decayed part of the tooth.

Young children have what are called milk teeth. After some time, usually at the age of six (6) or seven (7) the milk teeth fall off and new and permanent teeth grow. If you lose permanent teeth, they will not grow again. So we must look after our teeth for the rest of our lives.

Figure 1.3 (a) adult decaying teeth **(b) child decaying teeth**

What is tooth decay?

Our teeth are coated by a substance called enamel. **Enamel** is the hard outer layer of the teeth. When teeth decay, it is that enamel that gets destroyed as shown in Figure 1.4.

Figure 1.4 Decaying tooth

Signs of tooth decay

A sign is a mark that tells us about something. Before the teeth decay we can see signs. When we see signs we must act to prevent teeth from decaying. The following are some of the signs and symptoms of tooth decay:

1. Toothache
2. Tooth sensitivity
3. Pain when you bite
4. A mild to sharp pain when eating or drinking something sweet, hot or cold
5. Holes or pits in your teeth
6. Black, brown or white stains on the surface of the teeth.

Activity 4

In groups

1. Discuss each of the signs of tooth decay you have learnt.
2. Talk to your friends about yourself, a friend or family member who had these signs.
3. Make a report back to the whole class at the end of the discussion.

What causes tooth decay?

1. There is a substance called **plaque** which is a sticky film of bacteria. Plaque always forms around the teeth of children and even adults. **Bacteria** is an organism which causes a disease.
2. When someone eats or drinks food that contains sugars, the bacteria in the plaque produces acids which attack the tooth enamel. An **acid** is a substance that tastes sour.

3. When the enamel is attacked, tooth decay starts.
4. When plaque builds up in your mouth, it can also cause gum disease which attacks our teeth.

What is gum disease?

Bacteria in our mouth can cause gum disease. When one has **gum disease**, his or her gums become red, swollen and they bleed easily. If you have gum disease you should visit the dentist.

Activity 5

Demonstrating tooth decay

The egg experiment

What you need

A small pot, electric stove (if you have electricity), or a gas stove or firewood, one egg, cold water, vinegar (vinegar is an acid) and a jar.

Procedure

1. Boil the egg.
2. Feel the boiled egg.
3. Feel your own teeth.
4. Talk about the hardness of the boiled egg and the teeth.
5. Is the hardness of the teeth similar to that of the boiled egg?
6. Now put the egg in a container with vinegar and make sure it sinks in the vinegar.
7. Leave the egg in the vinegar overnight.
8. What is likely to happen to the egg tomorrow? (predict).

Results of the experiment

1. Open the jar where you placed the egg yesterday.
2. What has happened to the egg?
3. Does it still look the same?
4. What changes do you see?

We used the egg in the vinegar as an example of a human teeth. The acid in the vinegar broke down the egg shell. The bacteria in the plaque found in our mouths has acid which can break down enamel on our teeth.

Conclusion

We must always brush our teeth after eating sweet foods or starchy foods with sugars. These sugars will form acids that break the hard enamel on our teeth.

Remember

Before you go to sleep, do not forget to brush your teeth with a fluoride(toothpaste). Remember what happened to the egg in the experiment.

Ways of preventing tooth decay

To prevent is to stop something from happening. Teeth can be prevented from decaying by the following:

1. Brush your teeth at least twice a day with a toothpaste that contains fluoride.
2. Brush teeth after each meal and before going to bed.
3. Clean between your teeth with dental floss.
4. Look after your teeth and gums well.
5. Avoid smoking and drinking alcohol.
6. See your dentist often, to check your teeth.
7. Also use salt or soda to brush your teeth if toothpaste is not available.
8. Do not share the same toothbrush.

Activity 6

1. Watch a video on tooth decay.
   Or
2. Bring pictures from a magazine on tooth decay for you to see how teeth decay.

Activity 7

Now, go outside your classroom and do the following activity.

1. Stand in twos.
2. Take turns to open your mouths for each other to see.
3. See if there is any tooth that has changed its colour.

Task

1. A toothbrush is very important. Each one must have his or her toothbrush. Study this toothbrush below.

Figure 1.5 A toothbrush

1. Do you have a toothbrush at home?
2. How many times do you brush your teeth?
3. Draw your toothbrush and colour it as you like.

Exercise C

1. Name the substance that attacks the enamel on our teeth.
   A. incisors B. canines C. premolars D. plaque
2. _____is a sign of tooth decay.
   A. toothache B. noise C. plague D. sugar
3. Identify the name of the person responsible for our teeth when we have problems.
   A. nurse B. doctor C. dentist D. surgeon
4. What does bacteria in the plaque produce?
   A. water B. liquids C. acids D. salt
5. Identify the kinds of foods that cause tooth decay.
   A. protein giving foods B. starchy foods with sugars
   C. calcium and mineral salts D. protective foods
6. Draw a tooth and label the enamel.
7. When should you clean your teeth?
8. Name the important substance that should to be in a toothpaste.
9. How is cavity formed on your tooth?
10. What would you do if you see that you have a gum disease?

Summary

- People have different teeth which are called the incisors, the canines, the premolars and the molars.
- Teeth have different shapes and purposes.
- We use our teeth to chew our food in order to make it ready for digestion.
- Teeth are coated by enamel which is a hard substance.
- The bacteria that is in the plaque, produces acids that attack tooth enamel causing the tooth to decay.
- Tooth decay can be prevented, if we take good care of our teeth.
- We must avoid eating sweet food and brush our teeth at least two times a day.

Unit 2 Diet

In this unit you will:

1. identify food nutrients
2. describe food nutrients and their functions in the body
3. explain balanced diet
4. list diseases caused by lack of certain nutrients.

Flashback

Different foods come from different sources. Food gives us energy, builds our bodies and protects us against diseases.

Key words

balanced diet, carbohydrates, diet, fats, fibre, malnutrition, mineral salts, vitamins, proteins

What is a diet?

A **diet** refers to the kinds of food that a person, animal, or community usually eats.

What is a balanced diet?

A **balanced diet** is a way of eating all of the nutrients that your body needs in the right quantities in order to be healthy.

Food Nutrients

A food nutrient is a component in food that provides nourishment. Living things which are also called organisms use nutrients to survive and grow. Nutrients are found from food in the environment. Nutrients are found in different types of food. The following are different types of nutrients:

(a) Carbohydrates (b) Proteins (c) Fats (d) Mineral salts
(e) Vitamins (f) Fibre (g) water

Functions of food nutrients in the body

Carbohydrates

Carbohydrates are one of the food nutrients that give us starches and sugars. They are a main energy source for the body. When we eat carbohydrates, the body breaks down sugars and starch into glucose. The body cannot function well

without carbohydrates. The following are foods that give us carbohydrates: dairy products, grains like bread, rice and cereal, starchy vegetables like potatoes, sugary sweets and also maize or corn.

Study Figure 1.6 and name the foods that you can see.

potatoes rice maize

Figure 1.6 Foods that provide carbohydrates

Proteins

Proteins are body building nutrients. These include eggs, milk, fish, beans, chicken, nuts and pork. Protein is mainly used for growth and body repair.

Look at the kinds of foods that give us proteins from the Figure 1.7.

egg beans milk meat

Figure 1.7 Foods that provide proteins

Fats

Fats are one of the nutrients that give the body some energy. Fats from fish, nuts, avocados and vegetables are very healthy. Fats from red meat are not healthy. Fat supplies the body with energy.

Study Figure 1.8 showing foods that are high in fat.

butter fatty meat cheese

Figure 1.8 Foods that provide fats

Fats provide warmth to the body. Fats also help to protect our bodies from shock.

Mineral Salts

Mineral salts naturally come from inorganic substances that are extracted from below the ground surface. These include sodium, calcium, ammonium phosphate, potassium, magnesium, chlorine, sulphur and phosphorus. Sodium is the salt that we eat every day. Mineral salts help the body to function normally.

spinach peas cabbage broccoli

Figure 1.9 Foods that provide mineral salts

Vitamins

Vitamins are organic components in food that help our bodies to grow. Vitamins are used in many different ways inside your body. We get vitamins from different foods. Examples of vitamins are Vitamin C, Vitamin B and many others.

Figure 1.10 shows foods that provide vitamins. All these foods can give us vitamins. Vitamins protect the body from diseases.

fruits vegetables

Figure 1.10 Foods that provide vitamins

Fibre

Fibre are the parts of grains, fruits and vegetables that contain cellulose and are not digested by the body. Fibre helps the intestines to absorb water to build stool and causes it to move more quickly through the colon.

Look at Figure 1.11 and name at least four other different foods that give us fibre.

bread

cereal

nuts

Figure 1.11 Foods that provide fibre

Water

Water is a very important nutrient needed by the body. We get water from both the fluids we drink and the foods we eat. Water also assists in removing waste products from the body. Waste products come out of the body as stool, sweat and urine.

What is a balanced diet?

A balanced diet is a way of eating food with all of the right nutrients that your body needs in order to be healthy. Everyone's body is different and often individuals require a different amount and type of nutrients. We must eat food with all the different nutrients that we have learnt about.

Importance of a balanced diet

A balanced diet helps our bodies to function properly. It is important for proper growth and development of the body. It gives the body warmth and energy to do work. It also helps the body to grow and repair body tissues.

Activity 8

Drama on a balanced diet

1. Form groups of six.
2. Imagine that you are a mother or father at home. What foods would you give your children within a week so that they can have a balanced diet?

3. Let the teacher play a video on nutrients for the class.
A video can be found at the following site https://www.youtube.com/watch?v=ZcNpcqtl2yU

Exercise D

Fill in the table below and write the exercise in your books.

Nutrient	Function in the body
Carbohydrates	
Protein	
Fats	
Vitamins	
Fibre	
Water	
Mineral salts	

Exercise E

1. Bread, cereal, rice and pasta are good sources of _____.
   A. vitamins B. carbohydrates
   C. fats D. mineral salts
2. Meat, eggs and beans are good sources of _____.
   A. carbohydrates B. fats C. mineral salts D. proteins
3. Name the food that does not contain fat.
   A. cheese B. butter C. avocado D. rice
4. Which one of the following is a mineral salt?
   A. milk B. iodine C. avocado D. rice
5. Water helps us to remove _____.
   A. sugar B. iron
   C. vitamins D. waste products
6. What is a food nutrient?
7. Name two kinds of food that provide carbohydrates.
8. Where do we get vitamins from?
9. Define the term balanced diet.
10. Explain why proteins are important to our bodies.

Lack of nutrients

It is important that one eats a balanced diet. This means that one has to eat food that contains carbohydrates, proteins, vitamins, mineral salts, fibre and fats. When you do not have a balanced diet you may suffer from diseases.

Deficiency diseases

Lack of nutrients causes deficiency diseases. Some of the diseases caused by lack of certain nutrients are kwashiorkor, goitre and scurvy. These diseases can be prevented when one eats a balanced diet.

Kwashiorkor

Kwashiorkor is a form of malnutrition. **Malnutrition** is lack of enough nutrition. Kwashiokor is caused by a lack of proteins. There are symptoms that show if a person has kwashiorkor. To prevent suffering from kwashiorkor, you should eat foods that contain proteins. These include fish, eggs, meat, beans, peas and nuts.

The symptoms of kwashiorkor include:

1. Change in skin and hair colour to a rust colour and texture
2. Diarrheoa
3. Failure to grow and gain weight
4. Loss of weight
5. Swelling feet and pot belly
6. Flaky rash
7. Fatigue
8. Thin legs.

Figure 1.12 A child suffering from kwashiorkor

Goitre

Goitre is the swelling of the neck resulting from enlargement of the thyroid gland caused by lack of Iodine.

Not all goitres show signs and symptoms. When signs and symptoms do occur they may include:

1. A visible swelling at the base of your neck that may be particularly obvious when you shave or put on makeup
2. A tight feeling on your throat
3. Coughing
4. Hoarseness
5. Difficulty in swallowing
6. Difficulty in breathing.

Figure 1.13 A person suffering from goitre

Scurvy

It is a disease caused by a deficiency of vitamin C. It is characterised by swollen bleeding gums and the opening of previously healed wounds.

Signs and symptoms of scurvy:

1. Feeling very tired
2. Feeling irritable
3. Pain in legs
4. Red spots on skin
5. Swollen gums
6. Joint pains
7. Lack of appetite
8. High temperature.

Figure 1.14 A person suffering from scurvy

Summary

- People need a good diet for them to be healthy.
- Food gives us different nutrients which are carbohydrates, proteins, fats, vitamins, fibre, water and mineral salts.
- The different nutrients help us to have a balanced diet.
- We need to be careful about what we eat so that we can be healthy and prevent diseases.

Unit 3 Diseases and prevention

In this unit you will:

1. identify two parasitic diseases
2. discuss the signs and symptoms of parasitic diseases
3. state breeding places for parasites
4. discuss preventive measures.

Flashback

Germs such as viruses, bacteria, protozoa and fungi cause diseases. How can we prevent ourselves from getting sick?

Key words

bilharzia malaria parasitic diseases protozoa

Parasite

A **parasite** is an organism that lives in or on another organism. It gains from the body where it is sitting. It is fed or nourished by the body where it is living. The body from which the parasite is feeding, does not gain from the parasite. Parasites can live in a human body and they are harmful. Eventually they cause parasitic diseases. The body on which the parasite is living is called a host.

Parasitic diseases

A **parasitic disease** is passed on or transmitted by a parasite. When someone is suffering from a parasitic disease, there are signs and symptoms that show on that person. Examples of parasitic diseases are malaria and bilharzia.

Malaria as a parasitic disease

Malaria is caused by a protozoa called plasmodium. A **protozoa** is an organism that lives as a parasite. The malaria parasite spreads through a mosquito bite. The infected female anopheles mosquito is the one that spreads malaria. Study Figure 1.15 showing a mosquito biting a human being.

Figure 1.15 Mosquito biting a human being

Once a person is bitten by an infected mosquito, the parasite enters the blood through the mosquito's saliva. The parasite burrows into the human skin and breed, laying eggs in our skin.

Activity 9

What can you do to prevent mosquito bites?
Teacher brings a malaria educational video at the following site:-
https://www.youtube.com/watch?v=7jYaxcBRgZQ

Where do mosquitos breed?

Mosquitos breed in unmoving water. Unmoving water sources are water sources that do not flow for example, ponds and lakes. They can also be known as stagnant water sources. We can also find stagnant water at home, when we have rubbish and empty containers lying around. When rain falls, sources of stagnant water increase, leading to a rise in the breeding areas for mosquitos.

Signs and symptoms of malaria.

1. Feeling weak
2. Failing to fall asleep or waking up several times during the night
3. Fever
4. Grinding teeth in your sleep
5. Having pain in muscles or joins
6. High temperature
7. Sweats
8. Vomiting

How to prevent malaria

We prevent the spread of malaria by:
1. Applying insect repellent

2. Sleeping under a mosquito net
3. Taking malaria prevention tablets
4. Wearing long clothes that cover your legs and arms
5. Covering pits and clearing rubbish to prevent the emergance of stagnant water where mosquitos breed.

Areas affected by malaria in Zimbabwe

Look at the map in Figure 1.16. The areas shown in red colour are high malaria areas. The area between the two areas in red colour are not malaria areas. There are zones or areas which are prone to malaria. It means people who live in these areas are likely to suffer from malaria. These are in the northern and eastern regions that border Mozambique and Zambia.

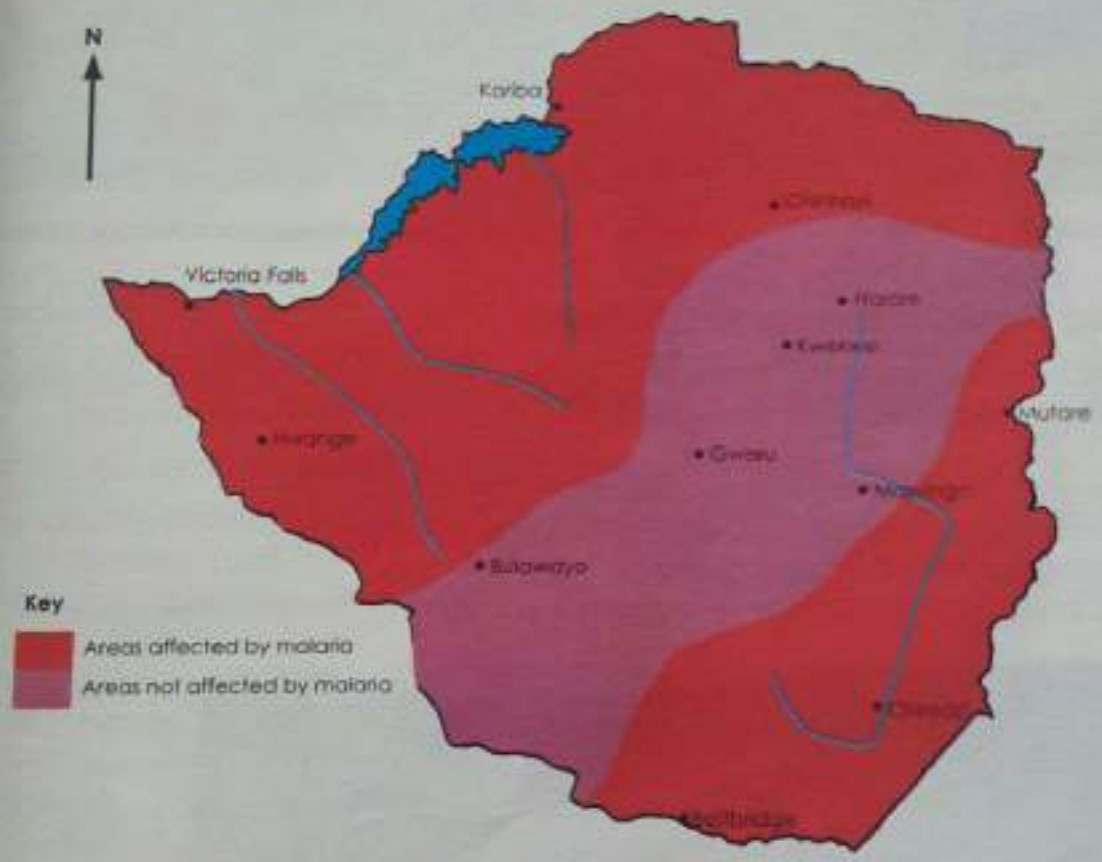


Figure 1.16 Areas affected by Malaria in Zimbabwe

Bilharzia as a parasitic disease

Bilharzia is a parasitic disease which is caused by parasitic worms called schistosoma. Bilharzia is common in ponds, streams and irrigation canals. Small animals called snails live in ponds, streams and even irrigation canals. Those snails transmit bilharzia. If a human being walks barefooted, he or she may get infected by the parasites that cause bilharzia.

A snail

A snail is a small animal that lives in fresh water. Look at the animal in Figure 1.17. Have you seen it before?

Figure 1.17 A snail

Figure 1.18 People doing different activities at a stream

Where do fresh water snails breed?

Snails breed in sources of fresh water like ponds, lakes, rivers, reservoirs and canals. The snail that carries the schistosomiasis breed in those fresh water sources.

Look at Figure 1.18 and answer the questions that follow.

1. Describe what the people are doing.
2. Are these people safe from bilharzia?
3. What can you do to help these people from getting the bilharzia disease?

Figure 1.19 People collecting water from a stream

Study Figure 1.19 and answer the following questions.

1. Are these people safe from the bilharzia disease?
2. What can you do to help them?

Figure 1.20 A pond

Figure 1.20 shows a clear pond. The water is clear but it is not safe for drinking. People can get infected and become sick from drinking clear water. This is because we can not see bacteria or germs with our naked eyes. People should treat water before drinking it.

Signs and symptoms of Bilharzia

Signs and symptoms of Bilharzia infection include:

1. Abdominal pain
2. Anemia (shortage of blood)
3. Blood in stool or urine
4. Coughing
5. Diarrhoea
6. Failing to feel full after having meals
7. Fatigue
8. Feeling weak
9. Having skin irritation or rashes
10. Having high temperature above 38°C
11. Muscle pain.

How to prevent bilharzia

1. Avoid swimming or coming into contact with stagnant contaminated water.
2. Boil water before use.

Exercise F

1. A parasite is an organism that lives in or on another _____.
   A. place B. pond C. stream D. organism
2. If a human being walks barefooted in or near a contaminated river he or she gets affected by a parasite that causes_____.
   A. malaria B. bilharzia C. goitre D. kwashiorkor
3. The following is a sign of someone suffering from bilharzia disease_____.
   A. low temperature B. blood in urine
   C. vomiting D. stomach ache
4. When a human being is bitten by a mosquito, he or she could get _____.
   A. bilharzia B. malaria C. cholera D. typhoid
5. Water snails are known to transmit a disease called _____.
   A. bilharzia B. malaria C. goitre D. kwashiorkor
6. Explain two ways of preventing bilharzia.
7. What is the name of the insect that spreads malaria?
8. Name sources of water that are contaminated where people must not get drinking water.
9. What happens to people when they eat undercooked food?
10. Where do parasites breed?

Summary

- Malaria and bilharzia are parasitic diseases.
- Parasitic diseases are caused by organisms such as the snail and mosquitos.
- Parasites burrow into human skin.
- They breed and lay eggs in our skin.
- Parasitic diseases can be prevented by avoiding contaminated food and water.

Unit 4 Safety at school and in the community

In this unit you will:

1. identify possible accidents that can occur at home and at school
2. discuss safety measures to be implemented at home or school
3. identify danger warning signs at school
4. administer first aid on wounds
5. use appropriate protective clothing.

Flashback

Name the laboratory safety rules.

Key words

accident first aid safety

Possible accidents at home and school

When children are at home or school they need to be safe from danger arising from accidents. An **accident** is an event that causes harm, injury or even death to people. Sometimes accidents are unforeseen.

When we foresee accidents, we should always prevent them. When someone has been hurt in an accident, he or she needs immediate help through what is called **First Aid**. There is need for safety in our schools and homes. **Safety** is a condition that makes one feel protected.

Accidents sometimes happen, but we must know their possible causes so that we can prevent them. When accidents happen, they hurt people or property. Study Figure 1.21 and discuss how accidents can be caused.

There are many different ways accidents in which accidents can happen at home or school. Study Figure 1.21 and discuss which accidents could possibly occur.

There are many accidents that could possibly occur at home and school these include:

- Cuts
- Choking
- Bruises
- Sprain
- Fracture

- Bites
- Poisoning
- Drowning.

Figure 1.21 Causes of accidents

Activity 10

In groups of four.
Discuss how the possible accidents mentioned could happen at school and at home.

Safety measures are actions put in place to prevent an accident or harm to people.

Safety measures around the home

Possible accident	Preventive safety measure
Cuts	Do not handle sharp objects such as knives, scissors and razor blades without the help of an adult.
Burns	Always ask an adult to assist you when handling hot pots and pans from the stove. Wear kitchen gloves when handling hot things.
Choking	Sit comfortably when eating a meal. Eat your food slowly, making sure you chew your food adequately.
Bites	Always sleep under a mosquito net.

Drowning	Do not go swimming without an adult. When you see someone drowning go and call for help from an adult. Do not attempt to rescue them yourself.
Electric shock	Do operate electric appliances with wet hands. Do not place sharp metal objects in an electric socket.
Fracture	Avoid climbing to get something from those hard to reach places like cupboards, refridgerators and so on. Call an adult to come fetch it for you.
Poisoning	Do not eat plant leaves. Do not touch or use detergents or insecticides and pesticides.

Safety measures in school

Possible accidents	Preventive safety measures
Falls	Always put litter such as banana peels in the bin. Always make sure your shoe laces are tied. Do not run in corridors or in the classroom.
Burns	Follow the safety rules of the laboratory. Do not operate a bunsen burner without the help of the teacher.
Drowning	Do not go to the swimming pool in the absence of the teacher.
Sprain and fracture	Follow rules of sporting games. Do not shove or push each other.

Safety measures in a school

These are steps taken to make sure that school learners and everyone else in the school is safe from danger. Accidents must always be prevented. In trying to prevent accidents, there is need to have safety drills in school. This is where all learners are trained on how to behave when there is an unwanted fire in the school.

Activity 11

Group work: A discussion

1. Go round your school in groups and see areas where accidents can happen.
2. What could be the causes of the accidents?
3. What would you do to prevent the accidents from happening?

Danger warning signs in the school and the community

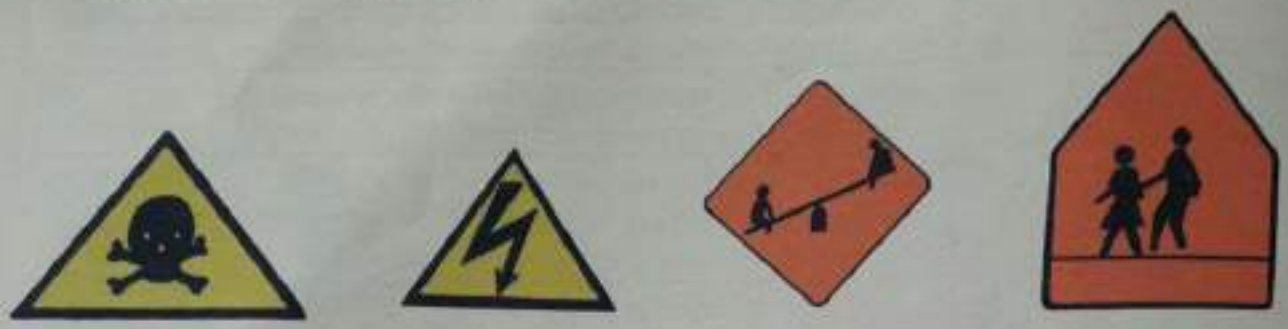


Figure 1.22 Danger warning signs

Activity 12

1. What does each sign mean in Figure 1.22?
2. Go round your school in groups and identify all the danger warning signs around.
3. Draw and name each two of them, for example, a hump, drive slowly or children crossing and so on.

First Aid

When accidents happen, we should give help to the injured person by doing First Aid, before the person is taken to the clinic or to the doctor for full treatment. An accident can cause a cut, bruise or wound.

Administering first aid on wounds

When someone is bleeding, we put direct pressure on the cut with a clean cloth until the bleeding stops. The wound can also be cleaned with soap and warm water. Then the wound must be protected from infection or dirt getting into it. The last thing is to take the injured person to the clinic or doctor for full medical attention.

Contents of the First Aid Kit

1. Plasters in a variety of sizes and shapes
2. Small, medium and large sterile gauze dressings
3. At least two sterile eye dressings
4. Triangular bandages
5. Crêpe rolled bandages
6. Safety pins
7. Disposable sterile gloves
8. Tweezers

Figure 1.23 First aid kit contents

What is the use of each of these items which are found in a First Aid Box?

What is protective clothing?

Protective clothes are worn to prevent people from being hurt in the home or at work.

Activity 13

Group

1. Study the Figure 1.24.
2. Name each one of them.
3. When is it worn?
4. Why is it worn?

Figure 1.24 Protective clothing

Activity 14

In groups of four, do a drama play.

Group 1: Dealing with unwanted fire

Imagine that there is an unwanted fire at your school. What would you do to prevent learners from the accident?

Group 2: Preventing accidents

Imagine that you have been asked to water the school garden. What would you do before working in the garden to prevent accidents?

Group 3: How to administer First Aid

Imagine that your classmate has been wounded by a hoe while working in the school garden. He is bleeding and you want to help to stop the bleeding. In your groups follow all the steps needed to stop the bleeding.

Group 4: Designing

Think of different warning signs that help people to prevent danger. Design 4 different danger warning signs like the stop sign and draw them in your exercise books.

Exercise G

1. An accident causes_____.
   A. harm and injury
   B. hatred and injury
   C. sorry and injury
   D. parasites and injury
2. First Aid is the help given _____.
   A. at the clinic
   B. at the surgery
   C. at the doctor's room
   D. just after the accident by the person close
3. The following are protective clothing **except**_____.
   A. overall
   B. helmet
   C. gloves
   D. skirt
4. The purpose of having danger warning signs in the school yard is to_____.
   A. teach children
   B. make the school look different from other schools
   C. to prevent accidents from happening
   D. decorate the school
5. When someone gets a wound, it must be protected from_____.
   A. heat
   B. cold
   C. infection
   D. sunlight
6. Name two situations where safety clothing must be worn.
7. Explain the importance of safety measures in a school.
8. Why do we need to put on safety clothing?

9. Draw any two signs found in a school that help to prevent children from accidents.
10. Why is First Aid important to school children?

Summary

- Safety is very important in the homes, schools and community.
- It is important to prevent accidents before they happen.
- People should prevent accidents at home, work and school.
- Sometimes, it is necessary to put on safety clothing.
- All schools must have safety signs.
- When an accident happens, the people around must help with First Aid to the one who is hurt.

Glossary

appetite – a desire, especially one for food or drink
contaminate – to make unclean
environment – the surroundings or conditions in which a person, animal, or plant lives or operates
permanent – lasting or remaining without change
undercooked – not well cooked

End of topic assessment

Multiple choice

1. The following are human teeth **except** _____.
   A. incisors B. premolars C. molars D. bones
2. When teeth decay, it means they get _____.
   A. long B. rotten C. thinner D. whiter
3. An adult has a total of _____ teeth.
   A. 22 B. 32 C. 42 D. 52
4. The incisors make a total of_____ and they are found in front of the mouth.
   A. 10 B. 8 C. 4 D. 9
5. The incisors are used to_____.
   A. chop food B. grind food C. mesh food D. swallow
6. Our teeth are quoted by a substance called _____.
   A. milk B. enamel C. gums D. incisor
7. Malaria and bilharzia are _____diseases.
   A. parasitic B. stomach C. children's D. women's

8. Parasites breed diseases in our _____.
   A. house B. class C. skin D. food
9. The malaria parasite spreads through a mosquito _____.
   A. bite. B. legs C. eyes D. wings
10. Bacteria in our teeth can cause_____.
   A. gum disease B. teeth to grow
   C. teeth to straighten D. join each other

Structured questions

1. What is malnutrition?
2. List the four main types of human teeth.
3. Name the type of person that treats tooth decay.
4. Give any sign of tooth decay.
5. Which type of mosquito causes malaria?
6. Explain the use of canine teeth.
7. Why is a dentist important to people?
8. What is the difference between milk teeth and permanent teeth?
9. What causes goitre?
10. Explain how you can help people from getting a disease called bilharzia.
11. What is an accident?
12. Why do we take someone to a clinic after doing First Aid?

Topic 2 Materials and structures

Unit 5 Characteristics of materials

In this unit you will:

1. describe properties of material.

Flashback

Material refers to any substance in which a thing is made. Therefore, material can be naturally made or it can be man-made. List man-made and natural materials you know.

Key words

brittle elasticity flexible fragile hardness rigidity properties softness

Material is the type of matter from which something is made out of. It can be natural or man-made and has many properties. It is used to make different items. Material also has a mass meaning that you can weigh it. It is recognised by appearance mostly but sometimes with the help of our senses. An element is the basic substance in nature and cannot be broken down further into smaller parts. A mixture is the combination of two or more substances. There are different ways of separating mixtures. These are sieving, filtration, evaporation and distillation.

Activity 1

Study Figure 2.1 and name each item and the material used to make it.

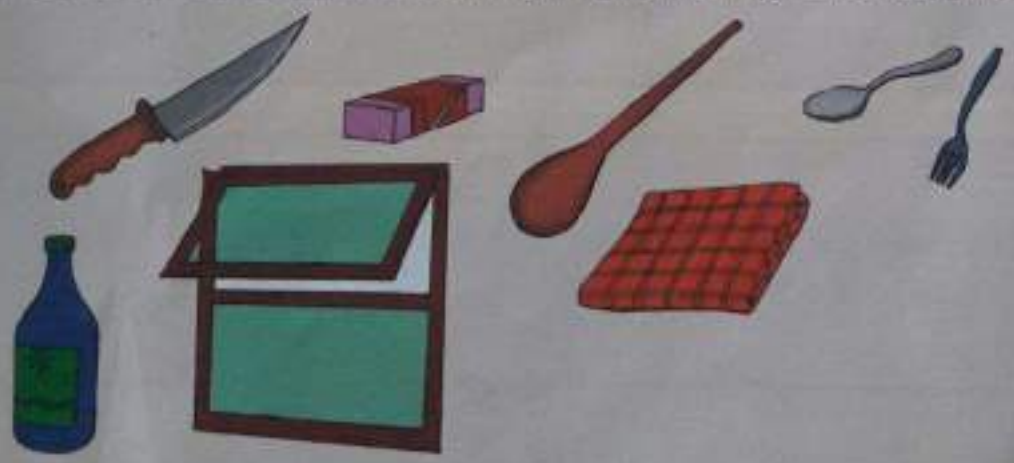


Figure 2.1 Items made from different materials

Materials have different properties. Property is the quality of material.

Study Table 2.1 below and learn to describe the different properties of materials that we find in our homes and around us.

Table 2.1 Property of material

Item	Material that it is made of	Description of material
Knife	Metal	Hard
Rubber or eraser	Rubber	Soft
Cooking stick	Wood	Rigid
Bottle	Glass	Fragile
Elastic	Rubber	Elastic
Dish towel	Cotton	Inelastic
Clay pot	Clay	Brittle

Activity 2

1. In groups, make a list of six materials with different properties.
2. For each different item, describe what it is made of.
3. For the same items, describe the material that it is made of.
4. In your exercise book, make a table like that one above and complete it in full.

Activity 3

A discussion: Comparison of materials

1. Compare the material that is used to make a knife with that used to make a cooking stick.
2. What is the difference between a dish towel and a bottle of soft drink?
3. Compare the material that is used to make rubber with that used to make a dish towel.

Activity 4

Draw and name the following items and show the material that it is made of: (a) a football (b) a skirt (c) windscreen (d) bicycle tyre (e) bedroom door (f) baby sun hat

Activity 5

1. Make a list of uses of each type of material in everyday life:
   (a) glass (b) wood (c) rubber (d) cloth (e) metal

Materials and their use

In our everyday life people make use of goods or items. The goods are used for different purposes that suit them. Goods are made of a substance called matter. Everything around us is made up of matter and it can take up the state of a solid, liquid or gas. For example, a knife is made of metal because it has to cut different things. We use cotton to make clothes because cotton is soft and flexible. When we say cotton is flexible it means it is not stiff. It is not rigid. We are able to wear clothes because they are not rigid.

Glass is used to make windows because it is transparent. When we say it is transparent it means we can see through it. When we are in our houses we see the outside through the windows. When driving or moving in the car we see through the car windows.

Objects like clay pots and dinner plates are brittle. They are hard but fragile. To be **fragile** means they easily break. Clay pots can be used as water containers or pots. However, when put under pressure they break.

A cooking stick is made of wood because it does not conduct heat. To conduct heat means to be able to hold heat.

Activity 6

Handling of materials in order to find their properties.
Pair Work

1. Collect different materials and name them.
2. Handle each material and feel it and describe it.
3. State the suitable use of the item made from the different material.

Activity 7

1. What is a can of beef made of?
2. What is a book shelf made of?
3. Identify the different types of materials that can be used to make a container for drinking water.
4. What type of material is needed to make overalls or jackets for work?

Exercise A

1. Material refers to_____.
   A. any substance of which a thing is made
   B. metal objects only
   C. wooden objects only
   D. glass objects only
2. Naturally made material is_____.
   A. made by man
   B. not made by man
   C. made by a few men
   D. made by few men and women
3. Material that is described as fragile can be clay or can be_____.
   A. wood
   B. metal
   C. glass
   D. rubber
4. Name the type of matter that makes clothes.
   A. rubber
   B. elastic
   C. cotton
   D. metal
5. Why do we use glass for windows in our homes and vehicles?
   A. because it is transparent
   B. because it is shadowy
   C. because it is cheap
   D. because it very expensive
6. Name one object made from rubber.
7. Why is a cooking stick made of wood?
8. What do we mean when referring to properties of material?
9. Explain the difference between glass material and metal material?
10. Draw and name two different materials that are used to make objects.

Summary

- Characteristics refer to features that make up different materials.
- Material that is used to make objects must be suitable for its use. For example, knives are made of metal because they need the strength to cut objects.
- Windows are made of glass, because we need to see through them.
- Rubber is elastic which means that it is not rigid. It is also flexible because it can stretch. Rubber is resistant to water. It is used in making vehicle tyres because tyres must not be rigid as they move on the ground.

Unit 6 Elements, mixtures and compounds

In this unit you will:

1. explain how to separate different mixtures
2. demonstrate separation of mixtures.

Flashback

Solids are removed from liquid by the process of filtration. Distillation is a process used to purify water.

Key words

compounds elements solute solvent solution

Separating mixtures

In Science we learn about elements, mixtures and compounds. Mixtures are separated using different ways.

What is a mixture?

A mixture is a group of different substances put together. We can, therefore say a mixture is a substance that is made by combining or putting together two or more different materials.

Whenever we have a mixture, it must be a substance that can be separated back into what it was before the mixture. For example, we can have salt and sugar solution which is used to treat people suffering from diarrhoea or a running stomach. In this case, salt and sugar solution is a mixture but we can separate the solution. You can get back the sugar and the salt. You are now going to learn how to separate mixtures.

There are many methods that can be used to separate mixtures. Some of them include the following:

i) Sieving
ii) Filtration
iii) Evaporation
iv) Magnetism.

How to separate different mixtures

Sieving

In this section, we are going to learn how to separate grain and chaff mixture through sieving. Grain refers to a seed of a cereal like rapoko or wheat. Grain can be separated, for example you can handpick wheat from rapoko. You can also sieve or filter the grain. In this case, the wheat seeds may not go through a sieve with small outlets. Therefore, we are able to separate the grains from the chaff.

Figure 2.2 Separating a mixture by sieving

Filtration

Another method of separating a mixture is called filtration. Filtration is a method that is used where we want to separate, for example, sand and water. Water can be filtered as we remove sand particles. For example, water can pass through filter paper leaving the sand behind.

Figure 2.3 Separating mixture by filtration

Evaporation

Evaporation is another method of separating mixtures. It is well used where we have a solution. The solution can be heated until the solvent turns into a gas. When a liquid turns into a gas we say it is evaporating. The other substance that cannot evaporate will remain behind. That way we will separate the substance that can evaporate from the substance that cannot evaporate. For example, if we have a mixture of sand and water, water can evaporate leaving behind the sand that cannot evaporate.

Figure 2.4 Separating mixture of sand and water by evaporation

Magnetism

This refers to the ability to attract other particles. There are some materials that are attracted by a magnet and there are others that are not. When we use magnetism, we can also separate materials. We use a magnet to attract for example, metal objects and those that are not metal will not be attracted. By taking that action, mixtures can be separated.

Activity 8

Demonstration

1. In groups of four, separate materials of the following kinds after the teacher's demonstrations of the four groups of substances below (a to d).
   a) Salt solution through evaporation.
   b) Grains from cereals by sieving.
   c) Metal particles from wooden particles by using a magnet.
   d) Sandy water by filtration.

After the experiments, each group takes a turn to explain to the whole class.

Activity 9

Group work

1. Explain the differences between sieving and evaporation.
2. Explain how magnetism can be used to separate materials.
3. How can filtration be used to separate materials.
4. Explain how evaporation is used to separate materials.

Summary

- Different materials can make up a mixture.
- A mixture can be separated.
- Mixtures can be separated in different ways.
- Sieving, filtration, evaporation and magnetism can be used to separate mixtures.

Exercise B

1. A mixture _____.
   A. is a substance that is made by combining or putting together two or more different materials
   B. is a substance that is not made by combining or putting together two or more different materials
   C. is a substance that forms when two or more elements chemically react
   D. is a substance that attracts other particles.

2. The process of separating metal filling from wood shavings is called_____
   A. filtration B. magnetism C. sieving D. decanting
   D. a method of separating a mixture.
3. When we separate impurities from water the process called_____.
   A. sieving B. filtration C. evaporation D. distillation
4. How best can you separate a grain mixture?
   A. distillation B. sieving C. electrolysis D. filtration
5. When we separate water from sand, the process or activity is called _____.
   A. sieving B. evaporation C. filtration D. distillation
6. What do you understand by the word mixture?
7. What is the difference between filtration and distillation?
8. How do you separate a grain mixture?
9. Draw a sieve and label it.
10. What is the difference between evaporation and sieving?

Unit 7 Tools

In this unit you will:

1. design tools of own choice
2. construct an artefact from sketches
3. modify tools to increase efficiency.

Flashback

Tools are used to make work easier. Name kitchen tools and garden tools you know.

Key words

design sketches

There are many tools used at home. These include kitchen tools, garden tools, building tools and many other household tools.

Activity 10

In groups of four.

1. List 5 examples of kitchen tools.
2. List 5 examples of garden tools.
3. List 5 examples of building tools.

Materials used to make different tools

Tools are made from different materials. In Zimbabwe we keep flowers in different containers. Flower pots are made from different materials like clay, metal, plastic and so on.

plastic

clay

metal

Figure 2.5 Different types of flower pots

We would like to design flower pots from readily available materials

How to design tools

To design means to make a plan of something. When you design a tool, it means that a plan of how the tool will look like is made.

When designing a tool we must remember the elements of design we learnt in Grade 3 Unit 5 'Design and Technology'. These are:

(a) Form
(b) Balance
(c) Colour
(d) Lines
(e) Texture.

When sketching a design, you draw what your tool will look like. You even colour in the final design

Figure 2.6 Shows designs of different flower pots

Figure 2.7 Sketch designs of flower pots

Construction of artefact from sketches

When the design is available, we then look for the materials to construct the artefact, for example, a flower pot. Collect the materials and begin the construction. The final product should be close to the sketch design as much as possible.

Safety should be exercised when making artefacts. Ask your teacher to assist you when cutting parts with a scissors or any other sharp objects.

Activity 11 Project Work

Individual Work

1. Sketch a design of a flower pot.
2. Collect materials to make your flower pot.
3. Mould or make your flower pot

Activity 12

When your flower pot is completed, plant a flower of your choice and water it.

Modifying tools to increase efficiency

There are a lot of ways we can use to modify tools to increase efficiency. For example, in Zimbabwe some people keep drinking water in plastic buckets and some in clay pots.

Figure 2.8 Water containers

In order to make the containers/tools more efficient, people have added plastic taps to water containers. Some have even added electric elements to plastic containers so that they can easily heat their water. To clay pots, some have included handles for easy handling.

Table 2.1 shows original tools and their modified version

Table 2.1 Tools and their modifield version

25 litre water bucket	25 litre water bucket with tap
25 litre water bucket with electric element	
Clay pot	Clay pot with a lid and handles
School trunk or suitcase	School trunk or suitcase with wheels
Knife	Folding knives

Exercise C

1. The following is a kitchen tool.
   A. a hoe B. a cooking stick C. a shovel D. a spade
2. The following is a garden tool.
   A. a hoe B. a cooking stick C. a shovel D. a spade
3. The following is a building tool.
   A. a hoe B. a cooking stick C. a trowel D. a dish
4. A cooking stick is made of _____.
   A. wood B. metal C. China D. glass
5. A trowel is made of _____.
   A. glass B. wood C. metal D. paper
6. What is a design?
7. Give two tools you can modify and state how you can modify them?
8. Draw any one tool and label it.

Summary

- Tools are used by people when they want to do some work.
- Tools are found in different groups which are garden, kitchen and building tools.
- Tools can be designed.
- A design is a plan of something.
- Tools can be modified to improve efficiency.

Unit 8 Structures

In this unit you will:

1. identify natural structures in the environment
2. construct models of structures
3. relate structures and their functions
4. appreciate the aesthetic value of structures.

Flashback

Different structures are found in rural areas and urban areas. Give 3 examples of common structures found in rural areas.

Key words

Aesthetics natural-structures

A structure is something that is built or created. It is found in two forms which are natural or man-made. This unit will deal with the natural forms of structures. **Natural structures** include beehives, birds' nest and cave etc. These structures are the ones created by nature. The relationship between structures and their function is based on how they are shaped. Natural structures are also important in making the environment beautiful.

A spider web, for example, is shaped like a net in order to capture food and it is also shelter

Other functions:

- Sheltering
- Lifting
- Communicating
- Separating
- Storing

Aesthetics is accomplished by shape, texture, type of material and the simplicity of the repeated patterns used in design, for example, a beehive.

Caves

It is a hollow place on the ground, or on the side of a hill, cliff or mountain. Caves

form naturally through a process called weathering. Common caves in Zimbabwe are Chinhoyi caves, Domboshava caves and many others.

Figure 2.9 Chinhoyi caves

Mountains

A large rise of the earth's surface is called a mountain. A mountain is higher than a hill and some of them have very steep sides. The highest mountain in Zimbabwe is Mount Nyangani.

Figure 2.10 Mountains

Activity

In groups.

1. Find out where Mount Nyangani is located in Zimbabwe.
2. Research on the height of Mount Nyangani.
3. Present your findings to the class.

Kopjes

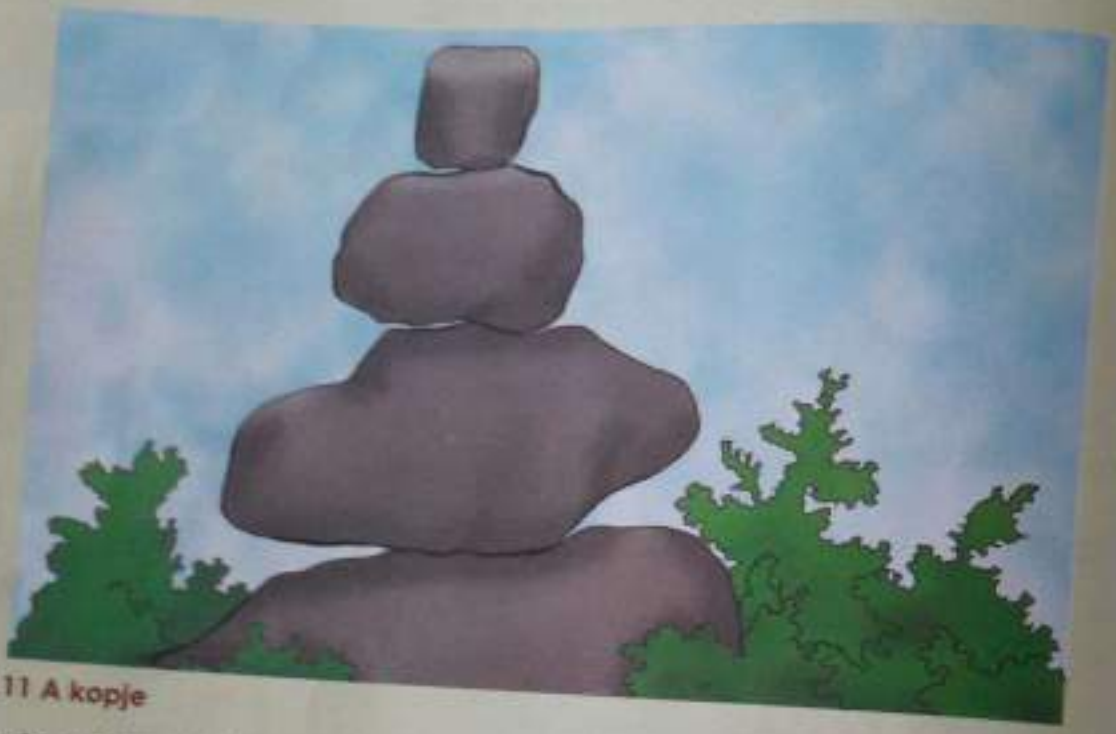


Figure 2.11 A kopje

A kopje is a natural structure which is formed by balancing rocks. The balancing rocks are found in many parts of Zimbabwe, and are particularly in Matopos National Park and near Epworth to the southeast of Harare. These were formed naturally and balance without support.

Functions of structures

Caves

Long back caves have been used as places of shelter and as homes by people. In more modern times, a few caves are still used as shelters by religious people and as temple. In other countries some caves are used as storage places, or for growing mushrooms or aging and storing cheese and wine, because of their temperatures and absence of light. Others have been used as factories and stores during periods of war. Some people choose to live in caves, others to use them for entertainment. Caves are also used in advertising.

Mountains

Many people living in lowlands benefit from mountains. They are the sources of both major and small rivers on Earth. Mountains also play an important role in the water cycle because they capture moisture from the atmosphere and release it in the form of snow or water, which is essential for industries, settlements and agricultural activities downstream. Water from mountains is also used to generate hydroelectric power. Renewable energy from mountains promotes economic development, especially in rural areas.

In Zimbabwe wood fuel from mountains is the main source of energy. They provide wood for timber for local use and export. They are also provide wild foods, such as mushrooms, birds and game. Mountains also provide ground for recreation, sporting and tourism activities. People do mountain climbing, for example, in Chimanimani.

Kopjes

The balancing rock formations are seen throughout Zimbabwe. The natural shelters formed by the rock formations in the Matopos Hills, which are part of the Matopos National Park in Central Zimbabwe, have been in existence since long ago. These have contributed to the development of rock art Zimbabwe. The balancing rock are also seen on the Zimbabwean dollar. The most commonly known balancing rock formation is of the Motabo Hills, which is the inselberg of "Mother and Child Rock formation". It has become a tourist attraction.

Exercise D

1. A structure is a _____.
2. _____ is a structure with balancing rocks.
3. Name two natural structures.
4. What is the function of mountains?
5. Which animal lives in a cave?
6. The natural structures are a tourist centre. True or false
7. The Zimbabwean dollar has a picture of caves. True or false

Summary

- A structure is a built or created.
- Structures make the environment beautiful.
- They attract tourist and have different functions such as providing shelter for people and animals.
- In Zimbabwe commonly known structures are Chinhoyi caves, Mount Nyangani and Matopo Hills.

Glossary

combining	–	to join two or more substances to make a single substance such as a chemical compound or mixture
grain	–	a small seed of fruit of cereal crop
pressure	–	the act of pressing
separation	–	the act or process of moving apart or forcing something apart
sieving	–	a process of separating substances using a utensil of wire mesh or closely perforated metal or plastic

End of topic assessment

Multiple choice

1. Windows are made of _____.
   A. wood B. glass C. plastic D. metal
2. A glass is _____.
   A. soft B. elastic C. fragile D. hard
3. The following are made of wood except _____.
   A. a desk B. a chair C. a ruler D. cardboard
4. We can separate soil and water by a method called _____.
   A. filtration B. evaporation C. sieving D. magnetism
5. _____ is an element of design.
   A. sketch B. colour C. design D. flower
6. We can modify a tool to increase its _____.
   A. efficiency B. design C. length D. height
7. Chinhoyi caves are found in _____.
   A. Zambia B. South Africa C. Mozambique D. Zimbabwe
8. Balancing rocks are called a _____.
   A. mountain B. river C. kopje D. cave
9. Lions live in a _____.
   A. kopje B. mountain C. hive D. cave
10. Which statement is true?
    A. Caves where not used as homes long ago.
    B. Caves are used as a storage place.
    C. Caves are not found in Zimbabwe.
    D. People do not use caves as shelter.

Structured questions

1. List 3 natural structures found in Zimbabwe.
2. What is a window made of?
3. Name three items made from plastic.
4. What method can you use to separate water and salt?
5. Which mountain is found in Zimbabwe?

Ventures Primary Science and Technology

Learner's Book Grade 4

THE HEAD
MTCH BEZ PRIMARY SCHOOL
P.O. M 5212, BULA, AYO
TEL: 0284 20392
DATE

college press

college press

New Curriculum

Ventures Primary
Science and Technology

T. Sibanda
C. Nhamoti
F. Mbiriyakura
C. Verenizhu

Learner's Book

Topic 3 Energy and fuel

Unit 9 Energy

In this unit you will

1. identify forms of energy
2. describe forms of energy
3. demonstrate kinetic and potential energy in action.

Flashback

What is energy?

Key words

kinetic energy potential energy

Energy is the ability to do work. There are many forms of energy. These are heat, sound, light, to name a few familiar sources. There is also potential and kinetic energy. **Potential energy** is energy stored in an object in the same position. **Kinetic energy** is the energy found in a moving object. A fuel is a material that if burnt it produces heat. An example of a fuel is coal, wood, oil to name a few. In order for burning to take place there must be a fuel, air to supply oxygen and heat. One should take precaution when burning fuels as they are hazardous.

Figure 3.1 Energy and fuel hazards

Forms of energy

Energy is the ability to do work. For example, the energy in our bodies enables us to do many things. The energy in our bodies enables us to walk, to run, to play, to talk, to sing and to think. There are many different forms of energy.

Different forms of energy.

A ball moving in the air has got energy. The energy contained by moving bodies is called **kinetic** energy.

Figure 3.2 Kinetic energy

A stove produces **heat** energy. Burning wood also produces heat energy.

Figure 3.3 Heat energy

A radio produces **sound** energy.
A drummer playing a drum produces sound energy.

Figure 3.4 Sound energy

A bulb can produce **light** energy if electricity is switched on.
A lamp can produce light energy.

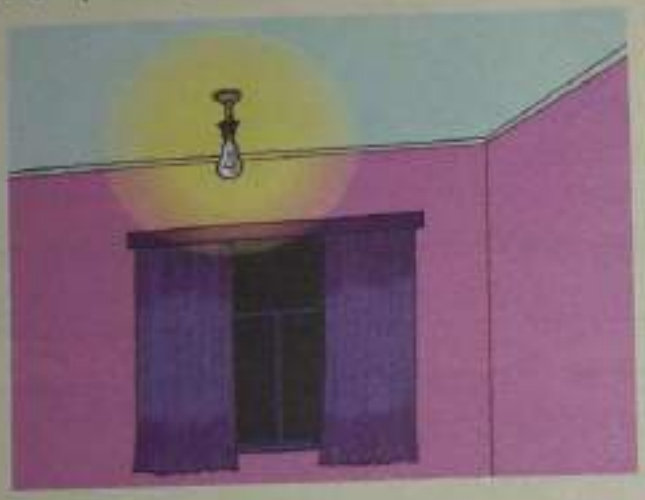


Figure 3.5 Light energy

An apple hanging on a tree and is about to fall has got **potential** energy.

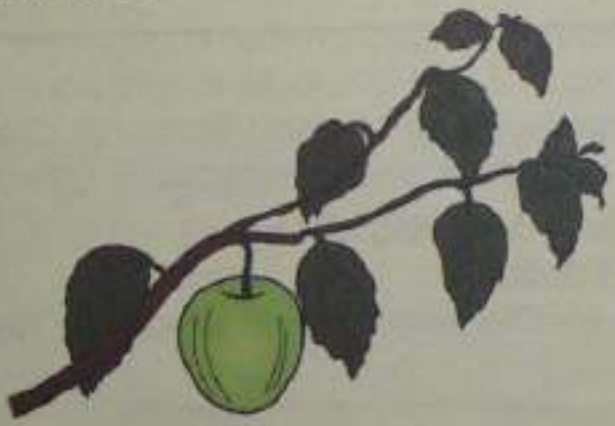


Figure 3.6 (a) Potential energy

A ball hanging at a corner of a table and is about to fall to the ground has got potential energy.

Figure 3.6 (b) potential energy

Activity 1

In your groups, carry out the following activities that can demonstrate how energy can make things work.

1. Switch on a bulb to show how it can produce light energy.
2. Switch on a radio to show how it can produce sound energy.
3. Play some drums so as to produce sound energy.
4. With the help of the teacher, light a candle with a match stick so as to produce heat energy.

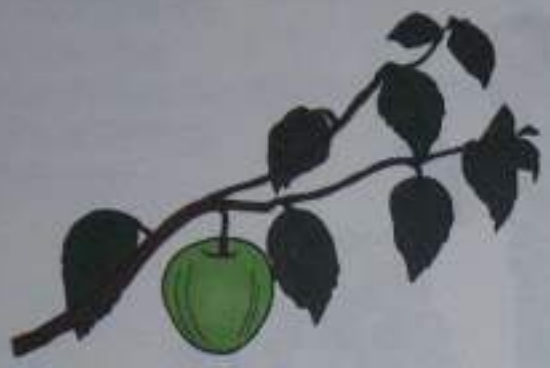
Activity 2

1. Kick a ball to show potential and kinetic energy.
2. How else can you produce potential energy?
3. How else can you produce kinetic energy?

Exercise A

1. _____ is the ability to do work.
   A. lightning B. water C. energy D. thunder
2. What type of energy does a moving ball have?
   A. light B. kinetic C. sound D. chemical
3. A bulb that has been lit after switching on electricity has got _____ energy.
   A. movement B. sound C. potential D. light

4. A fruit that is about to fall from a tree has got _____ energy.
   A. kinetic B. potential C. sound D. light
5. A ball that is about to be kicked by a girl playing football has got_____ energy.
   A. potential B. kinetic C. sound D. electric
6. Say whether the following statements are true or false.
   (a) Energy can be passed from one object to another. True/False
   (b) We get energy from eating food. True/False
   (c) Burning wood does not produce energy. True/False
7. Where does the energy we use when we are running come from?
8. The diagram below shows an apple that is about to fall from a tree branch.



Look at the diagram above and answer the questions below.
(a) What type of energy is contained in the fruit that is about to fall?
(b) As the fruit is falling to the ground, it will be containing _____ energy.
(c) What do we call energy contained by a radio playing music?
(d) Name the energy contained by an electric bulb that enables us to see things.

Potential energy and kinetic energy in action

Kinetic energy is the energy in a moving object. **Potential energy** is any form of energy that is stored in an object at a position. Energy can pass from one form to another. For example, an apple hanging on a tree has potential energy. If the apple falls and it is moving, it becomes kinetic energy.

Figure 3.7 shows how potential energy can be changed into kinetic energy.

Figure 3.7 Changing potential energy to kinetic energy

Activity 3

Your teacher takes you to a nearby children's play centre so that you can demonstrate how potential energy is passed on to kinetic energy.

1. On a slide, identify the position of potential energy and that of kinetic energy.
2. On a swing, identify the position of potential energy and that of kinetic energy.

Exercise B

1. A pressed spring contains _____.
   A. potential energy B. sound energy
   C. kinetic energy D. light energy
2. A released spring moves forward because it now contains _____.
   A. potential energy B. sound energy
   C. light energy D. kinetic energy

3. A child seated on top of a slide as shown in the diagram above contains _____.
   A. kinetic energy B. potential energy
   C. light energy D. sound energy
4. A child sliding downwards to the ground has got _____ energy.
   A. sound energy B. chemical energy
   C. potential energy D. kinetic energy
5. A moving ball has got _____.
   A. electric energy B. sound energy
   C. potential energy D. kinetic energy
6. The energy contained by an object that is about to fall or move is called _____.

7. Name the energy that is contained in a moving body.
8. A child seated on top of a slide contains _____ energy. When the child is now sliding down we say the potential energy has been converted to _____.
9. A ball that is about to be kicked contains _____ energy.
10. A ball that has been kicked and is now moving contains _____ energy.

Summary

- Energy is the ability to do work.
- There are different forms of energy such as kinetic, potential, sound, heat, and light.
- Forms of energy can be changed from one form to another.
- Potential energy is energy possessed by a body because of its position.
- Potential energy can be changed to kinetic energy.

Unit 10 Fuels

In this unit you will:

1. discuss conditions necessary for fuel to burn
2. identify fuel hazards
3. suggest safety precautions.

Flash back

Fuel is found in three forms. Give an example of each form.

Key word

oxygen

Conditions necessary for fuel to burn

Oxygen

Oxygen is a very important gas that we find in the air around us. All animals and plants need oxygen for them to respire and produce energy that keeps us alive. Without oxygen, all animals and plants will die. We want to find out if oxygen is necessary for fuel to burn.

Activity 4

Experiment

You will need: candles, a **transparent** glass tumbler or beaker

Light two candles, cover one of the candles with a transparent glass tumbler or beaker (through which we can see).

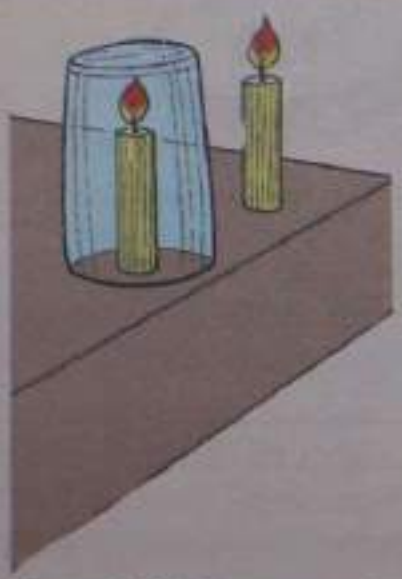


Figure 3.8(a) Presence of oxygen

1. After a few minutes, what can you see?
2. Which of the two candles is still burning?
3. What has happened to the candle covered by a tumbler or a beaker?
4. Repeat this experiment and see if you will get the same results.

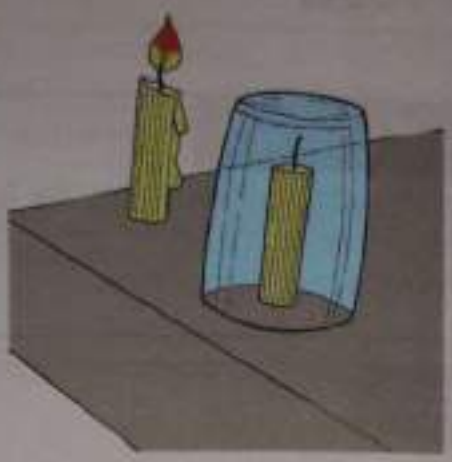


Figure 3.8(b) Absence of oxygen

The candle that is not covered continues to burn. This means that this candle is still getting everything that it needs in order to continue burning. The covered candle only burns for a few seconds then it stops burning. This means that something needed to continue burning is no longer there. It was used up when the candle was burning.

Activity 5

Take two candles again. Place them in a dish with some water. Again, cover one of the burning candles with a transparent glass. The other burning candle should remain uncovered.

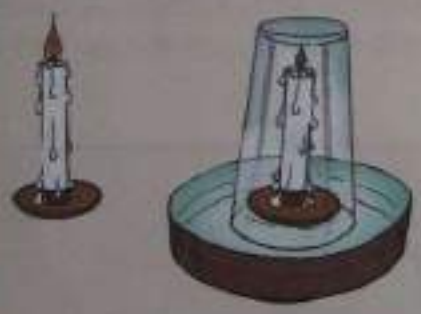


Figure 3.9(a) Presence of oxygen

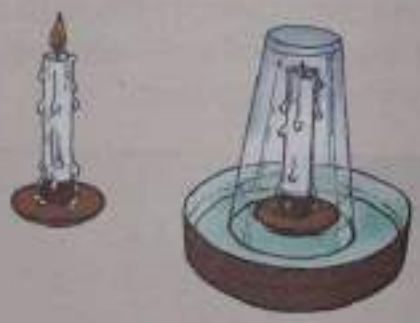


Figure 3.9(b) Absence of oxygen

1. Observe what will happen as soon as the covered candle stops burning.
2. Some water has risen to about one fifth of this glass.
3. Repeat this experiment.

The water is rising to replace the oxygen that was used by the burning candle. This means that once the oxygen has been used up, the candle can no longer continue to burn. The water then rises to fill up the space that had been occupied by the oxygen before it was used during the burning process. Notice that the candle that is not covered will continue to burn. This is because the oxygen that is

needed for the burning process to continue is still available in the air around the burning candle.

Oxygen is needed for all fuels to be able to burn and produce heat. Once the oxygen is no longer available, the fuel will stop burning.

Heat

Heat is a form of energy that warms things. We get heat from many sources for example, the sun. We would like to find out if heat is necessary for fuels to burn.

Activity 6

1. Outside your classroom, put together some dry wood.
2. Make two heaps; on one heap of the firewood light a matchstick.

Figure 3.10(a) Presence of heat

Figure 3.10(b) Absence of heat

3. After a few minutes, what can you see?
4. Which of the two heaps is burning?
5. What has happened to the heap that was not ignited?
6. Repeat this experiment and see if you will get the same results.

For fuels to burn heat should be present. If you want to start a fire, with wood in order to cook something, you have to **ignite** or start the fire by lighting a matchstick in order to increase the heat. Without increasing the heat, the wood will not burn.

Exercise C

1. The following are examples of fuels **except** _____.
   A. wood B. candle C. water D. paraffin
2. Oxygen can be found in _____.
   A. the air around us B. carbon monoxide
   C. air from industries D. nitrogen

3. The candle not covered continues to burn because _____.
   A. the air around it has used up oxygen
   B. the air around it has got oxygen
   C. the air around it has got some water
   D. the candle has got some paraffin
4. The candle covered by the glass tumbler or beaker stops burning because _____.
   A. the oxygen in the glass is now used up
   B. it has been disturbed by the water
   C. it has been disturbed by the glass
   D. the water in the dish is too cold for the candle to continue burning
5. The water rises in the glass where the candle stopped burning in order to replace _____.
   A. the water that was used by the burning candle
   B. the heat that was used by the burning candle
   C. the candle wax
   D. the oxygen that was used up when the candle was burning
6. (a) _____and_____ is needed for fuels to burn.
   (b) State three materials that are fuels.
7. Say whether the following statements are **true/false.**
   (a) Oxygen is needed for fuels to burn.
   (b) Oxygen can be found in the air.
   (c) A covered candle will continue burning.

Fuel hazards

Fuels can be solid, liquid and gas. Fuels are substances that can burn to produce a fire very easily. Therefore, fuels can easily cause fires that can burn down and destroy buildings and property and even harm people.

Figure 3.11 Fire causes hazards

Fires are dangerous and they should be avoided. Fuels can cause fire outbreak when they are stored where it is very hot. If petrol or diesel is stored where it is very hot, this can start a dangerous fire **outbreak**. It can also be caused by leaking of petrol containers.

Fuels such as gas used in gas stoves can also be dangerous if not handled with care. If the gas is allowed to leak, this can cause a fire that can even injure or kill people and also destroy buildings and property.

Leaving burning **cigarette** stubs and litter like glass bottles in the bush can lead to a **veld fire**.

Safety precautions when using fuels

1. Fuels should be kept in cool places where temperatures are kept low.
2. Fuels should be kept out of children's reach. Children should not be allowed to temper with gas stoves and fuel containers.
3. Fire extinguishers should be found in homes, schools, cars and in industries so as to help put out fires. However, they should be checked on the expiry date because after a certain period they will not work.
4. Read and follow instructions when operating electrical appliances.

Figure 3.12 Leaking petrol containers causes hazards

Figure 3.13 Leaking gas stove

Figure 3.14 Veld fire caused by cigarettes

Exercise D

1. For a fuel to burn the following should be present.
   A. oxygen and heat
   B. oxygen and water
   C. heat and water
   D. carbon dioxide and heat
2. If fuels are stored in a very hot place, this can_____.
   A. cause thunder
   B. cause lightening
   C. cause fire outbreak
   D. cause rain to fall
3. A fire extinguisher can be used to_____.
   A. start a fire
   B. iron clothes
   C. put out a fire
   D. cook food
4. Name two things that should be present for a fire to start burning.
5. List two things you can do to make sure you avoid fire outbreak from occurring.
6. What is the use of a fire extinguisher?

Summary

- Fuels are substances that can burn to produce heat.
- Heat and oxygen are needed for fuels to burn.
- Fuels can be very dangerous.
- Precautions should be taken when storing and burning fuels.
- Expiry date should be checked on the fire extinguisher.

Glossary

cigarette – a small roll of finely cut tobacco for smoking
ignite – to cause to burn
outbreak – a sudden increase
precautions – taking steps to avoid something bad from happening
transparent – easily seen through
veld fire – is an unwanted fire that occurs in an area with vegetation

End of topic assessment

Multiple choice

1. The food that we eat provides us with the _____ to enables us to run.
   A. force B. energy C. combustion D. oxygen
2. The energy that is found in a mango fruit that is about to fall to the ground is called_____ energy.
   A. kinetic B. chemical C. sound D. potential
3. The energy produced by a bulb that enables us to see is called_____ energy.
   A. light B. kinetic C. potential D. solar
4. When a football player kicks a ball_____.
   A. potential energy is changed to chemical energy
   B. kinetic energy is changed to potential
   C. potential energy is changed to sound energy
   D. potential energy is changed to kinetic energy
5. _____ is a gas that is needed for fuels to burn.
   A. Carbon dioxide B. Steam
   C. Water vapour D. Oxygen
6. A burning candle that is covered by a tumbler will stop burning because_____.
   A. the oxygen has been used up
   B. the tumbler is too heavy
   C. there is no light inside the tumbler
   D. it is cold inside the tumbler
7. Two conditions needed for fuels to burn are_____.
   A. oxygen and water B. oxygen and heat
   C. oxygen and light D. oxygen and carbon dioxide
8. Fuels should not be stored in a very hot place because_____.
   A. they can burn and cause fire outbreaks
   B. they are expensive
   C. they are not dangerous
   D. they should always be cold
9. A fire extinguisher can be used to_____.
   A. reduce floods B. put out fires
   C. reduce winds D. reduce road accidents
10. A solar panel can change_____.
   A. sunlight to electricity B. heat to light
   C. sunlight to food D. sunlight to sound

Structured questions

1. A_____ is a substance that can burn to produce heat.
2. Write down the form of energy involved in the following activities:
   (a) A ball moving in the air_____.
   (b) A fire from burning wood_____.
   (c) A book about to fall from a table_____.
   (d) A switched on bulb produces _____.
3. (a) Name the two conditions needed for fuels to burn.
   (b) What can happen if you store fuels in a hot place?
   (c) Why is it important to keep gas stoves out of children's reach?

Unit 11 End of term 1 assessment

Paper 1

1. The purpose of the canine teeth is to _____.
   A. cut the food B. chop the food
   C. grind and mash the food D. decorate the mouth
2. The toughest teeth in the mouth are the _____.
   A. molars B. canine C. incisors D. premolars
3. Wisdom teeth are used to chew _____.
   A. smooth food B. a lot of food C. tough food D. lean food
4. A _____ is a person who treats our teeth.
   A. doctor B. specialist C. dentist D. nurse
5. Parasites breed and lay eggs in the human _____.
   A. legs B. feet C. eyes D. skin
6. Scurvy is prevented by eating_____.
   A. fruits B. meat C. everyday D. milk
7. The incisors teeth are _____.
   A. four B. six C. seven D. eight
8. Malaria is caused by a _____ called plasmodium.
   A. parasite B. an animal C. thing D. an object
9. When a young one is growing which teeth grow first?
   A. incisors B. canines C. premolars D. molars
10. A small animal that carries a parasite which causes bilharzia is called _____.
    A. mosquito B. housefly C. snail D. ant
11. Bilharzia is common in the following places **except** _____.
    A. ponds B. streams C. rivers D. swimming pool
12. Which type of mosquito spreads malaria?
    A. infected female mosquito B. infected male mosquito
    C. infected black mosquito D. infected male mosquito
13. Human beings get parasitic diseases when they drink_____.
    A. cold water B. warm water
    C. hot water D. contaminated water
14. Eating dirty_____ and vegetables can cause parasites to enter the human body.
    A. sadza B. meat C. fruits D. milk
15. The following are signs and symptoms of someone suffering from a parasitic disease **except**_____.
    A. failing to fall asleep B. having skin irritations
    C. feeling weak D. having blisters
16. If a human being walks barefooted in contaminated water he or she gets infected by a parasite that causes_____.
    A. malaria B. bilharzia C. kwashiorkor D. headache

17. When a tooth decays, it ends up having a _____.
A. cavity B. wound C. a second tooth D. white colour

18. When milk teeth fall off they are replaced by_____.
A. rough teeth B. temporary teeth
C. permanent teeth D. baby teeth

19. When an area is prone to malaria, it means people there_____.
A. can suffer from headache B. can suffer from malaria
C. may never suffer from malaria D. may suffer from goitre

20. When food is undercooked, it means _____.
A. it is well cooked B. it is fully cooked
C. it is not well cooked D. it is overcooked

21. The premolar teeth are eight and they are next to the _____.
A. incisors B. baby teeth C. molars D. milk teeth

22. Our teeth are coated by a substance called _____.
A. skin B. enamel C. cavity D. gum

23. Failing to feel full after having meals may mean that someone has _____.
A. stomach-ache B. parasitic disease
C. influenza D. cholera

24. A snail is an animal that transmits bilharzia parasites and it lives in _____.
A. a hole B. a shelter C. water D. a building

25. The last teeth to grow in a human being after the age of 20 are called _____.
A. canine B. incisors C. premolars D. wisdom teeth

26. An apple that is about to fall from a tree contains _____.
A. kinetic energy B. potential energy
C. chemical energy D. sound energy

27. An apple that is falling from a tree contains _____.
A. potential energy B. sound energy
C. heat energy D. kinetic energy

28. A tool is an instrument that _____.
A. is very expensive B. is very cheap
C. helps us to do work D. is very light to carry

29. A gas found in the air that helps fuels to burn is called _____.
A. oxygen B. water vapour
C. smoke D. carbon dioxide

30. Which of the following is **NOT** an example of a tool?
A. knife B. spanner C. wheelbarrow D. air

31. What causes tooth decay?
A. premolars B. incisors C. canines D. plaque

32. When a tooth decays it ends up having a _____.
A. cavity B. decay C. canine D. premolar

33. Which of these foods does **NOT** provide carbohydrates.
A. rice B. bread C. potatoes D. avocado

34. Proteins are mainly used for ____ and ____.
A. fat and energy
B. growth and body repair
C. nutrients and fibre
D. removing waste and glucose

35. Which of these is a symptom of Kwashiorkor?
A. lack of appetite
B. hoarseness
C. failure to grow and gain weight
D. scurvy

36. Malaria and Bilharzia are examples of _____.
A. parasites
B. germs
C. parasitic diseases
D. plasmodium

37. A parasite is an organism that lives in another ____.
A. organism
B. snail
C. mosquito
D. pond

38. Which statement is **TRUE**?
A. A comb is part of the contents of a First Aid kit.
B. An accident is an event that causes harm, injury or death to people
C. Malaria is a type of accident.
D. Failing to fall asleep is a type of an accident.

39. Which one of these is **NOT** a form of protective clothing?
A. gloves
B. shorts
C. helmet
D. overalls

40. Material can be classified into ____ and _____ made.
A. hard and soft
B. fragile and brittle
C. elastic and rigid
D. natural and man

41. What is a mixture?
A. A group of different substances put together
B. A distillation process
C. A method used to separate mixtures
D. A process to purify water

42. Which of these is **NOT** a method of separating mixtures?
A. solvent
B. filtration
C. sieving
D. distillation

43. The following is a garden tool.
A. knife
B. cooking stick
C. hoe
D. spoon

44. A hut is a structure that is usually built in the ____.
A. urban areas
B. forest
C. city centre
D. rural areas

45. Which of these is **NOT** a form energy?
A. kinetic
B. pressure
C. heat
D. potential

46. A stove produces _____ energy.
A. light
B. sound
C. solar
D. heat

47. Which of these conditions is necessary for a fuel to burn?
A. nitrogen and hydrogen
B. carbon monoxide
C. candle wax
D. oxygen and heat

48. What is potential energy?
A. Energy in a moving object
B. A form of light energy

C. Any form of energy that is stored in an object at a position
D. Kinetic energy

49. Material that is fragile can _____.
A. be seen through easily
B. conduct heat energy
C. easily break
D. be flexible

50. What is a balanced diet?
A. A meal with all the required nutrients in the right quantity
B. A meal with food in equal quantities
C. Food that contains lots of carbohydrates
D. A diet with lots of water

[Total 50]

Paper 2

Structured questions

1. Draw and label the incisor tooth showing the root, tooth and enamel. [1]
2. State one sign or symptom of someone suffering from a parasitic disease. [1]
3. Name one place where bilharzia is common. [1]
4. Name one way of preventing parasitic diseases. [1]
5. Name two sources of water which are contaminated. [2]
6. Write two ways through which parasites enter the human body. [2]
7. State one sign of tooth decay. [1]
8. Explain the difference between the incisors and the molars teeth. [2]
9. Name one sign of someone suffering from kwashiorkor. [1]
10. Explain the causes of goitre. [2]
11. What is malnutrition? [1]
12. What is a deficiency disease? [1]
13. What is a balanced diet? [1]
14. Explain the meaning of each of the following words:
    (a) Parasite (b) Wisdom teeth (c) Enamel [3]
15. Describe places where people are likely to get bilharzia. [2]
16. Explain the following terms:
    (a) Digest (b) Malaria (c) Tooth decay. [3]

[Total 25]

Topic 4 Electricity and electronics

Unit 12 Electricity

In this unit you will:

1. recognise sources of electricity in Zimbabwe
2. identify dangers of electricity
3. suggest safety precautions when using electricity
4. identify conductors and insulators.

Flashback

What do we use electricity for at school?

Key words

conductors generator insulators transmit

Figure 4.1 Hwange thermal power station

Electricity is used for different purposes at home, school, industries and so on. In Zimbabwe, electricity is generated in Hwange and Kariba using coal and falling water respectively. Electricity is generated and transmitted to different places for use. It is also important for people to use electricity safely because it is dangerous. People may die or get injured when using electricity in a wrong way.

Sources of electricity in Zimbabwe

Electricity is generated in big power stations found in Hwange and Kariba. Smaller power stations are also found at Munyati, Bulawayo, Harare and Dema. A power station is a place with big generators that produce electricity. A **generator** is a rotating machine that converts mechanical energy into electrical energy.

The Map below shows places in Zimbabwe where power stations which can generate electricity can be found.

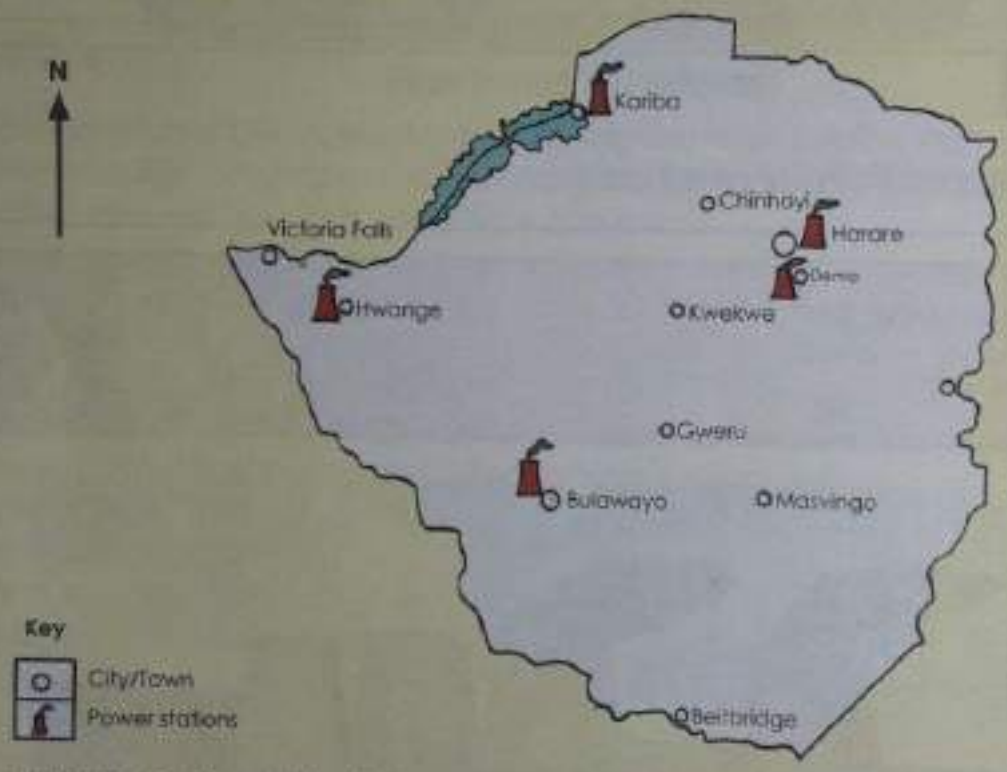


Figure 4.2 Power stations in Zimbabwe

Generating and transmitting electricity

Electricity is generated in different ways. At Kariba power station, electric power is obtained from water flowing along the Zambezi River. This is called Hydro-electric power. At Hwange power station, electric power is obtained from coal. This is called Thermal power.

Thermal power is also produced at Munyati, Bulawayo and Harare power stations. Dema power station produces electricity from diesel. After the electricity is generated at the power station, it should be carried or **transmitted** in power lines

which can conduct electricity. The electricity is transmitted from power stations to sub-stations then carried to factories, schools, colleges, universities and homes where it is used. At homes and schools we can see wall sockets where we can plug in electronic devices if we want to use them.

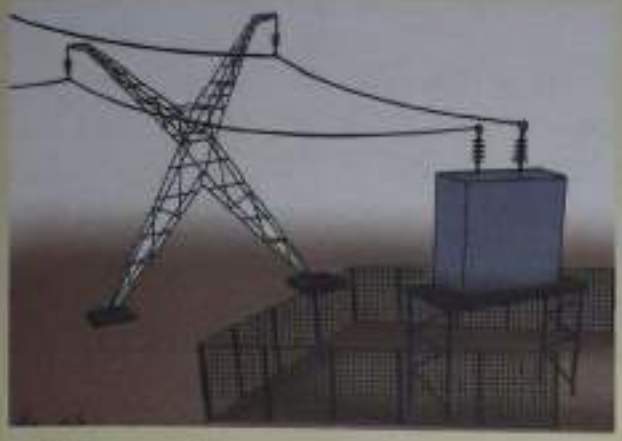


Figure 4.3 Transmitting electricity

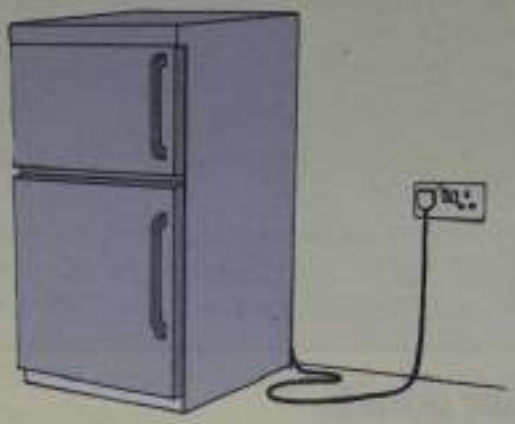


Figure 4.4 Using electricity at home.

Electricity from a battery

Batteries contain chemicals that can produce electricity. Batteries can convert chemical energy into electricity. A battery has got a negative end and a positive end.

Figure 4.5 A car battery used in a car

Batteries are usually used in small radios. When placing batteries in a radio or a torch, the batteries must be placed in the gadget such that the positive end of the battery is connected to the negative **terminal**. The negative end of the battery is connected to the positive terminal. Look at Figure 4.6.

Figure 4.6 Using a battery as a source of power

The spring is connected to the flat end of the battery and the end with a knob is connected to the flat end where there is no spring.

Activity 1

Your Teacher has brought a torch and other electronic gadgets that operate using batteries.

1. Put batteries into the gadget and switch on the gadget. See if it works.
2. If you have fitted in the batteries in a proper way, the gadget will work.
3. If you continue to use the gadget without replacing the batteries, they will get flat.
4. Some batteries cannot be recharged.
5. If batteries cannot be recharged, then you will have to replace the flat batteries with new ones.

Solar panels

Figure 4.7 Solar panels

Solar energy is energy obtained from the sun. Solar panels can change solar energy to electricity. The electricity from the solar panel is stored in a battery. The panel is connected to an **inverter**. The inverter changes solar energy to electric energy which is then stored in a battery.

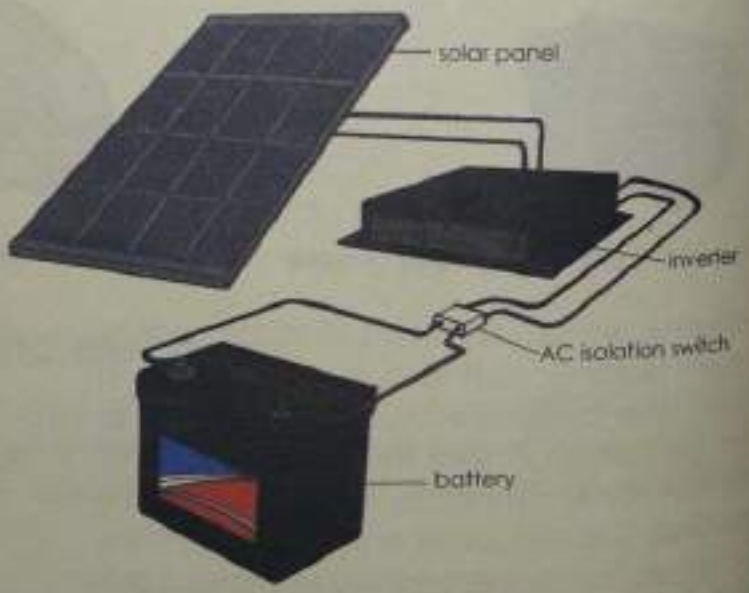


Figure 4.8 Using solar as a source of power

Activity 2

Your teacher has organised a trip so that you visit a homestead using solar energy. Look at the solar panel. Are the solar panels facing the sun or not? Why? Draw the solar panels, the inverter and the battery.

Collect batteries from home and school. Draw the batteries showing the positive and negative end.

Exercise A

1. The electricity from Kariba is generated from _____.
   A. burning coal B. moving water C. lightening D. moving wind
2. The electricity from Hwange is called _____.
   A. thermal power B. hydro power C. diesel power D. wind power
3. From the power station to the sub-station, electricity is carried through _____.
   A. water B. wind C. power lines D. clouds
4. _____ can store electricity that can be used to power electronic devices that are not plugged onto wall sockets.
   A. Engine B. Batteries
   C. Generators D. Hydro
5. _____ are found in power stations where they generate electricity.
   A. Generators B. Batteries C. Engines D. Power stations
6. Solar panels can produce electricity when they are exposed to _____.
   A. the sun B. the clouds C. the winds D. the rain
7. Say whether the following statements are **true** or **false**.
   (a) Before you plug in an electric device, make sure that your hands are dry.
   (b) Hydro power and thermal power are produced by generators.
   (c) A switch is used for turning on and turning off electricity.
8. List the six power stations that can generate electricity in Zimbabwe.

Dangers of electricity

Naked wires

All electric cables on an electric circuit should be covered by an insulating material such as plastic. Naked wires on an electric **cable** can cause fires. If someone touches the naked parts of the wire that is carrying electricity, they will get an electric shock that could seriously injure or even kill them. Children should never be allowed to touch or handle electric cables with naked wires.

Figure 4.9(a) Naked wires

(b) Playing with naked wires

Wet hands

When using electrical appliances such as stoves, fridges and so on, make sure that your hands are dry. Whenever you touch electric gadgets with wet hands you could get an electric shock that could seriously injure or even kill you.

Figure 4.10 Cooking with wet hands

Fixing appliances

When fixing electric appliances you should make sure that there are switched off. Figure 4.11a shows a boy getting an electric shock. Trying to fix an appliance when it is on may lead to injuries or death.

Figure 4.11(a) Fixing an appliance while its on

Plugging in sockets

It is very dangerous for someone to plug in appliances while the sockets are on. You get an electric shock. You should make sure that the socket is off always before you plug in any appliance.

Figure 4.11(b) Plugging in while the socket is on

Children playing near power lines and electric sub-stations

Children should avoid playing near powerlines and electric sub-stations as shown in Figure 4.12. Power lines carry large amounts of electricity. If the children were to accidentally touch or get in contact with a power line carrying electricity, they would get **electrocuted**.

Figure 4.12 Children playing near power lines and electric sub-stations.

Overloaded wall socket

Sometimes we plug too many appliances onto one wall socket. This can easily cause a fire to break out.

Figure 4.13 Overloaded socket

Safety precautions

Always be aware that electricity can be very dangerous. Exercise extra care and caution whenever you are using electricity to avoid being electrocuted. A person who has received an electric shock is said to have been electrocuted. You can get seriously injured or even die if you get electrocuted.

Switching on electricity

A switch can be used for turning on and turning off the electricity.

(a)

b)

Figure 4.14(a) and (b) switching a plug on

If you want to use an electric gadget such as a radio, television, refrigerator or a computer you insert the plug carefully into the socket. Make sure your hands are dry before you can do this. Also make sure the switch on the socket is off before you insert the plug. Carefully push the plug into the wall socket. Switch on at the wall socket. After that, switch on the electronic gadget or device.

Figure 4.15 Using electric appliances with dry hands

1. Dry your hands before using any electrical appliances. Electrical appliances should not be positioned near a water source, or a place that is usually kept wet.
2. Children should not be permitted to play near power lines or electric sub-stations.
3. Put up danger warning signs and educate people particularly children about the dangers of electricity.
4. Never touch or go near a power line on the ground.
5. Avoid overloading electric circuits with too many electric appliances.
6. Never insert wires or sharp objects into wall sockets.
7. Make sure that wall sockets are switched off if appliances are not being used.
8. Always unplug appliances before cleaning them. Only plug them when they are dry and are being used.
9. Children should not climb on to **pylons** where electric power lines are connected.
10. Avoid touching or playing in areas with a danger warning sign as shown in Figure 4.16.

Figure 4.16 Danger warning sign

Activity 3

1. With the guidance of the teacher, look at the power lines that are carrying electricity to your school.
2. Discuss dangers of electricity and dramatise some of the dangers of electricity in your groups.
3. Recite the following poem to your friend.

Electricity

Electricity is helpful
Electricity is good
It is a benefit to me and you
It gives us light, to see at night
It gives us heat, to cook our meals
Electricity helps you and me
It is very useful but can be harmful
We should be careful when using electricity.

Exercise B

1. The diagram above shows that electricity is _____.
   A. harmless B. good C. very dangerous D. useless
2. When using electric gadgets such as stoves, make sure that _____.
   A. you are wearing red clothes B. your hands are wet
   C. your hair is short D. your hands are dry
3. Never touch and never get into contact with an electric cable with naked wires because_____.
   A. you could get an electric shock which could even kill you
   B. you could disturb the wiring
   C. you could be an electrician
   D. you could fall asleep and never wake up
4. Before you plug in an electric gadget or appliance onto a wall socket, you should_____.
   A. make sure that the wall socket is switched off
   B. make sure that the wall socket is switched on
   C. make sure that the wall socket is removed
   D. make sure that the room is cold
5. If you see children playing near electric power lines you should_____.
   A. avoid talking to them
   B. encourage them to climb
   C. stop them and warn them of the dangers of electricity
   D. join them

6. Electricity is very _____. Therefore, we should be very _____ when we are using electricity.
7. Make sure that your hands are _____ when you are using electric gadgets.
8. If you expose solar panels to the sun shine, they produce _____.
9. Say whether the following statements are **true** or **false**.
   (a) Electricity is dangerous.
   (b) When using electric gadgets make sure that your hands are wet.
   (c) Never touch or get in contact with a naked wire on an electric cable.
   (d) Playing soccer near power lines or electric sub-stations should be encouraged.
   (e) If you see an electric power line on the ground you should kick it.

Electric conductors and insulators

Some substances are able to allow electricity to pass through them. Such substances are called **conductors.** However, some substances do not allow electricity to pass through them and these are called **insulators.** We have carried out experiments to identify substances that are good at conducting electricity, can you name them. Name some substances that are insulators.

Activity 4

Collecting materials

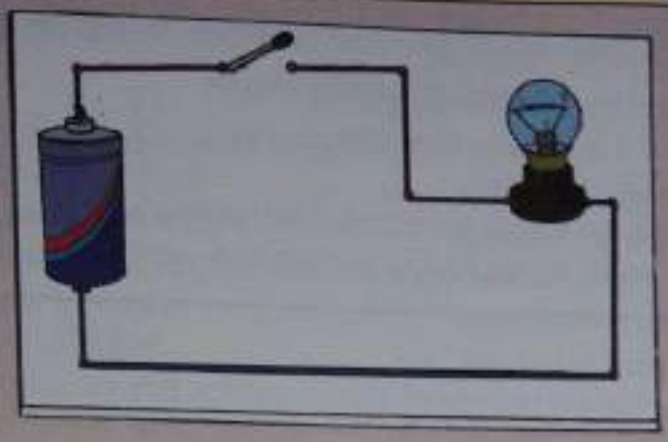
In groups, collect materials such as copper wires, aluminium and steel, iron nails and so on.
Also collect the following materials, wood, plastic, wool, glass, grass and paper. Carry out the following experiments to find out if these materials can conduct electricity.

Experiments to identify materials that are conductors of electricity and insulators of electricity

Equipment or apparatus needed
You need the following equipment for you to be able to carry out experiments to identify materials that are conductors of electricity and insulators.

You will need: circuit boards, bulbs, electric wires, batteries, crocodile clips

Connect batteries, wires and the bulb to your circuit board as shown in the diagram below. Also connect the material that you are testing. If the bulb lights up, it means electricity has been able to pass through the **Circuit**. Therefore, the material that is being tested is a conductor of electricity. If the bulb fails to light, what does it mean?



Results table

Material being tested	Material made of	Bulb
Cooper Wire	Metal	Lights up
Pencil	Wood	Does not light up
Piece of tube	Rubber	
Nail	Metal	
Copper coil	Metal	
Matchstick	Wood	
Plastic cup	Plastic	

From the activity above, you have discovered that materials made of metals such as copper, aluminium, iron and steel are conductors of electricity. Materials that are not made of metals such as wood, glass, plastic and rubber do not conduct electricity. These are therefore called insulators.

Exercise C

1. A substance that can allow electricity to pass through is called _____.
   A. a poor conductor of electricity B. an insulator
   C. a conductor of electricity D. a pathway of electricity
2. A material that cannot allow electricity to pass through is called _____.
   A. a good conductor B. an insulator
   C. a pathway D. a bulb
3. Which of the following materials is a conductor of electricity?
   A. wood B. rubber C. plastic D. copper
4. Which of the following materials is an insulator?
   A. aluminium B. copper C. steel D. plastic
5. If the bulb on a circuit board lights up, it means the material you are testing is _____.
   A. allowing electricity to pass through it

B. not allowing electricity to pass through it
C. allowing light to pass through
D. not allowing light to pass through

6. List two examples of conductors of electricity.
7. List three examples of insulators.
8. If a substance that is an insulator is connected to a circuit at home, will the electric appliance work even if you switch the wall socket on? Why?

Summary

- Electricity is generated in Zimbabwe at the following places, Kariba, Hwange, Munyati, Bulawayo, Harare and at Dema.
- Electricity is very dangerous.
- Precautions should be taken so as to use electricity safely at home, at schools and in industries.
- There are some materials that can conduct electricity for example, copper, aluminium and steel.
- There are some materials that cannot conduct electricity, these are called insulators for example, wood, glass, plastic tube, rubber and so on.

Glossary

cables – strong, thick wires used to transport electricity to homes
circuit – path followed by electricity from the source, through the conducting wire, to the appliance being used
convert – to change something into another state
electrocuted – receiving an electric shock from electricity and getting seriously injured or dying
inverter – a device used to convert direct current into alternating current
pylons – large steel poles used to support cables above the ground
terminal – the mechanical device which connects electrical appliances

End of topic assessment

Multiple choice

1. In Zimbabwe, hydro electric power is generated at_____.
   A. Hwange power station B. Munyati power station
   C. Harare power station D. Kariba power station
2. In Zimbabwe, thermal electric power is generated at_____.
   A. Kariba power station B. Hwange power station
   C. Dema power station D. Mukuvisi river
3. Solar panels can convert solar energy from the sun to _____energy.
   A. light B. electricity C. wind D. rain
4. Which of the following is a very dangerous form of behaviour when you are cooking on an electric stove_____.
   A. cooking with wet hands B. cooking with shoes on
   C. cooking with a hat on D. cooking while eating

5. The diagrams above shows the_____.
   A. danger of lightening B. danger of crossing a busy road
   C. danger of electricity D. danger of over eating
6. Whenever you see power line lying on the ground, you should_____.
   A. lick it B. hold it C. burn it D. never touch it
7. Copper is a material that can allow electricity to pass through it. Therefore, copper is_____.
   A. a good conductor of electricity B. a liquid
   C. a bad conductor of electricity D. an insulator
8. Wood does not allow electricity to pass through it, therefore wood is_____.
   A. a good conductor of heat B. an insulator
   C. a good conductor of electricity D. a gas
9. Which of the following can conduct electricity.
   A. copper B. plastic C. paper D. wood
10. On a circuit board, electricity is able to move from the_____ through the wires and will be able to make the bulb light up.
   A. battery B. river C. coal D. diesel

Structured questions

1. List three places in Zimbabwe where thermal electric power is generated.
2. Name one place where electricity is generated from water flowing in a river.
3. Say whether the following statements are **true** or **false**.
   (a) It is dangerous to have naked wires on a cable carrying electricity.
   (b) Electricity from Hwange power station is carried in pipelines to industries, homes and schools.
   (c) Make sure that your hands are wet whenever you are using electricity.
   (d) Plastic can conduct electricity.
4. Draw the diagram showing an electricity danger warning sign.

Topic 5

Design and technology

Unit 13 Elements of design

In this unit you will:

1. show appreciation of elements of design in food preparation
2. design an indigenous dish from local food sources
3. describe how to prepare an indigenous dish.

Flashback

What are the elements of design?

Key words

ingredient measurement recipe

Food is important to our lives. We need to prepare food that looks appetising. Food needs to be prepared using correct measurements and served in right proportions. Appetising food will include food with different colours and cooked to have a good texture. It is important to design our food so that it can look nice when eating.

Figure 5.1Different types of food

Elements of design in food preparation

Figure 5.2 Designing food to look appetising

Activity 1

1. What makes the food attractive from the Figure 5.2?
2. What food nutrients do we get from the food shown?
3. Name the food shown.
4. What are the things that are decorating the food?
5. Give one use of food in the body.

Colour

Colours tell a story about the brand. It attracts the eye. It appetises. Every colour sends a different message. A combination of colours will impress the eyes further. It makes the food more attractive.

Figure 5.3 Colourful food

Measurement

Measurement is the quantity of each ingredient needed to prepare food. When preparing food you need to put the right measurement of ingredients in order for the food to taste good. When making cake, we measure different ingredients.

Making a cake using measurements

Figure 5.4 Measurements used to bake a cake

Texture

Texture refers to how things feel. Texture can be described as 'rough' or 'smooth', 'hard' or 'soft'. Food needs to be of the right texture and this makes it appealing to the eye of the consumer. For example, when preparing potatoes, it should have its softness but not too hard or too soft.

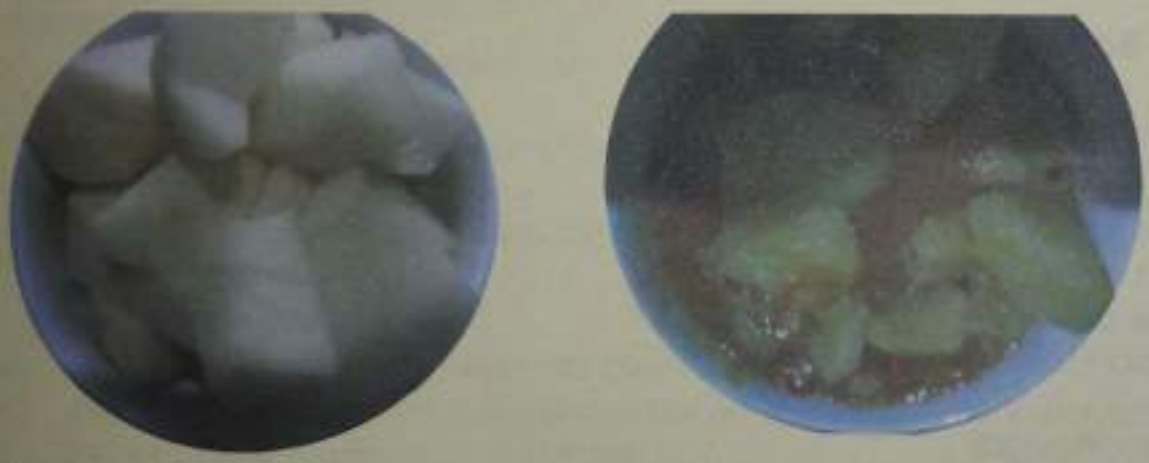


Figure 5.5 Texture of potatoes when uncooked and when cooked

Activity 2

1. Describe texture as an element of design in food preparation.
2. Feel mealie meal in your hand and say how it feels. Say whether it's rough or smooth.
3. Say what is the difference between uncooked mealie meal and cooked mealie meal for example, sadza.

Balance

Balance looks at the **organisation** or **arrangement** of food elements so that the food is tasty and healthy. It relates to physical composition of ingredients. **Ingredients** are food substances that are combined to make a dish. If there is no balance in elements and composition of food ingredients, the result is food being poorly made and not appealing to the consumer. Balance results in food quality being good.

Exercise A

1. What does balance deal with?
2. What are ingredients?
3. Who is a consumer?
4. Balance result in food quality being_____.
5. Food makes our body_____.

Proportion

Proportion refers to the relative size and scale of various elements in a design. The issue here is about parts of a whole and their relationship. How the parts are mixed in preparing a dish (food). The proportion of ingredients play an important part in preparing food. Too little of one will also affect the quality of food.

Proportion: Baking home bread

Ingredients needed

1. 2 cups flour
2. 2 teaspoon dried instant yeast
3. 2 tablespoon margarine
4. 1 cup milk or water
5. $\frac{1}{2}$ teaspoon salt
6. 1 egg
7. 2 tablespoon sugar

The proportion of each ingredient will determine the quality of bread to be made. For example, when baking bread, if you use little yeast the bread will not rise. Too much sugar will also make the bread sweet.

Exercise B

1. What is proportion?
2. Too little of one part of food will affect the _____ of food?
3. What do you think will happen to the bread if dried instant yeast is increased in quantity?
4. How much salt is needed in making home bread?

Preparing and indigenous dish from local food sources

An indigenous dish is food prepared from native plants from that area. These are meals that were prepared long ago. They are good because of the nutrients they contain.

Figure 5.6 Indigenous plant vegetables

How to prepare pumpkin leaves with peanut butter (dovi/idobi)

Ingredients:

Ingredients:

1. 1 bunch of fresh pumpkin leaves
2. 2 chopped tomatoes
3. 1 to 2 tablespoons of peanut butter
4. $\frac{1}{2}$ a cup of water
5. $\frac{1}{2}$ a teaspoon of bicarbonate of soda
6. Salt to taste

Procedure

1. Wash the pumpkin leaves until clean.
2. Break of a part of the stem and peel off the silk thorny layer from the pumpkin leaves. Do this one leaf at a time.
3. Slice the pumpkin leaves into small strips.
4. In a pot, bring the water, bicarbonate of soda and salt to a boil.
5. Add the pumpkin leaves and tomatoes. Cover and allow to simmer.
6. Stir occasionally.
7. After about 10 minutes, your pumpkin mixture will be reduced to about half and the leaf texture will be soft. Remove and put aside the vegetables when the mixture has a smooth taste and is not prickly. Save the remaining liquid.
8. Add the peanut butter to the remaining liquid in the pot and mix well to a paste.
9. Once the peanut butter mixture starts to bubble add the pumpkin leaves and mix well.
10. When your pumpkin leaves are well cooked you can serve with sadza.

Exercise C

1. How many onions are needed when preparing pumpkin leaves in peanut butter stew?
2. How many tablespoons of creamy peanut butter are needed?
3. What does procedure 5 say?
4. Procedure 3 says add the rest of the peanut butter to the spinach and heat for _____ minutes.
5. What can you serve the pumpkin leaves with?

How to prepare Sadza reZviyo

Ingredients

1. 4 cups of water
2. $2\frac{1}{2}$ cups of zviyo meal.

Procedure

1. Bring 3 cups of water to a boil in a large pot.
2. Combine $1\frac{1}{2}$ of the zviyo meal with the remaining 1 cup of water.
3. Reduce zviyo meal mixture to the boiling water, stirring constantly with a wooden spoon. Cook for about 5 minutes.
4. Slowly add the remaining 1 cup of zviyo meal, when the mixture is very thick and start to pull away from the sides of the pot, transfer to a serving bowl or plate.
5. Use a wooden spoon to shape the mixture into a round shape.
6. Serve 4 to 6 people.

Summary

- Elements of design in food preparation include colour, shape, texture and balance.
- Texture in food preparation means how it feels.
- Ingredient are the things needed in order to prepare a named dish.
- The amount or quantity of each ingredient needed to prepare food is called measurement.
- Indigenous meals are very important to every person's diet and we must have them at our homes.
- In order to cook food well we must follow the instruction on the **recipe**.
- A book of instructions on how to cook the food is called a recipe.
- It is important for the food to have a good look; hence design plays a very important role.

Glossary

procedure – a series of actions conducted when preparing something

End of topic assessment

Multiple choice

1. The appetite for food can be increased by one of the following.
   A. food design B. age C. attention D. sport
2. Which one of the following is **not** an element of design in food preparation?
   A. colour B. balance C. texture D. money
3. What is the purpose of colour in food design?
   A. to taste nice B. to look attractive
   C. to give energy D. to grow well
4. Balance makes food_____.
   A. healthy and colourful B. tasty and proportional
   C. tasty and heathy D. measurable
5. What is food proportion?
   A. relative size and scale B. balance and organisation
   C. making food attractive D. quantifying of ingredients
6. Texture can be best described as how rough or _____ something is.
   A. smooth B. colour C. big D. small
7. Measurement in preparation of food involves the _____ of each ingredient needed to prepare the food.
   A. colour B. shape C. texture D. measurement
8. What is a recipe?
   A. a book of maps
   B. instructions on how to prepare a meal
   C. a book with stories
   D. a book for subjects to be taught in schools
9. Things needed to cook a dish are called _____.
   A. ingredients B. meat C. recipe D. bowl
10. Which element of food design in food preparation deals with organisation or arrangement of food elements so that the food tastes and is healthy?
    A. balance B. measurement C. colour D. texture

Structured questions

1. How does the element of food design; colour help our food preparation?
2. Name two other elements of food design in food preparation besides colour.
3. Define
   (a) Design
   (b) Dish
4. The composition of food and how rough or smooth it is can be described as _____.
5. The proportion of each ingredient needed in preparation of cooking a dish is called a_____.

Topic 6

Water

Unit 14 Properties of water

In this unit you will:

1. name the three states of water
2. demonstrate the changes water undergoes when heated and cooled.

Flashback

A property is how a certain substance acts. Do you remember the following properties?

- water can flow
- water is colourless
- water is tasteless
- water takes the shape of its container.

Key words

melting freezing evaporation condensation

Water is very important in our lives. We use water for different purpose. Water is also used in its different state. It can be found in three states. Water can also be found in different sources. Some water sources are protected and safe for drinking and some are unprotected water sources which are not safe for drinking. Water can be harvested for use. This is usually done during the rain season. It is also important to note that water can also cause diseases if it is infected.

States of water

Water exists in three states, that is, liquid, solid and gas.

Liquid

Solid

Gas

Figure 6.1 Three states of water

Activity 1

Does water change its state?

You will need:

3 beakers liquid water ice cubes burner small lid

Safety: take caution when using the burner

Use the following words to describe the changes which you observe in the following experiments; melting, condensing, freezing and evaporation.

Method:

Beaker	Do	Observation
Beaker1	Heat 100ml of liquid water for 10 minutes. Put the lid over the steam for one minute.	
Beaker 2	Place ice cubes in a beaker for 10 minutes	
Beaker 3	Pour 100ml of liquid water and put it in a freezer for 24 hours	

Conclusion

What conclusions can you make from what you observed?

State the changes of state of water in beaker 1,2 and 3.

When we heat up water in solid state it changes into the liquid state. When ice was placed in beaker 2, it started **melting** into liquid water. Melting is when solid water changes state to liquid by introducing heat. When we heat water in liquid state it changes state into gas. Water in beaker 1 produced steam. That is, it started to **evaporate** into the sky. Evaporation is when water changes state from liquid into gas by introducing heat.

When we cool the steam it changes state to become liquid water. When we place a lid on beaker 1. The steam formed droplets of liquid water on the lid. This is called **condensation**. When we cool liquid water it freezes to become solid. **Freezing** is when we cool liquid water and it changes state to solid water called ice.

Exercise A

Answer all the questions.

1. What are the three states of water?
2. What is condensation of water vapour?
3. The reverse of freezing is _____.
4. When you heat up liquid water it becomes _____.
5. When you cool water vapour it changes state to _____.

Which of the following statements is **true** or **false**.

6. When you heat water it does not change state.
7. When solid water is heated it changes into liquid water.
8. Cooling water vapour changes to solid state.

Summary

- Water has three states.
- Water changes state when heated.
- Water changes state when cooled.

Unit 15 Sources of water

In this unit you will:

1. identify protected water sources
2. make models of protected water sources
3. identify unprotected water sources
4. classify water sources as protected or unprotected.
5. Suggest methods used to harvest water from rain in Zimbabwe.

Flashback

We need water for various purposes. We get water from different sources.

Key words

contamination protected surface underground unprotected

Sources of water

We can get water from the surface of the earth. We also have water from beneath the surface and we call it **underground** water. Some sources of water are clean while others are dirty. It is important to know that we can have protected sources of water and unprotected sources of water. When water is coming from a protected source it is safe for people to drink. When it is coming from an unprotected source it is not safe for people to drink.

Protected water sources

A **protected** water source is covered to prevent contamination. Sometimes the protection is done by people through construction. It is usually protected from outside contamination, from faecal matter and other rubbish. At times water can be coming from a naturally protected water source like from a spring. Examples of protected water sources are; boreholes, covered deep well, a tap and spring.

Activity 2

1. Watch a video brought by your teacher showing both the protected and unprotected water sources.
2. Write a short poem about water and read it to your friend.

A tap

Figure 6.4 shows a tap of water. A tap is an example of a protected water source. We have taps of water in our homes, schools and hospitals.

Figure 6.4 A tap

Activity 5

1. Why do you think water from a tap is safe for drinking?
2. Make a model of a tap of water and display it in your classroom.
3. Make two short sentences about water from the tap as a protected water source.

A spring of water

Study Figure 6.5 of water flowing from a spring. The water comes from underground where it flows through cracks in the rocks below the earth's surface. Water coming out from a spring is safe to drink, but once it flows down in a stream, it may get contaminated.

Figure 6.5 Water from a spring

Unprotected water sources

Unprotected water sources do not hold safe water for drinking. The water will be dirty because of many things that go into the water. Examples of unprotected water sources include:

(a) Water from a pond
(b) Water from a river
(c) Water from an unprotected well.

Activity 6

Study the three water sources below. What can you say?

(a) river

(b) pond

c) a stream

Figure 6.6 Different sources of water

In towns, dirty water from industries is sometimes poured into rivers or lakes. If someone drinks that water, he or she will get sick because of bacteria living in the water.

Activity 7

1. What can you do to reduce water pollution in towns and cities?
2. What is happening to the environment when waste material is poured into rivers?

Classification of water sources

Water sources are classified into two. Two classes of water sources are protected and unprotected water sources.

Activity 8

Classify the following into protected and unprotected sources of water.
Tap, covered well, dam, river, tank, spring, reservoir, stream, lake, shallow well, ponds, uncovered well and borehole.

Harvesting water from rain

Methods of harvesting water from rain in Zimbabwe

Harvesting of water is the collection of run-off water for productive purposes. When it rains, water usually runs down surfaces. As it runs-off, it can cause soil erosion. The run off of water can be stopped by harvesting it. Water harvesting is also regarded as a way of water conservation. The harvested water can be used in many ways.

There are many ways in which water can be harvested. It can be harvested during the rain season. The water can be collected from surfaces on which rain falls. Sometimes it is collected from roofs of buildings and stored in tanks. When the water is collected, it is stored for use later on. The changing weather of today makes people think of water harvesting and then using it for irrigation.

Activity 9

Observation

1. Look closely at the roofs of the houses in the Figure 6.7. Where do you collect more water, from the hut or from the modern house?
2. Describe the harvesting of water on the modern house?

Figure 6.7 (a) A hut

(b) A modern house

Designing

3. Imagine that you have your own house. How would you design the house so that it can help you to harvest rain water?

Methods of harvesting water

We can harvest water from the roofs or from the ground floor.
We can harvest water, but we need to prevent accidents happening when it is raining.

1. Do not work in the rain.
2. Do not try to collect rain water when it is raining.
3. Prepare for collection of water before it rains.
4. Avoid handling metals when it is raining, so that you can avoid being struck by lightning.

Activity 10

Class Project

Teacher brings a video of a water harvesting project for learners to see, from a computer or from a smart phone.

1. Make your own water harvesting model, where you use the harvested water to irrigate your garden as homework and display it in your class. Below is a list of equipment that you can use for your project in your experiment.

   You will need: a beaker, a small plastic bottle, a small piece of hosepipe, cardboard box, plastic leaves, a plastic tray, hard transparent plastic, a big bottle top, water and a small container
2. With the help of your teacher, design ways to collect water in the coming rain season at your school.

Activity 11

Enterprise skills and hard work

1. If you collect water from the roofs of houses, where would you store it?
2. What could be the uses of harvested water?
3. Think of an idea where water harvested can lead to a source of income both in rural or in urban areas.
4. Work in pairs and write a short story from Figure 6.8.

Summary

- Water is part of our environment.
- We must look after it well. It is good to make proper use of water than to leave it flowing away.
- We must harvest it so that we can use it later in our homes and industries.
- If we harvest water, we reduce the water that we buy from the City Council if you live in towns.
- Water is life because water continues to be in shortage. We must think of ways to harvest it and make good use of it in our lives.

Unit 16 Water and the environment

In this unit you will:

1. list water borne diseases
2. explain how water transmits diseases.

Flashback

Too much rain can cause floods and people and animals can drown. All the buildings and crops can be destroyed. What precautions can be taken for safety?

Key words

conservation gutter harvest irrigation
soil erosion storage

Water borne diseases

Water is life and needs to be taken care of when using it. It is important for people to use safe water because dirty water may cause sicknesses. There are water borne diseases which are caused by dirty water. These are cholera, typhoid and bilharzia.

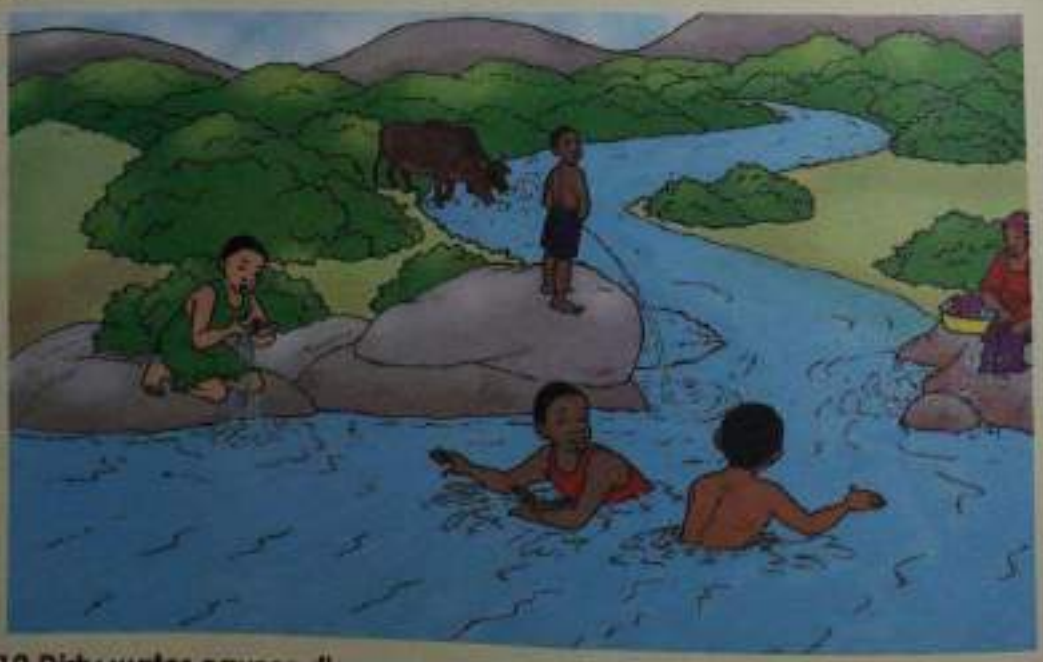


Figure 6.10 Dirty water causes diseases

Activity 13

1. What can you see in Figure 6.10?
2. Who is likely to get sick and why?
3. What should you do to avoid water borne diseases?

Diseases transmitted by water

Water transmits diseases, this means that it may cause illnesses to people.

Bilharzia

Bilharzia is a human disease caused by parasitic worms called Schistosoma. It is common in areas with fresh water such as streams, ponds, lakes, rivers, dams, canals and reservoirs. Schistosoma eggs are passed from an infected human being through faeces or urine. You may get infected when you come into contact with contaminated water for example, when swimming, washing or drinking water. When the parasite enters your body, the worms move in the blood and lay eggs. When the infected person passes out faeces or urine, eggs are passed out and some remain in the body and cause sickness. The eggs that are passed out by an infected person, when they get into contact with water, they enter the water snail and live in them until they infect another person.

Cholera

Vibrio cholera is the bacteria that causes cholera. It is usually found in food or water contaminated by faeces from a person with the infection. The common sources of cholera are contaminated water sources, contaminated foods mostly sold from dirty areas, poorly cleaned fruits and vegetables grown and irrigated by water that contains human wastes. This human waste includes sewage water, raw or undercooked fish, crabs, oysters and seafood caught in water polluted with sewage water. When a person consumes the contaminated food or water, the bacteria releases a toxin in the stomach that produces severe diarrhoea. Cholera bacteria enter the body through the mouth, often in food or water that has been contaminated with human waste, due to poor sanitation and hygiene.

Typhoid

Typhoid is a disease contracted by eating and drinking contaminated food and drink that contains the bacteria. Stool can cause contamination of unprotected water sources. The bacteria salmonella typhimurium causes one to be ill. The bacteria enters a person and lives in the intestines and bloodstreams. The bacteria spreads when one gets into contact with feces of an infected person.

Safety precautions

We can avoid getting sick from contaminated water by:

1. Not swimming in contaminated water sources such as dams and rivers

2. Not drinking water from unprotected water sources without treating or boiling the water
3. Wearing shoes when walking near unprotected water sources
4. Not passing urine and stool everywhere for example, in the bush.

Exercise B

1. When water flows and washes away soil, it can form a _____.
   A. spring B. well C. river D. dam
2. When water finds its way through cracks in the rocks it forms a _____.
   A. river B. spring C. dam D. well
3. The following is **NOT** a man-made water source.
   A. river B. well C. tank D. tap.
4. What do we use to dig a borehole?
   A. a hoe B. a pick C. a spade D. a driller
5. Which one of the following is **NOT** an open water body?
   A. a well B. a borehole C. a spring D. dam
6. If you are living in a rural area, where would you get safe water for drinking?
7. If you are living in town, where do we get safe water for drinking?
8. What is the difference between surface water and underground water?
9. Why do you think borehole water is safe for drinking?
10. Draw a protected source of water and label it.

Summary

- Water is part of our environment and we have to look after it well.
- There are protected water sources and unprotected water sources.
- Faecal things cause water not to be safe for drinking.
- We should look after our water sources everyday of our lives.

Glossary

conclusion – a judgement made by reasoning
disaster – an occurrence causing widespread destruction
exists – live
faecal matter – waste matter such as urine and feces discharged from the body
formed – make to a certain state
gutter – a channel at the edge of a street or road for carrying off surface water
management – the act of managing or control
pollution – the introduction of harmful substances or products into the environment
risk – the possibility of suffering harm or loss; danger
waterborne – transported or transmitted by water

End of topic assessment

Multiple choice

1. Water harvesting means_____.
   A. digging a well to get water
   B. buying water from the shop
   C. collecting water from the dam
   D. collecting rain water from roofs of houses
2. It is dangerous to collect water while it is raining because you may be struck by _____.
   A. people B. lightning C. wetness D. weather
3. Name the equipment that you would use to collect water from a roof into a tank.
   A. bottle B. gutter C. hosepipe D. a tap
4. When we save water we serve our _____.
   A. homes B. schools C. environment D. garden
5. Water that is collected from the ground is called _____.
   A. lake water B. dam water C. ground water D. roof water
6. Water can be stored in a_____.
   A. river B. tank C. spring D. roof
7. A gutter is found on the _____.
   A. roof B. wall C. window D. floor
8. The following are states of water except _____.
   A. gas B. evaporation C. liquid D. solid
9. Which of the following is an unprotected source of water.
   A. tap B. borehole C. river D. covered well
10. What are the parasitic worms that cause bilharzia called?
    A. schistosoma B. larva C. vibrio D. plasmodium

Structured questions

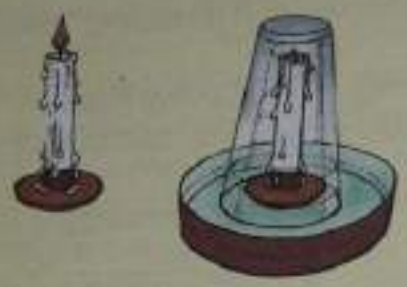
1. Suggest two ways of harvesting water with simple technology.
2. Explain how you would store harvested water from your home roof?
3. Why is it important to harvest water?
4. Why is it dangerous to collect water when it is raining?
5. What project can you do from harvested water in order for you to make a living?
6. Name unprotected water sources.
7. Which two diseases are transmitted by water?
8. Why is water from a tap safe for drinking?
9. List one way that can be used to make water safe.
10. Where does spring water come from?

Unit 17 End of term 2 assessment

Paper 1

Multiple choice

1. Potential energy can be changed into _____.
   A. light energy B. sound energy C. heat energy D. kinetic energy



2. The candle covered by the glass tumbler or beaker stops burning because _____.
   A. the oxygen in the glass is now used up
   B. it has been disturbed by the water
   C. it has been disturbed by the glass
   D. the water in the dish is too cold for the candle to continue burning
3. Fire extinguishers are used to_____.
   A. start fires B. iron clothes C. put out fires D. cook food
4. Batteries are able to _____.
   A. store electricity
   B. drain electricity from electronic devices that are plugged onto wall sockets
   C. store electricity that can be used to power electronic devices that are not plugged onto wall sockets
   D. make electricity
5. You could get an electric shock which could even kill you, if you _____.
   A. switch on naked wires. B. talk about naked wires
   C. fix naked wires D. touch naked wires
6. On a circuit board, electricity is able to move from the_____ through the wires and will be able to make the bulb light up.
   A. battery B. river C. coal D. diesel
7. Wood does not allow electricity to pass through it, therefore wood is_____.
   A. a good conductor of heat B. an insulator
   C. a good conductor of electricity D. good conductor of energy.
8. Relative size and scale of ingredients in food is called _____.
   A. food decoration B. food organisation
   C. making food types different D. food proportion

9. A book with instructions on how to cook is a _____.
   A. atlas B. recipe book C. dictionary D. textbook
10. Which element of food design in food preparation deals with organisation or arrangement of food elements so that the food is tasty and healthy?
   A. balance B. measurement C. colour D. texture
11. Which one of the following is not an open water body?
   A. a well B. a borehole C. a spring D. dam
12. When underground water finds its way through cracks in the rocks it forms a _____.
   A. waterfall B. spring C. stream D. well
13. A driller is used to dig _____.
   A. a well B. a spring C. a gulley D. a borehole
14. The bilharzia parasite is transmitted by _____.
   A. drinking contaminated water
   B. being bitten by mosquitoes
   C. parasites found in contaminated water
   D. water snails
15. Protected sources of water are _____.
   A. ones that have contaminated water
   B. ones that have water that breeds parasites
   C. ones that contain clean water that is safe to drink
   D. ones that give people typhoid.
16. People can avoid getting sick by _____.
   A. boiling the water they drink B. drinking dirty water
   C. dumping waste in water sources D. going to the hospital.
17. In Zimbabwe, thermal power is generated at _____.
   A. Hwange power station B. Munyati power station
   C. Dema power station D. Kariba power station
18. Solar energy can be converted into electricity using _____.
   A. solar panels B. compact disks
   C. windows D. aluminium foil
19. When a light bulb switches on, it means _____.
   A. electricity passed through the socket
   B. electricity passed through the circuit
   C. electricity passed through the switch
   D. electricity passed through the wire
20. A fuel is _____.
   A. a substance that can burn to produce heat
   B. a substance that is made of fire
   C. wood
   D. paraffin
21. Kinetic energy is _____.
   A. the energy produced by movement
   B. that stores energy

C. energy that produces light
D. energy that produces heat

22. Fuels should be kept in _____.
A. hot places B. fridges C. cool dry places D. ovens

23. We can get electrocuted if we _____.
A. use electrical appliances with dry hands
B. use electrical appliances with wet hands
C. touch electrical appliances
D. look at electrical appliances

24. The electricity from Kariba is generated from _____.
A. burning coal B. moving water C. lightning D. moving wind

25. For fuels to burn _____ must be present.
A. carbon dioxide and oxygen B. water and oxygen
C. heat energy and oxygen D. carbon dioxide and water

26. A good conductor of electricity is a substance that_____.
A. can allow electricity to pass through it
B. cannot allow electricity to pass through it
C. burns to produce heat
D. that cannot be attracted by a magnet.

27. Which of the following is a good conductor of electricity_____.
A. wood B. plastic C. copper D. paper

28. An insulator is a substance that_____.
A. cannot allow electricity to pass through it
B. can allow electricity to pass through it
C. can burn to produce heat
D. can be attracted by a magnet

29. Which of the following substances can be attracted by a magnet _____
A. iron B. paper C. wood D. plastic

30. Which of the following substances is an insulator (poor conductor of electricity)?
A. copper B. aluminum C. iron D. wood

31. An adult has _____ teeth.
A. 32 B. 20 C. 26 D. 30

32. The substance that coats our teeth is called _____.
A. acid B. enamel C. plaque D. gums

33. Starch and sugars are mostly found in_____.
A. proteins B. carbohydrates C. fats D. water

34. The woman in the picture suffers from _____.

A. goitre B. scurvy C. kwashiorkor D. headache

35. Cooking oil is high in _____.
A. fibre B. vitamins C. fats D. minerals

36. One way of preventing malaria is by _____.
A. using a mosquito net
B. avoiding swimming in stagnant water
C. preparing a balanced diet
D. boiling water before use

37. Glass is easy to _____.
A. make B. bend C. separate D. break

38. Wheat and sand can be separated by _____.
A. evaporation B. distillation C. filtration D. sieving

39. A cave is made from _____.
A. water B. wood C. rocks D. metal

40. A burning candle produces _____ energy.
A. kinetic B. heat C. potential D. sound

41. Name the danger of electricity shown below

A. playing with naked wires B. cooking with wet hands
C. fixing an appliance while it's on D. naked wires

42. Which of these is a conductor of electricity.
A. copper B. wood C. glass D. rubber

43. All these are elements of design in food preparation **except** _____.
A. shape B. texture C. recipe D. colour

44. All these are states of water **except** _____.
A. gas B. borehole C. liquid D. solid

45. What is water harvesting?
A. It is the amount of rainfall received
B. It is a season of harvesting of water
C. It is the conservation of water
D. It is the collection of run-off water for productive purposes.

46. What is a generator?
A. A machine that produces heat energy.
B. A machine that conducts electricity.
C. It is a rotating machine that converts mechanical energy into electrical energy.
D. an insulator.

47. What is the sign below?

A. An electric shock sign. B. A red robot sign.
C. A danger warning sign D. Weather hazard sign

48. Which of these is a naturally protected water source.
A. Borehole B. Tap C. River D. Spring

49. What causes bilharzia?
A. schistosoma B. anopheles C. bacteria D. water

50. Texture in food preparation means _____.
A. how it looks B. how it feels C. how it tastes. D. its quantity

Paper 2

Structured questions

1. What is a balanced diet? [2]
2. What is the important food nutrient found in the following foods? [1]
   (a) Oranges [1]
   (b) Eggs [1]
   (c) Fish [1]
   (d) White bread [1]
3. (a) Which food nutrient provides our bodies with energy? [1]
   (b) Which food nutrients helps our bodies to grow big? [1]
4. Name the organism or animal that spreads the following diseases:
   (a) Malaria
   (b) Bilharzia
5. (a) If we put two or more materials together like sand and water without having a chemical reaction taking place what have we produced? [1]
   (b) The change of a liquid to gas because of heating is called _____.

6. Describe how filtration can be used to separate a mixture of sand and water. [1]

7. What is the form of energy that can cause the following to happen.
   (a) A stone moving through the air. [1]
   (b) A stove being used to cook food when it becomes hot. [1]
   (c) An apple about to fall from a tree. [1]
   (d) A drum producing sound. [1]
   (e) A ball hanging at a corner of a table and is about to fall. [1]

8. What is an insulator? [1]

9. Name two places in Zimbabwe where electricity is generated. [2]

10. a) Name one man made water source. [1]
    b) Name one natural water source. [1]

[Total 25 marks]

Unit 18 Weather and climate

In this unit you will:

1. predict weather changes
2. examine weather forecast elements
3. interpret weather recordings on graphs to illustrate variations from time to time.
4. Calculate average rainfall and temperature
5. Justify the importance of keeping weather records

Flashback

Weather changes because of different elements such as temperature, sunshine, wind, rainfall and cloud cover.

Key words

modern technolology weather report

What is weather?

Weather is the state of the atmosphere of a particular place at a given time. It also varies from place to place.

Weather changes from time to time. It is important for people to be able to predict weather because of weather hazards that may occur such as floods, heat waves, drought and so on. Different technologies can be used to predict weather. Weather can be used to know the general climate of an area.

What is climate?

Climate is the weather condition that prevails in an area in general for a long period of 30 to 40 years.

Activity 1

The whole class goes outside the class to feel the weather of the day around their school.

1. Make groups of four and describe the weather, if it is hot or cold , raining or not, cloudy or not and windy or not.
2. Learners go back to the class to tell other learners on the weather.

Weather forecast

Weather forecast is predicting weather. This involves telling what the weather will be in the near future at a given place and time.

Weather forecast or prediction can be done through indigenous ways or through the use of modern technology.

How to predict weather changes using indigenous ways

Indigenous methods of predicting weather came from people's knowledge of their surroundings and environment. People would study and note the behaviour of animals and plants in certain weather conditions and information was passed down orally to the next generation.

1. Prediction of a good rain season
   - When there are many spider webs. Spiders to not like moisture.
   - Halo around the moon called dzivaremvura can also show the amount of wetness.
   - When there are many tree leaves there will be a good rain season
   - Many fruits mean a bad rain season
   - When trees are infested with caterpillars there would be a dry season
   - Late bearing of figs and waterberry (muonde and mukute) shows a poor rain season
   - When there are crickets there would be a poor rain season

2. Emergence of rain
   - When there is many jerry manglums (dzvatsvatsva)
   - When you see a black and white stock (shohori/shuramvura)
   - Singing of the cuckoo bird (kohwera/rain bird)

How to predict weather using modern technology

There are many ways in which people can predict weather using modern technology

- **Modern technology** has instruments used to measure weather. These instruments lead to people recording weather elements such as temperature.

rainfall, wind speed and wind direction. This has led to people being able to predict weather conditions for a particular place and time.

- Weather satellites
  This tool collects weather data by taking pictures of the earth from space. The measurements of the weather for a place and time are compared to satellite data to be able to interpret and predict weather
- Doppler radar

Figure 7.1 Doppler radar station

This tool records location of clouds, strength of rainfall, wind direction, wind speed and so on. It is used to measure and predict weather.

How to predict or foresee weather using modern technology.

There are many ways in which people can predict or foresee weather using modern technology. People can watch weather reports from television or cell phone. In some cases, people can listen to the weather report from the radio. A **weather report** is a summary of weather conditions of a given area.

Activity 2

Drama

1. One group of learners imagines that they are in the rural area but they want to predict weather. The learners then have drama fore, telling weather using the indigenous ways.
2. The other group of learners imagines that they are in the urban area and they want to predict weather. The learners then have drama fore, telling weather using the modern technology.

Instruments used to measure weather

The instruments used to measure weather are different. These include the thermometer, rain gauge, wind vane and many others.

Figure 7.2 Weather instruments

How weather and climate affect the environment

Weather and climate can affect the environment in a good or bad way. Climate brings about different seasons. Sometimes the climate can bring warmer temperatures that make us able to grow crops and feed livestock. Very hot weather can also cause heat waves and drought which can kill people or livestock. When the weather is too hot, crops can die because of drought. When there is drought people face food shortage.

When there is too much rainfall, floods can occur and cause many water borne diseases. Water borne diseases are those that are caused by drinking contaminated or dirty water. Examples of such diseases are cholera, typhoid and dysentery.

Activity 3

1. Draw either a raingauge or thermometer and label it in your exercise book.
2. What happens when there is too much rainfall in your area?
3. Explain what can happen to the environment when the weather is too hot.

Exercise A

1. Weather refers to _____.
   A. the state of the house at a particular place at a given time
   B. the state of the atmosphere at a particular place on a day to day basis
   C. the state of the sun on a day to day basis
   D. the state of the heat and cold at a given place
2. Climate refers to_____.
   A. the weather conditions prevailing in an area in general or over a long period of 30 to 40 years
   B. how people feel about the weather
   C. how hot or cold the day is
   D. drought conditions in a place
3. The following are water borne diseases **except** _____.
   A. typhoid B. cholera C. dysentery D. goitre

4. The following is a modern way of technology in predicting weather.
   A. use of television B. beliefs about weather
   C. thinking about the weather D. observing clouds with one's eyes
5. Very hot weather can bring about all of the following **except** _____.
   A. drought B. dying of crops C. a shooting star D. heat waves
6. Define the terms weather and climate.
7. Name one modern technology used for predicting weather.
8. List any three elements of weather.
9. Explain the idea of weather forecast.
10. Explain the difference between weather and climate.

Interpreting weather

To interpret weather means to seek meaning of the weather of a place and understanding it. Weather is recorded. The recorded weather can be studied and people can then foretell or forecast what will happen about weather in the future. The forecast are usually correct. However, you should understand that weather changes from place to place and from time to time.

Daily weather can be studied and interpreted. Before the weather is interpreted, it can be measured and recorded. Temperature is measured in Degrees Celsius (°C), by an instrument called thermometer. Rainfall is measured in millimeters by an instrument called rain gauge.

Activity 4

Interpreting weather

1. All learners go out of the classroom as a class.
2. They form four groups.
3. They describe the day's weather.
4. They prepare to report back to others when back in the classroom.

Recording weather on graphs

Weather can be recorded on graphs. The following is an example of a graph showing rainfall recorded in a week in Mutare. Rainfall is measured in mm from Monday to Friday.

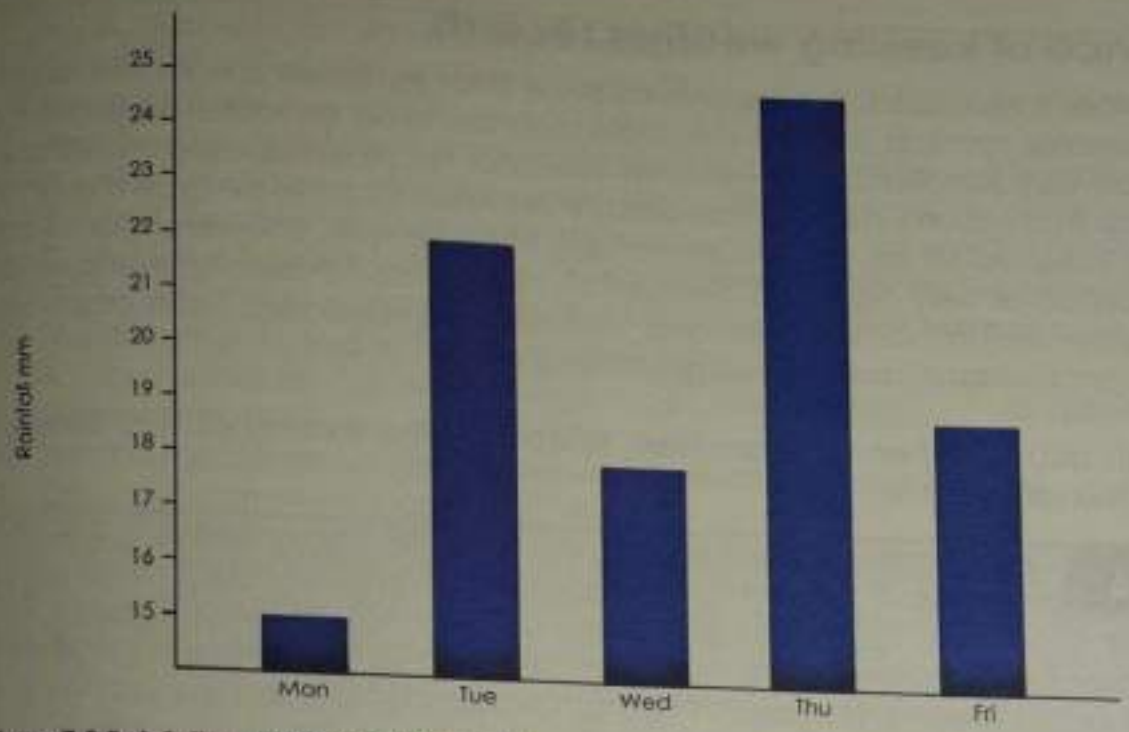


Figure 7.3 Rainfall collected in different days

Activity 5

In groups

1. Study the graph above showing rainfall received in Mutare.
2. What is the total amount of rainfall received in Mutare from Monday to Friday?
3. Calculate the average rainfall received in Mutare for the whole week.
4. Calculate the difference in amount of rainfall between the highest and lowest rainfall received in Mutare.

Exercise B

How to draw a graph

You will need: graph paper or a mathematics exercise book, a pencil, a rubber and a ruler.

Temperature recorded at Marange Primary School in Mutare from Monday 20th of January 2017 to Friday 24th of January 2017 was as follows: Monday 19 °C, Tuesday 23 °C Wednesday 25 °C Thursday 21°C Friday 18°C

1. Draw a simple bar graph showing temperature from Monday to Friday using the information given above.
2. Name the day when the school had the highest temperature in the week.
3. Which day had the lowest temperature and what was the reading?
4. Calculate the average temperature for the weekdays Monday to Friday 2017.

Importance of keeping weather records

When weather is recorded, the records must be kept for future use. It is important to keep weather records so that the facts can be used to make decisions for example, farming activities at a given time. Weather records help us to understand climate. With that record, people can decide on what crops to be grown or what agricultural work could be done successfully. For example, if temperatures, are always recorded as very high and low rainfall, people can think of growing crops that can grow well in hot weather and with little rain needed. Such crops are called drought resistant crops like sorghum and millet.

Records can also tell when rains are likely to come after looking at the history of the time of the rain season.

Activity 6

Project work

1. In groups of 5 in a class, go out of the classroom to measure temperature with a thermometer and make daily recordings up to a week.
2. Construct a wind vane using cardboard boxes.
3. The learners calculate the average weather for a week's recording by adding all the daily recordings for a week then divide by 7 days in a week to get the average temperature.
4. Learners make simple graphs to record weather. Teacher demonstrates on the board on how to draw a graph that represents the weather records for a week.
5. In groups, learners are asked to continue recording temperature for a month and then calculate the average temperature per month.

Exercise C

1. Weather refers to_____.
   A. the state of the atmosphere of a given place
   B. the state of the atmosphere of a given place at a given time
   C. the climate of an area
   D. the amount of time taken to understand a cold climate
2. Temperature is measured in _____.
   A. kilometres B. centimetres C. degrees celsius D. metres
3. What is a weather report?
   A. It is a summary of weather conditions of a given place
   B. It is a summary of hotness of a place
   C. It is a summary of coldness of a place
   D. It is a summary of climate of an area
4. Why do we keep weather records?
   A. So that we can keep away from the sun

B. So that we can understand climate
C. So that we can sleep in good weather
D. So that we can grow flowers early

5. How do we calculate the average weather of a place in a week?
   A. Add weather records for all the week days and get the total
   B. Add weather records for all the week days and divide by seven
   C. Add the highest record and the lowest record in the week
   D. Subtract the lowest temperature from the highest temperature
6. The instrument used to measure rainfall is called a _____.
   A. thermometer B. rain gauge C. wind vane D. speedometre
7. Define climate in your own words.
8. What is the difference between weather and climate?
9. Draw a thermometer and label it.
10. Make a bar graph showing rainfall recorded over five days at a place called Masvingo. The recordings are as follows: Monday 15mm, Tuesday 20mm, Wednesday 31mm, Thursday 19mm and Friday 22mm.
11. (a) Calculate the average rainfall received in Masvingo as stated above.
    (b) Calculate the average rain for two days in Masvingo: Tuesday 21°C and Wednesday 29 °C.

Summary

- Weather is the state of the atmosphere of a particular place at a given time and varies from place to place.
- Climate is the weather condition that prevails in an area in general for a long period.
- Weather is predicted by using different weather instruments.
- Weather can be recorded for future use and helps to understand the climate.

Unit 19 Seasons

In this unit you will:

1. identify and name the four seasons in Zimbabwe
2. describe each of the four seasons.

Flashback

The weather changes. Sometimes it is very cold and we wear jerseys. Sometimes it is very hot and we protect ourselves from the sun by using an umbrella.

Key words

autumn characteristic season spring summer winter

Seasons in Zimbabwe

Weather continues to change throughout the year. The changes in weather lead to the forming of periods called **seasons**. Zimbabwe has four main seasons which are summer, autumn, winter and spring. Zimbabwe is our country, but you should know that Zimbabwe is part of the earth. The earth as a planet, moves around the sun. As it moves around the sun, it changes its position. In doing so, the four seasons are created. Knowing more about each season helps us to predict or foresee the oncoming weather wherever we are in Zimbabwe.

There are four main seasons in Zimbabwe and these are **Summer**, **Autumn**, **Winter** and **Spring**. The seasons come one after the other as the year goes round. Study Figure 7.4 which shows you how the seasons come about in Zimbabwe.

Figure 7.4 Seasons in Zimbabwe

Characteristics of each season

When we talk about characteristics of a season, we are looking at that which makes up a season. Characteristics help us to identify each season clearly. Now, we shall list the characteristics of each of the seasons in Zimbabwe.

Characteristics of the Summer season (mid-November to mid-March)

1. They start from mid-November to mid-March
2. It is a wet or rain season
3. Temperatures sometimes go very high and it becomes very hot
4. Longest days and shortest nights.

Characteristics of the Autumn season (mid-March to mid-May)

1. It is a season of transition which means a changing season from summer to winter
2. This season is usually where trees shed off their leaves from deciduous trees
3. It is also a windy period
4. Temperatures start to go up during this season.

Characteristics of the Winter season (mid-May to mid-August)

1. They start from mid-May to mid-August
2. This is a dry season
3. Temperatures are cool
4. The coldest season of the year
5. There is no rain
6. It has short days and long nights.

Characteristics of the Spring season (mid-August to mid-November)

1. It starts from mid-August to mid-November
2. It has warm days
3. It is the hottest season of the year
4. Plants and vegetation begin to grow in this season.

Activity 7

1. Make four groups from your class.
2. One member of the group picks a card from a box given by the teacher with a name and reads it.
3. The name on the picked card is your group.
4. Your group could be named summer, winter, autumn or spring.
5. Now each group should describe the characteristic of its season.

Activity 8

1. The summer group must compare its characteristics with the winter group.
2. The autumn group must compare itself with the spring group.
3. Each group discusses activities taking place during their season like growing crops and so on.
4. Draw a flow diagram showing the four seasons in Zimbabwe and name them.

Exercise D

1. A season is_____.
   A. a year B. a short period C. half a year D. a full year
2. As the _____changes, it brings different seasons.
   A. sun B. rain C. weather D. climate
3. The _____is a windy season.
   A. winter B. autumn C. summer D. spring
4. Which season has the highest rainfall?
   A. winter B. autumn C. summer D. spring
5. Which season has the longest days and the shortest nights?
   A. winter B. autumn C. summer D. spring
6. How many seasons does Zimbabwe have?
7. Describe the summer season.
8. List the characteristics of the winter season.
9. What is the difference between spring and autumn seasons?
10. Draw a flow diagram showing how the seasons in Zimbabwe come about.

Summary

- In Zimbabwe we have summer, winter, autumn and spring.
- The changes in weather lead to seasons.

Unit 20 Weather and climate hazards

In this unit you will:

1. list weather hazards
2. explain how to mitigate and adapt to weather and climate hazards.

Flashback

Changes in weather cause hazards like floods, cyclones, heatwaves and drought.

Key words

drought, hazard, resistant crops, short season, weather

Weather hazards

Weather hazards come in different forms. The weather can bring too much rainfall, or can become too cold or it can bring very strong damaging winds. People living in their areas should be able to predict or forecast weather so that they can prevent harm from hazards. Hazards can do harm to people, livestock and the rest of the environment. In Zimbabwe drought, floods, heat waves and tropical cyclones are common weather and climate hazards.

Figure 7.5 (a) floods (b) drought

Drought as a hazard

- It kills livestock because there would be no water to drink and all pastures will dry up.
- Food production will be reduced so people will get malnourished and die of diseases caused by an unbalanced diet.
- Rivers and dams dry up and there is no water for urban use and for irrigation of crops.

Floods as a hazard

- They affect people, livestock and the environment.
- There is loss of life (people and animals die).
- They damage infrastructure like houses, offices, roads, bridges and railway networks.
- They destroy crops.
- They bring about water borne diseases like typhoid, cholera and such others.

Heat waves as a hazard

- This is a continuous period of hot weather.
- It affects human health by headaches, dehydration, discomfort and fatigue.
- It leads to death, especially to babies and very old people.

Tropical cyclone as a hazard

- These are very strong winds that usually come with very heavy rains.
- They damage life and property.

Activity 9

1. Learners are divided into four groups and each group is asked to discuss and find ways of reducing the effects of the above mentioned weather and climate hazards.
2. Each group is to be given time to present their solutions for the different hazards.
3. What can we do to lessen or reduce the effects of drought, floods, heat waves and the tropical cyclones?

Activity 10

Watch videos based on weather and climate hazards and identify the dangers of these hazards.

How to reduce weather and climate hazards

1. When a drought has been predicted or foreseen, people must grow crops that are drought resistant like millet (*inyawuthi, rukweza, mhunga*) or rapoko (*amabele, mapfunde*).

2. Farmers should grow **short season** variety crops. These are crops that take a shorter time to mature.
3. People and livestock must be moved away to higher ground or safer areas before the heavy rains come down.
4. People must avoid working in the sun when there is a heat wave, and they must drink a lot of water.
5. People can also have air conditioners in their houses where possible.
6. In the time of floods, people must be given safe water to drink to avoid water borne diseases like typhoid, cholera and such others.
7. When floods and the tropical cyclone disturb electricity, people can cook using the solar cooker.

Exercise E

Answer the following questions.

1. What is a hazard?
2. Name the four weather and climate hazards that you have learnt.
3. What can you do to reduce the effect of floods around people in towns and people in rural areas?
4. What can you do to help people when there is a heat wave?

Exercise F

Answer the following questions.

1. Weather hazard means_____.
   A. danger that comes from the harshness of weather
   B. weather measurement
   C. weather forecast
   D. weather put together with climate
2. Heat waves_____.
   A. affect babies and very old people
   B. are as good as sea waves
   C. bring comfort to people
   D. do not cause any problem
3. A tropical cyclone is a_____.
   A. strong heat
   B. strong wind accompanied by heavy rain
   C. a way of recording temperature
   D. a way of mitigating problems of weather
4. The following are weather and climate hazards **except** _____.
   A. heat waves B. drought C. tropical cyclone D. tributary
5. Floods can cause _____.
   A. headache
   B. water borne diseases like cholera
   C. no harm to people
   D. hot weather to come

6. Explain what you understand by weather hazard.
7. How do you save people in the rural areas from floods?
8. Why is it important to record weather?
9. State two ways in which we can reduce the effect of floods in rural areas.
10. Explain why drought is not good for the environment.

Summary

- Weather hazards come in different forms.
- Weather hazards include too much rainfall, too cold, too much heat and strong damaging winds.
- Hazards can destroy people, livestock and the rest of the environment.

End of topic assessment

Multiple choice

1. The following are weather elements **except** _____.
   A. temperature B. rainfall C. cloud cover D. ice
2. Temperature refers to the degree of heat or cold in the_____.
   A. atmosphere B. river C. clouds D. well
3. Giving weather forecast means _____weather.
   A. driving B. pouring C. writing D. foretelling
4. The following are water borne diseases **except** _____.
   A. typhoid B. cholera C. dysentery D. malaria
5. To interpret weather means to _____ weather.
   A. ignore B. understand C. control D. revise
6. Which of the following is NOT an instrument to measure weather?
   A. weather record B. thermometer
   C. rain gauge D. wind vane
7. How many seasons are there in Zimbabwe?
   A. 3 B. 4 C. 5 D. 6
8. Which season do trees start to develop shoots and leaves?
   A. summer B. winter C. spring D. autumn
9. Rainfall is measured in _____.
   A. kilometres B. centimtres C. millimetres D. metres
10. The following are seasons except _____.
    A. summer B. autumn C. winter D. October

Structured questions

1. What do you understand from the word weather?
2. Define the word climate.
3. Identify two ways in which we can forecast weather.
4. Explain the term weather forecast.
5. Explain how you can lessen the drought hazard.
6. Why is the tropical cyclone known as a weather hazard?
7. Explain your understanding of drought resistant crops.
8. Explain the difference between thermometer and a rain gauge.
9. Why is it important to keep weather records?
10. Name two water borne diseases.

Topic 8 Soil, plants and animals

Unit 21 Soil

In this unit you will:

1. identify organisms living in and on the soil
2. discuss how plants and animals benefit from the soil
3. explain how soil benefits from organisms.

Flashback

Soil consists of solid particles, water, air, dead animals and dead plant matter.

Key words

habitat organic

Soil is important to plants and animals that use soil as their habitant. Plants that grow on the soil can be classified into groups. These plant foods provide different nutrients. Some animals also eat plants that grow on the soil. There are different types of animals and these provide organic matter to the soil. These are classified into five groups. Some live in water and some on land. This means they have different habitants.

Organisms living on and in soil

Soil provides a habitat for living organisms. An organism is a form of life, such as, a plant, animal, bacteria or fungus. Some soil organisms help speed up the decay of dead plant and animal matter. This makes the soil good for plant growth.

Figure 8.1 Soil is important to plants and animals

Activity 1

Find out if there are organisms which live in and on the soil.

You will need: spade, hoe, lens, soil organism identification chart, tweezers and gloves.

Safety: use hand gloves

Method: Observation
Visit a garden in your local area. Search and identify organisms which live on and in the soil. Use the hoe and spade to dig and identify living organisms in the soil.

	Number of living organisms on soil only	Number of living organisms in soil only	Number of living organisms found in and on soil
1. insects			
2. worms			
3. frogs			
4. plants			
5. fungi			
6. other			
Total			

Conclusion

The soil is a habitat for_____.
We found out that there is quite a number of living organisms found on and in soil.

Challenge

A **habitat** is the place where an animal or plant lives. A habitat should have shelter, water, food and protection.
Take any two living organisms from Activity 1. List how they get the following from soil:
(a) shelter (b) water (c) food (d) protection

How plants benefit from soil

Plants need nutrients for them to stay healthy. They take up the nutrients from the soil through their roots. The soil stores the nutrients and supplies them to plants. Examples of nutrients are nitrates, phosphates and potassium. Nitrates promote healthy leaf growth. Phosphates are needed for healthy plant roots. Plants require potassium for making healthy flowers and fruits.

Activity 2

Watch a plant video showing how plants take up nutrients from the soil.

Word Tree

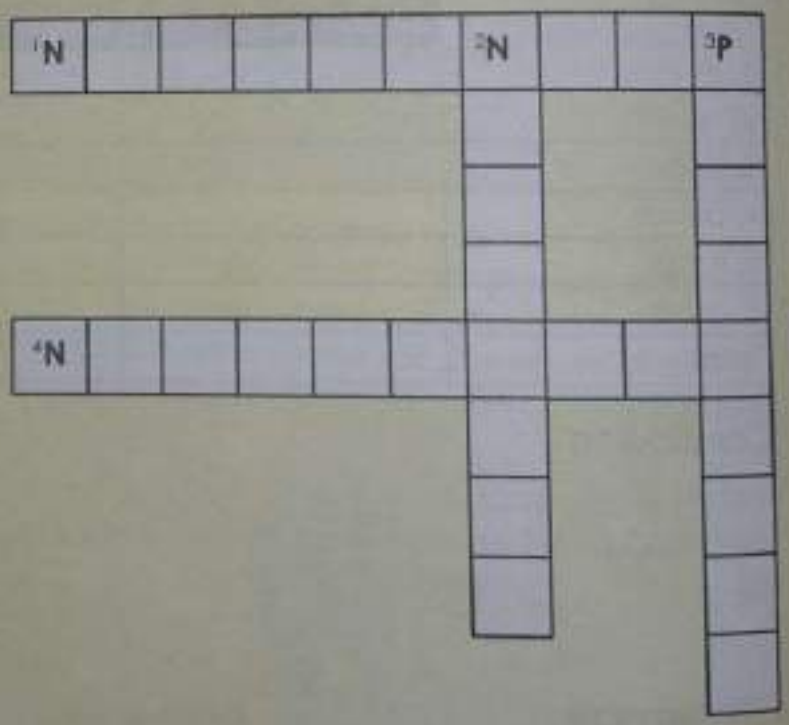
Use the clues below to complete the boxes of the word tree with the correct words.

Across

1. They are stored in the soil and plants take them up
2. It is important for healthy root development

Down

3. Plants need them for healthy leaves
4. Plants use it for making healthy flower and fruits



How animals benefit from soil

Animals just like plants need nutrients for them to stay healthy. Animals get nutrients from plants and water. Soil has many plants growing on them. Insects such as, ants bore into the soil to live underground. They come up to get food from plants and animals and keep their animals under the soil.

Other animals such as a mole feed on plant roots under the soil. They are also protected by soil from the weather elements, such as sun, wind and rain. Soil consists of air therefore, animals have adequate air underground to breathe.

Exercise A

Answer the questions.

1. The following animals live underground except_____.
   A. mole B. ants C. dragon fly D. mice
2. A habitat needs all the following except _____.
   A. food B. water C. shelter D. wind
3. The nutrient that promotes healthy leaf growth is called _____.
   A. phosphates B. nitrate C. potassium D. nutrient
4. Plants need _____ from the soil.
   A. air B. leaves C. sun D. nutrients
5. An animal that eats plant roots is called a _____.
   A. insect B. mouse C. mole D. bees

Organisms provide organic matter to the soil

Dead leaves and tree branches fall to the ground and decay. Animals get rid of waste which also decays in soil. Many plants and animals die and decay in the soil. The decaying plant and animal materials is called **organic** matter. This organic matter decays with the help of bacteria to form a material called humus. Humus has many important nutrients needed by plants.

Activity 3

Project work

Visit a woodland of your choice. Ask for permission to collect small samples of decaying remains of plants and animals from the soil. This organic matter eventually decays and changes to become humus.

Safety: be sure to use rubber gloves when handling the organic matter

Scientific exhibition

1. Display the collected samples in neatly labelled transparent jars.
2. Make a scientific write up of what you found out on a chart.
3. Design a poster telling people that soil is our heritage. Include the various ways in which we can protect the soil.
4. Present your findings in class.

Summary

- Soil is a habitat for living organisms.
- Plants get their nutrients from soil.
- Dead plants and animals decay and restore nutrients to the soil.

Unit 22 Plants

In this unit you will:

1. classify plant foods
2. explain the nutritional value of different plant food
3. list nutrients found in plant foods.

Flashback

Soil is part of our environment. Soil is a source of plant nutrients and it is a habitat for animals. People grow their plants in the soil. Therefore, people depend on plants, while plants also depend on the soils.

Key words

cereals legumes tubers

Plant food groups

Plant foods belong to different groups. Each group has its own nutritional value. There are different plant food groups such as: cereals, legumes, root tubers, fruits and vegetables. Plant food contains nutrients that are good for health. It is easy to remember plant foods from the way they are classified. Read the table below which shows you the different classes of plant food.

Classifying plant foods

Cereals	Legumes	Root tubers	Fruits	Leafy Vegetables
Maize or corn	Peas	Potatoes/*mbatatisi*	Apples	Rugare
Rice	Beans	Peanuts/*nzungu*	Bananas	Cabbage
Sorghum	Lentils	Sweet potatoes/ *mbambaira*	Grapes	Rape
Millet	Soya beans	*Madhumbe*	Oranges	Spinach
Barley	Peanuts	Carrots	Pineapples	Chomoliar
			Mazhanje	
			Mapfura	

Activity 4

1. Name and add two more fruits from your home area.
2. Name and add two types of leafy vegetables usually found at your local market.
3. In groups, collect different plant foods that are available to you.

What is a cereal?

A **cereal** is any grass grown for the purposes of getting its grains. Cereal grains provide food energy. Cereals are regarded as staple crops. Staple crops give staple food. The staple food in Zimbabwe comes from the cereal called maize. Cereals as whole grain are rich in vitamins, minerals, carbohydrates, fats, oils and protein.

Activity 5

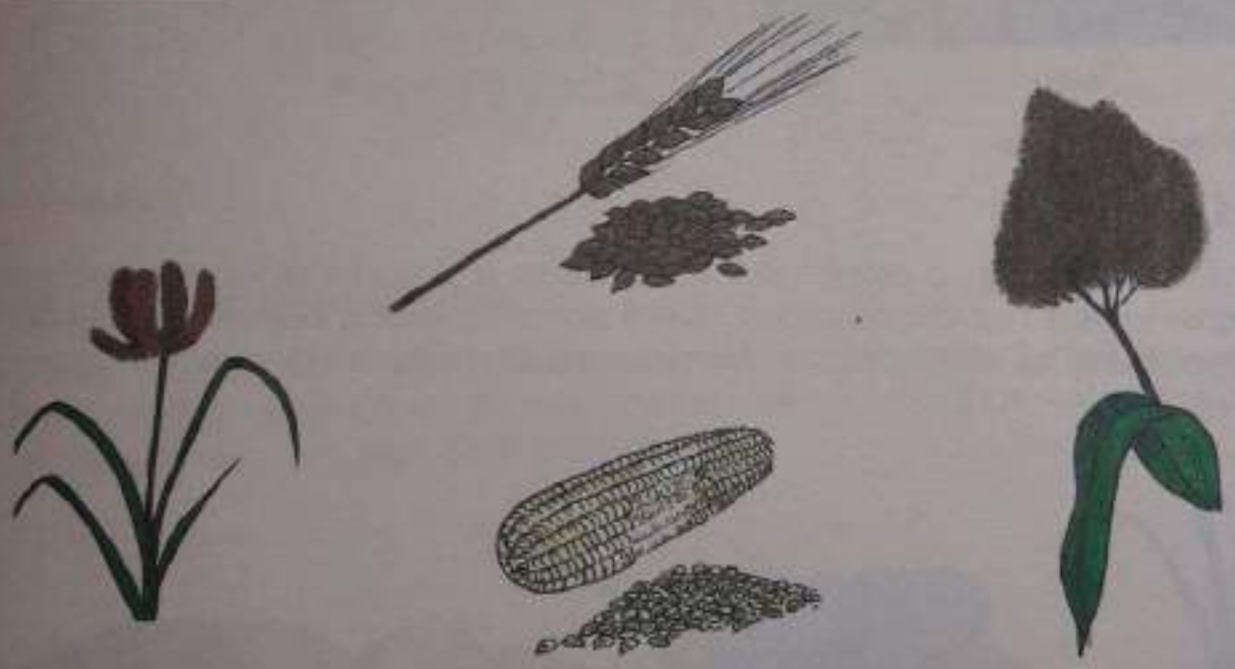


Figure 8.2 Cereal crops

1. Match the following cereals with the list of names provided:
   (maize, wheat, millet/*mhunga*, *inyawuthi*/sorghum, rapoko/*amabele*, *mapfunde* and rice)
2. Draw and name each of the above cereals in your exercise book.

What is a legume?

A **legume** is a plant that produces fruit or seed in pods. The examples of legumes include peas, beans, soya beans and peanuts. A legume fruit is opened from its shell on two sides. Legumes have nitrogen fixing bacteria in their root nodules. Legumes can fix nitrogen in the soil, they play an important role in crop rotation.

Activity 6

1. Study the pictures below of different legumes.
2. Which three legumes from the picture do you enjoy eating?
3. What nutrients do we get in peanuts and in peas?

nuts

green beans

Figure 8.3 Legume plants

What is a tuber?

A **tuber** is a growth on a plant root. The tuber is a storage organ for nutrients. Examples of tubers include potatoes, sweet potatoes/*mbambaira/imbambayila*, carrots, madhumbe, and cassava. An example of a country that grows cassava is Tanzania.

Onion

potatoes

sweet potatoes

cassava

Figure 8.4 Tuber plants

Exercise B

Answer the questions.

1. Name nutrients found in sweet potatoes/*mbambaira/imbambayila*.
2. Name the nutrients found in onions.
3. Name the nutrients found in beans.

What is a fruit?

A fruit is a seed bearing structure in flowering plants. Examples of fruits include apples, bananas, grapes, lemons, oranges, strawberries, mango, *hacha*, *nhunduru*, *tswubvu/umtshwankela*, *matohwe/uxakuxaku*. A fruit is formed from the ovary after flowering. People eat fruits as a source of food. Fruits can be eaten in a raw state.

Figure 8.5 Fruits

What is a leafy vegetable?

This is plant food that is also known as green vegetables. Examples include *rugare*, cabbage, spinach, covo, *tsunga* and many others that we eat at home. Vegetables have a very high fibre content.

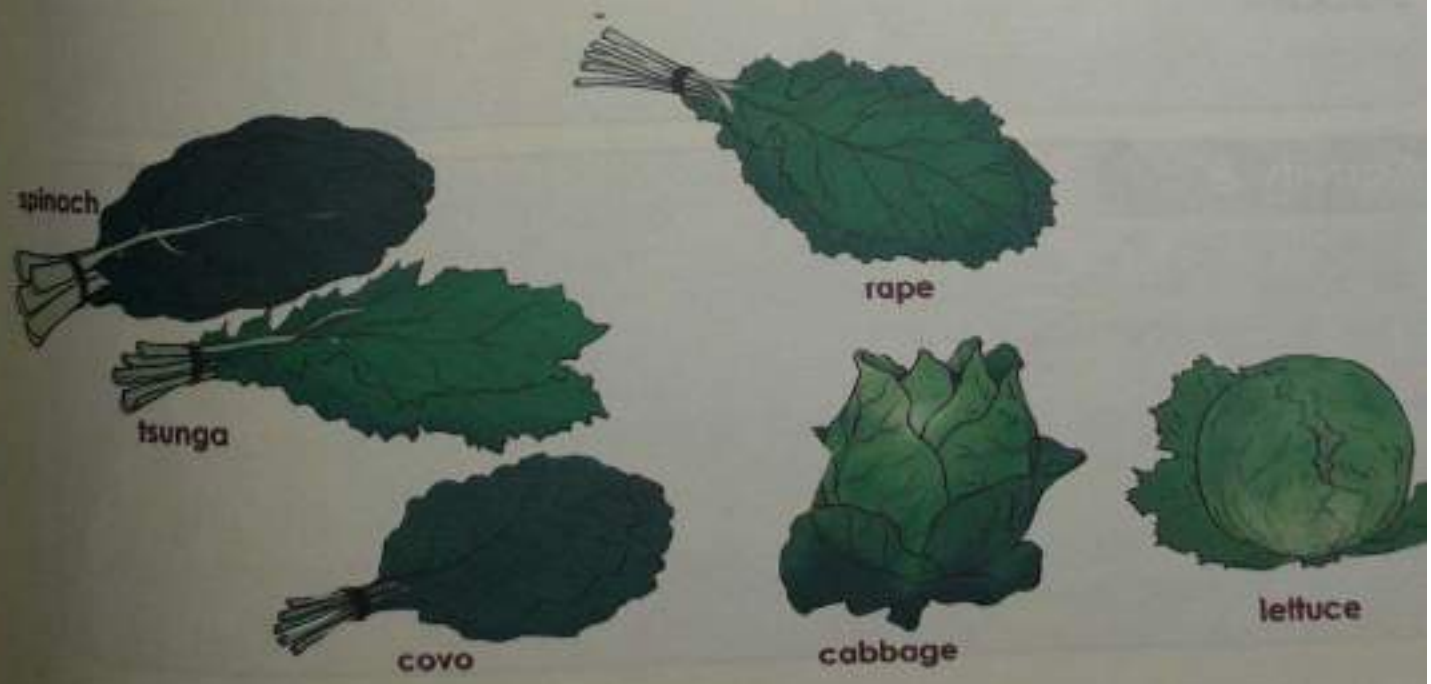


Figure 8.6 Leaf vegetables

Nutritional value of different plants

1. Vegetables give us vitamins and minerals. The vitamins help to build our bones, heal wounds and boost our immune system.
2. Cereals have grains and the main part of the cereals have starch which make carbohydrates. Carbohydrates give energy to the body.
3. Tubers mostly contain dietary fibre. Dietary fibre is also called roughage. Roughage is the indigestible portion of food derived from plants. It helps push waste out of the body.
4. Legumes provide a range of nutrients that include protein, carbohydrates, dietary fibre and minerals and vitamins. They mostly contain protein. Protein helps build the body.
5. Fruits are mainly a source of various nutrients that include vitamin C, potassium and dietary fibre. They protect the body from diseases.

Activity 7

Fill in the table below with nutrients found in each plant food in your small groups.

Plant Food	Nutrient
Mango	
Sweet potato	
Cabbage	
Beans	
Carrot	
Groundnuts	

Debate

Which plant food is more important and why?

Activity 8

Class project

Get a portion from the school garden and grow one bed of carrots and another of spinach for your grade 4 class.

You will need: a hoe, a bucket, seeds for spinach and carrots, a pick, a string, and a hosepipe.

Your teacher will help you on what to do first and how you will monitor the growth of your plant food at school.

Exercise C

Answer the question.

1. The following plant is **not** a tuber.
   A. sweet potatoes B. rape C. potato D. carrots
2. The other name for millet is_____.
   A. rice B. rapoko C. maize D. wheat
3. Which plant can fix nitrogen into the soil?
   A. beans B. mango C. wheat D. maize
4. Which plant food does **not** open from its shell?
   A. apple B. groundnuts C. peas D. beans
5. Which vitamin do we get from green vegetables?
   A. vitamin E B. vitamin A C. vitamin B D. vitamin C
6. Name the plant food that gives us more carbohydrates.
7. Name two fruits that are grown at our homes.
8. Why do we need to eat different plant food?
9. Why is dietary fibre important to our bodies?
10. Why are legumes important in crop rotation?

Summary

- People's lives depend on plant food.
- The plant foods are found in different classes like the legumes, fruits, vegetables, tubers and cereals.
- We need to eat a variety of plant foods so that we get different nutrients needed by the body.
- It is good for us to grow plants that give us food at home for our families and in the farms for commercial purposes.

Unit 23 Animals

In this unit you will:

1. identify characteristics of vertebrates
2. classify vertebrates into five groups
3. describe the external features of each group of vertebrates
4. state examples of vertebrates in each group
5. identify vertebrates according to their habitats.

Flashback

There are different kinds of animals. Some are called invertebrates. Name invertebrates you know.

Key words

amphibians	mammals	reptiles
vertebral column	vertebrates	warm blooded

The animal kingdom

The animal kingdom is very big. It has many animals. Some are called vertebrates and some are called non vertebrates. Vertebrates are known by having certain characteristics. In this section, we shall learn about animals called vertebrates. The vertebrates also have different classes.

Vertebrates

Vertebrates have backbone. The bones help vertebrates to move, to run, to climb or even to swim. The bone that helps them to move is called backbone or **vertebral column**. All animals that have a backbone are the ones called **vertebrates**. Vertebrates are classified into five groups as shown in Figure 8.7. The five groups are fish, amphibians, reptiles, birds and mammals. Study the pictures below.

Figure 8.7 Vertebrates

Classifying vertebrates

They are classified based on:

(i) their skin covering
(ii) how they reproduce
(iii) how they maintain body temperature
(iv) characteristics of their limbs (arms and legs, or their equivalent such as wings or fins).

Fish

Fish belong to one class of vertebrates. See Figure 8.8 of fish.

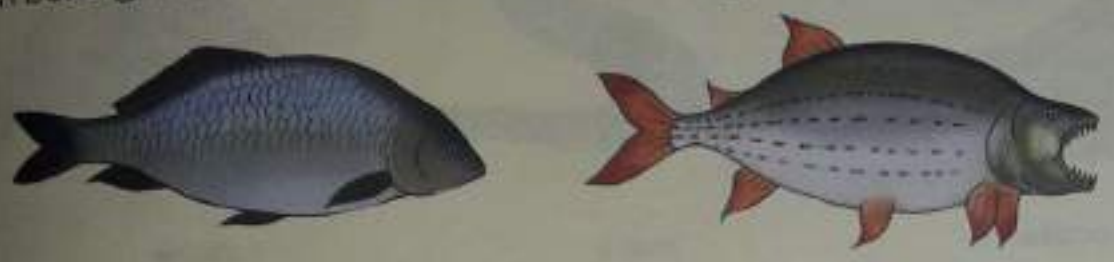


Figure 8.8 Fish

Characteristics of fish

Fish skin is covered with scales. They have limbs which are called fins. They use the fins to swim. Fish are very interesting because they can breathe in water. They breathe with gills. They lay eggs for reproduction but the eggs bust in water. Fish are also cold blooded.

Where do fish live?

Fish live in water. They are adapted into living in water. Fish also live in fresh water habitats like rivers, lakes and swamps.

Amphibians

Amphibians are the other group of vertebrates.

Figure 8.9 Amphibians

Examples of amphibians include frogs and toads. Amphibians are cold blooded. You must notice that they do not have scales or hair. Their skin is always moist. They also lay eggs in water for reproduction.

Where do amphibians live?

Most amphibians live part of their lives underwater and part on land.

Reptiles

Reptiles are another group of vertebrates, see Figure 8.10. Which one of these animals have you seen before? Have you seen any of these animals alive?

crocodile snake tortoise

Figure 8.10 Reptiles

Characteristics of reptiles

They have a backbone, therefore, they are vertebrates. Reptile bodies are covered in scales. They breathe with lungs. They also lay eggs for reproduction. Almost all the reptiles are cold blooded.

Where do reptiles live?

Most reptiles live on land. However, some live in the water like crocodiles do. Some snakes live on the land while some live in the water. Most reptiles are dangerous.

Activity 9

1. Which reptile does not have legs?
2. Can a crocodile live in water?
3. What do reptiles do for reproduction?

Birds

Birds are another group of vertebrates, see Figure 8.11. They are found in different shapes and colours.

eagle

pigeon

Figure 8.11 Birds

Characteristics of birds

All birds have feathers and have a backbone. All birds are vertebrates. All birds are warm blooded and they can regulate their body temperature. The female birds lay eggs and they have wings they use to fly. Not all birds with wings fly for example, an ostrich.

Where do birds live?

Birds live in a nest. Birds live in different habitats like mountains, forests, deserts and near bodies of water. When the weather changes very much, they move from cold regions to warmer regions.

Activity 10

1. Teacher brings a video showing different kinds of vertebrates. Learners watch the video and describe the features that they see for each group of vertebrates.
2. Choose one bird that you like and draw it in your exercise book.
3. Research Work: Weekend assignment Choose (a) or (b)
   (a) Look out for a station on television that has some facts about birds. Watch it and write short notes on the birds.
   (b) Look out for magazines that show pictures of birds and observe their characteristics that you have learnt. Write short notes on birds.

Mammals

Mammals are another group of vertebrates, see Figure 8.12. Name each of these mammals.

Figure 8.12 Mammals

Characteristics of mammals

Mammals are vertebrates, which means that they have a backbone or spine. Mammals are **warm blooded** animals, so they regulate their own body temperature. They have hair on their bodies. They produce milk to feed their young ones.
Where do mammals live?

Most of the mammals live on dry land. Some live in the deserts while some live in tropical forests, some in arctic waters and some in mountains. Are you a mammal? Do you have a backbone?

Activity 11

Comparison.

1. Compare a reptile and a mammal.
2. Compare a bird and an amphibian. Write out the differences that you see.
3. Give examples of each group of vertebrates

Birds	Reptiles	Mammals	Amphibian	Fish

4. Draw a picture of the following and label it by its name (a) one amphibian (b) one reptile. (c) one mammal

Activity 12

Case Study

1. The teacher organises an educational trip to the local National Park.
2. You need to carry your note book, pen, pencil and camera if you can.
3. When you get to the National Park, you will be handed over to a guide who will take you around.
4. Observe the animals that are there and do the following tasks:
   (a) Name different types of animals that you see.
   (b) Describe their outer skin.
   (c) Where do they live?
   (d) Classify the animals that you see.
5. Prepare to report back to your class what you learnt about the animal kingdom at the National Park near your school area.

Exercise D

Answer the question.

1. The common characteristic in all vertebrates is they have a_____.
   A. smooth skin B. skin with scales
   C. backbone D. fur
2. The following animal is **NOT** a reptile_____.
   A. crocodile B. snake C. tortoise D. bird
3. The following animal does **NOT** lay eggs_____.
   A. crocodile B. snake C. bird D. monkey
4. Which of the following is **NOT** a vertebrate?
   A. birds B. reptiles C. ants D. amphibians
5. Where do crocodiles live?
   A. in the water B. in the valley
   C. in the mountains D. in the village
6. Name all of the five groups of vertebrates that we have?
7. Describe the skin of an amphibian.
8. What are the limbs of fish called?
9. Explain the importance of the backbone in vertebrates.
10. If all these animals are part of the environment where we live, what can we do to conserve them?

Summary

- The animal kingdom is very big.
- Animals are classified into groups which include the vertebrates.
- Vertebrates are classified into five groups, namely the fish, amphibians, reptiles, birds and mammals.
- Vertebrates have a backbone which enables them to walk, swim or fly.

- Birds have wings but not all of them use them to fly.
- Soil, plants and animals are all part of the environment.
- We should keep our environment safe.

End of topic assessment

Multiple choice

1. An apple is an example of a_____.
   A. fruit B. cereal C. legume D. tuber
2. Which nutrient does a legume plant fix in the soil?
   A. potassium B. nitrogen C. phosphorus D. nutrient
3. Organic matter includes _____and_____.
   A. dead plants and animals B. soil and water
   C. tools and animals D. compound and leaves
4. What are the bodies of reptiles covered in?
   A. scales B. hair C. blanket D. feathers
5. Where do crocodiles live?
   A. in the water B. in tanks C. in the mountains D. in the village
6. Mammals have backbone and _____.
   A. spine B. wings C. scales D. gills
7. Which of the following is a reptile?
   A. bird B. elephant C. crocodile D. baboon
8. A _____is a cereal crop.
   A. tomato B. millet C. onion D. carrot
9. Legumes can fix _____ in the soil.
   A. nitrogen B. hydrogen C. carbohydrates D. fruits
10. An example of a tuber is a _____.
    A. peas B. rape C. cabbage D. cassava

Structured questions

1. Name two tubers.
2. Give three example of reptiles.
3. What nutrient do we get from meat?
4. State two things that can change to organic matter.
5. What is a legume?
6. Name one animal that is a mammal.

Unit 24 Landforms and maps

In this unit you will:

1. identify natural and man-made landforms
2. to distinguish between natural and man-made landforms.

Flashback

A landform is a feature that is found on the land. It can be man-made or natural. Examples of landforms that are found on the earth's surface include mountains, hills, a valley and many others.

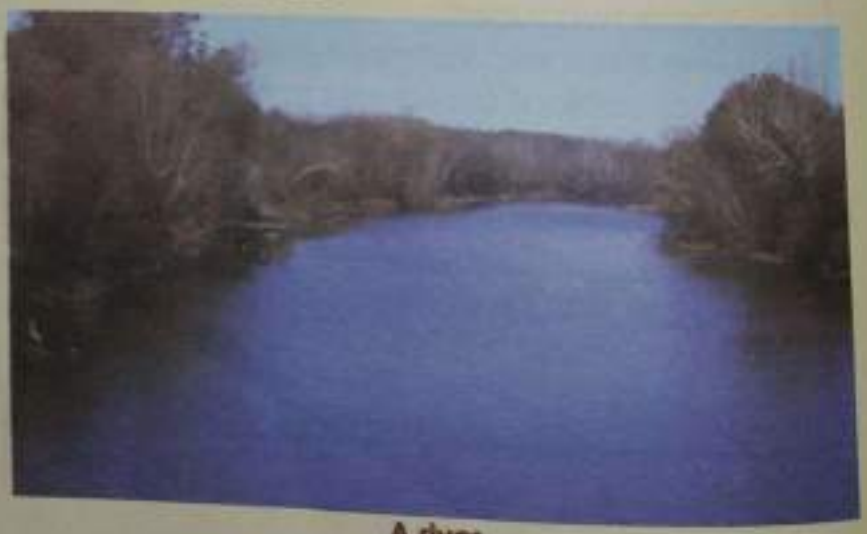
Key words

man-made landform map natural landform

A landform is any shape on the earth's surface. There are two types of landforms which are natural and man-made landforms. Natural landforms include mountains, deserts, valleys and so on, while man-made include skyscrapers, bridges, roads and so on. Landforms have different purposes and are important.

Natural and man-made landforms

Mountains



A river

Figure 9.1 Natural landforms

A natural landform and a **man-made landform** is a feature or figure that is found on the earth's surface. Examples of **natural landforms** include the mountains, hills, valleys, rivers, waterfalls and others. Try to remember the mountains or hills that you have seen before.

A canal

A pond

Figure 9.2 Man-made landforms

The man-made landforms include a lake, canal, dam, terrace, contour ridges and many others. Try to remember any of these that you have seen before.

The difference between man-made landforms and natural landforms

The main difference is that the **man-made landforms** are made by human beings like the dam, while the **natural landforms** are figures on the earth' surface that are not made by man like a river or mountain.

What is a map?

A **map** is a plan or diagram of an area of land or sea showing physical features. The following is a map that represents an area of land or sea. Do you remember seeing a map of Zimbabwe?

Figure 9.3 Landforms found in Zimbabwe

Most of the landforms that are seen on the landforms map of Zimbabwe show the highest mountain in the country and the other mountains. The map in Figure 9.3 shows major rivers and lakes in the country of Zimbabwe like the Limpopo and the Zambezi Rivers.

Importance of landforms

1. Some landforms can become tourist centres, like Mt. Nyanga in Zimbabwe.
2. The mountain is a shelter to many wild animals.
3. A river can be used as a border line. For example, Limpopo river is the border between South Africa and Zimbabwe.
4. Landforms can be used to study the geography of an area.
5. Mountains can influence the weather of an area. The higher you go up a mountain the cooler the temperature becomes. People visit such sites and that creates business for example, National Parks and Wildlife.
6. Lake Kyle is a man-made dam. Water collects there in large amounts and it is used for irrigation and **canoeing** for **tourism**. Water in the dam can also breed fish and the fish are an important food component in our diet. A **canal** is used to direct water for irrigation where people do not use hosepipes.

Exercise A

Complete the following table showing the man-made landforms and natural landforms.

Man-made landforms	Natural landforms
Canal	Mountain

Activity 1

1. Make two groups from your class.
2. Go outside the classroom.
3. Look around and identify man-made and natural landforms in your school environment.
4. Draw and name at least 2 man-made landforms and 2 natural landforms found around your school or not around your school.
5. Why are landforms important to us?

Activity 2

Constructing landform models

Watch a video brought by your teacher on man-made and natural videos. You watch both of them and then do the following tasks:

1. Describe any man-made landform.
2. Describe any landform.
3. Choose one man-made or natural landform and make a model using papier marche. Work in pairs.
4. Collect the following which can help you to make models of the man-made and natural landforms.

You will need: soil, tins, grass, paper, water, glue and pebbles.

Activity 3

Solve the word scramble. Find the words listed from the box.

1. AREA
2. SEA
3. MAP
4. DAM
5. POND
6. MODEL
7. RIVER
8. CANAL
9. LAND
10. MADE
11. HILL
12. LAKE

D	N	A	L	A	P
R	I	V	E	R	D
M	C	S	D	N	A
H	A	V	O	S	M
I	N	P	M	T	A
L	A	R	E	A	D
L	L	A	K	E	E

Summary

- Landforms are man-made and natural.
- Mountains, rivers and valleys are natural landforms, this means that they are not made by man.
- Man-made landforms include dams, lakes, terrace and canals.
- Man-made and natural landforms are very important to us because they help to bring beauty to the earth and the landforms can become attractive tourist centres.

Glossary

canoeing – the sport or activity done in water using a boat
pebbles – small stones made that are smooth and round
tourism – the organisation of holidays and visits to places of interest

End of topic assessment

Multiple choice

1. A map is a diagram that represents the landforms on the _____.
   A. earth's surface B. lower part of the earth's surface
   C. hottest day D. coldest day
2. A man-made landform is the one that is_____.
   A. made by a man B. made by a river
   C. made by a lake D. made by a mountain
3. The following are naturally made landforms **except** _____.
   A. mountain B. river C. tributary D. dam wall
4. The following are natural landforms in Zimbabwe **except** _____.
   A. hill B. valley C. mountain D. canal
5. A landform is a feature that can be natural, which means that they form_____.
   A. outside B. inside C. between D. naturally
6. One of the rivers found in Zimbabwe is _____.
   A. Mutirikwi B. Kariba C. Gwayi D. Manyuchi
7. The following is a man-made lake.
   A. Kariba B. Kyle C. Munyati D. Save
8. A _____ is used for irrigation.
   A. canal B. bridge C. terrace D. contour ridge
9. Pebbles are _____.
   A. forms of water B. small stones
   C. rocks D. different soils
10. In Zimbabwe one of the tourist centre is_____.
    A. Shangani river B. Mt Nyanga
    C. Umzingwani river D. Mt Everest

Structured questions

1. What is a landform?
2. Name the two major types of landforms that you know.
3. Describe a map.
4. Draw a map of Zimbabwe and show the two major man-made and two natural landforms.
5. Explain the difference between man- made and natural landforms.

Topic 10 Sustainable resource management

Unit 25 Managing resources

In this unit you will:

1. classify natural resources into renewable and non-renewable resources
2. locate some natural resources in Zimbabwe
3. describe uses of natural resources
4. identify different forms of waste and give examples of each respectively
5. assemble natural resources in the science corner.

Flashback

Sources of waste include electronic gadgets, plants, industrial waste, household waste and should be taken care of.

Figure 10.1 (a) Collecting waste

(b) Worker collecting waste

Key words

environment non-renewable resource renewable resource

There are many resources in our country. Some of them are renewable and some are non-renewable. The renewable and non-renewable resources can be natural and man-made. Some natural resources can be found underground and some on the soil. Different resources are found at different places. Resources are important because they are used for different purposes that include agricultural activities.

When the resources are used some become waste which should be disposed of as solid or liquid.

Renewable and Non-renewable resources

Renewable resources

A **renewable resource** is a resource which can be used repeatedly because it is replaced naturally. Examples of renewable resources are: oxygen, water (river), solar energy, timber (vegetation), biomass and land (soil).

river

land

forests

solar energy

Figure 10.2 Renewable resources

Exercise A

1. What is a renewable resource?
2. Give a renewable resource we get from the sun.
3. Name the natural resource that can help farmers to grow crops.
4. In order for crops to grow well they need a natural resource called _____.
5. Why are natural resources used repeatedly?

Non-renewable resources

A **non-renewable resource** cannot be replaced by natural means once used. Examples of non-renewable resources are oil, natural gas, minerals such as coal, gold, diamond, silver and platinum.

Non-renewable resources are not sustainable because their formation takes billions of years. Non- renewable resources should be used wisely.

Diamond

Gold

Figure 10.3 Non-renewable resources

Exercise B

1. What are non-renewable resources?
2. Give two examples of non-renewable resources
3. Non-renewable resources should be used_____.
4. Why are non-renewable resources not sustainable?
5. State two renewable resources.

Location of natural resources

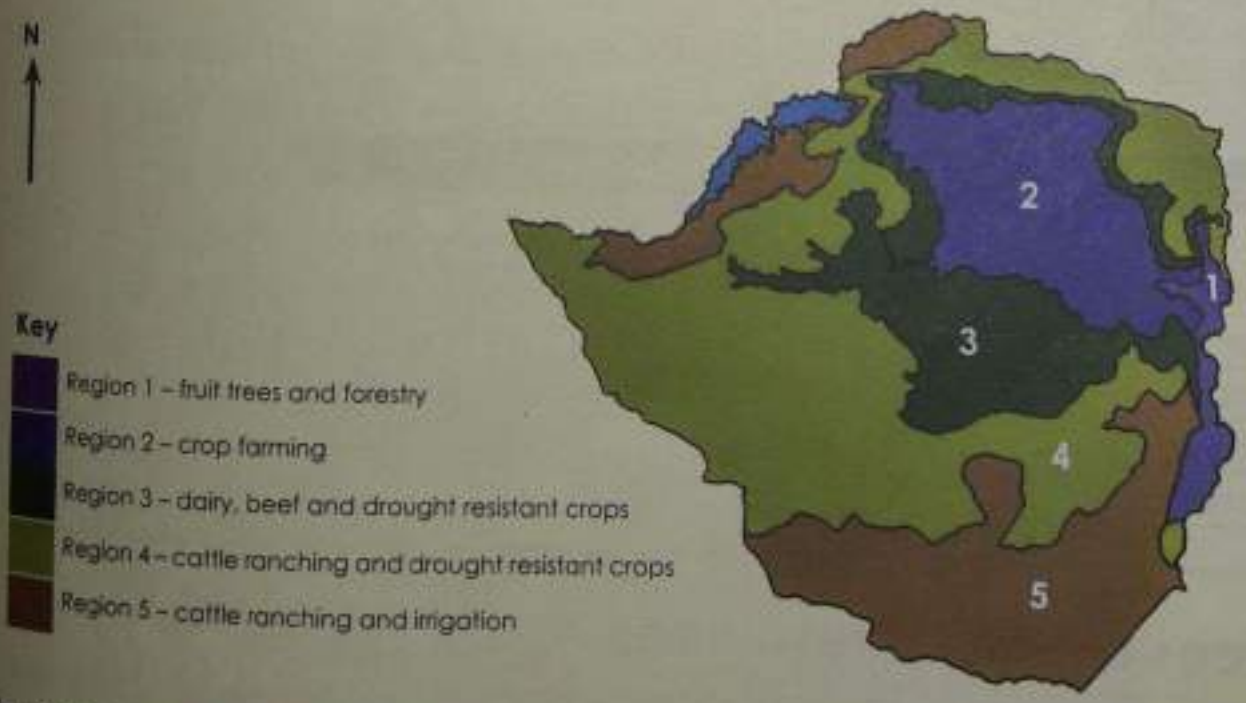


Figure 10.4 Agriculture land in Zimbabwe

Minerals found in Zimbabwe

Figure 10.5 Areas with minerals in Zimbabwe

Activity 1

1. Classify the following resources into renewable and non-renewable resources.
   a) gas b) water c)gold d)trees e) oil f) platinum g) solar energy
2. Compete the table below.

Mineral	Where it is mined
a) Gold	
b) Asbestos	
c) Platinum	
d) Nickel	
e) Iron ore	
f) diamonds	

Sources of natural resources

Soil, water, air, minerals and plants are a few of the natural resources that make life possible.

Figure 10.6 Vegetation as a natural resource

Soil is an important resource where agricultural activities such as growing of crops and keeping of animals are done. This is very important to human life as we all depend on farming. We get food from soil and vegetation. Water plays a very important part in farming, irrigating crops and survival of animals.

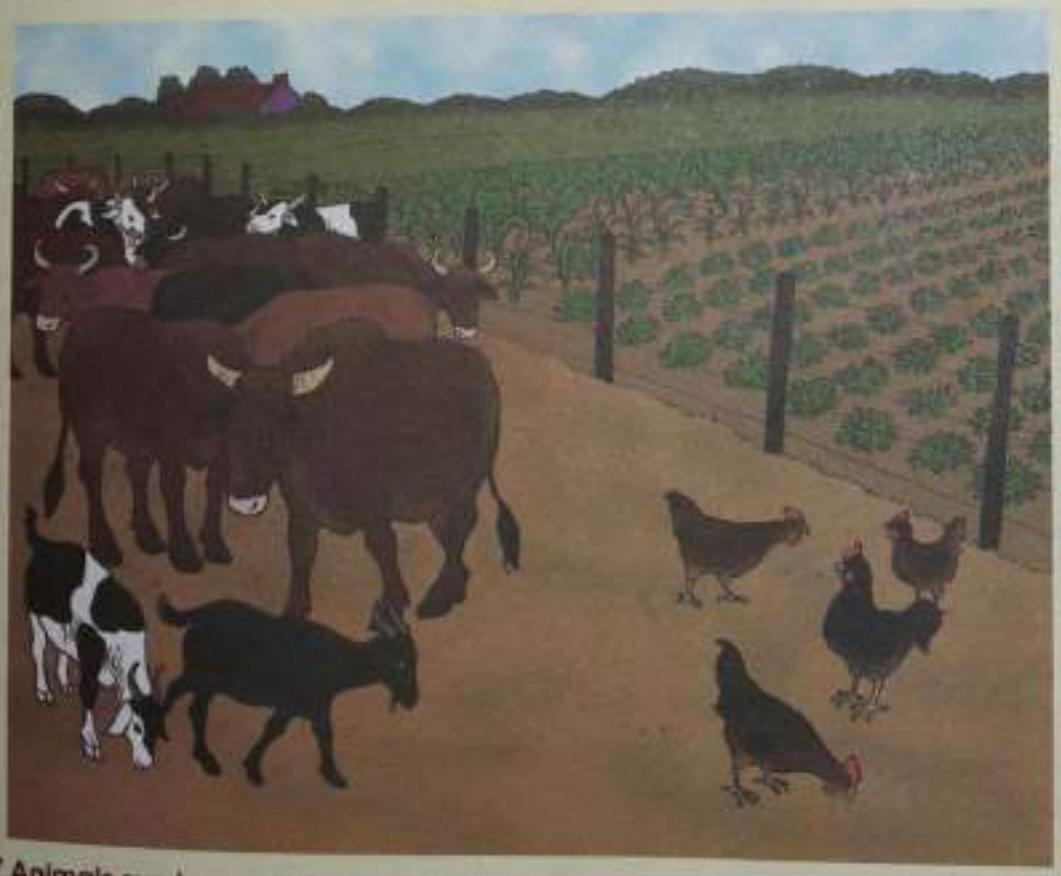


Figure 10.7 Animals survive on natural resources

Trees provide materials for newspapers, medicine as well as furniture. They also create oxygen.

Figure 10.8 Gadgets made from different materials

Televisions, cellphones, computers and cellphone devices contain a variety of valuable resources such as copper and precious metals including zinc, platinum, silver and gold.

Exercise C

Answer the questions

1. Name a natural resource that makes life possible.
2. How is a river important to life?
3. Soil is important. Explain how it is important.
4. State two uses of water.
5. Televisions, computers or cellphone devices use valuable resources such as _____, _____ and _____.

Activity 2

Group Assignment: Practical

Assemble natural resources at a science corner.

1. Make a list of natural resources both renewable and non-renewable resources.
2. Make a collection of the natural resources and put your collection at a science corner.
3. Are there any natural resources which need to be handled with care associated with mining?
4. Name disasters that are associated with mining.
5. Identify and describe the natural resources you collected for your science corner.

Unit 26 Forms of waste

In this unit you will:

1. identify forms of waste
2. state examples of solid, liquid and gaseous waste.

Flashback

Where do we put away waste in our homes and schools?

Key words

liquid solid gaseous organic

Forms of waste

Figure 10.9 Different forms of waste

A waste is a substance considered no longer useful or required. Generally waste could be liquid, solid or gas. All of them could be dangerous.

Waste is a result of overproduction, waiting or delaying transportation, inappropriate processing, excess and defects or things made with damages.

Liquid waste

Waste can come in form of a **liquid**. Some solid can be converted to liquid waste. Examples of liquid waste include; (a) Wash water from homes (b) liquids used for cleaning in industries (c) waste detergents.

Figure 10.10 Waste from liquid

Solid waste

Solid waste is mainly any garbage, refuse or rubbish that we make in our homes and other places. Examples of solid waste include: (a) old car tyres (b) old newspapers (c) broken furniture (d) food waste.

Figure 10.11 Solid waste

Gaseous waste

This includes fumes/smoke from industries that pollute the air that we breathe. Examples of **gaseous** waste include; (a) carbon monoxide (b) carbon dioxide (c) smoke from industries (d) fumes from vehicle exhaust.

Figure 10.12 Waste produced by gas

Organic waste

Organic waste comes from plants or animal source. They commonly include; a) food waste b) fruit peels c) vegetables.
Many people put their organic waste into compost and use it in gardens.

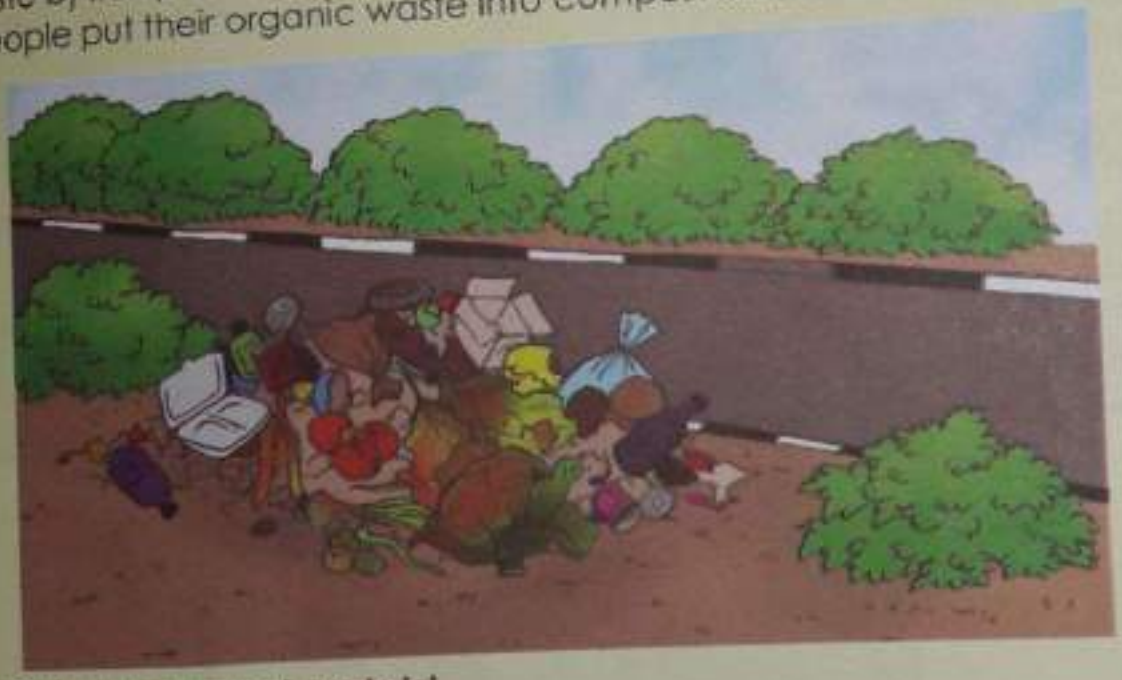


Figure 10.13 Waste from organic material

Exercise D

1. What is waste?
2. Give two reasons that result in waste.
3. Name the type of waste at A and B.

A

B

4. Give two examples of solid waste.
5. Which waste is useful and is used to put in the garden for our crops to grow well?

Activity 3

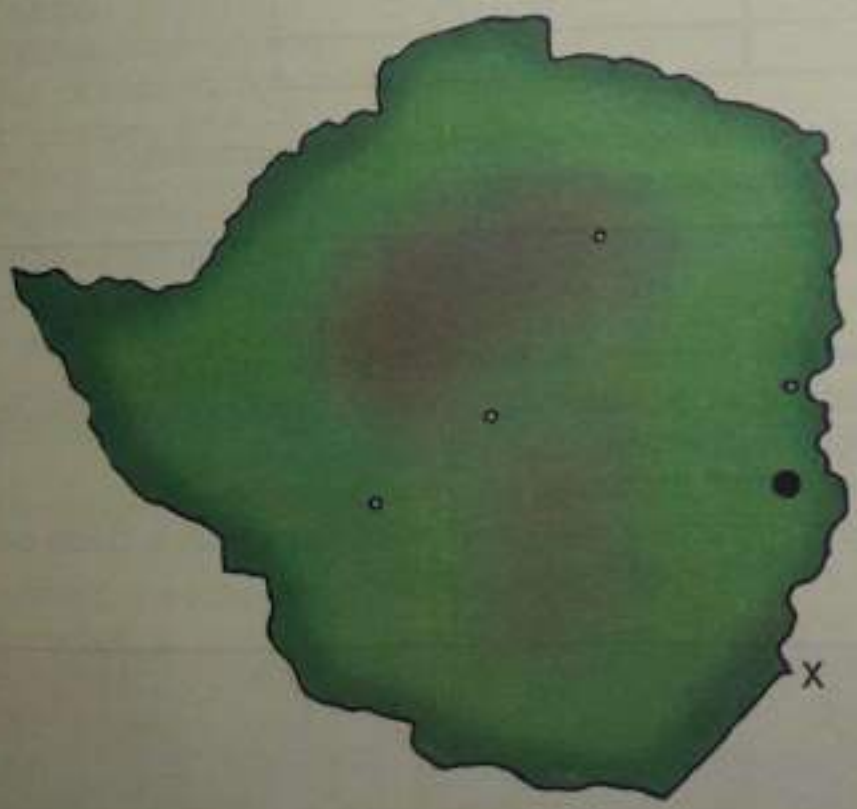
In groups do the following:

1. In Zimbabwe which department is responsible for ensuring that there is proper waste management?
2. Suggest ways of reducing dangers of a) liquid waste b) solid waste c) gas waste.
3. How do you deal with waste at your home?
4. At your school what have you done to ensure that waste does not cause harm to your health?
5. Does Zimbabwe as a country have laws to deal with waste?

End of topic assessment

Multiple choice

1. A renewable resource is_____.
   A. used once
   B. used twice
   C. used again and again
   D. never used again
2. The following is a renewable resource.
   A. water B. gold C. nickel D. oil
3. A non-renewable resource is one that _____.
   A. is replaced B. cannot be replaced
   C. expensive but used again D. old and usable
4. The following is an example of a non-renewable resource.
   A. solar energy B. land C. timber D. platinum
5. _____ is mined in Hwange.
   A. Nickel B. Gold C. Diamond D. Coal
6. Why are non-renewable resources not sustainable?
   A. they take a long time to form B. they are cheap
   C. they are new D. they are found underground
7. Which natural resource is mined at X?
   A. gold B. diamond C. silver D. coal



8. A forest found in Zimbabwe is called _____.
   A. Chirinda forest
   B. pine plantation
   C. wattle plantation
   D. gum plantation
9. Trees are important because _____.
   A. they provide timber for furniture
   B. they are green
   C. they give water
   D. they gives us carbon dioxide
10. Waste is not good for the environment because_____.
   A. it threatens public health
   B. add manure
   C. makes industry grow
   D. makes our homes clean

Structured questions

1. (a) Natural resources are grouped into two which are _____and _____. [2]
   (b) Give one example for each, renewable and non-renewable resources. [2]
2. (a) Name the natural resource mined at Hwange. [1]
   (b) Non-renewable resources take billions of years to form. This makes them not _____ [1]
3. Fill in the table below.

Mineral	Where it is mined
Asbestos	
Nickel	
Platinum	
Gold	
coal	

[5]

4. Name any four natural resources that makes life possible. [4]
5. Name four things that we get from trees. [4]

Summary

- There are renewable and non-renewable resources.
- A waste is a substance considered no longer useful or required which includes liquid, gas and organic waste.
- Organic waste comes from plants or animals source.
- There are different minerals mined in Zimbabwe which include gold, copper, zinc, aluminium, iron, diamond and asbestos.

Glossary

sustainable – capable of being sustained

Unit 27 End of year assessment

Paper 1

Multiple choice questions

Answer all questions.

1. _____ is a sign of tooth decay.
   A. toothache
   B. stomach ache
   C. size of tooth
   D. position of the tooth
2. Why are the molar teeth sometimes pulled out by the dentist?
   A. it is done to improve the number of teeth
   B. it is done to avoid over-crowding of teeth
   C. it is done to allow air to pass
   D. it is done to allow food to be swallowed.
3. Water helps us to remove _____.
   A. sugar
   B. carbohydrates
   C. vitamins
   D. waste products
4. Bilharzia is transmitted by an_____.
   A. infected mosquito
   B. infected snail
   C. infected bettle
   D. infected lizard
5. The purpose of having danger warning signs in the school yard is to_____.
   A. teach children
   B. avoid children from running
   C. to prevent accidents from happening
   D. make school beautiful
6. A compound is_____.
   A. a material made from two or more chemical elements that have bonded
   B. not a material made from two or more chemical elements that have bonded
   C. both a mixture and a compound
   D. the same as a mixture
7. The process of separating water from sand is called_____.
   A. sieving B. evaporation C. filtration D. distillation
8. An orange that is about to fall from a tree has got_____ energy.
   A. kinetic B. potential C. sound D. light
9. For a fuel to burn, the following should be present.
   A. oxygen and heat
   B. oxygen and water
   C. heat and water
   D. carbon dioxide and heat
10. Moving water generates electricity at_____.
   A. Hwange B. Kariba C. Zvishavane D. Bulawayo

11. A substance that can allow electricity to pass through is called _____.
   A. a poor conductor of electricity
   B. an insulator
   C. a conductor of electricity
   D. a pathway of electricity
12. A solar panel can change_____.
   A. sunlight to electricity
   B. heat to light
   C. sunlight to food
   D. sunlight to sound
13. Ingredients are used to_____.
   A. cook B. wash C. clean D. brush
14. When water finds its way through cracks in the rocks it forms a _____.
   A. river B. spring C. dam D. borehole
15. The following is a protected source of water.
   A. river B. dam C. borehole D. stream
16. The following is **NOT** a man-made water source.
   A. river B. well C. tank D. tap.
17. Water that is collected from the ground is called _____.
   A. lake water B. dam water C. ground water D. roof water
18. Weather refers to _____.
   A. the state of the house at a particular place on a day to day basis
   B. the state of the atmosphere at a particular place on a day to day basis
   C. the state of a school on a day to day basis
   D. the state of the home at a given place
19. Which season has the highest rainfall?
   A. winter B. autumn C. summer D. spring
20. A tropical cyclone is a_____.
   A. strong heat
   B. strong wind accompanied by heavy rain
   C. a way recording temperature
   D. a way of reducing problems of weather
21. As the _____changes, it brings different seasons.
   A. sun B. weather C. night D. climate
22. Which animal lives underground?
   A. mole B. lion C. dragon fly D. tortoise
23. The nutrient that promotes healthy leaf growth is called _____.
   A. phosphates B. nitrate C. potassium D. nutrient
24. The following animal is a reptile_____.
   A. crocodile B. dove C. fish D. elephant
25. Which plant can fix nitrogen into the soil?
   A. beans B. mango C. wheat D. maize
26. A man-made landform is the one that is_____.
   A. made by a man
   B. made by a river
   C. made by a lake
   D. made by a mountain

27. A natural land form is_____.
A. seen under the surface B. seen on the surface
C. seen on the road D. seen in air

28. When water flows and washes away soil, it can form a _____.
A. spring B. well C. river D. dam

29. The following is a water borne diseases _____.
A. tb B. cholera C. polio D. rickets

30. From the power station to the sub-station, electricity is carried through _____.
A. water B. wind C. power lines D. clouds

31. What does the sign mean?

A. danger B. poisonous C. toxic D. not dangerous

32. At a weather station you find _____and _____.
A. rain and wind
B. weather and climate
C. thermometer and rain gauge
D. wind and thermometer

33. A parasite breeds in_____.
A. air B. the skin C. nails D. hair

34. _____ are found in power stations where they generate electricity.
A. Generators B. Batteries C. Engines D. Power stations

35. The following teeth are also called bicuspids and they are found on the side of the mouth
A. incisors B. canines C. premolars D. molars.

36. Meat, eggs and beans are a good source of _____.
A. carbohydrates B. fats C. mineral salts D. proteins

37. The following is a sign of someone suffering from a parasitic disease_____.
A. failing to fall asleep B. always eating fast
C. drinking a lot of water D. eating very little food

38. When we run an electric current through water, it produces hydrogen and oxygen. That process is called_____.
A. electrolysis B. filtration C. evaporation D. distillation

39. A trowel is made of _____.
A. glass B. wood C. metal D. paper

40. We build structures at our homes because we need_____.
A. water B. shelter C. friends D. food

41. _____ is the ability to do work.
A. Lightning B. Water C. Energy D. Thunder

42. Material that is described as fragile can be clay or can be_____.
A. wood B. metal C. glass D. rubber

43. A moving ball has got _____.
A. electric energy B. sound energy
C. potential energy D. kinetic energy

44. Bacteria in our teeth can cause_____.
A. gum disease B. teeth to grow
C. teeth to straighten D. join each other

45. The food that we eat provides us with the _____to enable us to run.
A. force B. energy C. combustion D. oxygen

46. Which plant food does **NOT** open from its shell?
A. apple B. groundnuts C. peas D. beans

47. Which one of the following is **NOT** an unprotected water source?
A. a well B. a borehole C. a spring D. dam

48. Plants need _____ from the soil.
A. air B. water C. humus D. nutrient

49. Heat wave can cause _____.
A. headache
B. water borne diseases like cholera
C. no harm to people
D. hot weather to come

50. Coal is mined in _____.
A. Mazoe B. Chiredzi C. Hwange D. Chipinge

Paper 2

Structured questions

Answer all questions.

1. How many times must teeth be cleaned per day? [1]
2. Name the tooth. [1]

3. Explain why carbohydrates are important to our bodies. [1]
4. Explain two ways of preventing a parasitic disease. [1]
5. Name the situations where safety clothing must be worn. [1]
6. Name the three groups of tools that can be used in the home. [3]
7. What is a structure? [1]

8. What is energy? [1]
9. What do we use a fire extinguisher for? [1]
10. What is electricity from Hwange called? [1]
11. A substance that will not allow electricity to pass through is called what? [1]
12. Define the following terms:
    (a) Proportion
    (b) Ingredients
    (c) Balance
    (d) Texture. [4]
13. Name three sources of protected water. [1]
14. Define the term climate. [1]
15. Which season is known to be windy? [1]
16. Name three drought resistant crops. [1]
17. Give examples of each group of vertebrates [10]

Birds	Reptiles	Mammals	Amphibian	Fish
(a)	(b)	(c)	(d)	(e)
(f)	(g)	(h)	(i)	(j)

18. Why are non-renewable resources not sustainable? [1]
19. Why is waste not good for the environment? [1]
20. Fill in the table. [6]

Mineral	Where it is mined
(a) Gold	_____
(b) _____	Zvishavane
Platinum	_____
(d) _____	Hwange
Iron ore	_____
(f) _____	Chiadzwa

21. List five groups of vertebrates. [5]
22. Draw a danger warning sign and label it. [2]
23. How many molar teeth does a human being have? [1]
24. Give two reasons why people should wear protective clothing. [2]
25. What conditions are needed for fuel to burn? [1]

Ventures Primary Science and Technology Grade 4

Ventures Primary Science and Technology [illegible] Grade 4 has been developed to support the content, aims and [illegible] New Primary Education Curriculum for Zimbabwe. It contains all the [illegible] learners need to cover the Science and Technology Syllabus for Grade 4.

The book:

- Equips learners with the creative, technical and practical expertise to participate in a scientific and technological world.
- Instills the appreciation of the dynamic state of technology, its role in providing modern day solutions and the need for constant appraisal for relevance and technological competence.
- Endorses the ethical use of technology in the socio-cultural environment through the training of Unhu/Ubuntu/Vumunhu.
- Instills an aptitude for critical and logical thinking as well as self-expression.
- Encourages learners to manipulate materials and equipment to enhance creativity.
- Cultivates critical evaluation skills in technical, aesthetic, economic, environmental social and cultural contexts.

The Learner's Book is part of the Junior Primary learner's Development Series and is supported by a comprehensive Facilitator's Resource Book.

college press

9 781779 009791

Approved by the Ministry of Primary and Secondary Education, 2017