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New Curriculum

Ventures Primary Science and Technology



George Mujajati

Learner's Book

Ventures Primary Science and Technology

Learner's Book Grade

3



college press

Ventures Primary Science and Technology Learners Book Grade 3

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Health and safety

Topic 1



Figure 1.1 Keeping healthy

Introduction

Our body is made up of different parts. Our body let us do many activities. We must take care of our body to keep it healthy. Following safety rules help to prevent accidents that may cause harm to the body.

Unit 1 The human body

Objectives

You should be able to:

1. list body parts
2. describe how to take care of the body parts
3. state toiletries and cosmetics used to take care of the body
4. design cleaning equipment
5. make cleaning equipment
6. manipulate toiletries, cosmetics and equipment that are used in personal hygiene.

Flashback

Do you know a song or a rhyme about the parts of the body? For example, there is a rhyme called "Head and Shoulders". In pairs, recite the rhyme with your friend.

Key words

personal hygiene germs
cleaning equipment toiletries
cosmetics disinfectant soap

The parts of the body

Our body is made up of many different parts. Each part of the body has a use. For example, we use our hands to hold things and we use our legs to walk. Figure 1.2 shows the parts of the body.

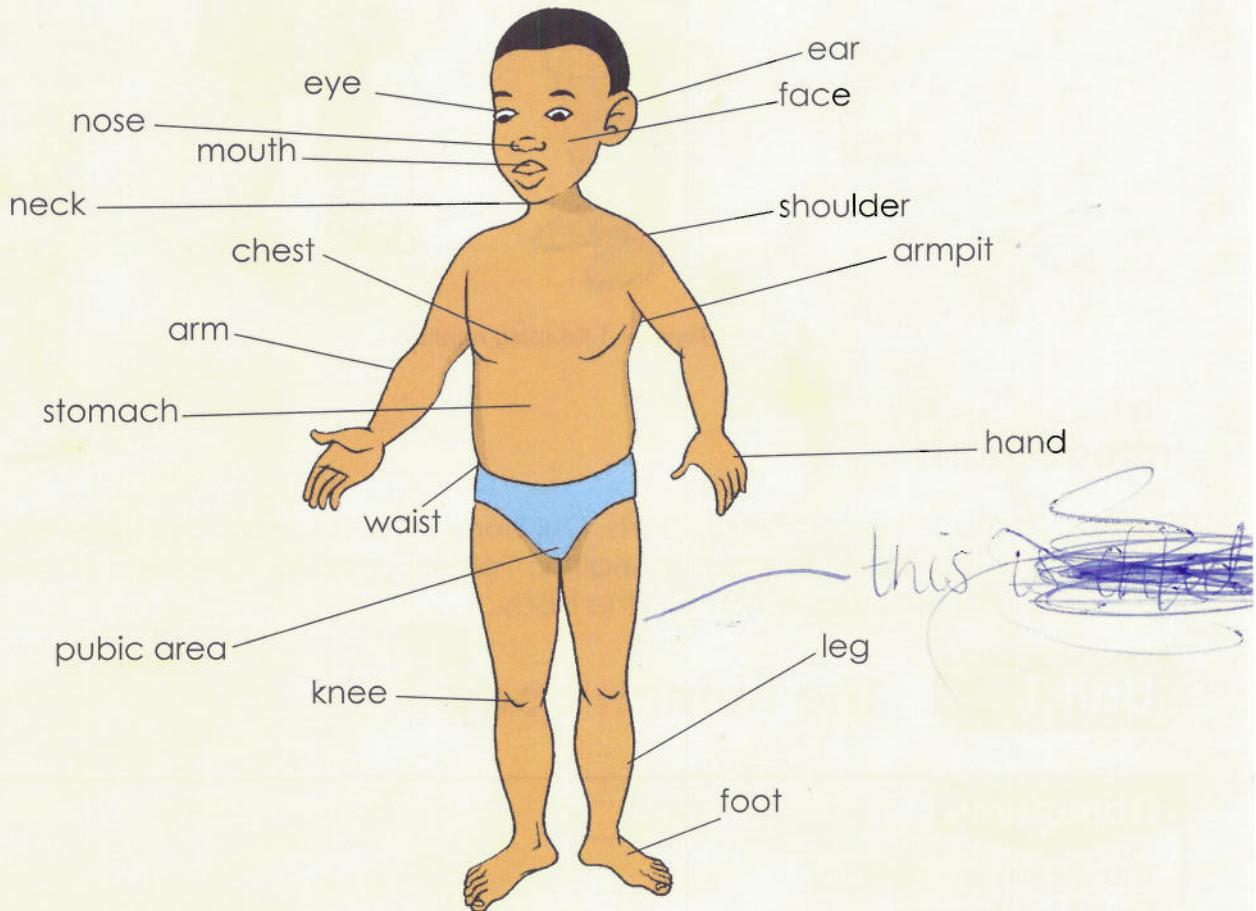


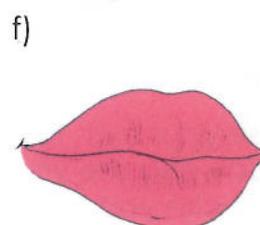
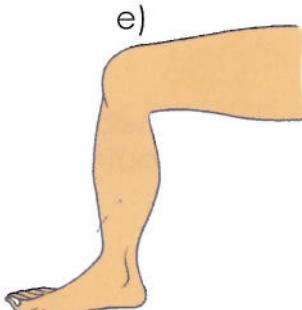
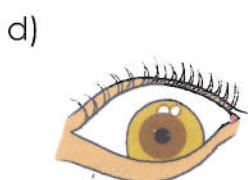
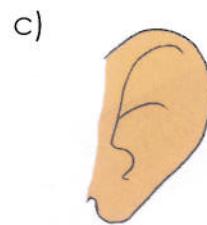
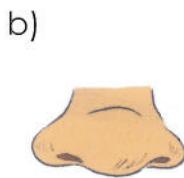
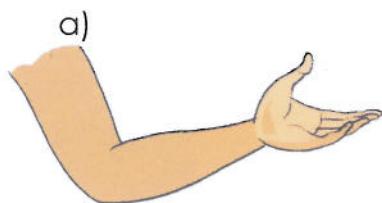
Figure 1.2 Parts of the body

Activity 1

1. Read each of the labels in Figure 1.2 and look where each label points to on the picture.
2. Point to each of the same parts on your own body and say their names one-by-one like this:
"This is my head"
"This is my nose"
"These are my eyes", and so on.

Exercise A

Look at the parts of the body.



1. Name the part of the body shown in each picture.
2. Which of the parts are found on the head?
3. Which part of the body has fingers?
4. Which body part has teeth inside it?

Taking care of the parts of the body

We must take care of the parts of our body to keep them healthy. We must keep our body clean. Keeping your body clean is called **personal hygiene**.

We use the following things to take care of our body:

- **Cleaning equipment** – tools to take care of parts of the body such as toothbrushes and hair brushes
- **Toiletries** – substances to clean the parts of the body such as toothpaste and soap
- **Cosmetics** – substances to make the body look or smell good as, hair food or smell nice such as deodorant.

Teeth

We use our teeth to chew our food and to make sounds when we speak. We must keep our teeth clean to keep them healthy.

What you need to care for your teeth

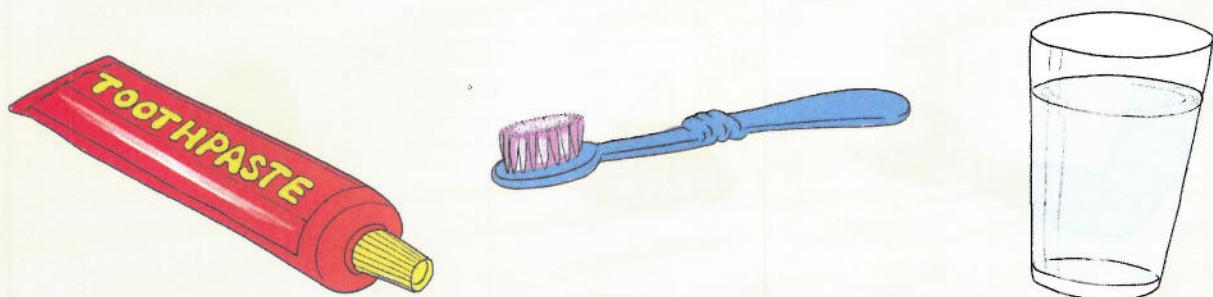


Figure 1.3 Toothpaste, a toothbrush and water

Always use your own toothbrush. Never use somebody else's toothbrush. Never let anybody else use your toothbrush. Sharing toothbrushes can spread **germs** that can make you sick.

Brushing your teeth

- Clean your teeth at least twice a day.
- Wet your toothbrush with clean water and then put a little toothpaste on it.
- Brush your teeth by gently moving your toothbrush in tiny circles over your teeth and gums.
- Make sure you brush all the sides of your teeth, the tops, sides, back and front.
- When you have finished, spit the toothpaste out.
- Rinse your mouth with clean water and spit again.



Figure 1.4 A girl brushing her teeth

Activity 2

1. Find out from your family what you can use to clean your teeth if you do not have a toothbrush and toothpaste.
2. Collect the materials and bring them to school.
3. In groups, discuss the items you brought and how they are used.
4. Show how to clean teeth with these materials.
5. Show how to clean your teeth with a toothbrush and toothpaste.

Hair

We need to take care of our hair to keep it healthy, clean, neat and smelling fresh.

What you need to take care of your hair



Figure 1.5 What you need to take care of your hair

Always use your own hairbrush or comb. Never let anybody else use your hair brush or comb. Sharing hairbrushes and combs spreads germs and lice.

Washing

- Wet your hair with clean water.
- Add soap or shampoo and use your fingers to rub it into all of your hair.
- Rinse all of the soap or shampoo out of your hair with clean water.
- Dry your hair with a clean towel or let it dry in the air.
- Oil your hair with a little petroleum jelly or hair food.
- Brush or comb your hair so that it is neat.
- Keep your hair short. If you have longer hair, keep it in a neat style like cornrows.

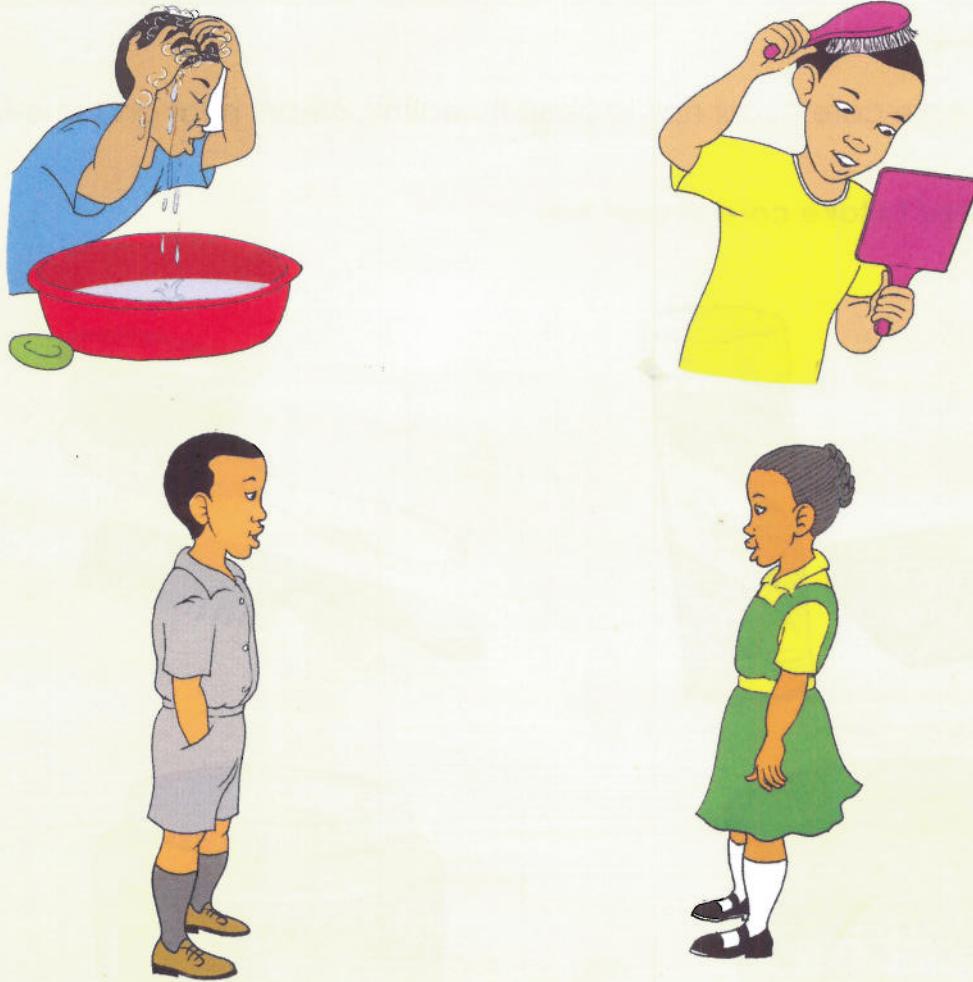


Figure 1.6 Taking care of your hair

Activity 3

1. Show your partner how you wash your hair and brush it by pretending to use the following things:
water, soap, towel, brush.
2. Do you or anyone in your family oil their hair? Show how to do this.

Activity 4

1. Collect pictures from magazines and newspapers of the different toiletries and cosmetics that people use to take care of their hair.
2. Discuss what each is used for.
3. Make a class collage and display it.

Hands

We use our hands to do a lot of things each day. We also touch a lot of things with our hands each day. When we touch things with our hands, germs get onto our hands. Germs can make us sick. You need to take care of your hands to keep them clean and prevent the spread of germs.

What you need to take care of your hands

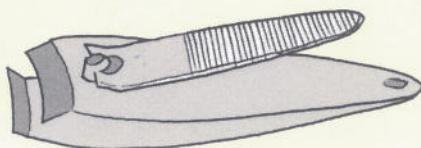
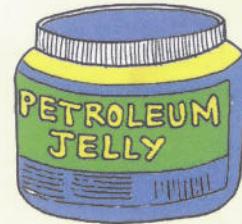
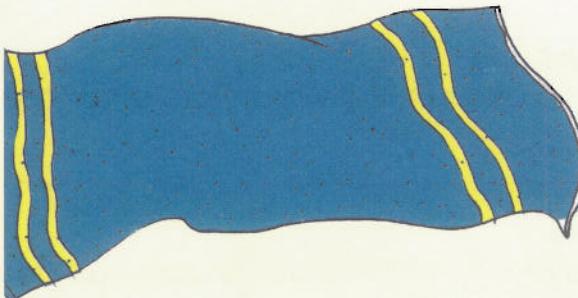


Figure 1.7 What you need to take care of your hands

Use **disinfectant soap** because it will kill the germs on your hands. Use running water. Running water washes the germs off your hands. If you do not have a tap with running water, pour water over your hands from a jug, cup or bottle. Sharing a bowl of water can spread germs that will make you sick.

Taking care of your hands

You must wash your hands every time:

- after you go to the toilet
- before you prepare food and drink.

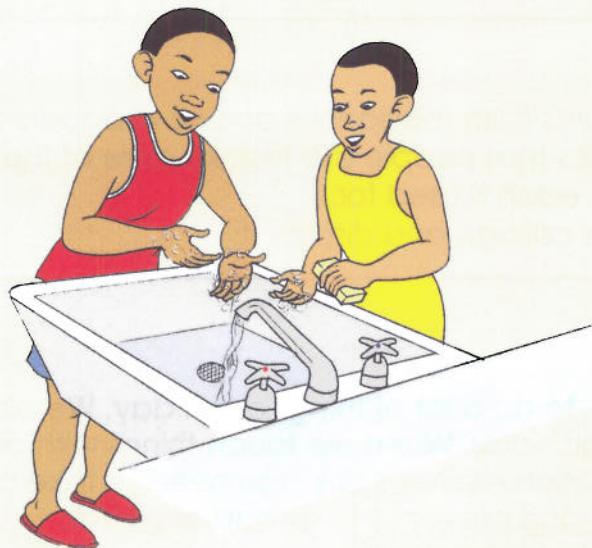


Figure 1.8 Wash your hands with soap and running water

Activity 5

1. List the toiletries you need to wash your hands.
2. Show how to wash your hands with soap and running water from a tap or a jug.

Ears and eyes

We use our ears to hear. We use our eyes to see. You must care for your ears and eyes to keep them healthy.

What you need to take care of your ears and eyes

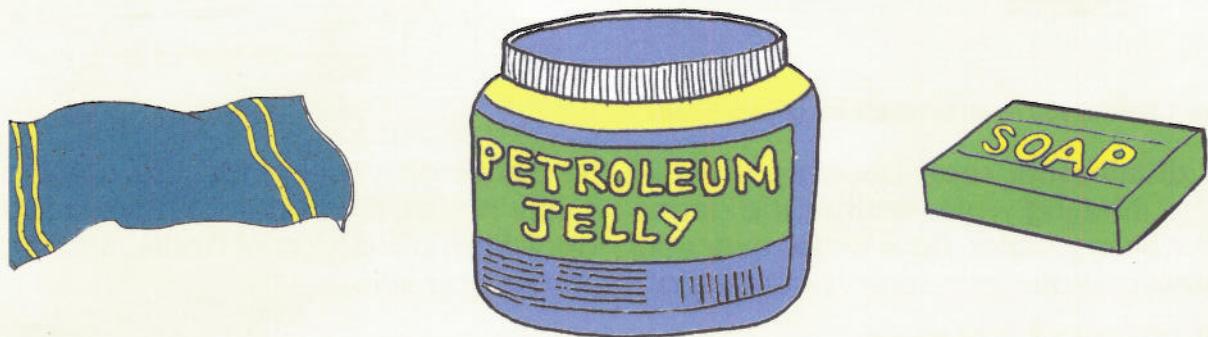


Figure 1.9 What you need to take care of your ears and eyes

Never put anything inside your ears or your eyes. Do not use earbuds to clean your ears. They can damage your ear and cause you to lose your hearing.

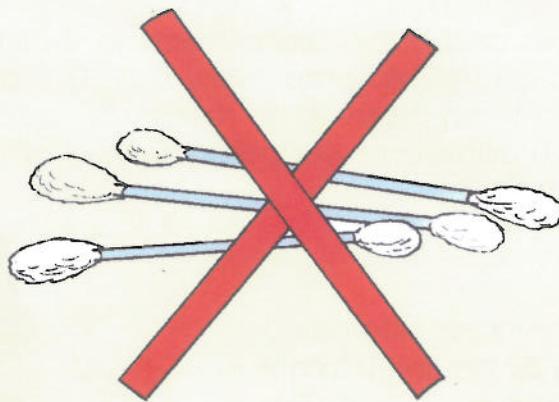


Figure 1.10 Do not use earbuds to clean your ears

Taking care of your ears and eyes

- Wash your ears and face at least twice a day.
- Wet a facecloth with clean water and rub soap onto it.
- Use the facecloth to gently wash your face and ears.
- Wash the outside of your ears, and behind your ears.
- Close your eyes and gently wipe the dirt off the skin around your eyes. Do not get the soap in your eyes because it will sting.
- Rinse all the soap off the facecloth with clean water.
- Use the facecloth to rinse all the soap off your ears and face.
- Dry your face gently with a clean towel.
- You can put petroleum jelly on your face after it is dry to keep your skin soft.



Figure 1.11 How to take care of your ears and eyes

Armpits and pubic area

We need to keep our armpits and pubic areas clean so that they are healthy. You must wash your armpits and pubic area every day. Use a facecloth, soap and clean water to carefully wash them. Rinse them with clean water and dry them with a clean towel. You can apply deodorant in your armpits. Wear clean underwear and clothes each day.

Nose

We use our noses to smell. Our noses also help to stop dirt and germs from the air getting into our body. When we breathe in, dirt and germs get stuck in the sticky mucus inside our noses. If you need to clear the mucus from your nose, you should use a handkerchief or tissue to blow your nose. Put the tissue over your nose, close your mouth and gently blow out through your nose. Throw the tissue away in the dustbin when you are finished.

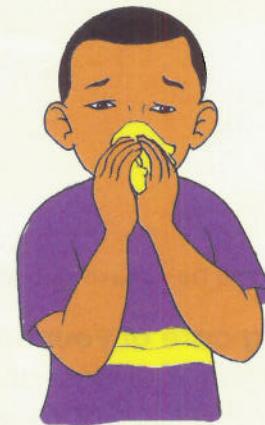


Figure 1.12 Always use a handkerchief or tissue to blow your nose

Activity 6

1. Do a role play to show how to do the following things:
 - clean your ears
 - clean your eyes
 - clean your armpits.
2. Discuss why we should not use earbuds to clean our ears.

Activity 7

1. Draw one of the following pieces of equipment: toothbrush, nail brush, hair comb
2. Make a model of the piece of equipment you have chosen. Use whatever materials are available.
3. Show how to use your piece of equipment using your model.

Exercise B

1. Which body part is used to smell and breathe?
A. eye B. ear C. mouth D. nose
2. We brush our teeth using _____.
A. a towel B. a toothbrush C. a nail clipper D. soap

3. Which body part has an elbow?
A. arm B. leg C. neck D. foot
4. Which of the following should be used to clean our ears?
A. water B. cotton buds C. toothpick D. toothpaste
5. We do not share our combs, toothbrush, towel and hairbrushes because ____.
A. they are new
B. it spreads germs
C. they will wear out
D. they are not clean.
6. Name all the parts of the body that you take care of with the following toiletries:

Toiletry

a)



Parts of the body

b)



7. List the equipment and toiletries you need to take care of your hair.
8. What do you use to clean your teeth?
9. Explain why you should wash your hands every time after you go to the toilet?
10. Explain why it is important to use a tissue when you blow your nose.

Summary

- The body is made up of many different parts. Parts of the body have different functions.
- We must take care of the parts of our body to keep them clean and healthy.
- We use different equipment, toiletries and cosmetics to take care of the body.

Objectives

You should be able to:

1. name sources of food
2. classify foods according to their sources
3. state the importance of food to the body.

Flashback

People eat food so that they can grow up and be strong and healthy.

**Key words**

source grains cereal
crops flesh energy-giving
foods body-building foods
protective foods vegetables

Sources of food

People eat different types of food. Different foods come from different sources. A **source** is where something comes from. Some foods come from plants and some foods come from animals.

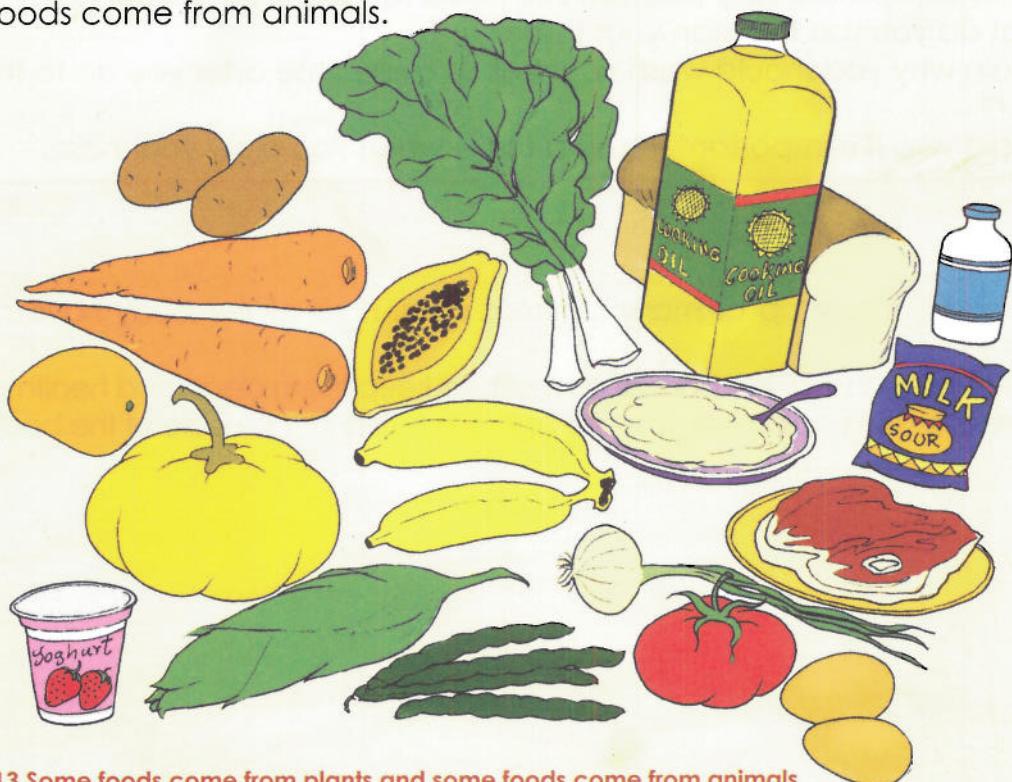


Figure 1.13 Some foods come from plants and some foods come from animals

Activity 8

1. Make a list of the types of food you eat every day at home and at school.
2. Now list the same foods under the following headings:

Foods that come from plants

Foods that come from animals.

Foods from plants

People eat many different foods that come from plants. Foods that come from plants include: grains, vegetables and fruits.

Grains

Grains are small seeds found on some types of plants. The plants we get grains from are called **cereal crops**. Examples of cereal crops are maize, wheat and sorghum.

Uses of maize grains

We can dry grains and store them for a long time. We can grind dried grains to make meal or flour. Many people all around the world eat grains every day.

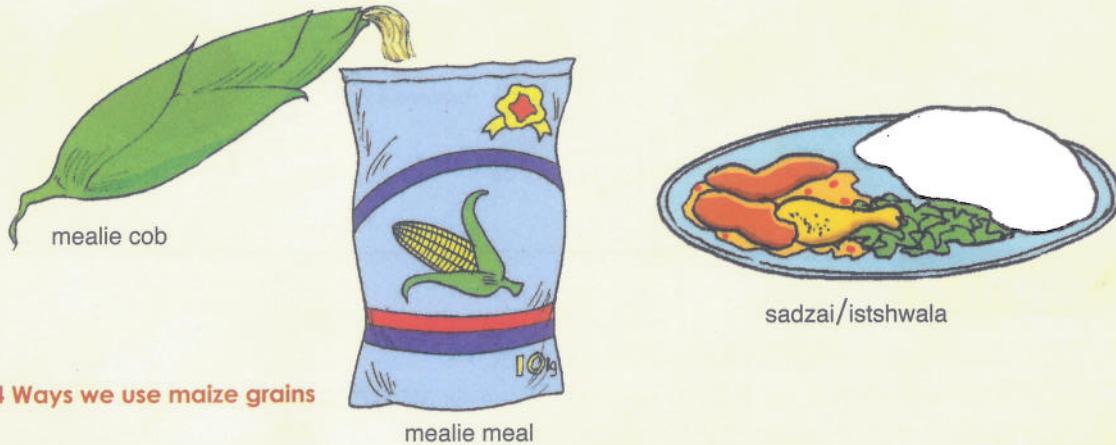


Figure 1.14 Ways we use maize grains

Use of wheat grains

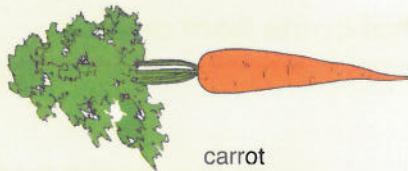
We can dry wheat grains to form whole wheat. We can grind dried wheat to form flour. We can use wheat flour to make bread or other baked foods.



Figure 1.15 Ways we use wheat grains

Vegetables

Vegetables are foods that come from the roots, stems or leaves of plants. Figure 1.16 shows some examples of vegetables.



carrot



potatoes

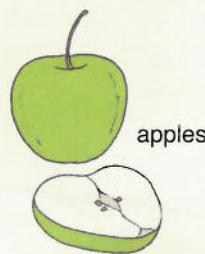


spinach

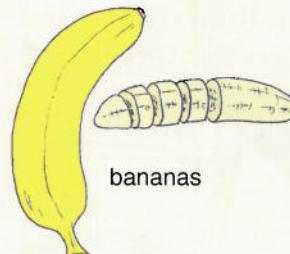
Figure 1.16 Examples of vegetables

Fruits

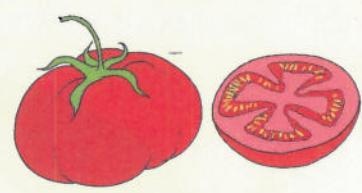
Fruits are foods that come from the part of the plant that makes seeds. That is why there are seeds inside fruits. Some examples of fruits are apples, bananas and tomatoes. Tomatoes are often called vegetables, but they are really fruits. Figure 1.17 shows some examples of fruits.



apples



bananas



tomatoes

Figure 1.17 Examples of fruits

Activity 9

1. Collect foods that come from plants.
2. Group the foods as either grains, fruits or vegetables.
3. Display them in your science corner.

Foods from animals

People eat many different foods that come from animals. Foods that come from animals include meat, milk and eggs.

Meat

Meat comes from animals such as chickens, cattle, pigs, sheep, goats and fish. The meat from cattle is called beef. The meat from pigs is called pork. The meat

from adult sheep is called mutton. The meat from young sheep is called lamb. The meat from goats is called chevon.

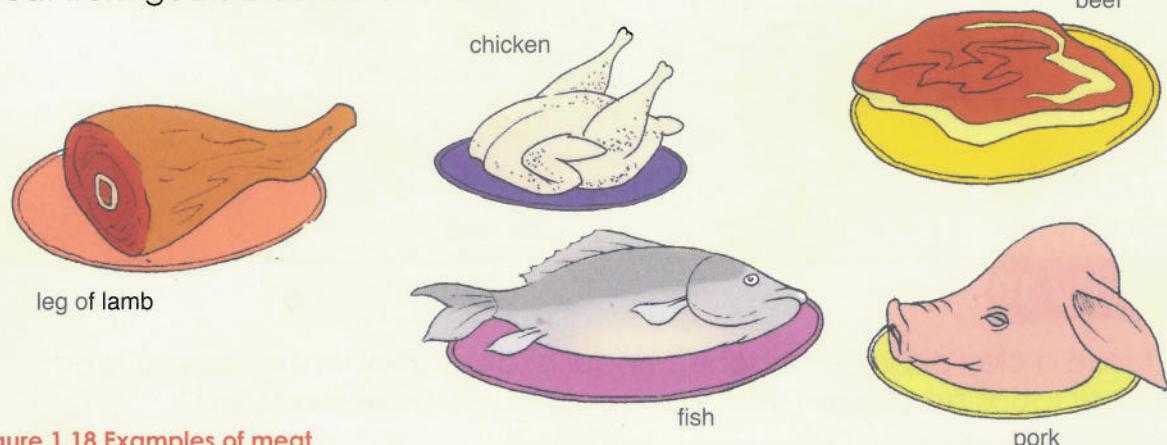


Figure 1.18 Examples of meat

Milk

Babies drink their mother's breastmilk. Children and adults drink milk from cows and goats. We use milk to make other foods such as sour milk, cheese, butter and yoghurt.

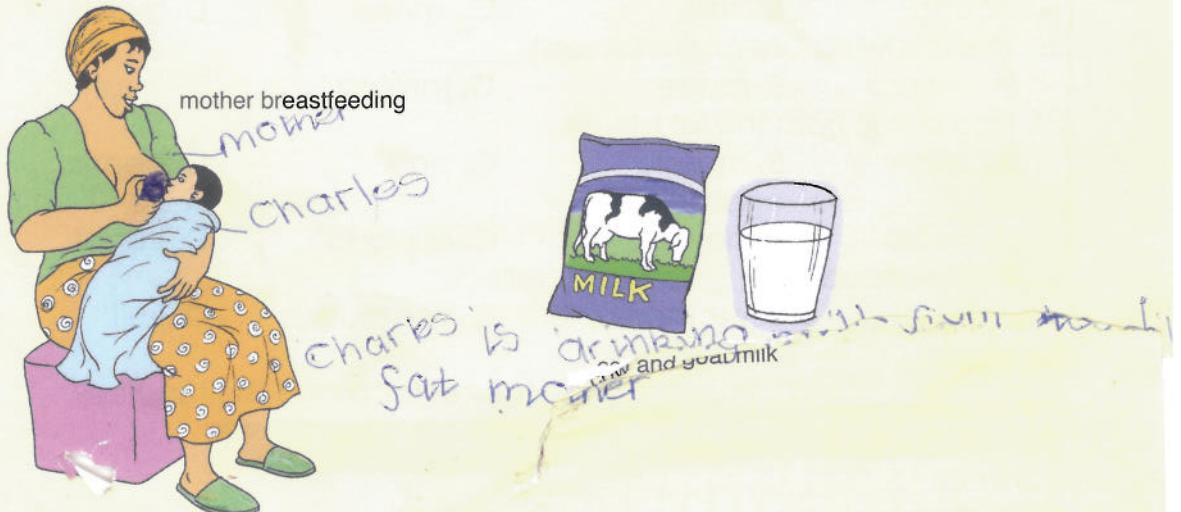


Figure 1.19 Sources of milk

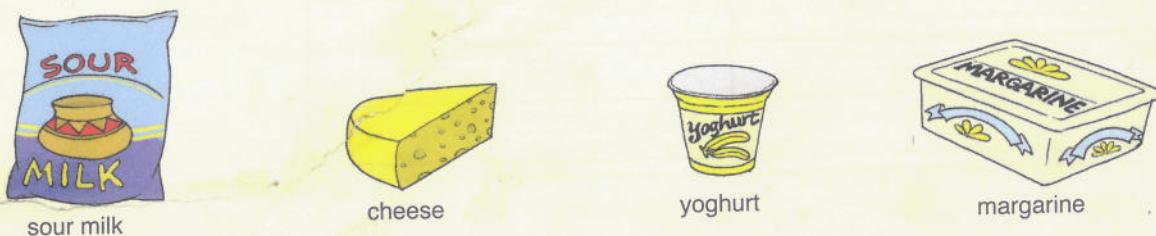


Figure 1.20 Foods made from milk

Eggs

Eggs come from female chickens, called hens. A hen usually lays one egg per day.

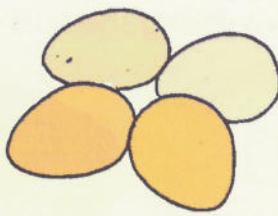


Figure 1.21 Eggs

Activity 10

1. Make a clay or papier mache' model of an animal that gives you food.
2. What foods do you get from each animal you have modelled?

Exercise C

1. Which food comes from a plant?
A. egg B. milk C. maize D. meat
2. The following are grains except _____.
A. wheat B. maize C. tomato D. sorghum
3. Find a fruit from the list below.
A. onion B. mango C. pork D. beans
4. _____ is a vegetable.
A. maize B. paw-paw C. banana D. carrot
5. Babies need _____ to grow well.
A. food B. mother's milk C. vegetables D. fruit

Complete the following showing types of food and their sources.

Type of food	Source
a) Beef	---
b) Bread	---
c) _____	Pig
d) _____	Maize
e) Mutton	---

The importance of food

Food gives our body energy, builds our body and protects against diseases.

Different foods give our body different things. This is why it is important to eat a variety of foods each day.

Energy-giving foods

Some foods are **energy-giving foods**. They give our bodies energy to be able to do things like walk, run, play sports, do schoolwork and have fun with our friends. Examples of energy-giving foods are bread, potatoes, mealies and sadza.

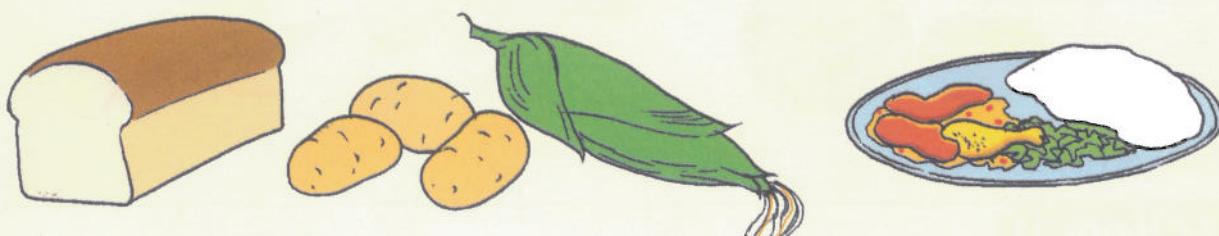


Figure 1.22 Energy-giving foods

Body-building foods

Some foods are **body-building foods**. They give our bodies the things it needs to grow and be strong. Examples of body-building foods are eggs, meat, chicken, fish, beans and nuts.

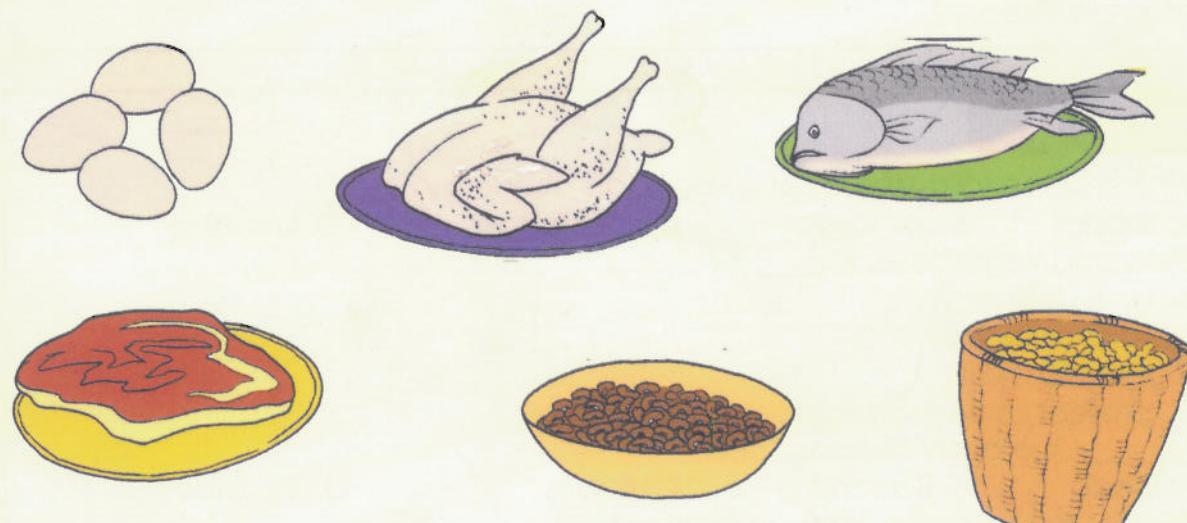


Figure 1.23 Body-building foods

Protective foods

Some foods are **protective foods**. They help our bodies to fight disease and stay healthy. Examples of protective foods are vegetables and fruits. We should try to eat vegetables and fruits every day.

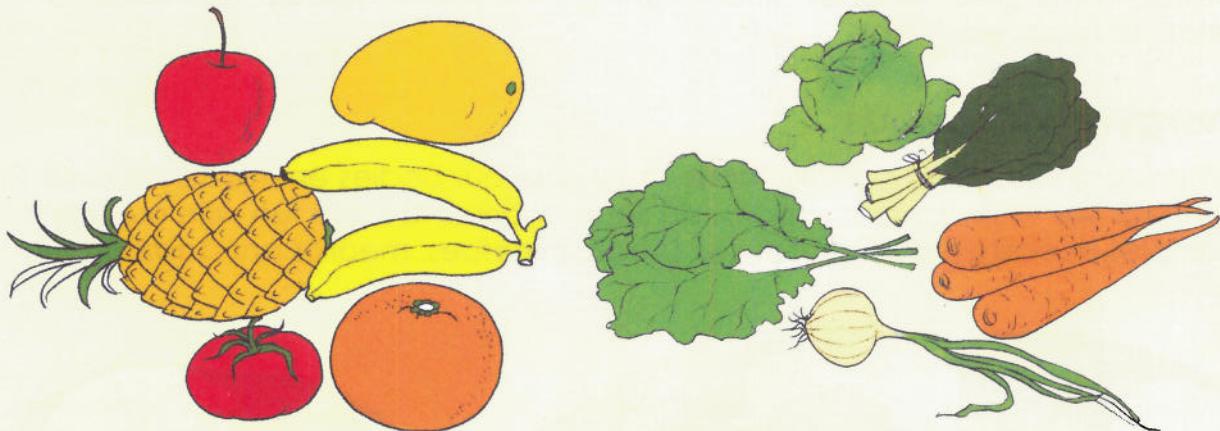


Figure 1.24 Protective foods

Activity 11

1. Collect pictures of foods.
2. Divide the class in groups of five.
3. The teacher pulls out the picture.
4. The groups point out which type of food is shown. The groups that has more points wins.
5. Make a list of the types of food that you eat every day at home and school.
6. Does your list have foods that give you energy, build your body and protect against disease?

Exercise D

1. Which of the following food gives us lots of energy?
A. beans B. potatoes C. cabbages D. bananas
2. Fruits and vegetables _____.
A. give us energy
B. help us to grow
C. make us walk
D. protect us from diseases
3. _____ is a body-building food.
A. Bread B. Banana C. Beans D. Potatoes
4. We get the following from animals except _____.
A. meat B. milk C. mealie meal D. eggs
5. _____ is a protective food.
A. Egg B. Orange C. Meat D. Milk

6. Name two types of food that we can get from plants.
7. Name two types of food that we get from animals.
8. Give an example of food that we can eat in order to get energy.
9. Why is it important for us to eat a lot of fruits and vegetables?
10. Why should we eat eggs, beans and meat?

Summary

- Some foods come from plants and some foods come from animals.
- Foods from plants include grains, vegetables and fruits.
- Foods from animals include meat, eggs and milk.
- Food gives our bodies energy, builds our bodies and protects against diseases.
- Energy-giving foods such as bread, potatoes, mealies and sadza give us lots of energy to do things.
- Body-building foods such as eggs, meat, chicken, fish, beans and nuts help our bodies to grow and be strong.
- Protective foods such as fruits and vegetables protect our bodies from diseases.

Objectives

You should be able to:

1. identify causes of diseases
2. list organisms that cause diseases
3. discuss diseases caused by organisms
4. demonstrate how germs can be prevented from spreading
5. discuss the causes of diarrhoea
6. suggest ways of preventing diarrhoea
7. describe preparations of Oral Rehydration Solution treatment.

Flashback

Have you ever been sick? How did it feel? Do you know what made you sick?

Key words

germs disease microscope
vaccine diarrhoea stools
mosquito net oral rehydration solution

What causes diseases?

Germs cause diseases. Germs are very small living organisms that make you sick if they get into your body. A **disease** is a sickness such as flu.

Germs are so small that you cannot see them with your eyes. You need a microscope to see germs. A **microscope** is a piece of equipment that makes small things look big.

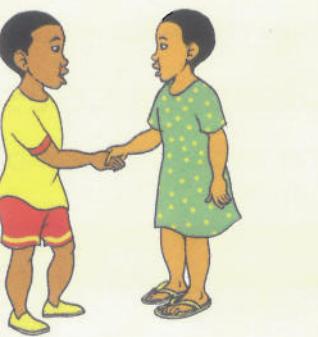
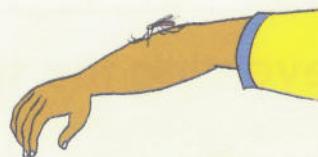


Figure 1.25 Using a microscope

How germs spread

Germs can spread from one person to another. Look at Table 1.1. It shows the four main ways that germs spread:

Table 1.1

<ul style="list-style-type: none">• By air. When a sick person sneezes or coughs, germs spread into the air around them. If another person breathes in the germs from the air, they will get sick too.	
<ul style="list-style-type: none">• By contact. If you touch something that has germs on it, the germs will spread to your hands. This can happen when you go to the toilet or shake someone's hand. If you then touch your food, the germs will spread from your hand onto your food. When you eat the food, the germs get into your body and can make you sick.	
<ul style="list-style-type: none">• By food and water. Germs can live in water and food. If you drink dirty water or eat food with germs in it, the germs will get into your body and make you sick.	
<ul style="list-style-type: none">• By insect or animal bites. Insects and animals carry germs. If insects or animals bite you, they can spread the germs food to your body. If insects such as flies land on your food, they can spread germs to your food.	

Types of germs

There are four main types of germs: bacteria, viruses, protozoa and fungi. Figure 1.26 shows what they look like when you look at them with a microscope.

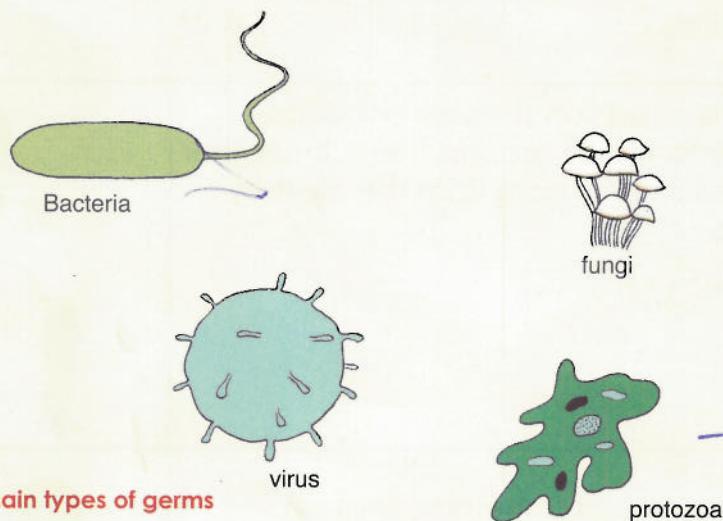


Figure 1.26 The four main types of germs

Diseases caused by different germs

The table below shows some of the diseases caused by the different types of germs.

Type of germ	Examples of diseases
Bacteria	Dysentery, tuberculosis (TB), cholera, diarrhoea and typhoid
Viruses	Common cold, influenza (flu), chicken pox, measles, mumps and AIDS
Protozoa	Malaria, bilharzia and sleeping sickness
Fungi	Ringworm and athlete's foot

Exercise E

1. List the four types of germs.
2. Name two diseases caused by viruses.
3. List four ways that germs are spread.
4. Which insect spreads malaria?

Preventing the spread of diseases

You have learnt that germs spread through the air, by contact, through food and water and by insect and animal bites. Now you will find out how to prevent the spread of germs. Table 1.2 shows ways to prevent.

Table 1.2

Preventing the spread of germs by air

- If you are sick, always cover your mouth and nose with your elbow when you sneeze or cough.



Preventing the spread of germs by contact

- Wash your hands with soap and running water after visiting the toilet.
- Wash your hands with soap and running water before you cook or eat food.
- Keep the kitchen and kitchen utensils we use clean all the time.



Preventing the spread of germs by food and water

- Only drink clean safe water that has been boiled or disinfected with bleach.
- Wash vegetables and fruits with clean safe water before you cook or eat them.



Preventing the spread of germs by insect or animal bites

- Sleep under a **mosquito net** at night to prevent mosquitoes from biting you. Mosquitoes carry germs that cause malaria and other diseases.



Activity 12

With your teacher's help, do this experiment in a group to see how far germs can spread when you shake hands with a person. In the experiment, use some flour to represent germs that we usually cannot see.

- Stand in a single line.
- Let the first person in the line put the palm and fingers of their hand in a bowl of flour.
- Look at their hand. How much flour does it have on it?
- Now let the person shake hands with the next person in the line like in Figure 1.27.
- Look at the second person's hand. How much flour does it have on it?
- How many people along the line do you think the flour germs could spread to?
- Let the second person shake hands with the third and so on to the end of the line.
- Look at each person's hand. How many people did the flour spread to?
- What happens to the flour if you touch other things like your desk, or your face?
- What would happen to the flour if you ate your food with the flour on your hands?



Figure 1.27

Activity 12 shows that:

- germs spread easily from one person to another and onto things that you touch
- germs on your hands can get onto your food and into your body if you do not wash your hands before you eat.

Diarrhoea

Diarrhoea is when you pass watery stools many times than you normally do.

Causes of diarrhoea

Diarrhoea is caused by germs, such as bacteria or viruses.

Many of the germs that cause diarrhoea are spread by drinking water with germs in it or eating food that has germs on it.

Preventing diarrhoea

We can prevent diarrhoea by preventing germs from getting into water or food by doing the following things:

- **Only drink water that is clean and safe.** Figure 1.32 show how you can kill the germs in water and make it safe to drink. Always ask an adult to help you if you need to make water safe to drink.



Figure 1.28 Ways to kill the germs in water

Ways to kill germs in water

Boil water for ten minutes.

Add 1 teaspoon of bleach to 25 litres of water.

Stir and let it stand for 2 hours.

Make sure the water is covered.

Put water in a clear plastic bottle, close the lid and leave in the sun for 6 hours.

- **Wash your hands after you go to the toilet and before you eat.** When you use the toilet, some germs may get on your hands. If you do not wash your hands, the germs can get onto anything you touch, such as your face or your food. Then the germs can get into your body and make you sick. Wash your hands with clean running water and disinfectant soap.
- **Wash vegetables and fruit before you cook or eat them.** They can have germs on them from the soil and from people who have touched them.

- **Only eat food that is properly cooked and while it is still hot.** Cooking kills germs in food.
- **Cover food to prevent flies landing on it.** Flies carry germs and spread them to food if they land on it.
- **Keep the toilet clean.** Use clean water and disinfectant soap to clean the toilet and the area around it.
- **Keep the kitchen clean.** Use clean water and disinfectant soap to clean the kitchen surfaces and utensils.



Figure 1.29 Proper way of washing hands

Activity 13

1. Figure 1.29 shows you how to wash your hands properly.
2. Practice the correct way to wash your hands by copying the pictures and pretending you are washing your hands with soap and clean running water.
3. Show how to wash your hands using clean running water and disinfectant soap. If you do not have running water, ask a friend to pour clean water over your hands while you wash them.

How to treat diarrhoea

Diarrhoea makes you lose a lot of water from your body through your watery stools.

If you lose more water than you drink, your body will get **dehydrated**. If you get dehydrated, you can get very sick and you may even die.

The best way to prevent dehydration is to give a person with diarrhoea **oral rehydration solution** (ORS) to drink. ORS is a mixture of clean boiled water, sugar and salt that can be made at home. ORS should be taken within 24 hours.

Preparing the oral rehydration solution (ORS)

1. Put one litre of clean boiled water in a container.
2. Add six level teaspoons of sugar to the water.
3. Add a half level teaspoon of salt to the water.
4. Stir the mixture until all the sugar and salt have dissolved.

5. Let the person with diarrhoea drink a cup of the ORS every time after they go to the toilet until the diarrhoea stops.

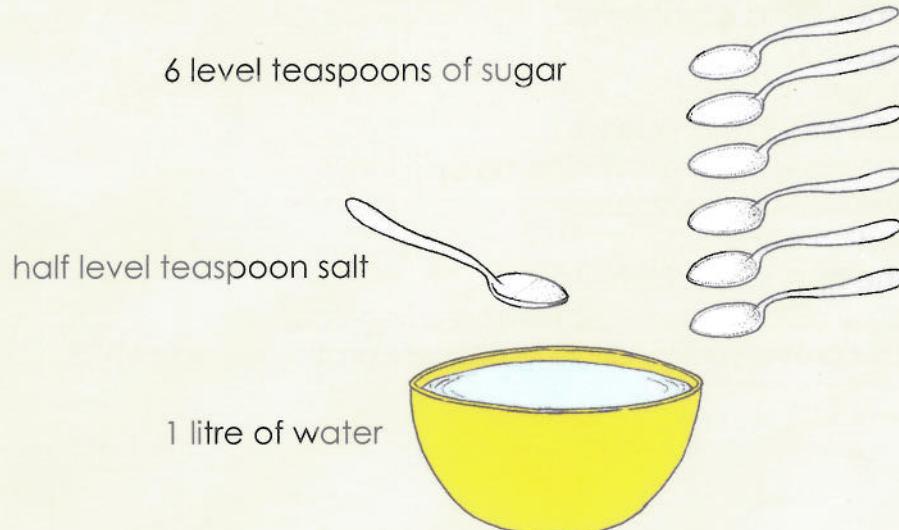


Figure 1.30 How to make oral rehydration solution (ORS)

Activity 14

1. With your teacher's help in your groups, prepare oral rehydration solution (ORS).
2. Write down the steps for making the ORS.

Exercise F

1. Diseases are caused by _____.
A. plants B. wind C. dirt D. germs
2. Flue is caused by a _____.
A. protozoa B. bacteria C. fungi D. virus
3. We can prevent spreading germs when we sneeze or cough by _____.
A. sleeping under a mosquito net
B. washing our hands
C. cleaning the kitchen
D. covering our mouth and nose with our elbow
4. A person suffering from diarrhoea is given _____ to prevent dehydration.
A. salt B. water C. sugar D. oral rehydrating solution
5. Name four types of germs that can cause illness.
6. Name one disease that you know that is spread by mosquitoes.
7. Why is it important for you to wash your hands before eating?
8. Name two ways to make water safe to drink.
9. When making the oral rehydration solution, you should mix ___ level teaspoons of sugar and ___ teaspoon of salt and ___ of boiled water.
10. Ringworm is caused by _____.

Summary

- Germs are very small living organisms.
- Germs causes diseases.
- A disease is a sickness.
- Germs can spread through many ways.
- Types of germs are viruses, bacteria, protozoa and fungi.
- We can prevent the spread of diseases
- Diarrhoea is caused by germs.
- We can prevent the spread of diarrhoea.
- Diarrhoea can cause dehydration which is very dangerous.
- Dehydration can be prevented by drinking oral rehydration solution (ORS).

Unit 4 Safety

Objectives

You should be able to:

1. state accidents that happen in the laboratory
2. identify objects that cause accidents in the laboratory
3. describe substances that cause accidents in the laboratory
4. list laboratory safety rules.

Flashback

Do you have a laboratory at your school? Figure 1.31 shows a school laboratory. Discuss what you see.

Key words

laboratory experiment
laboratory equipment toxic

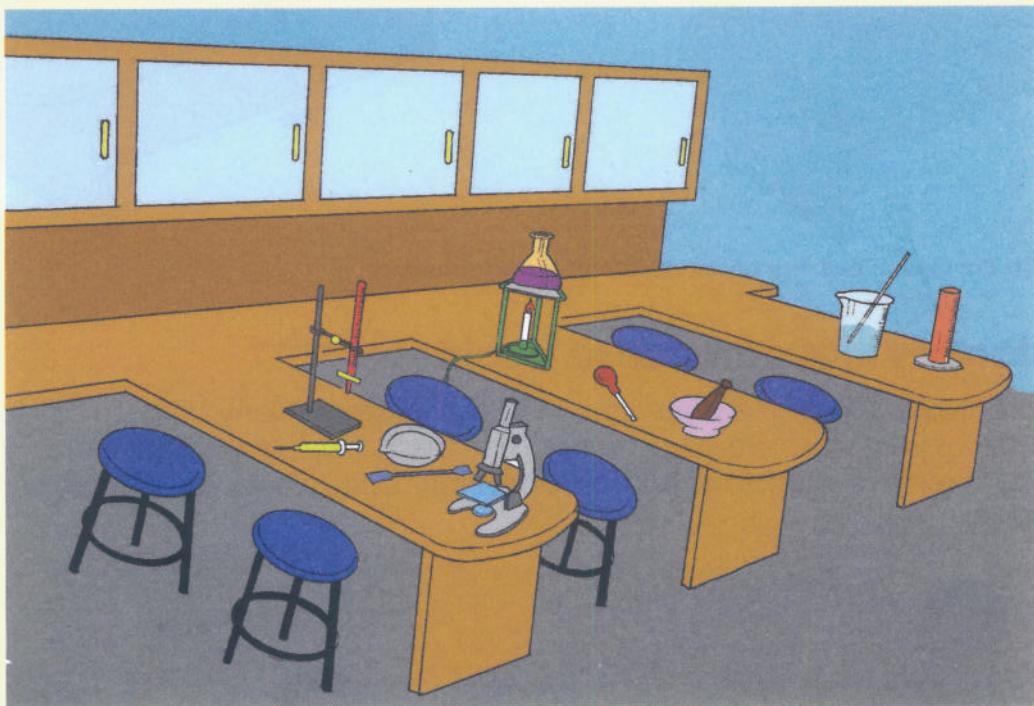


Figure 1.31 A school laboratory

Accidents in the laboratory

A **laboratory** is a room where we can do scientific experiments. An **experiment** is a scientific way of finding something out.

The **laboratory equipment** and substances in a laboratory can be dangerous. If we are not careful, we can cause accidents in a laboratory. Laboratory equipment are utensils and machines used to conduct experiments.

Equipment that can cause accidents in the laboratory

There is glass equipment, gas burners and electrical plugs and wires in a laboratory. These can all be very dangerous.

Figure 1.32 show accidents that can happen when we use some of the equipment in the laboratory. Discuss how you think each accident happened.

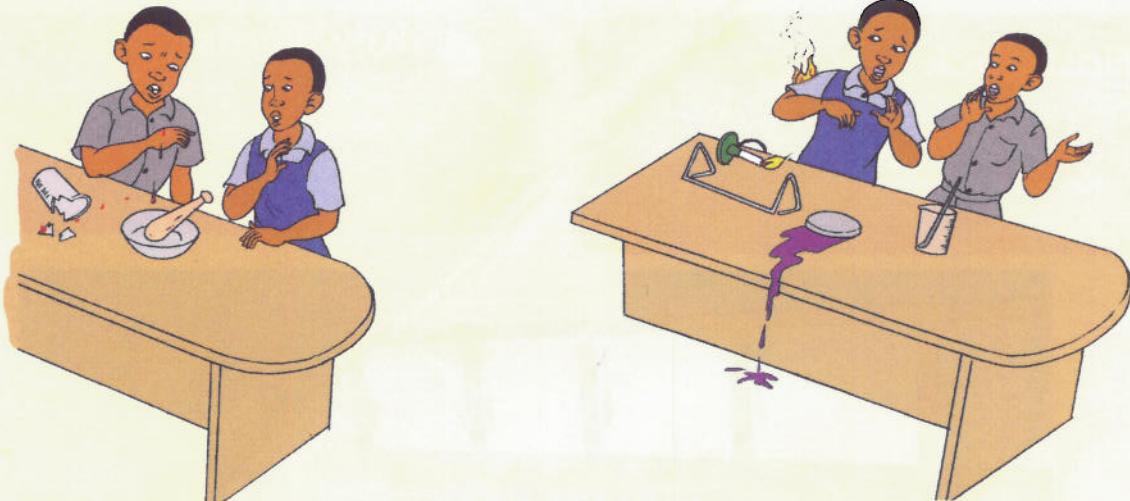


Figure 1.32 Equipment that can cause accidents in the laboratory

Substances that can cause accidents

There are many gases and chemicals in the laboratory. Many of them are toxic. They can make us very sick if we breathe them in, touch them or swallow them. Figure 1.33 shows accidents with substances in the laboratory. Discuss how you think each accident happened.



Figure 1.33 Substances that can cause accidents in the laboratory

Laboratory safety rules

We can prevent accidents in the laboratory by following these safety rules:

- Do not run around.
- Follow the instructions your teacher gives you.
- Be careful when you handle glass equipment.
- Be careful when you use a gas burner.
- Do not touch electrical plugs and wires.
- Do not sniff, touch or taste chemicals.
- Do not eat or drink in the laboratory.
- Always wear closed shoes.
- Wear safety goggles to protect your eyes.
- Wear a laboratory coat to protect your skin and clothes.
- Wear safety gloves to protect your hands.
- Keep the windows open for fresh air.
- Wash your hands when you leave the laboratory and before you eat.



Figure 1.34 Wear safety clothing

Exercise G

1. The following are accidents that occur in a laboratory except _____.
A. burns B. poisoning C. drowning D. electric shock
2. An instrument used to heat chemicals in a laboratory is called a _____.
A. gas tank B. gas burner C. tripod D. fire extinguisher
3. The following protective clothing should be worn in the laboratory except _____.
A. laboratory coat B. safety glasses
C. gloves D. apron
4. An instrument used to put out fires in a laboratory is called a _____.
A. gas tank B. gas burner C. tripod D. fire extinguisher

5. We do not smell chemicals because they could be _____.
A. burning B. toxic C. blue D. yellow
6. Which two accidents can occur in the laboratory?
7. Why should you never eat or drink while in a laboratory?
8. Are the following statements true or false?
 - a) Never put any chemical close to your nose in order to smell it while in a laboratory. True/False
 - b) It is not important to always follow instructions while in the laboratory. True/False
 - c) It is important to wear safety goggles while working with chemicals in the laboratory. True/False.

Summary

- A laboratory is a room where we can do scientific experiments.
- The equipment and substances in a laboratory can be dangerous.
- Equipment in the laboratory can cause accidents in the laboratory.
- Substances in a laboratory can cause accidents.
- We can prevent accidents in the laboratory by following the safety rules.

Glossary

bleach	- a chemical used to whiten or sterilise materials/substances
chemical	- a man-made substance to carry out a purpose
chew	- bite and work food with teeth in the mouth
hairfood	- a substance used in taking care of hair
gas	- a fuel that can easily light up/heat up things
pretending	- to show a specific action/to make it appear as doing a specific action
rinse	- wash something with clean water to remove soap, detergent, dirt or any impurities
substances	- a material of a particular kind

End of topic assessment test

Multiple Choice

1. Which of these is a part of the leg?
A. wrist B. shoulder C. knee D. elbow
2. Which piece of equipment do we use to take care of our teeth?
A. stick B. comb C. soap D. toothbrush
3. Which of the following types of food will protect you from diseases?
A. fruits B. sugar C. soft drink D. mahewu

4. _____ is a type of germ that can cause diseases.
A. Fly B. Mosquito C. Bacteria D. Bird
 5. Which of the following is not included in the oral rehydration solution?
A. sadza B. salt C. sugar D. water
 6. Which of the following drinks should be given to a person suffering from diarrhoea?
A. oral rehydration solution C. sugar solution
B. fruit juice D. salt solution
 7. We prevent malaria by _____.
A. cleaning toilets
B. washing our hands
D. covering with mosquito nets when we sleep
D. boiling water
 8. _____ can cause accidents in the laboratory.
A. Walking B. Seating C. Eating D. Talking
 9. Which of the following is an energy giving food?
A. apple B. potato C. lemon D. beef
 10. Which of the following disease is caused by a virus?
A. malaria B. flu C. tuberculosis D. diarrhoea

Structured questions

1. State whether the following statements are true or false.
 - a) We can get energy to do well in sports if we eat sadza and bread. True/False
 - b) It is necessary to wash one's hands before eating. True/False.
 - c) Flies can spread germs. True/False
 - d) People suffering from diarrhoea should be given the oral rehydration solution. True/False
 - e) The oral rehydration solution can be made from soup, salt and sugar. True/False
 2. Why should you wash your hands before eating anything? (1)
 3. Why should you never eat or drink anything while you are in the laboratory? (1)
 4. Fill in the following sentences using the given answers. (mutton, virus, cereals)
 - A. Grains are also called _____.
 - B. We get _____ from sheep.
 - C. A _____ causes flu.

Topic 2

Materials and structures

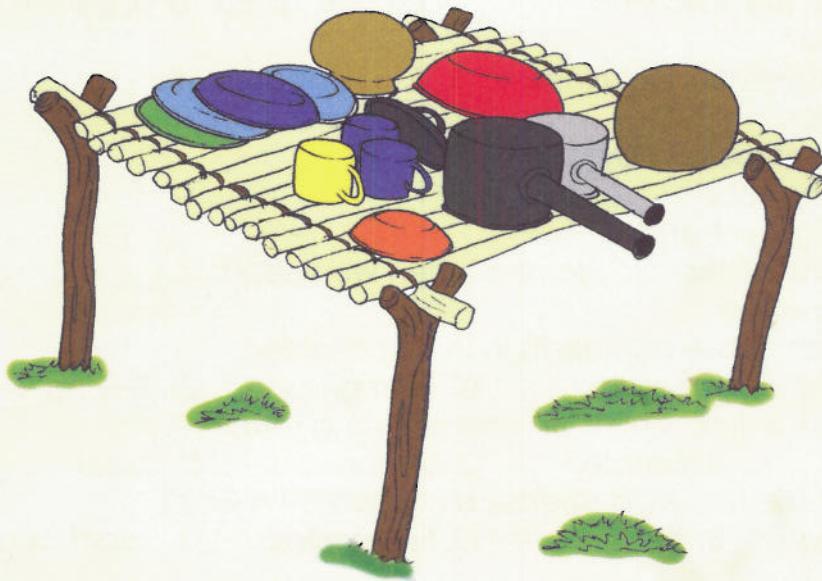


Figure 2.1 We use different materials to make tools and structures

Introduction

We use different materials to make things. Some materials are mined from the ground and some are made by people. Materials are used to make tools and structures that make our lives easier.

Unit 5 Characteristics of materials

Objective

You should be able to:

1. distinguish between natural and man-made materials.

Flashback

Look around you in the classroom. What things can you see? Can you see chairs, tables and books? What are each of these objects made of?



Key words

material natural material
matter man-made material

Natural and man-made materials

Everything is made of some type of material. A **material** is the type of **matter** that an object is made of. For example, a book is made of paper. A chair could be made of wood, metal or plastic. Matter is anything that takes up space and mass.

We can group materials into two groups based on where they come from: natural materials and man-made materials.

- **Natural materials** are materials that come from the environment. Examples of natural materials are sand, rock, leather, chalk, oil, gold, cotton, coal and wood.
- **Man-made materials** are materials that are made by people. Examples of man-made materials are paper, glass, steel, plastic, concrete, synthetic rubber, rayon, nylon and polyester.

Look at Figure 2.2. It shows objects made of natural materials and objects made of man-made materials.

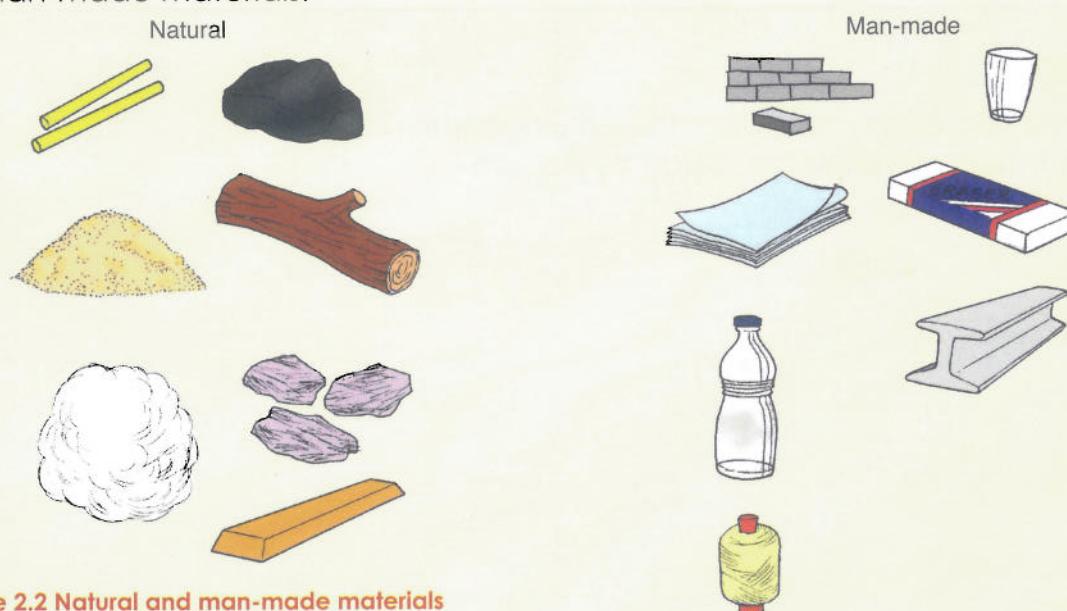


Figure 2.2 Natural and man-made materials

Activity 1

In groups, collect objects made of different materials found inside and outside the classroom.

1. Make a list of all the objects that you collected.
2. Write the name of the materials each object is made of next to the name of the object in your list.
3. Group the objects made of natural materials together.
4. Group the objects made of man-made materials together.
5. If an object is made of both natural and man-made materials?
Write both of the materials.

Exercise A

1. The following are man-made materials except ____.
A. paper
B. glass
C. soil
D. shoes
2. Which of the following is made from a natural material?
A. chalkboard
B. wooden spoon
C. plate
D. pot
3. What are man-made materials?
4. Give three examples of man-made materials.
5. Name three natural materials.

Summary

- Natural materials come from the environment.
- Man-made materials are made by people.

Unit 6 Elements, mixtures and compounds

Objectives

You should be able to:

1. differentiate pure and impure materials
2. demonstrate how to purify water.

Flashback

What do we do to water at home before we can drink it? Why do you think we do this to the water?

Key words

substances mixtures pure materials impure materials distilled water filtration filter

Pure and impure materials

You have learnt how we can group materials as natural or man-made materials by where they come from.

We can also group materials into two groups by how many **substances** they are made up of.

- **Pure materials** are materials that are made up of only one substance. For example, **distilled water** is pure because it contains only water and no other substances. Examples of pure substances are distilled water, paraffin, petrol, sugar, salt, gold, iron and oxygen gas.
- **Impure materials** are materials that contain more than one substance. For example, if we add sugar to distilled water, the water is no longer pure. The water is impure because it is now made of two substances, water and sugar. Examples of impure substances are mixtures of water and sugar, water and salt, salt and sugar and sand and salt.

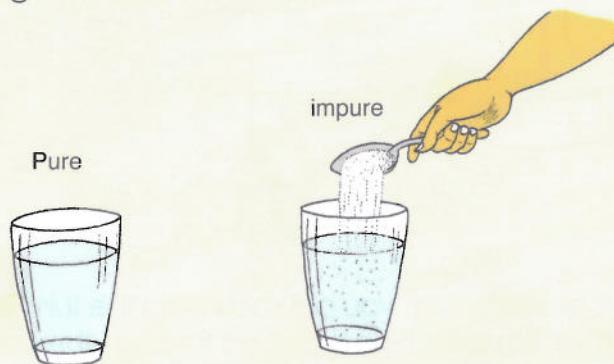


Figure 2.3 Pure material and an impure material

Purifying water

Water usually has lots of substances inside it, even if it looks clean. So water is impure, unless it is distilled water.

To make water pure, we need to remove all the substances from the water. Two ways to purify water are: filtration and distillation.

Filtration

Filtration is a process of removing solid things like sand or leaves from impure water. We pour the impure water through a **filter**. The filter is a material with small holes in it. The water can pass through the holes but the larger solid things cannot. The filter catches the solid things but lets the water flow through it.

Activity 2

In this activity you will remove sand from water by filtration.

You will need: water with sand in it, a beaker, a funnel, filter paper and a flask.

What you must do:

1. Your teacher will show you how to fold a piece of filter paper.
2. Put the folded filter paper into the funnel. Put the funnel into the opening of the flask as in Figure 2.4.
3. Use the beaker to slowly pour the sandy water into the funnel.

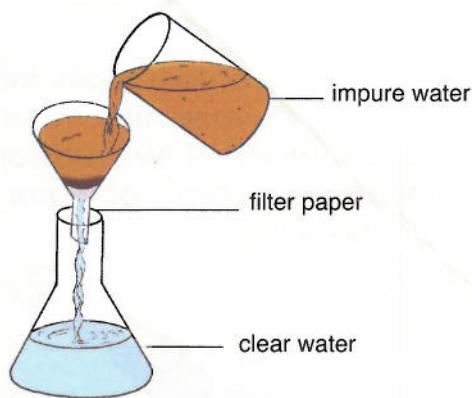


Figure 2.4 A water filter

4. What did the water look like before you poured it into the funnel?
5. What did the water look like after it had passed through the filter paper into the flask?

- What was left on the filter paper after you poured the water through it?
- Do you think the water that passed through the filter paper was pure?

Distillation

The water that passed through the filter paper in Activity 2 is still not pure. Even if it looks pure, the water contains substances such as salt that are too small to see and too small to remove with a filter.

The way to remove these very small substances is by distillation. **Distillation** is a process of removing substances from impure water by heating and then cooling the water.

Activity 3

In this activity you will remove salt from water by distillation.

You will need: a heat source such as a Bunsen burner, a solution of salt and water, a distillation flask, a thermometer, condenser, rubber tubing, cool water, a flask, glass connectors and a rubber stopper.

What you must do:

- Your teacher will set up the distillation equipment as you can see in Figure 2.5
- Watch what happens as the salty water in the distillation flask heats up.
- Can you see droplets of water inside the condenser?
- What comes out of the bottom of the condenser?
- What is left in the distillation flask?

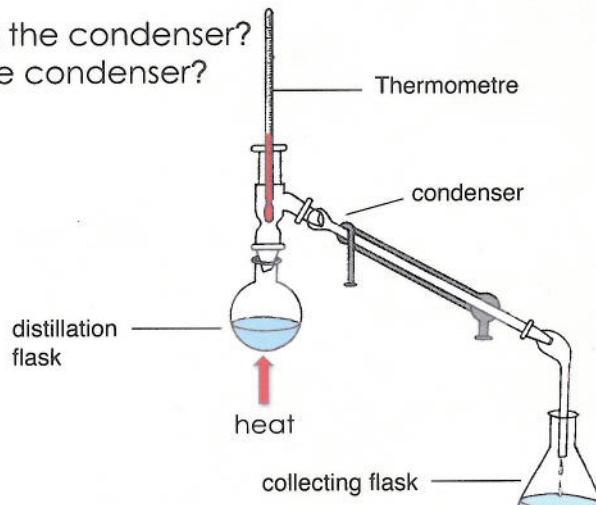


Figure 2.5: How to purify water by distillation

When we heat the salty water, the water turns into steam. The salt cannot turn into steam. The steam rises up and moves into the condenser. The condenser is cool because of the cooling water passes around it. When the steam cools down in the condenser, it turns into pure water. The drops of water run down into the collecting flask. The water in the collecting flask is pure water. The salt is left behind in the distillation flask at the end of the experiment.

Exercise B

1. The process of heating and cooling impure water to get pure water is called ____.
A. pouring B. filtration C. distillation D. solution
2. Which of the following is an impure material?
A. distilled water B. paraffin C. sugar water D. petrol
3. We can make a material impure by _____ another material.
A. removing B. adding C. heating D. serving
4. The process of removing sand from sandy water is called ____.
A. pouring B. filtration C. solution D. purification
5. The following are impure materials except ____.
A. muddy water B. sugar solution C. gold D. salt solution
6. What is a pure material?
7. If you add sugar to salt is the salt still pure?
8. Explain how filtration removes large solid substances from water.

Summary

- Pure materials are made up of only one substance.
- Impure materials are made up of more than one substance.
- We can remove the solid substances from water by the process of filtration.
- We can purify water by the process of distillation.

Unit 7 Tools

Objectives

You should be able to:

1. classify tools from home
2. design tools of your own choice
3. construct artefacts from sketches of tools.

Flashback

Imagine if your teacher asks you to go and get sand from the playground. Which tools would you use to dig the sand out of the garden and bring it to the classroom?

Key words

tools kitchen tools
garden tools building
tools design model

Types of tools

Tools are pieces of equipment that we use to make our work easier. Can you imagine how difficult it would be to dig in the garden only with your fingers? It would be very difficult. It is much easier to dig soil with a tool such as a spade or a hoe.



Figure 2.6 Digging with a hoe makes work easier

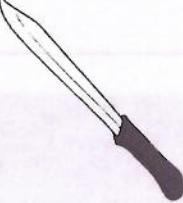
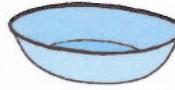
There are many tools that people use at home and at work. Think of the tools you use each day. We can group tools based on where we use them: garden tools, kitchen tools and building tools.

Safety: Always be careful when you use tools at home or at school. Some of the tools are sharp and they can injure you.

Kitchen tools

Kitchen tools are tools we use in the kitchen for preparing and eating food. The table below shows some kitchen tools and what they are used for.

Table 2.1 Kitchen tools and their uses

Kitchen tool	Uses	Kitchen tool	Uses
Knife 	For cutting food	Pot 	For cooking food
Spoon 	For stirring food and drinks For eating food	Cup 	For holding drinks
Fork 	For eating food	Plate 	For holding food

Activity 4

1. List the kitchen tools that you use each day.
2. Describe what you use each tool for.
3. State what material each tool is made of.

Garden tools

Garden tools are tools we use in the garden to make our work easier. Look at the table below which shows some examples of garden tools.

Table 2.2 Garden tools and their uses

Garden tool	Uses	Garden tool	Uses
Hoe	For digging For removing weeds	Trowel	For digging small holes for planting small plants
Spade	For digging large holes For moving soil	Fork	For turning the soil For breaking down lumps of soil
Rake	For leveling beds For removing cut grass	Watering can	For watering plants

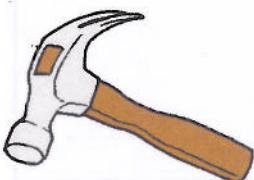
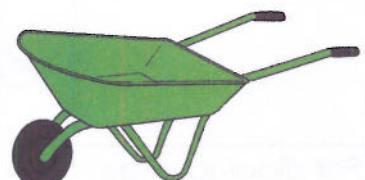
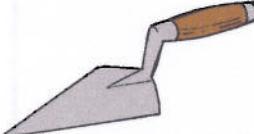
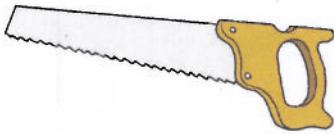
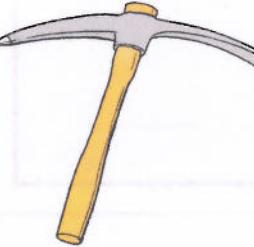
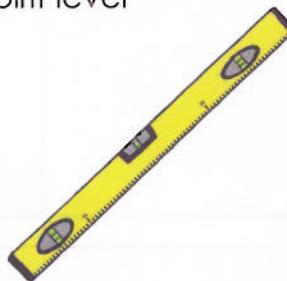
Activity 5

1. List three garden tools used for digging.
 2. Describe what a watering can is used for.
 3. State what materials each tool is made of.

Building tools

Building tools are tools we use to make work easier building things like houses. Have you seen people building a house? What tools did they use? Look at the examples of building tools in the table below.

Table 2.3 Building tools and their uses

Building tool	Uses	Building tool	Uses
Hammer	To hit nails into wood	Wheelbarrow	To carry heavy things
			
Trowel	Spread mortar on bricks	Saw	To cut wood
			
Pick	Lifting stones out of the soil for loosening hard soil	Spirit level	To show if the surface is levelled
			

Activity 6

1. Collect as many pictures of tools as you can from home and school.
2. Name the tools.
3. Group the tools together as either kitchen, garden or building tools.

Design a tool

To **design** something is a process of planning and drawing a thing that we want to make. Drawing helps us to work out how we will make a thing.

When we design something we need to think about:

- what we want to use it for
- what materials we will use to make it
- what size it will be
- what we want it to look like
- how the different parts fit together.

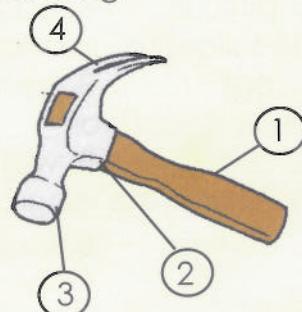


Figure 2.7 A sketch for a hammer

Activity 7

1. Choose a tool that you would like to make.
2. Write down what the tool is used for.
3. Draw a sketch of the tool.
4. On your sketch show what materials the tool is made of.

Make a model of a tool

We can make a **model** of a tool from our design sketches. Making a model helps us to test a design using materials that are cheap and easy to find. A model is a smaller version of the final tool.

Activity 8

1. Collect pictures of tools that were used by our ancestors. These tools are called artefacts.
2. Sketch a design of the artefact you want to make.
3. Choose and collect materials that are easy to get to make a model of the tool that you designed in Activity 7. You could use materials such as clay or paper or cardboard to make the model.
4. With the help of your teacher, make a model of the tool.
5. What did you learn from making the model?
6. Would you change your design after making your model? Why?

Exercise C

1. Tools make work _____.
A. difficult B. easier C. slower D. faster
2. The following are kitchen tools except _____.
A. pot B. spade C. spoon D. plate
3. A hoe is used for _____.
A. cutting B. watering C. building D. digging
4. The tool in the diagram is a _____ tool.
A. cutting B. kitchen C. garden D. building



5. A wheelbarrow is used for _____ heavy things.
A. building B. cutting C. cooking D. carrying
6. Tools used for preparing food are called _____ tools.
7. Tools are made from various materials. Write down the name of a kitchen tool and state the materials it is made of.
8. Draw the kitchen tool you described in question 7.

Summary

- Tools are used to make work easier.
- There are kitchen tools, garden tools and building tools.
- When we design a tool, it helps to draw a sketch.
- Making a model of a tool helps us to test a design using materials that are easy and cheap to get.

Unit 8 Structures

Objective

You should be able to:

1. identify structures at home.

Flashback

What structures do you find around your home? Discuss with your friend.

Key words

structure rural area
urban area

Structures at home

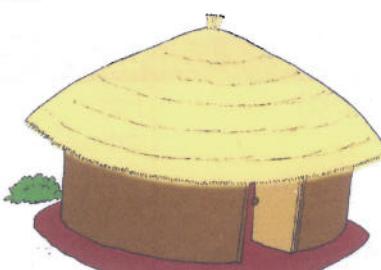
A **structure** is a building or an object that is made of different parts joined together. Examples of structures are huts, houses, kraals and gazebos. Structures are made according to the owner's needs.

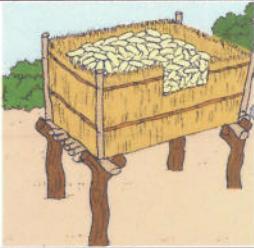
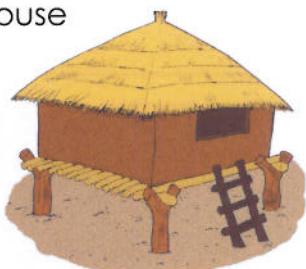
Structures in rural areas

In **rural areas**, people grow their own food. Many of the structures in rural areas are for farming, such as storing grain and keeping animals compared to urban areas.

Look at the table below. It shows examples of structures you may find in the rural areas of Zimbabwe.

Table 2.4 Structures in rural areas

Structure	Uses	Structure	Uses
Hut 	For living in	Dishrack 	For drying dishes

Open pole platform		For storing maize or other grains	Kraal		For keeping cattle or other animals
Bird house		For keeping chickens or other birds	Blair toilet		For relieving yourself

Activity 9

Look at Figure 2.8. It shows a picture of a rural village in Zimbabwe.

1. Name the structures you can see.
2. What is each structure used for?
3. What materials are the structures made of?



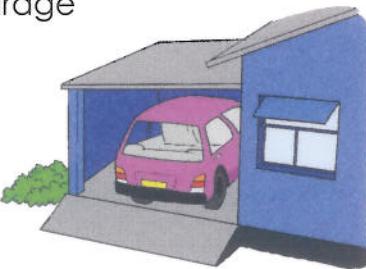
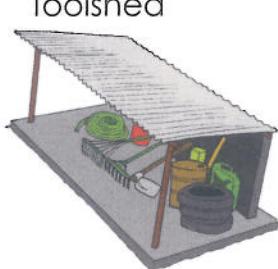
Figure 2.8 Structures in a rural village

Structures in urban areas

In **urban areas**, people do not grow their own food. Many of the structures in urban homes are for storing things or for leisure activities. Urban areas have many houses and buildings because many people live there.

Table 2.5 Structures in urban areas

Structure	Uses	Structure	Uses
House	For living in	Gazebo (lapa)	For cooking, eating and spending time outside

Garage		For storing motor vehicles		Toolshed	For storing tools
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Drawing structures at home

It is useful to draw the design of a structure before we try to build it. Drawing helps us to understand things like:

- how the parts of the structure fit together
- what materials it is made up of
- what it will look like.

Activity 10

1. Choose a rural structure or an urban structure you are interested in.
2. Draw the structure.
3. On your drawing label what it is used for and the materials it is made of.

Exercise D

1. Structures in rural areas are often related to _____.
A. farming B. travelling C. working D. sleeping
2. The following structure is common in urban areas.
A. Blair toilet B. grain store C. garage D. kraal
3. In the rural areas when we wash plates and dishes we dry them on a _____.
A. metal sink B. granary C. hut roof D. dish rack
4. Give three structures found in rural areas.
5. Give three structures found in urban areas.
6. Name the structure in Figure 2.9.
7. Draw the structure in Figure 2.9.

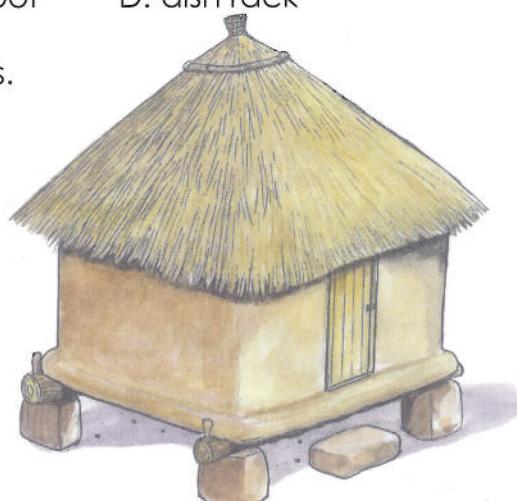


Figure 2.9

Summary

- A structure is a building or an object that is made of different parts joined together.
- Structures are found in rural areas.
- Structures are found in urban areas.
- It helps to draw a structure before we build it to plan how we will make it.

Glossary

artefacts	- an object made by humans in the past
distilled water	- pure water made by the process of distillation
leisure	- use of free time
sketch	- a rough drawing used to make a final product
substance	- a material from which something is made
condenser	- equipment used to cool water vapoursteam

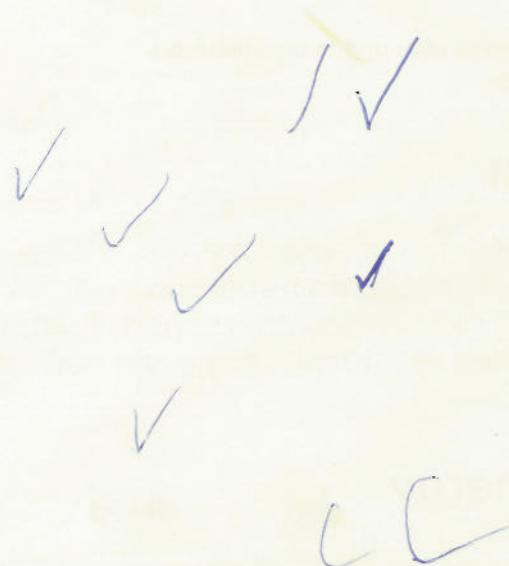
End of topic assessment test

Multiple choice

1. Which one of the following materials is man-made?
A. wood B. cotton C. plastic D. soil
2. Which one of the following materials is natural?
A. bread B. bottle C. car D. rock
3. Which of the following materials is pure?
A. distilled water B. sugar and water solution
C. salt and water solution D. sugar and salt mixture
4. If you mix water and sand, you can remove the sand using a method called ____.
A. filtration B. mixing C. boiling D. heating
5. A _____ is used to make work easier.
A. structure B. material C. tool D. design
6. A spade is an example of a _____ tool.
A. school B. garden C. kitchen D. building
7. A spoon is used for _____.
A. stirring B. drinking C. digging D. building
8. Which of the following tools is NOT used to dig soil?
A. hoe B. spade C. pick D. watering can
9. A hammer is used for _____.
A. turning screws B. watering vegetables
C. carrying heavy things D. hitting nails
10. Which of the following is a structure?
A. plate B. wood C. garage D. metal

Structured questions

1. Is water a man-made or natural material? [1]
2. What is the name of water that is pure? [1]
3. Name the process by which impure water can be made pure. [1]
4. Explain why we use tools. [2]
5. Give three examples of building tools. [3]
6. What is a structure? [2]
7. Why are there different structures in rural areas and urban areas? [2]
8. Name and draw a structure that is usually found in rural areas. [5]



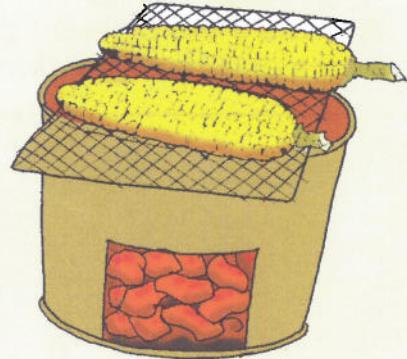


Figure 3.1 Energy is used to play and to prepare food.

Introduction

Energy is the ability to do work. We use energy to do many things like playing, working, cooking, lighting and heating our homes. Fuels store energy. Fuels release their stored energy when they are burned. There are solid, liquid and gas forms of fuels. Some fuels are renewable; some are non-renewable.

Unit 9 Energy

Objectives

You should be able to:

1. explain the meaning of energy
2. identify uses of energy
3. identify forms of fuel
4. demonstrate characteristics of fuels
5. classify fuels as renewable and non-renewable.

Flashback

What gives you energy to be able to work and play?

Key words

energy

What is energy?

Energy is the ability to do work. For example, if a person has energy, they can play and do work. When a plant has energy, it can produce seeds and fruit. If an animal has energy, it can walk and run. If a machine has energy, it can move. When a lamp has energy, it can shine.

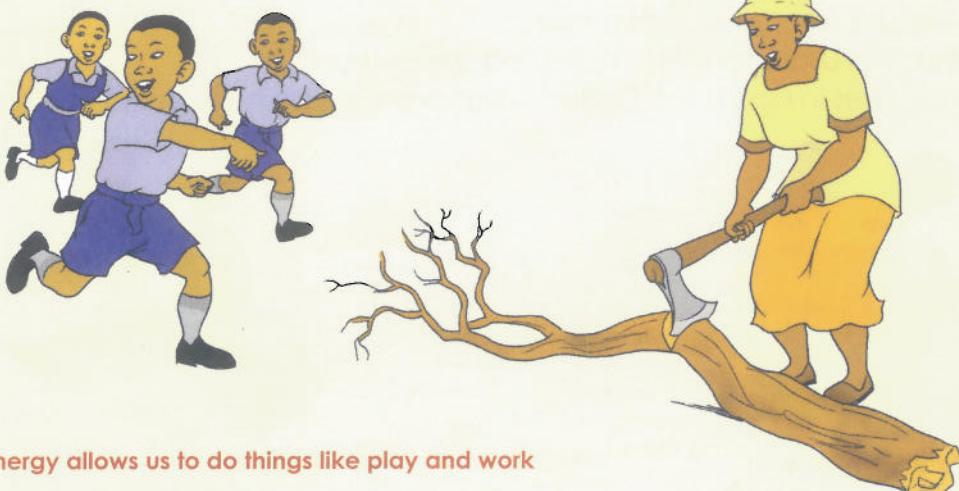


Figure 3.2 Energy allows us to do things like play and work

Energy can pass from one object to another. For example, we get energy from the food we eat. When you eat, energy from the food passes to your body. You can then use the energy in your body to do things like kick a ball. When you kick the ball, energy passes from your foot to the ball and makes the ball move.

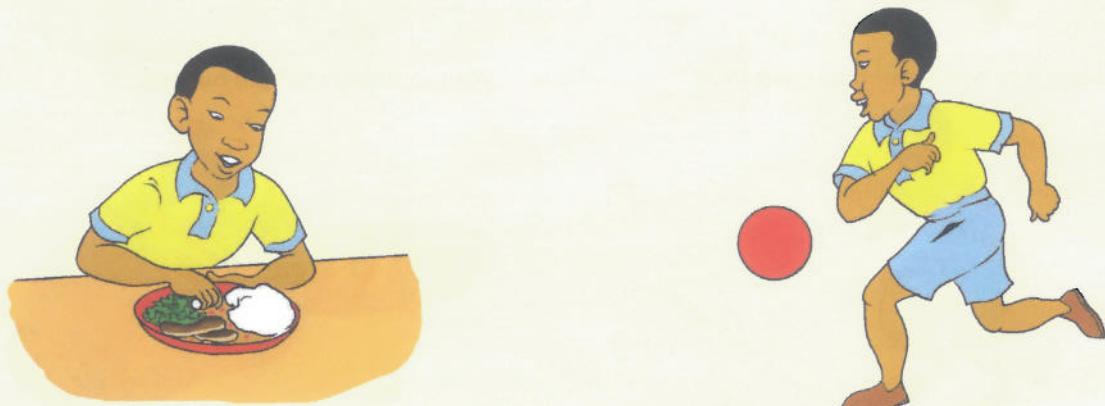


Figure 3.3 Energy passes from the food to the boy and then to the ball

Uses of energy

We use energy for many activities in everyday life. Some of the main uses of energy are:

- **Growth:** Our bodies use energy to grow and develop into adults.
- **Movement:** We use energy to move our bodies. This lets us move from place to place, play sport and dance.
- **Work:** We use energy to do work such as schoolwork and helping with tasks at home and in the garden.
- **Purifying water:** We use energy to boil water.
- **Cooking:** We use energy to cook our food.
- **Lighting:** We use energy to light our homes and classrooms.
- **Heating:** We use energy to warm our bodies and our homes and classrooms when it is cold.
- **Music:** We use energy to make music.
- **Machines:** We use energy to make machines work.

Look at the pictures in Figure 3.4. Discuss what energy is being used for in each picture.



We use energy to play sport



We use energy to do work



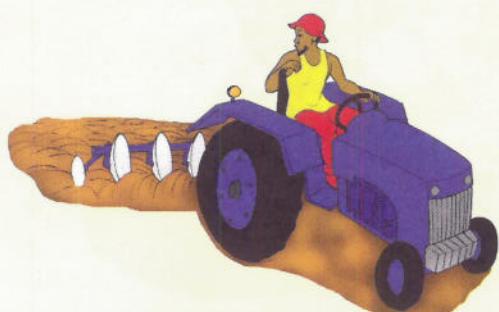
We use energy to boil water and cook food



We use energy to light our homes



We use energy to make music



We use energy to make machines work

Figure 3.4 Some of the ways we use energy

Exercise A

1. We get our energy from _____.
A. light
B. heat
C. water
D. food
2. Energy is an object's ability to _____.
A. do work
B. get smaller
C. cool down
D. do nothing
3. What makes machines work?
A. water
B. oil
C. sunlight
D. energy
4. Say whether the following statements are true or false.
a) Energy can pass from one object to another. True/False
b) Children who are playing games do not need energy. True/False
5. Complete the following statements
a) We use energy to ____ (cook/cover) our food.
b) We need energy to ____ (light/leave) our homes when it is dark.
c) We use energy to make ____ (game/music) when we play the drums.

Summary

- Energy is the ability to do work
- Energy can be passed from one object to another
- We use energy for many activities

Unit 10 Fuel

Objectives

You should be able to:

1. identify forms of fuel
2. demonstrate characteristics of fuels
3. classify fuels as renewable and non-renewable.

Flash back

Think of all the different materials that people can burn to cook their food. Discuss with a friend.

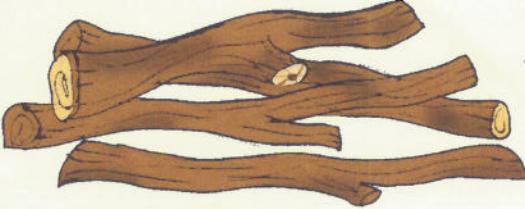
Key words

fuel solid fuel liquid fuel gas
fuel renewable fuel
non-renewable fuel biofuel

What is fuel?

A **fuel** is a material that burns to release heat. Examples of fuels are wood, paraffin and cooking gas. A fuel stores energy. When the fuel burns, the energy is given off as heat and light. Figure 3.5 shows examples of fuels and how we use them when they burn.

a)



b)



c)



Figure 3.5 Fuels burn and release heat and light which we can use. (a) Wood (b) Paraffin (c) Cooking gas

Activity 1

1. In groups collect fuels that we use to make fire at home and at school. You can collect materials such as dry wood, dry grass, paper, coal and dried cow dung.
2. Go outside with your teacher and find a safe place to make a fire.
3. Follow your teacher and test each fuel to see how it burns. (Be very careful when making fire. Make sure that the fire does not spread. Fire is very dangerous. Fire can destroy property and even kill people.)

4. Which of the fuels was easiest to light?
5. Which of the fuels burnt the fastest?
6. Which of the fuels burnt for the longest time?
7. Which of the fuels made the most smoke when burning?

Forms of fuel

We can group fuels based on their physical properties as solid, liquid or gas fuels.

Solid fuels

Solid fuels are hard when you touch them. They cannot be poured from one container to another. Examples of solid fuels are wood, dry grass, cow dung and candle wax.



Figure 3.6 Examples of solid fuels.

Liquid fuels

Liquid fuels are like water because they can be poured from one container to another. Examples of liquid fuels are paraffin, petrol and diesel.



Figure 3.7 Examples of liquid fuels

Gas fuels

Gas fuels are like air. You cannot see them or touch them. Sometimes you can

smell a gas. Gas fuels spread out to fill up a container. They are usually stored in gas tanks. Examples of gas fuels are cooking gas and welding gas.

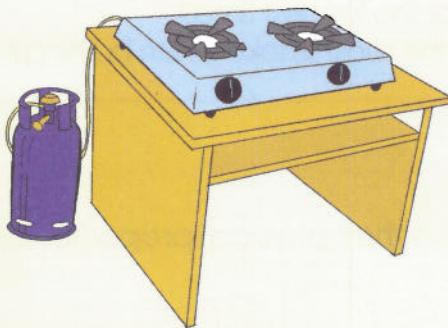


Figure 3.8 A cylinder of cooking gas connected to a gas stove

Gas tanks and cylinders are very dangerous. Do not play near them or tamper with them. You could cause a fire or an explosion.

Renewable and non-renewable fuels

We get fuels from the environment around us. When we burn a fuel, it is used up. We cannot use it again. We divide fuels into two groups based on how long they take to be replaced in the environment: renewable and non-renewable fuels.

Renewable fuels

Renewable fuels are fuels that take quite a short time to be replaced in the environment. As long as we do not use these fuels faster than they can be replaced, we will not run out of them. For example, if we do not cut down trees for firewood faster than new trees can grow to replace them, we will not run out of firewood. Examples of renewable fuels are wood, vegetable oils from crops like sunflowers and biofuels. **Biofuels** are renewable fuels made from plant or animal materials from farms. For example, bioethanol is a biofuel that can be made from sugar or starch from potatoes or maize. It can be used to replace petrol in motor engines.

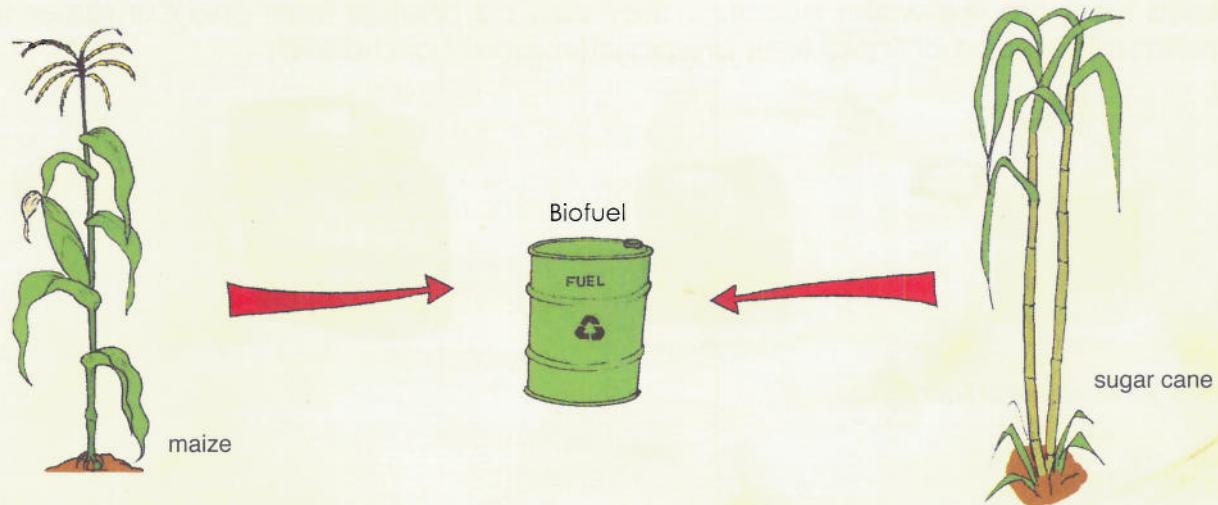


Figure 3.9 Biofuels and its sources

Non-renewable fuels

Non-renewable fuels are fuels that take so long to be replaced in the environment that once we have used them all up, we will never have any more to use again. Examples of these fuels include coal, crude oil and natural gas. These are called fossil fuels. Petrol, diesel, paraffin and cooking gas all come from these fossil fuels. Fossil fuels are fuels formed deep under the ground by natural processes that take hundreds of thousands of years.

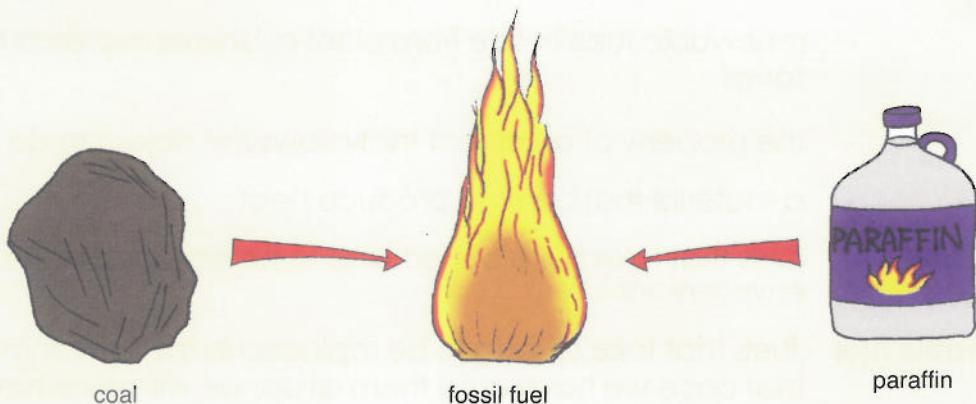


Figure 3.10 Fossil fuels are non-renewable fuels

Exercise B

1. Fuel _____ to release energy .
A. smells B. glows C. burns D. shines
2. Which of the following is a renewable fuel?
A. wood B. cooking gas C. candle wax D. petrol
3. Which of the following is not a liquid fuel?
A. gas B. paraffin C. diesel D. petrol
4. What is a fuel?
5. Name the three forms of fuels.
6. Why do we say that wood is a renewable fuel?
7. Why will we eventually run out of non-renewable fuels?

Summary

- Energy is the ability to do work.
- We get our energy from our food.
- We use energy to do many things like playing, working, cooking, lighting and heating our homes.
- Fuels store energy which is released when they are burned.
- There are three forms of fuels: solid, liquid and gas fuels.
- Examples of solid fuels are wood, dry grass, dry cow dung and candle wax.
- Examples of liquid fuels are paraffin, petrol and diesel.

- Examples of gas fuels are cooking gas and welding gas.
- Renewable fuels can be replaced quickly. Non-renewable fuels cannot be replaced.
- Examples of renewable fuels are wood and biofuels such as bioethanol. Examples of non-renewable fuels are fossil fuels such as coal, crude oil and gas.

Glossary

biofuel	- renewable fuels made from plant or animal materials from farms
energy	- the property of an object that allows the object to do things
fuel	- a material that burns to produce heat
renewable fuel	- fuels that take quite a short time to be replaced in the environment
non-renewable fuel	- fuels that take so long to be replaced in the environment that once we have used them all up, we will never have any more to use again

End of topic assessment test

Multiple Choice

1. _____ makes us able to run and work hard.
A. Energy B. Sleeping C. Clothes D. Shoes
2. Which is a renewable fuel?
A. diesel B. petrol C. wood D. cooking gas.
3. These are all liquid fuels except for _____.
A. candle wax B. paraffin C. petrol D. diesel
4. A material that burns to produce heat is called a _____.
A. hot plate B. fuel C. stove D. fire
5. _____ is an example of a fuel that people can replace in a short of time.
A. Petrol B. Gas C. Bioethanol D. Diesel
6. Which of the following is a property of a gas fuel?
A. you can see it B. you can smell it
C. you can touch it D. you can hear it
7. These are all fossil fuels except _____.
A. bioethanol B. paraffin C. diesel D. petrol

8. Fossil fuels are non-renewable fuels that _____.
A. take a short time to form
B. take a long time to form
C. form in the air
D. form in the sea.
9. Which is an example of a solid fuel?
A. candle wax B. cooking gas C. paraffin D. diesel
10. People get energy from _____.
A. air B. sunlight C. water D. food

Structured questions

1. What is energy? [2]
2. Name three uses we have for energy. [3] ?
3. What is a fuel? [2]
4. Name the three forms of fuels. [3]
5. What is the difference between renewable and non-renewable fuels? [2]

End of term 1 assessment test

Multiple choice

Answer all questions

Choose the correct answer.

1. The following are important parts of the human body except _____.
A. head B. legs C. arms D. tail
2. Which part of your body do you use for seeing things?
A. mouth B. eyes C. nose D. tongue
3. Chipo said that the fruit she was eating was sweet. Which part of her body did she use to find out whether the fruit was sweet?
A. eyes B. fingers C. tongue D. stomach
4. Farai's teeth are very clean. He uses a _____ to clean his teeth.
A. handkerchief B. comb
C. toothbrush D. shoes
5. When washing our hands we should use _____.
A. detergent soap B. toothpaste
C. cosmetics D. petroleum jelly

19. Sarah has a bag which is very heavy. She wants to carry it from the bus stop to their house. Which of the following tools should she use?
 A. dish B. wheel barrow C. shovel D. hoe
20. Tendai runs fast. He also plays football. He needs _____ to perform well in sport.
 A. energy B. meat C. fruit D. tools
21. A tool used to dig in the garden is a _____.
 A. hammer B. knife C. spade D. spoon
22. A saw is used to _____.
 A. cut food B. cut wood C. stir food D. dig holes
23. A material that can burn to produce heat is called a _____.
 A. fire B. wood C. paper D. fuel
24. Which of the following fuels is a liquid?
 A. coal B. wood C. paraffin D. cow dung
25. The following are all non-renewable fuels except _____.
 A. wood B. petrol C. coal D. paraffin

Structured questions

1. a) A substance that burns and produces heat is called _____.
 b) Paraffin is a fuel that is in the form of a _____.
 c) Wood is a fuel that is in the form of a _____.
 d) For you to be able to run and perform well in sports you need to have _____.
 e) Foods such as potatoes, bread and sadza will give you a lot of _____. [5]

2. Which of the following materials are pure or impure? Write pure or impure after each material.
 a) Distilled water
 b) Paraffin
 c) Tea with milk
 d) Oral rehydration solution
 e) Gold [5]

3. a) Why do people use tools?
 b) Where are the following tools used at home?
 i. Pots [1]
 ii. Garden fork [1]
 iii. Watering can [1]
 c) Why is it important to wash hands before eating? [5]

4. a) Germs spread by mosquitoes cause a disease called _____. [1]
 b) A person suffering from _____ should be given oral rehydration solution.

- c) When making oral rehydration solution;
- how much boiled water do you need?
 - how much sugar do you need?
 - how much salt do you need? [5]
5. a) Draw the diagram of a person (either a boy or a girl) and show the following parts of the body.
- head
 - legs
 - arms
 - eyes
 - mouth [3]
- b) Name the part of the body that we use to smell things. [1]
- c) Name the part of the body that we use to see things. [1]



Figure 4.1 Electronic devices use electricity to work.

Introduction

Electronic devices use electricity to work. Electricity is a form of energy. In Zimbabwe we use electricity to power industries and factories. Electricity is hazardous, so we must learn how to use electronic devices correctly. Force pulls certain materials to it. Magnets attract certain materials but they do not attract certain materials.

Unit 12 Electronics

Objectives

You should be able to:

1. identify electronic devices
2. use the devices correctly
3. recognize sources of electricity in Zimbabwe
4. identify dangers of electricity
5. suggest safety precautions when using electricity
6. identify conductors and insulators.

Flashback

Have you ever watched a program on a television? What made the television work?

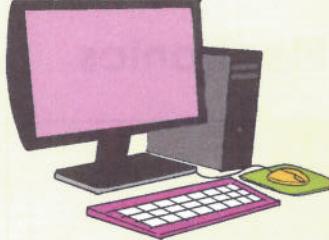
Word check

electronic device electricity
hydropower powerline
thermal power electric
circuit plug switch battery
electric current

Electronic devices

Electronic devices are objects that use electricity to work, for example; a radio, television and stove. **Electricity** is a form of energy.

Table 4.1 Electronic devices use electricity to work.

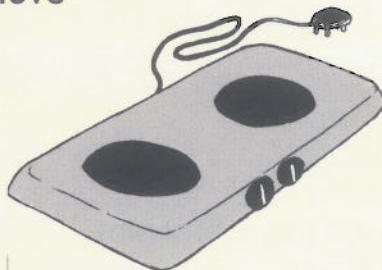
Television  Uses electricity to make moving pictures and sound.	Radio  Uses electricity to make sound.
Cell phone  Uses electricity from its battery to transmit sound.	Computer  Uses electricity to do calculations, store information and show videos.

Electric light bulb

An electric light bulb uses electricity to make light.

Electric kettle

An electric kettle uses electricity to heat water.

Electric stove

Uses electricity to heat food or water.

Refrigerator

Uses electricity to keep food and drinks cold.

Look at Table 4.1. It shows some examples of electronic devices that we may find at home or school.

Activity 1

1. Discuss the devices on Table 4.1.
2. Which ones have you seen?
3. Which ones have you used?
4. How do they work?

Using electronic devices

Electricity is very dangerous. If electricity comes in contact with your body, it can give you an electric shock. An electric shock injures your body. An electric shock can even kill you.

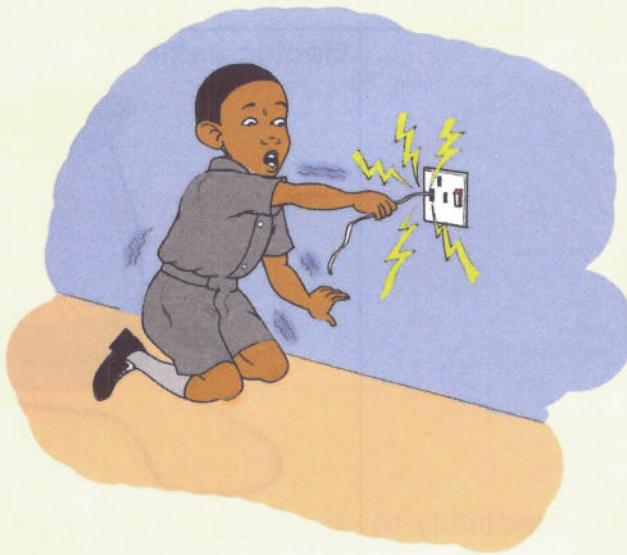


Figure 4.2 Never put your finger or a tool into an electrical socket. You will get an electric shock

We need to use electronic devices correctly so that we do not get an electric shock.

How to plug in an electrical device:

- Make sure your hands are dry.
- Make sure the switch at the wall socket is OFF.
- Make sure any switches on the device are OFF.
- Hold the plug so that your fingers do not touch the metal pins.
- Push the plug into the electrical socket in the wall.
- Switch ON the switch at the wall.
- Switch ON the switch on the device.

How to use an electrical device

- Follow the instructions on how to use the device.
- Instructions on how to use an electronic device are contained in a manual.
- Electricity flows through water, so make sure your hands are dry when you use electrical devices. Never use an electronic device near any water.

How to unplug an electrical device

- Switch OFF all the switches on the device.
- Switch OFF the switch at the wall socket.
- Pull the plug out of the wall socket. Never pull on the cord or wires to pull a plug out of the wall.



Activity 2

1. Work with a partner to do a role play on how to use an electrical device correctly.
2. Your role play should cover the following things:
 - a) how to plug in the device
 - b) how to use the device safely
 - c) how to unplug the device.

Exercise A

1. An electrical device uses _____ to work.
A. water B. sunlight C. electricity D. lightning
2. The electrical device that uses electricity to make sound is the _____.
A. television B. kettle C. light bulb D. radio
3. Which of the following statements is true or false.
 - a) A switch has to be on before you plug an electrical device into an electrical socket. True/False
 - b) For television to start working we have to switch on the electricity. True/False
4. Explain why it is important to make sure your hands are dry before you plug in an electrical device.

Sources of electricity

There are two sources of electricity that electrical devices use: electricity from a power station and electricity from a battery.

Electricity from a power station

We generate electricity at power stations such as the Kariba Hydroelectric Power Station and the Hwange Thermal Power Station. **Hydropower** is electricity that comes from water. **Thermal power** is electricity that comes from coal. The electricity from a power station is transmitted along wires called **power lines** to substations and from substations to the electrical sockets of homes, schools and places of work around the country.

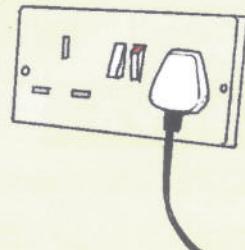
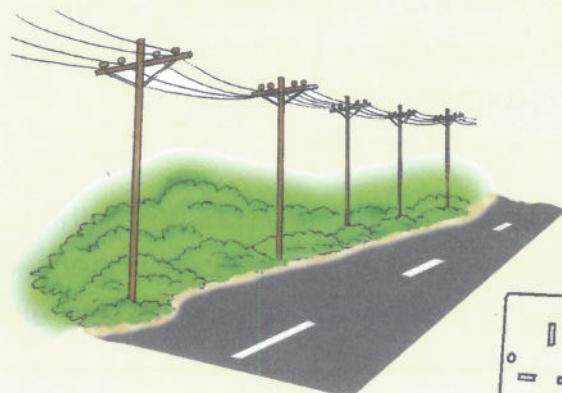
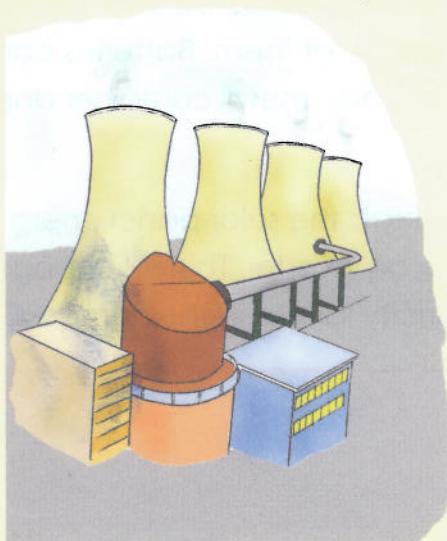


Figure 4.3 Electricity from a power station is transmitted along power lines to electrical wall sockets where we can plug in electronic devices

To make an electrical device work, we plug it into an electrical socket. The electricity flows from the wires in the socket through the electrical cord to the electronic device. Electrical sockets have **switches**. When the switch is ON, electricity flows from the electrical socket to the device that is plugged into it. When the switch is OFF, the electricity does not flow.

Electricity from a battery

Batteries contain stored electricity. We use batteries to supply electricity to electronic devices when they are not plugged into an electrical socket.

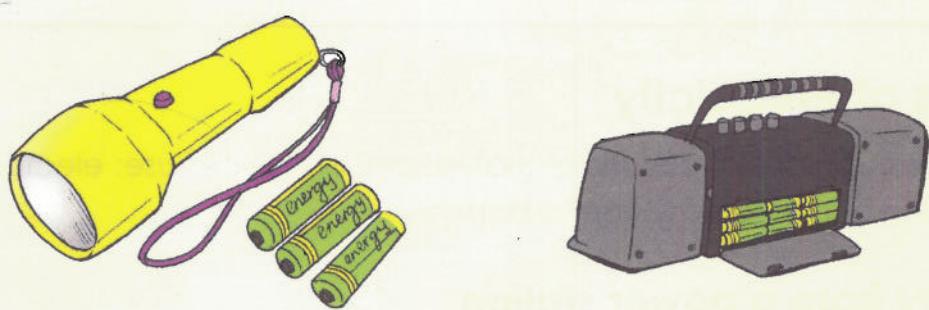


Figure 4.4 The energy stored in batteries make electrical devices like radios work

When energy from a battery runs out, we say that the battery is 'flat'. A flat battery cannot make devices work. Some batteries can be re-charged when they run out of electricity. Cellphone batteries can be re-charged. We re-charge a battery by using a charging device. The charging device is plugged into an electrical socket. Electricity flows from the socket into the battery. Other batteries cannot be re-charged. When the energy is used up, we have to dispose of them. Batteries can be harmful hence when disposing them place them in a non-metal container and take them to a recycling centre.

Solar energy is electricity from the sun. When the sun heats the solar panel energy is stored in a battery. The battery will be connected to an inverter. This will change the current from the battery's electricity (DC) to electricity for use in the home AC.

Activity 3

1. Collect pictures of different types of batteries.
2. Make a class collage and label it.

Sources of electricity in Zimbabwe



Figure 4.5 Map of power stations in Zimbabwe

Below are the 6 power stations we have in Zimbabwe.

- Kariba hydropower station
- Hwange thermal power station
- Harare thermal power station
- Bulawayo thermal power station
- Munyati thermal power station
- Dema diesel emergency power station

Dangers of electricity

Electricity is dangerous. When electricity comes in contact with your body, you can get electric shock. Electric shock can hurt you or even kill you.

Wall sockets



Figure 4.6 A worn cable and an overloaded wall socket

Open or worn out cables can lead to electrical shock if you touch them. Overloaded wall sockets can overheat and cause fire.

Electronic appliances



Figure 4.7a) Operating an appliance with wet hands b) Poking a plugged on appliance with a knife

Operating an appliance when your hands are wet can lead to electrical shock. Using sharp objects to poke appliances plugged on the wall socket can lead to electrical shock.

Electrical equipment

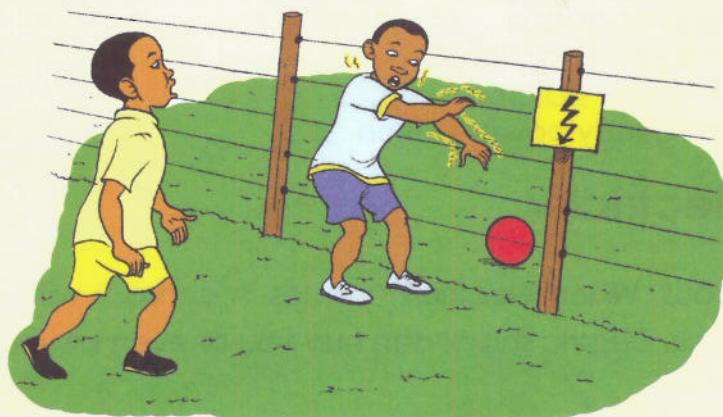


Figure 4.8 Playing close to power lines or electric fences

Playing next to electrical cables and power lines can cause electric shock.

Safety precautions when using electricity

Some of us use electricity every day, children and adults alike may forget how dangerous electricity can be. Staying safe can be easy if you know how to handle electricity. Below are some of the safety precautions we can follow when handling electricity.

- Do not play near or under power lines.
- If you notice a power line on the ground, do not touch it. Please inform an adult. Read danger warning signs.
- Do not insert anything into a socket.
- Appliances should always be unplugged before cleaning.
- Any electrical device should be far away from any water source.
- Overloaded circuits are dangerous. Do not plug in a device without the supervision of an adult.

Danger warning signs



Figure 4.9 Danger warning signs

Danger warning signs are there to caution us on the possibility of danger. Figure 4.9 shows some danger warning signs. The first one warns of possible electric shock so we should not touch. The second warns us as to keep out of the electrical equipment.

Activity 4

Find out the nearest power lines from your school.

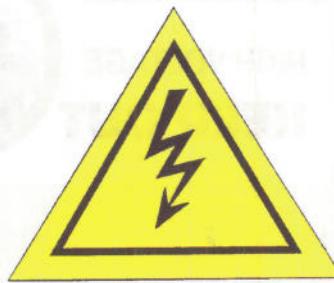
Visit the location and discuss the dangers that you might see.

Draw danger warning signs in groups.

Prepare a short drama to present during assembly.

Exercise B

1. Wires that transfer electricity from the substation to our homes are called _____.
A. wall socket B. hydropower C. power lines D. thermal power
2. The hydropower station in Zimbabwe is found in _____.
A. Gweru B. Harare C. Hwange D. Kariba
3. Which of the following devices stores electricity?
A. radio B. battery C. electric iron D. electric jug
4. Electricity from the sun is called _____.
A. thermal B. solar C. hydropower D. biomass
5. If you notice a power line on the ground you _____.
A. pick it up
B. touch it
C. do not touch it
D. do not touch it and notify an adult.
6. Name two sources of electricity.
7. What does the following danger warning sign mean?



8. Overloaded wall sockets can cause _____ and _____.

Electric conductors and insulators

An **electric circuit** is a path in which **electric current** flows. Electric current is a flow of electric charge. A circuit is made by linking electrical components together with pieces of wire cable.

How electricity flow in a circuit

Materials which allow electric current to flow in a circuit are called **conductors**.

Materials that do not allow electricity to pass through them easily are called **insulators**.

Activity 5 Which materials are conductors and which are insulators?

You will need: aluminium foil, copper coins, metal keys, plastic, matchstick, pencil lead, eraser, glass, batteries, circuit boards, electrical wires, bulb.

1. Connect the circuit board. The bulb must light up.
2. One by one place the free wires of your circuit board in contact with the two ends of the samples you have collected.

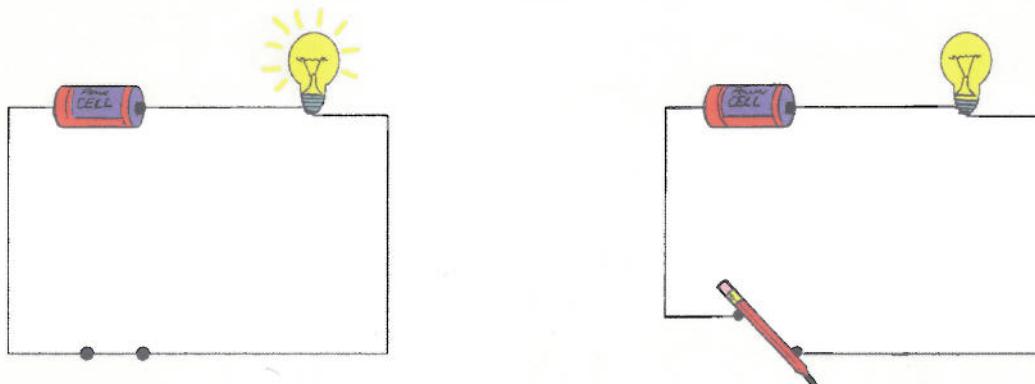


Figure 4.10

3. Put your results in a table below.

Material	Material it is made up of	Bulb
Key	Metal	Lit up
Pencil	Wood	Did not light up
Eraser	Rubber	
Lunch box	Plastic	
Matchstick	Wood	
Cup	Glass	
Nail	Metal	

From the activity, you found out that materials made of metals such as copper and aluminium are conductors of electricity. Materials such as rubber, wood, plastic, wool and glass do not allow electricity to pass through them easily. They are insulators.

Summary

- There are many electronic devices.
- We need to be careful when using electronic devices.
- There are five power stations in Zimbabwe.
- Danger warning signs caution us from harm or death.
- Conductors allow electricity current to flow in a circuit.
- Insulators do not readily allow electricity current to flow in a circuit.

Unit 13 Forces

Objectives

You should be able to:

1. illustrate magnetic force
2. explain action of magnets as force at a distance
3. identify devices with magnets.

Flashback

Have you ever opened and closed a refrigerator door? What keeps the door closed?

Key words

magnet force magnetic force magnetic field

Magnets

A fridge door closes itself because the magnets pull it shut and prevents it from bouncing back open.

A **magnet** is an object that pulls metal things towards it. We say that a magnet 'attracts' metal things.

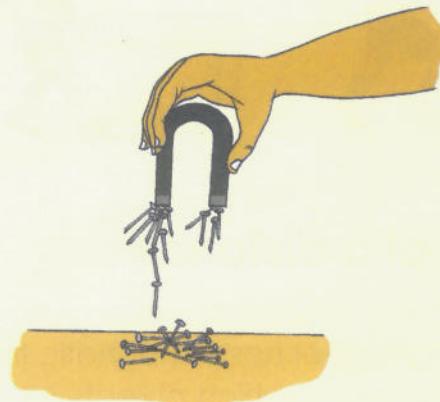


Figure 4.11 When you put a magnet close to metal things, it pulls them towards itself

Activity 6

Your teacher will bring some magnets to class. You will test which materials are attracted to the magnet.

1. Collect some small objects made of different materials including metal, plastic, wood, paper and stone. For example, plastic bottle caps, sticks, paper, grass, stones and metal bottle tops.

- One by one test if the magnet can attract each object.
- Write the results of your tests in a table like this:

Object	What material is it made of?	Does the magnet attract it?
Plastic bottle cap	Plastic	No
Metal bottle cap	Metal	Yes
Stick		

Magnetic force

A magnet pulls things towards itself by a **magnetic force**. A **force** is a push or a pull that one object applies to another object. If a force is strong enough, it can make an object move. For example, you apply a push or a pull force to a desk. If the force is strong enough, the desk will move across the floor.



Figure 4.12 A force is a push or a pull

Action of magnets at a distance

A magnet can pull metal things towards it without the objects having to touch each other. This is because a magnet has a magnetic field around it. A **magnetic field** is a space around a magnet in which objects are pushed or pulled by the magnetic force. We cannot see a magnetic field. We know it is there because when we put metal things inside this space, they are pulled towards the magnet. We say that a magnet applies a force on objects at a distance.

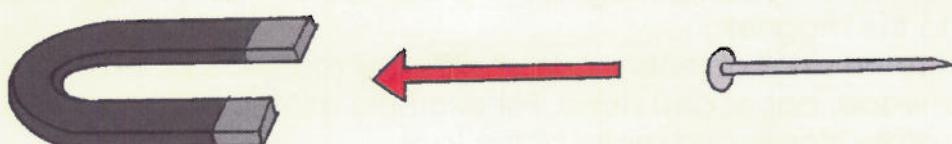


Figure 4.13 Magnetic force acts without the objects having to touch each other.

Activity 7

Your teacher will bring some magnets and drawing pins or similar small metal objects to class. You will use them to show that magnetic force acts over a distance.

1. Put the metal object and the magnet on a desk apart from each other so that they do not pull towards each other.
2. Slowly move the magnet closer to the metal object until it moves towards the magnet.
3. Repeat this, and this time use a ruler to measure how far away the magnet can be and still attract the metal.

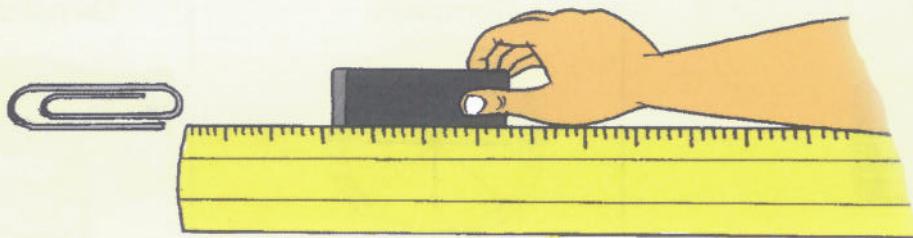
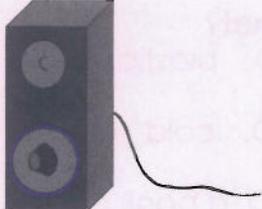
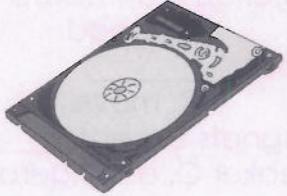


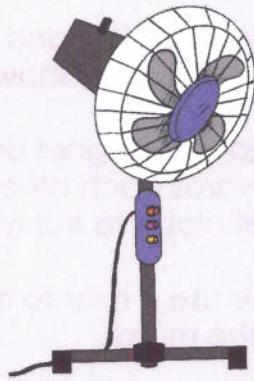
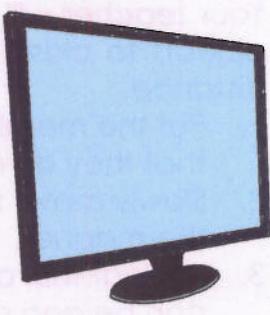
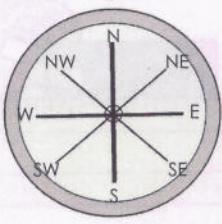
Figure 4.14 Measuring how far a magnet can be from an object and still attract it

Devices with a magnet

We use magnets in some devices to do useful things. The table shows examples of devices with magnets in them and what they do.

Table 4.2 Devices with magnets

Loudspeaker	Computer hard drive	Refrigerator door
 Makes sounds louder	 Records information	 Keeps the door closed

Scrapyard crane	Electric fan	Television
 Lifts pieces of scrap metal	 Makes blades move	 Shows picture on screen
Bank card 	Compass  Shows direction	Generator  Makes electricity

Activity 8

- With the help of your teacher find the magnet in a device such as a loudspeaker.
- How can you test that it is a magnet?

Exercise C

- Which of the following materials is attracted by a magnet?
A. paper B. iron nail C. wood D. plastic
- A force can make an object _____.
A. shine B. hot C. move D. cold
- These devices contain magnets except _____.
A. a clock B. a loudspeaker C. a refrigerator door D. a bank card
- What is a force?
- Describe what would happen if you brought a magnet close to a metal paperclip.
- How does a magnet attract an iron nail without touching it?

Summary

- A magnet is an object that pulls metal things towards it.
- A magnet pulls things towards itself by a magnetic force.
- A force is a push or a pull that one object applies to another object.
- If a force is strong enough, it can make an object move.
- A magnet applies a force on an object at a distance.
- We use magnets in some devices.

Glossary

conductor	- a material which allows electric current to flow in a circuit
insulator	- a material that does not allow electricity to pass through them so readily
manual	- the book that contains instructions on how to operate an electric device
electrical socket	- the place into which we plug electric devices to give them electricity
re-charge	- to re-fill a battery with electricity after it has gone flat
electric shock	- when electricity flows through a person's body

End of topic assessment test

Multiple choice

1. The electric bulb can only produce light when _____.
A. the switch is off B. the switch is on
C. electricity is available D. the switch is on and electricity is available
2. A cellphone battery needs to be _____.
A. switched on B. switched off C. saved D. charged
3. Electricity from Kariba Power Station gets to homes and schools along _____.
A. power sockets B. power lines C. plugs D. cords
4. Do not place electric devices near _____.
A. heat B. cold C. air D. water
5. Some of electricity used in Zimbabwe is generated at _____.
A. Gweru and Chinhoyi B. Hwange and Kadoma
C. Harare and Bulawayo D. Hwange and Kariba
6. The following are electrical devices except _____.
A. television B. compass C. radio D. cellphone
7. Magnets attract _____.
A. paper B. metal C. wood D. plastic

8. The following devices contain magnets except _____.
A. loud speaker B. refrigerator door C. electric fan D. bicycle
9. Magnets attract metal objects by a magnetic _____.
A. force B. fan C. rope D. glue
10. The following materials are insulators except _____.
A. wood B. rubber C. metal D. plastic

Structured questions

1. a) Name three devices that we use at home and at school that use electricity. [3]
b) Name two sources of electricity that electrical devices may use. [2]
2. a) A force is a ____ or a _____. [2]
b) A magnetic force acts over a _____. [1]
c) Name a magnetic device and state what it is used for. [2]

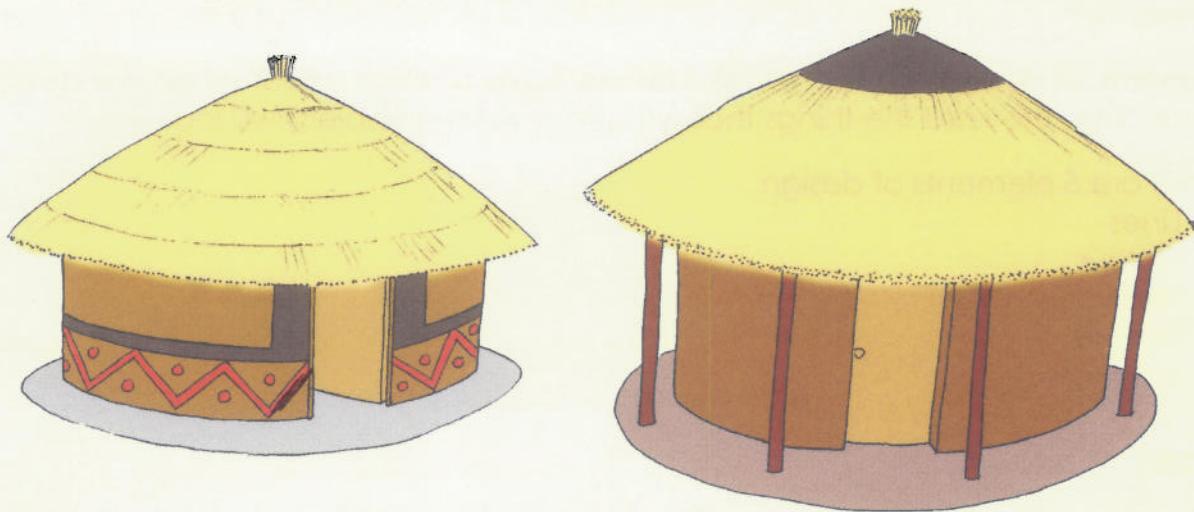


Figure 5.1 The two huts are not the same because they are built from different designs

Introduction

For us to build a hut or make an object or machine, we have to design it first. When we design something, we make a drawing of it to show what the final product will look like. In this topic, you are going to design and then make a model of an object that looks like your design.

Unit 14 Elements of design

Objectives

You should be able to:

1. appreciate elements of design
2. manipulate materials such as clay or papier mache to make artefacts.

Flashback

In topic 2 Materials and structures you made a design sketch of a tool to make an artefact and drew an urban or rural structure. When we do a design what do you need to think about?

Key words

elements of design form
texture decoration

What are the elements of design?

Were the models of urban or rural structures that were drawn by different people in your class in Term one, all the same? Were they all the same size, the same shape or the same colour?

Buildings and objects look different to each other because they are designed differently.

Elements of design are the things that we have to think about when we design something. They are the things that will affect what an object will look like.

There are 5 elements of design.

1. Lines
2. Colour
3. Form
4. Texture
5. Balance

Lines

We use lines to draw our designs. The lines can be smooth or jagged; straight or curved; thick or thin.

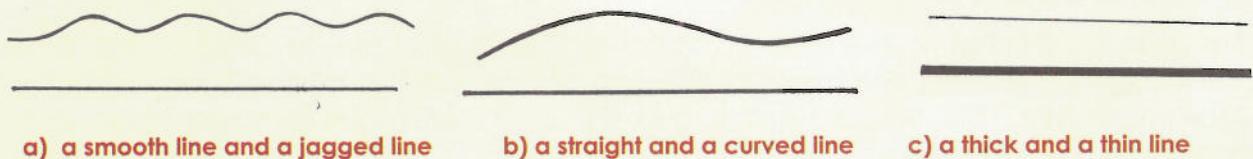


Figure 5.2 There are different kinds of lines used in designs

Colour

Different colours can be used in our designs. Colour can make an object look more interesting or attractive.

Look at all the different colours you can choose from in Figure 5.3.



Figure 5.3 There are different colours used in designs

Form

Form is the shape of an object. The shape can be round, square, rectangular or even something that is irregular or unusual.

Some of the different shapes that we can use in our designs are shown in Figure 5.4.

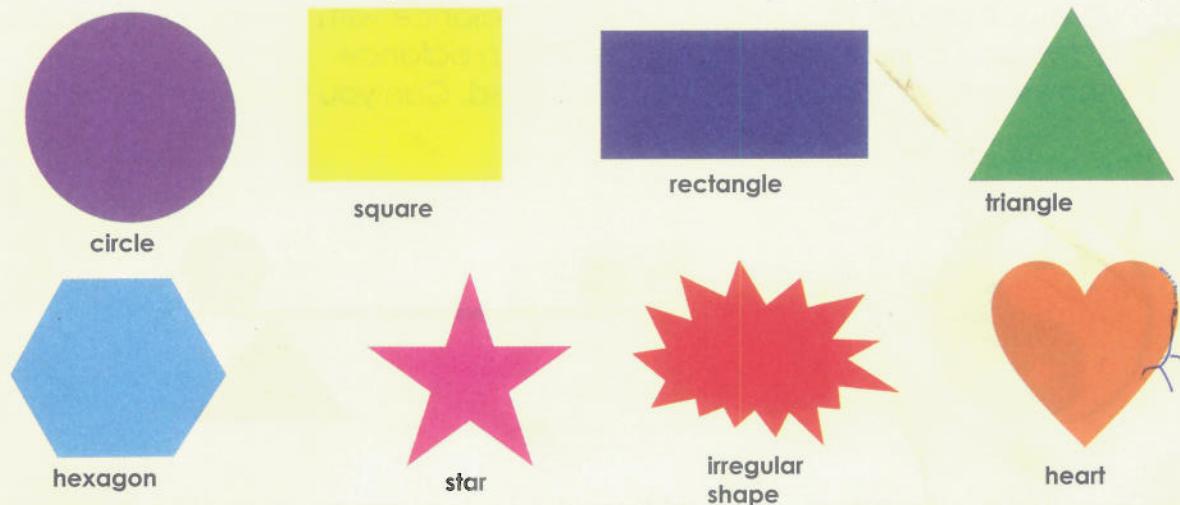


Figure 5.4 There are different kinds of shapes used in designs

Texture

We have to make sure that we choose the **texture** we want to use in our designs. Different objects have different textures. The **texture** of something is what it feels like when you touch it with the tips of your fingers.

The texture of an object can be smooth (like a glass window) or rough (like sandpaper). It can be soft (like a feather) or hard (like a stone).

Look at the objects in Figure 5.5. Which objects have a smooth texture and which have a rough texture?

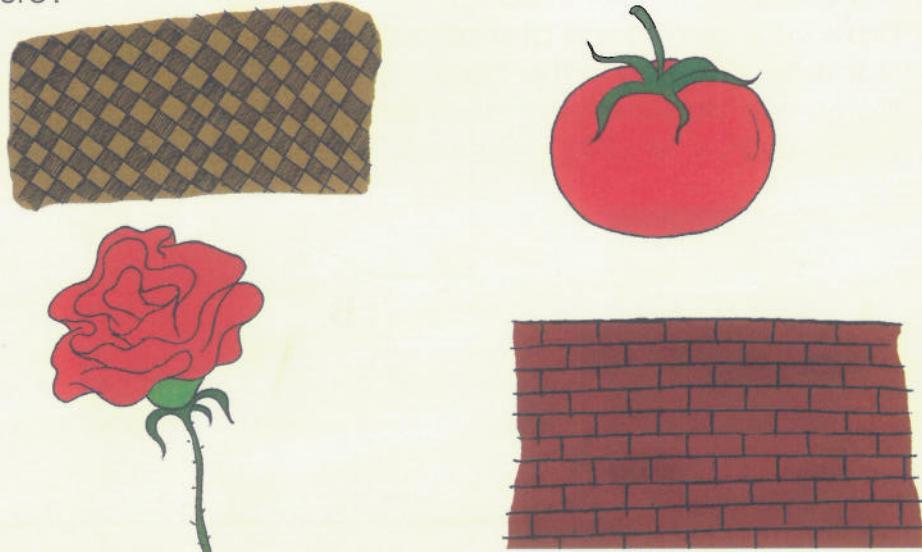


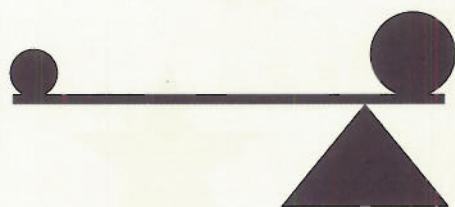
Figure 5.5 Do these things have a smooth or a rough texture?

Balance

We have to make sure that our design is balanced. When the parts of a design is pleasant, it is a balanced design. It should not look like there are a lot more things on one side of the design than on another side.

The left side of the design should look like it is in balance with the right side of the design. The top and bottom sides should also be in balance.

Figure 5.6 shows ways of making a design balanced. Can you see how they work?



a) Use a mix of light and dark colours

b) Place larger objects near the centre of the design and smaller object further away from the centre.

Figure 5.6 Ways to balance a design

Activity 1

1. Draw a smooth line and a jagged line. Which looks nicer?
2. Draw a square. Did you have to use a curved or a straight line?
3. Draw a heart shape. Did you have to use a curved or a straight line?
4. Colour in your square with a blue crayon or paint.
5. Colour in your heart with a green crayon or paint.
6. Did colouring in your shapes make them look more or less attractive?
7. Draw your own shape and colour it in with any colour that you want.
8. Name two objects in the classroom that have a shiny texture.
9. Name two objects in the classroom that have a rough texture.
10. Which picture (A or B) in Figure 5.7 is balanced? Explain why.

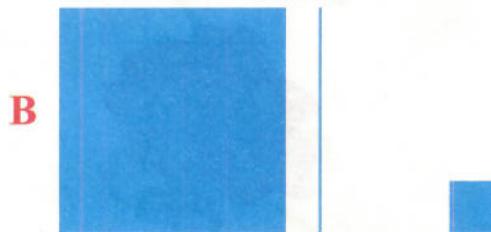


Figure 5.7 Which design is balanced?

Activity 2

1. Design a hat or a shoe.
2. Use a pencil to make a drawing of a hat or a shoe that you would like to make.
3. Colour your drawing in.
Add any decorations that you want on your hat or shoe to your drawing.

Models from materials such as papier-mache and clay

When we design something we make a drawing of it first, then we make a model of it so we can see what it will look like. A model is a smaller copy of something that is usually made of papier-mache or clay. Look at the picture in Figure 5.8 that shows a clay model of a car.



Figure 5.8 A clay model car

We can use papier-mache and clay to make models because it is easy to squeeze and press them into different shapes.

How to make papier-mache for making models

1. Collect old newspapers and tear them into very small pieces.
2. Put the torn pieces of newspaper into a bucket and pour water in so that it covers the pieces of newspaper.
3. Add glue and flour to the bucket and mix with the newspaper pieces and water.
4. Leave the mixture to settle overnight.
5. The next day you will find a thick paste, which you can use to make your model.

How to prepare clay for making models

1. Dig up some clay soil. You can easily get clay soil from an anthill.
2. Remove any stones from the soil. Break up and grind the lumps of soil to make sure that the clay soil is like powder.

3. Put the clay soil in a bucket and pour water in, a little at a time.
4. Mix the clay soil and the water until you form a thick paste that can be squeezed and pressed into different shapes (for example, a ball or a sausage).
5. The clay can now be used to make your model.

Activity 3

Make a model of the hat or shoe that you designed.

1. Make a model of the hat or shoe that you designed in the previous activity using either papier-mache or clay.
2. Let your model dry in the sun.

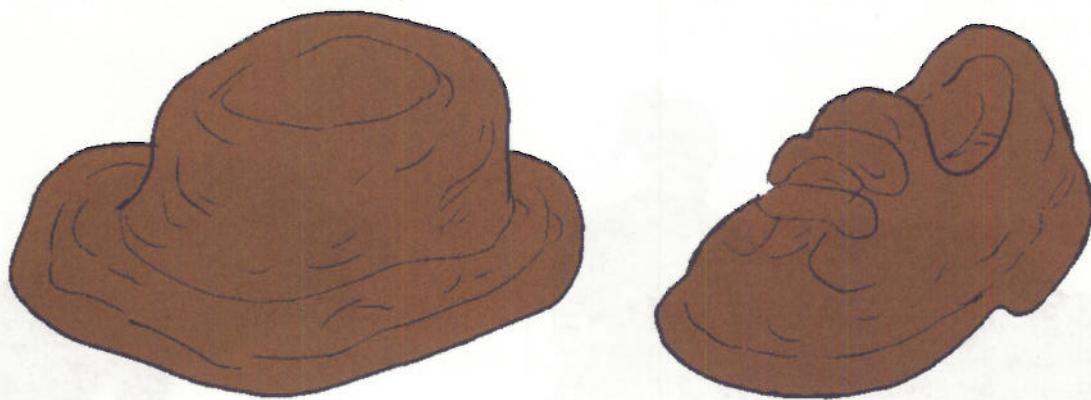


Figure 5.9 Clay models of a hat and a shoe

Decorations

When we have finished making a model of the object that we have designed we need to decorate it so that it looks more attractive. **Decoration** is the process of making something attractive.

We can use different materials to decorate models. Paint is used to add colour to the model. Beads, seeds, feathers, sand, stones, aluminium foil, shells and bottle tops are used to add colour as well as texture to the model.

Activity 4

Decorate your model hat or shoe from Activity 3.

Use whatever materials you can find to decorate your model. You could use things like paint, glue, beads, seeds, feathers, sand, stones, aluminium foil, shells or even bottle tops to decorate your model.

1. First paint your model hat or shoe the same colour as you used in your design from Activity 2.

2. Use glue to decorate your model with the items you brought to your lesson.



Figure 5.10 A decorated clay model of a hat and a shoe

Summary

- The elements of design are lines, colour, form, texture and balance.
- We can use papier mache and clay to design and model objects.
- Papier mache can be made by mixing newspaper cuttings, glue, flour and water.
- Clay can be made from clay soil.
- We can decorate papier mache or clay models using beads, seeds, feathers, sand, stones, aluminium foil, shells and bottle tops.
- Decorations make models more attractive.

Glossary

elements of design	- the things that we have to think about when we design something
texture	- what the surface of something feels like when you touch it with the tips of your fingers
form	- the shape of an object
model	- a smaller copy of something (a real object) which is usually made of papier mache or clay
papier-mache	- a mixture of newspaper cuttings, water, flour and glue that is used in making models
decorate	- to make something look attractive using different colours, beads, bottle tops etc.

End of topic assessment test

Multiple choice

Choose the correct answer

1. Important things that you should think about when designing models are _____.
A. elements of design B. pictures of design
C. drawings of design D. models of design
 2. Which of the following is an element of design?
A. colour B. air C. electricity D. food
 3. Which of the following is not an element of design?
A. line B. colour C. electricity D. shape
 4. Which of the following is not a colour?
A. red B. picture C. yellow D. green
 5. Lines are used to _____.
A. bring the texture of the model
B. make sketches of a model
C. balance the shape of a model
D. mix clay
 6. Texture is the _____ of materials.
A. longest and widest
B. roughness and smoothness
C. brightest and dimness
D. availability
 7. What is the texture of clay?
A. rough B. thick C. smooth D. thin
 8. _____ is a material that you can use to make models.
A. Sand B. Papier mache
C. Loam soil D. Gold
 9. Which of the following material is not used in the making of papier mache?
A. glue B. newspaper C. sand D. water
 10. Why do we decorate models?
A. to make them strong B. to make them big
C. to make them more attractive D. to make them cheap
- [10]

Structured questions

1. List five elements of design. [5]
2. List three materials you need in order to make papier mache [3]
3. Other than papier mache what else can you use to make models? [1]
4. Why do you decorate models? [1]

Topic 6

Water



Figure 6.1 We need water to live

Introduction

Water has unique properties. Water flows from a higher place to a lower place some water sinks into the soil. Water is found in different places. We need to make water safe for drinking. Water can be hazardous during flooding.

Unit 15 Properties of water

Objectives

You should be able to:

1. identify properties of water
2. predict where water will flow to in the local environment
3. demonstrate water flowing from a higher to a lower place
4. describe water infiltration
5. observe water infiltration
6. design a model of a water filter

Flashback

Think about how you have used water today. Water has many different uses. Make a list of all the ways we use water in our homes and in our schools.

Key words

properties solvent flow runoff infiltration



Properties of water

The **properties** of a substance are the things that describe it. They are the things that tell us what it looks like, what it smells like, what it tastes like and how it behaves.

Water has unique properties. These properties make it a special substance.

Some of the properties of pure, clean water are:

- it is colourless (it is clear with no colour)
- it is odourless (it does not smell like anything, only dirty water smells)
- it is tasteless (it does not taste of anything)
- it is a **solvent** (things like sugar and salt can dissolve in it)
- it can **flow** (it can move from one place to another)

Activity 1

Your teacher will give you a cup of clean water, some sugar and a teaspoon.

1. What colour is the water?
2. Smell the water. What does the water smell like?
3. Take a sip of the water. What does the water taste like?
4. Add a teaspoon of sugar to the water and stir the mixture with a spoon. What happens to the sugar?
5. Pour the water in the cup into a large container. How does the water move?
6. Write a list of the properties of water that you have seen.

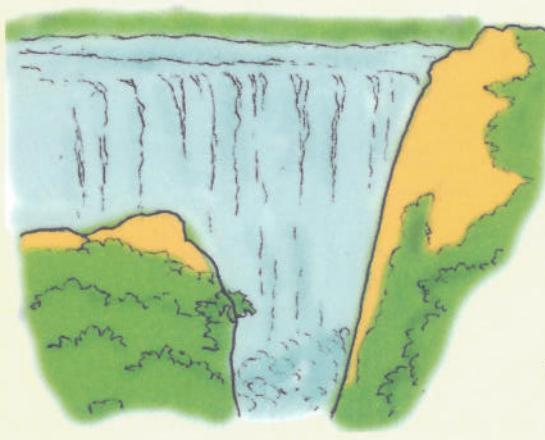


Figure 6.2 Properties of water

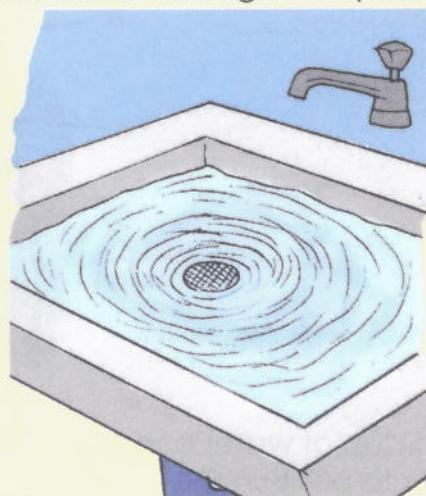
Water flows

You have learned that water flows from one place to another.

Look at the pictures in Figure 6.3. What direction is the water flowing in the pictures?



Victoria Falls



a plughole



a shower

Figure 6.3 What direction is the water flowing?

Activity 2

1. Go outside into the school grounds with your group. Each member of your group should have a cup of water.
2. Find different places on the school grounds where there is a hard surface on a slope.
3. Pour a cup of water onto the hard surface and watch what happens to the water.
4. In which direction does water flow on a hard surface? Does it flow from a high place to a low place or a low place to a high place?

When water is poured onto a hard surface, it moves from a high place to a low place.

Have you ever seen how water flows soon after it rains? Rainwater that falls onto the ground will flow from high places to low places. Water that flows over the ground after it rains is called **runoff**.

Activity 3

Predict where water will flow in each of the pictures in Figure 6.4

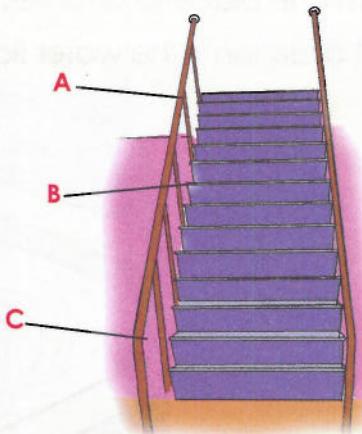


Figure 6.4

1. If a cup of water is spilt at position A on the steps, will the water flow to position B or to position C?
2. Water is flowing in one direction along this river. Is it flowing from position A to position B or from position A to position C?

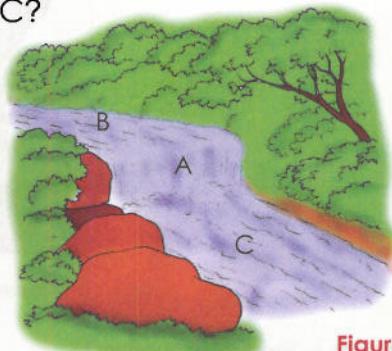


Figure 6.5

- From the activity we can see that in Figure 6.4a) water flows from position to position. Then in Figure 6.4b) water flows to position C showing that water flows from a higher place to a lower place.

Water infiltration

When rain falls on hard soil the rain water flows over the surface of the ground from a higher place to a lower place.

If the soil is loose the water sinks into the soil. The movement of water through the soil surface and into the soil is called **infiltration**.

Activity 4

- Fill up a transparent container such as a glass beaker or a jam jar with loose soil.
- Pour water slowly from a cup onto the surface of the loose soil.



Figure 6.6 Water sinks into loose soil

- Observe what happens to the water. Where does the water go?

Before we grow crops such as mealies or tomatoes it is important to dig or plough the soil to loosen it before planting seeds.

When the soil is loose, water can sink into it more easily. This makes more water pass into the soil by infiltration and less water flows away by runoff. This means that there is more water for the plants in the soil, so they will grow better.

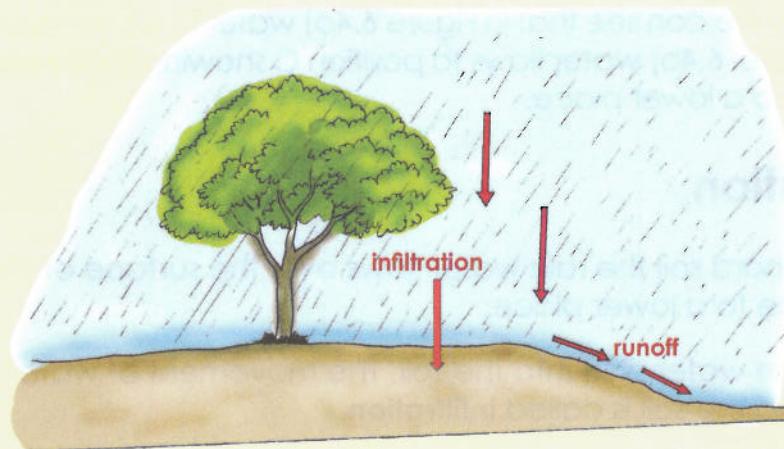


Figure 6.7 Water either sinks into the soil by infiltration or flows over its surface by runoff

Water filters

Water that we collect from rivers or dams is not pure water. This water may contain bits of soil, dead leaves and different types of germs.

If we want to drink this water it is important to purify it. We can use a water filter to make water clear.

Figure 6.7 shows a simple water filter that anyone can make if they have a plastic bottle, gravel, sand, charcoal and fabric such as a cheesecloth. When water is poured into the top of the water filter it travels through the layers of stones (gravel), sand, charcoal and then through the cheesecloth. The bits of soil, dead leaves and some of the germs are removed from the water as they pass through the different layers of the filter. Clear water comes out of the bottom of the filter.

Water that comes out of the bottom of the filter must then be boiled to get rid of the rest of the germs.

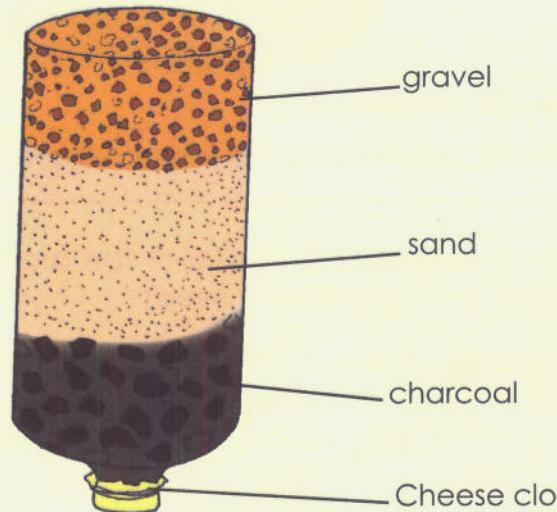


Figure 6.8 A simple water filter

Activity 5

Work in a group.

1. Collect whatever materials you can find that are similar to the water filter in Figure 6.8.
2. Design and build your own water filter.
3. Pour dirty water collected from a river or dam into your water filter. Does the dirty water come out?

Exercise A

1. The following are all properties of water except _____.
A. water is colourless
B. water has a sour taste
C. water does not have a smell
D. water flows
2. When water is poured on a high place, it will _____.
A. flow to a higher place
B. sink to a higher place
C. flow to a lower place
D. flow from clouds like rain
3. Water poured on loose soil that has been dug will _____.
A. stay on top of the soil
B. infiltrates into the soil
C. flow across the surface of the soil
D. flow to a higher place
4. Water is a _____ because things like sugar and salt can dissolve in it.
5. When water is poured on to the ground it moves from a _____ place to a _____ place.
6. The movement of water though the soil surface and into the soil is called _____.

Summary

- Water has many properties. It is colourless, odourless and tasteless. It is a solvent and it can flow.
- Water flows from a high place to a low place.
- Infiltration is when water sinks into the soil.

Unit 16 Sources of water

Objectives

You should be able to:

1. list natural sources of water
2. describe natural water sources
3. identify man-made water sources
4. compare man-made to natural sources of water
5. design models of man-made sources of water.

Flashback

Where does the water that you drink come from? Does all the water that you drink or use come from the same place or different places? Talk about where you get your water from with your partner.

Key words



spring
source

reservoir rainwater

Natural sources of water

Some of the water that we use come from natural sources.

A natural **source** of water is one that is not made by people. It is part of the natural environment and supplies plants and animals as well as people with water.

Natural sources of water are:

- natural lakes and ponds
- rivers and streams
- seas and oceans
- springs

Lakes and ponds are filled with fresh water.

There are no natural lakes in Zimbabwe but there are many very large natural lakes in Africa, for example, Lake Malawi.



Figure 6.9 Lake Malawi is visible from space

Rivers and streams have fresh water that flows from one place to another. Zimbabwe has many rivers and streams. Two well known rivers are the Zambezi and the Limpopo rivers.



Figure 6.10 The Zambezi river

Seas and oceans are filled with salt water. Salt water is not good to drink. Zimbabwe is a landlocked country which means that it is surrounded by other countries and so it is not next to an ocean.

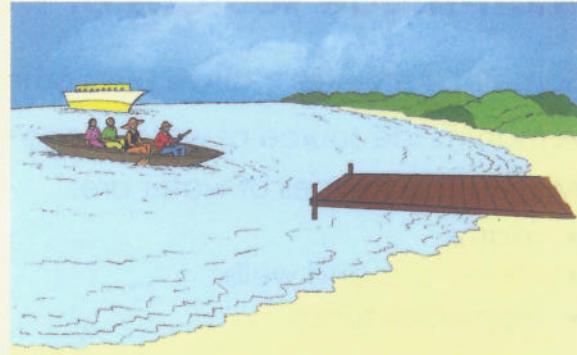


Figure 6.11 The Indian Ocean of Mozambique

Springs occur when water which has sunk into the ground rises up and comes out of the ground again. Water from springs is fresh water but it can be hot or cold. Water from hot springs also contains minerals. Many people believe the water from hot springs has the power to cure certain diseases. In Zimbabwe we have hot springs in Binga and Nyanyadzi.

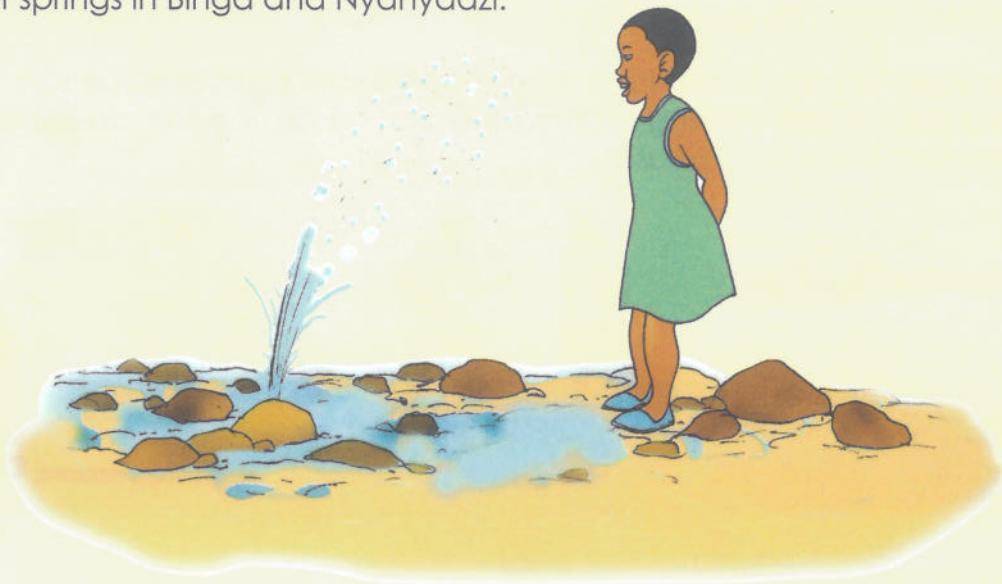


Figure 6.12 Binga Hot springs

Activity 6

1. Name the different types of natural water sources.
2. Explain the difference between a lake and a river to your partner.
3. Explain the difference between the water in a lake and the water in the sea to your partner.
4. Draw a picture of a hot spring showing the water coming out of the ground.
5. Find any pictures of natural water sources in magazines or newspapers. Bring your pictures to class and stick them onto a large poster on the classroom wall. Label each picture correctly.

Man-made sources of water

Some of the water that we use comes from man-made sources.

A man-made source of water is one that is made by people.

Man-made sources of water are:

- dams
- boreholes and wells
- rainwater tanks

A dam is a man-made barrier that holds water in a large **reservoir** behind the barrier. Kariba dam was built on the Zambezi river in Zimbabwe.

Boreholes and wells are man-made structures that allow us to get to underground water. A hole is dug or drilled into the ground to get to the water and an electric pump is usually used to bring the water up to the surface.

Rainwater tanks can be used to collect water that falls onto the roofs of buildings. The rainwater flows into gutters which carry the water to the rainwater tank.

Pipes are used to carry water from man-made water sources to people's houses or communities. A tap coming off the pipe can be opened or closed to control how much water we want to use.



Figure 6.13: Man-made sources of water

Activity 7

1. Draw a picture of a man-made source of water in your school or your community.
2. Tell your partner how it works.

Activity 8

Using papier-mache or clay or cardboard, make a model of any of the man-made sources of water you have learned about: a dam, a borehole or well or a rainwater tank.

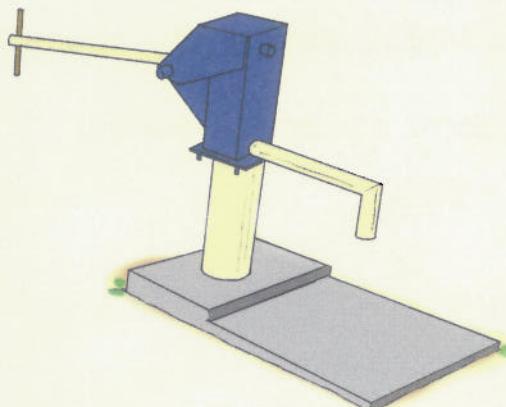


Figure 6.14 A model of a borehole pump

Compare natural sources of water and man-made sources of water

Look at the table below. It compares natural sources of water to man-made sources of water.

Natural sources	Man made sources
Not made by people	Made by people
Some have fresh water such as lakes, rivers, streams and springs	All have fresh water

Exercise B

1. A _____ is a man-made source of water.
A. dam B. river C. spring D. ocean

2. A _____ is a natural source of water.
A. dam B. borehole C. well D. spring
3. Which of the following is the largest source of water?
A. dam B. lake C. well D. ocean
4. A source of water that is not built by people is called a _____ source of water.
5. A source of water that is built by people is called a _____ source of water.
6. At your home do you get your water from a natural or a man-made source?

Summary

- Natural sources of water are not made by people.
- Man-made sources of water are made by people.
- Examples of natural sources of water are natural lakes, ponds, rivers, streams, seas, oceans and springs.
- Examples of man-made sources of water are dams, boreholes, wells and rainwater tanks.

Unit 17 Water and the environment

Objectives

You should be able to:

1. identify water hazards caused by floods
2. discuss effects of floods
3. discuss safety precautions
4. demonstrate safety precautions.

Flashback

Think about what it's like when it rains. Is all rain the same?

Key words

flood drown pollution

Floods

Rain is something we look forward to. We need rain to water our crops and provide our animals with water to drink. Rain fills our dams and rivers and provides us with the water that we need.

However, sometimes we get too much rain. The rivers and dams overflow and the water covers the land. We call this flooding.

A **flood** is a large amount of water covering an area of land that is usually dry.



Figure 6.15 A flooded maize field

Accidents caused by floods

Floods are very dangerous. Look at the picture in Figure 6.15. What could happen to the animals and homes? What could happen to the people who were staying in the homes?

When you look at a river you can see that the water can sometimes flow very quickly. When water flows very quickly in a river, it is very powerful. Water in floods can also flow very quickly and can be strong enough to carry the bus and people away. Many vehicles are damaged and many people may **drown** in floods.

Floods can burst river banks and water flows into homes, schools, factories and clinics leading to a lot of hazards.

Flooding can lead to pollution. **Pollution** is the introduction of a toxic chemical into the environment. Water flows into factories where they keep chemicals for making things, the water will wash away the chemicals. This pollution can lead to diseases as people and animals are poisoned by polluted flood water.

Flooding can also lead to death through electric shock. If water flows into a building that has electricity we need to switch off the mains as this can lead to an electric shock.

Effects of floods

How could a flood affect the lives of people in your community?

Water from a flood has many effects on a community.

Floods may result in:

- damage to homes and other buildings
- destruction of crops
- the death of animals and people (by drowning).





Figure 6.16 The effect of floods

Activity 9

Work in a group.

Discuss all the possible effects of a flood on your community. Talk about

- the effects of a flood on your family
- the effects of a flood on your school.

Safety precautions

We can take safety precautions to reduce the dangerous effect of flooding.

Some of the safety precautions we can take are:

- To build our houses on high ground (avoid building houses in river valleys).
- Make sandbags by filling sacks with sand. These can be put in front of doors to prevent water from getting into our homes.
- Disconnect all electrical appliances. Electricity moving through water is very dangerous.
- Move to higher ground and wait for help.
- Do not move though flowing water. Just six inches of moving water can make you fall down and drown.
- If you have to walk though water, make sure that it is not moving. Use a long stick to feel the ground ahead of you to make sure that the water is not too deep and that the soil is not too soft to walk on.

Activity 10

1. Discuss the safety precautions that you should take if you had to leave your school due to a flood. Make a list of what you would need to do.
2. Practice how your class would leave your school following the instructions on your list.

Summary

- Too much rain can cause floods.
- People can drown in floods.
- Floods can destroy buildings, crops and animals.
- We can reduce the dangerous effect of flooding by taking safety precautions.

Glossary

dissolve	-	become part of a liquid so as to form a solution
drown	-	die through breathing in water
hazard	-	a risk of danger
gutter	-	a shallow container fixed beneath the edge of a roof for carrying rain water
overflow	-	flow over the available space

End of topic assessment test

Multiple choice

1. The following are properties of water except _____.
A. colourless B. sweet C. odourless D. flows
2. Sugar and salt can dissolve in water because water is _____.
A. a liquid B. colourless C. tasteless D. a solvent
3. Where does water flow in our local environment?
A. From lower places to higher places
B. From higher places to lower places
C. Upwards
D. Water does not flow
4. When rain falls on ploughed land it mostly _____.
A. flows B. grows C. floods D. sinks
5. Dirty water can be cleared by a _____.
A. borehole B. filter C. tap D. bottle
6. The following are natural sources of water except _____.
A. river B. sea C. dam D. ocean
7. Which from the following is a man-made source of water?
A. spring B. river C. borehole D. ocean

8. An _____ is a very large natural source of water.
A. dam B. borehole C. spring D. ocean
9. The following can be caused by floods except _____.
A. destruction of crops
B. destruction of buildings
C. building sandbags
D. drowning of animals
10. When I am on my way home and see that a river has flooded I _____.
A. use a stick to cross the river
B. go back to school and notify a teacher
C. swim across the river
D. help other people to cross the river

[10]

Structured questions

1. List any three properties of water. [3]
2. a) Give two examples of natural sources of water. [2]
b) Give two examples of man-made sources of water. [2]
3. Explain why floods are dangerous for animals. [1]
4. Give two safety precautions you can take if your home is flooded. [2]



Figure 7.1 Different kinds of weather

Introduction

Weather changes from one day to the next. It changes because of different weather elements. In this topic you will learn about the different elements that affect weather. You will also find out how weather can be hazardous.

Unit 18 Weather elements

Objective

You should be able to:

1. identify weather elements.

Flashback

Describe what the weather is like today. Is it the same as the weather you had yesterday or the weather you had last week?



Key words

temperature, thermometer, rain gauge, waterproof, icon, mime, weather

Weather elements

Weather is a description of the outside air in a certain place at a certain time.

There are 5 weather elements that affect the weather. These are:

- Temperature
- Sunshine
- Wind
- Rainfall
- Cloud cover

Temperature

Temperature is a measure of how hot or cold it is. The temperature that we see on the weather forecast is the temperature of the air around us. Temperature is measured in units called degrees Celsius ($^{\circ}\text{C}$) using an instrument called a **thermometer**.

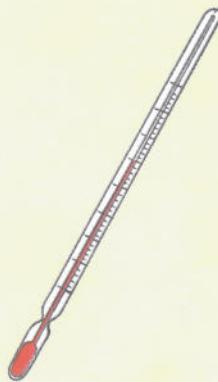


Figure 7.2 A thermometer that can measure air temperature

Air temperature around us affects how hot or cold we feel. When it is hot, we dress and behave differently to when it is cold.

Sunshine

During the day the sun shines. At night the sun sets and does not shine.

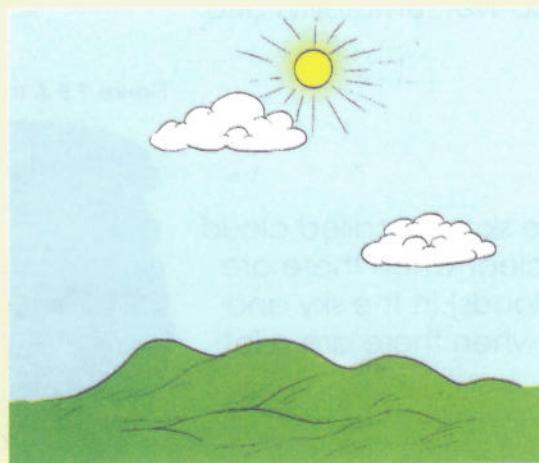


Figure 7.3 The sun shines very brightly. The sun gives off heat and light. The sun warms the environment.

When there are no clouds in the sky and we can see the sun, we feel warm. The sunlight is bright and can hurt our eyes. We should not look directly into the sun. When the sun is hidden by clouds we feel colder and the sunlight is less bright.

Wind

Wind is the movement of air. When there is wind we say that the weather is windy. Where there is no wind, we say that the weather is calm or that the air is still.



Figure 7.4 A very windy day

Rainfall

Rain is the water that falls from clouds in the form of rain drops. We can measure the amount of rain that falls using an instrument called a **rain gauge**.

When we go out on a rainy day, we need to wear **waterproof** clothing and shoes to prevent ourselves from getting too wet. Umbrellas also protect us from the rain.

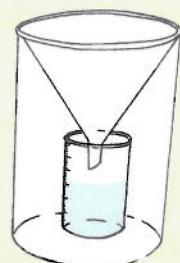


Figure 7.5 A rain gauge filling up with water

Cloud cover

The clouds that are in the sky are called cloud cover. We say the sky is clear when there are no clouds (or very few clouds) in the sky and we say the sky is cloudy when there are a lot of clouds in the sky.



Figure 7.6 The sky is cloudy

Activity 1

The picture below shows some **icons or symbols** that represent different kinds of weather elements. Choose the letter of the icon that you think matches each of the following types of weather.

1. _____ represents a hot day.
2. _____ represents a sunny day.
3. _____ represents a rainy day.
4. _____ represents a cloudy day.
5. _____ represents a windy day.

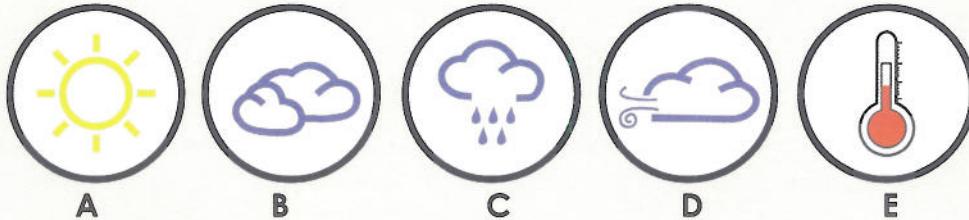


Figure 7.7 Symbols representing different weather elements

Activity 2

In your group use **mime** to act how you would behave when there is a particular weather condition. Mime is acting without speaking. The rest of the class must guess which kind of weather condition you are trying to show.

Choose one of the following weather conditions: cold day, hot day, sunny day, cloudy day, rainy day, windy day.

Exercise A

1. The following are elements of weather except ____.
A. temperature B. cloudy C. rainfall D. sunshine
2. When there are lot of clouds, we say, "it is ____."
A. cold B. clear C. cloudy D. bright
3. When there is no wind, we say, "it is ____."
A. windy B. calm C. clear D. cloudy
4. Which element shows how hot or cold it is outside?
A. wind B. sunshine C. temperature D. cloud cover
5. Instrument used to measure rainfall is ____.
A. thermometer B. windvane C. rain gauge D. cup

Summary

- There are five weather elements: temperature, sunshine, wind, rainfall and cloud cover.
- We can use symbols to show the weather conditions for a particular day.

Unit 19 Weather and climate hazards

Objectives

You should be able to:

1. discuss weather and climate hazards
2. discuss effects of weather and climate hazards.

Flashback

You learned about floods in Topic 6: Water. Flooding is an example of extreme weather conditions. Flooding is when there is a heavy rainfall in a short period of time. When there is no rain at all that is an extreme weather condition. What is it called when there is no rain at all in the rainy season?

Key words

climate weather hazard
drought lightning cyclone
heatwave

Weather and climate hazards

Weather hazard is an extreme weather event that threatens people or property. **Climate** is a pattern of weather for a long period of time.

Climatic hazards are caused by one or a combination of:

- floods
- fires
- cyclone
- heatwave
- droughts

Floods

A flood is a large amount of water covering an area of land that is usually dry. Flooding occurs when there is heavy rainfall in a short period of time.

Fires

Fires can occur when the weather has been very hot and dry. Plants or buildings made of wood or thatch easily catch fire and burn quickly. Fires destroy buildings and kill plants (animal grazing) and animals and people.

A fire may often be caused by lightning.

Lightning occurs during thunderstorms and if it hits a building or a tree it may start a fire.

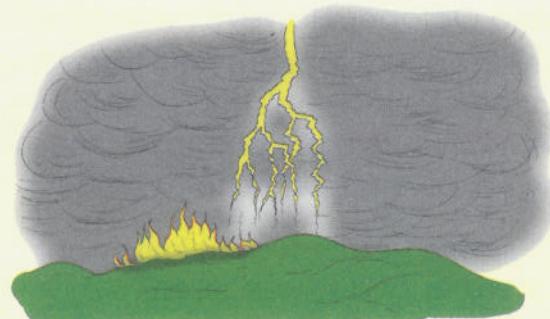


Figure 7.8 Lightning causing a fire

Cyclone

A **cyclone** is a large, powerful storm with very strong winds. A storm is a sudden appearance of bad weather often with strong winds, heavy rain or ice.

The wind in a cyclone rotates or goes round and round in circles. Cyclones can be very hazardous and the strong winds of a cyclone can destroy buildings and crops and kill people and animals.



Figure 7.9 Cyclones can be dangerous (a) The shape of a cyclone (b) Mankonkoni Bridge on the Thuli River destroyed by Cyclone Eline in 2000

Heatwave

Sometimes the air temperature is high. In Zimbabwe this often happens in September and October. However, when the air temperature remains very high for more than a few days we call this a heatwave. A **heatwave** is the period of time in which we experience very hot weather.

During a heatwave it is important to drink lots of water and to keep cool.



Figure 7.10 Experiencing a heatwave

Drought

A **drought** is caused by a long period of time with little or no rain. Plants need rain to grow. We need rain to fill dams. Without rain plants will die. Without plants and water people and animals will die of hunger and thirst.



Figure 7.10 A drought destroys crops

Activity 3

In your group talk about how each of the climate hazards could affect your family and your community.

Summary

- Unusual changes in weather may cause floods, fires, cyclones, heatwaves and droughts.

Glossary

weather	- conditions found in the air around us
waterproof	- something that repels water
icon/symbol	- a simple picture of something
lightning	- flashes of light in the sky that are produced during a storm
instrument	- a tool or gadget
mime	- acting without speaking
cyclone	- a large powerful storm with very strong winds
heatwave	- the period of time in which we experience very hot weather

End of topic assessment test

Multiple choice

- When there are many clouds in the sky we say it is _____
A. rainy B. cloudy C. clear D. hot
- We measure temperature with a _____
A. thermometer B. icon C. ruler D. rain gauge
- Which of the following is not a weather element?
A. fire B. wind C. cloud D. temperature

4. Which of the following is the hazardous part of a cyclone?
A. fire B. wind C. cloud D. rain
5. If rains do not fall in an area during summer, we say there is a _____.
A. cyclone B. thunderstorm C. heatwave D. drought
6. When it is raining we prevent ourselves from getting wet by using a _____.
A. scarf B. gloves C. raincoat D. sunhat
7. Floods are caused by heavy _____ in a short period of time.
A. wind B. rain C. heat D. cold
8. Fires may be caused by _____.
A. rain B. wind C. clouds D. lightning
9. When there is drought all of the following happen except _____.
A. plants dry up and die
B. animals die from hunger and thirst
C. bridges are washed away
D. people die of hunger and thirst
10. What weather element causes a flood?
A. rain B. wind C. cloud D. temperature

Structured questions

1. Name the five weather elements. [5]
2. What is temperature? [1]
3. Name the climate hazard that causes;
a) plants to dry up and die
b) plants and buildings to burn
c) people to get very hot
d) buildings to be destroyed by winds [4]

Topic 8

Landfoms and maps



Figure 8.1 Landforms in Africa (a) Matobo Hills in Zimbabwe (b) A volcano in the Democratic Republic of Congo

Introduction

When we take a walk in the natural environment we can see many different things. Mountains, valleys, rivers and hills. These make the environment interesting to look at and affect our lives in many different ways.

Unit 20 Types of landforms

Objectives

You should be able to:

1. identify landforms
2. design models of landforms.

Flashback

Think about the route that you took coming to school today. Are there any interesting natural things that you passed, for example, a river or a hill or a waterfall?

Key words

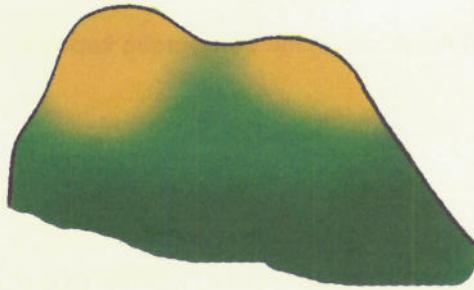
landform lava diorama

A landform is a surface feature of the earth. A **landform** is a natural formation on the earth's surface. This means that it is not man-made. Each kind of landform has a particular shape that helps us to recognize it.

There are different types of landforms. Table 8.1 shows the different types of landforms.

Mountain

A mountain is a very tall landmass. It is much higher than a hill. Mountains are usually very steep and rocky.



Volcano

A volcano is a mountain or hill with a cone shape which has an opening or crater at the top. Hot gases, ash and **lava** pass out of the opening or crater volcano when it erupts.



Hill

A hill is a rounded raised area of land. It is not as high as a mountain.



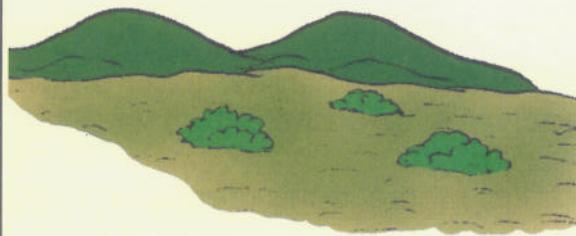
Valley

A valley is a low area of land between hills or mountains.



Plain

A plain is an area of land that is flat. Plains are usually covered with grass.



River

A river is a large, natural body of water that flows towards a lake, ocean or another river.



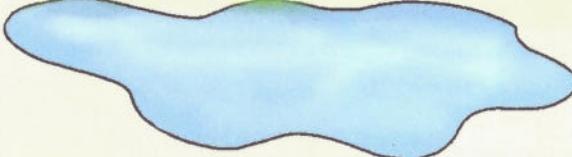
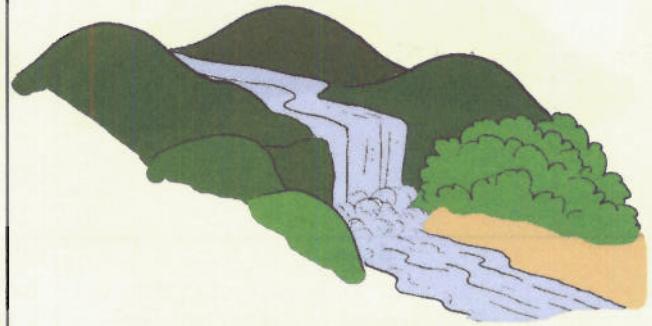
Lake	Waterfall
A lake is a large, natural body of water surrounded by land on all sides. 	A waterfall consists of moving water that falls off the steep slope of a mountain or the edge of a cliff and drops downwards. 

Figure 8.2 Different types of landforms

Activity 1

1. Make a list of all the different landforms that are shown in the table on the previous page and place a tick next to each type of landform that you have actually seen.
2. How many types of landforms from your list are there in the area where you live?
3. Draw a picture to show one type of landform in the area where you live.
4. Look at the picture in Figure 8.3. Provide a name for each of the landforms Labelled A – F that are shown in the picture.

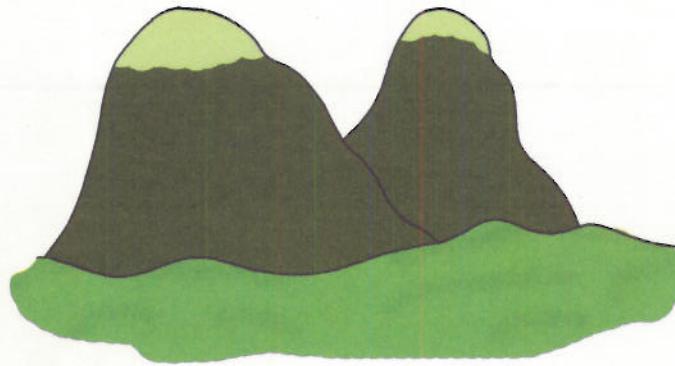


Figure 8.3 Landforms

Activity 2

Work in a group.

1. Make models of the different types of landforms that you have learned about. Use clay, papier mache, plasticine or cardboard.
2. Put your models together to form a **diorama** on a paper plate, a piece of cardboard or in a shallow cardboard box. A diorama is a three dimensional model showing miniature objects placed in a realistic setting.
3. Paint your model so the setting looks realistic and label each type of landform with its name written on a piece of paper or card like the models in the picture.

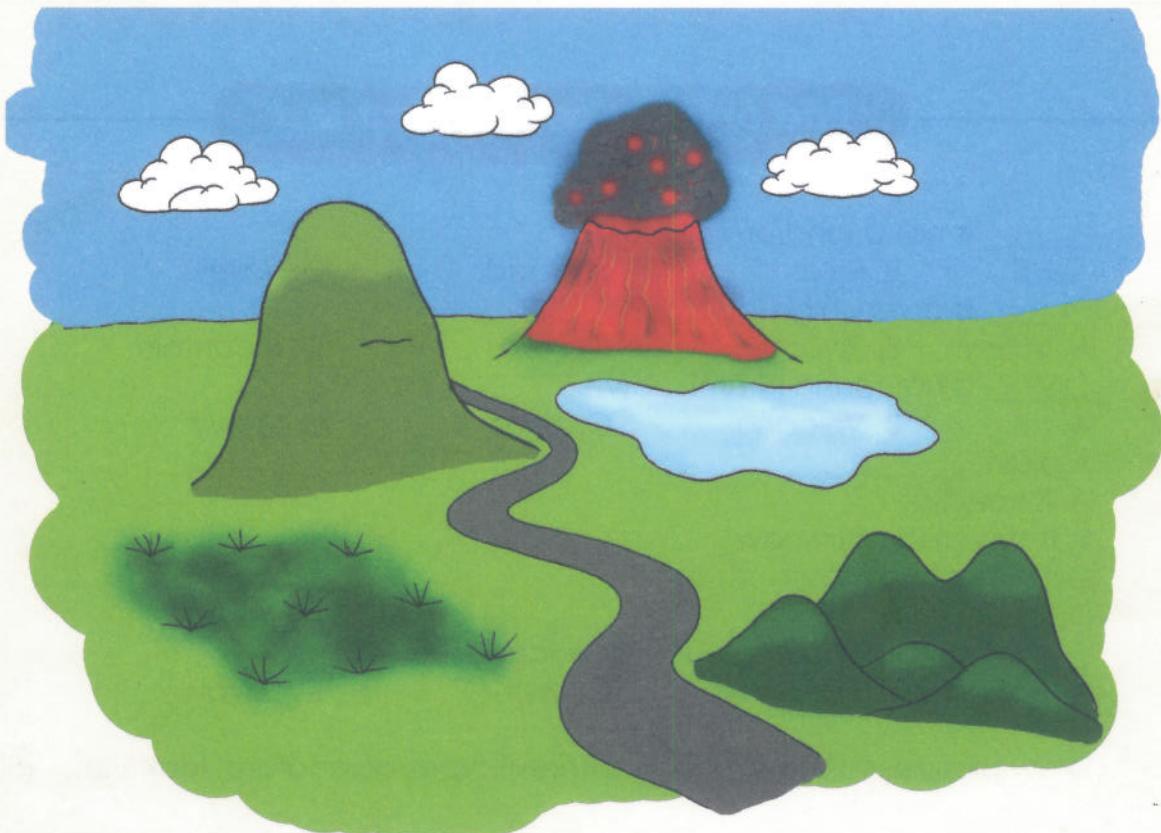


Figure 8.4 A diorama made of models of different types of landforms

Summary

- There are many different types of landforms. Some examples of landforms are mountains, volcanos, hills, valleys, plains, lakes, waterfalls and rivers.

Glossary

landform - a natural formation on the Earth's surface that has a particular shape that helps us to recognize it

lava - the hot, semi liquid rock that passes out of a volcano when it erupts

diorama - a three dimensional model showing miniature objects placed in a realistic setting

End of topic assessment test

1. _____ is not a landform.
A. Hill B. River C. Road D. Valley
2. _____ is a very high landform
A. Valley B. River C. Lake D. Mountain
3. _____ is not found in Zimbabwe
A. Hill B. Volcano C. River D. Valley
4. A plain _____.
A. is very flat
B. is covered with snow
C. is filled with water
D. is very high
5. _____ does not come out of a volcano
A. Hot gases B. Snow C. Ash D. Lava [5]
6. Draw pictures to show what 5 different types of landform look like. [5]

Unit 21 End of term 2 assessment test

Paper 1

Answer all questions

Choose the correct answer.

1. Why should you never eat anything when you are in a laboratory?
A. you could burn down the building
B. there is nowhere to sit
C. you could get poisoned
D. food is expensive
2. It is unhygienic for many people to wash their hands with the same water because _____.
A. water is difficult to find
B. this will cause diseases to spread
C. water may cause floods
D. water is unsuitable for washing hands.
3. Which of the following is a pure substance?
A. sugar and water solution
B. salt and water solution
C. paraffin
D. tea
4. Which of the following is an impure substance?
A. distilled water B. petrol C. gold D. muddy water
5. Foods such as bread and sadza give us lots of _____.
A. energy B. water C. muscles D. speed
6. Which of the following fuels is a solid?
A. charcoal B. paraffin C. diesel D. petrol
7. The following are examples of devices that need electricity for them to work except a _____.
A. radio B. television C. refrigerator D. plough
8. The electronic device that will produce heat when electricity is switched on is called a _____.
A. switch B. remote control C. refrigerator D. stove
9. Which of the following is an electronic device that is used at home to keep food and water cold?
A. refrigerator B. computer C. stove D. decoder
10. When there is a difference in height, water will flow _____.
A. upwards
B. downwards
C. along a level pathway
D. from the soil into the air

11. The following materials are used to making of papier mache except _____.
 A. newspaper
 B. glue
 C. mud
 D. water
12. When designing models you should consider _____ of design in order to make the model look attractive.
 A. weather B. elements C. signs D. parts
13. The following are elements of design except _____.
 A. colour B. texture C. shape D. temperature
14. Why do we decorate models?
 A. to make them expensive
 B. to make them beautiful
 C. to make them strong
 D. to make them soft
15. Water _____ from a high place to a low place.
 A. sinks B. flows C. walks D. freezes
16. Water _____ when it is poured on loose soil.
 A. stops B. sinks C. freezes D. floods
17. Which of the following is a natural source of water?
 A. river B. borehole C. tap D. dam
18. Which of the following is a man-made source of water?
 A. river B. spring C. borehole D. ocean
19. The following are all properties of water except _____.
 A. water tastes sweet
 B. water is colourless
 C. water does not have a smell
 D. water flows
20. Which of the following is not a weather element?
 A. fire B. cloud cover C. wind D. temperature
21. If rains do not fall in an area during summer, we say there is a _____.
 A. cyclone B. cloudy sky C. thermometer D. drought
22. Man-made structures are structures that _____.
 A. are built by people
 B. are destroyed by people
 C. are part of the natural environment
 D. are models of landforms
23. The diagram shows a _____.
 A. river B. volcano C. mountain D. hill
24. A _____ is not a landform.
 A. hill B. building C. river D. valley



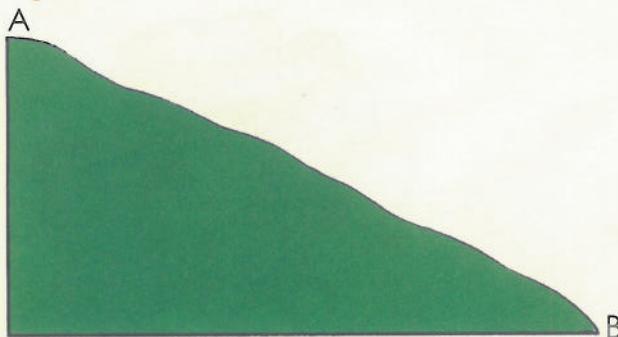
25. Which of the following is a landform?

- A. a road B. a table C. a train

- D. a plain

[25]

Paper 2



1. Look at the diagram that represents a piece of land sloping downwards from A to B.
 - a) Is A or B higher?
 - b) If you pour water onto the land at point A where will the water go?
 - c) If you pour water onto loose soil that has been ploughed, what will happen to the water?
 - d) List two bad things that can happen during floods. [5]
2. a) Name two examples of natural landforms.
b) Name three weather elements. [5]
3. Say whether the following statements are true or false.
 - a) A television does not need electricity for it to work. True /False
 - b) A refrigerator needs electricity for it to work. True /False
 - c) A cellphone needs batteries for it to work. True/False
 - d) A switch is not necessary for electricity to be used at home. True/False
 - e) Most of the electricity used in Zimbabwe comes from Kariba and Hwange Power stations. True/False [5]
4. Choose the correct words to fill in the spaces.
(heavy, garden, work, man-made, kitchen)
 - a) Tools can help us to make _____ easier.
 - b) A wheel barrow can be used to carry very _____ objects.
 - c) Garden tools are tools that are used when working in the _____.
 - d) A spoon is an example of a _____ tool.
 - e) Materials made by people can be called _____ materials. [5]
5. a) Name three important elements of design that you should think of when making models.
b) Name two things that can be used to decorate models. [5]



Figure 9.1 People and animals need soil and plants to survive

Introduction

Living things depend on each other and their environment. Plants need soil to grow and they need animals to pollinate their flowers. Many animals feed on plants.

Unit 22 Soil

Objectives

You should be able to:

1. describe soil formation
2. identify soil types found in the local environment
3. distinguish soil types
4. explain soil properties
5. demonstrate how to make a clay body
6. create models made of clay.

Flashback

Soil is used for many different uses. Why is soil important to plants and animals?

Key words

particle decay weathering
property texture aeration
drainage clay sand loam clay
body

Soil formation

Soil is made up of stones as well as smaller soil particles called sand and clay. Soil is also made up of bits of dead plants such as leaves and dead animals. Dead plants and animals decay and break up into small pieces/bits. This substance is called humus. Small animals such as earthworms and ants burrow in the soil. They create pockets of air as they do so.

Activity 1

Work in a group.

1. Place some soil into a transparent plastic or glass jam jar. Add some water and stir the soil and water mixture with a stick.
2. Let the mixture stand for a while and let the water settle. Look/observe at the different parts of the soil that separate into layers from the bottom up of the container.

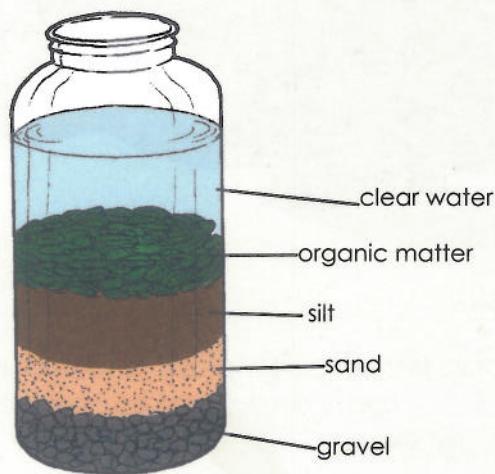


Figure 9.2 Soil is made of different parts

Gravel –small stones

Sand – soil with large particles

Silt –sedimentary mix of sand and clay soil

organic debris –materials such as dead plant and animal matter

Place some soil onto a piece of paper. Observe the soil through a magnifying lens. A magnifying lens makes something look much larger.

Describe what can you see?

The muddy water settles into layers. Describe these layers.

Write down the things from the list that you can see in the soil:

- small stones
- small soil particles like clay and sand (a particle is a very small part)
- bits of dead plants and dead animals
- small animals

How soil is formed

Soil comes from rocks. Did you know that soil comes from rocks?

Rocks break down to form stones and the particles of sand and clay that make up soil. Rocks are broken down in the process called **weathering**. Weathering is the breaking down of rocks into smaller pieces.

Soil forms continuously in nature. It takes a very long time for soil to form. Therefore soil should be considered as a non-renewable resource.

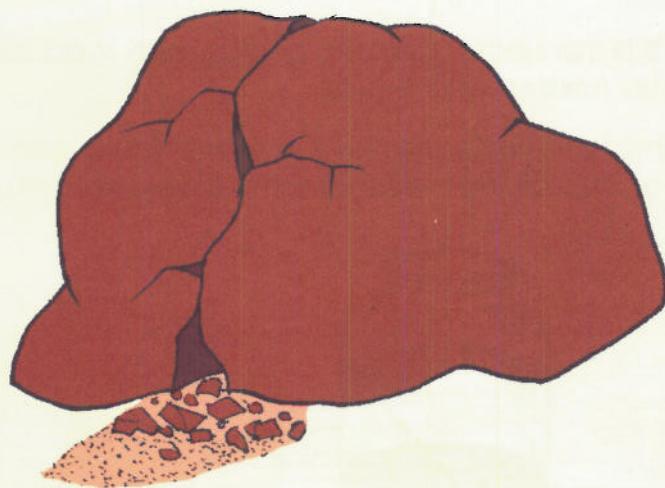


Figure 9.3 Rocks break down

The weathering of rocks is caused by plant and animal life, changes in temperature and moving water. Plant roots and animals can get into the cracks in rocks and cause the cracks to get bigger.

Changes in temperature can cause rocks to break up. When it gets very cold at night after a hot day, cracks may appear in rock or they may get larger.

Water that runs over the surface of a rock may wear away the surface of the rock.



Figure 9.4 Plant roots are breaking up the rock

Activity 2

In this activity you are going to demonstrate the breaking down of rocks to form soil particles.

1. Rub two rocks together over a piece of paper.
2. Observe what forms on the paper.
3. Observe/describe what happens when you rub the two rocks together? You are wearing away the surface of the rocks and getting small particles that will become part of soil.
4. Soil consists of different parts. What would you have to add to the rock particles to form soil?

Types of soil

There are three main types of soil: **clay soil**, **sandy soil** and **loam soil**.

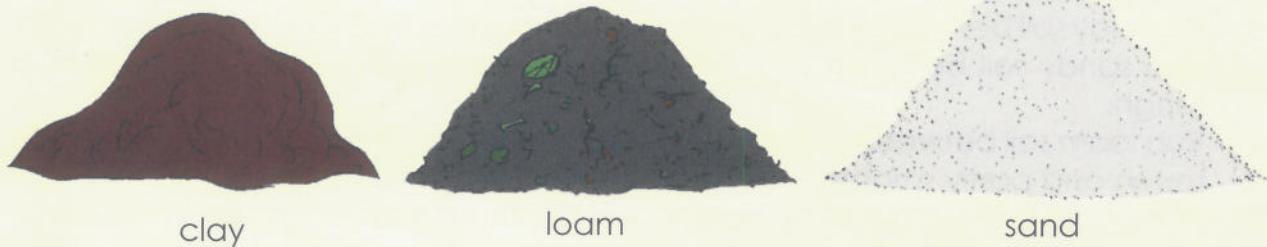


Figure 9.5 Different kinds of soil [add captions under each pile of soil in the order given] a) clay soil b) loam soil c) sand

Explain that soil is a mixture of different types of soil grains/particles in different proportions. There are three main soil types: sand, clay and loam.

- Clay soil is mainly made up of clay particles which are very small and fine. The soil forming anthills are made up of clay soil.
- Sandy soil is mainly made up of sand particles which are a little larger than clay particles. The soil at the bottom or dry river beds is usually sandy soil.
- Loam soil is a mixture of clay and sand particles as well as decaying plants and animal matter

Soil properties/Properties of soil

A **property** is what a substance looks like, what it feels like and how it behaves.

Activity 3

Work in a group

1. You will investigate four different properties of the three kinds of soil:
the colour.
 - the **texture** (what it feels like).
 - if it contains air (this is called **aeration**).
 - if it allows water to pass through it (this is called **drainage**).
 - if it contains dead decaying plant and animal material (humus).

Collect different types of soil. Your teacher will help you label them as clay soil, sandy soil and loam soil.

1. Write your observations in a table.
2. What colour is the clay soil?
3. What colour is the sandy soil?
4. What colour is the loam soil?
5. Rub clay soil between your fingers. What does it feel like? Clay soil feels smooth.
6. Rub sandy soil between your fingers. What does it feel like? Sandy soil feels rough.
7. Rub loam soil between your fingers. What does it feel like? Loam soil feels partly rough and partly smooth.
8. Put any kind of soil in a three transparent plastic or glass jam jar and add water to the soil. Stir the soil and water mixture with a stick. Observe what happens. Can you see any bubbles coming out of the soil? The bubbles show that there is air in the soil.
9. Cut three plastic bottles in half and place the top half upside down into the lower half as shown in Figure 9.6. Place a paper towel in the top half and fill it

with clay soil. Pour water onto the soil and measure how long the water takes to travel through the soil and into the bottom half of the bottle.

9. Repeat this experiment using sandy soil and then loam soil.
10. Which soil lets the water through the quickest? You should have found that sandy soil lets water through the quickest then loam soil and then clay soil. Sandy soil therefore has the best drainage.



Figure 9.6 Water drains through soil

Record your observations in a table like this:

Property	Clay	Loam	Sand
Colour			
Texture			
Aeration			
Drainage			

Clay soil has small fine particles. It is often rich in colour that is dark colours such as black, reddish brown. Clay soil allows little air in it and it also allows little water to pass through it.

Sandy soil has large rough particles. It is light in colour, that is, beige and sometimes even white. Sand allows a lot of air in it and water also passes through sand easily.

Loam soil is a mixture of small and large soil particles. It has both smooth and a rough texture. Loam soil allows both air and water to pass through it. It has good drainage.

Exercise A

1. Name the three types of soil.
2. Explain how sandy soil is different to clay soil?
3. Describe the properties of loam soil.
4. How can we determine if soil contains air?
5. Which type of soil has the best drainage?

Pottery

We can use clay soil to make a **clay body**. A clay body is the clay mixture that is prepared and used to make a clay model.

In Topic 5 Design and technology you learned how to prepare clay soil for making a clay body that you used to make a clay model.

Activity 4

1. Collect some clay soil from an anthill and make a clay body using the instructions on page 87.
2. Make a clay model of a fruit (for example a banana or an apple) and a clay model of a small animal (for example an earthworm or a snail).

Exercise B

1. The type of soil which is made up of very small and fine soil particles is called _____.
A. clay soil B. sandy soil C. loam soil D. rocks
2. A mixture of sandy soil and clay soil will produce _____.
A. sandy soil B. loam soil C. clay soil D. mud
3. _____ is a property of soil that tells us that it might contain air/how much air it contains
A. Colour B. Texture C. Aeration D. Drainage
4. The soil with the biggest soil particles is called _____.
A. The soil with the smallest soil particles and can be used to make pottery models is called _____.
B. The soil which is made of clay and sand particles as well as bits of decaying dead plants and animals is called _____.
C. The soil with the smallest soil particles and can be used to make pottery models is called _____.
D. The soil which is made of clay and sand particles as well as bits of decaying dead plants and animals is called _____.
5. The soil with the smallest soil particles and can be used to make pottery models is called _____.
A. The soil with the smallest soil particles and can be used to make pottery models is called _____.
B. The soil which is made of clay and sand particles as well as bits of decaying dead plants and animals is called _____.
C. The soil with the smallest soil particles and can be used to make pottery models is called _____.
D. The soil which is made of clay and sand particles as well as bits of decaying dead plants and animals is called _____.
6. The soil which is made of clay and sand particles as well as bits of decaying dead plants and animals is called _____.

Summary

- Soil consists of small stones, small soil particles like sand and clay, bits of decaying dead plants and small animals. It also contains air and water.
- Rocks are broken down to form soil particles. This process is called weathering.
- The three types of soil are clay soil, sandy soil and loam soil.
- Properties of soil are: colour, texture, it contains air (aeration), it allows water to pass through (drainage).
- Clay soil can be used to make clay bodies to create pottery models.

Unit 23 Plants

ENVIRONMENT

Objectives

You should be able to:

1. identify plant parts
2. relate plant parts to their function.

Flashback

What are the names of some of the plants that you know?

Key words

flowering plant anchor absorb
reproduce pollen

Parts of a plant

There are many different kinds of plants. **Flowering plants** are plants that have flowers. There are different kinds of flowering plants. All flowering plants have the same structure/consist of the same parts. Parts of a flowering plant are: roots, stems, leaves, flowers, fruits and seeds.

A tomato plant is a flowering plant. Look at the picture in Figure 9.7 that shows the different parts of a tomato plant. The roots grow downward into the soil. The stem grows upwards above the ground. The stem, support/hold the leaves and flowers. The flowers of the tomato plant reproduces and forms the fruit called tomatoes. Inside the fruit are the seeds. When we cut the tomato in half, we can see the seeds inside the fruit.

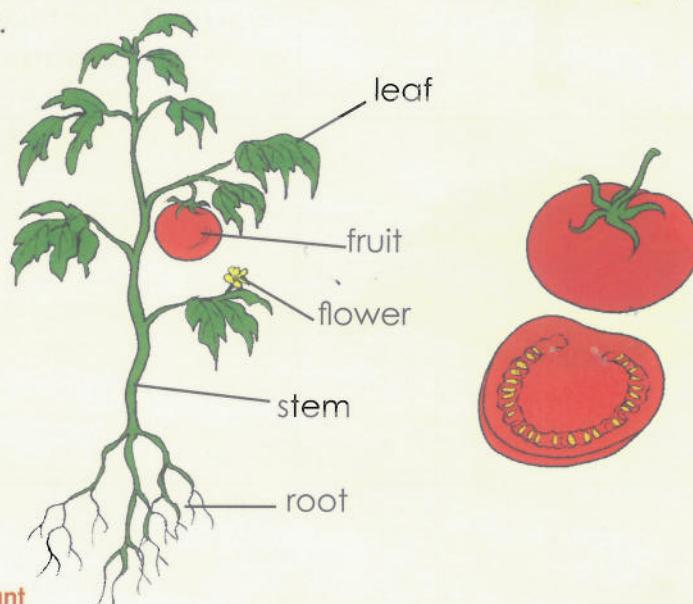


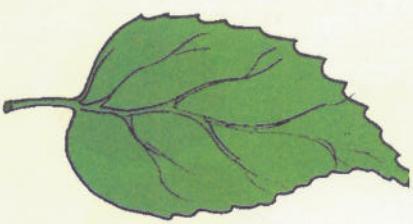
Figure 9.7 The parts of a plant

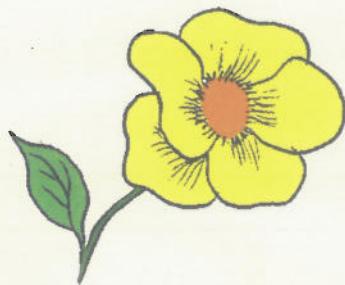
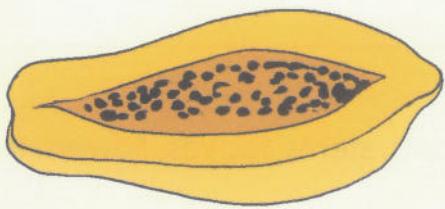
Activity 5

1. Find a small plant such as a weed in your school grounds or on your way to school. Pull up the plant gently, making sure that you have also pulled the roots out of the soil.
2. Wash the plant to get the soil off the roots then draw a picture of the plant.
3. Label all the parts of your plant that you can see. (Your plant may not have flowers or fruit.)

Functions of the parts of a plant

You have learned that flowering plants consist of roots, stems, leaves, flowers, fruit and seeds. Each part of a plant has its own use that helps the plant to grow and to produce fruit.

Roots		The roots of a plant anchor it in the ground. This means that they hold the plant in position and prevent it from falling over. Roots also absorb water and nutrients from the soil. This means that they take in water and nutrients.
Stems		The stem holds the leaves and the flowers above the ground. Leaves need to be above the ground up in the air to absorb sunlight. Flowers need to be above the ground for the plant to reproduce . To reproduce means to make fruits and seeds.
Leaves		The leaves make food for the plant. Leaves need sunlight to make food.

Flowers		The flowers are the parts of the plant used for reproduction . Flowers form the fruit and seeds. Many flowers are brightly coloured to attract insects such as bees. Some flowers, such as the flowers of grass plants are small and not brightly coloured.
Fruits and seeds		The fruit contains seeds. Seeds can grow into new plants (offspring).

Activity 6

Work with your partner.
Look at the picture of a sunflower plant.
Take it in turns to name each part of the plant labelled A – D and then explain what the function is of that part of the plant (what it is used for).

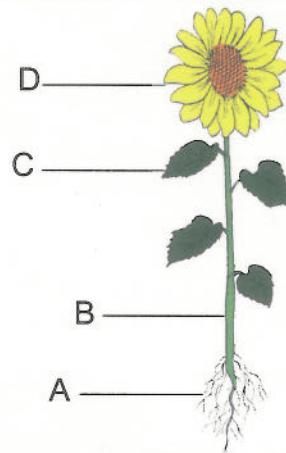


Figure 9.9 Different parts of a sunflower plant

Exercise C

leaf	root	seed	stem	flower	fruit
------	------	------	------	--------	-------

Choose the correct word from the word box to complete each of the following sentences.

1. The _____ supports leaves and flowers, holding them up above the ground.
2. The _____ makes food for the plant.

3. The _____ holds the plant in the soil and absorbs water and nutrients from the soil.
4. The _____ is used for reproduction and making seeds.
5. The _____ contains seeds.
6. The _____ grows into a new plant.

Activity 7

In pairs study a certain plant
Go outside and look at it
Give feedback on its plant parts and their function.

Summary

- The parts of a flowering plants are: roots, stems, leaves, flowers, fruits and seeds.
- Each part of a plant has a different function.
- Roots hold the plant in the soil and abosrbs water and nutrients.
- Stems hold the leaves and flowers above the ground.
- Leaves make food for the plant, when they have enough sunlight.
- Flowers reproduce to form fruits and seeds.

Unit 24 Animals

Objectives

You should be able to:

1. classify animals
2. outline characteristics of invertebrates
3. state examples of invertebrates
4. identify useful and harmful insects.

Flashback

What are the names of some of the animals that you know?

Key words

classifying invertebrates
vertebrate backbone
characteristics pollinate
polluted diarrhoea

There are many different kinds of animals. In order for us to organise all the different kinds of animals on earth, scientists have worked out a system that we use to sort/group them.

We can group animals that are similar to each other in appearance (how they look) together. This is called **classifying** animals.

The features of living things that make them similar or different to other living things are called **characteristics**. Animals are classified according to similar **characteristics**.

Animals form part of the Animal kingdom. Animals are classified into two big groups. The vertebrates and the invertebrates. Examples of **vertebrate** animals are cows, horses, cats and dogs. These animals have a backbone or spinal column and bones.

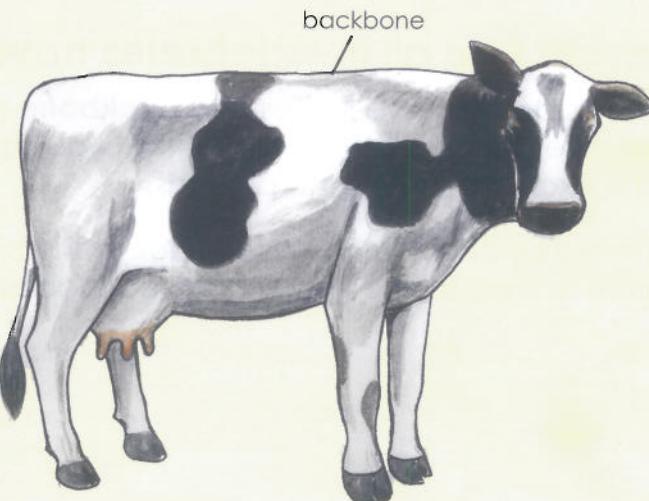


Figure 9.10 A cow has a backbone and spinal column.

Invertebrate animals do not have a backbone or spinal column.

Characteristics of invertebrates

Examples of invertebrates are shown in Figure 9.11. Write down the name of each of these the animals.



Figure 9.11 Different invertebrate animals

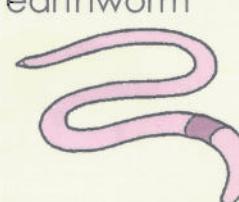
What characteristics do all invertebrates have?

All invertebrate animals do not have bones or a **backbone** (spinal column). This is what makes them different from other animals that you know that have bones and a backbone, for example, cows and pigeons.

There are many different kinds of invertebrates. Look at the pictures of the different kinds of invertebrates shown in the table and read about how their different characteristics.

In which part of the table would you put the millipede?

Table 9.1 Characteristics of invertebrates

Characteristics of different kinds invertebrates	Examples of these kinds of invertebrates		
Some invertebrates have a soft body made up of segments. The body is filled with a liquid.		earthworm	
Some invertebrates have a hard body with many jointed legs.	insect	spider	
	crab	centipede	
Some invertebrates have a soft body with tentacles on their head. Some have a hard shell.	slug	snail	

Insects

The largest group of invertebrate animals are the insects. Look at Table 9.1. The example of an insect in the table is a ladybird.

There are many other kinds of insects. All insects have 6 legs or three pairs of legs. Some insects, for example, the ladybird has wings and some insects like the ant does not have wings.

Figure 9.12 shows some of these different kinds of insects.

Which ones have wings?

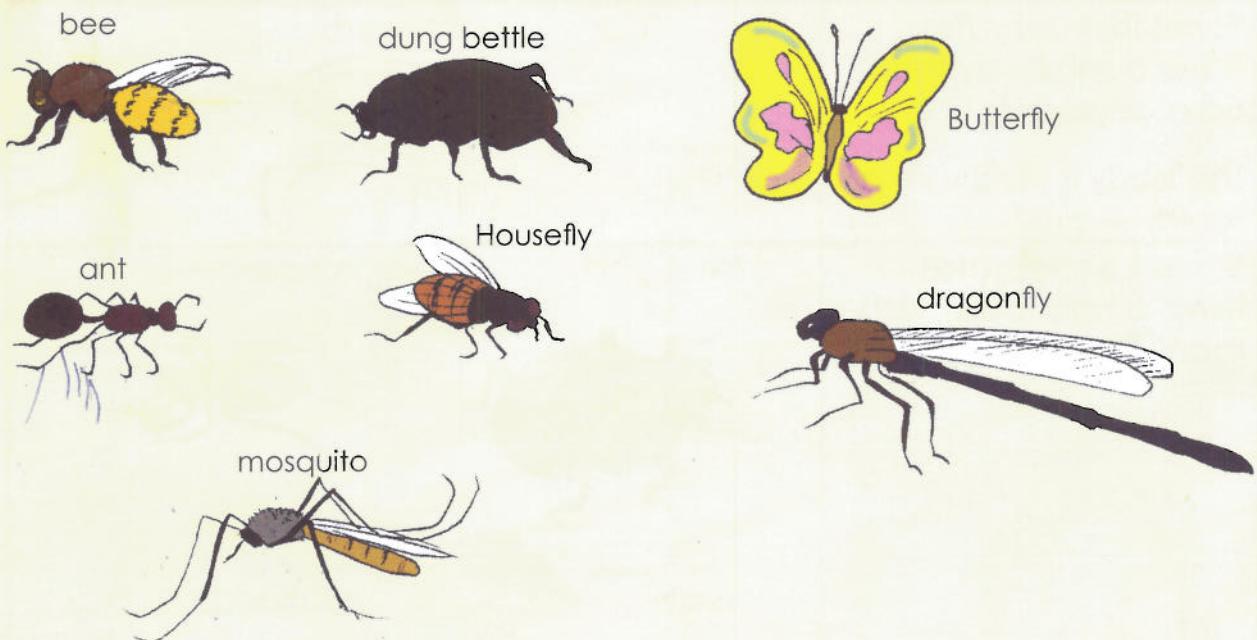


Figure 9.12 Different kinds of insects

Activity 8

1. Explain why insects are invertebrates?
2. Draw pictures of three insects from Figure 9.12.
3. Collect different kinds of insects from the school grounds and home. Place the insects in a box.
4. Use a magnifying lens to observe the insects.
5. What can you see?
6. How many different kinds of insects did you/the class find?
7. Write down the names of the different kinds of insects that you found. Write down where the insect was found. Ask your teacher for help if you don't know the names of all your different insects.

Insects can be grouped as useful to humans or harmful to humans.

Useful insects

Some insects are useful to humans.

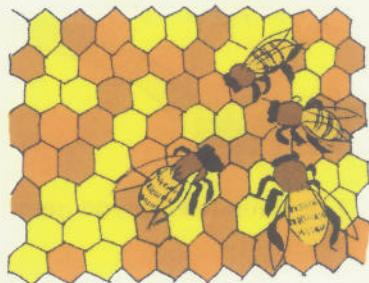


Figure 9.13. Bees make honey



Figure 9.14. Bees pollinate flowers

Bee

Bees are very useful insects. They make honey in their hives. Humans eat honey.

Can you see that the honey comb in the picture is full of honey?

Bees help to **pollinate** flowers. You learned about pollination in the last unit.

Pollen is produced by the male part of a flower and it needs to get to the female part of another flower. When this happens the flower can then make seeds and fruit.

The pollen needs to be transferred to other flowers for the plant to reproduce. The process of transferring pollen from one flower to another is called **pollination**. When pollination takes place the flower can develop/form fruit and seeds. Humans eat the fruits and seeds. Bees help to pollinate plant crops.

Dragon fly

Dragon flies live close to water.

Young dragonflies, called larvae do not have wings and they live in fresh water in streams and rivers. The presence of dragonfly larvae in a river indicate the health of the river.

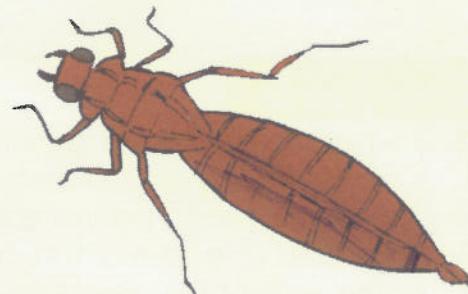


Figure 9.15. Young dragonflies live in clean water

When the water is clean there are many young dragonflies. There are very few young dragonflies in dirty or **polluted** water.

The number of dragonflies visiting a river can tell us how healthy the river is and whether it is safe for us to use the water.

Harmful insects

The housefly

Some insects are harmful to humans. Flies can pick up harmful germs when they feed on rotten food, dead animals or animal waste. You learned about harmful germs that cause disease in **Topic 1: Health and safety**.

When the flies land on our fresh food they bring these harmful germs with them. When we eat this food we swallow the harmful germs and can get **diarrhoea**.

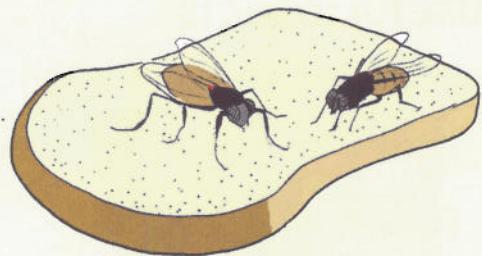


Figure 9.16. Houseflies spread germs

The mosquito

Mosquitos are harmful because they spread the disease called malaria. Many people die from malaria.

Mosquitoes feed on our blood. When a mosquito bites a person who is suffering from malaria, the mosquito sucks up the germs that cause the disease.

The mosquito can then spread these germs to the other people that it bites.

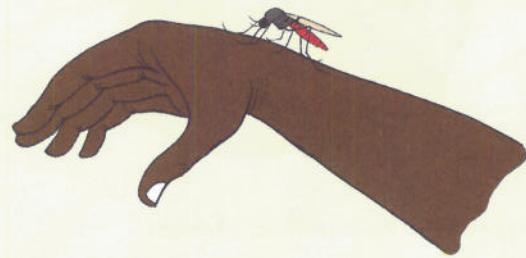


Figure 9.17 Mosquitoes spread malaria

Exercise D

Say whether the following statements are true or false.

1. A mosquito is a useful insect. True /False
2. We need bees to pollinate our crops. True /False
3. Houseflies spread malaria. True /False
4. Young dragonflies live in rivers. True /False
5. Houseflies make honey. True /False

Summary

- Animals without backbones are called invertebrates.
- There are many different kinds of invertebrates.
- Insects are invertebrates.
- There are some insects useful to humans, such as bees and dragonflies.
- There are some insects harmful to humans, such as house flies and mosquitoes.

Glossary

particle	- a very small part of something
decay	- the rotting or breakdown of something
weathering	- the breaking down of rocks into smaller pieces
property	- what a substance looks like, feels like and how it behaves
texture	- what something feels like
aeration	- the mixing of air with something
drainage	- the movement of water through something
clay body	- is the clay that is used to make a clay model
flowering plant	- a plant that has flowers
anchor	- to hold something in position
absorb	- to take in or suck up something
reproduce	- to make young ones
pollen	- a powder substance made by flowers to reproduce
classifying	- grouping according to similar characteristics
invertebrates	- animals without backbones or spinal column
backbone	- bones that form the spine along the back of an animal
characteristics	- the features of something that helps us to recognize/classify/identify it
pollinate	- to carry pollen from one flower to another
polluted	- made dirty or unclean
diarrhoea	- a runny tummy

End of topic assessment test

Multiple choice

- When we look at something through a hand lens it becomes _____.
A. smaller B. transparent C. bigger D. a different shape
- Large rocks can be broken into smaller rocks by the following activities except _____.
A. roots growing through rocks
B. jumping over the rock
C. flowing water
D. changes in temperature
- Which part of a plant absorbs water from soil?
A. leaf B. stem C. root D. flower
- Which part of a plant is responsible for producing seeds and fruits?
A. flower B. root C. leaf D. stem

5. Which part of a plant contains seeds?
A. leaf B. stem C. root D. fruit
6. Which part of a plant holds it up?
A. leaf B. root C. stem D. fruit
7. Which part of a plant is responsible for making food?
A. flower B. stem C. seed D. leaf
8. An animal without a backbone is called a _____
A. vertebrate B. invertebrate C. cow D. harmful
9. Which animal has a soft body that is filled with a liquid?
A. spider B. centipede C. insect D. earthworm
10. Which of the following is a useful insect, to humans?
A. dragonfly B. house fly C. snail D. mosquito [10]

Structured questions

1. Name three different types of soil. [3]
2. Explain how soil is formed from rocks? [3]
3. Describe the function of the roots of a plant? [1]
4. What is the main characteristic of an invertebrate? [1]
5. Why is it important for humans to keep/not kill bees? [2]

Topic 10

Sustainable resource management

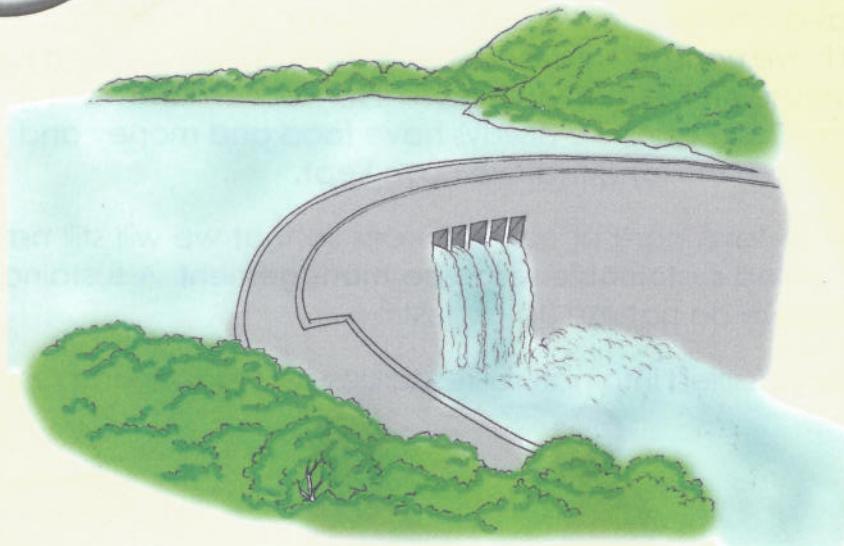


Figure 10.1 Kariba dam

Introduction

Every day of our lives we use things. Some of the things are used up and others can be used again and again. Others can be used once and they cannot be used anymore. After being used they have to be thrown away as waste. Everyday as we learn, play and work we use many things. These things produce waste.

Unit 25 Sustainable resource management

Objectives

You should be able to:

1. identify resources
2. classify resources.

Flashback

In Unit 4: Electronics we learned that some of the electricity we use in Zimbabwe is generated at Kariba hydropower station. Kariba Dam assist all the people in Zimbabwe to get electricity. It is a national resource.



Key words

resources sustainable resource management

Sustainable resource management

We call the things that we use **resources**. Resources are the things that we need or want to make our lives better.

Land is a resource. We can use the land as a field to grow crops, as a grazing field for animals, as a yard where we build a house or sell it to get money. If we sell our land, we will have none left. It is better to grow crops on the land to sell for money, or to build a house on the land and leave it for your children and grandchildren as an inheritance. This means we always have food and money and won't starve or become poor from the land that we have kept.

It is important to take care of our resources so that we will still have them in the future. This is called **sustainable resource management**. A sustainable resource is a resource that we do not use up or destroy.

Resources are classified into natural resources and man-made resources.



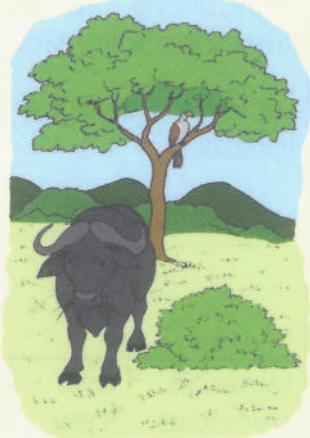
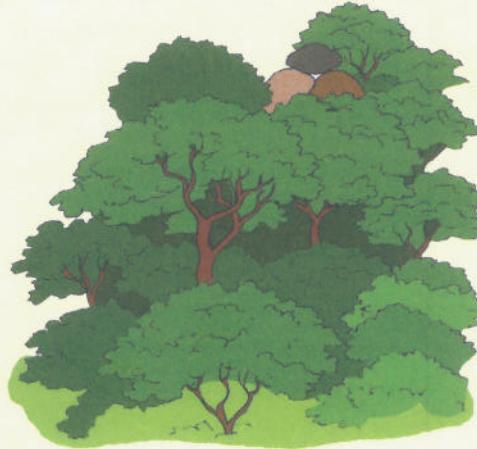
Figure 10.2 Caring for our environment means caring for our resources

Some resources are natural resources. A natural resource is part of the natural environment.

Examples of natural resources are:

- wildlife
- forests
- rivers
- land
- minerals

Look at the pictures of the different types of natural resources shown in Table 10.1 read the information to find out how we can use each of them and why they are important.

Type of natural resource	How we use the natural resource
<p>Wildlife</p> 	<p>Wildlife is a resource because foreign tourists come to our country to see these animals in game reserves and they bring money that they spend in our country.</p> <p>Some wild animals such as wildebeest, antelope and kudu can also be kept for food.</p>
<p>Forest</p> 	<p>Forests are a resource because they consist of large trees and many different kinds of plants and animals.</p> <p>We can use the wood from the trees for fires and making furniture.</p> <p>We can use the plants in the forest for food and medicine.</p>
<p>River</p> 	<p>Rivers are a resource because they provide us with water.</p> <p>We need the water in rivers for drinking and washing and for our crops.</p> <p>Rivers are also the home of many different kinds of fish which we can eat.</p>

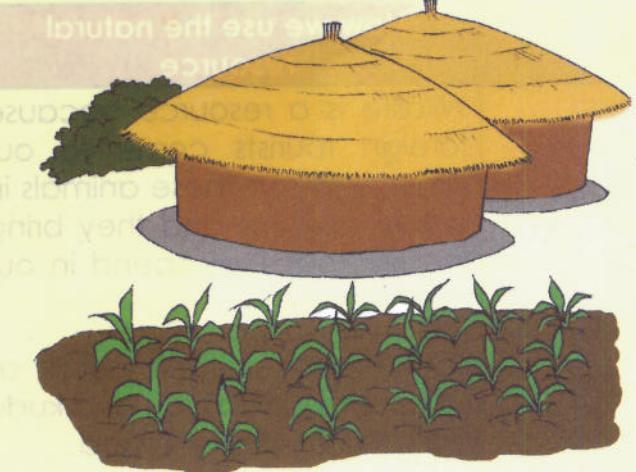
<p>Land</p> 	<p>Land is a resource because we need it to build houses, villages and cities.</p> <p>We also need land for agriculture - to grow our crops and for our livestock.</p> <p>Land is used for wildlife and forests.</p>
<p>Minerals</p> 	<p>Minerals are a resource because they provide our country with metals like copper to make things that are useful to us. Power lines are made from copper cables. Fuel like coal provides us with electricity.</p> <p>Gemstones like the diamonds are exported and they bring in foreign currency.</p> <p>We get most of the minerals that are found in Zimbabwe through mining.</p>

Figure 10.3 Different natural resources

Activity 1

1. Make a list of the natural resources found in Zimbabwe. Collect pictures of natural resources and make a poster to display in class.
2. What natural resources do you have near your home or your school?
3. How do people in your community use this natural resources?

Man-made resources

A man-made resource is something that we use that is made by humans. We use many different kinds of man-made resources every day.

Examples of man-made resources are:

- dams
- roads
- rubber
- plastic

We need dams for water and to make electricity. In Zimbabwe we have many dams in farms that are used for irrigation.

We need roads to transport people and goods from one part of the country to another.

We make rubber from a substance that we get from rubber trees. Rubber is used to make tyres and rubber gloves.

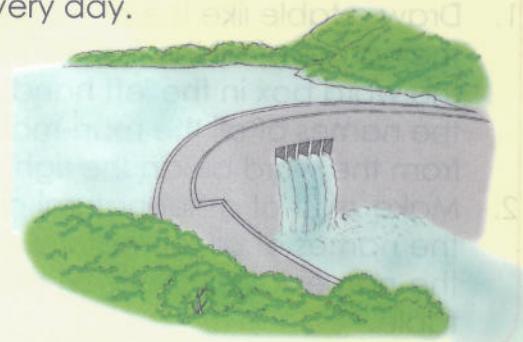


Figure 10.4 Kariba dam is man-made



Figure 10.5 Roads are man-made



Figure 10.6 Rubber is used to make tyres and rubber gloves

We make plastic in factories from coal or oil. Plastic is used to make plastic bottles and plastic tables and chairs.

Man-made resources cost money to produce and are expensive to replace. If we care for our man-made resources and fix them when they are broken it will cost a lot less money than trying to replace them.

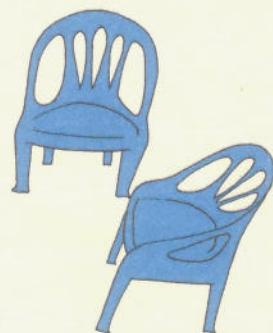


Figure 10.7 Plastic is used to make bottles and chairs

Activity 2

plastic dam river land mineral rubber forest wildlife roads

1. Draw a table like the one shown. Write the names of all the natural resources from the word box in the left hand column and the names of all the man-made resources from the word box in the right hand column.
2. Make a list of other natural and man-made resources you can think of. Add the names of all the natural resources in your list to the left hand column and the names of all the man-made resources to the right hand column of your table.

Natural resources	Man-made resources

Exercise A

Say whether the following statements are true or false.

1. A zebra is a natural resource. True /False
2. We can get food from rivers. True /False
3. Buildings are natural resources. True /False
4. Plastic is made from rubber. True /False
5. We can get electricity from coal. True /False

Summary

- Natural resources such as wildlife, forests, rivers, land and minerals are part of the natural environment.
- Man-made resources such as dams, roads, rubber and plastic are made by people.
- It is important to take care of our natural resources.

Unit 26 Sources of waste

Objective

You should be able to:

1. state sources of waste.

Flashback

What did you last throw away? We call things that we throw away **waste**.

Key words

waste sources electronic
gadget poison recycled
compost

Sources of waste

When we use resources we produce waste. Most of the products we use in our everyday life produce waste).

Activity 3

In groups, look at your classroom.

How is waste produced in your classroom?

How do you dispose of your classroom waste.

There are various **sources** of waste. Waste can come from:

- household waste
- plant and animal waste
- industrial waste
- electronic waste

Household waste

Families that live in houses produce waste all the time.

This waste produced in homes is called household waste.

Plastics and cardboard from packaging, carrier bags, left over foods and broken furniture are often thrown away.



Figure 10.8 Household waste

This waste produced in homes is called **household waste**

Plant and animal waste

Plants and animals produce waste. This waste

can be useful. We can make **compost** with plant and animal waste. Compost can be added to the soil we use for growing crops. Compost enriches the soil which produces healthy plants.

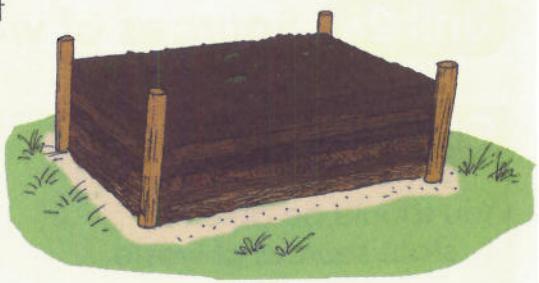


Figure 10.9 Use plant and animal waste to make compost

Activity 4

Do you make compost at home?
Find out how to make compost
Report back to the class
How does compost utilize plant and animal waste?

Industrial waste



Figure 10.10 Waste from industries can damage the environment

Industry produces waste. Many of these wastes are poisonous and harm the environment. Figure 10. 10 shows harmful wastes entering a river where it can poison fish and the people who drink the water.

How can these wastes harm the environment and harm people?

Electronic gadgets

When **electronic gadgets/devices** like computers or cell phones stop working or are too out of date to work any more people throw them away. This is a big problem as they can **poison** the water or the land that they are thrown into. It is much better to try to fix electronic gadgets or take them to a place where the parts can be **recycled**.

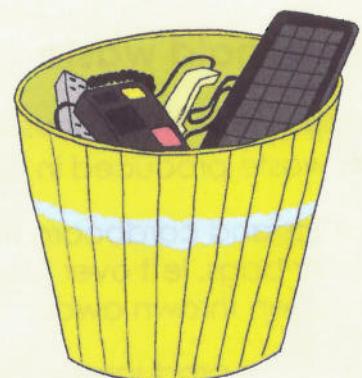


Figure 10.11 Electronic gadgets can be waste

What electronic gadgets have you seen being thrown away?

Activity 5

1. Name four sources of waste.
2. Make a list of all the different examples of waste that you can see on the school grounds and on your way home.
3. Tick the examples of waste on your list that can be harmful to people.
4. Put an R next to the examples of waste on your list that can be reused/recycled or made into compost.

Summary

- Electronic gadgets, houses, industry, plants and animals are all sources of waste.

Glossary

resources	- the things that we need or want to make our lives better.
sustainable resource	
management:	- making sure that we do not use up or destroy resources
waste	- things that we throw away
sources	- where things come from
electronic gadget	- electronic devices
poison	- a substance that can kill plants, animals or people
recycled	- used to make something else or for another purpose
compost	- mixture of dead, decaying plant and animal waste

End of topic assessment test

Multiple choice

1. A resource that is not made by human is called a _____.
A. natural resource
B. man-made resource
C. useful resource
D. people's resource
2. The following are natural resources except _____.
A. minerals B. wood C. buildings D. land
3. The following are man-made resources except _____.
A. buildings B. land C. tables D. roads
4. Resources that are made by humans are called _____.
A. man-made resources
B. natural resources
C. manufactured resources
D. pure resources
5. Waste produced by people in their homes is called _____.
A. electronic waste
B. household waste
C. industrial waste
D. plant and animal waste
6. Which of the following is a natural resource?
A. road B. minerals C. dam D. buildings
7. What resource is needed to make electricity?
A. dam B. rubber C. wildlife D. road
8. We get water from _____.
A. rivers B. roads C. forests D. waste
9. What type of waste is compost made from?
A. electronic gadgets
B. plants and animals
C. industries
D. plastic and rubber
10. Why is it not good to throw waste material on the streets?
A. it can harm people
B. it is a natural resource
C. it is healthy
D. it is nice to look at

[10]

Structured questions

- Give two examples of natural resources. [2]
- Give two examples of man-made resources. [2]
- Name one natural resource that is found near your school or community. [1]
- Give two examples of things you use at home that are man-made. [2]
- Name three sources of waste. [3]

Unit 27 End of year assessment test

Paper 1

Answer all questions

Choose the correct answer.

- Which of the following foods will give you energy?
A. potatoes and bread B. eggs and fish
C. cabbage and spinach C. meat and water
- Which of these is not a germ which can cause a disease?
A. virus B. bacteria C. protozoa D. dust
- A tool that we can use to cook food in the kitchen is called a _____.
A. spoon B. plate C. tin opener D. pot
- A solid fuel commonly used in rural areas in Zimbabwe is _____.
A. wood B. petrol C. paraffin D. gas
- If a magnet is brought near a plastic cup _____.
A. the cup will be attracted by the magnet
B. the cup will not be attracted by the magnet
C. the cup will become very hot
D. the cup will move away from the magnet
- An example of an electronic device is a _____.
A. spoon B. hammer C. cellphone D. magnet
- A natural material commonly used for making models or pottery is _____.
A. metal B. clay C. plastic D. cotton
- The following material can be used to decorate models except _____.
A. paint B. bread C. bottle tops D. seeds
- If water is poured onto a hard surface that is not flat, it _____.
A. rises B. flows C. stays where it is D. infiltrates
- When water is poured onto loose soil that has been dug, it _____.
A. rises B. infiltrates C. flows D. stays where it is
- Which of the following is a natural source of water?
A. ocean B. borehole C. tap D. dam

12. When it is not cloudy and rainy and the sun is shining we say the weather is _____.
 A. rainy B. cloudy C. sunny D. cold
13. People are wearing jerseys and coats and sitting next to fire places and heaters. What kind of weather is this?
 A. it is hot B. it is cold C. it is windy D. it is sunny
14. Which is not a landform?
 A. a river B. a hill C. a plain D. a bridge
15. Which soil type has both large and small particles?
 A. clay soils B. sandy soil C. red soil D. loam soil
16. Water passes very quickly through _____.
 A. clay soil B. loam soil C. mud D. sandy soil
17. Which part of the plant is responsible for absorbing water from the soil?
 A. leaf B. root C. stem D. flower
18. The _____ is the part of the plant which absorbs sunlight and makes food for the plant.
 A. root B. stem C. flower D. leaf
19. The _____ is a very useful insect to humans because it indicates us how healthy a river is.
 A. housefly B. dragonfly C. bee D. mosquito
20. The _____ is a very useful insect to humans that pollinates flowers and makes honey.
 A. housefly B. dragon fly C. mosquito D. bee
21. An animal without a backbone is called _____.
 A. a vertebrate B. a plant
 C. an invertebrate D. a bird
22. Which of the following animals is an insect?
 A. a bee B. a snail
 C. a worm D. a chicken
23. Important things that we use in everyday life are called _____.
 A. resources B. food C. landforms D. rocks
24. _____ is an example of a man-made resource.
 A. rubber B. forests C. rivers D. land
25. All are examples of natural resources except _____.
 A. wildlife B. land C. rivers D. road
- [25]

Paper 2

1. a) If you were to pour water onto some sandy soil and some clay soil, which soil would water drain through very quickly?
 b) How could you find out that soil contains air?
 c) If you rub wet clay soil between your fingers how does it feel?
 d) If you rub wet sand soil between your fingers how does it feel?

- e) If you mix dead plants, sandy soil and clay soil what type of soil do you get? [5]
2. a) Draw a plant and label the following parts: root, leaf and stem.
- b) What is the solution that is given to someone suffering from diarrhoea? Which insect spreads malaria? [5]
3. a) Name two animals that are invertebrates
- b) Name an insect that is useful to humans.
- c) Which two natural landforms are made of water? [5]
4. a) Name any two sources of electricity.
- b) Which two electronic devices are used in communication.
- c) How does electricity get from Kariba Power Station to homes in Zimbabwe? [5]

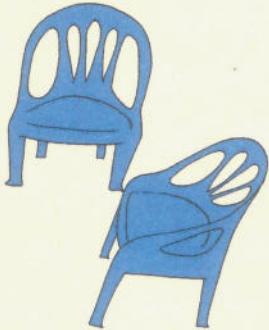


Figure 10.12 A plastic chair

- a) The chair is made of which material?
- b) What is the process of purifying water called?
- c) Name one type of natural resource.
- d) Name any two sources of waste. [5]

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