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Pearson Zambia

Secondary Catalogue

2020

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Our experienced and well-trained sales representatives will be visiting your school during the course of this year to show you sample copies of our wide range of titles.

Contact us

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

Longman Zambia – books that you can trust!

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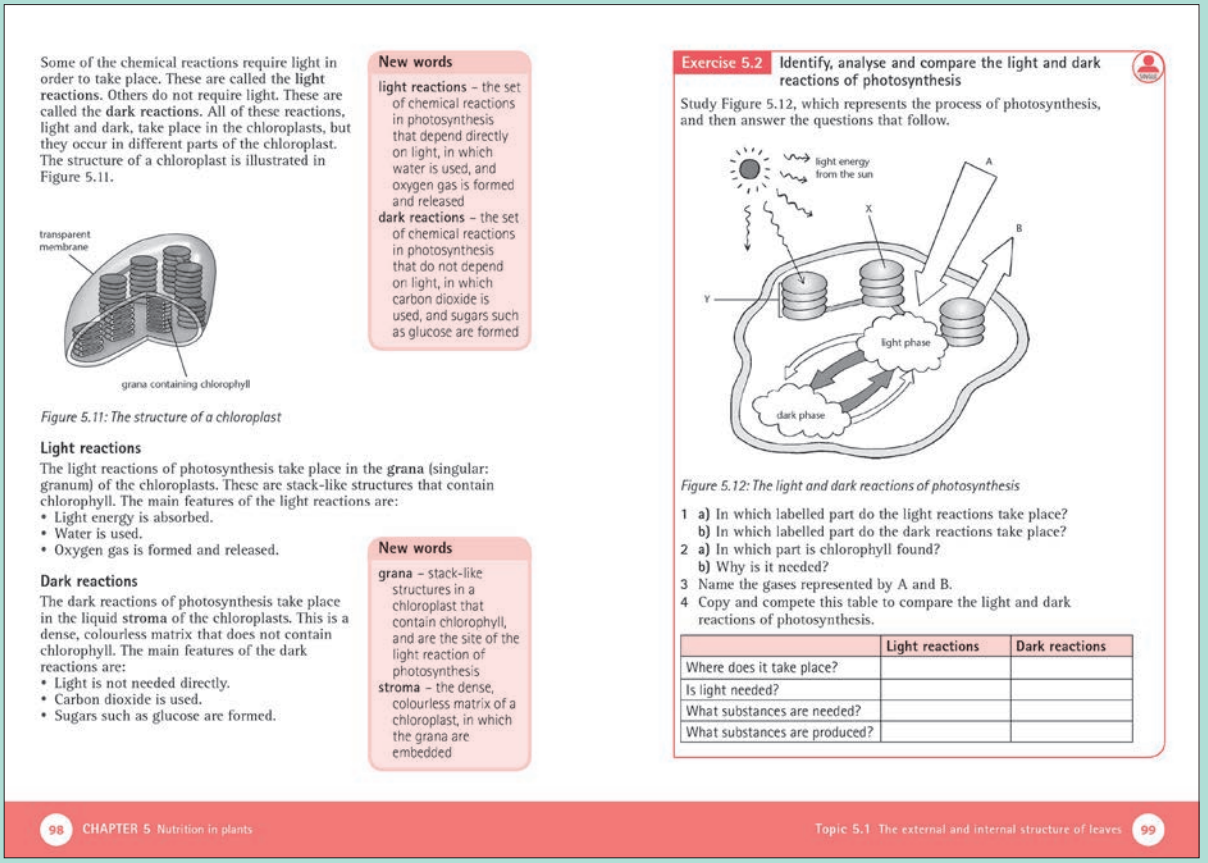
Biology Grade 10

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 level of the learners.
- Assessment activities and content summaries at the end of each chapter.
- Informative illustrations and photographs.



Some of the chemical reactions require light in order to take place. These are called the **light reactions**. Others do not require light. These are called the **dark reactions**. All of these reactions, light and dark, take place in the chloroplasts, but they occur in different parts of the chloroplast. The structure of a chloroplast is illustrated in Figure 5.11.

New words

light reactions – the set of chemical reactions in photosynthesis that depend directly on light, in which water is used, and oxygen gas is formed and released

dark reactions – the set of chemical reactions in photosynthesis that do not depend on light, in which carbon dioxide is used, and sugars such as glucose are formed

Figure 5.11: The structure of a chloroplast

Light reactions

The light reactions of photosynthesis take place in the **grana** (singular: granum) of the chloroplasts. These are stack-like structures that contain chlorophyll. The main features of the light reactions are:

- Light energy is absorbed.
- Water is used.
- Oxygen gas is formed and released.

Dark reactions

The dark reactions of photosynthesis take place in the liquid **stroma** of the chloroplasts. This is a dense, colourless matrix that does not contain chlorophyll. The main features of the dark reactions are:

- Light is not needed directly.
- Carbon dioxide is used.
- Sugars such as glucose are formed.

New words

grana – stack-like structures in a chloroplast that contain chlorophyll, and are the site of the light reaction of photosynthesis

stroma – the dense, colourless matrix of a chloroplast, in which the grana are embedded

Exercise 5.2 Identify, analyse and compare the light and dark reactions of photosynthesis

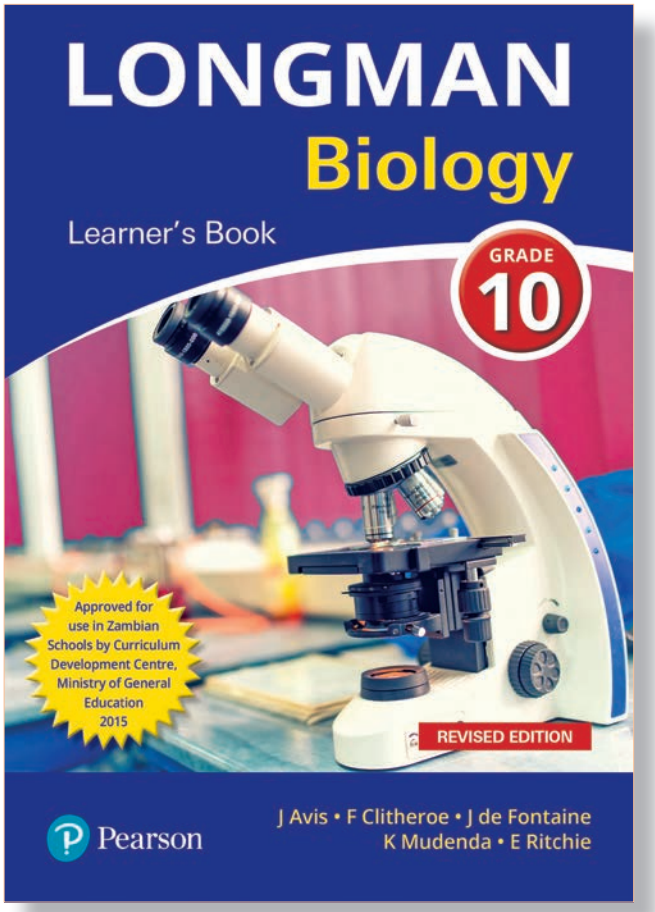
Study Figure 5.12, which represents the process of photosynthesis, and then answer the questions that follow.

Figure 5.12: The light and dark reactions of photosynthesis

1 **a)** In which labelled part do the light reactions take place?
b) In which labelled part do the dark reactions take place?
2 **a)** In which part is chlorophyll found?
b) Why is it needed?
3 Name the gases represented by A and B.
4 Copy and compete this table to compare the light and dark reactions of photosynthesis.

	Light reactions	Dark reactions
Where does it take place?		
Is light needed?		
What substances are needed?		
What substances are produced?		

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.



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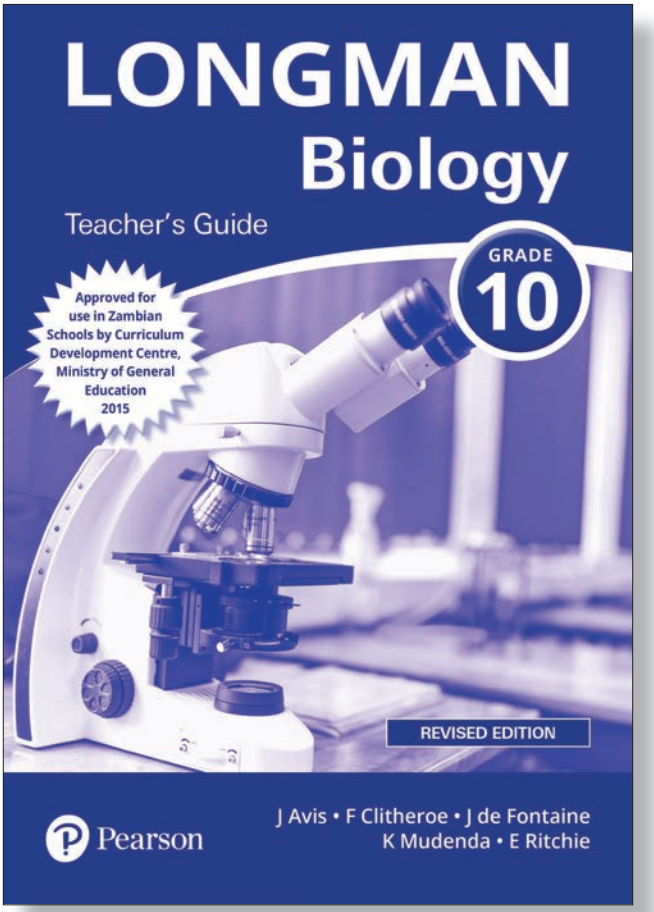

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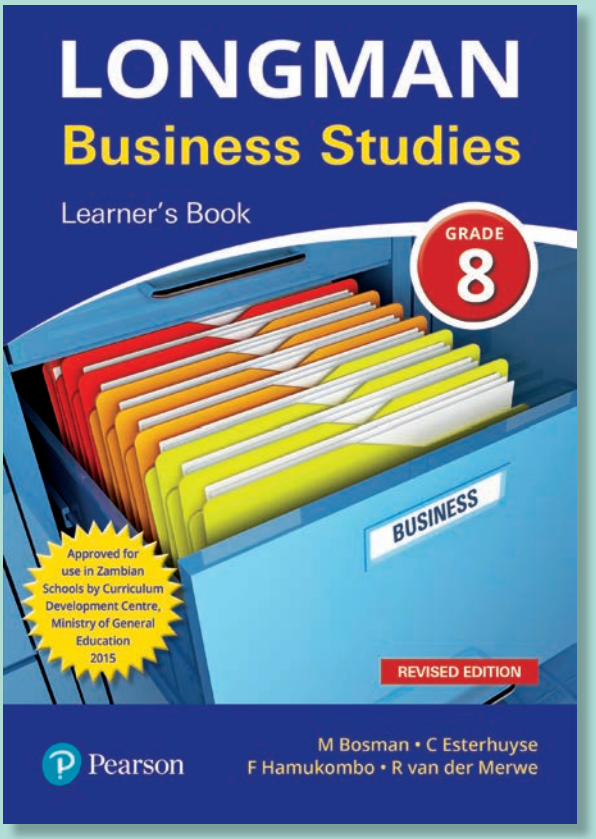
Business Studies Grades 8 and 9

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 level of the learners.
- Assessment activities and content summaries at the end of each chapter.
- Colourful illustrations and photographs.



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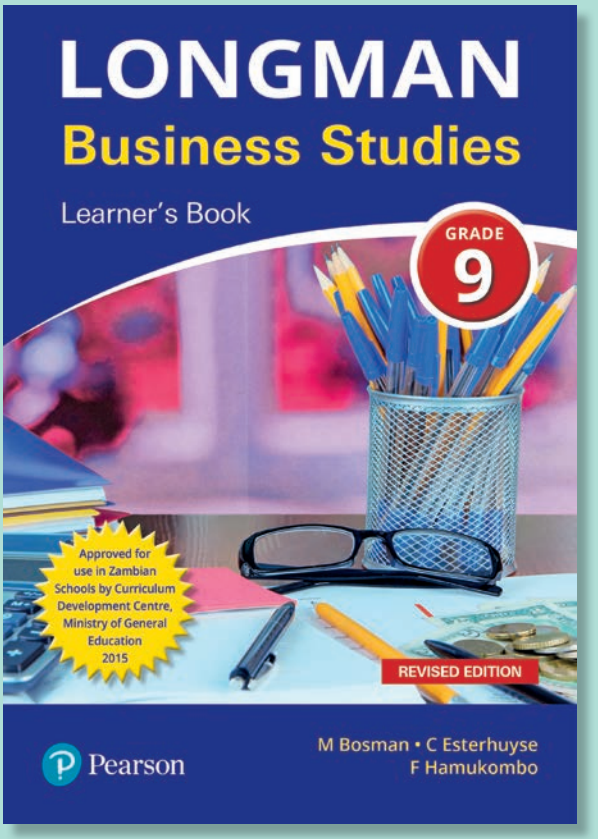

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These books are each accompanied by a Teacher's Guide that offers teaching guidelines and answers to all exercises and activities in the Learner's Book.

Read the following article about unrest in Zambia.

Causes of the current unrest

ACCORDING to government sources, there is no truth in the rumours that the current unrest in the mining sector can be attributed to xenophobia. '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 emphasised 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 70 per cent. This has brought negotiations to a deadlock and has resulted in the strike.

The owners of the three mines, Chinese businessmen Mr Wo Chong, Mr Yu Mai and Mr Sumi Tiang, were not available for comment.

One of the managers at the Kusi Coal mine expressed his distress at the death of his senior manager, Mr Sing Awai. On Monday Mr Awai was run over by a coal carrier and died instantly. Mr Awai was at the mine shaft, addressing a group of about 1 000 underground workers when the coal carrier suddenly appeared as if from nowhere and ran him over. No miners were injured in the accident.

Although this incident has officially been declared an unfortunate accident, senior 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 management,' one of the men alleged. 'They resent us. This is xenophobia. It has nothing to do with wage disputes.'

Influx of Chinese investment has supported and strengthened Zambia's developing mining sector, but also resulted in unrest.

The workers, however, claim that more than a hundred miners were shot at during a strike protest concerning poor working conditions and a lack of safety measures underground in 2013. Four miners died in the shooting.

In a press release early this morning, the Chinese owners claimed that a language barrier and a poor work ethic were to blame.

Government is considering a new law that will set a new minimum wage for mine workers. This minimum wage is roughly 65 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

Dumisani decides to take photographs at school events to earn pocket money. He realised 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 a special event.
He needs to invest in the following:
- Buy a camera.
- Pay for photography lessons.
- Buy equipment to develop photographs.

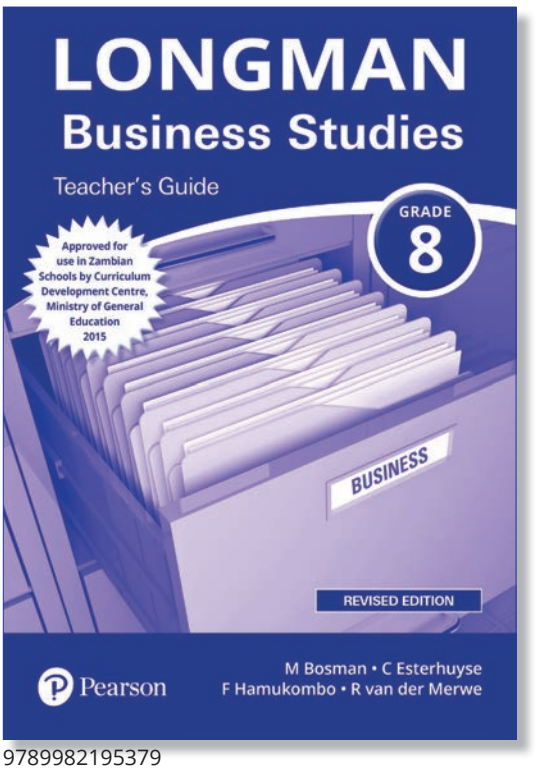
Advantages of the investment:
- Sole provider of the photography service.
- Lots of sporting events and functions to photograph.
- Skill to take photographs.
- Can continue with photography after leaving school at the end of matric.
- Can start his own photography studio.
- Can teach other learners the 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
- Innovative
- Risk taker
- Energetic
- Motivated
- Disciplined
- Responsible
- Committed

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
- Capital
- Resources (equipment, material, employees)
- Knowledge needed for this business
- Skills needed for this business
- Location
- Customers



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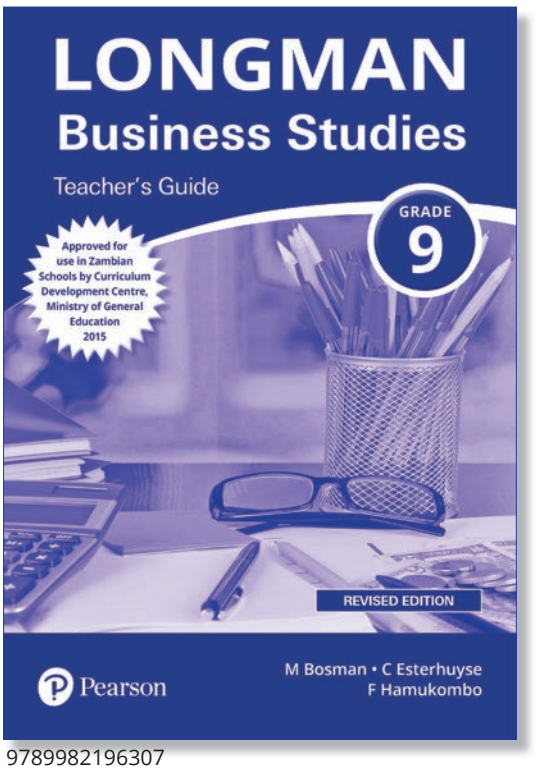

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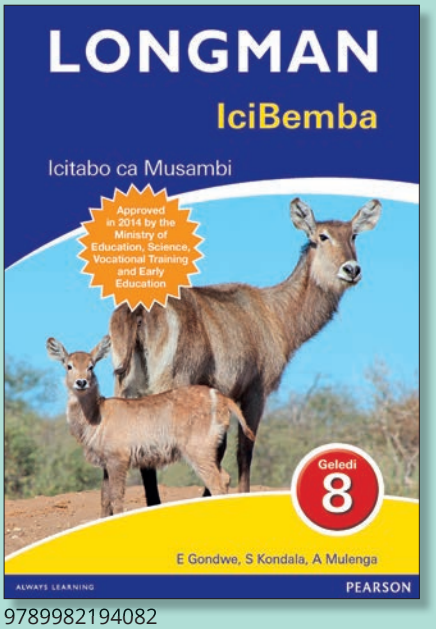
IciBemba Grades 8 to 10

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 grammatical 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.



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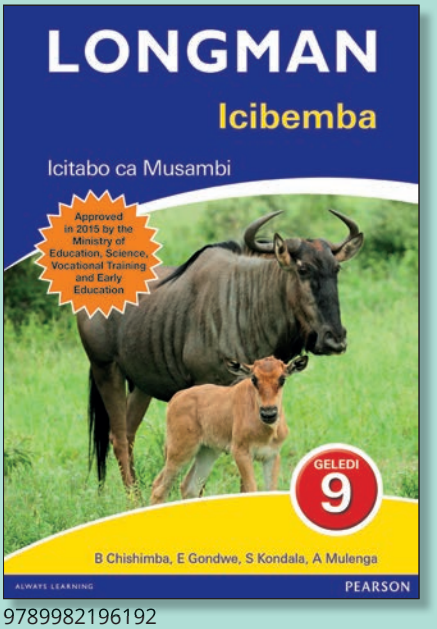

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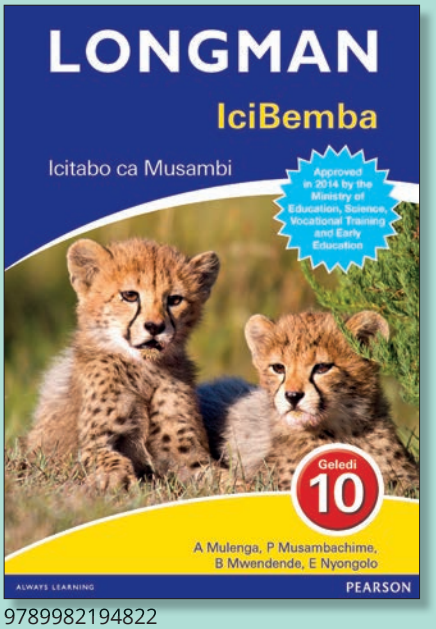

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Ifyakucita 1

1 Lanshanyeni pa fileecitika mu fikope mube mumabumba, mulembe ifyo mulelanshanya. Cila ibumba lilande ku icintu-bwingi.
   a) Bushe cinshi abantu isonde lyonse bafwailisha Lesa?
   b) Ukulingana na imitontonkanishishe yobe, cinshi calingila ukwishiba na ukulumbanya Lesa?

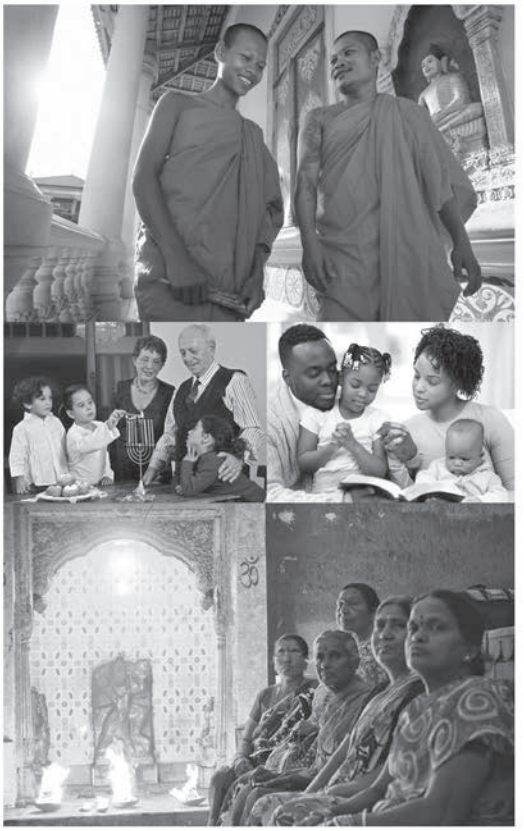
Ukubelenga

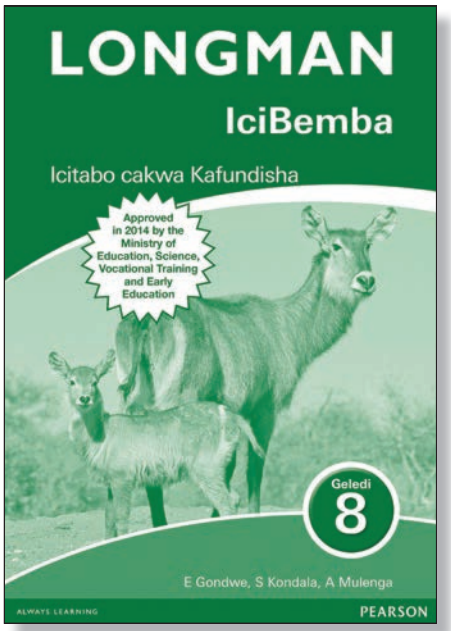
Ukufwaya fwaya Lesa

Bushe Lesa ninani? Inga eko aba nikwi? Bamo batila Lesa aba ku muulu. Bushe aba bantu bapilibula ukuti Lesa aba mu makumbi nangu mu lwelele? Bambi nabo batila Lesa abaa fye konse, mpanga fye yonse. Nga aba nabo finshi bapilibula? Nga iwe finshi waishibapo pali Lesa?

Umuntu onse pano isamba lya Icaalo, alikwata icilaka ca kufwaya fwaya Lesa. Abantu abengi isonde fye lyonse balikwata icisumino cakuti Lesa eko aba, nangu tamonekela ku cinso ca bantu, lelo eko aba. Naici icisumino caba pacishinka cakuti kwaliba amaka ayaba mufibumbwa fya pano Icaalo. Icaalo na ifibumbwa fyabamo, tafyaipangilefye fyeka iyoo. Lelo fifwile fyapangilwe na maka ukufuma kumo. Teyapo peka, imitukuto ya bantu mukufwayafwaya Lesa yalishininkisha ukuti Lesa cine cine eko aba.

Lesa wena eko aba lelo imifwailishe yakwe eyalekana lekana ku bantu abapusana pusana. Bamo ba Kirisitiani, bambi ba Juda, kwaisa aba Isilamu – nangu tutile ama moslemu, bambi nabo ba Hindu elyo, naba Buddha, naba Eckankar nabambipo fye.





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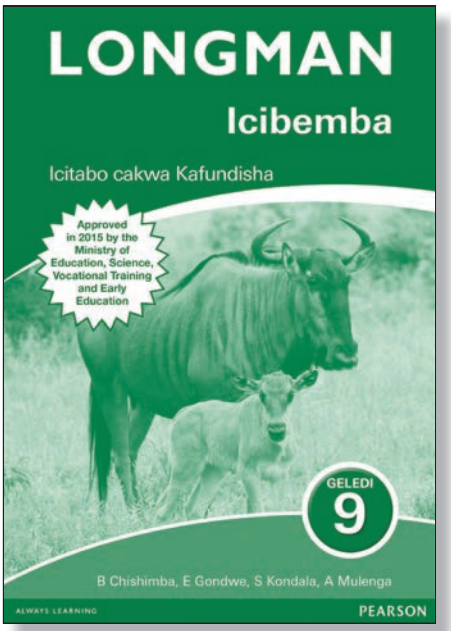

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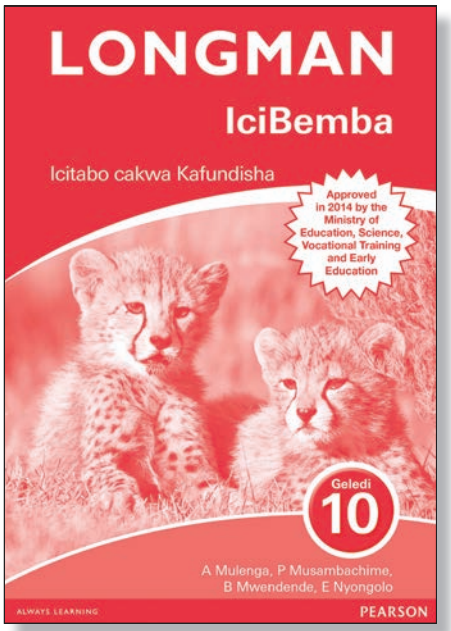

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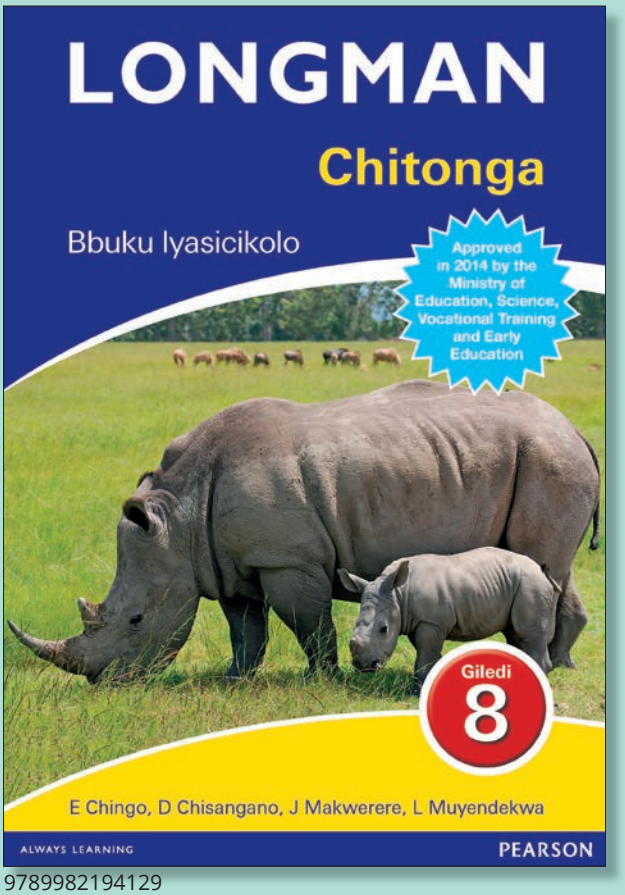
Chitonga Grades 8 and 10

Longman Chitonga 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 grammatical 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.



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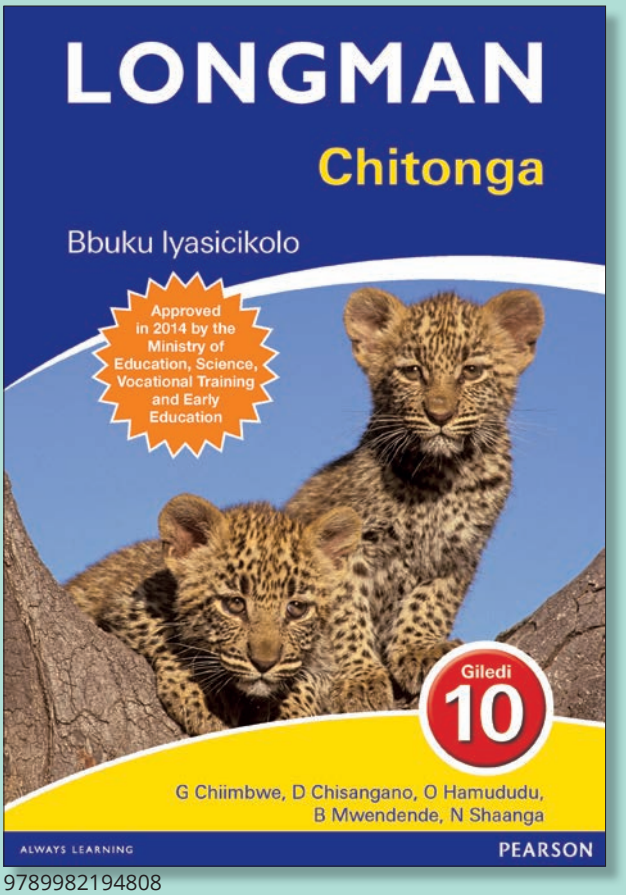

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Mazuba aano tulabona akuzyiba bantu balaa mpuwo kubikkilizya abamakaintu mbuli Esther Phiri walo wakali ngusyaankakila kumusobano wanyindi. Bamwi bantu balaa mpuwo mumbazu zyisiyene-siyene mbuli Matete, mukulunduka, ba Chilala mubulimi, ba Kenneth David Kaunda, kuba baleli ba Zambia bakutaanguna ba Barack Obama mubusololi, ba Nelson Mandela, mukulwanina lwaanguluko, alimwi abamwi mbotutakonzyi kubandauka.

Esther Phiri mukaintu wakali munkutwe kumakani aamusobano wanyindi alimwi ulidukide nyika yoonse mboizulwa. Inga twati nguntengwa mubili busungu buli mucamba. Tazundwi matanga, nkaambo ngu**syaankakila** mumusobano wanyindi. Pele tweelede kuzyiba kuti alimwi kuli mpuwo mbi. Eeyi mpuwo ilajanwa kwiinda mukucita zyintu zyibi naa zyisampuzya. Bamwi bantu balaa mpuwo mumamambi nkaambo tababoni iisuba. Balijisi **bukanku** butaambiki munkwela cakuti lyoonse tabakkalikili muciimo eeci. Aboobo balafwa abulwazi bwasikalileke.

Bamwi balaa mpuwo mububbi, mubujayi, mukuvwiya, mubulozi, mubucakolwa alimwi azyintu zyimwi zyibyaabi kapati zyalo zyipa kuti bantu batakkali kabotu pe. Tweelede kuba ampuwo zyipa bulemu, bulumbu akugwasya basimukoboma. Mpuwo zyamusyobo ooyu zyileta lusumpuko mumikwasyi amucisi coonse mbocizulwa. Pele mpuwo mbi itola aansi lusumpuko abuvwubi bwacisi nkaambo kakuti bantu balaa mpuwo muzyiyanza zyibi balalijana mumalwazi, ntenda azyintu zyimwi zyijaya maumi aabo mbuli bulwazi bwasikalileke. Bana babo balakakilwa kwiiya nkaambo kakubula mali mukuti bazyali babo balatakanisya mali muzyilengwa zyamafwunze. Cimwi ciindi balaangwa akusiya mikwasyi yabo mumapenzi mapati.

Amabala mapya

syaankakila – muntu usyomeka, munkutwe alimwi muyumu kucita zyintu
bukanku – buvwuule butaambiki

Toonse tweelede kugwasilizya kusumpula cisi cesu kwiinda mukucita zyintu zyileta lusumpuko abulumbu kubantu. Mukozyanyo wabantu bamwi.



Nbuli mbukwaambwa kale, boobu mbalombwana ba Kenneth David Kaunda, Barack Obama aba Nelson Mandela.

Cakucita 2 **Kupandulula mpuwo azyakuyabizya**

Mutubunga twabobilo-bobilo kamwiingula mibuzyo iiccilila:
1 Ino mpuwo igwasya nzi kumuntu?
2 Sena kuli mpuwo mbyaabi? Kopandulula mpuwo mbyaabi.
3 Kobandauka zyibelesyo zyakuyabizya.

Mulimo 1 **Vwiila mibuzyo**

Kobala cibalo campuwo alimwi wamana wiingule mibuzyo iiccilila.
1 Kuzwa mbolyabelesyegwa muciga cakusaanguna cacibalo, kopandulula ncolyaamba bbala lya "mpuwo".
2 Ono kolemba zyintu zyotatwe zyipa mpuwo mbotu.
3 Kosala kaambo kaluzi akati katootu:
   a) Mpuwo zyili mumbazu zyobilo.
   b) Kuli buyo musyobo wampuwo omwe.
   c) Mpuwo ipa buumi butamani.
4 Mabala nzi aazwa mucibalo aamba cintu comwe ayaaya:
   a) Nduumo
   b) Cikkomanisya
   c) Mupila
   d) Mfwaindi
   e) Zyipego
5 Konomoona mabandausyo otatwe kuzwa mucibalo wamana waabelesye mutwaambo twako.
6 Kopandulula maambila mbali aaya kweendelana ambwaabelesyegwa mucibalo:
   a) Ntengwa mubili
   b) Taboni iisuba
   c) Tazundwi matanga.

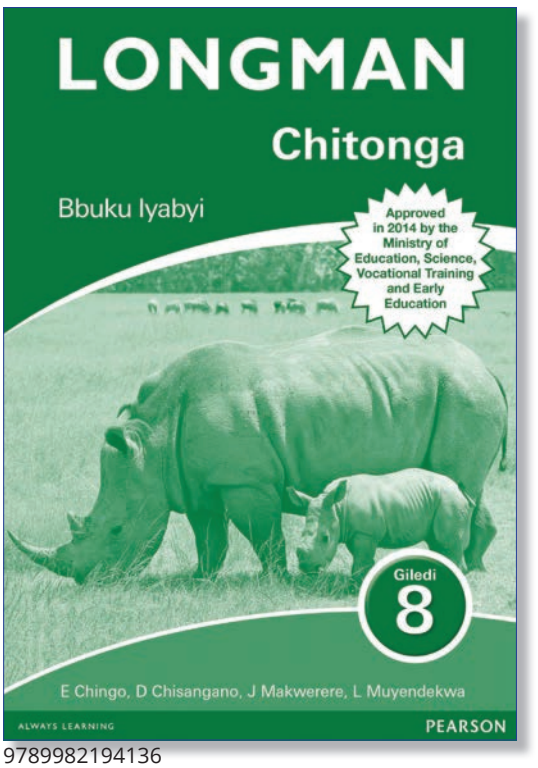
Kulemba

Caano cakulipandulula

Kuli zyaano zyaanwa buyo azyaano zyakulipandulula. Eezyi zyaano zyili mbuli mulaso. Ulakonzya kupandulula muntu, lwako omwini antela cintu.

Cakucita 3 **Kulipandulula mukukanana**

1 Mutubunga twabotatwe-botatwe kamukanana zyaano zyakulipandulula.
2 Kamubamba mitwe yamakani yotatwe akukanana mitwe eeyi ncoyaamba.



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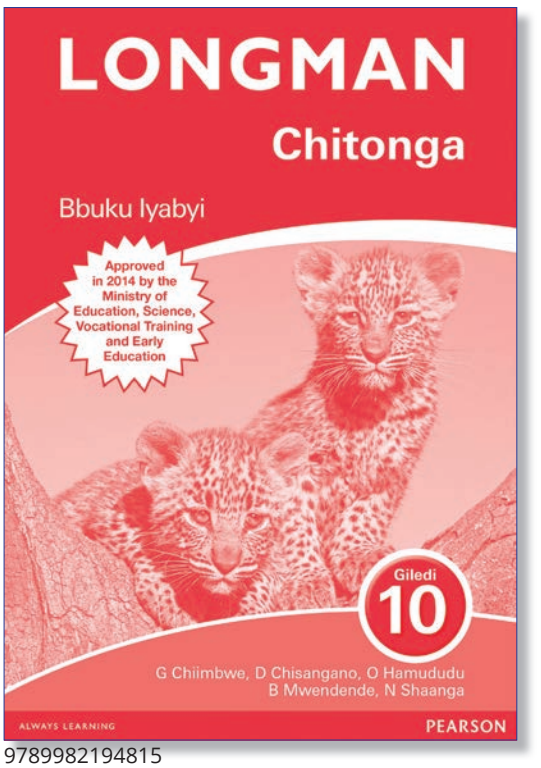

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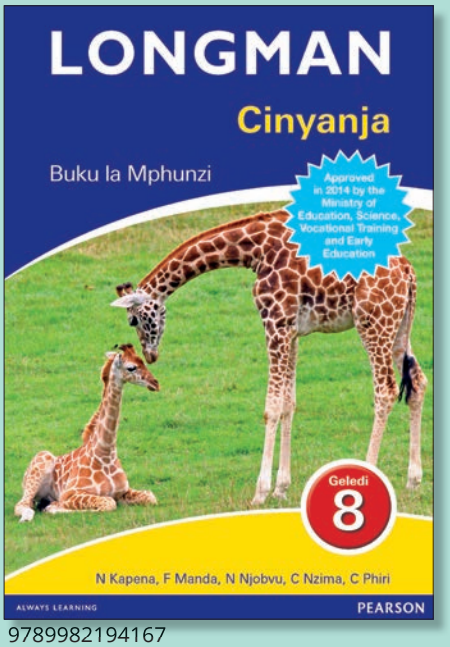
LONGMAN

Cinyanja Grades 8 to 10

Longman Cinyanja 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 grammatical 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.



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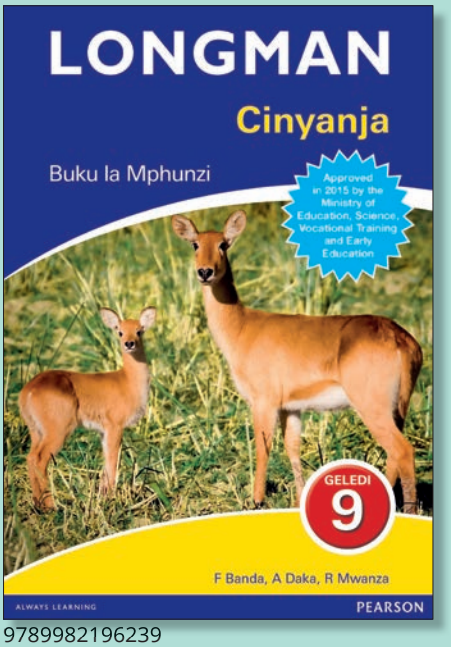

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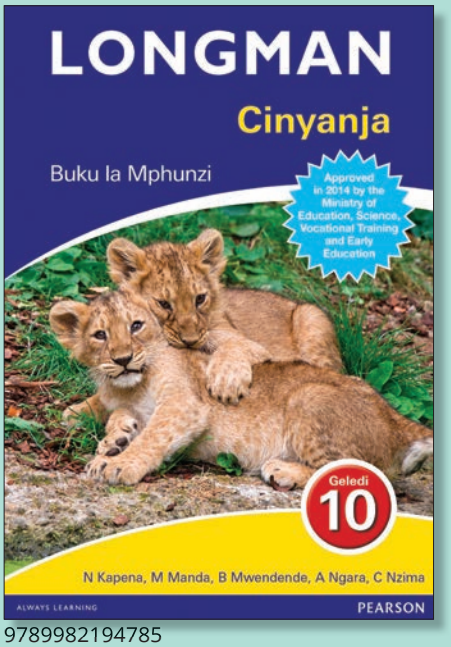

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MUTU 7 Njira zoyenera zakadyedwe

Potsirizira pa mutu uyu aphunzi onse ayenera:
- Kugwiritsa nchito mau oyenera mnthawi zosiyana.
- Kuzindikira ndi kusanthula mau ozama.
- Kungwiritsira nchito mau ozama m'nkhani.
- Kusiyanitsa pakati pa afotokozi ndi apamneni.
- Kugwiritsa nchito afotokozi.
- Kuika afotokozi m'magulu kulingana ndi abvomerezi ao.
- Kulemba mau amene ali ndi kamvekedwe kolinga ndi m'mene achulidwira m'cilankhulo cobwerekedwakoco.
- Kulemba nkhani kucotsa msewero.

Mvetsero ndi lankhulo

Zocita 1

Penyetsetsani pa cinthuzi ici:
a) Lembani m'ndandanda wa mau amene angagwiritsire nchito Mwatha pa kulankha ndi agogo ake.
b) Lembansoni m'ndandanda wa mau amene agogo ake Mwatha angagwiritsire nchito pofuna kulankhula ndi m'dzukulu wao.

Mwatha alankhulana ndi agoya ake a Tikulirekuti

Kuwerenga

Zocita 2

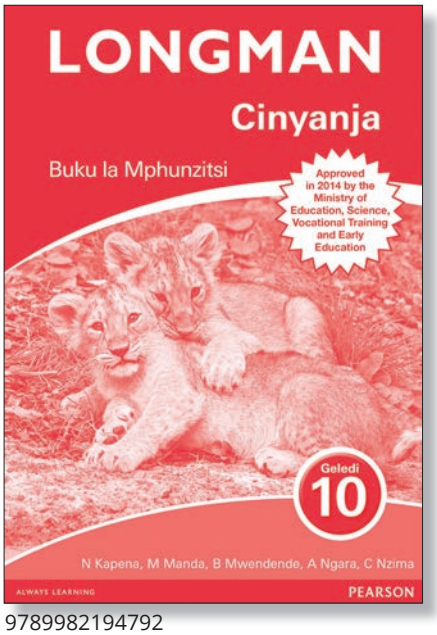
Kambiranani mafunso otsatirawa ndi m'nzanu pakugwiritsira nchito cithunzi ciri pa mwamba apa.
1 Kodi ndi zakudya zotani zimene tiyenera kudya kuti tikhale **athanzi** labwino?
2 Kodi mau akuti kudya zakudya zosayenera atanthauza ciyani?
3 N'cifukwa ciyani tiyenera kusamala zakudya zomwe timadya masiku onse? Ikani cakudya ciri conse ciri pa cithunzi apa m'magulu ake.
4 Tsopano werengani nkhani yonena pa za cakudya.

Mau atsopano

athanzi – umoyo wa thupi; thanzi la bwino ndiko kuti thupi la munthu liribe zosowekera ziri zonse

Magulu azakudya ndi kadyedwe

Pali Njira zoyenera za kadyedwe ndi maphunziro okhudzana ndi zakudya za thanzi la munthu. Anthu ophunzira za kadyedwe amayesetsa kuti apeze zakudya zimene zingathandize munthu mokwana bwino atazidya. Iwo apeza kuti zakudya ziyenera kukhala za mitundu yosiyana-siyana monga zakudya zopatsa mphamvu, zakudya za mafuta, zakudya zomanga thupi ndi m'cere.



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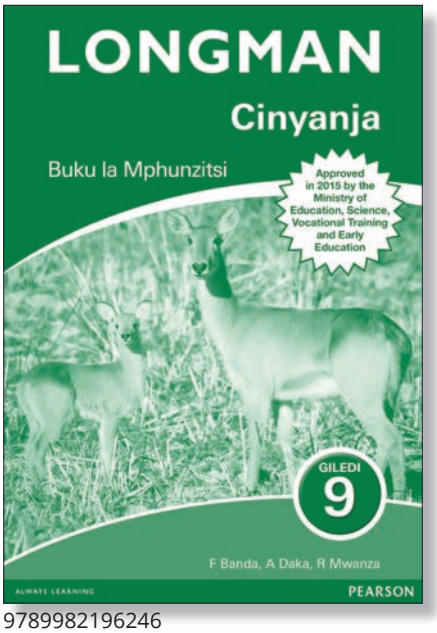

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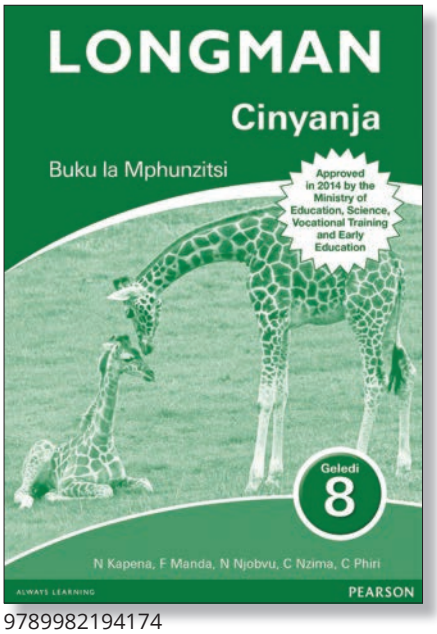

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Civic Education Grade 10

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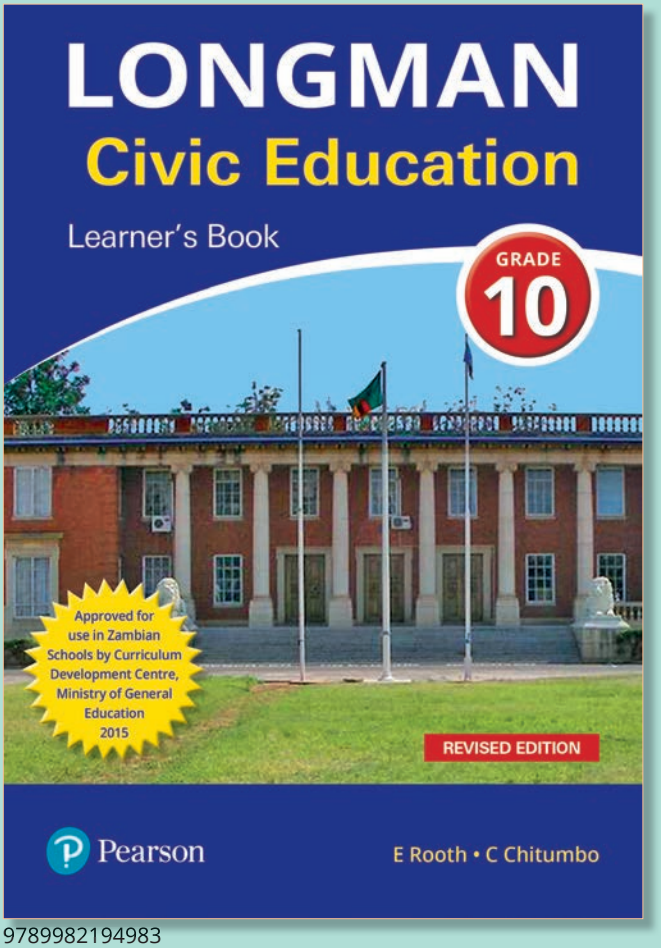
- Many exercises to reinforce learning.
- Content presented in clear and simple English, at the level of the learners.
- Assessment activities and content summaries at the end of each chapter.
- Informative illustrations and photographs.



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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 to 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 6.7 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 crocodiles, or in life after death.

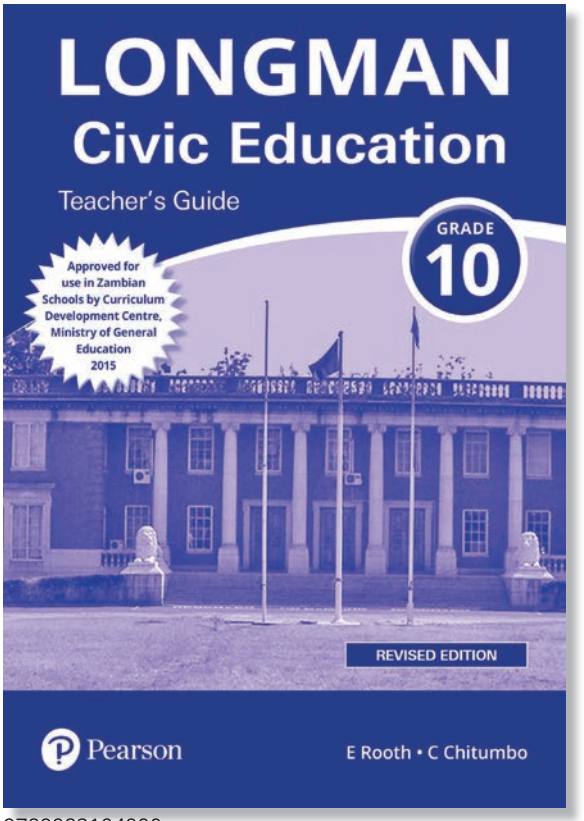
Our traditions include our customs and cultural practices. This is the way of life that is unique to us. Traditions are conventions that guide our behaviour and actions. We follow our Zambian traditions that have been passed on from those who went before us.

Exercise 1 Describe culture

1. Write a paragraph to describe culture.

Activity 1 Describe your culture

1. Briefly describe your culture.



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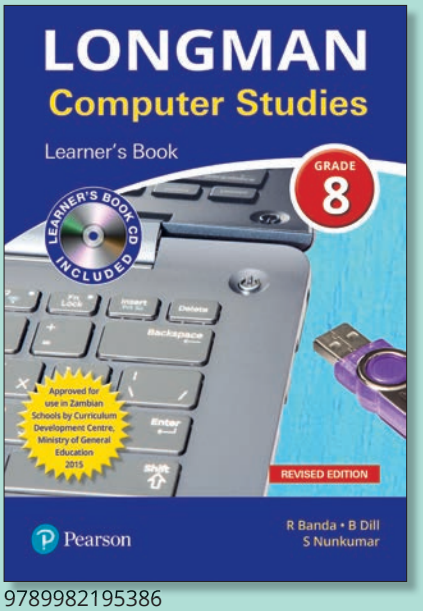
LONGMAN

Computer Studies Grades 8 to 10

Longman Computer Studies offers:

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.



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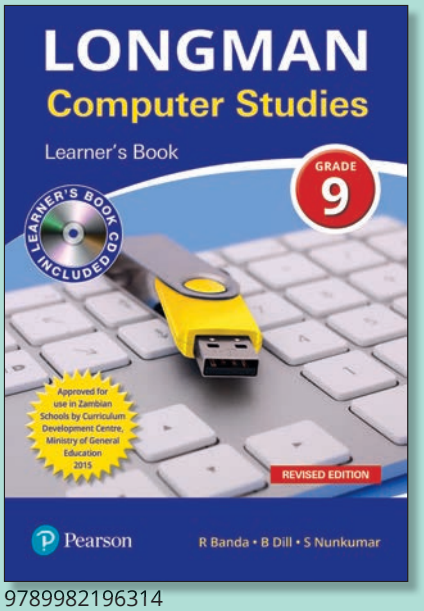

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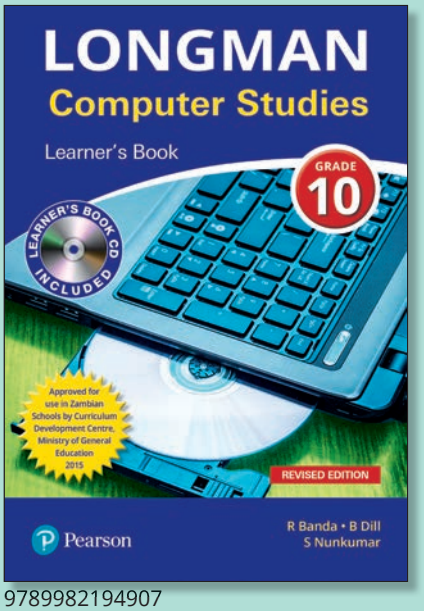

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The Learner's Book and its accompanying CD are complemented by a Teacher's Guide, which suggests what methodology to use, and a Teacher's CD with easy-to-use files with answers and/or solutions to activities.

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.

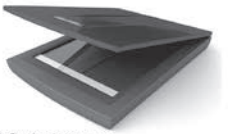
TOPIC 1 Digitising images

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.

New word

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



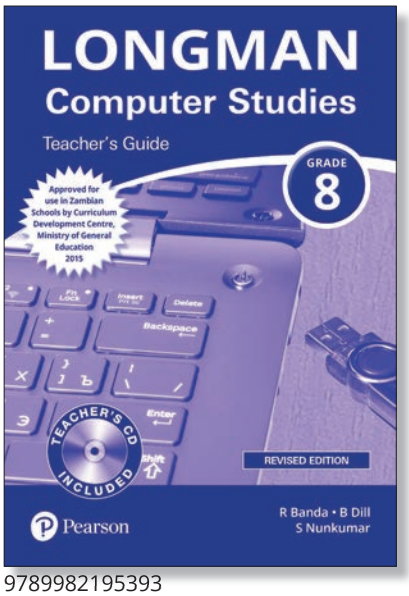
A flatbed scanner

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 multi-function printer with a scanner option

A photocopier that can also scan

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.



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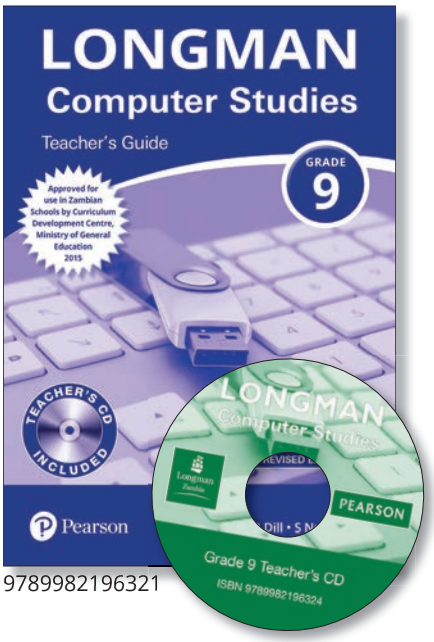

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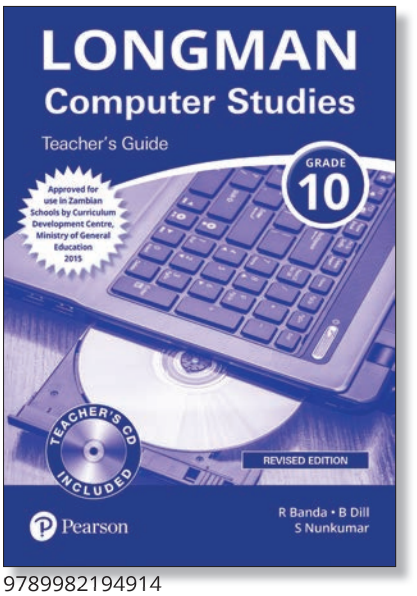

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LONGMAN

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 grammatical structures.
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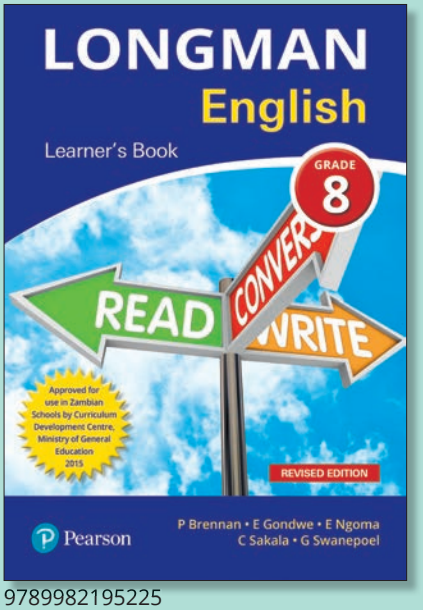
- Assessment activities at the end of each unit.
- Informative illustrations and photographs.



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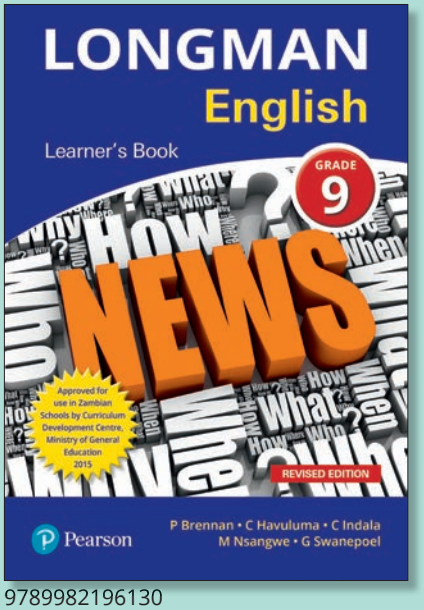

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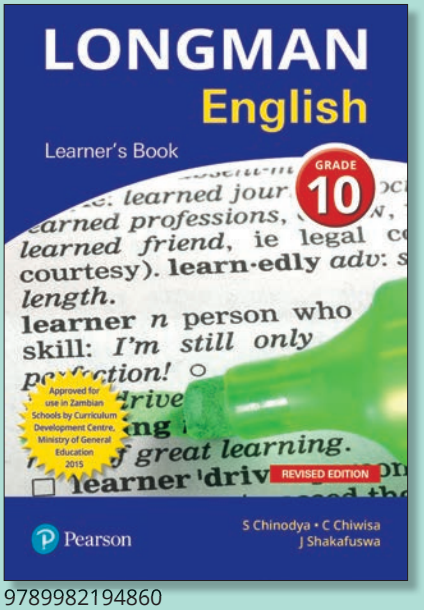

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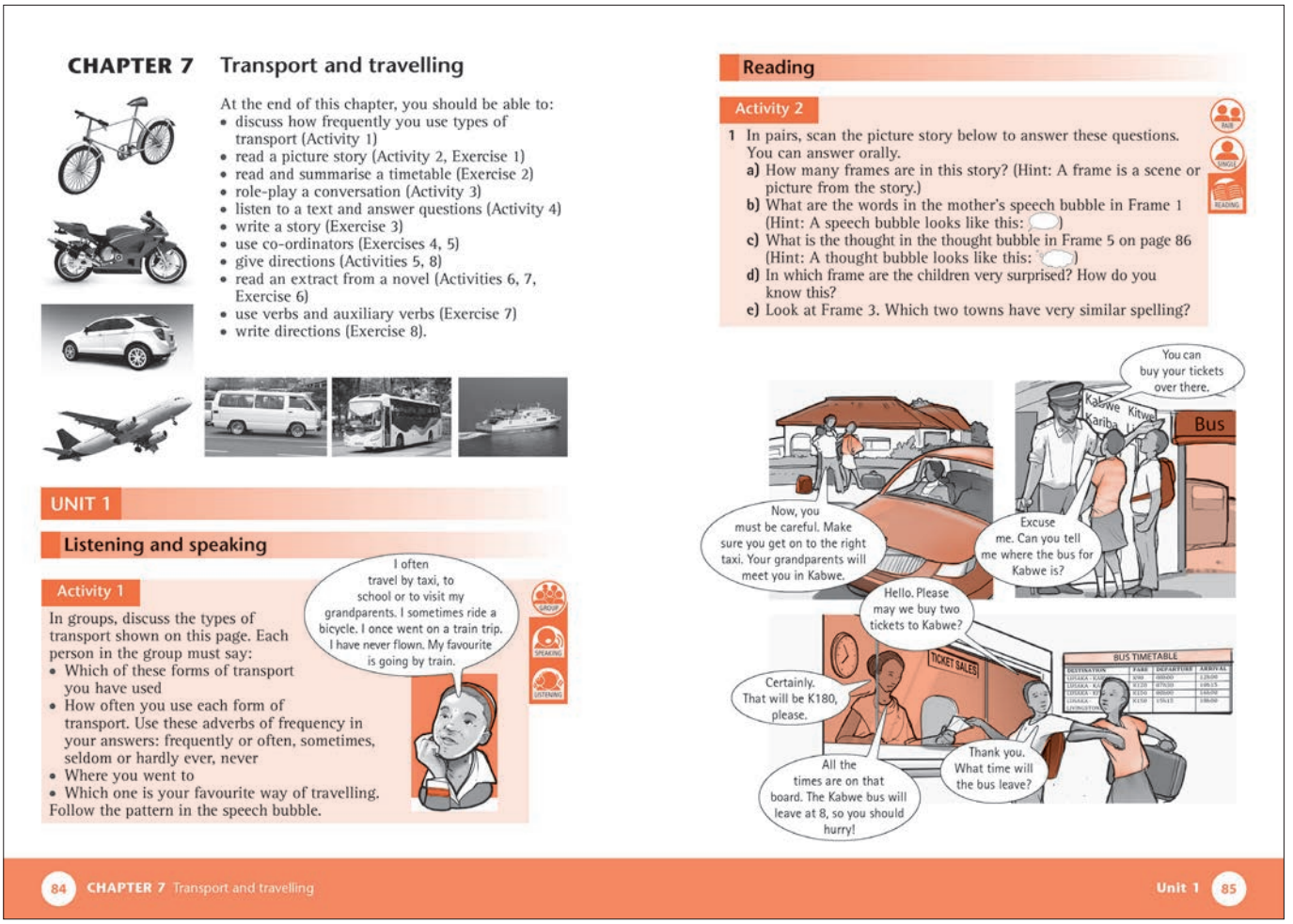


CHAPTER 7 Transport and travelling

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-ordinators (Exercises 4, 5)
- give directions (Activities 5, 8)
- 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

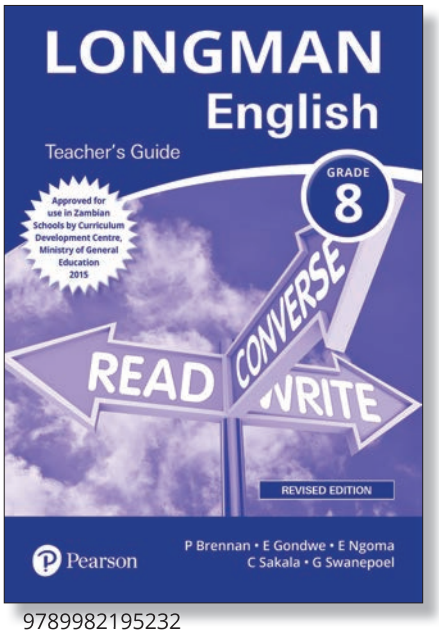
In groups, discuss the types of transport shown on this page. Each person in the group must say:
- Which of these forms of transport you have used
- How often you use each form of transport. Use these adverbs of frequency in your answers: frequently or often, sometimes, seldom or hardly ever, never
- Where you went to
- 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 thought bubble in Frame 5 on page 86 (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 3. Which two towns have very similar spelling?



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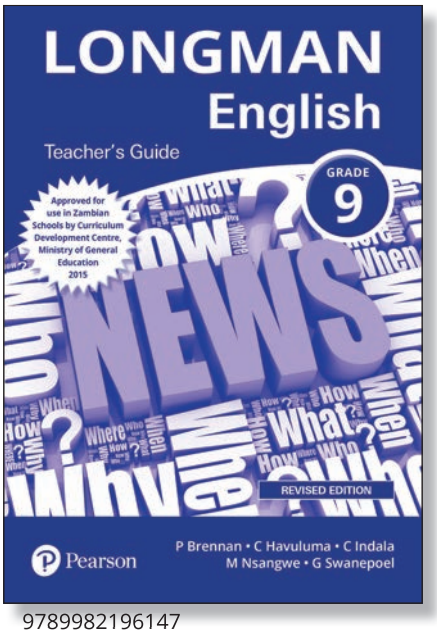

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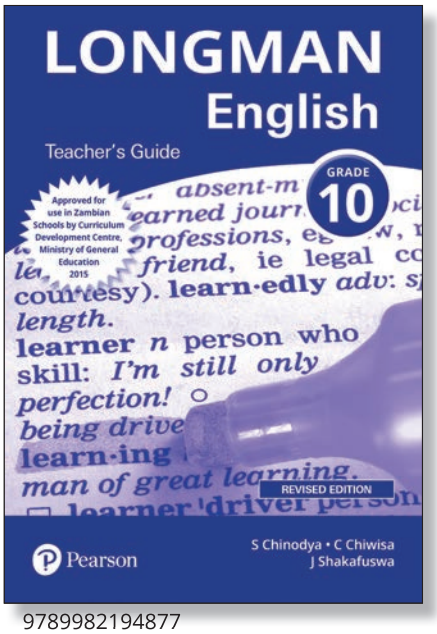

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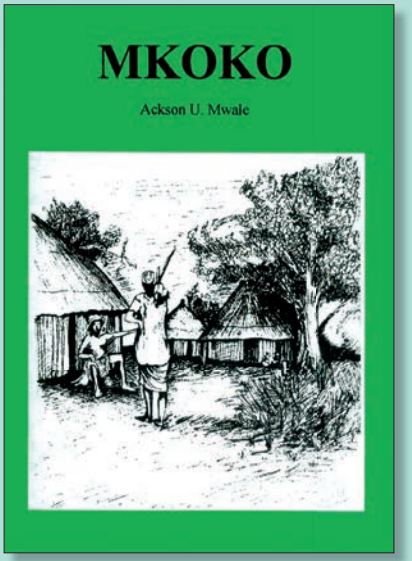
These titles all meet the requirements of the new curriculum.



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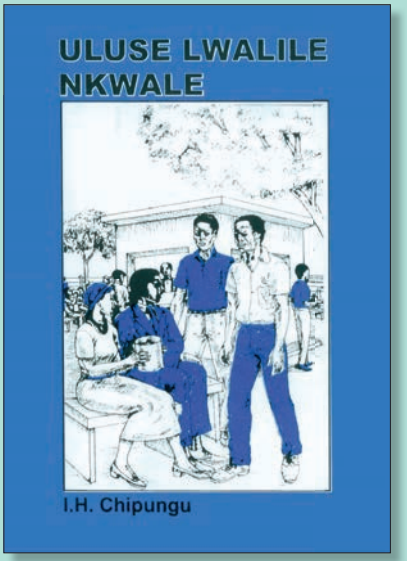

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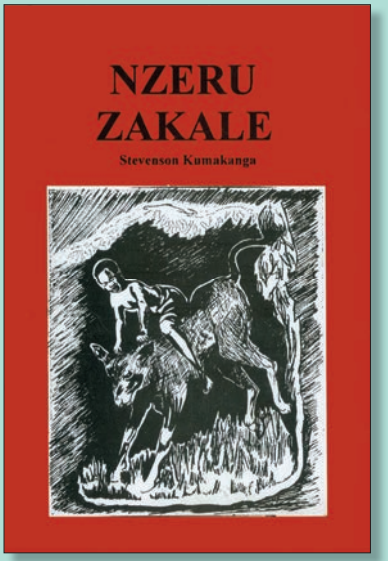

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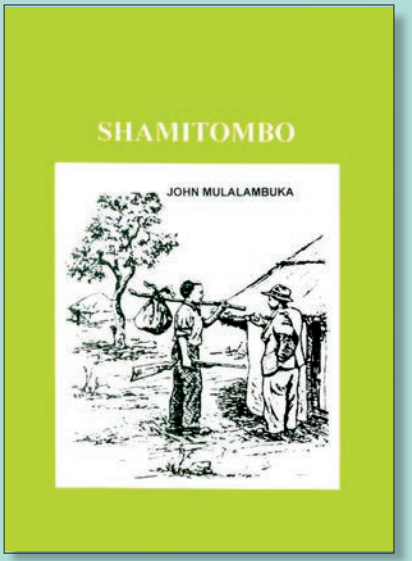

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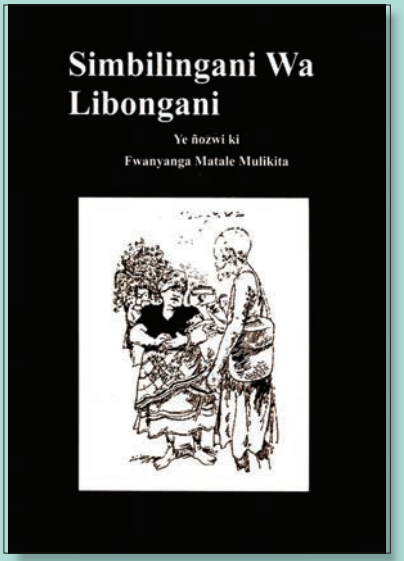

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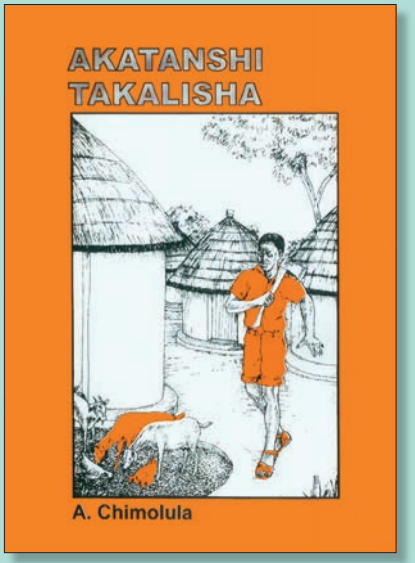

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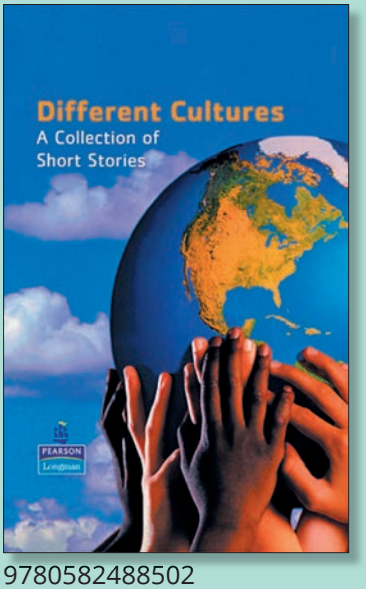

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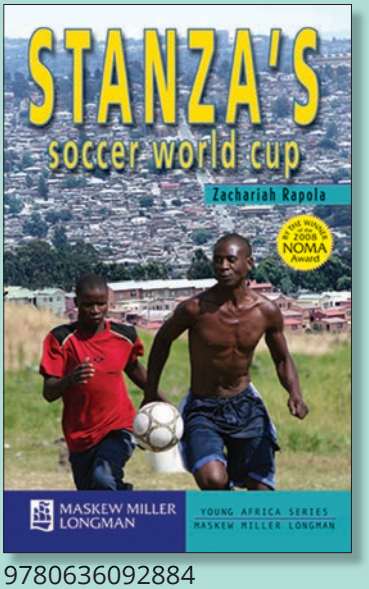

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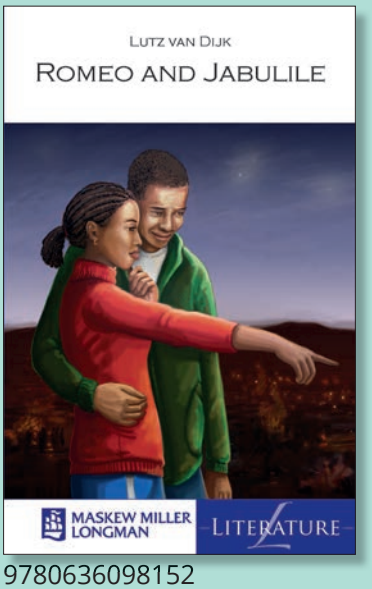

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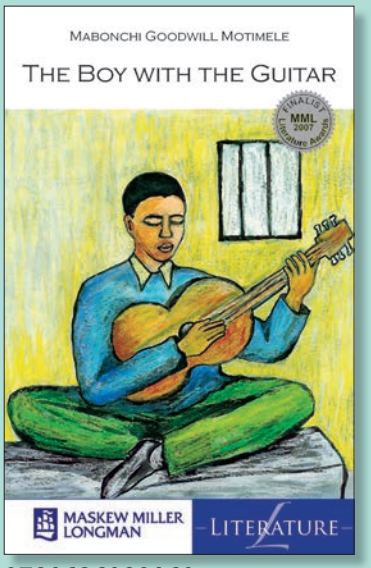

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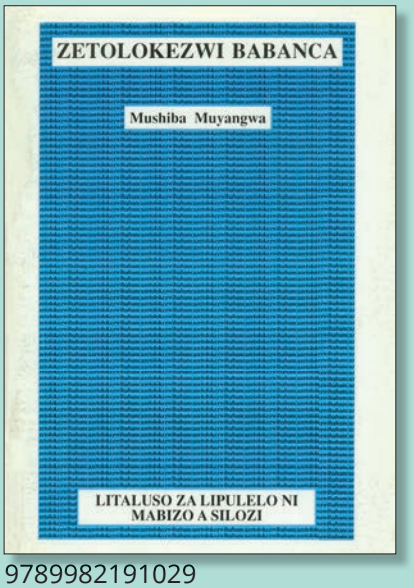

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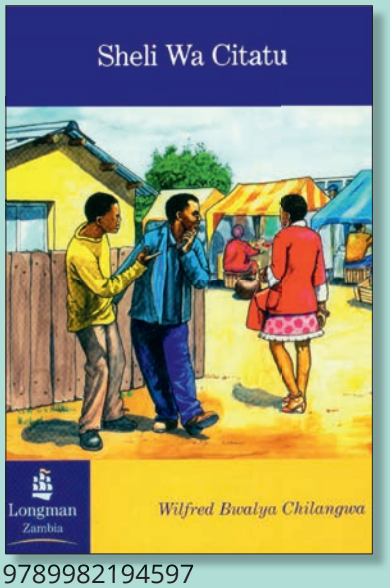

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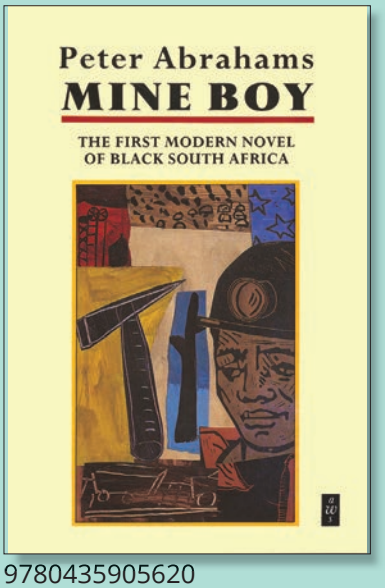

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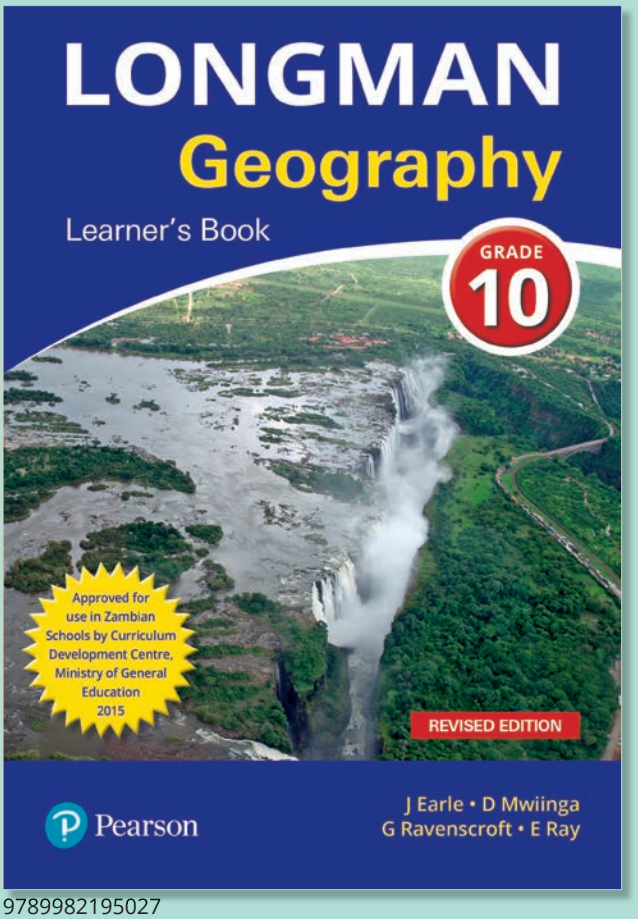
- A variety of activities to support skills development and application of knowledge.
- Many exercises to reinforce learning.
- Content presented in clear and simple English, at the level of the learners.
- Assessment activities and content summaries at the end of each chapter.
- Informative illustrations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



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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 us many of the things on the ground. Topographic maps 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, farmland, railways, power lines and mines
- other features, such as names of places, rivers, farms, and boundaries of different kinds.

Key words

topographic map – map showing the relief of the land, the vegetation and many of the constructed (man-made) features

symbol – a sign that represents an object

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.

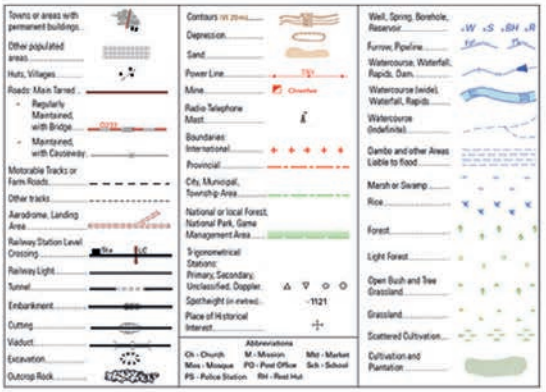


Table 1.1 Symbols used on Zambia's 1:50,000 topographic map sheets

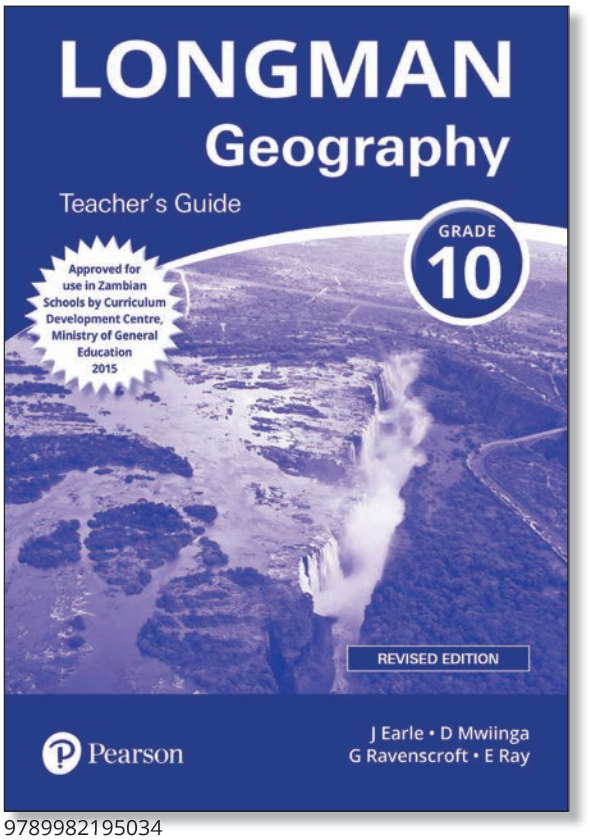
Table 1.2 shows photographs of some topographic features. These are what the map symbols represent.

	Main road		Mast or tower (for telephone, radio and TV signals)
	Road cutting		Dam
	Farm road		Open bush and tree grassland
	A track		Forrest
	Power line		Rice plantation
	Trigonometrical station		Cultivated land (a maize field)

Table 1.2 Photographs and map symbols of some topographic features

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) forest
   d) huts/village e) power line



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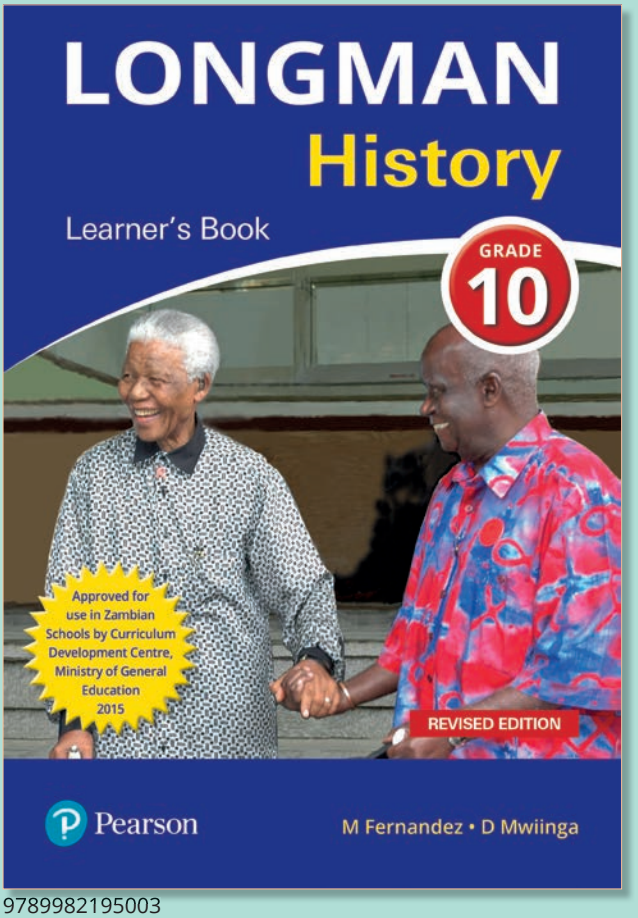
- Many exercises to reinforce learning.
- Content presented in clear and simple English, at the level of the learners.
- Assessment activities and content summaries at the end of each chapter.
- Informative illustrations and photographs.



9789982195003

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TOPIC 2 Indigenous communities

CHAPTER 3 Earlier inhabitants of Southern Africa

At the end of this chapter you will be able to:
- discuss the socio-economic and political organisation of the San and the Khoikhoi.

Do you recognise any of the indigenous groups shown in the pictures above?

Oral activity

1. Discuss with a partner the different groups of people in South Africa that you are aware of, both in the past and in the present.
2. Then compare your ideas with those of the rest of the class.

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 120 000 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 cave dwellers 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.

Key word

archaeology – the study of peoples of the past from what physical remains they left behind

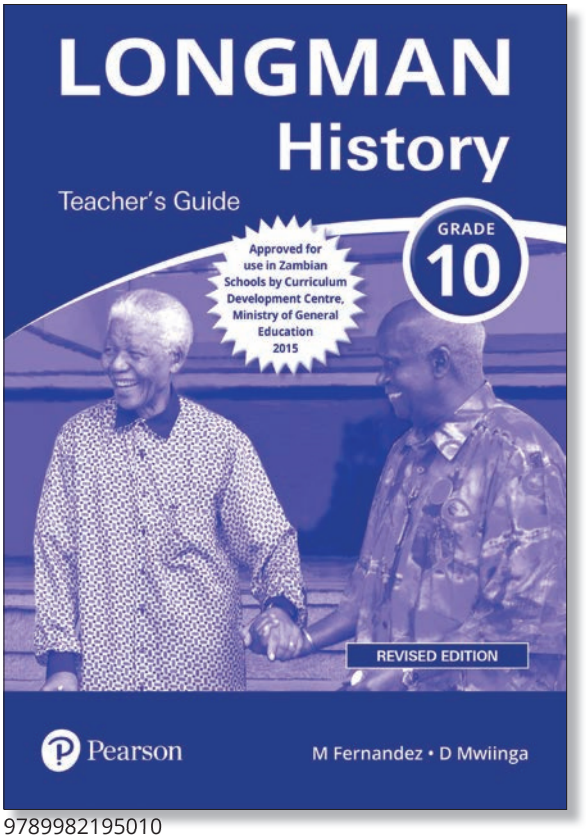
catgut – natural cord or string made from natural fibres found in the intestinal walls of sheep, cattle or horses, (not cats)

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 bigger 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 skilfully made tools from wood and stone, clothing from animal hides, and even musical instruments from wood, **catgut**, and ostrich quills, as well as bows and arrows tipped with poison. They have left an impressive record of their culture in many thousands of rock paintings and engravings throughout Southern Africa.

The San have used ostrich egg shells as water containers for centuries.



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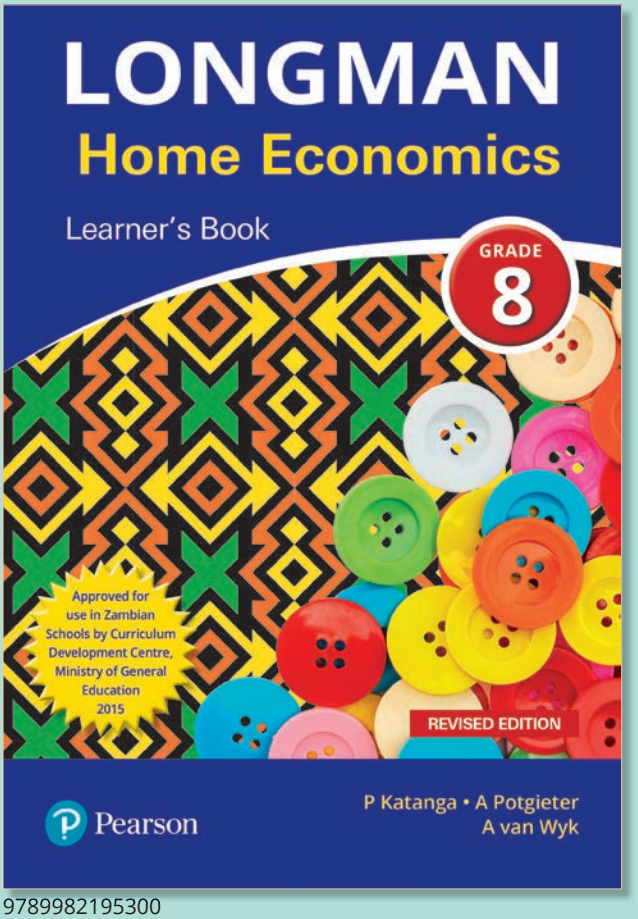

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CHAPTER 3 Health education

A family enjoying a healthy meal.

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-organised 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 save 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 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 suffocation 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

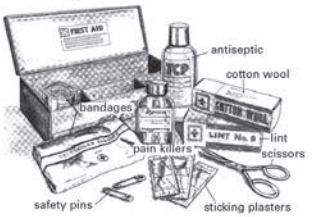
First aid is giving immediate care to a victim with an injury or illness. It is performed until the injury or illness is adequately dealt with (such as in the case of small cuts, minor bruises and blisters), or until professional medical care is available.

Key concept

First aid refers to treating minor injuries and also helping someone who has been injured severely or is in distress due to choking, heart attack, allergic reactions and drugs.

Contents of the first aid box

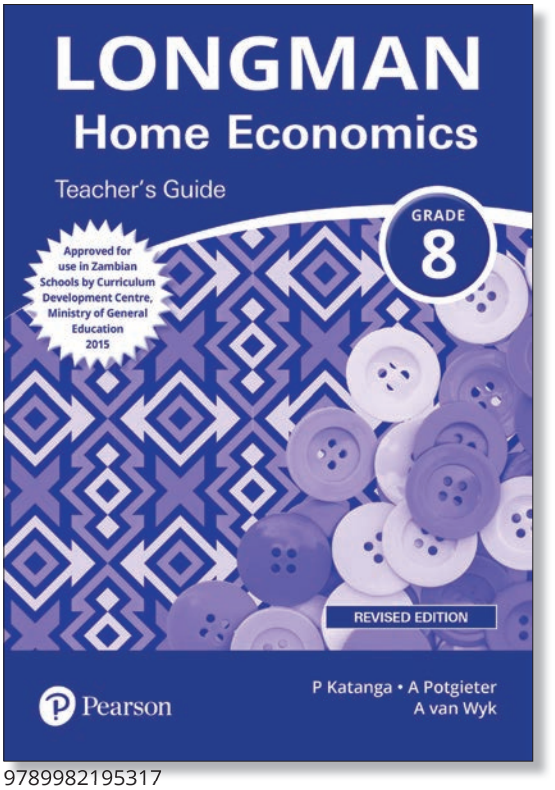
The basic requirements for a first aid box are safety pins, cotton wool, scissors and sterile bandages of various sizes, gauze, burn dressing, adhesive plaster, *Vaseline*, antiseptic solution (*Dettol*) and pain killers.



The contents of a first aid box

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 clean clothing, bedding or towels.
- Splints: use wood (planks), plastic, and cardboard or metal, for example a broom or an umbrella. Use a T-shirt as padding.
- Slings: the bottom hem of a victim's shirt pinned to the top centre of their shirt or blouse will immobilise a forearm or shoulder injury.
- Bandages for sprains/fractures/breaks: use clothing such as jackets, sweatshirts, T-shirts, or clean dish cloths and towels to provide temporary cushioning and support.



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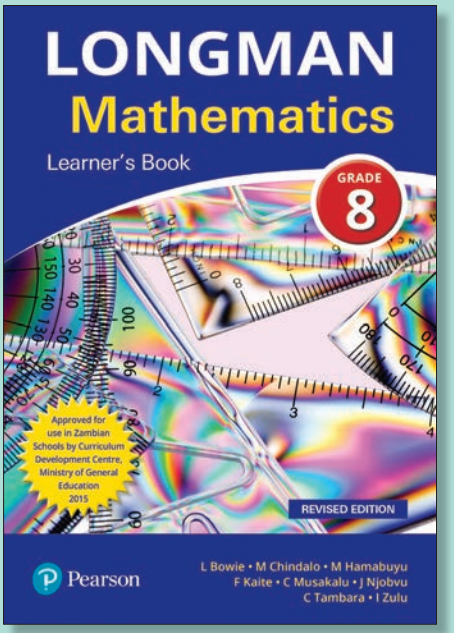

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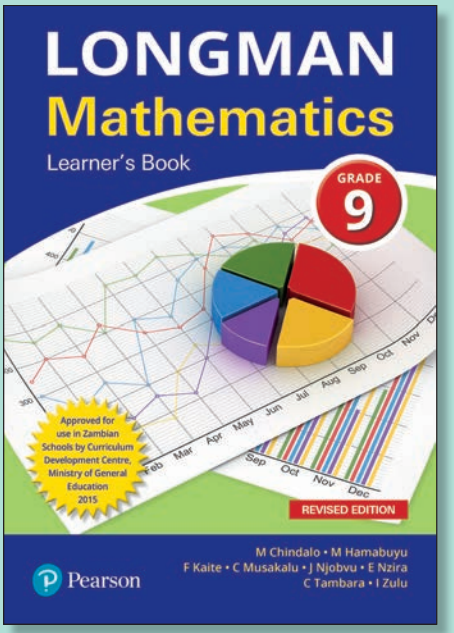

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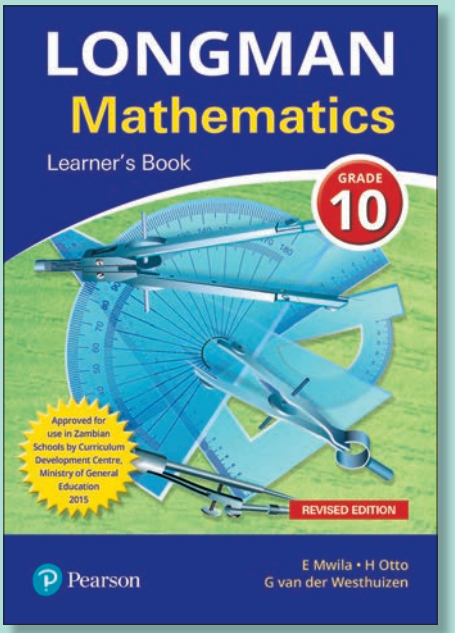

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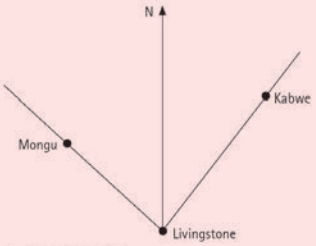
Revision exercise

1. Write True or False for each statement.
   a) A three-figure bearing of 180° corresponds with south 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 Livingstone, Kabwe and Mongu on a scale of 1 : 10 000 000. Use the figure to describe the positions of **(a)** Kabwe, and **(b)** Mongu in relation to Livingstone.



Scale 1 : 10 000 000

4. At a given moment a fish eagle circles above a rock on ground level. From a point 80 m 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 N pointing north. Construct line AE on a bearing of 30°. Mark off point B in AE 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

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).

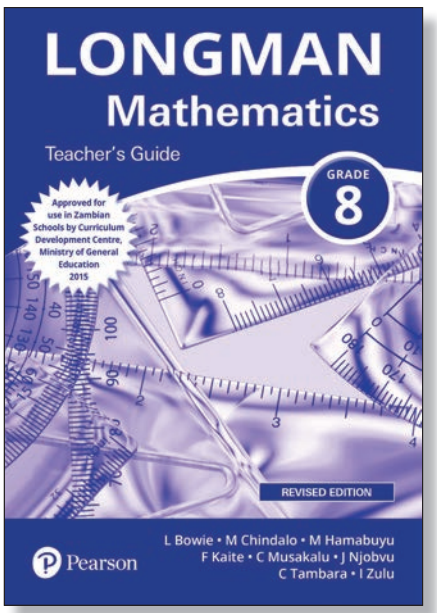
Line symmetry

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 **reflectional symmetry** or **mirror symmetry**. Look at the images below.

Perfect symmetry

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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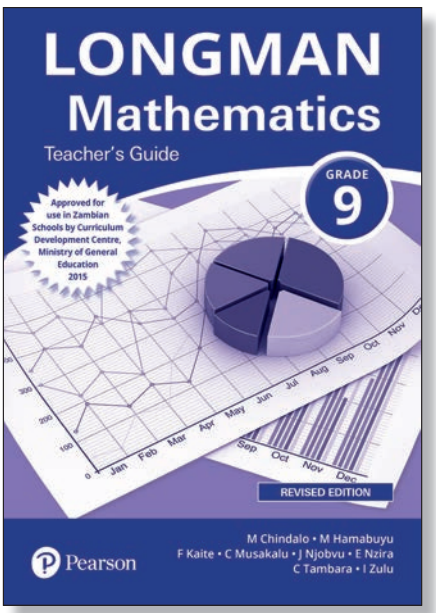

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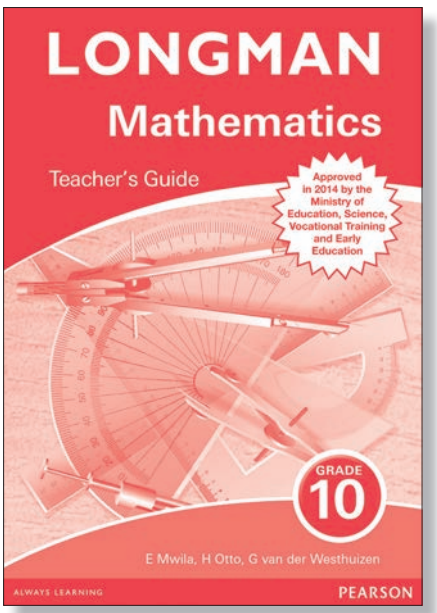

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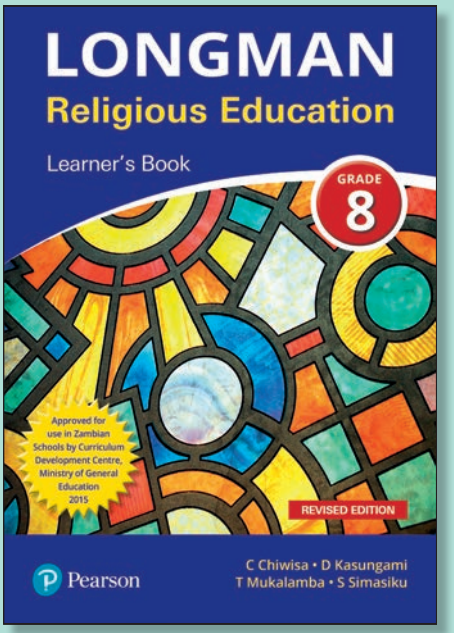
- Colourful illustrations and photographs.



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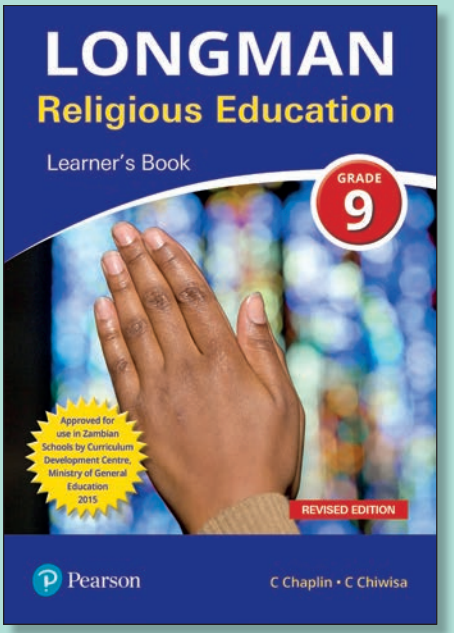

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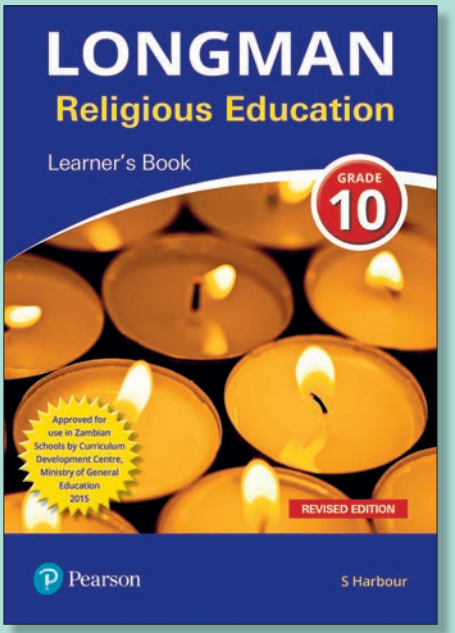

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UNIT 1 Suffering and death

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.

When we see someone who is suffering in some way, we can try and help them.

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 define suffering as the state of undergoing 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.

New words

suffering – the state of undergoing pain, distress, or hardship
unrequited – not returned or reciprocated

Case study: Elephants also grieve for their dead

A female elephant grieves for a dead calf.

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.

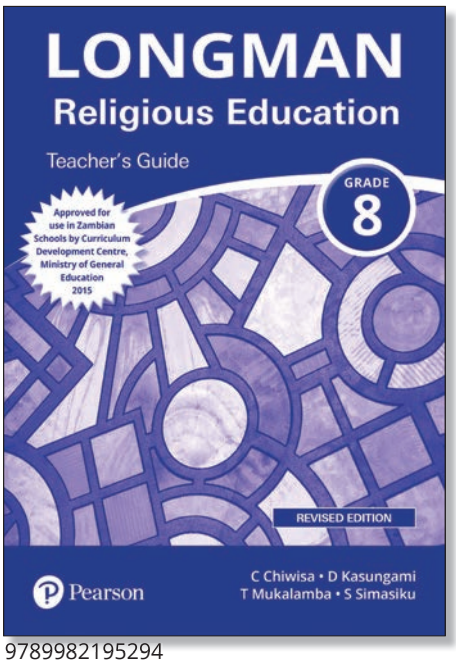
Because elephants live in such close-knit herds and live for about as long as humans do (approximately 70 years), they form strong bonds with those around them. When an elephant dies, the rest of the herd mourns that death. The herd will take great care in the burial of the dead. The cows walk to and 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 mull over the bones, fondling 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 as a protection for the rest of the herd, as it throws stalking 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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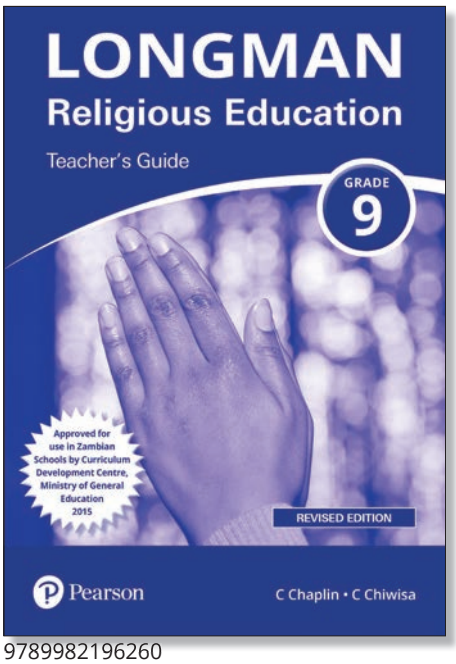

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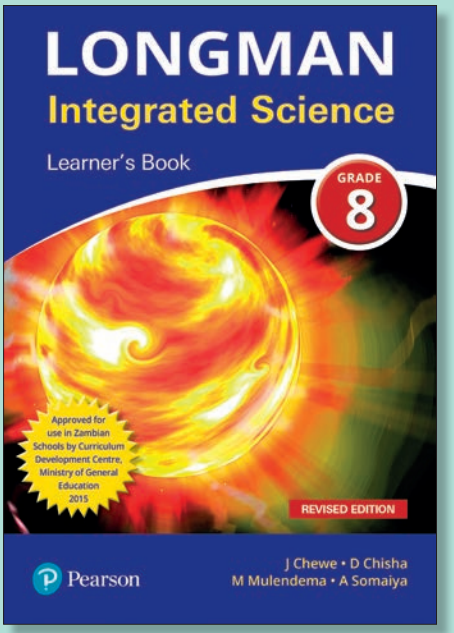

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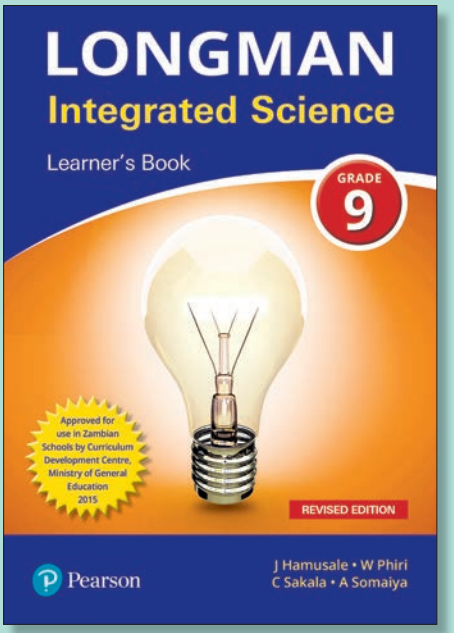

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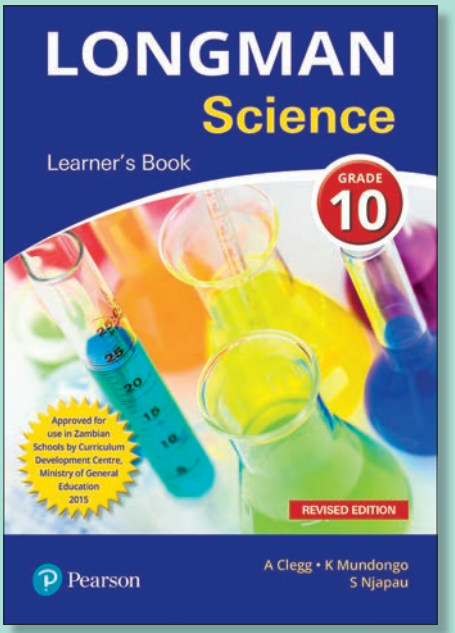

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TOPIC 5.2 Respiration

New word

respiration – the chemical process in which glucose is broken down to release energy

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:

glucose + oxygen ⟶ carbon dioxide + water + 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 (sunlight); products of photosynthesis: glucose and oxygen
- Requirements for respiration: glucose and oxygen; products of 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.

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

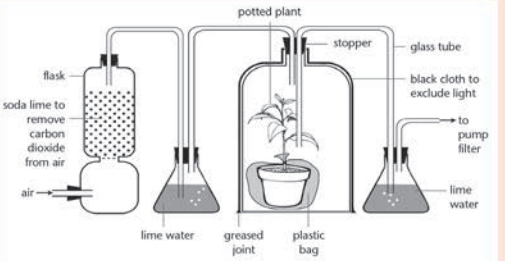
During respiration, plants take in oxygen and release carbon dioxide through the stomata in their leaves. Animals absorb oxygen from the air they breathe into their lungs and release carbon dioxide in the air they breathe out.

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 a milky white colour. 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.



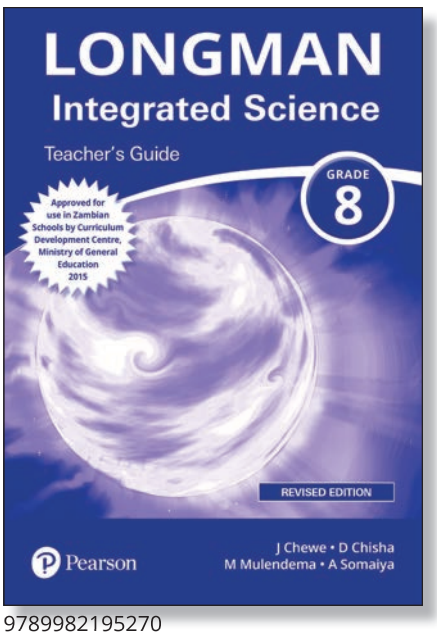
Demonstrating that plants respire

The apparatus worked as follows:

- Air was pulled 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 all 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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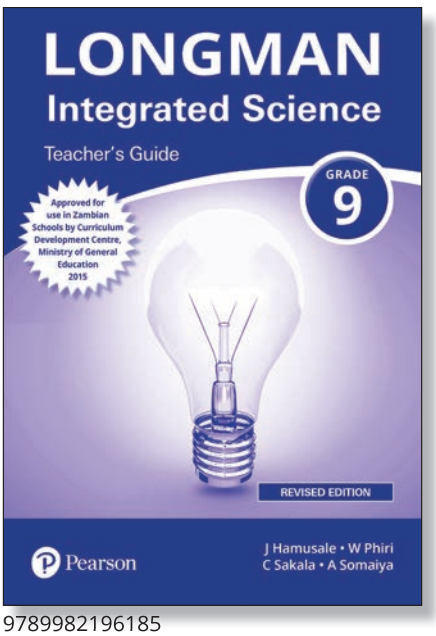

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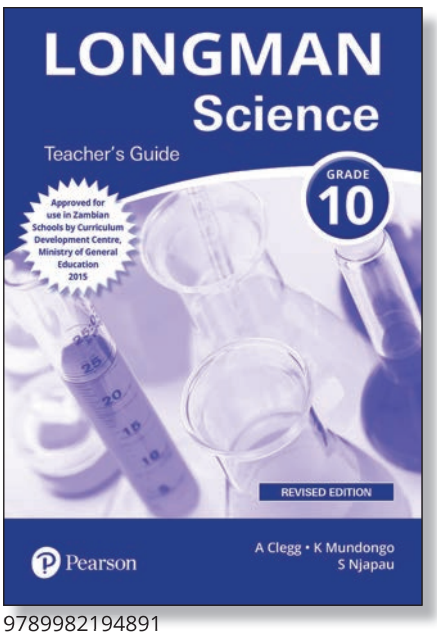

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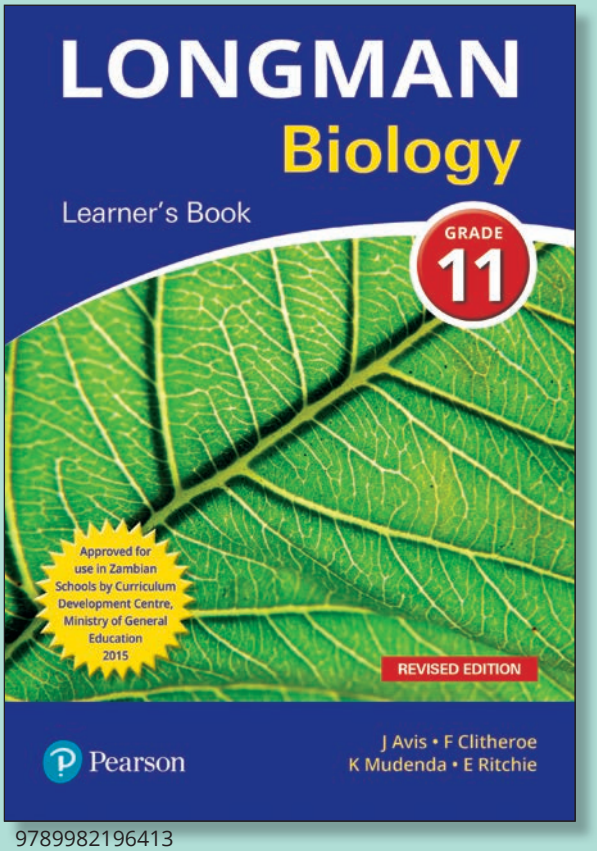

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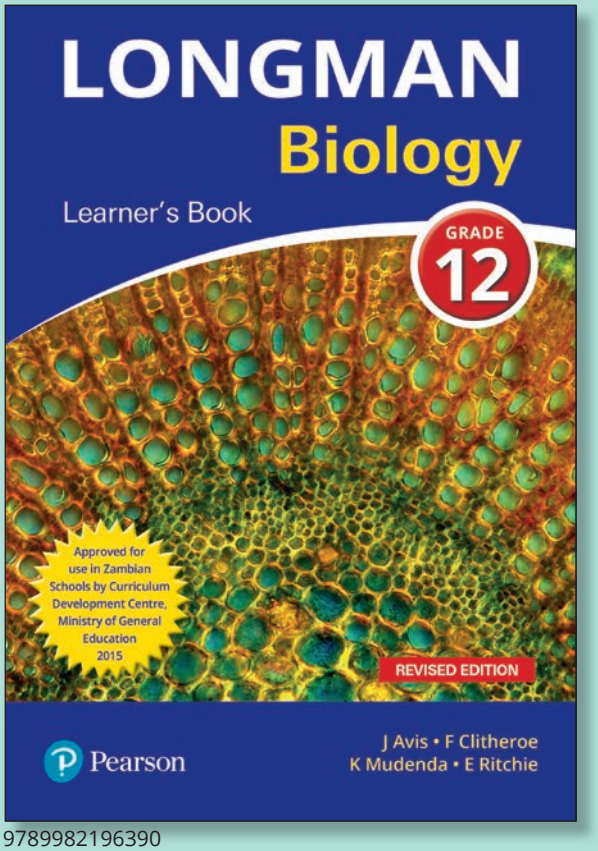

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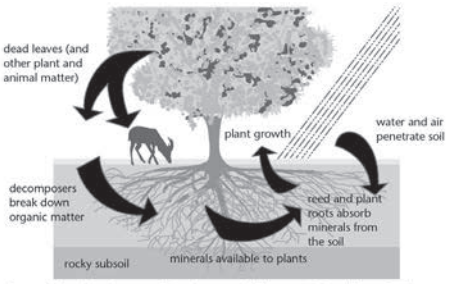


Figure 1.9 Nutrient recycling is essential for sustaining life on Earth.

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.

Bacillary dysentery

When *Escherichia coli* and *Salmonella* bacteria infect a person's digestive system they can cause bacillary dysentery. Severe diarrhoea and abdominal pain occurs. 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 (not a worm) called *Tinea corporis*. 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.

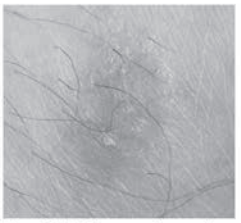


Figure 1.10 Ringworm is caused by a fungus, Tinea corporis.

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.

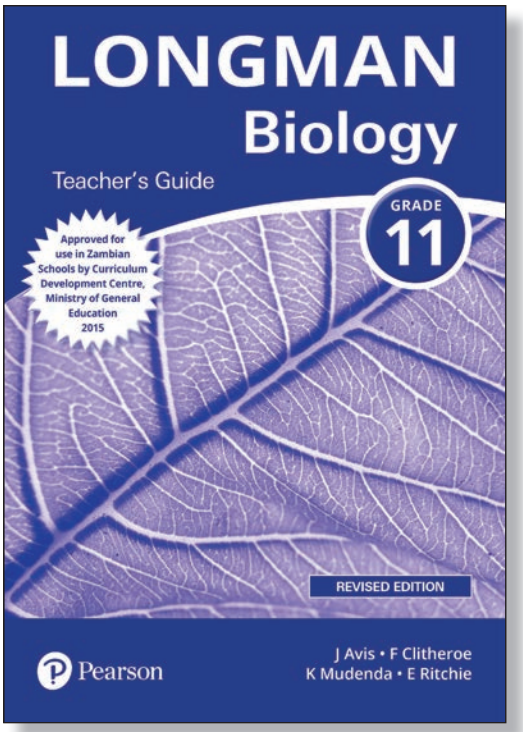
Some mushrooms, such as the *Termitomyces titanicus* mushrooms grow wild. They are very nutritious, but you must be very careful when picking mushrooms in the wild for food, since many varieties are poisonous.

Figure 1.11 Termitomyces titanicus mushrooms, which grown wild at the beginning of the rainy season in Zambia, are thought to be the largest edible mushrooms on Earth.

Exercise 1.3

Write a short essay to describe the importance of fungi. Use the following headings:

- Importance in the environment
- Importance to humans



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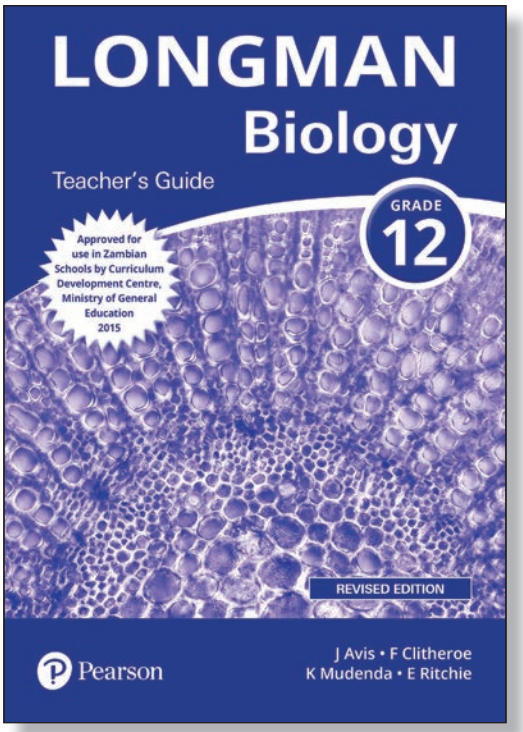

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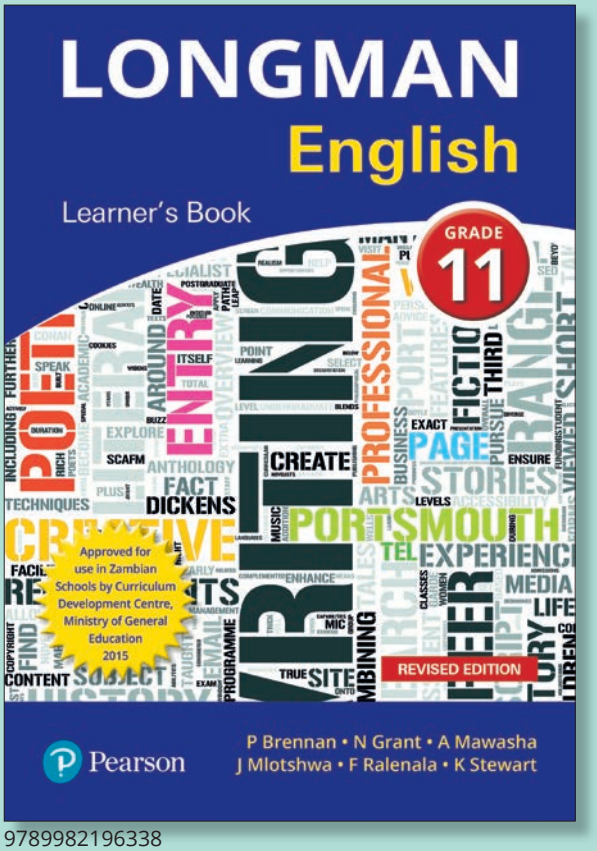

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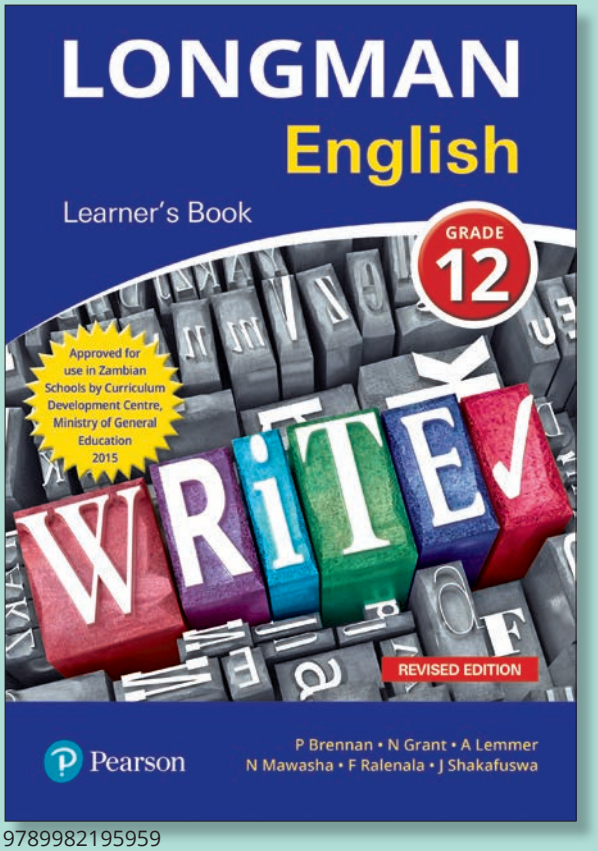

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UNIT 5 Enjoying novels

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
- practise completing verb + object + infinitive sentence structures
- work with direct and indirect speech modes of writing
- begin writing your own novel.

Reading

Introductions

Exercise 1

Answer the following questions:

1. Would you want to continue reading a story that begins with the following words: *"A man stood upon a railway bridge ..., looking down into the swift waters twenty feet below. The man's hands were behind his back, the wrists bound with a cord. A rope loosely encircled his neck ..."*? Why?
2. Certain questions come to mind, for example: "Where is this? Who is this man?" What other questions would you like to ask?

Novelists think very carefully about how they will begin their story, as they need to interest the reader and create the mood and atmosphere.

Exercise 2

Read the introduction to *The Whale Caller* by Zakes Mda below.

In this extract, the novelist has used word-pictures to create a certain type of atmosphere to introduce his story.

1. Is the mood exciting, romantic, depressing or concerned?
2. Can the Whale Caller see Sharisha's blood in the sea while he waits? Which sentence tells you this?
3. Identify two or three ways in which the novelist creates an atmosphere of patience and timelessness.
4. Does this introduction make you want to read the rest of the novel?

The sea is bleeding from the wounds of Sharisha*. But that is later. Now the tide returns in slight gentle movements. Half-moon is the time of small tides. The Whale Caller 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, blowing his horn. Blowing Sharisha's special song. Blowing louder and louder as the tide responds by receding in time to the staccato of his call. Yet she is nowhere to be seen. His eyes have become strained from looking into the distant waters, hoping to see Sharisha lobtailing* in the glare of the setting sun.

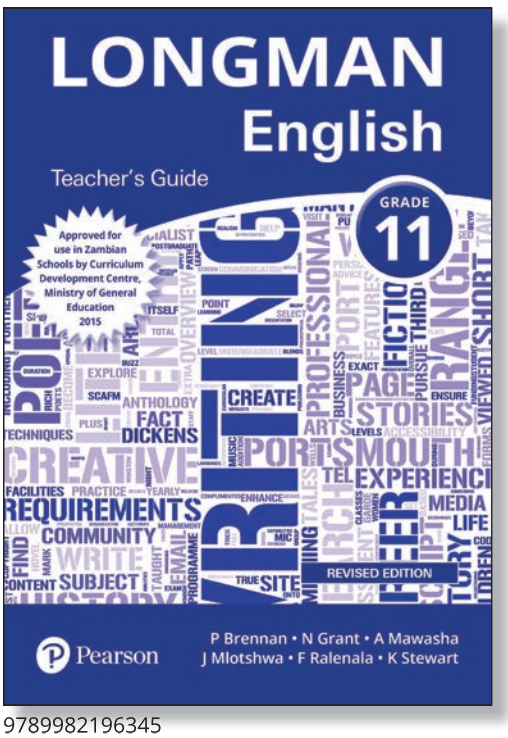
* *Sharisha: the name the Whale Caller calls one of the whales*
* *lobtailing: a whale's action of lifting its tail out of the water, sometimes for quite a long time*

Exercise 3

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

Carole-Amelia is my best friend. We live in the same town 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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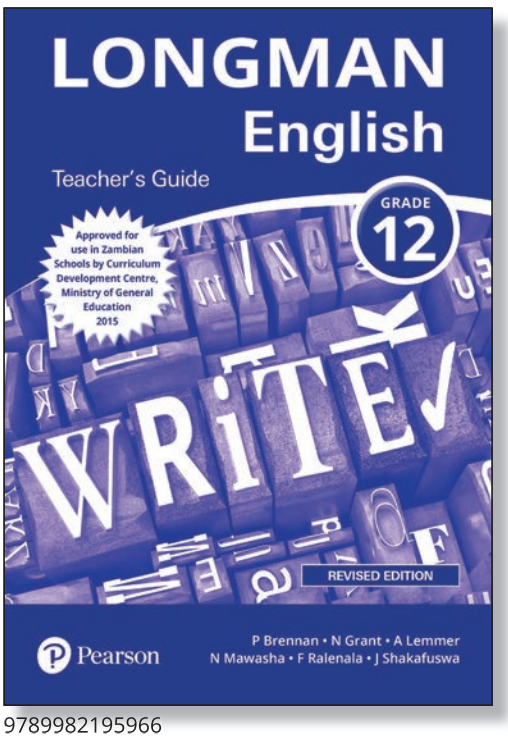

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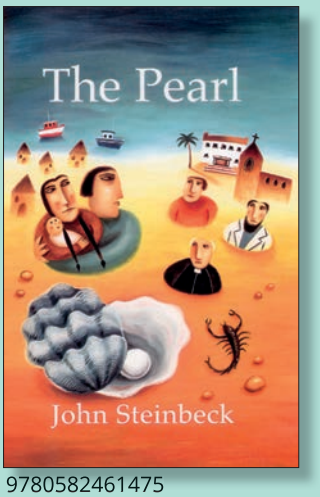

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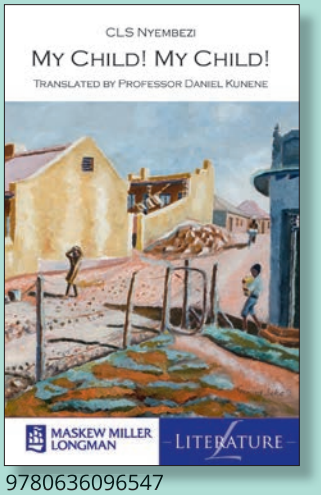

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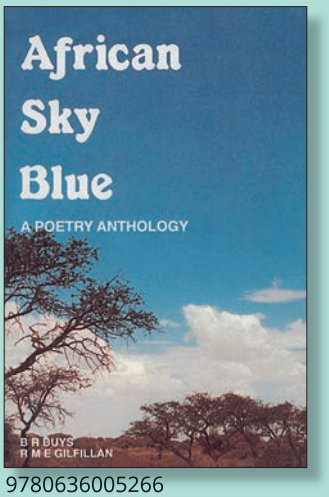

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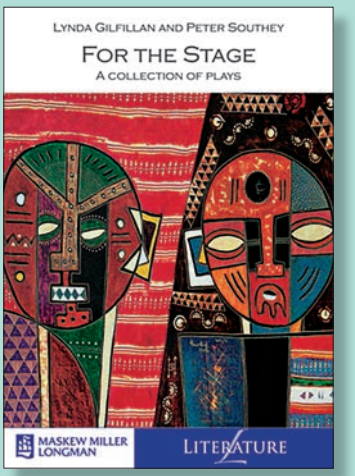

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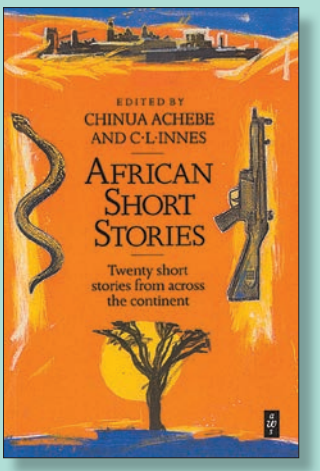

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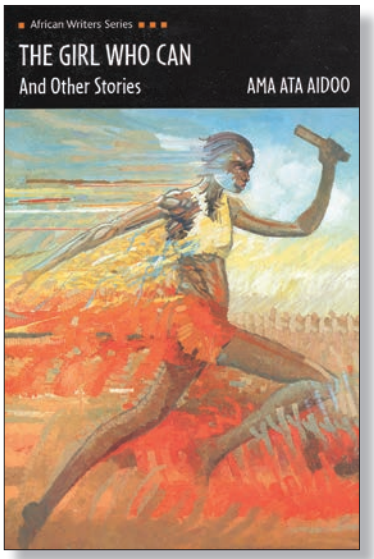

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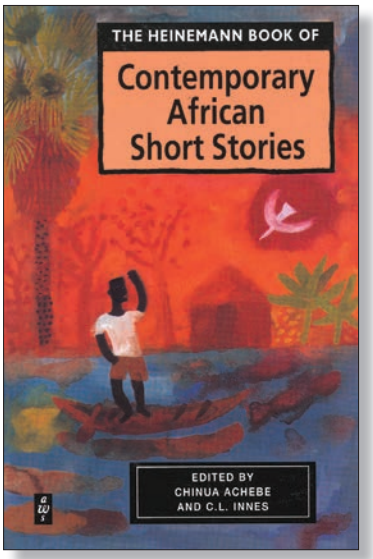

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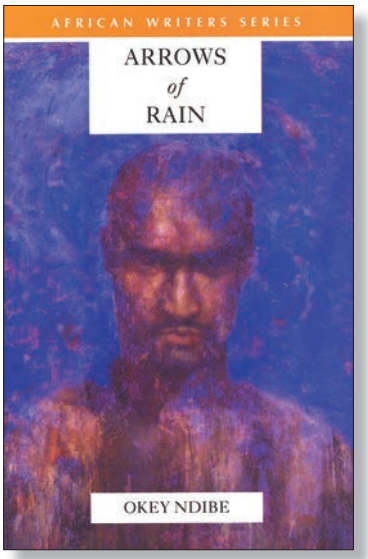

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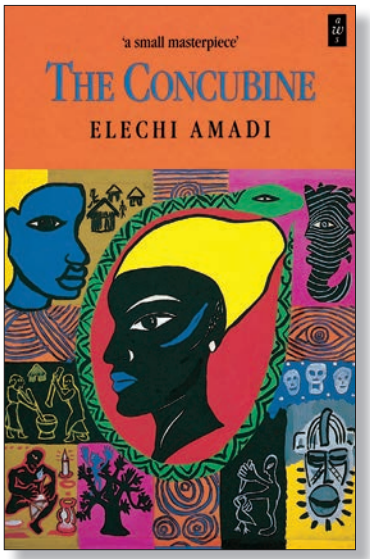

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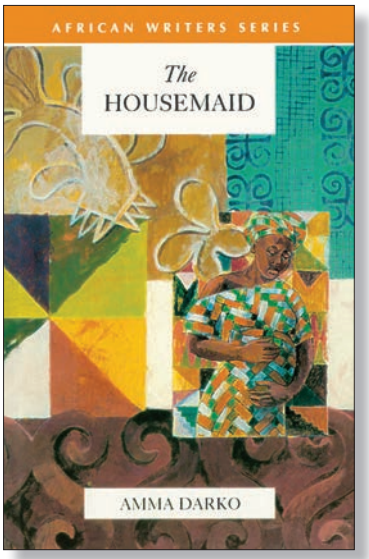

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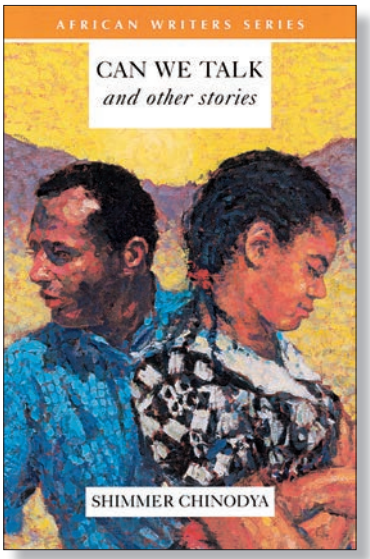

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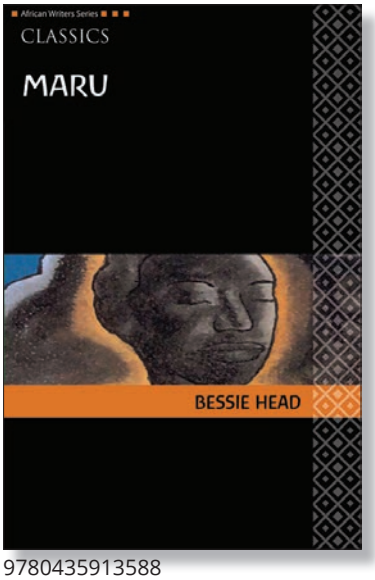

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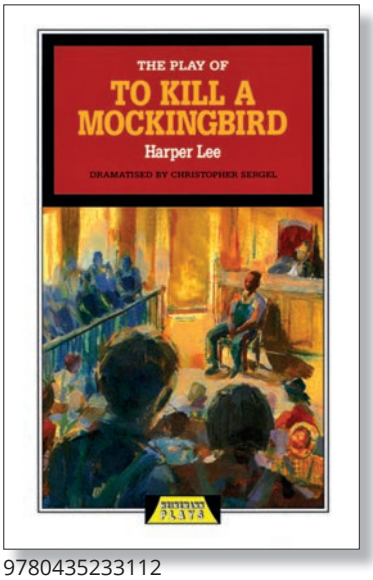

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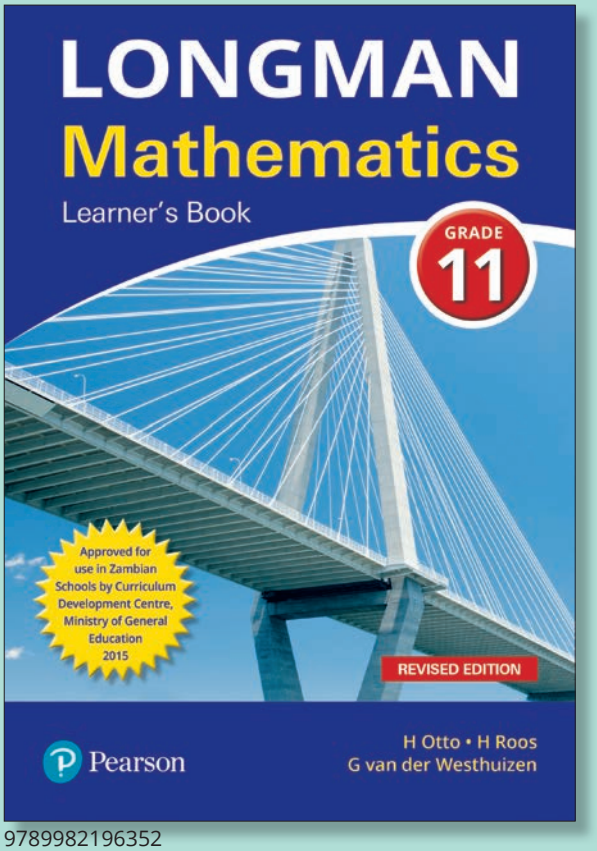

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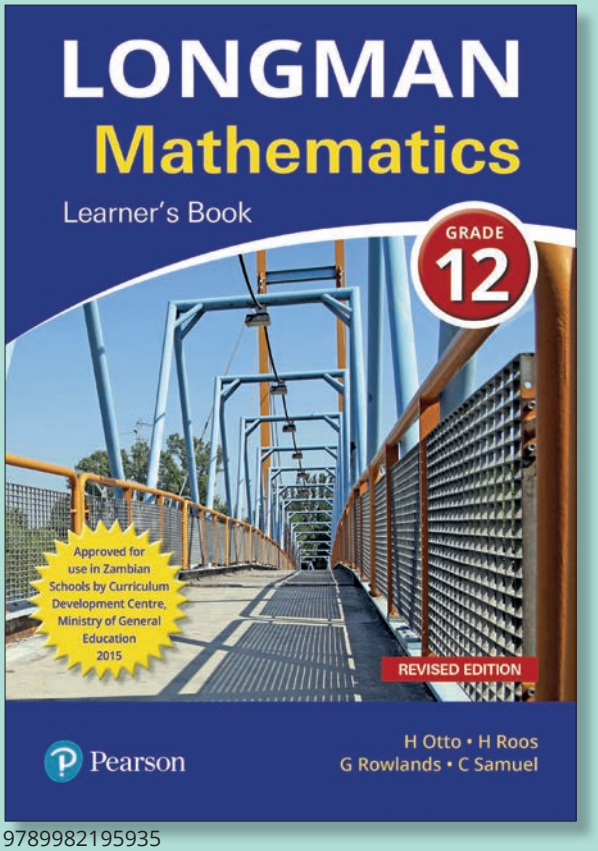

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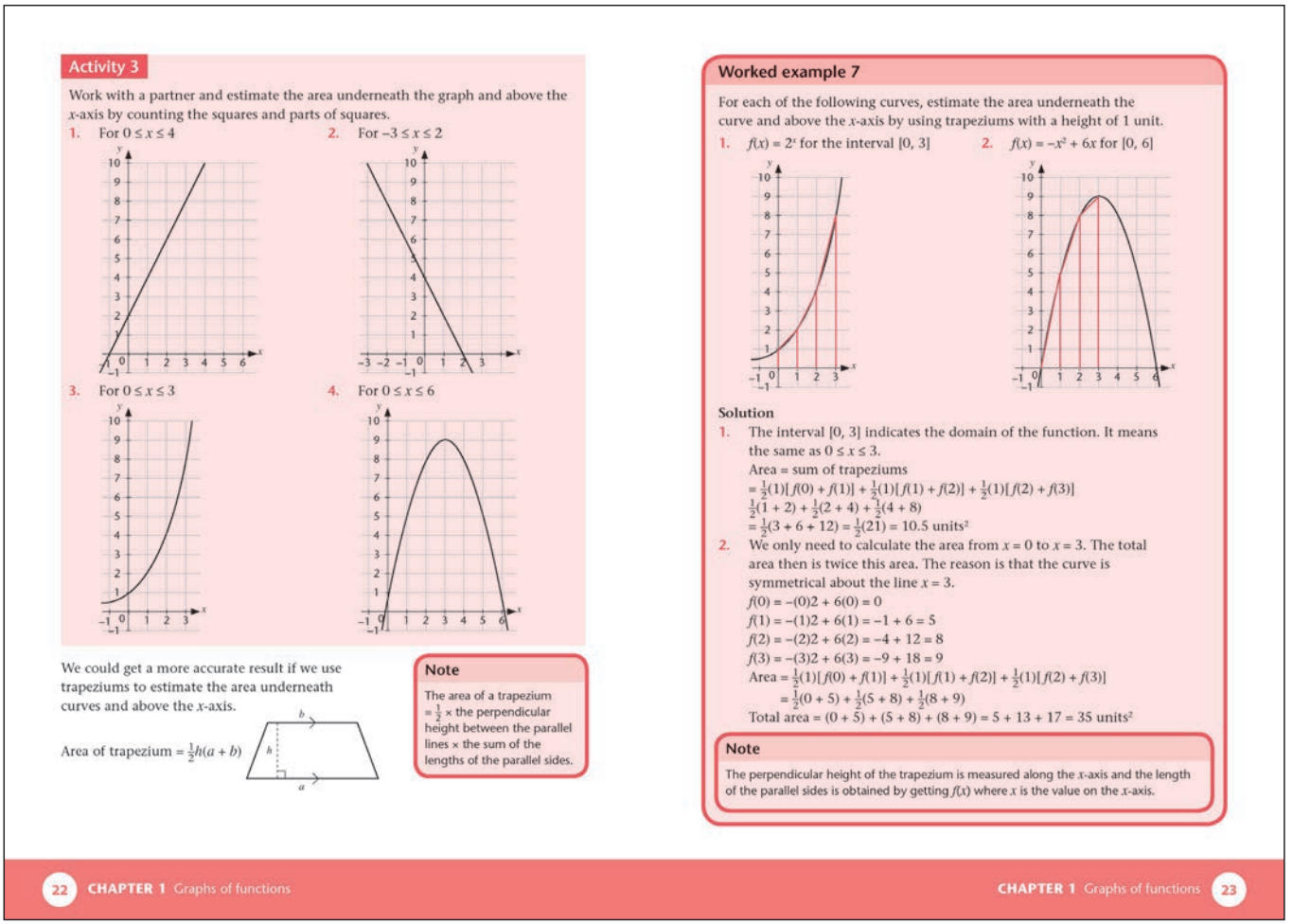


Activity 3

Work with a partner and estimate the area underneath the graph and above the x-axis by counting the squares and parts of squares.

1. For $0 \le x \le 4$
2. For $-3 \le x \le 2$
3. For $0 \le x \le 3$
4. For $0 \le x \le 6$

We could get a more accurate result if we use trapeziums to estimate the area underneath curves and above the x-axis.

Area of trapezium $= \frac{1}{2}h(a + b)$

Note

The area of a trapezium $= \frac{1}{2} \times$ the perpendicular height between the parallel lines × the sum of the lengths of the parallel sides.

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 1 unit.

1. $f(x) = 2^x$ for the interval $[0, 3]$
2. $f(x) = -x^2 + 6x$ for $[0, 6]$

Solution

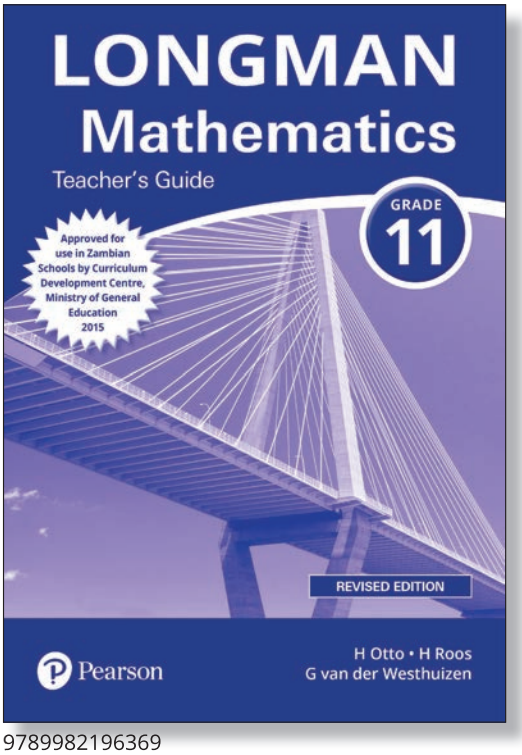
1. The interval $[0, 3]$ indicates the domain of the function. It means the same as $0 \le x \le 3$.
   Area = sum of trapeziums
   $= \frac{1}{2}(1)[f(0) + f(1)] + \frac{1}{2}(1)[f(1) + f(2)] + \frac{1}{2}(1)[f(2) + f(3)]$
   $\frac{1}{2}(1 + 2) + \frac{1}{2}(2 + 4) + \frac{1}{2}(4 + 8)$
   $= \frac{1}{2}(3 + 6 + 12) = \frac{1}{2}(21) = 10.5$ 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 $x = 3$.
   $f(0) = -(0)2 + 6(0) = 0$
   $f(1) = -(1)2 + 6(1) = -1 + 6 = 5$
   $f(2) = -(2)2 + 6(2) = -4 + 12 = 8$
   $f(3) = -(3)2 + 6(3) = -9 + 18 = 9$
   Area $= \frac{1}{2}(1)[f(0) + f(1)] + \frac{1}{2}(1)[f(1) + f(2)] + \frac{1}{2}(1)[f(2) + f(3)]$
   $= \frac{1}{2}(0 + 5) + \frac{1}{2}(5 + 8) + \frac{1}{2}(8 + 9)$
   Total area $= (0 + 5) + (5 + 8) + (8 + 9) = 5 + 13 + 17 = 35$ 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 $f(x)$ where x is the value on the x-axis.

22 CHAPTER 1 Graphs of functions

CHAPTER 1 Graphs of functions 23



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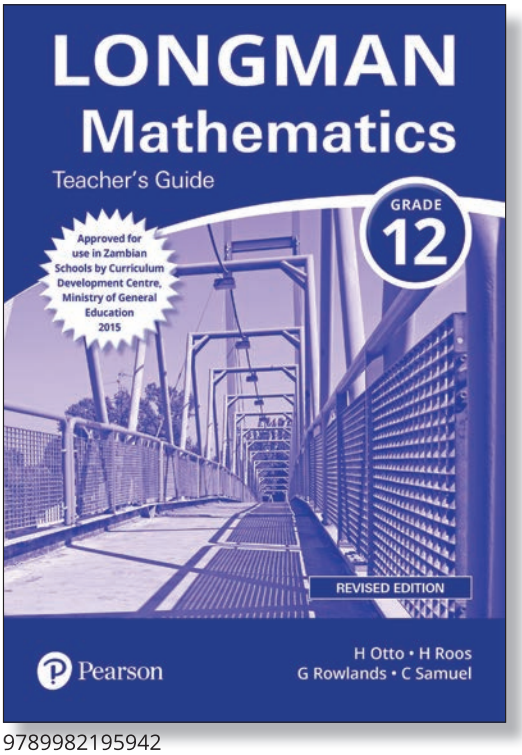

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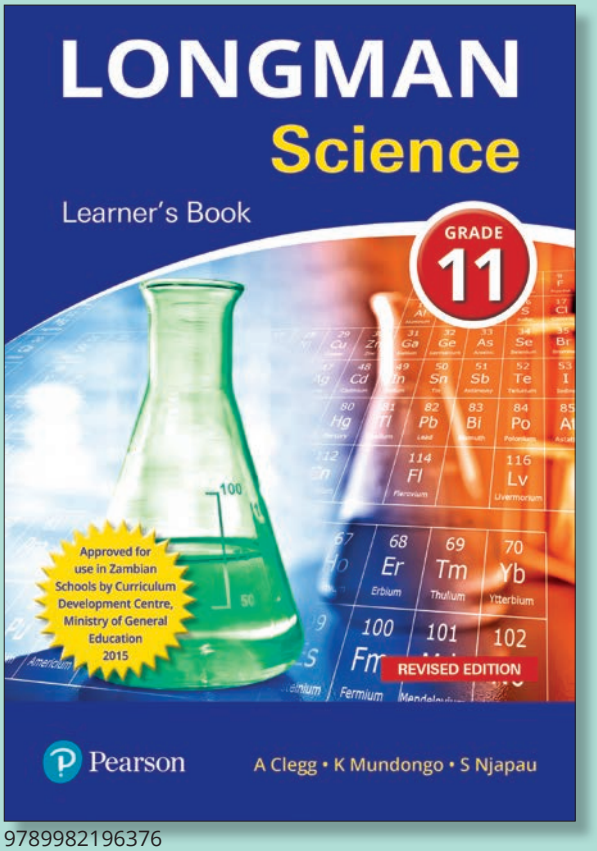

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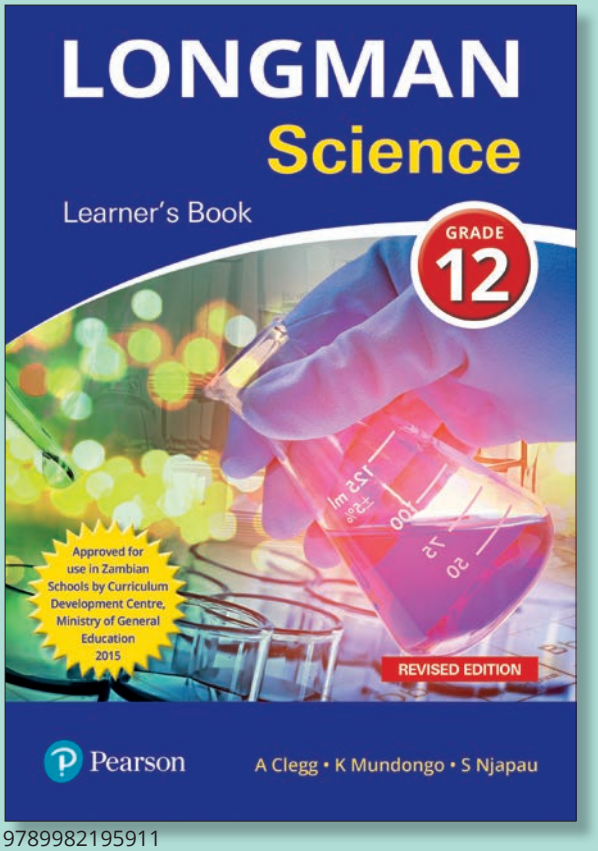

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CHAPTER 2 Temperature

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 hotness or coldness. The famous Greek doctor Galen, who lived approximately 200 BC, realised that when somebody was ill they often had a hot and wet 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-19th century there were around 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 1790. 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 got hotter, they moved faster. Their kinetic energy increases. Temperature, therefore, is a measure of the kinetic energy of particles and 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

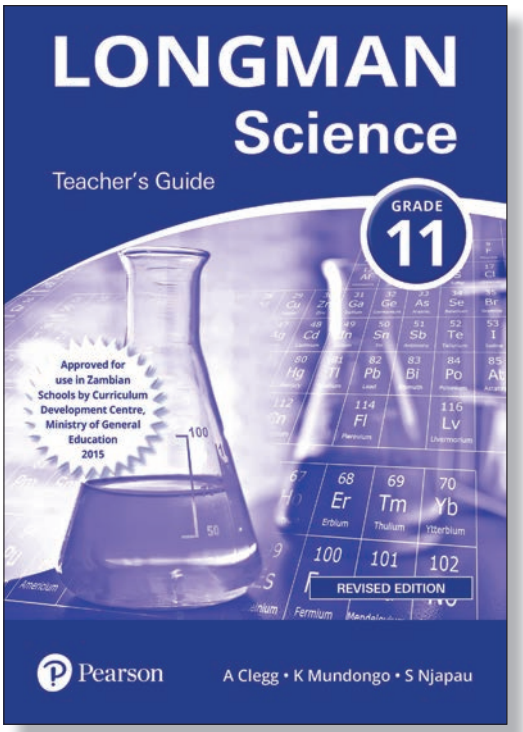
You know from everyday life that many properties of substances change when the temperature changes. You discovered in Chapter 1 that substances expand as they get hotter. This means that their density decreases, as their temperature increases.

You know that a steel bar glows 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 used 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 grandfathers were also well-known scientists and mathematicians. Anders Celsius was made a professor of astronomy at Uppsala University before he was 30. 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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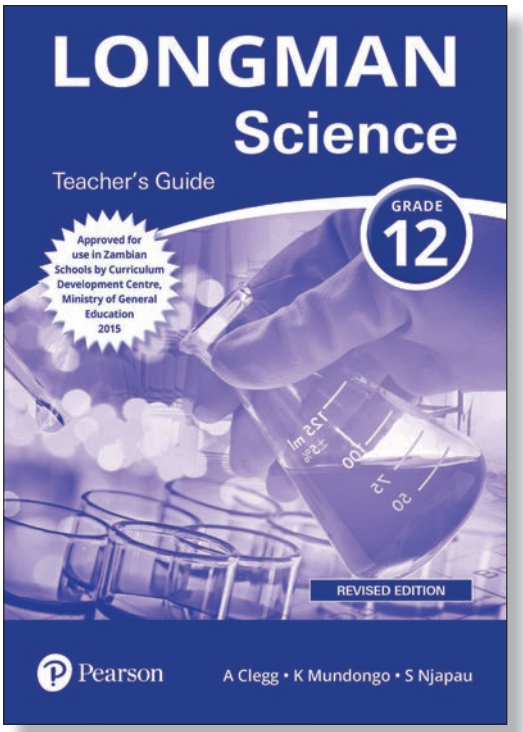

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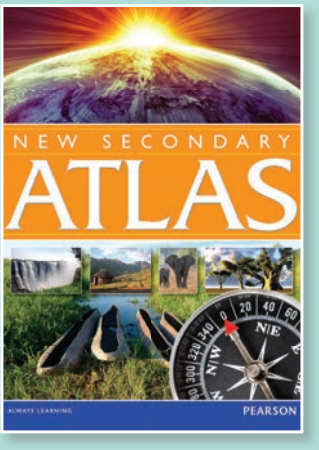

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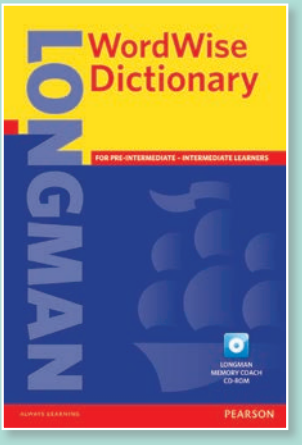

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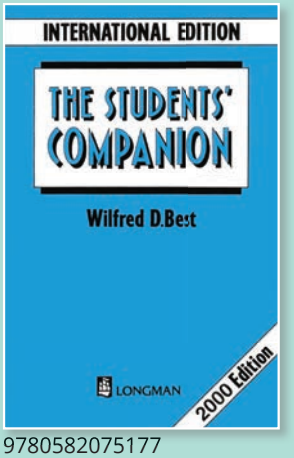

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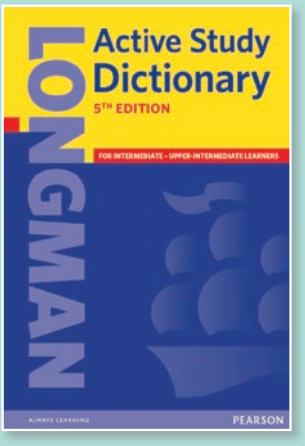

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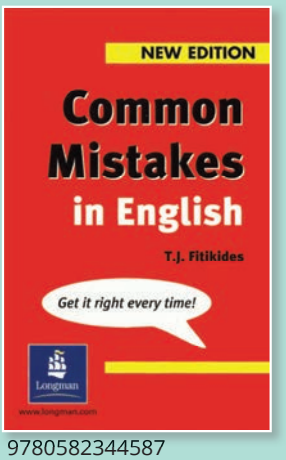

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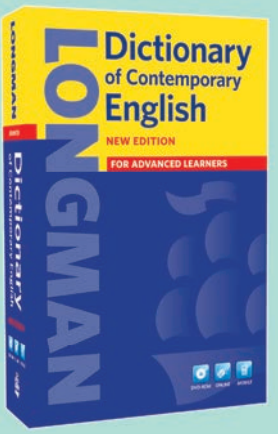

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