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Please feel free to contact the Longman Zambia office should you have any queries. Thank you for considering Longman products for use in your classroom.

We wish you a happy and successful teaching year!

Yours in education,

**Mabvuto Zulu**

General Manager

**Longman Zambia**

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Longman Zambia – books that you can trust!
Longman Biology offers:

- Full compliance with the knowledge, skills and values of the new curriculum.
- A variety of activities to support skills development and application of knowledge.
- Many exercises to reinforce learning.
- Content presented in clear and simple English, at the learners' level.
- Assessment activities and content summaries at the end of each chapter.
- Informative illustrations and photographs.

This book is accompanied by a Teacher's Guide that offers teaching guidelines and answers to all exercises and activities in the Learner's Book.
Business Studies Grades 8 and 9

Longman Business Studies offers:

- Full compliance with the knowledge, skills and values of the new curriculum.
- A variety of activities to support skills development and application of knowledge.
- Many exercises to reinforce learning.
- Content presented in clear and simple English, at the learners' level.
- Assessment activities and content summaries at the end of each chapter.
- Colourful illustrations and photographs.

These books are each accompanied by a Teacher’s Guide that offers teaching guidelines and answers to all exercises and activities in the Learner’s Book.
Read the following article about unrest in Zambia.

**Causes of the current unrest**

According to government sources, there is no truth in the rumors that the current unrest in the mining sector can be attributed to Siphokazi. There is no truth in such allegations, the Minister of Foreign Affairs declared at a press conference on Tuesday. This unrest is a result of recent wage negotiations. The Minister emphasized that, though the mine workers are dissatisfied with current wages, the Chinese owners of the mines are willing to increase the wages by 60 per cent. The miners, however, are demanding 30 per cent. This has brought negotiations to a deadlock and has resulted in the strike.

The owners of the three mines, Chinese businessmen Mr. Wei Chong, Mr. Yu Mai and Mr. Simi Yang, were not available for comment.

One of the managers at the Kansai Coal mine expressed his distress at the death of his son, Siphiwe. On Monday, Siphiwe was one of the first workers who lost his life in the accident.

Although this incident has officially been declared an unfortunate accident, junior staff members at the mine (who prefer not to be identified) regard it as manslaughter, if not murder. This is not the first time the miners have used violence to try to intimidate senior

Inflow of Chinese investment has supported and stabilized Zambia'stext mining sector, but also resulted in unrest.

management; one of the rumors alleged, 'They import Chinese workers, they have nothing to do with wage disputes.'

The workers, however, claim that more than a hundred miners were shot at during a strike protesting poor working conditions and a lack of safety measures underground in 2015. Four miners died in the shooting.

A press release early this morning, the Chinese owners claimed that a language barrier and a poor working environment.

Government is considering a new law that will set a new minimum wage for mine workers. The minimum wage is roughly 60 per cent higher than the current wage earned by entry-level workers.

**Methods of investment**

There are various methods of investment. We are going to look at entrepreneurship, small business, farming, bonds and shares.

1. **Entrepreneurship**

Entrepreneurship involves identifying an opportunity for investment purposes and using creative and innovative ways to make a success of the investment and to make a profit.

**Example 1**

Dambudzo decides to take photographs at school events to earn pocket money. He realized that no photographs were being taken at sporting events, school concerts and awards functions and knows that people like to have photos as a memory of special events.

He needs to invest in the following:

- Buy a camera.
- Pay for photography lessons.
- Buy equipment to develop photographs.

Advantages of the investment:

- Sole provider of the photography service.
- Lots of sporting events and functions to photograph.
- Skill to take photographs.
- Can continue with photography after leaving school at the end of matric.
- Can start his own photography studio.
- Can teach other learners the art of photography.

Disadvantages of the investment:

- No guarantee of customers.
- People might not want to use the services of a learner.
- Parents and learners may not be able to afford the photographs.
- Parents and learners may not be interested in buying photographs.

The entrepreneur who wants to use entrepreneurship as a method of investment must have the following qualities:

- Creative
- Risk taker
- Motivated
- Innovative
- Energetic
- Disinhibited
- Determined

2. **Small business**

Running a small business as an investment option means that you have to decide which business you want to start. Once you know which business you want to start, you need to consider the following:

- Start-up costs
- Location
- Capital
- Customers
- Resources (equipment, material, employees)
- Knowledge needed for this business
- Skills needed for this business
IciBemba Grades 8 to 10

Longman IciBemba offers:

• Full compliance with the knowledge, skills and values of the new curriculum.
• Full coverage of the outcomes for listening, speaking, reading and writing skills.
• Many exercises to reinforce learning of grammar structures.
• A variety of reading and comprehension texts, including stories, poems and articles.
• Assessment activities at the end of each unit.
• Informative illustrations and photographs.

These books are each accompanied by a Teacher’s Guide that offers teaching guidelines and answers to all exercises and activities in the Learner’s Book.
Iyiyo kutsi 1

   a. Buse iroshi abantu isonde iyembe sofikilelwa Lesa?
   b. Ikulungana na imitserwankundile yobu, cinthi calingila akwilihi sika ukuhunhanga Lesa?

Ukubelenga

Ukufwaya fwaya Lesa


Lase usakuphala uku umfutho, ngwako iyo abu tileda kugonzi kugonzi. Kugonzi kugonzi, kugonzi kugonzi.
These books are each accompanied by a Teacher’s Guide that offers teaching guidelines and answers to all exercises and activities in the Learner’s Book.
These books are each accompanied by a Teacher’s Guide that offers teaching guidelines and answers to all exercises and activities in the Learner’s Book.
**MUTU 7**

Njira zoyenera zakadyedwe

Ponurirwa pa mutu uyu aphambeni omen ayemera:
- Kguphthwa mabo mawo omen zinthwani zonkuya.
- Kuzimikha ndi kusathu ma osoza.
- Kunguphthwa echita mawo omen m’ikahani.
- Kusimukhala paketi pa afrikozani ndi spannawi.
- Kguphthwa mabo afritokosi.
- Kusimukhala mupali kalingana ndi ahwemero za.
- Koloma mawo amene ali ndi kuvandekeza kolera ndi m’tene achichitela m’ichankhulo

Mveisero ndi iankhulu

**Zoeka 1**

Ponuvenetani pa cimunji k’i:
a) Lembani m’tandana wa mau amene mageseziwe ekhisa. Mwathu pa kudanzo ndi ajago ake.

**Zoeka 2**

Kombinani maliwo otyatweza ndi m’izana pokugwiritsa othikho chihani, chileni pa mwamba apa.

1. Kuki ndi zakudya zotani zimele tyenera kudyalavutu ikhale abanuza iliwaya?
2. Kuki mau akulira kudya zakudya zonsewena atshinzeza cyai?
3. Ntakeva cyani tyenera luwamwala zaliwa zomwe timya m’ikahani ne?
4. Kuki zakudya cirime cyani chileni pa ethikho mwa mwamba?
5. Kuki zakudya cirime cyani m’ichankhulo.

Mavu akuzakudya ndi kadyedwe

Pani njira zoyenera za kadyedwe ndi mphunzioni okhulasana ndi zakudya za thakazi la munhu. Anthu okhunzera za kufunze maphunzi kuza zimele zingafuna m’ikahani kweto atshinzeza. Iwo sipeza ku panzani zoyenera kuthakala cnzithandwe m’ikahani kukhala zonsewena zimele zingafuna m’ikahani kuza zimele zingafuna m’ikahani, zaliwa zothokera zonsewena zimele zati wo kugwiritsa othikho chihani zimafuni, zaliwa zothokera zonsewena zimele zingafuna m’ikahani.

9789982194792

9789982196246

9789982194174
These books are each accompanied by a Teacher’s Guide that offers teaching guidelines and answers to all exercises and activities in the Learner’s Book.
CHAPTER 6: Cultural Studies

This chapter aims to help you develop an understanding of Zambia’s cultural heritage. It deals with:
• a description of culture
• components of culture
• characteristics of culture
• the importance of culture
• types of culture
• Zambia’s societal core values
• Zambia’s cultural practices
• factors that affect the appreciation of cultural diversity in Zambia
• global culture
• institutions that preserve our cultural heritage.

INTRODUCTORY ACTIVITY: Explore your cultural heritage

1. What events do you associate with Zambian culture?
2. What do you consider to be unique to your Zambian culture?
3. What do you consider to be a divisive factor in Zambian culture?
4. What do you consider to be a unifying factor in Zambian culture?

TOPIC 6.1: Describe culture

Culture refers to the customs, social roles, norms and behaviour, ideas, beliefs, values and traditions that are common to a group of people. It is people’s complete way of life.

We learn traditions, customs and values from our parents, families and the people around us. Hence culture is passed on from generation to generation.

Culture, as the characteristics of a particular group of people, can be identified by, for example, language, religion, social habits, food, attire, music and art. Most importantly, culture is identified by our values, beliefs and traditions.

Values, beliefs and traditions

Our values, beliefs and traditions are part of who we are and part of our way of life and cultural identity. In Topic 6.6 you can learn more about our Zambian core values, and in Topic 4.7 you can find out about our traditions and cultural practices.

Our values, beliefs and attitudes form an important component of culture. Values are guidelines for how to live in an acceptable way. They are culturally identified standards against which we can check what the correct actions and behaviour should be. Values guide a cultural group’s rules of behaviour.

A value is also a measure of the worth or importance you give to something. This you show in the way you live your life. For example, you may value your education, your family and your friendships, as well as your culture. Then you will work hard at school, be loyal to your family and friends, and be proud of your culture.

Cultural groups have specific beliefs that are common among its members. Beliefs are ideas that people believe are true. For example, people may believe in a god, in an ancestor spirit, in the power of medicines, or in life after death.

Our traditions include our customs and cultural practices. This is the way of life that is unique to us. Traditions are conventions that guide our behaviour and actions. We follow our Zambian traditions that have been passed on from those who went before us.

EXERCISE 1: Describe culture

1. Write a paragraph to describe culture.

ACTIVITY: Describe your culture

1. Briefly describe your culture.
The Learner’s Book and its accompanying CD are complemented by a Teacher’s Guide, which suggests what methodology to use, and a Teacher’s CD with easy-to-use files with answers and/or solutions to activities.

The Learner’s Books are each accompanied by a CD, which works as follows:

• The CD contains files and folders that learners will need in order to work on some of the activities in the Learner’s Book.

• In the Learner’s Book, such activities have an icon of a CD next to them, to advise the learners that they will need to use the CD to do a particular activity.

• The files and folders on this CD are arranged according to chapter. There is a document on the CD that lists the content.

• These files were developed using Microsoft® Windows 7 and Microsoft® Office 2007. The files were output in Compatible Mode, so that they can be read and used by earlier versions of Microsoft® Office.
CHAPTER 8 Multimedia files

At the end of this chapter you should be able to:

• create digital images using a scanner and/or a digital camera
• edit digitised images by cropping, enhancing pixels and colour
• save created images
• record video and audio
• save video and audio files.

Oral activity

Discuss the following questions based on what you learnt in Grade 8.

1. What is meant by the term multimedia?
2. Name at least three types of files that could be used in a multimedia presentation.
3. How could multimedia be used in school to promote an event?
4. How could a teacher use multimedia to make a lesson more interesting?

Various types of multimedia files can be used in a presentation.

TOPIC 1 Digitising images

Use a scanner to make a digital image

Scanners come in various sizes and can be part of a multi-functional device. A scanner on its own is a simple device with a cover and a glass platen on which you place the item to be scanned.

A flatbed scanner

Multi-function printers usually have a scanner. In this case, there can either be a slot into which you feed the page to be scanned or the device has a glass surface with a cover on which you place the item to be scanned.

A multifunction printer with a scanner option

Many modern photocopiers also have a scanning option. They use the same glass surface on which you place a document to be photocopied to scan the document.

A photocopier that can also scan

NEW WORD

platen – the flat glass surface in a scanner or photocopier on which documents are placed.
LONGMAN

English Grades 8 to 10

Longman English offers:

- Full compliance with the knowledge, skills and values of the new curriculum.
- Full coverage of the outcomes for listening, speaking, reading and writing skills.
- Many exercises to reinforce learning of grammar structures.
- A variety of reading and comprehension texts, including stories, poems and articles.
- Assessment activities at the end of each unit.
- Informative illustrations and photographs.

These books are each accompanied by a Teacher’s Guide that offers teaching guidelines and answers to all exercises and activities in the Learner’s Book.
CHAPTER 7  Transport and travelling

At the end of this chapter, you should be able to:
- Discuss how frequently you use types of transport (Activity 1)
- Read a picture story (Activity 2, Exercise 1)
- Read and summarise a timetable (Exercise 2)
- Role-play a conversation (Activity 3)
- Listen to a text and answer questions (Activity 4)
- Write a story (Exercise 3)
- Use co-ordinates (Exercises 4, 5)
- Give directions (Activities 5, 7)
- Read an extract from a novel (Activities 6, 7, Exercise 6)
- Use verbs and auxiliary verbs (Exercise 7)
- Write directions (Exercise 8).

UNIT 1  Listening and speaking

Activity 1

In groups, discuss the types of transport shown on this page. Each person in the group must write:
- Which of these forms of transport you have used
- How often you use each form of transport. Use these adverbs of frequency in your answers: frequently, often, sometimes, seldom or hardly ever, never
- Where you went
- Which one is your favourite way of travelling. Follow the pattern in the speech bubble.

Reading

Activity 2

1. In pairs, scan the picture story below to answer these questions. You can answer orally:
   a) How many frames are in this story? (Hint: A frame is a scene or picture from the story)
   b) What are the words in the mother’s speech bubble in Frame 1? (Hint: A speech bubble looks like this: “…
   c) What is the thought in the child’s thought bubble in Frame 5 on page 46? (Hint: A thought bubble looks like this: “…”
   d) In which frame are the children very surprised? How do you know this?
   e) Look at Frame 1. Which two towns have very similar spelling?

Now, you must be careful. Make sure you get on to the right seat. Your grandparents will wait you in Rishon.

Hello, please may we buy two tickets to Rishon?

Please give me the tickets, please.

Details. This one will be £10.95, please.

Thank you. What time will the bus leave at 8, so you should hurry!
Longman offers a collection of high-quality literature in all genres for secondary schools. The various titles cater to different reading interests, abilities and ages, offering something for every learner.

These titles all meet the requirements of the new curriculum.
See the Book List for other English Literature titles
This book is accompanied by a Teacher’s Guide that offers teaching guidelines and answers to all exercises and activities in the Learner’s Book.
### Topic 1.1 Map reading and interpretation

**Map symbols for ground features**

Maps are special drawings that show as many of the things on the ground as possible. They use symbols to show:

- **Natural features** which include:
  - relief features: the shape of the land, such as hills, valleys and cliffs
  - drainage, for example, rivers and lakes
  - vegetation, for example, woodland, forests, grassland and cropland
- **Constructed features**, which include man-made features such as roads, buildings, towns, farms, power lines, and boundaries of different kinds.

All of these features are shown on the topographic map using map symbols. Table 1.1 shows some of the map symbols used on Zambia's 1:50,000 topographic map sheets.

**Table 1.1** Symbols used on Zambia's 1:50,000 topographic map sheets

**Key words**

- **Topographic map** - a map showing the relief of the land, the vegetation and many of the constructed (man-made) features.
- **Symbol** - a sign that represents an object.

### Table 1.2

Table 1.2 shows photographs of some topographic features. These are what the map symbols represent.

![Map symbols](image)

**Activity 1**

1. Draw the topographic map symbols for:
   - a) post office
   - b) trigonometrical station
   - c) borehole
   - d) buildings
   - e) road

2. Draw the topographic map symbols for:
   - a) radio/telephone mast
   - b) well
   - c) buses/village
   - d) power line

![Map symbols](image)
History Grade 10

Longman History offers:

• Full compliance with the knowledge, skills and values of the new curriculum.
• A variety of activities to support skills development and application of knowledge.
• Many exercises to reinforce learning.
• Content presented in clear and simple English, at the learners' level.
• Assessment activities and content summaries at the end of each chapter.
• Informative illustrations and photographs.

This book is accompanied by a Teacher's Guide that offers teaching guidelines and answers to all exercises and activities in the Learner's Book.
The San - socio-economic and political organisation

Today there is little doubt amongst experts that the human species started in Africa. Modern man (Homo sapiens) appeared on the continent about 200,000 years ago. By about 130,000 years ago, these people had developed a lifestyle based upon the use of various stone tools. They often lived in caves and rock shelters. Archaeology has shown that these people always lived off plants, animals and fish, and were able to make fires for cooking or warming themselves. The plants, animals and fish were obtained by gathering and hunting. In Southern Africa, those people who lived by hunting and gathering have come to be known as the San.

The San, called "Bushmen" by early Dutch settlers, were physically small people with light brown or olive skins and fine features. They spoke languages with strong click sounds. They lived in small extended family groups of about 15 to 25 people. All their resources – water, plants, and animals - were held in common. In other words, there was very little private property (except, for example, for clothing and weapons). These family groups were part of larger bands of up to 80 people.

They occupied caves or temporary shelters and moved from place to place, depending on their need for water, plants to gather, and animals to hunt. There was a division of labour between men and women. Women took care of children and gathered edible plants, while men attended to the hunting.

The San skillfully made tools from wood and stone, clothing from animal hides, and even musical instruments from wood, ostrich eggshell, and ostrich quills. They also made bows and arrows tipped with poison. They have left an impressive record of their culture in many thousands of rock paintings and embroideries throughout Southern Africa.

Key words:
- archaeology - the study of peoples of the past, from what physical remains they left behind
- ostrich - large flightless bird
- eggshell - shell or casing of the egg of a bird
- quills - the long, pointed feathers from the back of various birds

The San have used ostrich eggshell as water containers for centuries.
This book is accompanied by a Teacher’s Guide that offers teaching guidelines and answers to all exercises and activities in the Learner’s Book.
CHAPTER 3 Health education

UNIT 1 Safety and first aid in the home

Safety precautions:
Many accidents or injuries are related to the home and its environment. Preventative measures can be taken in order to avoid or eliminate them.

• Keep the home clean and tidy. A well-organized home reduces the number of accidents that could happen.
• Ensure that there is adequate lighting in the home, especially in the kitchen, bathroom and on stairs.
• Store all dangerous chemicals (such as cleaning agents, poisons and medicines) and all dangerous equipment (such as knives), in safe places and out of reach of children.
• Prevent falls by picking up and putting away items such as toys and shoes, wiping up spills immediately, and having rails on staircases.
• Never leave broken glass or broken bottles lying on the floor as they can cause cuts.
• Do not leave children unsupervised near pools or in the bath.
• Make sure that all electrical and gas installations are done by a qualified contractor. Have all appliances serviced regularly and ensure that all electric cables are properly insulated and covered.

• Get any suspected gas leaks inspected immediately.
• Prevent burns and scalds by using thick oven gloves to handle hot pots, pans and dishes. Keep boiling liquid out of reach of children. Do not leave children alone near an open fire.
• Prevent asphyxiation and choking by keeping plastic bags out of reach of children.

Activity 3.1 Discuss safety precautions in the home

Discuss additional safety precautions that could be applied to make your home a safe, healthy place to live.

First aid
First aid is giving immediate care to a victim with an injury or illness. It is performed until the injury or illness is adequately dealt with (such as in the case of small cuts, minor bruises and blisters), or until professional medical care is available.

Contents of the first aid box
The basic requirements for a first aid box are safety pins, cotton wool, scissors, and sterile bandages of various sizes, gauze, burn dressing, adhesive plaster, vaseline, antiseptic solution (Betadine) and painkillers.

Many first aid situations however take place without a first aid kit being readily available and a first aider may have to improvise to use materials and equipment. Some common improvisations include:
• Gloves: use plastic bags, dish gloves or leather work gloves.
• Gauze: use clear clothing, bandaging plasters, the contents of a first aid box.
• Splint: use wood (planks), plastic, and cardboard or metal, for example a broom or an umbrella. Use a T-shirt as a pad.
• Slings: the bottom hem of a victim’s shirt pinned to the top corner of their shirt or blouse will immobilize a forearm or shoulder injury.
• Bandages for sprains/ injuries/breaks: use clothing such as jackets, sweaters, T-shirts, or clean dish cloths and towels to provide temporary cushioning and support.

See the Book List for other Home Economics titles.
These books are each accompanied by an Answer Book/Teacher’s Guide that offers teaching guidelines and answers to all exercises and activities in the Learner’s Book.
Revision exercise

1. Write True or False for each statement:
   a) A three-figure bearing of 180° corresponds with north on a compass.
   b) A scale of 1 : 1 500 means that 1 cm on a map equals 1 500 cm in real life.
   c) In Zambia, magnetic north and true north is the same direction.
   d) An angle of elevation is the angle between the horizontal and a line joining the point of observation with an object on a higher level.
   e) An angle of elevation is greater than an angle of depression.

2. Write down the cardinal direction for:
   a) a bearing of 90°
   b) a bearing of 270°.

3. The figure shows the locations of Livingstonia, Kabwe and Mongwe at a scale of
   1 : 1 000 000. Use the figure to describe the positions of (a) Kabwe, and
   (b) Mongwe in relation to Livingstonia.

4. A great mountain fish eagle circles above a rocky outcrop. From a point
   50 cm from the rock, the angle of elevation of the fish eagle is 28°. Use a scale of
   1 : 1000 and determine the height at which the fish eagle is flying.

5. Draw a vertical line AN on your page, with A pointing north. Construct line AE on a
   bearing of 30°. Mark off point B, ABE with AB = 6 cm. Construct line BF on a
   bearing of 120°. Mark off point C in BF with BC = 9 cm. Describe the position of
   point A with reference to point C.

CHAPTER 9 Symmetry

1 Plane symmetry

By the end of this chapter, you should be able to:
- Determine plane symmetry
- Determine symmetry of solids
- Determine order of rotational symmetry.

TOPIC 1 Symmetry of solids

1 Plane symmetry

Before you can understand the symmetry of solids, it is essential that you understand
symmetry of plane (2D) shapes.

We distinguish between three types of symmetry: line symmetry, mirror images, point
symmetry, and rotational symmetry (rotation about a point).

Line symmetry

If a shape can be divided into two halves such that the two halves are mirror images of
each other, the shape is symmetrical. The line that separates the two halves is called the
line of symmetry.

Line symmetry of a shape is easy to recognise, because one half is the reflection of
the other half. This type of symmetry is sometimes called reflective symmetry or
mirror symmetry. Look at the figure below.

The line of symmetry is horizontal but the symmetry is not perfect, because the
surface of the water changes the reflection a little.
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UNIT I Suffering and death

We do not live in a perfect world. Famine, war, earthquakes, disease and crime happen around us all the time. The results of these occurrences are often suffering and death.

Not all suffering is bad for us. It is through suffering that we develop character and strength. Some suffering is also necessary to ensure our survival.

The meaning of suffering

Imagine a world where there was no pain or suffering at all. In such a world, what would happen if we put our hand in a flame? The pain makes us withdraw our hand before we damage it too much. We can also experience suffering in the state of underlying pain, distress, or hardship. The word suffering is sometimes used in the narrow sense of physical pain, but more often it refers to mental or emotional pain, or more often yet to pain in the broad sense, i.e. to any unpleasant feeling, emotion or sensation. The word pain usually refers to physical pain, but it is also a common synonym of suffering. The words pain and suffering are often used both together in different ways especially by poets when they describe the effects of unrequited love.

Activity 5.1 How does suffering make us grow?

Discuss times of suffering or pain that you have experienced. How has this made you grow?

The meaning of death

All living things die. When we talk about death we generally mean the end of this life, as we know it. However death can also be seen as a stage in an ongoing journey.

It is also true that we experience many small deaths of different aspects of ourselves as we go through life. Our childhood dies to be replaced by adulthood, old friendships die and get replaced by new ones, attitudes and opinions die as we change and we mature.

The certainty of death and of not knowing how long our lives will last, makes it more important to find meaning in our lives.

Case study: Elephants also grieve for their dead

We may never know exactly what goes on inside the mind of an elephant, but it would be arrogant of us to assume we are the only species capable of feeling loss and grief.

Because elephants live in such close-knit herds, and live for about as long as humans do (approximately 70 years), they form strong bonds with those around them. When an elephant dies, the rest of the herd misses that death. The herd will take great care in the burial of the dead. The cows walk to and fro in search of leaves and twigs. They use this to cover the body of the deceased in an act of dignity for the dead. When a herd encounters the skeleton of a dead elephant, they have shown an undeniable fascination with the bones. The cows will roll over the bones, basking them in thoughtful contemplation. Cows take bones from the skeleton and scatter them, hiding them under bushes in the surrounding area. This behaviour is thought to be a protection for the rest of the herd, as it throws wolves and predators off the trail of the cows and their calves. Even years later, elephants have been observed revisiting the site where one of their herd or family had died. They will remain there for days at a time, mourning the loss of that one.

Activity 5.2 Loss of a pet

Many people have pets that they love and look after. These pets become part of their family. If you have had the experience of losing a pet, describe your feelings.

Reactions to suffering

All religions teach the difference between good and evil, but have different beliefs about evil and suffering. Religious leaders and sacred texts all encourage believers to live ‘good’ lives.
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**TOPIC 5.2 Respiration**

**What is respiration?**

All living organisms need energy to carry out the life processes in their bodies. Living organisms get energy by breaking down food to release the energy stored inside. All food can be broken down into basic units of glucose. In a process called respiration, glucose is broken down to release energy. We can summarise respiration in the following word equation:

\[ \text{glucose} + \text{oxygen} \rightarrow \text{carbon dioxide} + \text{water} + \text{energy} \]

**Compare respiration and photosynthesis**

Compare the word equation for respiration with the word equation for photosynthesis. You can think of respiration as the opposite of photosynthesis:

- **Requirements for photosynthesis:** carbon dioxide, water and energy
- **Produced by photosynthesis:** glucose and oxygen
- **Requirements for respiration:** glucose and oxygen
- **Produced by respiration:** carbon dioxide, water and energy

Photosynthesis only occurs in plants. However, respiration occurs in all living organisms.

The difference between respiration in plants and animals is that plants break down the glucose they make during photosynthesis, while animals break down glucose they obtain from food.

During respiration, plants take in oxygen and release carbon dioxide through the stomata in their leaves. Animals breathe in oxygen from the air they breathe into their lungs and release carbon dioxide in the air they breathe out.

**Showing that plants respire**

The easiest way to show that plants respire is to test whether they produce carbon dioxide. A simple test for carbon dioxide is the fact that it turns clear limewater milky. So, if a gas turns a solution of clear limewater milky, you know that the gas is carbon dioxide, and if carbon dioxide is being released, you can be sure that respiration is taking place.

---

**Activity 5.1 Demonstrate that plants respire**

A group of pupils designed an experiment to demonstrate that plants respire. They set up the apparatus as shown below.

We can clearly see the waste products from animals’ respiration on a cold day.

The apparatus worked as follows:

- Air was passed through the apparatus by a filter pump.
- The air that flowed into the apparatus first passed through soda lime, which absorbed the carbon dioxide from the air.
- Then, the air passed through the solution of clear limewater in A to show that there was no carbon dioxide left in the air.
- Next, the air flowed into the bell jar that was covered with black cloth or a piece of plastic to prevent sunlight from entering it.
- The bell jar contained a potted plant with the pot and soil covered with a plastic bag.
- Air moved from the bell jar to the container of limewater B.

The pupils had to take the following precautions to make sure that the carbon dioxide only came from the plant and not from other sources:

- They removed the carbon dioxide from the air that was inside the apparatus to ensure that any carbon dioxide leaving the apparatus was produced by the plant.
- They covered the soil with a piece of plastic to prevent the carbon dioxide given off naturally by organisms in the soil from entering the apparatus.
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Diseases

Fungi and bacteria are responsible for many diseases. Bacteria cause food poisoning, meningitis, pneumonia and some sexually transmitted diseases. Some types of fungi cause thrush, athlete’s foot and ringworm.

Bacterial dysentery

When bacteria such as salmonella and shigella infect a person’s digestive system they can cause bacterial dysentery. Severe diarrhea and abdominal pain occur. Poor hygiene and sanitation can increase the risk of dysentery by spreading the bacteria to food and water. Antibiotics and rehydration are ways of treating dysentery.

Ringworm

Ringworm is a common and highly infectious skin disease caused by a fungus, just a worm called Trichophyton. Ringworm causes a red, ring-like rash on the skin, as shown in Figure 1.10. Sometimes there may be more than one patch of ringworm. The rash can appear on any part of the body, but the feet, groin and scalp are common places. People of any age can get ringworm but it is more widespread in children.

Ringworm can be passed on easily from one infected person to another by direct skin contact, and by sharing of towels and hairbrushes or bedding. Pets like cats and dogs can also have ringworm and pass it on to humans.

You can easily treat ringworm by using antifungal creams for about two weeks.

In addition, if you have ringworm, avoiding scratching the rash as it could spread to other parts of your body. Furthermore, if you have animals—domestic animals, such as cats or dogs, or livestock, such as cattle—that have ringworm, avoid contact with these animals because direct contact with an infected animal can infect you too.

Although ringworm in animals will usually cure itself, it is best to treat domestic animals for ringworm or take them to a veterinarian for treatment.

Production of food and alcohol

Fungi and bacteria are used in the food industry. Lactic acid bacteria are used to ferment milk and make yoghurt. Different types of fungi and bacteria are also used for cheese-making. Fermentation is a process during which bacteria and yeast are used to produce alcohol. Fungi and bacteria are used to produce beer and wine by fermentation processes. Bread-making also uses yeast.

Source of food

All mushrooms are fungi that usually take the form of a domed cap on a stalk, often with gills on the underside of the cap. About 25 species of mushrooms are used as an important food source in Zambia, and many are sold in marketplaces. Two important examples are oyster mushrooms, and white button mushrooms, which are also widely cultivated.

Some mushrooms, such as the Termitomyces fungus, mushrooms grow wild. They are very nutritious, but you must be very careful when picking mushrooms in the wild for food, since many varieties are poisonous.

Exercise 1.3

Write a short essay to describe the importance of fungi. Use the following headings:
- Importance in the environment
- Importance to humans
These books each include a Teacher’s Guide that offers teaching guidelines and answers to all exercises and activities in the Learner’s Book.
UNIT 5 Enjoying novels

Unit overview

In this unit you will:

- respond to pre-reading questions
- read extracts from novels
- answer response questions
- understand the structure of novels
- complete a summarising task
- conduct an interview
- use adjectives, adverbs and adverbial phrases
- examine present continuous tense (verb + ing) modes of story-telling
- analyse sentences, focusing on subject and predicate
- practice completing verb + object + infinitive sentence structures
- work with direct and indirect speech modes of writing
- begin writing your own novel.

Exercise 2

Read the introduction to The Whale-Galile by Zake Sibele below.

In this extract, the novelists have used word-pictures to create a certain type of atmosphere to introduce the story. 
1. Is the mood exciting, romantic, depressing or concerned? 
2. Can the Whale Galile see Shashi's blood in the sea while he walks? 
3. What's sentence tells you this? 
4. Identify two or three ways in which the narrative creates an atmosphere of action and tension. 
5. Does this introduction make you want to read the rest of the novel?

The sea is bleeding from the wounds of Shashi*. But that is later. Now the tide returns in slight gentle movements. Hallamoon is the time of small tides. The Whale-Galile stands on one of the rugged cliffs that form an arena above the bay. He has spent the better part of the day standing there, basking in the sun. Basking. 
10. Shashi's special song, Blessing, leader and binder of the tide, responds, by receding in time to the slaccato of his call. We are nowhere to be seen. His nys have become stained from looking into the distant waters, hoping to see Shasha's dressing* in the glare of the setting sun. 

* Shashi: the name the Whale-Galile calls one of the whales. 
* Dressing: a whale's selection of things it had eaten of the water, sometimes for quite a long time.

Exercise 3

Read the introduction to Dance with a Dead Man's Daughter.

Carol-Anne is my best friend. We live in the same house but we haven't met yet and although it won't be easy, we've made plans in this direction which we've decided not to tell anyone else.
1. Who is narrating the story? 
2. What unusual detail is given in this introduction? 
3. Does this introduction make you want to read the rest of the novel?
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Activity 7

Worked example 7

For each of the following curves, estimate the area underneath the curve and above the x-axis by using trapeziums with a height of 5 units.

1. \( f(x) = -x^2 + 6x \) for the interval \( 0, 6 \)
2. \( f(x) = x^2 + 4x \) for \( 0, 6 \)

Solution

1. The interval \( 0, 3 \) indicates the domain of the function. It means the same as \( 0 \leq x \leq 3 \).

Area = sum of trapeziums

\[
\frac{1}{2} \left[ f(0) + f(3) \right] + \frac{1}{2} \left[ f(1) + f(2) \right] + \frac{1}{2} \left[ f(2) + f(3) \right]
\]

\[
\left[ \frac{1}{2} (1) + \frac{1}{2} (2) \right] + \left[ \frac{1}{2} (1) + \frac{1}{2} (2) \right] + \left[ \frac{1}{2} (2) + \frac{1}{2} (3) \right]
\]

\[
\frac{1}{2} (3) + \frac{1}{2} (4) + \frac{1}{2} (4) + \frac{1}{2} (5) = 10.5 \text{ units}^2
\]

2. We only need to calculate the area from \( x = 0 \) to \( x = 3 \). The total area then is twice this area. The reason is that the curve is symmetrical about the line \( x = 3 \).

\[
f(0) = 0 \]

\[
f(1) = -1 + 6 \Rightarrow -1 + 6 = 5
\]

\[
f(2) = -2 + 12 \Rightarrow -2 + 12 = 10
\]

\[
f(3) = -3 + 18 \Rightarrow -3 + 18 = 15
\]

Area = \( \frac{1}{2} (5) + \frac{1}{2} (10) + \frac{1}{2} (15) + \frac{1}{2} (15) + \frac{1}{2} (15) + \frac{1}{2} (15) = 35 \text{ units}^2
\]

Total area = \( 2 \times 35 = 70 \text{ units}^2
\]

Note

The perpendicular height of the trapezium is measured along the x-axis and the length of the parallel sides is obtained by getting \( f(x) \) when \( x \) is the value on the x-axis.
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CHAPTER 2 Temperature

At the end of this chapter, you should be able to:
- explain what temperature is
- describe physical properties of substances which change with temperature
- measure the temperature with thermometers
- describe suitability of alcohol and mercury for use in liquid-in-glass thermometers
- describe the relationship between the Celsius and Kelvin scales
- describe the structure and use of a thermocouple thermometer
- demonstrate the measurement of temperature using an appropriate thermometer.

Figure 2.1 Temperatures on earth can range from very cold to very hot.

Humans have always been interested in how hot or cold something is and so they have tried to measure it. The famous Greek doctor Galen, who lived approximately 200 BC, realised that when somebody was ill they often had a hot and red skin. However, he did not have any instruments to measure body temperature.

Instruments to measure temperature were invented around 400 years ago. In Italy, Galileo invented a thermometer that worked as a result of the expansion of air. By the mid-18th century there were about 20 different scales for measuring temperature. Today we generally use one temperature scale throughout the world. This is the scale originally developed by Anders Celsius in 1740. However, they still use the old Fahrenheit scale (where water freezes at 32°F and boils at 212°F) in the United States of America.

In this chapter you will learn about two ways of measuring temperature. You will also learn why scientists have a special temperature scale, called the Kelvin or absolute scale of temperature.

TOPIC 1 What is temperature?

Temperature is a measure of how hot or cold something is. We measure temperature on the Celsius scale (°C). On this scale, 0°C is the melting point of pure water, while 100°C is the boiling point of pure water.

Did you know?
Early thermometers were often circular in shape. The temperature was recorded as how far around the circle the thermometer column had moved. This is why we talk about measuring temperature in ‘degrees’.

You discovered in Chapter 1 that as particles get hotter, they move faster. Their kinetic energy increases. Temperature, therefore, is a measure of the kinetic energy of particles in a substance. Because kinetic energy will vary from particle to particle, we usually talk about temperature being a measure of the average kinetic energy of particles in the substance.

Many properties of substances change with temperature

You know from everyday life that many properties of substances change when the temperature changes. You discovered in Chapter 1 that substances expand as they get hotter. This means that their density decreases, as their temperature increases. You know that a steel bar grows if you put it into fire. The colour with which it glows depends on how hot it is. Did you know that the resistance of an electrical wire increases when the wire gets hot? We can use these properties that change with temperature to make instruments that measure temperature.

The Celsius and Kelvin temperature scales

The two temperature scales that scientists use today were developed by Anders Celsius and William Thomson.

Figure 2.2 Anders Celsius was a Swedish astronomer and geographer born in 1701. His father and both his grandparents were also well-known scientists and mathematicians. Anders Celsius was made a professor of astronomy at Uppsala University before he was 35. He made his famous Celsius thermometer to use during weather observation. It had 0 for the boiling point of water and 100 for the freezing point. This was changed to the present scale after his death in 1744.
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