
O X F O R D P R I M A R Y

ATLAS

for South Africa

T E A C H E R ' S R E S O U R C E B O O K

Karen Morrison

with activities by

Mary Reynolds

OXFORD
UNIVERSITY PRESS

OXFORD

UNIVERSITY PRESS

Great Clarendon Street, Oxford OX2 6DP

Oxford University Press is a department of the University of Oxford.
It furthers the University's objective of excellence in research, scholarship,
and education by publishing worldwide in

Oxford New York

Auckland Bangkok Buenos Aires Cape Town Chennai
Dar es Salaam Delhi Hong Kong Istanbul Karachi Kolkata
Kuala Lumpur Madrid Melbourne Mexico City Mumbai
Nairobi São Paulo Shanghai Taipei Tokyo Toronto
with associated companies in Berlin Ibadan

Oxford is a registered trade mark of Oxford University Press
in the UK and certain other countries

Published in South Africa

by Oxford University Press Southern Africa, Cape Town

Oxford Primary Atlas for South Africa Teacher's Resource Book

ISBN 0 19 578497 9

© Oxford University Press Southern Africa 2014

The moral rights of the author have been asserted
Database right Oxford University Press (maker)

First published 2004

Revised for CAPS, 2014

All rights reserved. No part of this publication may be reproduced,
stored in a retrieval system, or transmitted, in any form or by any means,
without the prior permission in writing of Oxford University Press,
or as expressly permitted by law, or under terms agreed with the appropriate
reprographics rights organization. Enquiries concerning reproduction
outside the scope of the above should be sent to the Rights Department,
Oxford University Press, at the address below

You must not circulate this book in any other binding or cover and you must
impose this same condition on any acquirer

Published by Oxford University Press Southern Africa
PO Box 12119, N1 City, 7463, Cape Town, South Africa

Set in Melior and Helvetica Light by Christopher Davis
Imagesetting by Castle Graphics

Cover reproduction by The Image Bureau
Printed and bound by ABC Press, Cape Town

Contents

Introduction	iv
Geography aims in the Intermediate Phase	iv
Map skills in the Intermediate Phase	iv
CAPS map-skills related topics	v
About this book	vi
Chapter 1 Understanding what maps are	1
Plan views and side views	1
Introducing learners to maps	1
Why do we use maps?	2
Practical activities with plan views	2
Chapter 2 How to use maps: Symbols, keys and labels	6
Symbols and labels	6
Different kinds of symbols on maps	6
Conventions used on maps	7
Map keys	7
Practical activities on symbols	7
Chapter 3 Different kinds of maps	9
Physical maps	9
Political maps	9
Thematic maps	9
Locator maps	9
Practical activities on types of maps	10
Chapter 4 Direction	11
Basic directions	11
North, south, east and west	11
Wind directions	12
Orientating a map	12
Practical activities on direction	13
Chapter 5 Finding your way around maps and atlases	15
Grid references	15
Using an index to find places	15
Practical activities using an alpha-numeric grid	16
Chapter 6 Scale and distance	18
Understanding scale	18
Representing scale	18
Measuring and calculating distance	18
Practical activities on scale and distance	19
Chapter 7 Working with data: tables and graphs	21
Statistics	21
Presenting data in tables	21
Graphs and why we use them	22
Types of graphs and charts	22
Interpreting graphs and charts	24
Assessing understanding of graphs	24
Practical activities on tables and graphs	25
Chapter 8 Using and interpreting thematic maps	30
Thematic maps	30
The meaning of map titles	30
Thematic maps in the <i>Oxford Primary Atlas for South Africa</i>	30
Chapter 9 Worksheets	32
Answers to activities	48
Glossary	58

Introduction

This resource book focuses on map skills and complements the *Oxford Primary Atlas for South Africa*. The atlas and this book follow the Social Sciences Curriculum and Assessment Policy Statement (CAPS) on teaching map skills in the Intermediate Phase. It includes graded activities with answers and work sheets.

Geography aims in the Intermediate Phase

The activities in the *Oxford Primary Atlas for South Africa Teacher's Resource Book* facilitate the specific aims of Geography CAPS for the Intermediate Phase by allowing opportunities for:

- understanding and working with maps, statistical data, and photographs.
- developing problem-solving skills.
- prompting discussion and debates.
- developing curiosity about the world we live in by letting learners engage with and discuss interesting data about their provinces, country and the world. Learners are often asked to compare one data set with another and to think about why there are differences between them.
- a general understanding of the natural environment, different places, society and natural forces at work on Earth. The relationship between, for example, society and the natural environment is illustrated by explaining that rainfall influences natural vegetation, which in turn influences farm production and where people live.
- highlighting our responsibilities towards the environment and fostering sensitivity regarding environmental issues.

Map skills in the Intermediate Phase

The table on the next page gives you the key CAPS map-skills related topics and where they are addressed in the *Oxford Primary Atlas for South Africa* and this book.

CAPS map-skills related topics

Topic	Pages in <i>Oxford Primary Atlas for South Africa</i>	Pages in this <i>Teacher's Resource Book</i>	Grade and term in CAPS
WHAT IS A MAP?			
What is a map?	4–5	1–5	Grade 4 term 2
HOW TO USE MAPS			
Symbols, keys and labels	6	6–8	Grade 4 term 2 Grade 7 term 1
Distance and scale	7	18–20	Grade 6 term 1 Grade 7 term 1
A round Earth and flat maps	8	9–10 30–32	Grade 4 term 2
A round Earth and flat maps	9	30–32	Grade 4 term 2
What do the colours on maps mean?	10–11	7	Grade 4 term 2
Direction: North, south, east, west	12–13	11–14	Grade 4 term 2 Grade 5 term 1
How do we find places on maps?	14	15–17	Grade 4 term 2 Grade 7 term 1
Latitude and longitude	15	15–17	Grade 6 term 1
SOUTH AFRICA			
Provinces, cities and towns	16–17		Grade 4 term 2
Land height, rivers and dams	18–19		Grade 5 term 2
Climate	20	30	Grade 5 term 3
SA's climate zones	21		Grade 5 term 3
Weather	22		Grade 5 term 3
Water	23	31	Grade 4 term 4 Grade 5 term 2 Grade 7 term 4 Grade 7 term 2
Natural vegetation	24	30	Grade 5 term 3
Farm production	25	31	Grade 4 term 3
Mining and minerals	26	31	Grade 5 term 4
Manufacturing industry and trade	27	31	Grade 6 term 2
Population	28–29	31	Grade 6, term 4 Grade 7 term 3
Energy, environment and health	30–31	31	General
Nature conservation	32	31	Grade 7 term 4
SOUTH AFRICA'S PROVINCES			
SOUTH AFRICA'S PROVINCES	33–41		All grades, but specifically Grade 6 term 4
THE WORLD			
Land height and rivers	42–43		Grade 4 term 2 Grade 5 term 1 Grade 6 term 1

political map	44–45		Grade 4 term 2
Climate and natural vegetation	46–47		Grade 6 term 3
Structure of earth, volcanoes and earthquakes	48–49		Grade 7 term 2
Population	50–51		Grade 7 term 3
THE WORLD: CONTINENTS			
Africa	52–54		Grade 5 term 1
Australasia and Antarctica	55		All grades
North and South America	56–57		All grades
Europe	58		All grades
Asia	59		All grades

About this book

This resource book is designed to help teachers and learners get the most from the *Oxford Primary Atlas for South Africa*. It is divided into chapters, which each introduce (for teachers) a specific skill or concept (for example, direction). The outcomes of each are stated clearly at the start of each chapter. Each chapter includes a range of activities; these generally start with teacher-facilitated activities and are followed by activities that learners can do on their own, in pairs or in groups. The activities are also categorised as Level 1 or Level 2 based on the difficulty of the questions. Many of the activity sheets are suitable for photocopying and handing to the class. Finally, Chapter 9 includes a set of photocopyable worksheets that can be used for summative assessment; it also includes master maps that can be copied.

1 Understanding what maps are

This chapter covers:

- what a plan view (or bird's-eye view) is
- the differences between maps and photographs
- matching horizontal and vertical views
- how to draw a plan of an area
- why we use maps.

Plan views and side views

In order to understand and work with maps, learners need to understand that all maps are drawn from a 'bird's-eye' perspective. In other words, they show the world as it would appear if you were flying above it and looking straight down. A view from above is also called a plan view or an aerial view. When something is drawn like it would look from the side, it is called a side view.

Aerial photographs and maps

If you fly in an aeroplane and look down, you also have a 'bird's-eye view' of the area below. Some aeroplanes have cameras mounted under them, and these are used to take photographs of the area below. These photographs are called aerial photographs (meaning that they are taken from the air). An aerial photograph gives you a plan view of the Earth. An aerial photograph shows a real view of a place at a specific time: animals, people and vehicles that are in the area at that time are shown on the photograph. Maps, on the other hand, use symbols to represent real objects and do not include living things or moving objects. Maps are therefore usually clearer than photographs.

A side and plan view of a house

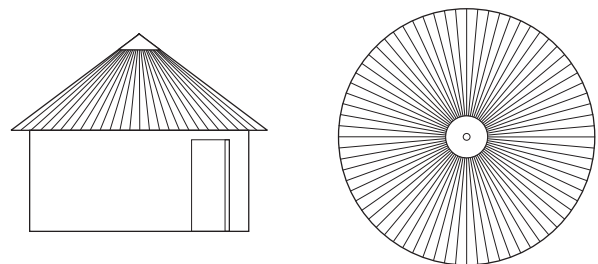
How maps show height and depth

Plan views also include a vertical dimension. In other words, they can indicate height or depth. For example, a symbol can be used to show a tunnel that goes under a road, or a river going under a bridge. Colour can also be used to show the heights of different areas on a map, and the depth of the sea.

Introducing learners to maps

Most learners will have been introduced to maps in the Foundation Phase classes. However, the concept of plan views may still be confusing for young learners because they do not normally view the world from above; initially it may be difficult for them to visualise what an area would look like when viewed from above. We recommend that you introduce or revise the concept with Activity 1 on page 2 of this book.

In order to work with plan views, learners need some understanding of the spatial relationship between things shown in the view: they need to consider the distances between places on a plan view, and they need to work out mentally where things would be in relation to each other and the space they are in. Simple plans of the classroom, or of their homes, can help them to understand this concept. Allow for the fact that most learners need a lot of practice before they can work confidently with plan views.



Once learners understand what a plan view is, they should be able to:

- match the plan view with a side view of the same object or area
- draw a plan of a simple object (e.g. a table)
- draw a plan of an area
- recognise depth (the vertical dimension) in a plan view
- identify correct spatial relationships in a plan view.

Why do we use maps?

We use maps for many reasons. The most obvious reasons are to find our way from one place to another, and to get a clear picture of our province, our country, and the world. However, as learners work through the atlas, many other reasons should become apparent. This is a question that we will return to at the end of this book.



Practical activities with plan views

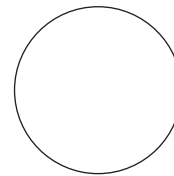
As learners work through these activities, they will also begin to develop their skills in other areas. They will start to use symbols and they will reduce items to fit their plan, thus beginning to work with scale. These skills are handled separately in later chapters and developed more formally through the activities included in those chapters.

(Answers are given at the end of this Teacher's Resource Book.)

Level 1

Teacher-facilitated activities

- 1 Give the learners various solid shapes. You can use tins, bottles, tubes, and boxes. Ask learners to draw around these shapes to show what they would look like if they were viewed from above. Encourage them to look down at the solid shapes and identify any features that should be shown on their outlines. For example:



Draw the outline

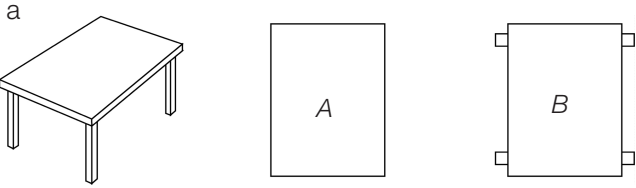


Fill in details

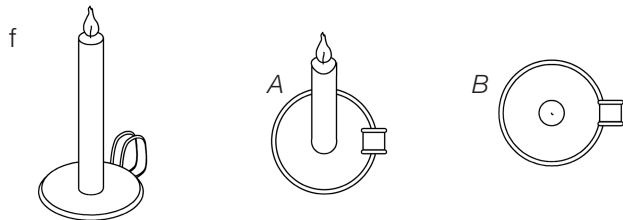
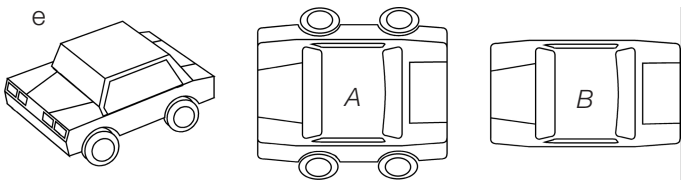
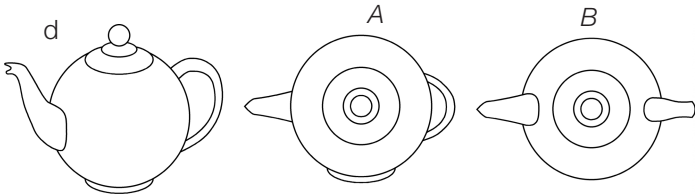
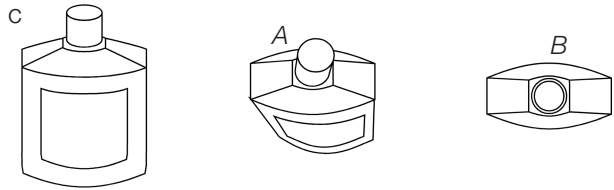
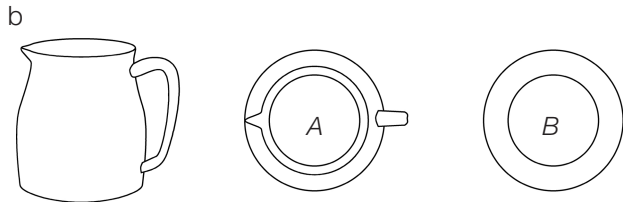
- 2 Draw a plan view of your classroom on the chalkboard – just the walls, with no details. Ask the learners to add to it:
 - the windows and door
 - the position of the chalkboard
 - the desks and any other furniture.
 Get them to label the plan so that other people can interpret it. Labelling is an important aspect of mapping, and will be covered in more detail in Chapter 2. You can see an example of a classroom plan view on page 4 of this book.
- 3 Get the learners to open the *Oxford Primary Atlas* on pages 4 and 5. Give them time to examine the drawings, and then ask them to:
 - a name ten things or places they can see in the top picture of Whale Bay
 - b then (working with a partner), look at the aerial view below it and identify where those ten places or objects are
 - c find four things in the aerial view that they can't see in the first picture
 - d look at the map on page 5 and find the following places: the sea, the roads, the river, and the school, and then identify three other places that they recognise on the map.

Learner activities

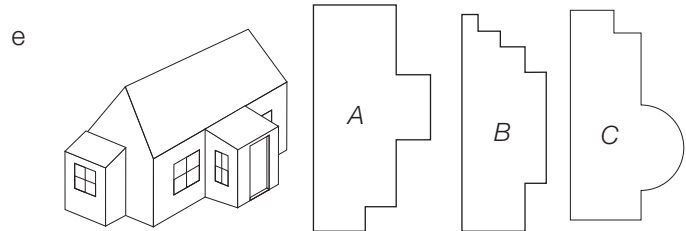
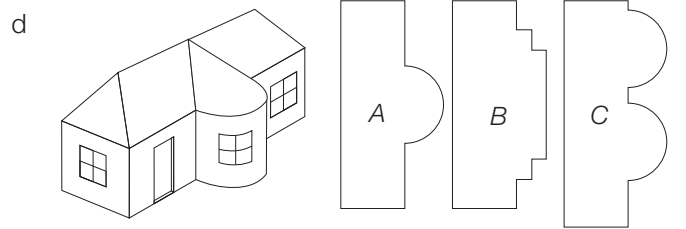
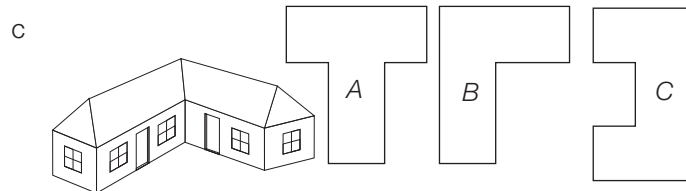
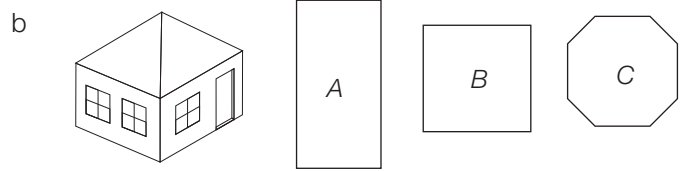
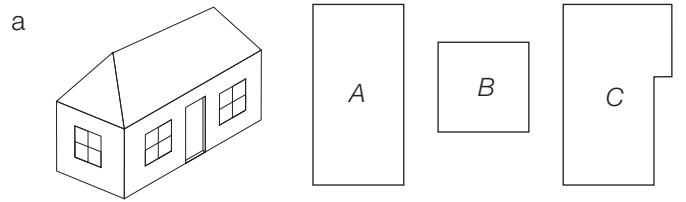
1 Match the object on the left to the correct view on the right that shows what it would look like in a plan view (from directly above).



(A is the correct plan view of the table.)



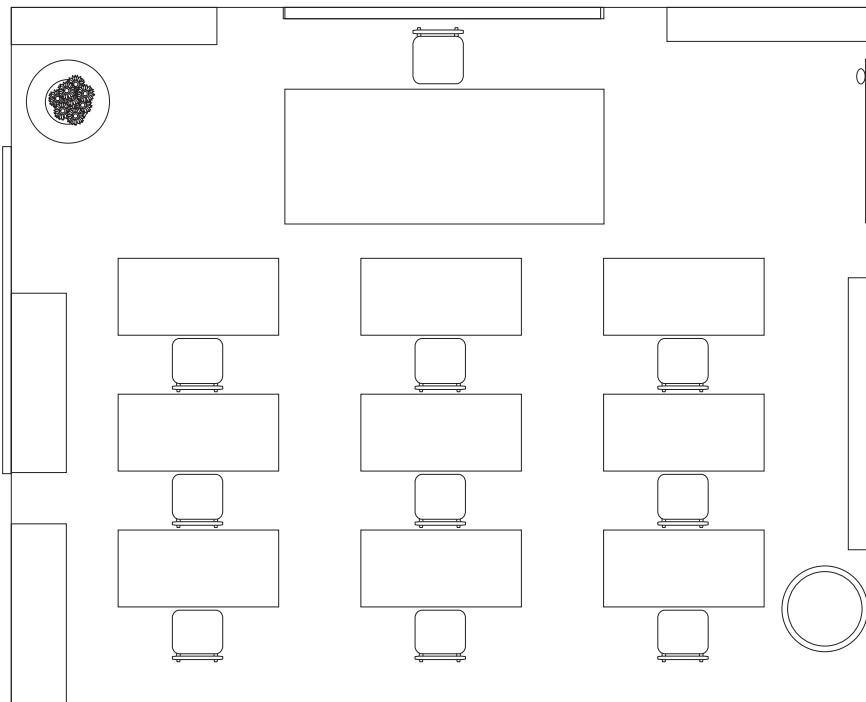
2 These five houses are next to each other in a street. A town planner has drawn a plan view of each house. Match each house to its plan view: colour the roof of each house, then colour the correct plan view to match.



3 Here is a drawing of a classroom and its plan view.
Work with a partner and label these things on the plan view:

- the teacher's desk
- the teacher's chair

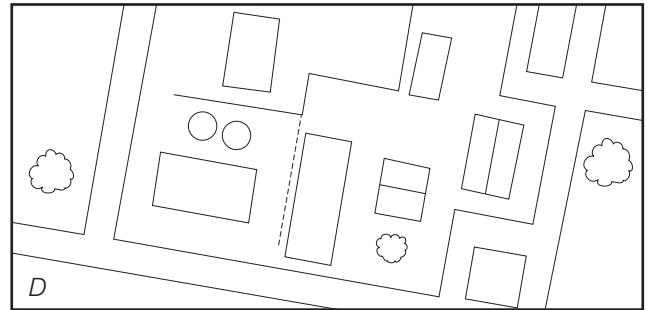
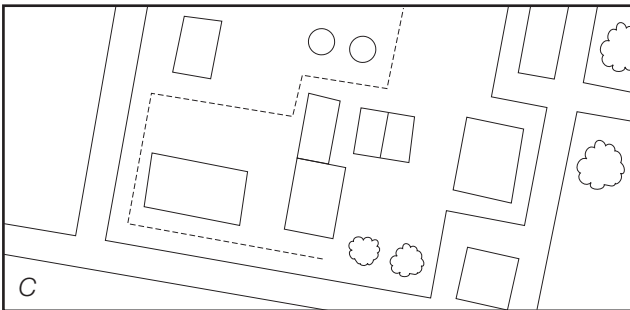
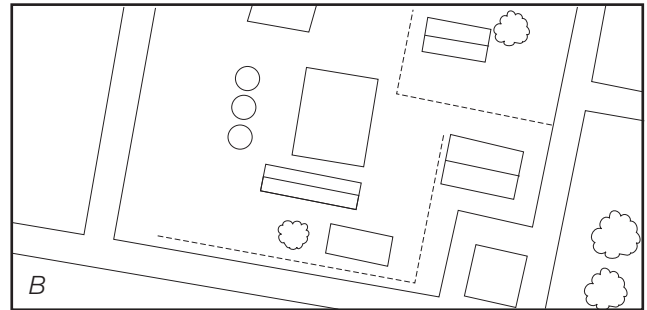
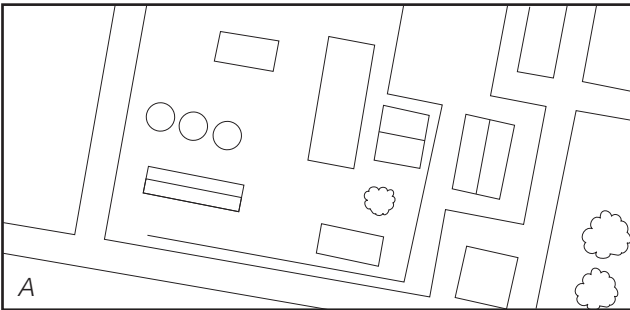
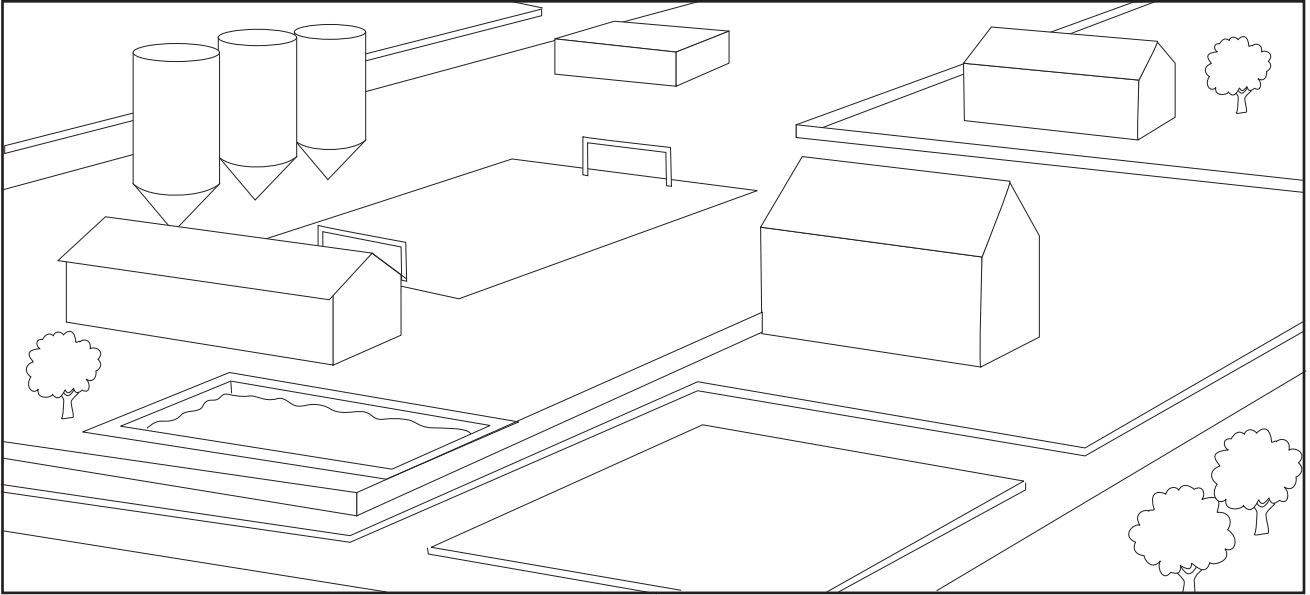
- the chalkboard
- the waste-paper bin
- the door
- the bookshelf
- the vase of flowers.



Level 2

Learner activities

- Here is a picture of a farm, and below it are four maps of the same farm. Only one map is correct. Which one is it?
- Explain to your partner how you decided which map was correct.



2 How to use maps: Symbols, keys and labels

This chapter covers:

- signs and symbols
- different types of symbols on maps
- map conventions
- map keys.

Symbols and labels

Most learners will be familiar with a range of signs and symbols that are used in everyday life. For example, they might recognise and be able to understand traffic signs (stop signs, speed limit signs, zebra crossing lines), product logos (the Ouma rusks' grandma, the Simba lion), sports icons (the Olympic rings, the Springbok) and many others such as the man and woman symbols used on public toilets. Make sure that learners understand that signs and symbols are often used to give information clearly and quickly without language or words.

The words we find on maps are called labels. Labels tell us the names of places, roads, streets, rivers, mountains, oceans, etc. Sometimes we do not understand the language in which the labels are written, and then we need to look at the symbols to understand the map.



Why do we find symbols on maps?

Symbols are used on maps to represent physical features (mountains, rivers), buildings (churches, farms, cities) and communications systems (roads, telephone lines, railways). Symbols are used because they allow the mapmaker to show detail without making the map difficult to read. They also allow people who do not understand the language of a particular place to read a map of that place.

It is important for learners to recognise that symbols on maps are used to represent features found in the real world. They should also understand that one symbol can be chosen to represent all varieties of a particular feature. For example, the symbol **P** might be used to show a post office. Everywhere a post office appears on the map, they will see **P**. This does not mean that all the post offices on the map look the same in the real world! On some maps, the symbols used for a post office may be different. For this reason, a key (sometimes called a legend) is normally found next to a map to show what the symbols represent. You can find many examples of keys in the *Oxford Primary Atlas for South Africa*. Encourage learners to look through their atlases and to say what the keys alongside different maps tell them.

Different kinds of symbols on maps

Points and icons

The most common symbols on maps showing large areas are points and icons. Points are used to show towns and cities. Icons are used to show land use, products, or natural resources. If you look at the map of South Africa on pages 16 and 17 in the *Oxford Primary Atlas for South Africa*, you can see that the  symbol (a point) has been used to show towns. On page 25, an icon similar to this one  has been used to show where maize is grown. You can find many other examples of points and icons in the atlas. Again, you can encourage learners to look through their atlases to find examples of these.

Lines and arrows

Some information on maps is best shown by lines or arrows. Borders (such as borders between countries) and transport routes (roads, railway lines, etc.) are usually shown in this way. Lines used can vary in terms of thickness and style. When some sort of movement or direction is indicated, the mapmaker normally uses an arrow. You can find examples of lines that show boundaries and transport routes on the provincial maps (pages 33–41).

Colours

Pages 10 and 11 in the atlas show several uses of colour on maps.

On the political map of South America, the colours show different countries. Colour is used for the same purpose on the maps of the other continents (for example, pages 54–56).

On the land-use map of South Africa (page 10), colours show what the land is used for, and the key tells you what the colours mean.

Colours on maps can be used to show features such as water and height above sea level. On the physical map of an island on page 11, colour has been used to show differences in the height of the land above sea level. Again, the key tells you what land height each colour represents. Use this map and the corresponding picture on page 10 to explain physical maps.

Conventions used on maps

The symbols used on maps are called conventional signs. These signs are normally similar on all maps produced in a country. Official South African maps are produced by the Directorate of Surveys and Mapping, which also produces a list of conventional signs. Most other mapmakers in South Africa use these signs as well to make it easier to read and understand any map.

Colour conventions

Certain colours are used on maps to indicate specific features:

- Blue is usually used to show water features such as oceans, rivers, dams, and wetlands.
- Green is normally used for natural vegetation, and it is commonly found on physical maps.
- Green is also part of a graded set of colours used to indicate height on maps.
- Red is used on maps to show transport routes. Often, the main roads are shown in red.
- Brown is used to show landforms. You can see brown used in this way on the map of the world on pages 42 and 43, or on the physical map of South Africa on page 18.
- Black is used for many map labels. In addition, symbols for towns and human-made features may also be shown in black.

Map keys

The key to a map is essential for fully understanding the map. Think of the key as the tool for unlocking the meaning of the map. All thematic maps in the *Oxford Primary Atlas for South Africa* have a key that tells you what the symbols and colours used on the map represent. When learners draw their own maps, they should always provide a key.



Practical activities on symbols

(Answers are given at the end of this Teacher's Resource Book.)

Level 1

Teacher-facilitated activity

- 1 Work through the activity on page 6 of the atlas. If you feel the need to give more practice in recognising symbols, draw these signs on the chalkboard. Ask learners to say what each one represents:



Learner activities

- 1 Turn to the map of Turtle Island on page 7 of your atlas. Answer these questions about the map:
 - a What colour line is used to show main roads?
 - b What symbol is used to show the clinic? Draw a clinic symbol in your book.
 - c What symbol shows the plantation? Draw it.
 - d Draw the mosque symbol in your book.
 - e How is the hiking trail shown?
- 2 Invent a holiday island of your own, and draw a map. Include a campsite, a road, and anything else that you want. Label the map, colour it, design symbols to show features, give it a title, and include a key.
- 3 Find the map of your own province in the atlas (pages 33–41). Answer these questions:
 - a What colour line shows the border of the province?
 - b How many airports can you find in your province?
 - c How are national routes (roads) shown? Draw the symbol in your book.
 - d What is the symbol for built up areas? Draw it in your book.
 - e How are the labels for capital cities written?
 - f In what colour are the river labels written?

Level 2**Learner activities**

- 1 Find three different points used as symbols in your atlas. Draw each one and write down what it symbolises.
- 2 Look at the physical map of South Africa on page 18. What does each colour on the map represent?
- 3 Draw and correctly colour the symbols used to represent the following:
 - a lighthouse (page 7)
 - b secondary roads (page 14)
 - c savannah (page 24)
 - d sunflowers (page 25)
 - e gold (page 26)
 - f nuclear power station (page 30)
 - g capital cities (pages 44-45)
- 4 Find the map of South Africa on pages 16 and 17. Plan a train journey to a place you want to go to. Name the place where the journey will start. Name five places you will pass through, and name the place where the journey will end.

3 Different kinds of maps

This chapter introduces:

- physical maps
- political maps
- thematic maps (e.g. land-use maps)
- locator maps.

Atlases include many different types of maps designed to give different information about places. On pages 10–11 of the *Oxford Primary Atlas for South Africa*, you can see examples of some of the different kinds of maps that you will find in the atlas, namely a political map, a land-use map, a climate zone map, a rainfall map and a physical map. Each of these maps has a different purpose. The main types of maps that you will work with in this atlas are:

Physical maps

These maps show natural features such as rivers, lakes, deserts, mountains, and other landforms. Colour is normally used on these maps to show you the height of the land. You can find the following physical maps in the atlas:

- an island (page 11)
- South Africa (page 18)
- the world (pages 42–43)

Political maps

These are maps that show the features of a region created by people, such as towns and cities, and political divisions such as province boundaries and country boundaries. Colour is used on these maps only to distinguish between different places. You can find examples of political maps on the following pages in the atlas:

South Africa (pages 16 and 17); Africa (page 54); North America (page 56); South America (page 57); Europe (page 58); Asia (page 59).

Thematic maps

Thematic maps give information about a particular topic, such as climate, what land is used for (land use), population, vegetation, rainfall, etc.

Thematic maps can use colour or shading to give information. (These are called choropleth maps – but learners are not required to know this term at this level.) The vegetation map of South Africa on page 24 is an example of a shaded thematic map.

Isoline maps are used mainly to show climate data. On these maps, lines are used to join places with equal temperature or rainfall measurements. The areas in between the isolines are shaded in different tones of the same colour. Lines that join places having the same rainfall are called isohyets. Lines joining places with the same temperatures are called isotherms. You can find isoline maps on page 20. (These terms are given for teachers' information, but learners are not required to know them at this level.)

Locator maps

The maps of the provinces (pages 33–41) include small maps of South Africa that are designed to show the relevant province in relation to the rest of the country. These are called locator maps.

 **Practical activities on types of maps**

Level 1

Teacher-facilitated activities

- 1 Look at the political map of South Africa on pages 16 and 17. Use it to answer these questions:
 - a What is colour used for on this map?
 - b How many provinces are there? List all the provinces in a table like the one below.
 - c Add the capital of each province to the table.

Province	Capital

- 2 Turn to the physical map of the island on page 11 in your atlas.
 - a What does the colour blue represent?
 - b At what height above sea level are the yellow parts of the map?
 - c At what height above sea level are the brown parts?
 - d How high is the highest part of the island?
- 3 Turn to the world map on pages 42 and 43.
 - a List the seven continents.
 - b List the four oceans.
 - c List three islands in the Atlantic Ocean.
 - d Name two seas in Asia.
 - e What is the main mountain range in South America called?
 - f Name a high mountain range in North America.
 - g Which two continents have no very high mountains?
 - h What famous African river flows from Lake Victoria to the Mediterranean Sea?
 - i Is the world mostly covered by land, or by sea?

Level 2

Learner activities

- 1 Look at the political map of Africa on page 54.
 - a List the six countries that share a border with South Africa. Name the capital cities of the six countries. Set your answer out in a table like this:

Country	Capital
Namibia	Windhoek

- 2 Look at the physical map of South Africa on page 18, and use it to answer these questions:
 - a What does the colour blue represent?
 - b What colour is used to show the lowest parts of South Africa (the parts closest to sea level)?
 - c What colour is used to show the highest parts of South Africa?
 - d Name three cities that are at sea level.
 - e At about what height above sea level is Bloemfontein?
 - f At about what height above sea level is Port Nolloth?
 - g Mafadi is South Africa's highest mountain. How high is it?
 - h What is the name of the highest mountain range in South Africa?
 - i Name two rivers that flow from the Drakensberg Mountains into the Indian Ocean.
- 3 Thematic maps give you information about particular topics. Work with a partner to find out where you will find thematic maps giving information about the following. Set your answers out in a table like the one below.

	Page number	Page heading
a	20	Climate

- a rainfall
 - b where you will find natural forests growing
 - c where farmers grow sugar cane
 - d the main wheat-farming areas
 - e where gold is mined
 - f where iron is mined
 - g areas exposed to the worst degree of air pollution in South Africa
 - h temperature
 - i where you will find fynbos growing
 - j where motor vehicles are made.
- 4 Think about the uses of each of the maps on your list. Choose three of the maps and say who might find those maps most useful.

4 Direction

This chapter covers:

- basic directions
- the points of the compass: north, south, east, and west
- other methods of finding direction
- orientating maps.

Basic directions

Most learners will have done some work on basic directions. At the very least, they should be able to follow directions using words like *left*, *right*, *ahead*, *behind*, *in front of* and *next to*. You might like to test what they know by playing some games and giving them instructions to follow to reach a particular place.

As learners learn to use maps they will need to work with the four cardinal points: north, south, east, and west. They will also use the intermediate points: north-east, south-east, south-west, and north-west. These are introduced on pages 12 and 13 of the atlas, along with the equator, the northern hemisphere and the southern hemisphere.

Most maps, including those in the atlas, are positioned so that north is at the top edge. The direction arrow next to the map shows where north is.

These are introduced on pages 12 and 13 of the atlas, along with the equator, the northern hemisphere and the southern hemisphere.

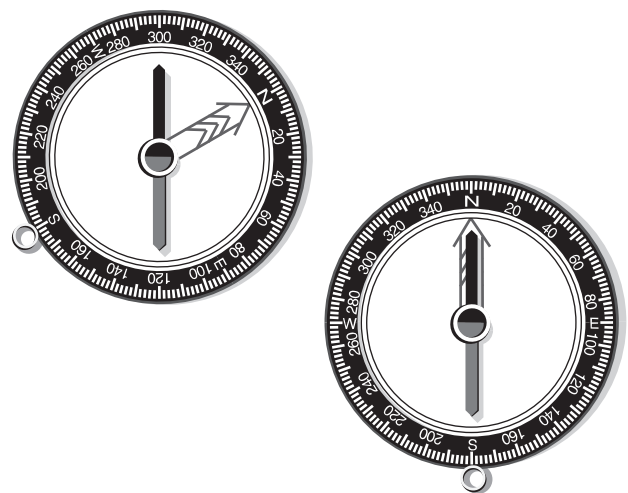
North, south, east and west

The sun always rises in the east and always sets in the west. In the southern hemisphere, the sun is at a position to the north of us at midday (12 o' clock). You can use this knowledge to get learners to understand where north, south, east

and west are. We suggest you take them outside the classroom at midday; ask them to point out where the sun rises, and where it sets, and where it is now. From that they can work out where north and south are. You can mark these in the school grounds using stones as markers (or on the classroom floor using a felt-tipped pen).

How a compass works

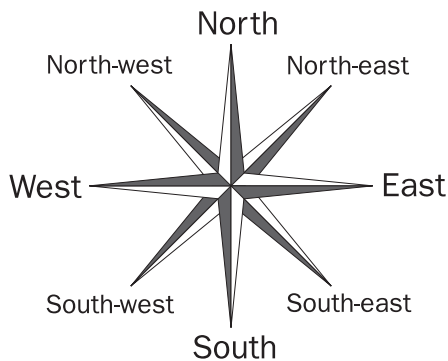
A compass is an instrument that is used to find north using the Earth's magnetic force. Inside each compass is a magnetic needle that is attracted by the natural magnetic force of the Earth. This force pulls (attracts) the needle so that it always points north. The needle is suspended in the compass and the person using the compass turns the base of the compass so that the letter N (or 0 degrees) is directly under the needle. You can see this in the diagrams below and on page 12 of the atlas. Once you know where north is, you can work out all the other compass directions.



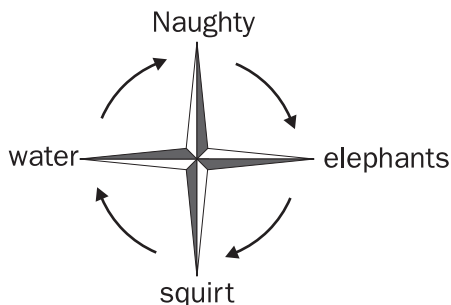
Technically, the compass points to a point on the Earth known as magnetic north. Navigators find magnetic north and then use this point to work out where true north is. True north corresponds with the north pole of the Earth. The north pointers in the atlas point to true north.

Points of the compass

The four main points on a compass – north, south, west, and east – are called the cardinal points. In-between the cardinal points are other points that are named according to the directions between which they are found. You can see eight compass points on the diagram below.

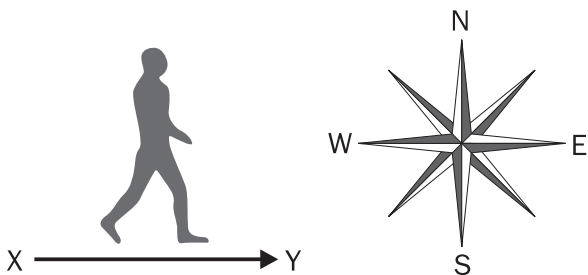


Make sure that learners know the names of the compass points. This mnemonic may help:

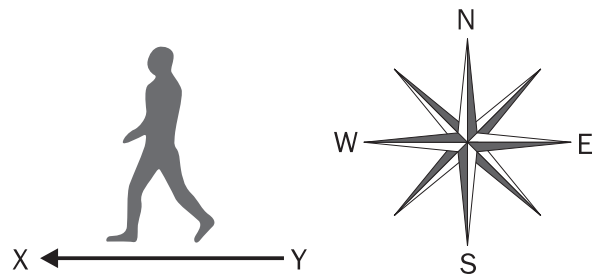


Giving directions using the points

On a map, you give directions according to the direction in which you are moving. For example:



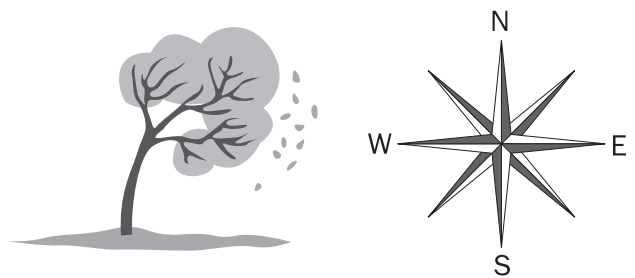
The direction from X to Y above is east because the man is moving towards the east or in an easterly direction.



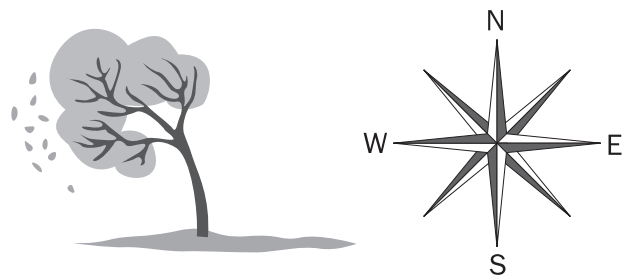
The direction from Y to X above is west because the man is moving towards the west or in a westerly direction.

Wind directions

Wind directions are different. These are given according to where the wind is blowing from:



This wind is a westerly wind because it is blowing from the west.



This wind is an easterly wind because it is blowing from the east.

Show the learners the pictures on page 22 of the *Oxford Primary Atlas for South Africa*. The weather map on page 22 is a good example of how wind direction is indicated.

Orientating a map

When you are using a map in the real world to plot a route or find your way, you need to turn the map so that north on the map faces north in the place where you are standing. This allows you to match the positions of features on the map and on the ground. In the classroom it is not practical or necessary to orientate maps in this way.



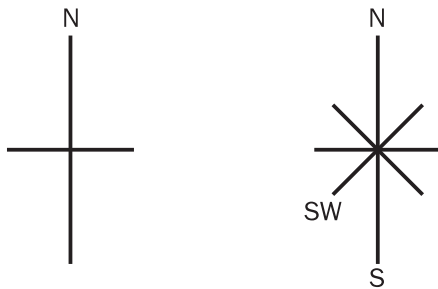
Practical activities on direction

Level 1

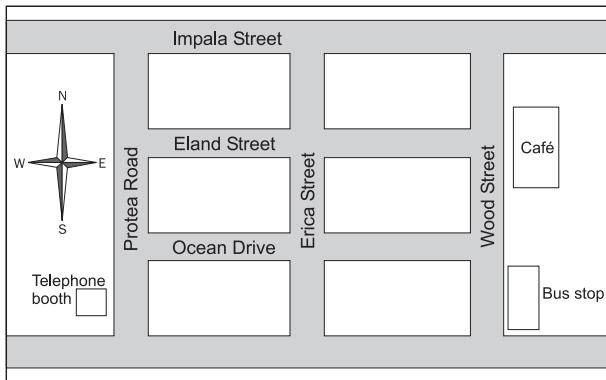
Teacher-facilitated chalkboard activities

(Alternatively, the activities can be photocopied and handed to the learners.)

- 1 Draw these compass roses. Fill in the missing directions:



- 2 Draw this map and get learners to give directions from one place to another.



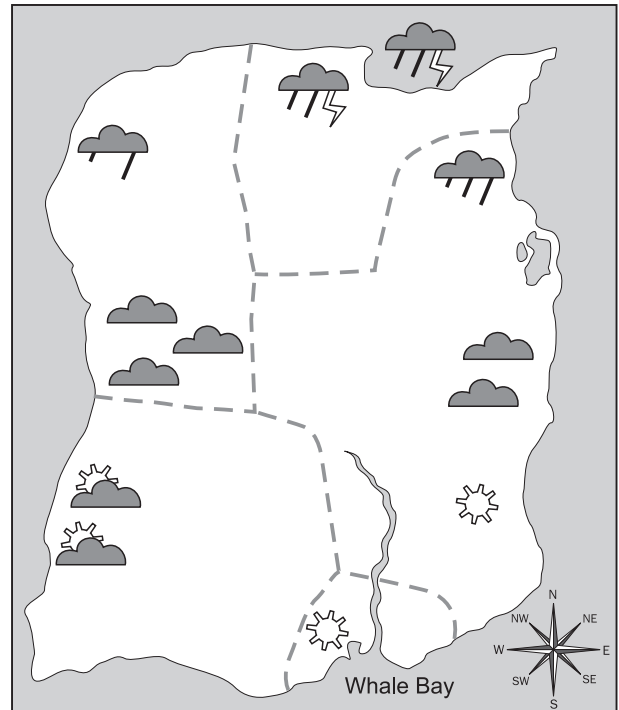
What direction will you be walking in if you go from:

- a Impala Street to Eland Street
- b Protea Road to Erica Street
- c Protea Road to Wood Street
- d Ocean Drive to Impala Street
- e Erica Street to Protea Road
- f the bus stop to the café
- g the café to the phone booth
- h the phone booth to the café?

If the learners need more practice with this, add more questions.

Learner activities

- 1 This is a weather map of Turtle Island. Use the key to check what the symbols mean, and complete the sentences below.



Key

	sunny		cloudy with showers
	partly cloudy		rainy
	cloudy		thundershowers

- a In the south-east and the the weather is fine.
 - b In the south-west it is
 - c In the east and west it is
 - d In the it is cloudy with showers.
 - e In the there are thundershowers.
 - f In the there is rain.
- 2 Find the map of Africa on page 54, and answer the questions:
 - a What is the most southerly country in Africa?
 - b What are the three most northerly countries in Africa?
 - c What is the most easterly country in Africa?

- d What ocean is on Africa's west coast?
- e What ocean is on the east coast of Africa?
- f Name three seas to the north of Africa.
- g What large island is east of Africa?
- h Name two islands west of Africa.
- i Find the equator. List three African countries that are south of the equator, and three north of the equator.
- j Name two African countries on the equator.

Level 2

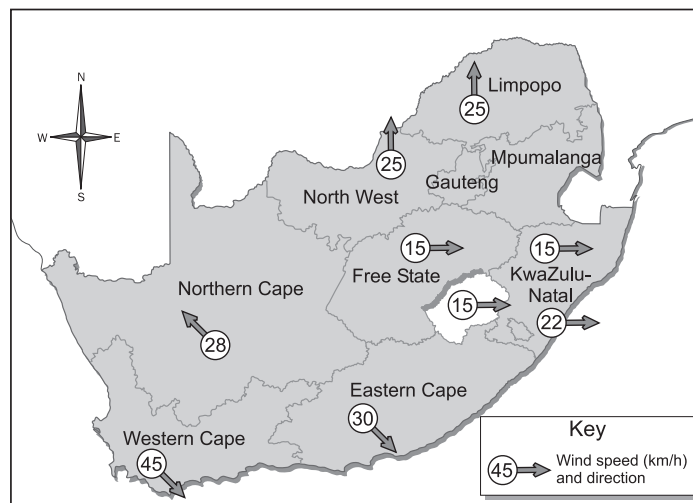
Learner activities

- 1 Turn to the map of South Africa on pages 16 and 17 and answer these questions:
 - a What is the most northerly province in South Africa?
 - b What is the most southerly province?
 - c Do you know what the name Mpumalanga means? If not, try to find the answer on the internet or ask your teacher. How do you think the province got its name?
 - d If you flew directly west from Durban to Port Nolloth, what provinces would you pass over? What neighbouring country would you fly over?

- 2 Turn to the map of your province (pages 33–41) and answer these questions:
 - a What is to the south of your province?
 - b What is to the east of your province?
 - c Look at the small locator map. What is the position of your province in South Africa (i.e. is it in the south-east, or the north, etc.)?
- 3 Turn to the map of your province (pages 33–41). Find your home town (or if it is not marked, find the town nearest your home). Name five towns or cities near your home and say what direction you would travel in to get to them. Set your answer out in a table like the one below:

Home town	Neighbouring town	Direction
Greytown	Dundee	north-west

- 4 On this weather map of South Africa the arrows indicate wind direction. Complete the information in the table. (Remember that a west wind blows *from* the west towards the east.)



Region	Wind direction	Wind speed
North West province	southerly	25 km/h
Western Cape		
Eastern Cape		
KwaZulu-Natal coast		
KZN interior, Lesotho & Free State		
Northern regions		
Northern Cape/Karoo		

5 Finding your way around maps and atlases

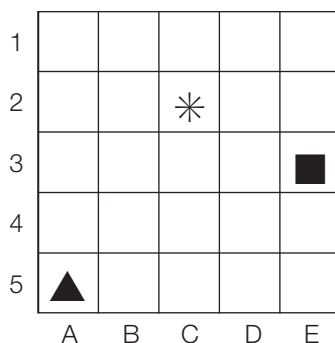
This chapter covers:

- grid references
- finding your way around an atlas
- using an index to find places.

Most maps include a grid of lines that is there to help you to find places on maps quickly. In the *Oxford Primary Atlas for South Africa*, these are alpha-numeric grids. Show learners the example of a map with an alphanumeric grid on page 14 of the atlas. At higher intermediate and senior levels, learners will work with the grid of lines that longitude and latitude make up.

Grid references

The diagram below has been divided into columns (running from top to bottom) and rows (running from left to right). The lines on the diagram form a grid. Each line on the grid has been given a letter or number to identify it. By referring to the numbers and letters on the grid, we can pinpoint blocks on the grid. For example, A5 refers to the block with the black triangle in it.



A5 gives us the position of a certain square on the grid. We call this an alpha-numeric grid reference

because it contains a letter of the alphabet and a number. Grid references like this one can be used to give the exact or rough position of places on maps. Activities later in this chapter give practice in using an alpha-numeric grid.

Latitude and longitude

The curriculum does not require junior learners to learn about latitude and longitude, but because many of the maps that they will see elsewhere are marked with lines of longitude and latitude, you may want to give them a simple introduction.

The key points are:

- lines of latitude and longitude are imaginary lines that form a grid on the Earth
- lines from north to south are lines of longitude
- lines from west to east are lines of latitude
- the equator is a line of latitude that divides the Earth into two hemispheres: the northern hemisphere and the southern hemisphere.

Once learners understand that lines of latitude and longitude form an imaginary grid on the Earth's surface, they can begin to understand how these lines are used to give the position of places on a map.

Using an index to find places

An index is an alphabetical list of all the places in the atlas. In order to use it effectively, the learners should understand alphabetical order. This skill will help them to use dictionaries and other alphabetically arranged reference works. Some ideas for developing this skill are given in the practical activities for this section.

Pages 60–64 of the atlas contain the index. It gives you information about the places on the maps, and also tells you where to find them. You will find:

- the place name
- the country (if relevant)
- a description of the place, e.g. *town*, *country*, *dam*. In some cases they are abbreviated, e.g. *mt.* stands for *mountain*
- a page number
- an alpha-numeric grid reference.

If a learner is trying to find Caledon (for example) on a map in the atlas, these are the steps to follow:

- 1 Find Caledon in the index.
- 2 Write down the page number and grid reference given there.
- 3 Turn to this page in the atlas and find the block in the grid.
- 4 Find Caledon in the block.

Some towns can be found in several different maps in the atlas, but in most cases the index only lists the most important map for that town.

Remember that the way some maps are drawn means that the lines of latitude and longitude may be curved. In this case, the grid does not form uniform square blocks. Turn to this page in the atlas and you can still use the same method to find places on a grid like this.



Practical activities using an alpha-numeric grid

Level 1

Teacher-facilitated activity

- 1 Draw the grid below on the chalkboard. Ask learners to say what position the following shapes are in:
 - the triangle
 - the circle
 - the X
 - the star
 - the *

If they still need practice, leave the grid on the board but rub out the shapes and ask individual learners to come up and colour in the blocks that you specify (e.g. 'Colour block A3 red'). If you don't have coloured chalk, get them to write their initials in the blocks you specify.

	A	B	C	D	E	
1		△				1
2					☆	2
3				○		3
4	*		X			4
5						5
	A	B	C	D	E	

Learner activities

- Turn to the map on page 14 in your atlas. Find the position of these places on the map, and complete the table in your books:

Place	Position
Lighthouse	D2
Shelly Beach	
Caravan Park	
Parking area near the Stillbaai East Nature Reserve	
Morris Point	
Kleinplaatjie	
School	
Shopping centre	

- Look at the contents page of your atlas. On which pages can you find the following?
 - a map showing South Africa and its provinces
 - a map of the Northern Cape
 - a map showing commercial farming in South Africa
 - a map of the world
 - a map of South America
 - the index
- Read the whole question before you start your answer. Draw a table like the one below, then use it to set out your answers.
 - Write these places in alphabetical order: Bisho, Alexander Bay, Zamdela, Giyani, Polokwane, Ulundi.
 - Now find these places in the index. On what page of the atlas would you find each place?

Place	Page number
Alexander Bay	33

- When places start with the same letter, they can still be placed in alphabetical order. How would you put these places in alphabetical order?
 - Gansbaai, Grahamstown, Giyani, Goegap
 - Howick, Hangklip, Hluhluwe, Hermanus
 - Atlantis, Amanzimtoti, Alexandria, Arniston
 - Mahikeng, Madibong, Mabopane, Maclear

- (Extension activity) What do these abbreviations in the index stand for?

SA	UK
mt.	USA
WC	mts.
KZN	DRC

Help learners find the answers in a dictionary if they do not already know them.

Level 2

Learner activities

- Use the index to complete the information in this table. Write abbreviations out in full.

Place	Description	Page	Grid position
Bedford	town		
Kilimanjaro			
Lesotho			
Magaliesberg			
Mangaung			
Mthatha			
Nile			
Sabie			
Zastron			

- (Extension activity) In what other books do we use alphabetical order? How does this help us?
- Turn to the world map on pages 42 and 43. On which continent and/or ocean are the following locations? Set your answer out as a table like this one:

Location	Continent	Ocean
F6	South America	Pacific
B7		Atlantic
D11		
E10		
G8		
C7		
B4		
B13		
B10		
H20		
H15		
F17		

6 Scale and distance

This chapter covers:

- understanding scale
- representing scale
- measuring and calculating distance.

Page 7 in the atlas introduces learners to distance and scale.

Understanding scale

Maps are scale representations of the real world. This means that they are much smaller than the real areas that they show. The scale of a map tells you how much smaller the map is than the real area. It also gives you the information you need to calculate how long the distances shown on the map actually are on the ground.

Representing scale

Scale on maps can be given in three ways:

- as a line scale
- as a statement in words
- as a ratio.

Line scales

In the *Oxford Primary Atlas for South Africa*, scale is shown as a simple line scale, supported by a clear statement in words, for example:

One centimetre (cm) on the map represents 50 kilometres (km) on the ground.

Scale



Scale as a ratio

Primary learners are not usually required to work with scale as a ratio. This is simply included for teachers' information, as learners are likely to come across maps that show scale in this way.

Many maps give scale as a ratio, for example:

1:2 000

A ratio of 1:2 000 means that the map is $\frac{1}{2\,000}$ th of the size of the real area. In other words, one unit of measurement on the map is equal to 2 000 of the same units on the ground. So, 1 cm on the map would represent 2 000 cm (that is, 20 metres) on the ground.

Large scale and small scale

A large-scale map usually shows a small area in generous detail. So on a large-scale map of Durban, for example, you would see streets, parks, etc.

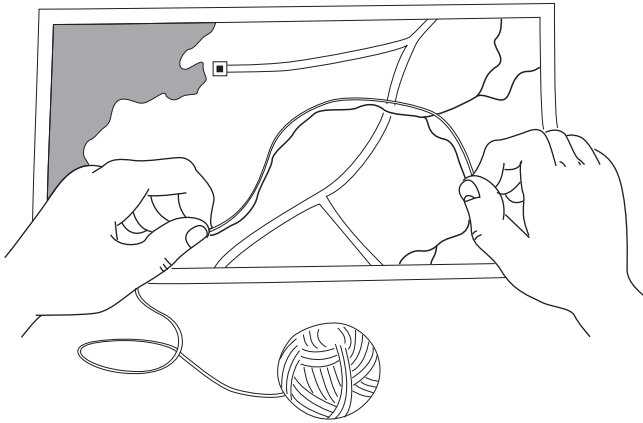
A small-scale map shows a much larger area, and it has to leave out many details. Therefore, on a small-scale map of South Africa, Durban would be shown as a dot.

Measuring and calculating distance

Learners can measure straight or curved distances on maps using a ruler, paper, string or a pair of dividers.

A ruler or a straight edge of paper can be used to measure straight line distances on a map. Once learners have measured, they place the ruler against the line scale on the map and read off the real distance.

Roads and rivers on maps are usually curved. The best way to measure curved distance on a map is to use a thin piece of cotton or string to follow the distance being measured. The distance can then be worked out by placing the string against the line scale.

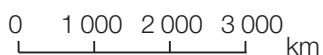
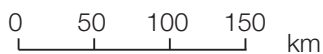
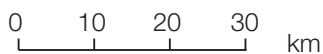


Practical activities on scale and distance

Level 1

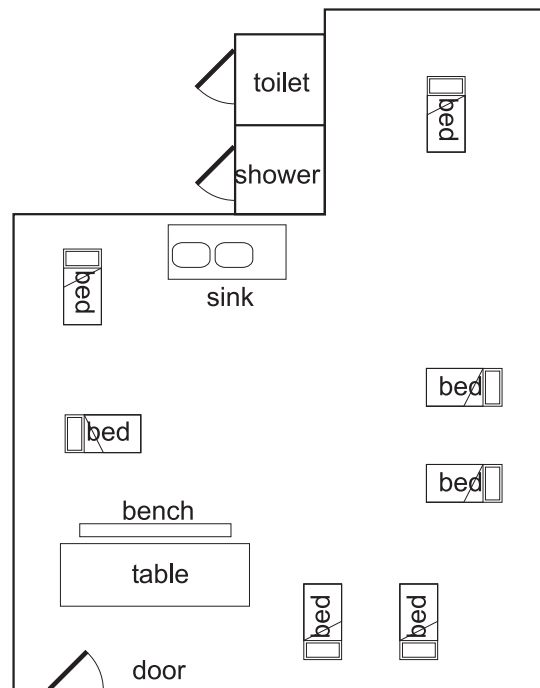
Learner activities

1 Look at these line scales. What does one centimetre represent in each one?



- 2 Turn to page 7 in your atlas, and look at the map of Turtle Island.
- On the map, what is the distance in centimetres from the Whale Bay clinic to the bus stop near Danger Beach?
 - What distance does this represent in kilometres on the ground?
 - How many kilometres is it by train from Klipspringer station to Elangeni Station if you go via Noordwyk?
 - If a bird flew straight from Klipspringer Station to Elangeni Station, what distance would it fly?
 - How many kilometres long is the hiking trail?

- How far would you have to walk from Baboon Cliff to reach the nearest road?
 - Which is the shortest route by road from Whale Bay to the lighthouse? How far is it in kilometres?
 - What is the perimeter of the maize field? (What distance would you walk if you went all the way around it?)
- 3 Look at this plan of the hikers' hut on Turtle Island.
- What is the scale of this plan in words?
 - How long is the hut in the plan?
 - How long is the hut in real life?
 - How wide is the hut in the plan?
 - How wide is the hut in real life?
 - How long are the beds?
 - How long is the table?
 - Hikers complain that the entrance is cluttered. Can you rearrange the plan so people can move around more easily?



Level 2**Teacher-facilitated activity**

- 1 You can use any map in the atlas to set measuring tasks. Ask learners to measure distances between places on the map and then to convert these to kilometres using the scale.

Learner activities

- 1 Compare the maps of South African provinces on pages 33–41.
 - a Which province is drawn at the largest scale?
 - b Why do you think this province has been drawn at a larger scale?
- 2 Turn to the map of Africa on page 54.
 - a A yacht-owner is planning to sail all the way around the coast of Africa. She will start at Alexandria in Egypt, and travel via Cape Town, stopping at ports on the way and ending up back at Alexandria. Approximately how long will the journey be? Calculate it in kilometres.

- b Find the equator. Measure along it from the west coast to the east coast of Africa. Calculate how far this distance is in kilometres.
- 3 Turn to the map of South Africa on pages 16 and 17. Work with a partner.
 - a Find East London and Johannesburg. How far do you estimate that it is from East London to Johannesburg by road? (Take a guess.)
 - b Now measure the distance with string and a ruler. What is the map distance in centimetres? What is the real distance in kilometres?
 - c If you fly in a direct line from East London to Johannesburg, what is the distance?
- 4 Look at the map of South Africa on pages 16 and 17.
 - a A pilot needs to know the flight distances between the cities below. Copy the table into your book and fill in the distances.
 - b Add three flight routes of your own. Remember to check that the towns you choose have airports.

Flight route (direct)	Distance on map (cm)	Distance in km
1 Cape Town to Johannesburg		
2 Johannesburg to Durban		
3 Johannesburg to Polokwane		
4 Mthatha to East London		
5 East London to Cape Town		
6		
7		
8		

7 Working with data: tables and graphs

This chapter covers:

- statistics and their uses
- drawing up and using tables
- the advantages of using graphs
- different types of graphs and how to use them.

Statistics

Statistics is a branch of mathematics that concerns itself with collecting facts derived from large quantities of numerical data. Examples are population numbers, and rainfall and temperature figures. Gathering statistics and working with them is an essential part of living in the modern world. A school principal can't do his or her job without knowing how many children are in the school, what grades they are in, what their home languages are, what future numbers are likely to be, etc. In order to do its job and to plan ahead, a government needs vast banks of statistics: it not only needs to know what the population is, but what percentages of people are young and old, where people live, how many have running water, matric certificates, and much more. Statistics are important for showing the relationships between different sets of information – for example, between levels of air pollution and people's health.

Any study of the world and our place in it requires some understanding of the nature of statistics and the methods that are used to collect, organise, display, and interpret information or data.

In order to make use of data that is collected over a long period or from various sources, statisticians often make the data easier to understand by calculating averages. Most Intermediate Phase learners will have worked

with data and averages in their Mathematics classes. However, you should make sure that they understand that an average is a middle – or typical – value worked out from a whole group of data. Temperatures, rainfall amounts, population figures, and life expectancy are all examples of averages that can be found in the *Oxford Primary Atlas for South Africa*. The average (mean) of a set of data is found by adding the data together and dividing the total by how many numbers there were.

Other types of averages are the median (middle value) and the mode (most frequent value) of a set of numbers.

Presenting data in tables

Tables are groups of data arranged in rows and columns. A table may show data that has been collected and averaged, or it may simply provide facts for comparison. It is important for learners to remember that:

- a row is a horizontal set of data
- a column is a vertical set of data.

Province	Population	Area in km ²	Population (per km ²)
N. Cape	840 321	361 830	2
W. Cape	3 956 875	129 370	31
Gauteng	7 348 423	17 010	432

rows

columns

Example of a table

Tables are useful because they allow the reader to see information at a glance. They also allow for quick comparisons between different rows and columns. Putting data into a table is often one of the first steps in organising data. (Many activities

in previous chapters of this book have already given learners practice in working with tables.)

You can find examples of data presented in tables in the atlas. For example:

- information about where South Africans get their water from (page 23)
- information about goods we import and export (page 27)
- information about population growth in South Africa (page 28)
- provincial statistics (pages 33–41)

You can encourage learners to find examples of tables on their own by looking through their atlases.

Graphs and why we use them

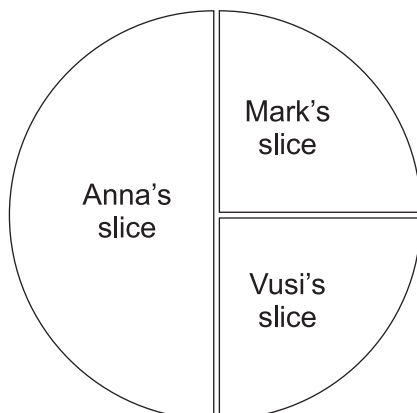
A graph is a diagram that shows the relationships between amounts or sets of numbers. Data are often shown on a graph to emphasise similarities and differences. For example, the bar graph on page 23 of the atlas shows the differences in the amount of clean water some households could get per person per day from 1993 to 2011.

Graphs can be invaluable aids to verbal descriptions. They are also very useful tools for problem-solving. Therefore, it is crucial that learners know how to interpret them, and how to present data in appropriate graph form. Both of these skills will be developed in the practical activities later in this chapter.

Types of graphs and charts

Pie graphs (or pie charts)

The concept of a pie graph is easy for learners to



grasp because it resembles slices of a pie:

From a diagram like this one it is easy for learners to see that Anna has half of the whole pie, and that Vusi and Mark each have a quarter. In summary, the pie diagram represents the whole pie (100% of the pie) divided up into:

- Anna's 50% share
- Vusi's 25% share
- Mark's 25% share.

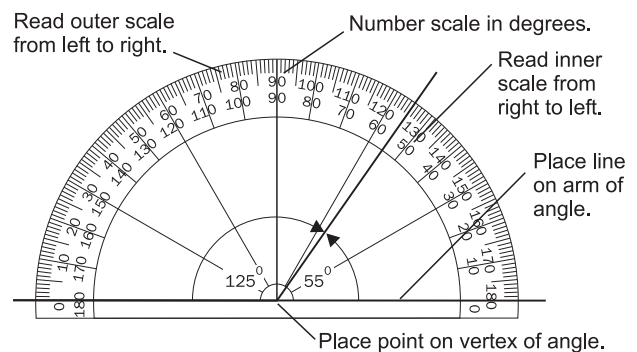
For learners who have not yet worked with percentages, you can refer to Anna's half share of the pie, and Vusi and Mark's quarter shares.

In a pie graph, the whole circle represents a total amount in a set of data. The size of each section (or slice) is always related to the amount of the total. Pie graphs are particularly useful for comparing data represented in one sector of the pie with data in another sector, and with the data represented by the entire circle. Note that the size of the circle does not affect the amount of data represented – pie graphs can use circles of any diameter.

You can find many different examples of pie graphs in the atlas, for example, on pages 23 and 27.

Reading pie graphs accurately (Extension)

In order to make sense of a pie graph at a more advanced level, learners need to understand that the angles around the centre of a circle are measured from 0 to 360 degrees. They also have to be able to use a protractor to measure the angles formed by each sector.



A protractor can be read from left or right, but you must start from 0.

It is also useful to be able to convert from degrees to percentage amounts. You can do this by following this formula:

$$\frac{\text{angle of sector}}{360} \times \frac{100}{1} = \% \text{ of total}$$

Drawing a pie graph

In order to draw a pie graph, you have to work out how big each sector of the pie will be in degrees. This can be calculated using the following formula:
















$$\frac{\text{amount to be represented}}{\text{total amount}} \times \frac{360}{1} = \text{size of sector in degrees}$$

Once the size of each sector has been calculated, learners can draw a circle and use their protractors to measure the different sectors.


Extension: Pictographs and block diagrams

The most basic graphs are pictographs and block diagrams. In a pictograph, the information is presented in the form of similar-sized pictures arranged in rows or columns.

In a block graph, one square (a block) is used to represent a single unit of data. The blocks are arranged in rows and columns.

Jan					
Feb					
March					
April					
May					
June					

Number of bicycles sold each month

Key:  = 10 bicycles

A simple pictograph

Understanding pictographs and block diagrams will give learners a good foundation for using bar graphs.

Bar graphs

A bar graph is based on the same principle as a pictograph or block diagram. You can see an example on page 51 of the atlas (the life expectancy graph). Another example is the bar graph on page 27.

Bar graphs use bars of uniform width to illustrate data. The length of each bar represents a statistic or figure. In the life expectancy graph on page 51 of the atlas, for example, the length of each bar shows how many years, on average, people live in each of the countries represented.

Bars can be arranged vertically (as they are on page 27), or horizontally (as in the graph on page 51).

In order to read a bar graph, learners need to read and understand the labels on both axes. You could use the chart showing what types of dwelling South African learners live in (the foot of page 33 in the atlas) to illustrate this. The labels on the horizontal axis (along the bottom of the graph) list the kinds of housing; on the vertical axis (up the side of the graph) the labels show that the bars represent the percentage of people in South Africa who live in these homes.

Extension: Histograms

A histogram is a bar graph in which the width of the bar changes according to the groups of data represented. The area of the bars is important in understanding the graph. It is quite difficult for young learners to make sense of histograms, so they have not been used in the *Oxford Primary Atlas for South Africa*. They are mentioned here as a reminder that the width of the bars on any graph does make a difference.

Line graphs

When there is a relationship between the sets of data represented by points on a graph, the points may be joined by a line to show that relationship.

You can see a good example of this in the population graph on page 28 in the atlas. In this graph, the line is used to show how the population increases over time.

The graph that compares urban and rural populations (page 29) is also a line graph which has been designed to show several things at once:

- growth in the percentage of South Africans who live in urban areas
- decline in the percentage of South Africans who live in rural areas
- urban and rural populations as percentages of the total South African population
- the changing ratio of the urban:rural population over time.

This is a good example of a graph that presents a lot of complex information in a way that is very clear and easy to read once one has grasped how a line graph works.

Composite graphs

Some graphs use two or more methods of showing data. Climate graphs use bars and lines on the same set of axes. Other graphs may show more than one set of data to make comparisons easier.

Reading the labels, keys and information on the axes becomes even more important when there is more than one set of information on a graph. Learners who do not make use of the information provided in this way are likely to misinterpret the data.

Interpreting graphs and charts

When you introduce learners to graphs and expect them to interpret data, the following steps may be useful:

- encourage them to look at the shape of the graph and to note its features

- get them to read the labels and captions carefully
- lead them to interpret the graph by asking questions that draw their attention to specific aspects of the graph or data
- encourage learners to ask their own questions about the graph
- get them to answer each other's questions.

Assessing understanding of graphs

The activities that follow in this chapter will give opportunities for assessing learners' understanding, but you can also devise your own practical tasks. These could include:

- collecting data or finding information
- organising the data in tabular or other forms
- selecting the best type of graph to use and representing the data graphically
- providing headings and labels that enable others to interpret the data
- getting learners to interpret data themselves and to draw conclusions or answer questions.

It is likely that the Mathematics teacher will be able to help you develop tasks for practical assessment.

Please note that the teacher-facilitated discussions and questions should be allowed to develop quite freely. Although they present specific, sometimes quite mechanical skills to practise, it is hoped that the topics themselves will encourage discussion and more questions in the classroom.

Before you do these activities, check that learners broadly understand the following terms:

- percentage
- average
- province.



Practical activities on tables and graphs

Level 1

Teacher-facilitated activities

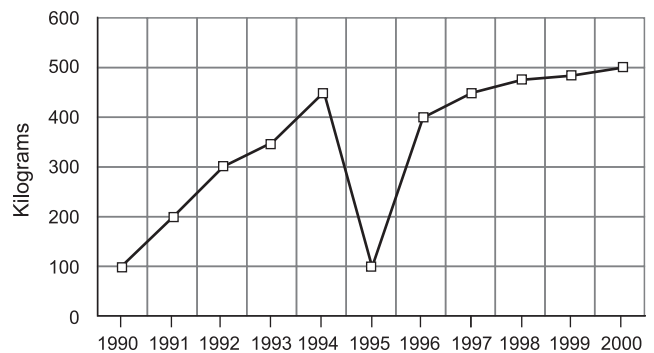
- 1 This activity is to check that learners can read information from a table. Ask them to find the map of their province (pages 33–41). Then ask questions such as these:
 - a What percentage of people in our province
 - have a tap at home
 - have electricity at home
 - are too poor to afford adequate food and shelter?
 - b What percentage of South African homes have a tap? (Refer to the pie chart on page 23.)
 - c In our province, are we better supplied with running water (taps) than South Africa as a whole, or worse?

At the same time as practising basic interpretation skills, encourage the class to talk about the issues that are raised. For example, if people don't have a tap at home, how do they get water, and how long does it take them each day? What happens to people who don't have clean water for washing and drinking? How do people without electricity manage? How do they cook, and what are the risks? What do you think it's like doing homework by candlelight? What is life like for people who can't read? Why do you think they haven't learned to read? Such discussions should help children to realise how important it is to strive for a more equal society and to reduce poverty.

- 2 Ask learners to find the language statistics for their province on the relevant provincial map (pages 33–41). Ask questions about the language information available:
 - a In our province, what language do most people speak at home?
 - b What language is spoken by the second highest number of people?
 - c Can you name any other languages spoken in our province?
- 3 Now look at the manufacturing pie chart on page 27.
 - a How many manufacturing industries are represented on it?
 - b Which manufacturing industry makes the

biggest contribution to the GDP?

- c Which industry makes the second biggest contribution?
 - d Which industry makes the third biggest contribution?
 - e Which industry makes the smallest contribution?
- 4 This activity is to check that learners can interpret bar graphs. Ask them to turn to page 23 in their atlases and to look at the graph about clean water. If the class needs more practice in interpreting bar graphs, you could devise similar questions for other graphs.
 - a What percentage of households had access to clean water in 1999/2000?
 - b What percentage of households had access to clean water in 2007/8?
 - c In which year did the biggest percentage of households have access to clean water?
 - d Is access to clean water getting better or worse?
 - 5 This activity is to ensure that learners can interpret a simple line graph. Draw this line graph on the chalkboard and ask questions about it. Below are suggestions:



The weight of the apple crop from Vanessa Williams's garden

- a What do the numbers along the bottom of the graph represent?
- b What do the numbers up the side mean?
- c What did Vanessa's apple crop weigh in 1990?
- d What did the apple crop weigh in 1992?
- e What was her best year for apples?
- f What do you think happened in 1995? (Take a guess.)
- g What does this graph tell us about Vanessa's apple-growing project?

Level 1

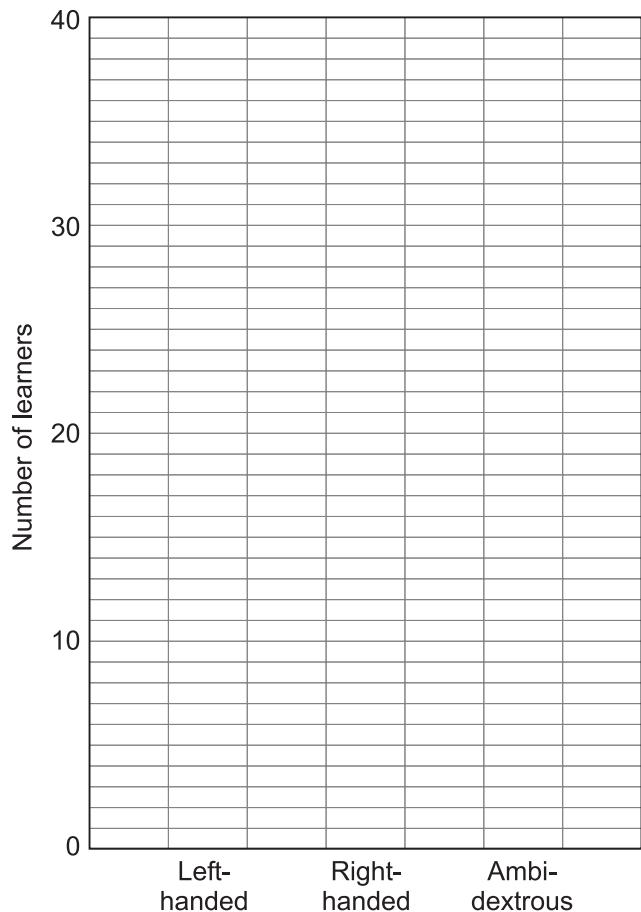
Learner activities

1 Draw a bar graph to show how many learners in your class are right-handed, how many are left-handed, and how many are ambidextrous (use both hands equally).

a First, as a class activity, find out the numbers and write them in the table.

	Number of learners
left-handed	
right-handed	
ambidextrous	
total number of learners	

- b Next, use the numbers to complete the bar graph below.
- c Finally, choose a different colour for each bar, and colour them in.
- d Give your graph a title.



2 Read the questions, and then complete the pie graphs below.

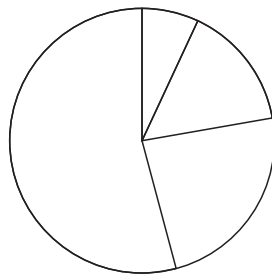
- a The boys in a primary school were asked to name their favourite sport.
- 55% chose soccer
 - 23% chose cricket
 - 14% had no favourite sport
 - 8% chose rugby

Choose a colour for each group. Colour in the key and the correct slice on the pie graph.

b The girls in the school chose these as their favourite sports:

- 41% chose netball
- 25% chose athletics
- 25% had no favourite sport
- 9% chose soccer

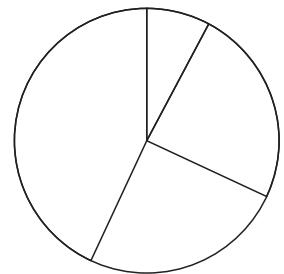
Colour the key and the correct slice on the pie graph for each group.



Key

	Soccer
	Cricket
	Rugby
	No favourite

Boys' favourite sports



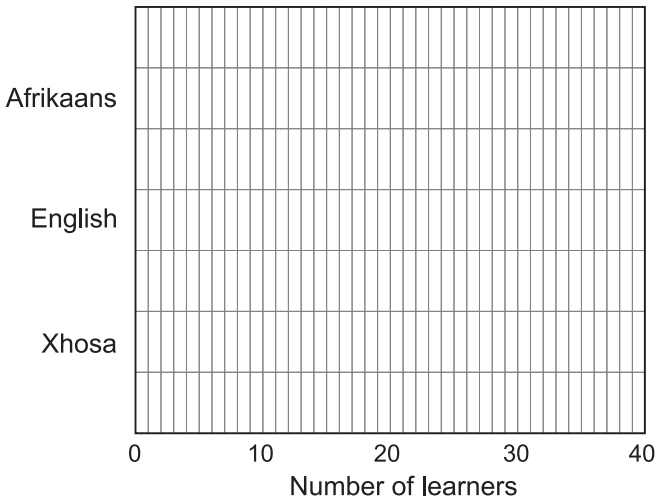
Key

	Netball
	Athletics
	Soccer
	No favourite

Girls' favourite sports

- 3 In the Grade 4 class at Protea Primary there are 35 learners.
- 9 speak Afrikaans at home
 - 6 speak English at home
 - 20 speak Xhosa at home
- Complete a bar graph to represent this, using the grid below.

When you have drawn the bars, choose a different colour for each language and colour your graph.



Home languages of Grade 4 class at Protea Primary School

- 4 You could draw a bar graph like the one in Activity 3, to show what home languages the learners in your class speak. Before you start, you will need to do a class activity to get the data.

Level 2

Class activities

- 1 Turn to page 29 in your atlas, and look at the bar graph that shows how old South Africans are.
- a Approximately what percentage of South Africans are aged 10–14?
 - b Approximately how many are aged 45–49?
 - c Which age group has the smallest number of people?
 - d Which two age groups have the greatest number of people?
 - e Which two government departments do you think would find the graph most useful:
 - the Police Service
 - the Ministry of Education

- the Ministry of Welfare and Pensions
 - the Ministry of Agriculture
- Why did you choose those departments?

- 2 Turn to page 28 in the atlas, and ask learners to look at the population graph at the top of the page. It may be helpful to draw it on the chalkboard before you discuss it. Here are suggestions for questions, but let discussions develop around the topic.
- a What does 'population' mean?
 - b What do the numbers along the bottom of the graph tell us?
 - c What do the numbers up the side of the graph tell us?
 - d Approximately how many people were living in South Africa in 1904?
 - e Approximately how many people were living in South Africa in 1921?
 - f What was the population in 1980?
 - g What was the population in 2001?
 - h Do you think the population will be greater or smaller in 2020 than it is now? (Encourage discussion around this.)
 - i How do we know what the total population is?
 - j Do you think a line graph is a good way of showing population change? Why?
- 3 This activity is to give learners practice in gathering data. The data will be needed to complete a learners' activity later in this chapter, so they should copy the table and keep it.

Copy the table below onto the chalkboard. Then find out how many learners in the class walk to school, come by car, etc. Complete the table with the class.

Method	Number	Percentage
on foot		
by bicycle		
by car		
by taxi		
by train		
other method		
total number of learners in the class		100%

Extension activity:

Remind the class that to work out the percentage of learners who walk to school, they must do the following calculation:

$$\frac{\text{number who walk to school}}{\text{total number of learners in class}} \times \frac{100}{1}$$

Learner activities

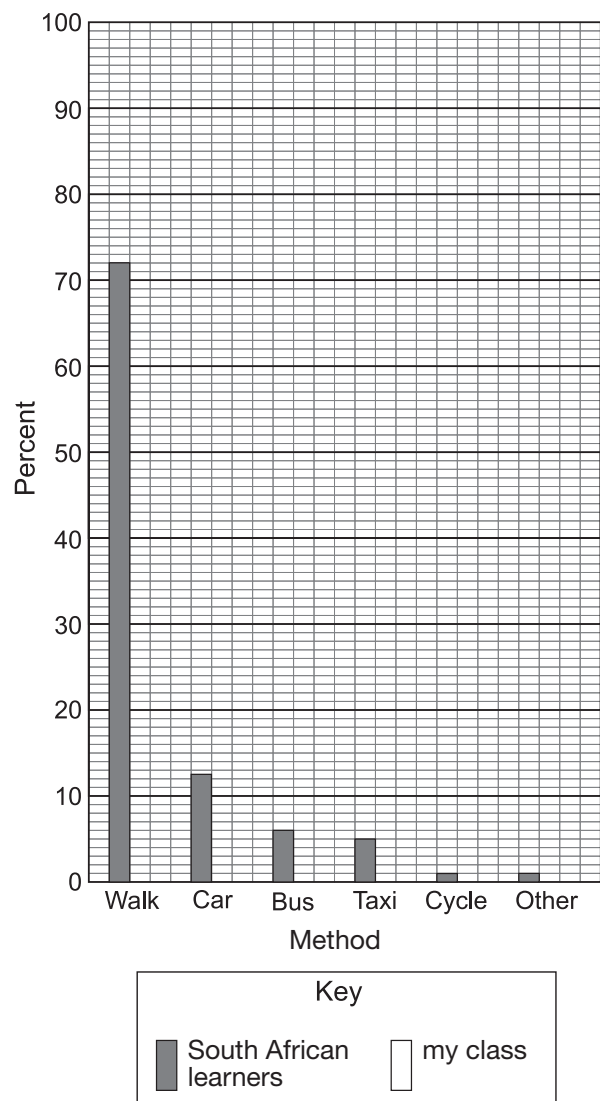
- 1 Turn to the bar graph headed 'Is access to clean water getting better or worse?' on page 23 of your atlas. Redraw it, but put the percentage labels along the bottom of the graph, and the other labels up the side of the graph. Choose your own colours for the bars, and add your own drawings.
- 2 a The table below shows what percentage of schools in South Africa have the services and facilities listed. Draw a bar graph to show this data. Remember to label the graph up the side and across the bottom, and to colour your bars. Add symbols (drawings) if you want to.

Services and facilities in SA schools	Percentage of schools with facilities
Electricity	53%
Toilets	52%
Running water (taps)	48%
Computer	24%
Library	20%
E-mail	13%
Internet	13%

(Figures from Statistics SA Survey, 2001)

- b How does your school compare with the national average? For each of the facilities that your school has, give it one point. Then add up the points and give your school a score out of seven.

- 3 The bar graph below shows you how learners in South Africa get to school. Now compare your class with the national average. Read the whole question before you start.
 - a Get the table of figures that the class drew up for Class activity, Number 3 on page 27 of this book.
 - b Choose a colour for South African learners. Use it to colour the correct block in the key. Use the same colour to colour the bars.
 - c Then add your own bars to show what percentage of learners in your class get to school on foot, by car, etc.
 - d Choose a colour to represent your class, and colour the bars and the correct block in the key.
 Is your class similar to the rest of the country, or different?



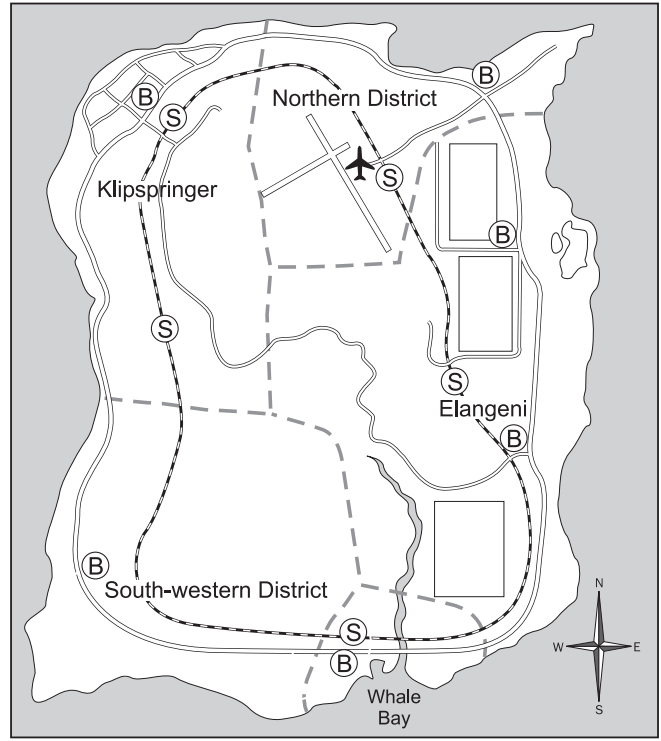
Bar graph showing how South African learners (as a whole) and my class get to school

Map showing the districts of Turtle Island

- 4 Complete the table below by answering these questions:
- Work out the population density per square kilometre for the five districts on Turtle Island. (Divide the population by the area to calculate the average population density per km².)
 - Calculate the total area of the island and write it in the table below. Write down the total population. Then work out the population density for the island as a whole.
 - Now colour the map to show the population density of each district. First choose colours for the key, then colour each district.

Key to population density

	0-5 people per km ²
	6-25 people per km ²
	26-50 people per km ²
	51-75 people per km ²
	over 75 people per km ²



Key

	road – major
	road – gravel
	railway line
	district boundaries
	bus stops
	railway stations

District	Area (in km ²)	Population	Population density per km ² (people per km ²)
Whale Bay	3	240	80
Klipspringer	27	162	
Elangeni	40	40	
Northern District	24	36	
South-western District	49	0	
Total			

8 Using and interpreting thematic maps

This chapter covers:

- thematic maps: what they are
- understanding the titles of thematic maps
- thematic maps in the *Oxford Primary Atlas for South Africa*
- ideas for integrating thematic maps into classroom activities.

Thematic maps

In Chapter 3, thematic maps were defined as maps that give information about specific topics. Some of these topics are climate, vegetation, natural resources, and land use. Thematic maps can give information about just one topic, as in the natural vegetation map on page 24, or they can provide information about different, but usually related topics. Such an example can be found on page 20. The weather map provides information about the minimum and maximum temperatures, weather conditions, and wind speed and direction. It also shows us different provinces and their capital cities, as well as the names of the surrounding oceans.

The meaning of map titles

In order to make sense of thematic maps, learners need to be alert to map titles and what these signal in terms of information on the map. Some of these titles are self-explanatory, such as *Farm production*. Others will be less familiar to the learners, and we recommend that you spend some time making sure that they read and understand them. They are explained in the section that follows.

One way of helping learners to understand map names is by getting them to find thematic map titles in their atlas contents list and to write these down. They can then guess (hypothesise) what they think each of these atlas pages will contain. By turning to the pages and looking at what they do cover, they can see how well they predicted and also learn what is meant by the titles.

Thematic maps in the *Oxford Primary Atlas for South Africa*

- *Climate (pages 20, 21)*
Learners need to understand that climate means the general weather pattern in an area over a long time. The climate of a place is influenced by its altitude (height above sea level – the higher you are, the cooler the temperature); latitude (the closer you are to the equator, the warmer the climate usually is); rainfall patterns through the year; temperature patterns through the year; and winds and ocean currents.

The atlas has been designed to help learners to see connections in geography: for example, the climate zones in the map on page 21 are shaped by the temperature, rainfall, and currents that they can see in the preceding maps. And climate zones in turn help to determine what natural vegetation grows in different parts of the country (see page 24), and what crops farmers can grow (see the maps on page 25).

- *Natural vegetation (page 24)*
This is the vegetation that evolved over millions of years in response to the local conditions: the climate, the soil, altitude, and other factors. It was the vegetation that

European settlers found when they arrived in the 1600s, with the exception of small areas of cropland where the Nguni and Sotho-Tswana people were farming. Since then, much natural vegetation has been replaced by commercial farm crops and invasive alien plants (for example, the black wattle and the Port Jackson willow, both from Australia). Now you find natural vegetation mainly in nature reserves and wilderness areas.

- *Farm production (page 25)*
The first map shows what types of commercial farming are practised in different parts of the country. It has close links to the map showing climate zones (page 21) and the map of natural vegetation (page 24). It is important for learners to work out and understand these connections.
Subsistence farming (traditional small-scale farming) is another important source of food and other means of livelihood.
- *Resources: mining and minerals (page 26)*
As learners can see from the table, South Africa is the world's top producer of several important minerals. The mines provide thousands of jobs, and the sale of minerals to other countries brings a lot of money into South Africa. But the mines are also a source of problems: for example, many miners get lung diseases, and the environment is damaged by mining.
- *Water (page 23)* fundamentally important resource. Our economic well-being depends very much on whether we have good rains or drought, and on the country's dams. Lack of clean water, felt most acutely in rural areas, is the cause of diseases such as diarrhoea and cholera.
- *Manufacturing industry and trade (page 27)*
Industry literally means 'work'. In the context of an atlas, the word usually refers to the making or producing of goods, especially in factories (as on page 27 of the *Oxford Primary Atlas for South Africa*). But it also has broader meanings: in the tables on the province maps (pages 33–41) we refer to the tourism industry.

Activities in this book are designed to help learners discover the complex connections between industry, natural resources, employment, population and environmental pollution.

- *Population (pages 28, 29, 50 and 51)*
The map and graphs dealing with population issues include information about population growth, population density (how many people live in an area), the numbers of people in each age group, and the shift over the past century from rural to urban areas.
- *Energy, environment and health (pages 30–31)*
Maps on this theme show where the main power stations responsible for producing electricity are. It also shows where the coal fields are. Maps on this theme can also show which areas as exposed to the worst degrees of air, sea and water pollution are. Pollution is caused by human activities such burning coal for electricity. Alternative methods can be used for the generation of energy, such as wind and solar power. These methods will not harm the environment or contribute to global warming.

9 Worksheets

	Worksheet topic	Skills and knowledge that can be assessed
1	Map skills: plan views	– identifying correct plan views
2	Map skills: map symbols	– drawing maps – understanding symbols – understanding keys
3	My province in South Africa	– basic knowledge of the learners' own province – interpretation of maps and their labels – interpretation of data from tables, graphs and symbols
4	Atlas skills: symbols and referencing	– knowledge of map symbols – interpretation of colour on physical maps – understanding the uses of maps – researching information from different sources (index, maps, etc.)
5	South Africa	– locational knowledge – interpretation of maps and their symbols and labels – knowledge of national symbols – researching information – completing a table
6	The world	– knowledge of what continents and oceans are – locational knowledge – map skills: labelling and colouring – researching information and presenting it – knowledge of direction
7	Map skills: maps and land height	– interpreting physical maps – creating physical maps – completing a map key – designing a map symbol
8	Map skills: distance, scale, direction	– using a scale to work out distances – working out directions – working with tables – recognising patterns in data – recognising differences between seasons in the northern and southern hemispheres
	Master sheets for South Africa, Africa, and the world	– wide range of activities that teachers can plan

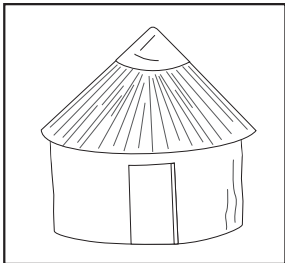
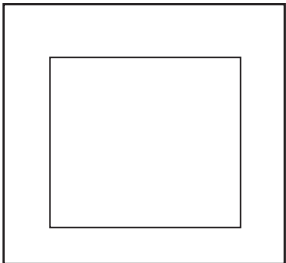
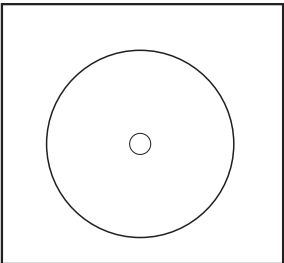
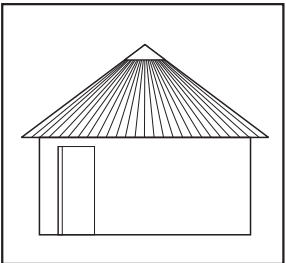
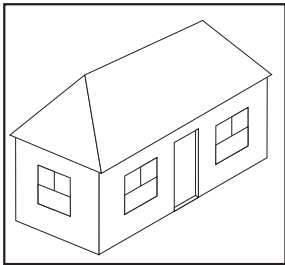
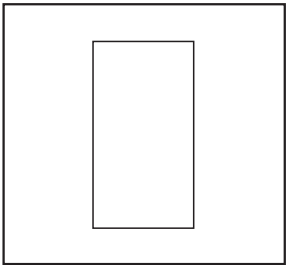
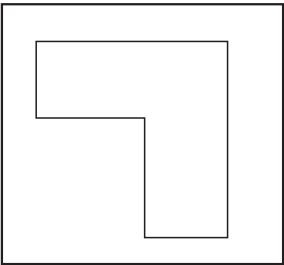
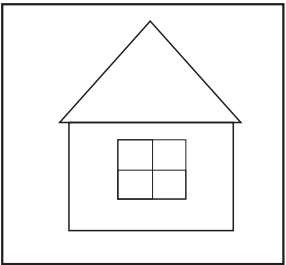
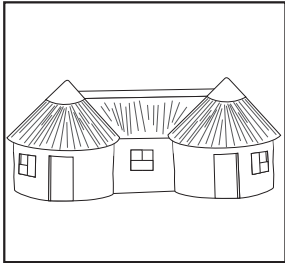
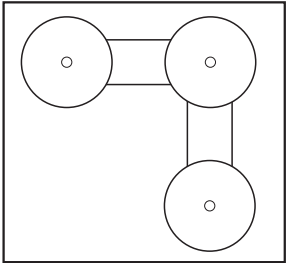
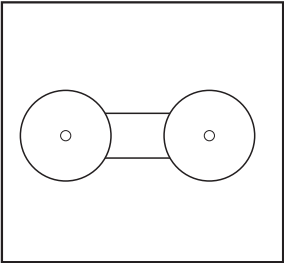
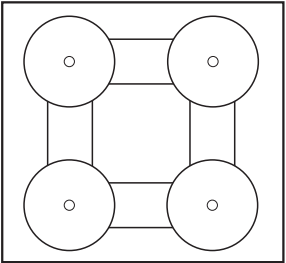

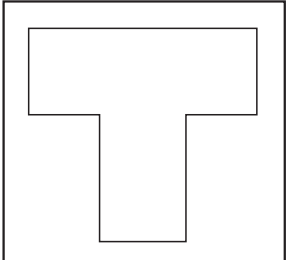
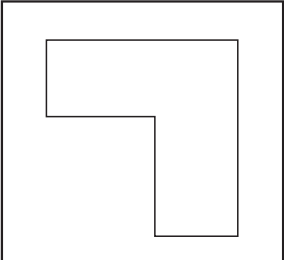
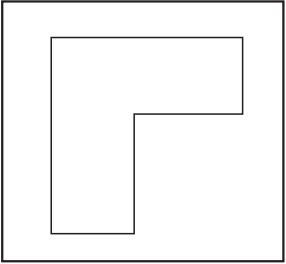
Worksheet 1

Map skills: plan views

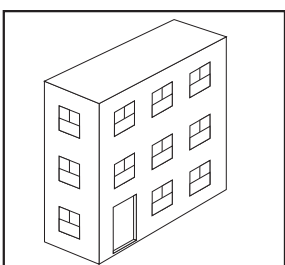

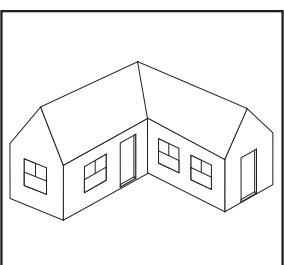

Looking down at buildings

A view from above is called a plan.

Colour the roof of each building in the left column. Then colour each building's *plan*.

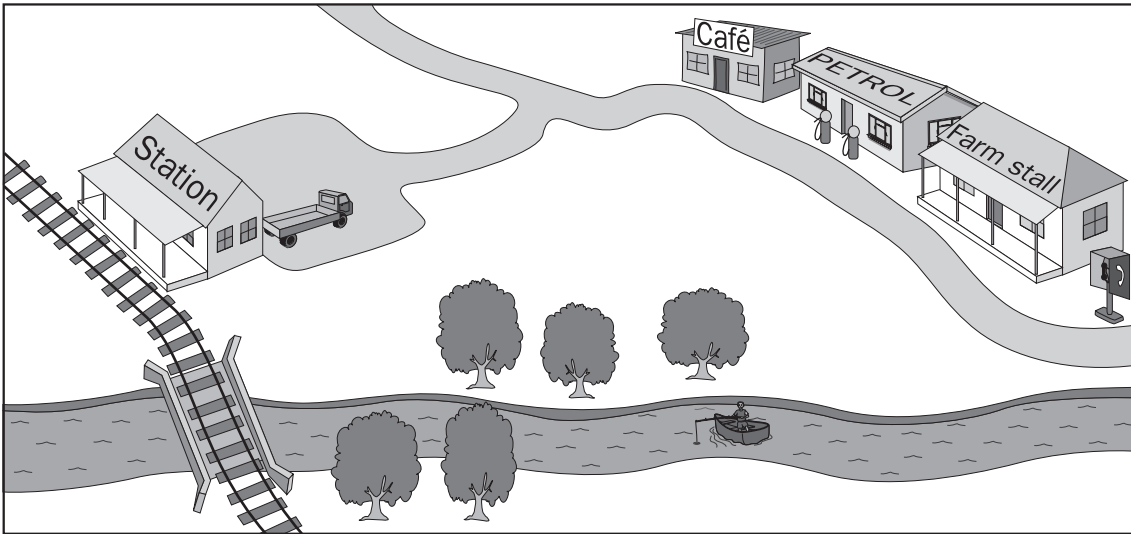
			
			
			
			

Draw the plan of each of these buildings.

			
---	---	--	---









Worksheet 2

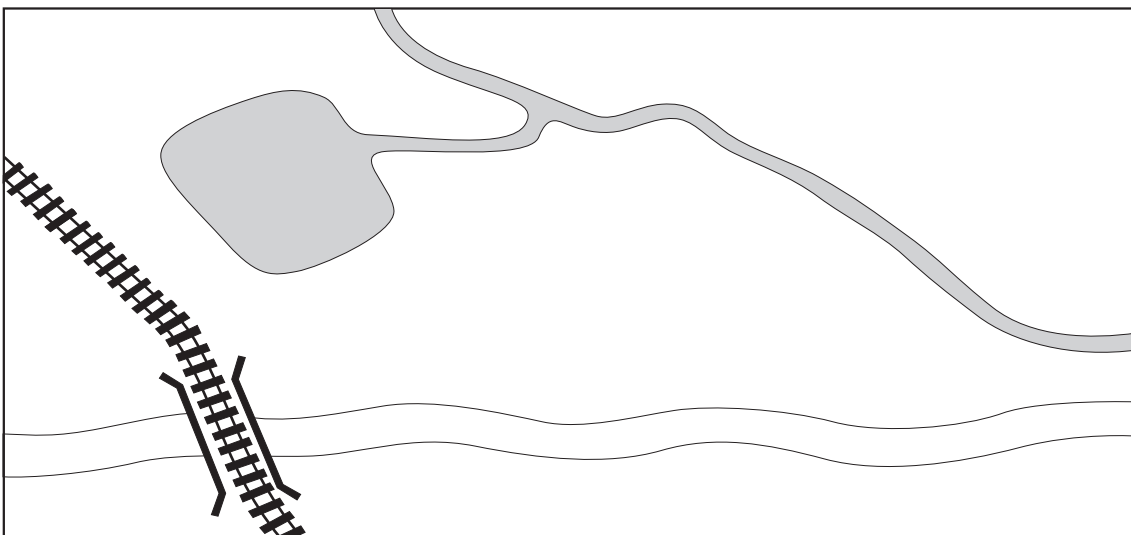
Map skills: map symbols



Design and draw the missing symbols in the key. Using the key, complete the map.

Key

 road	<div style="border: 1px dashed black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;">  </div> river	<div style="border: 1px dashed black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;">  </div> train station	<div style="border: 1px dashed black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;">  </div> phone
 petrol station	<div style="border: 1px dashed black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;">  </div> bridge	<div style="border: 1px dashed black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;">  </div> parking area	<div style="border: 1px dashed black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;">  </div> café



Worksheet 3

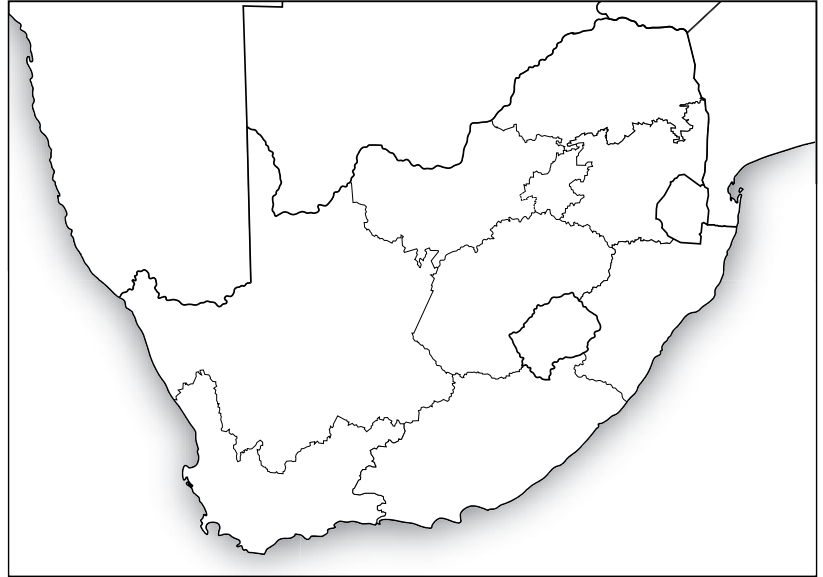
My province in South Africa

Use the map of your province together with the map of South Africa on pages 16 and 17, and the table at the bottom of your province's map, to complete this worksheet.

Find your province on this map of South Africa, and colour it in. Write its name in the space below the map.

Mark the capital and label it.

Colour the sea blue.



My province: _____

Population of province: _____

Area in km²: _____

Towns or cities with airport: _____

Neighbouring provinces: _____

Three main home languages (list them in order, starting with the language with the most speakers):

Neighbouring countries: _____

Physical features

Main rivers: _____

Mountain ranges: _____

Main nature reserves or national parks (name three): _____

Worksheet 4

Atlas skills: symbols and referencing

You will need to look at your *Oxford Primary Atlas for South Africa* while you complete this worksheet.

1 Draw a symbol that is used in your atlas to represent the following:

- | | | |
|------------------------|-----------------|-------------|
| capital city | railway | sheep farms |
| river | built-up area | gold |
| international boundary | airport | diamonds |
| large town | sunflower farms | copper |

2 What colours are used on the physical map of South Africa to show:

- the sea _____
- the highest land _____
- rivers and dams _____
- the lowest land? _____

3 Find three different maps in your atlas. Complete this table for the three maps you choose. An example has been done for you.

Map title	Atlas page number	People who might use a map like this
Rainfall	20	A farmer; also a foreign person planning a beach holiday in South Africa

4 Look at the place names in the box. Underline all the continent names in red. Underline the ocean names in blue. Draw a circle around the names of countries. Put a star next to all the names of towns or cities.

Atlantic	Asia	India	Pacific	Botswana	Lesotho	Pretoria	France
Australia	Namibia	Windhoek	Argentina	Europe	North America		
Canada	Washington	Paris	Durban	Egypt	Mexico	Queenstown	
	Swaziland	Harare	Lusaka	South America			

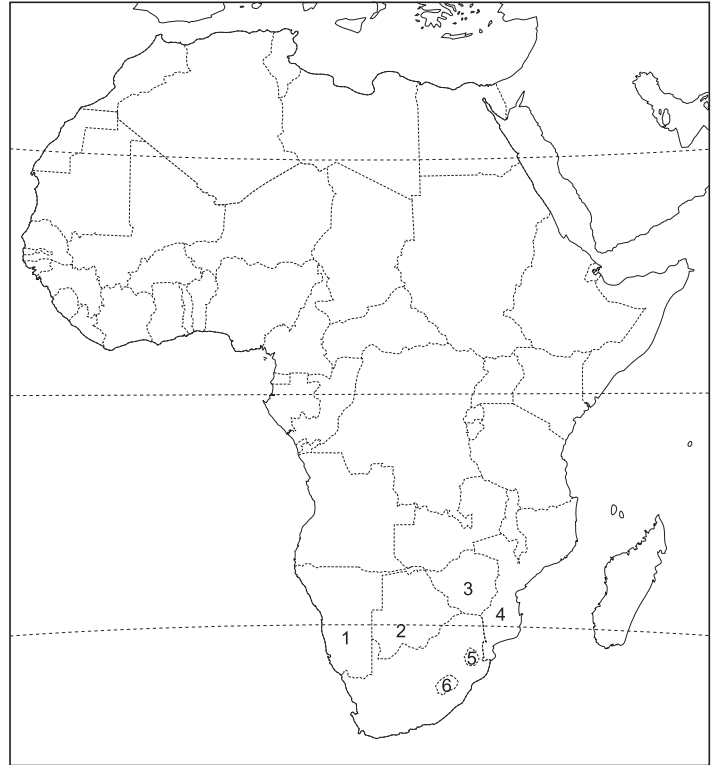
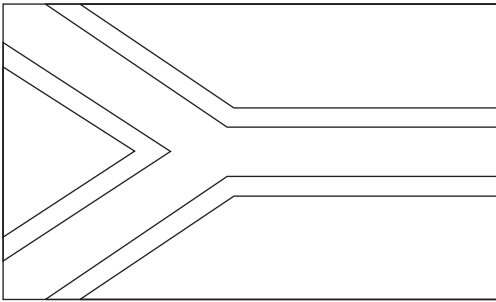
Worksheet 5

South Africa

Use the political and physical maps of South Africa in your atlas to complete this worksheet.

Find South Africa on this map of Africa. Colour in South Africa. (Remember to leave Lesotho clear.) Label it. Mark and label the two capital cities. Colour the sea and label the two oceans.

Colour the flag. (Use the correct colours!)



Basic facts

South Africa's population: _____

Physical features

Area: _____

Winiest place: _____

Highest point: _____

Driest place: _____

Longest river: _____

Wettest place: _____

Provinces

Province	Capital	Population	Main home language

National symbols

Imagine that you have been asked to choose a national insect. Draw it and name it.

National flower: _____

National animal: _____

National tree: _____

National fish: _____

National bird: _____

Neighbouring countries

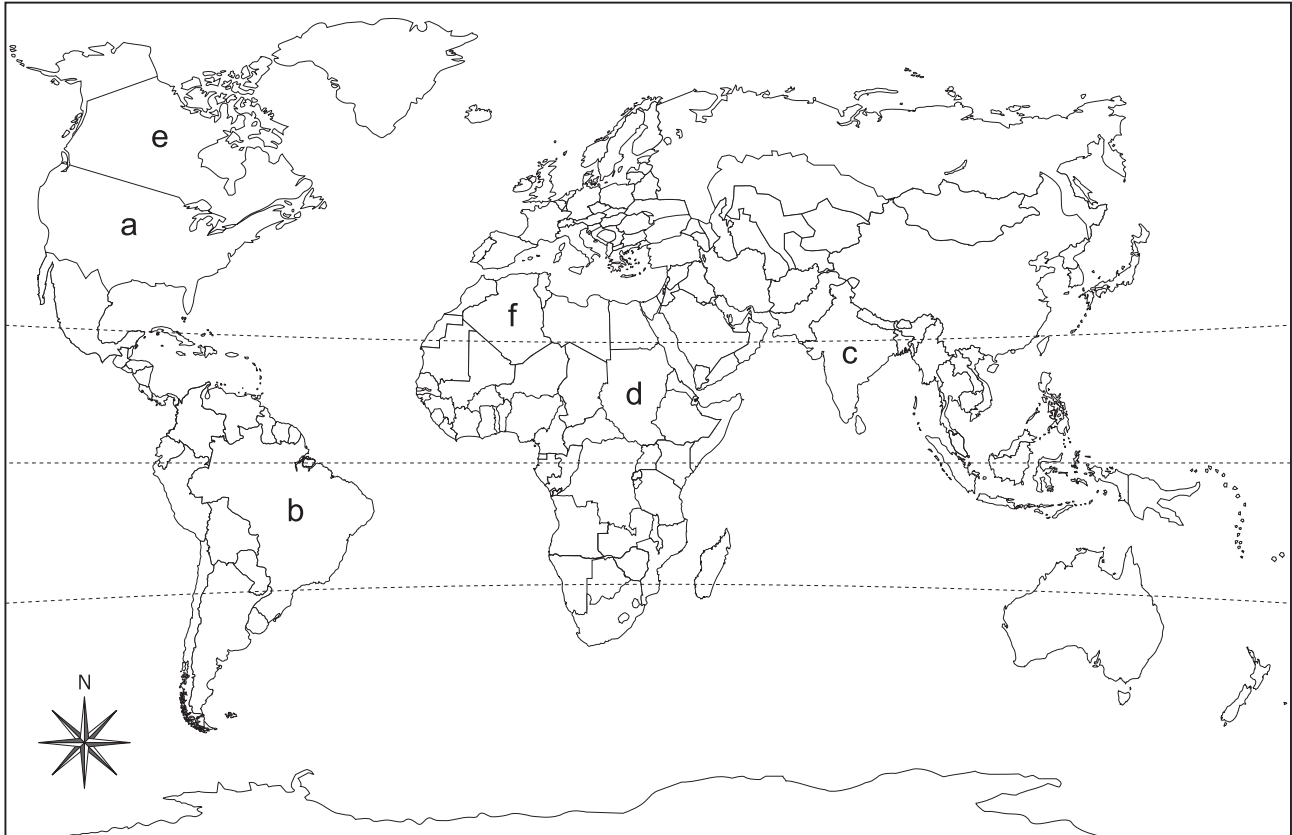
On the map you can see our neighbouring countries numbered 1–6. Name the countries and their capitals.

Country	Capital
1	
2	
3	
4	
5	
6	

Worksheet 6

The world

Refer to your atlas while you complete this worksheet, especially the world map and the continents.



- 1 Choose a different colour for each of the seven continents. Colour them in.
- 2 Label each continent.
- 3 Colour the seas and oceans blue. Label the oceans.
- 4 Label South Africa.
- 5 Label the equator.
- 6 Complete the labels on the eight-point compass diagram.
- 7 Name the countries that are marked on the map:

a _____ d _____

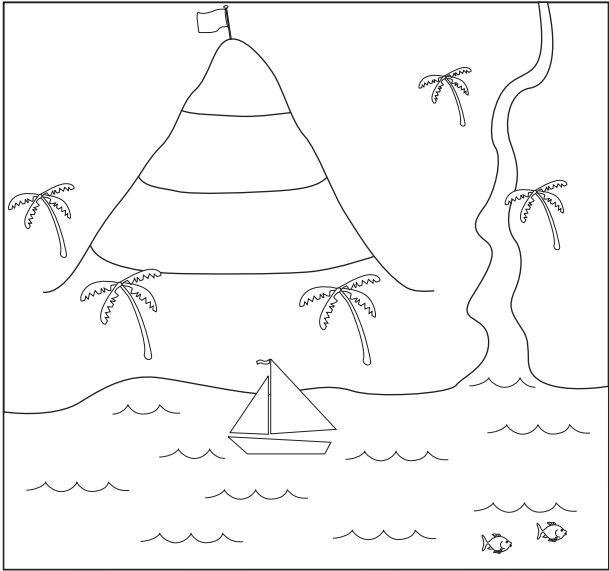
b _____ e _____

c _____ f _____

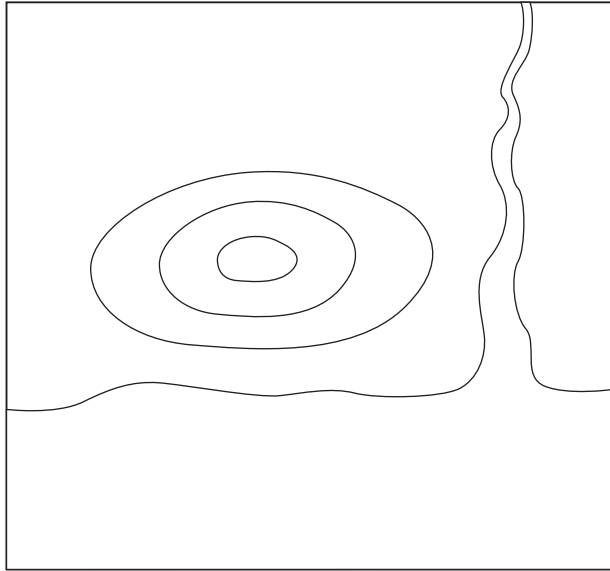
Worksheet 7

Map skills: maps and land height

Key	
<input type="checkbox"/>	30-40 m above sea level
<input type="checkbox"/>	20-30 m
<input type="checkbox"/>	10-20 m
<input type="checkbox"/>	0-10 m
<input type="checkbox"/>	flag



Porcupine Peak (side view)



Physical map of Porcupine Peak (plan view)

- 1 Above is a sketch of Porcupine Peak, and a map of the same area. You need to colour both to show the land height. Follow these steps:
 - a Choose a different colour for each band of land height on Porcupine Peak. Colour each band in.
 - b Colour the key to show what height each colour represents.
 - c Using the same colours, colour the map of Porcupine Peak to show the land height.
 - d Colour the sea and the river and label them.
 - e Design your own symbol for the flag and add it to the map and the key.

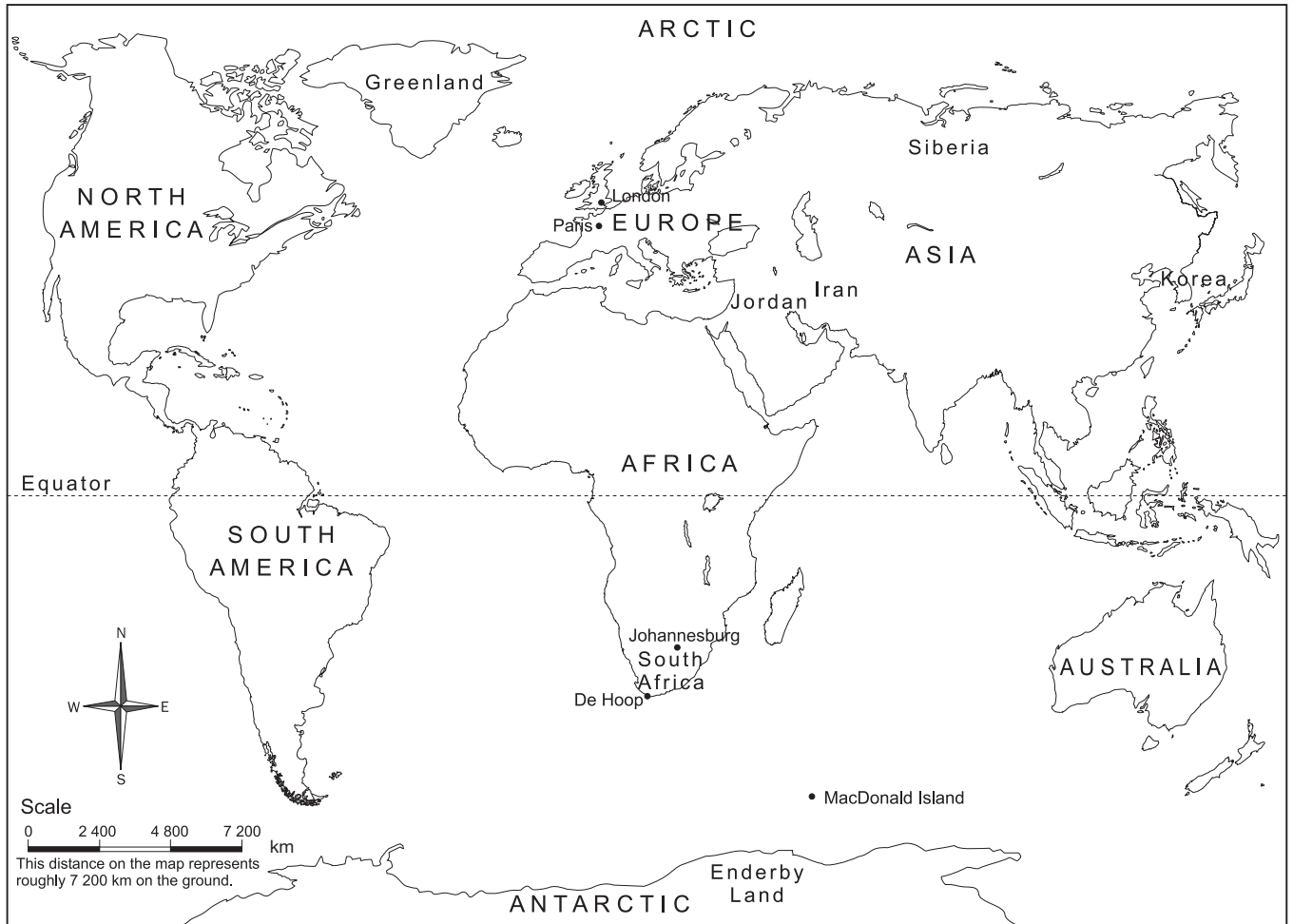
- 2 Turn to the physical world map on pages 42 and 43.
 - a Which side of South America has the highest land – the east or west side? _____
 - b Which side of North America has the highest land? _____
 - c Which part of southern Africa has the highest land? _____
 - d How high is the land in most of Australia? _____
 - e If you wanted to climb the highest mountain in the world, where would you go?
Name the mountain, the mountain range, and the continent. _____

Worksheet 8

Map skills: distance, scale, direction

Amazing migrants

The migrations of animals from one part of the world to another are among the most amazing events in nature. Each year, hundreds of bird species fly thousands of kilometres to breed. A few months later they fly all the way back to where they came from.



Work out the answers to these questions and write them in the table. Write them in pencil first so you can check and correct them if you need to. (It will help if you draw lines on the map to show the birds' routes. The distances you work out will be approximate; it is not possible to work them out completely accurately.)

- 1 In October, a flock of Eurasian swallows flies from London to Johannesburg to breed.
 - a Approximately what distance do they fly?
 - b In what direction do they travel?
 - c When they return, in what direction do they travel?
 - d In a year, what distance do they travel in their migration?

Provide the same answers (a, b, c, d) for the following birds:



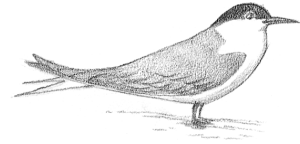
Steppe buzzard

Steppe buzzards catch small animals by dive-bombing them. They often perch on telephone posts.

Where they live:

April to September: Europe and Asia

October to March: Africa



Arctic tern

These sea birds are the long-distance champions of migration. They fly further than any other birds.

Where they live:

April to October: Antarctic

September to March: Arctic



White stork

Storks are large birds that make platforms of sticks to nest in. They are good at catching air-currents and cruising very high up.

Where they live:

April to September: Europe and Asia

October to March: southern Africa



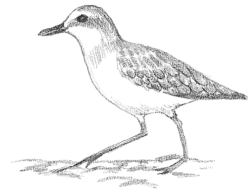
Eurasian swallow

These amazingly fast birds catch insects as they fly. They gather in huge flocks – sometimes millions of birds – before migrating.

Where they live:

April to October: northern hemisphere

November to March: southern hemisphere



Sand plover

Sand plovers search for food on the sea shore and edges of lagoons.

Where they live:

April to September: Asia (Korea, Iran, Jordan)

October-March: southern Africa, Australia

** Migration dates are approximate.*

- 2 In September, Steppe buzzards fly from Siberia to De Hoop in South Africa.
- 3 In October, Arctic terns fly from the northern coast of Greenland to Enderby Land in the Antarctic.
- 4 In October, a flock of sand plovers leaves Iran and flies to De Hoop.
- 5 In October, a flock of white storks flies from Paris to De Hoop.

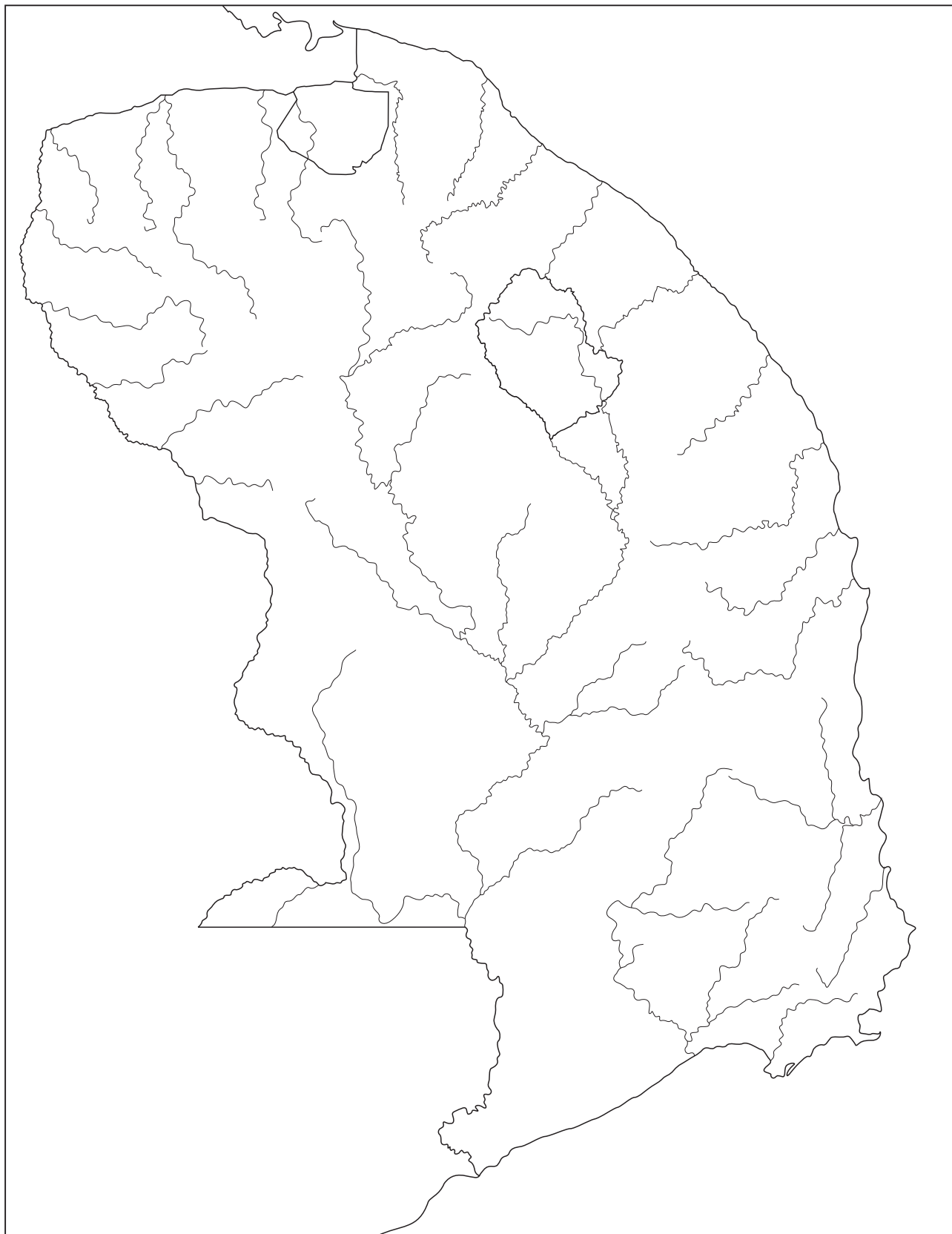
bird	a. distance of one migration	b. direction	c. direction of return flight	d. total distance of two migrations
1 Eurasian swallow				
2 Steppe buzzard				
3 Arctic tern				
4 Sand plover				
5 White stork				

- 6 When you have completed the table above, look at the answers to *b* and *c*. And also look at the lines you drew on the map to show the birds' routes. What do you notice?

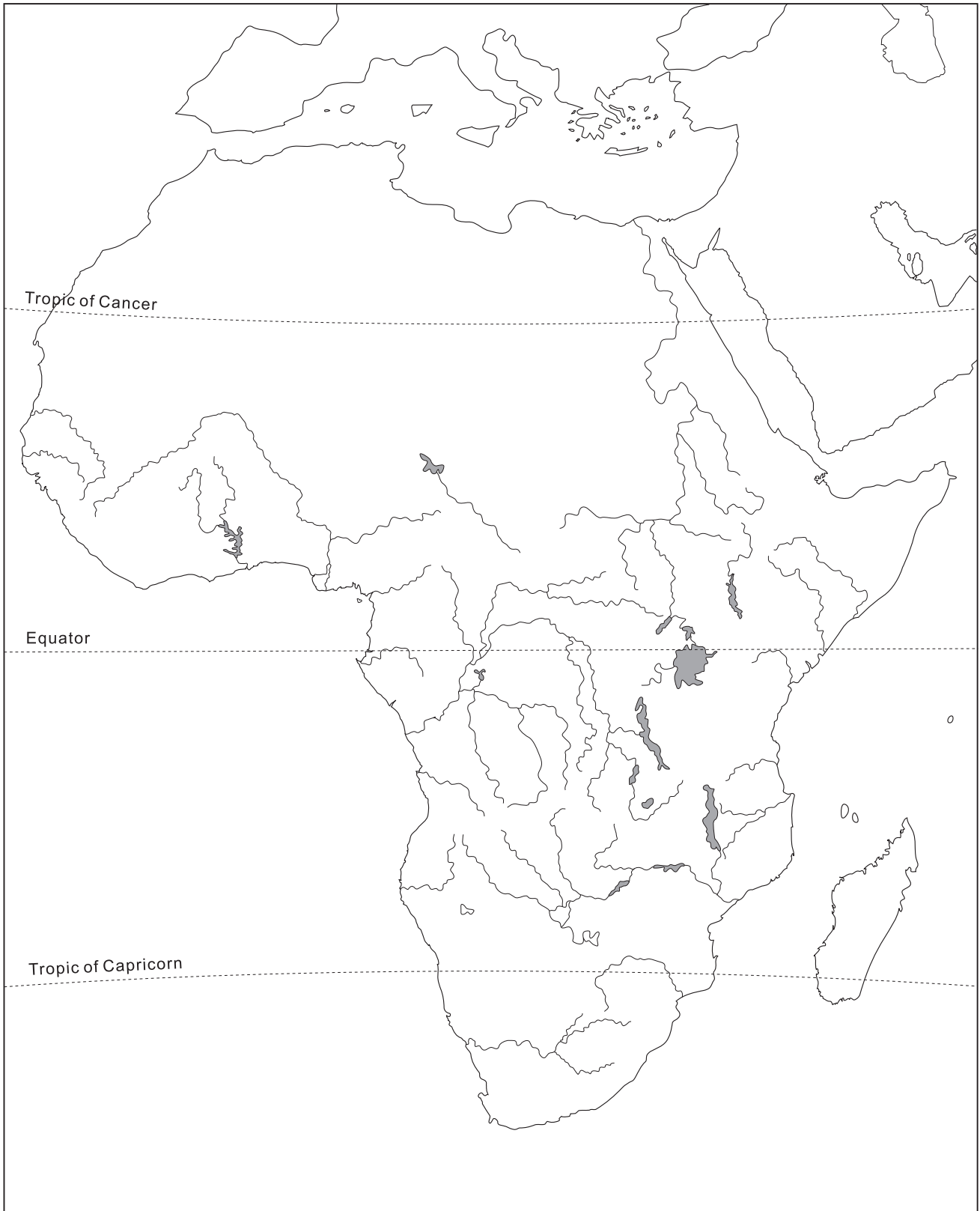
South Africa's provinces



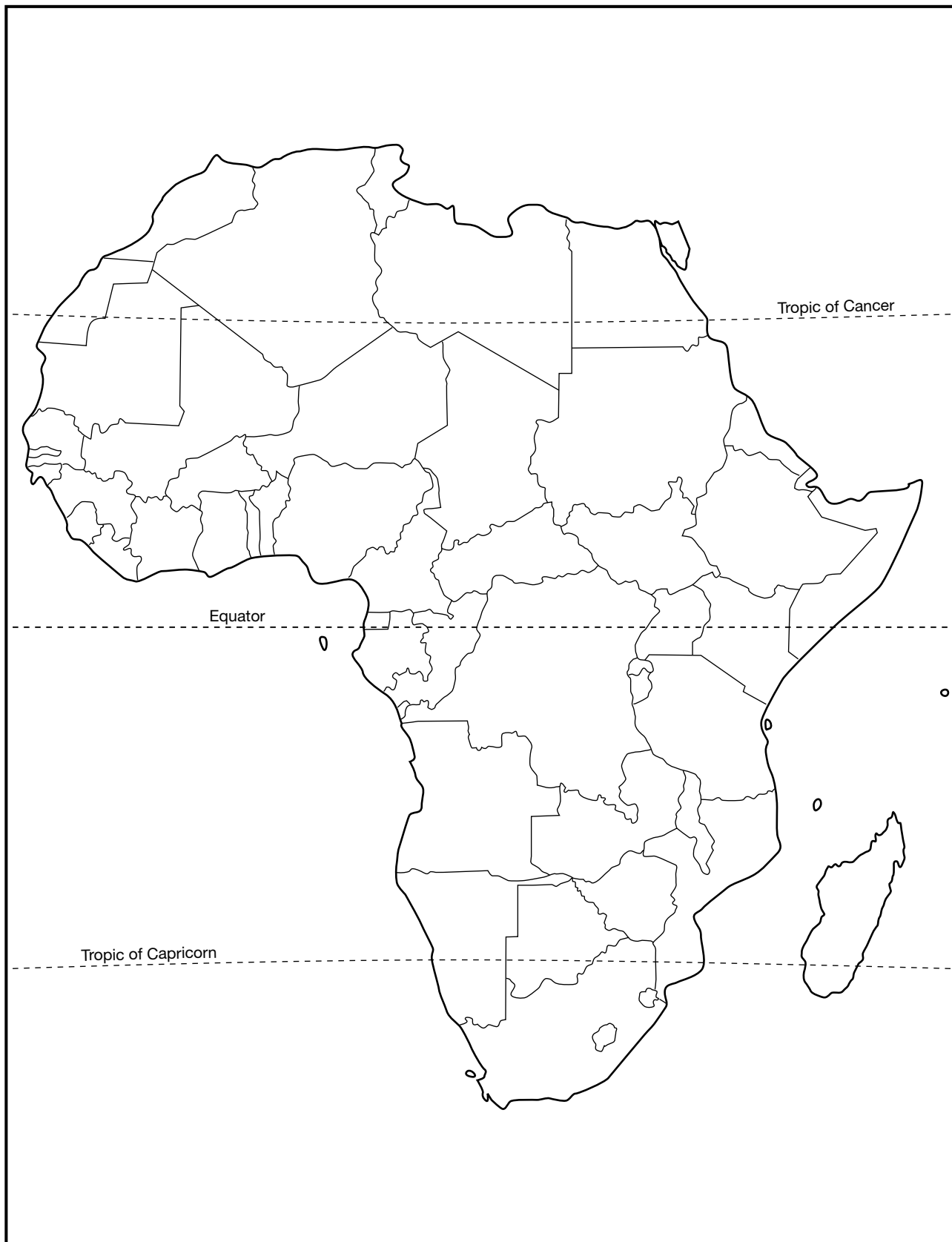
South Africa: physical map



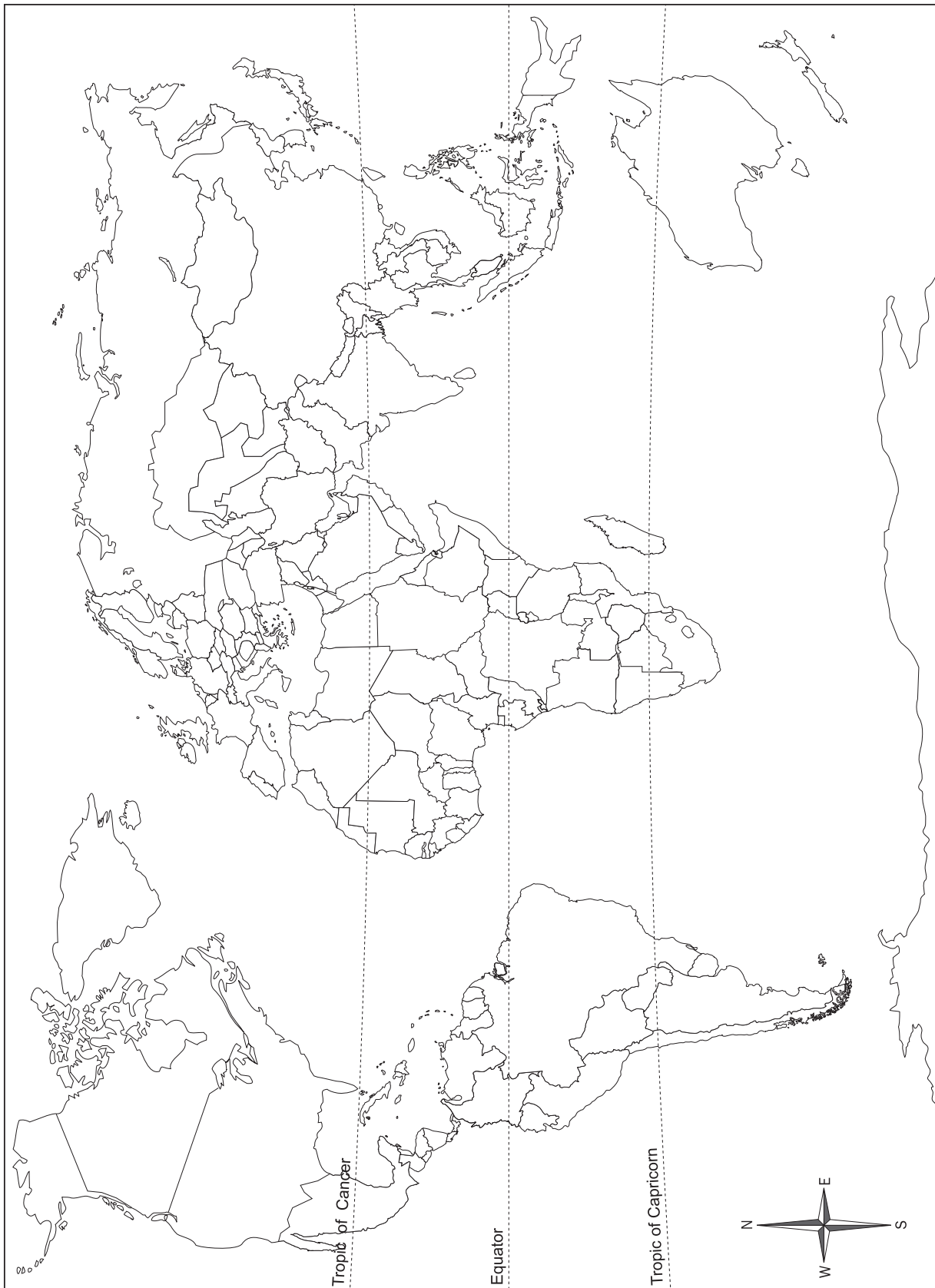
Africa: physical map



Africa: political map



World: political map



Answers to activities

Chapter 1 Understanding what maps are

Level 1

Teacher-facilitated activities (page 2)

- 1 Check that learners' drawings of plan views show that they have understood the concept.
- 2 If you want an example of a classroom plan view to refer to, see the diagram in Activity 3 in the learners' activities on page 4.
- 3 The purpose of these activities is to give learners practice in interpreting plan views, and in making links between normal views of places and plan views. Their answers should enable you to see whether they have understood the concepts of plan views and maps. These are fundamental skills, so don't move on to other map work until they can do this confidently.
 - a Examples are the river, the two bridges, the mosque, the boat (or yacht) in the bay, people on the beach with umbrellas, trees, the bakkie, various cars, the school building, the water tank behind the school, the sea, rocks, etc.
 - b The teacher will need to check answers.
 - c Examples are the car behind the mosque, sleepers (or bars) across the railway line, the motor vehicle behind the building at the front right of the scene, various back yards, the row of trees behind the school, etc.
 - d The purpose of this activity is to get learners to look closely at the picture and the map and to make the links from observation. (Later in the atlas they will also have symbols and labels to help them interpret maps.)

Learner activities (pages 3, 4)

- 1
 - a A is the correct plan view.
 - b A
 - c B

- d B
 - e B
 - f B
- 2
 - a The first plan view (A) is the correct one.
 - b B
 - c B
 - d A
 - e A
- 3 You will need to check the answers.

Level 2

Learner activities (page 5)

- 1 B is the correct map.

Chapter 2 Signs and symbols on maps

Level 1

Teacher-facilitated activity (page 7)

- 1 The signs mean:
 - People may not enter
 - Route for pedestrians (or people)
 - No cars allowed

Learner activities (page 8)

- 1 You will need to check the learners' drawings against the symbols in the atlas.
 - a A white line with black outline.
 - b A white cross in a red circle.
 - c The plantation is shown by light green colour with darker green trees on it.
 - d Learners must draw the mosque symbol.
 - e The hiking trail is shown by a brown dotted line.
- 2 The map of a holiday island could be treated as a special project, with examples being pinned up for the class to see. They would also be useful for learners' portfolios of work, and for assessment of learners' ability to:

- draw a map
 - produce map symbols
 - produce a key
 - label a map.
- 3 a Province borders are purple (or mauve).
 b Northern Cape has two airports marked; the Western Cape has two airports marked; the Eastern Cape has two airports marked; KwaZulu-Natal has two marked; Mpumalanga has two marked; Free State has one marked; Gauteng has two marked; North West has two marked; Limpopo has two airports marked. (Note that these are major and secondary commercial airports; in addition there are many smaller landing strips for aeroplanes, which it has not been possible to include on the maps.)
 c Learners should draw the red line with the symbol and number shown in the key.
 d Learners should reproduce the orange squares and circles shown in the key; it would also be correct to reproduce the more spread-out symbols used on the maps for bigger cities (e.g. Bloemfontein, Cape Town).
 e Check that learners write the label of their capital city in capital letters and underline it.
 f Blue.

Level 2

Learner activities (page 8)

- 1 Examples of points are the orange points used for built-up areas (see key on page 33); black points showing towns and cities (page 21); red points used to show cities on the continent maps (pages 44–45).
- 2 The main thing to check is that learners have understood that the colours on the map represent different heights of land above sea level, and different ocean depths. (They could draw and colour the land height key in their books, and label the land heights and ocean depths in the appropriate places.)
- 3 The teacher will need to check answers against the keys in the atlas.
- 4 To do this activity learners must check that the symbol for railway lines runs through the places they choose. You could encourage discussion about the destinations the children choose. For example, you could ask why they want to go there, what they know about these places, what they plan to do

there, and whether they have been there before. This should give a good informal opportunity for learners to bring their knowledge and ideas to the classroom, and to expand the class's knowledge of the country. We suggest you work with a large map of South Africa when you discuss the answers.

Chapter 3 Different kinds of maps

Level 1

Teacher-facilitated activities (page 10)

- 1 a Colour is used to show each province.
 b, c There are nine provinces. The provinces and their capitals are:

Province	Capital
Northern Cape	Kimberley
Western Cape	Cape Town
Eastern Cape	Bhisho
KwaZulu-Natal	Pietermaritzburg
Mpumalanga	Mbombela
Gauteng	Johannesburg
North West	Mahikeng
Limpopo	Polokwane
Free State	Bloemfontein

- 2 a Blue represents water (the sea).
 b The yellow parts represent land between 50 and 100 metres above sea level.
 c The brown parts are higher than 150 metres above sea level.
 d The highest part is over 150 metres high.
- 3 The main purpose of these questions is to check that learners know the meanings of the terms 'continent', 'ocean', 'island', etc.
 - a The seven continents are Africa, Asia, Europe, South America, North America, Australia and Antarctica.
 - b The four oceans are the Pacific, Atlantic, Indian, and Southern Oceans. (It is also correct to call the Southern Ocean the Antarctic Ocean.)
 - c Examples of islands in the Atlantic Ocean are the Canary Islands, the Azores, the Cape Verde Islands, Ascension, St. Helena, Tristan da Cunha, Iceland, the British Isles, the islands of the West Indies, Cuba, the Falkland Islands, and Greenland.

- d Two seas in Asia are the Caspian Sea and the Aral Sea. Learners might also correctly name seas off the coast of Asia, for example the Sea of Okhotsk, the South China Sea, and the Arabian Sea.
- e The Andes.
- f The Rocky Mountains (or the Sierra Madre).
- g Australia and Antarctica have no very high mountains.
- h The Nile.
- i Most of the world is covered by sea (about 70%).

Level 2

Learner activities (page 10)

1

Country	Capital
Namibia	Windhoek
Botswana	Gaborone
Zimbabwe	Harare
Mozambique	Maputo
Swaziland	Mbabane
Lesotho	Maseru

- 2 a Water (sea, dams and rivers).
- b Light green.
- c Brown.
- d Cities and towns at sea level are Port Nolloth, Cape Town, Port Elizabeth, East London and Durban.
- e Bloemfontein is between 750 and 1 500 metres above sea level.
- f Port Nolloth is between 0–150 metres above sea level.
- g Mafadi is 3 450 metres above sea level.
- h The Drakensberg.
- i The uThukela, the Mfolozi, the uMkhmazi, and the Mzimvubu rivers flow from the Drakensberg into the Indian Ocean. (Learners are asked to name two.)

3

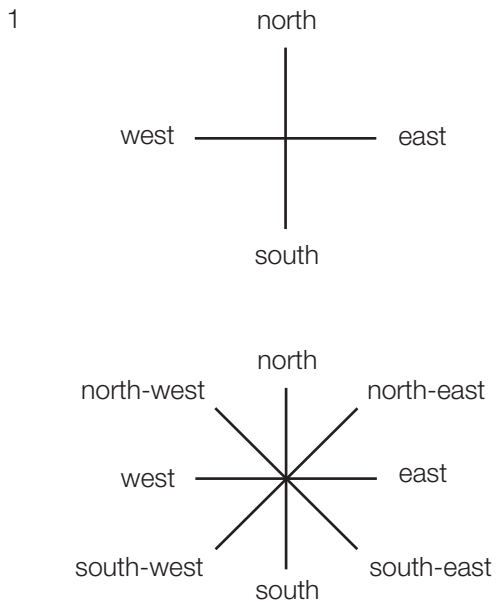
	Page number	Page heading
a	20	Climate
b	24	Natural vegetation
c	25	Farm production
d	25	Farm production
e	26	Mining and minerals
f	26	Mining and minerals
g	30	Energy, environment and health
h	22	Weather
i	24	Natural vegetation
j	27	Manufacturing industry and trade

- 4 Many answers to this question are possible. Here are suggestions:
- The maps on page 20 (the temperature and rainfall maps) might be useful to someone planning a holiday or a journey in South Africa; they would help them decide where to go, and at what time of year, what clothes to pack, and whether it would be a good idea to camp or not. The temperature and rainfall maps would also be useful to a farmer deciding what crops to plant. The temperature maps could be useful to the people who plan electricity supplies: the maps would help them judge when and where people would be using a lot of electricity to heat homes.
 - The top map on page 25 (Commercial stock farming in South Africa) might be useful to a person planning to set up a cheese factory: it would help him or her to see where there are a lot of dairy farms producing milk.

Chapter 4 Direction

Level 1

Teacher-facilitated chalkboard activities (page 13)



- 2
- South.
 - East.
 - East.
 - North.
 - West.
 - North.
 - West along Eland Street, then south down Protea Road. (Or south down Wood Street, then west along Ocean Drive, then south down Protea Road.)
 - North up Protea Road, then east along Eland Street. (Or north up Protea Road, east along Ocean Drive, and north up Wood Street.)

Learner activities (page 13, 14)

- 1
- south
 - partly cloudy
 - cloudy
 - north-west
 - north (or learners could also say the north and north-east)
 - north-east

- 2
- South Africa.
 - Morocco, Algeria, and Tunisia.
 - Somalia. (The Seychelles are also part of Africa, so this answer would also be correct.)
 - The Atlantic Ocean.
 - The Indian Ocean.
 - The Mediterranean Sea, the Black Sea, and the Caspian Sea.
 - Madagascar.
 - Islands west of Africa include St. Helena, Ascension Island, São Tomé, Bioko, the Canary Islands, and Madeira. (Learners are asked to name two.)
 - Countries south of the equator include Tanzania, Angola, Zambia, Malawi, etc. (See the map for others.) Countries north of the equator include the Central African Republic, Sudan, Ethiopia, Cameroon, etc.
 - African countries on the equator include Somalia, Kenya, Uganda, the Democratic Republic of the Congo, Congo, and Gabon. (Learners are asked to name two.)

Level 2

Learner activities (page 14)

- 1
- Limpopo.
 - Western Cape.
 - It means 'east' and 'where the sun rises' (in Siswati, Zulu and Xhosa). It was given this name because it is on the eastern side of South Africa.
 - You would fly over the following provinces: KwaZulu-Natal, Free State and the Northern Cape. You would also fly over Lesotho (a neighbouring country).
- 2 The main aim of this activity is to get learners to be familiar with their own province in relation to the rest of South Africa. The answers will depend on what province the learners are in.
- 3 The main aim of this activity is to get learners to be familiar with their own immediate area on the map. Answers will depend on where the learners live.

Region	Wind direction	Wind speed
North West province	southerly	25 km/h
Western Cape	north-westerly	45 km/h
Eastern Cape	north-westerly	30 km/h
KwaZulu-Natal coast	westerly	22 km/h
KZN interior, Lesotho & Free State	westerly	15 km/h
Northern regions	southerly	25 km/h
Northern Cape/Karoo	south-easterly	28 km/h

Chapter 5 Finding your way around maps and atlases

Level 1

Teacher-facilitated activity (page 16)

- The triangle is in B1.
The circle is in D3.
The X is in C4.
The star is in E2.
The asterisk is in A4.

Learner activities (page 17)

- Note that this activity gives learners practice in working with grids and interpreting symbols.

Place	Position
Lighthouse	D4
Shelly Beach	D1/D2
Caravan Park	B4
Parking area near the Stillbaai East Nature Reserve	B4
Morris Point	D2/D3
Kleinplaatjie	D2
School	B1
Shop	B1

- Pages 16 and 17.
 - Page 33.
 - Page 25.
 - Pages 42 and 43, and pages 44 and 45.
 - Page 57.
 - Pages 60–64.

Place	Page number
Alexander Bay	33
Bhisho	35
Calvinia	33
Giyani	41
Polokwane	41
Ulundi	36
Zamdela	38

- Gansbaai, Giyani, Goegap, Grahamstown.
 - Hangklip, Hermanus, Hluhluwe, Howick.
 - Alexandria, Amanzimtoti, Arniston, Atlantis.
 - Mabopane, Maclear, Madibong, Mahikeng.
- SA: South Africa WC: Western Cape
mt.: mountain KZN: KwaZulu-Natal
UK: United Kingdom
USA: United States of America
mts.: mountains
DRC: Democratic Republic of the Congo

Level 2

Learner activities (page 17)

Place	Description	Pg	Grid position
Bedford	town	35	C4
Kilimanjaro	mountain	43	E11
Lesotho	country	45	F11
Magaliesberg	nature reserve	39	A1
Magaliesberg (2)	mountains	40	B6
Mangaung	town	38	D3
Mthatha	dam	35	B6
Nile	river	52	D7
Sabie	town	37	B3
Zastron	town	38	E4

- 2 Examples of other books in which we use alphabetical order are dictionaries (to find words) and telephone directories (to find names of people, shops, offices, etc.).

3

Location	Continent	Ocean
F6	South America	Pacific
B7		Atlantic
D11	Africa	
E10	Africa	Atlantic
G8		Atlantic
C7		Atlantic
B4	North America	
B13	Asia	
B10	Europe	Atlantic
H20		Southern Ocean
H15	Antarctica	
F17	Australia	Southern Ocean

Chapter 6 Scale and distance

Level 1

Learner activities (page 19)

- One centimetre represents:
 - 10 kilometres
 - 50 kilometres
 - 1 000 kilometres
- About 8 centimetres.
 - About 8 kilometres.
 - About 14,5 kilometres.
 - About 6 kilometres.
 - About 35 kilometres.
 - About 1 kilometre.
 - The route that goes past Elangeni Station. It is about 16 kilometres long.
 - The perimeter of the sugar cane field is 6 kilometres.

- One centimetre on the plan represents 2 metres on the ground.
 - The hut is 9 cm long in the plan.
 - The hut is 18 metres long in real life.
 - The hut is 7 cm wide in the plan.
 - The hut is 14 metres wide in real life.
 - The beds are 1 cm long in the plan (2 metres in real life).
 - The table is 2,5 cm long (5 metres in real life).

Level 2

Learner activities (page 20)

- Gauteng is drawn at the largest scale.
 - Provinces were mapped at different scales to make the best use of the space on the pages. In addition, it made sense to map Gauteng to a large scale because it is very built up and therefore requires a lot of detail in a map.
- The distance she will sail is roughly 26 000–28 000 kilometres, assuming she follows the coastline fairly closely.
- About 3 727 kilometres.
- Learners should take a sensible guess at the distance. There is no right or wrong answer, but making reasoned estimates is an important skill to practise.
 - The distance is approximately 15 cm on the map, which represents about 900 kilometres on the ground.
 - By air the distance is approximately 720 kilometres (12 cm x 60).
- (see table below)
 - The learners' answers will vary.

Flight route (direct)	Distance on map (cm)	Distance in km
1 Cape Town to Johannesburg	19,5 cm	1170 km
2 Johannesburg to Durban	8 cm	480 km
3 Johannesburg to Polokwane	4,5 cm	270 km
4 Mthatha to East London	3 cm	180 km
5 East London to Cape Town	13 cm	780 km

Chapter 7 Working with data: tables and graphs

Level 1

Teacher-facilitated activities (page 25)

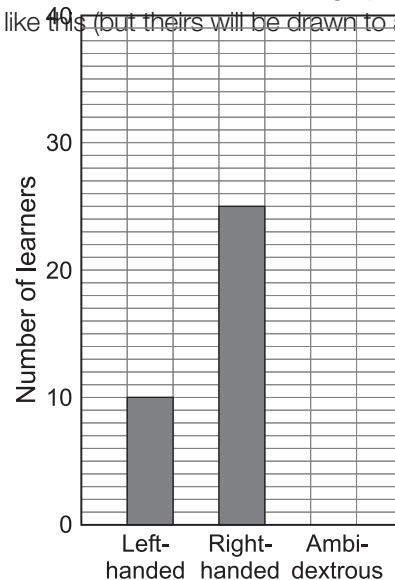
- 1 The answers will vary depending on the province the learners live in.
- 2 The answers will vary depending on the province the learners live in.
- 3 Accept approximate answers.
 - a Nine manufacturing industries are represented on the pie chart.
 - b The chemical manufacturing industry makes the biggest contribution.
 - c Foods and drinks make the second biggest contribution.
 - d Metals make the third biggest contribution.
- 4 Accept appropriate answers.
 - a About 62% of households had access to clean water in 1999/2000.
 - b 90% had access in 2007/8.
 - c During 2011/2012
 - d Access to clean water is getting better.
- 5
 - a The numbers along the bottom of the graph represent years.
 - b The numbers up the side represent the weight in kilograms of Vanessa Williams's apple crop.
 - c Vanessa's apple crop weighed 100 kg in 1990.
 - d In 1992 the crop weighed 300 kg.
 - e 2000 was her best year for apples.
 - f The graph shows that the weight of Vanessa's crop dropped very steeply in 1995. We don't know what the causes were, but the drop may have been due to bad weather such as drought, or a hailstorm. Her trees may have been affected by a plant disease. Or Vanessa herself may have been away or ill. Or the fruit may have been taken by thieves. (The learners may come up with other suggestions.)
 - g This is the most important question in this exercise. The graph suggests that in most years Vanessa's success as an apple-grower improved very steadily. She had a bad year but recovered from it and went on to even greater success. She probably has a good future as an apple-grower!

Level 1

Learner activities (page 26)

If possible, page 26 should be photocopied for everyone in the class.

- 1
 - a The teacher will probably need to facilitate the filling in of the table.
 - b Learners should draw and colour in bars to reflect the numbers of left-handed, right-handed and ambidextrous people in the class. (Ambidextrous people are uncommon, so you will very likely have none in the class.) The grid of lines makes it easy for learners to indicate accurately the number of learners represented in each bar. If your class has, say, 10 left-handed and 25 right-handed learners and no ambidextrous learners, their graphs should look like this (but theirs will be drawn to a larger scale):



- 2 The purpose of this activity is give learners practice in interpreting pie graphs very generally; they are not expected to do any accurate mathematical work on pie graphs at this stage.
- 3 This bar graph activity is similar to Activity 1, the difference being that the bars will be drawn horizontally across the chart and not vertically.
- 4 If this activity is done the teacher will need to facilitate it. If you hand out sheets of lined graph paper this will help learners to draw accurate graphs quickly.

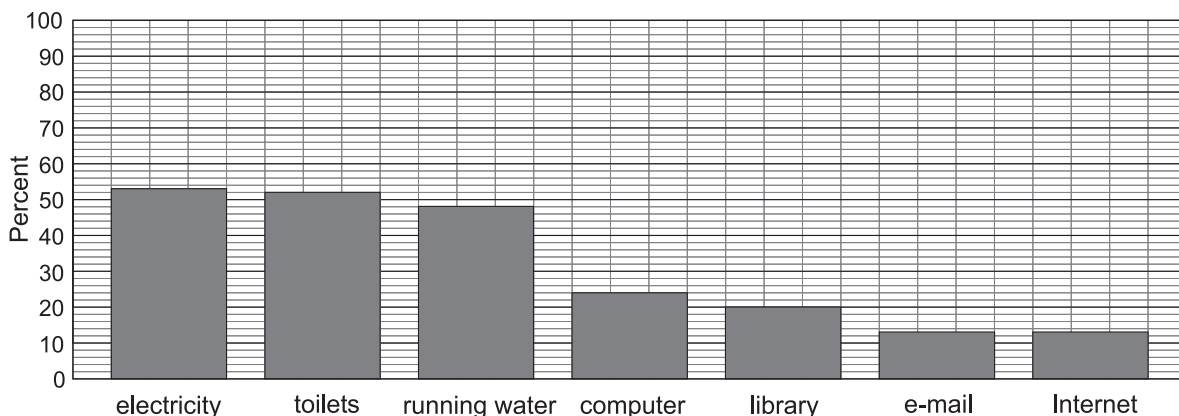
Level 2**Class activities (page 27)**

- 1
 - a Approximate percentage of South Africans aged 10–14: about 87%.
 - b Approximate percentage aged 45–49: about 32%.
 - c People aged 85 and over.
 - d People aged 0–4 and 20–24.
 - e Many correct answers are possible, but learners should be able to say why they have chosen the department that they did. For example, the figures are useful to the Ministry of Education because they will help them to plan for the large numbers of school-age people, and the large numbers of children who are still to enter school. The Department of Welfare and Pensions also needs the figures in order to work out how much money they will need for people of pensionable age.
- 2
 - a 'Population' means all the people who live in a place. 'The population of South Africa' means all the people who live in this country; 'the population of Ulundi' means all the people who live in that town.
 - b The numbers along the bottom of the graph refer to the years when a census was done – in other words, the years when the population of the country was officially counted by the government.
 - c The numbers up the side of the graph are population figures; they enable you to work out what numbers of people were living in the country in the period from 1904 to 2001.
 - d Approximately 5 million people were living in South Africa in 1904.

- e Approximately 7 million people were living in South Africa in 1921.
 - f In 1980 the population was just over 29 million.
 - g In 2001 the population was 44,8 million.
 - h We cannot accurately answer questions about the future. Some experts expect the population to drop in the future because of the numbers of people dying of AIDS. Others expect that treatment for AIDS will become available, and that the population will continue to grow – but not as fast as it used to because many people are choosing to have fewer children than in the past.
 - i We know what the total population is because the government carries out a census every few years: this is a massive exercise to count all the people who are in the country on one particular day.
 - j A line graph shows population change very clearly: it shows numbers rising or falling, and it shows how steeply they are rising or falling. A line graphs gives you a quick, general sense of how the population is changing, but you can also get an accurate figure from it if you look carefully at the numbers.
- 3 This activity needs to be facilitated by the teacher.

Learner activities (pages 28–29)

- 1 This activity is to remind learners that graphs can be drawn in different ways to give you the same information.
- 2
 - a Learners may draw the bar graph with the bars running vertically, or they may choose to have them run horizontally. Check that all labels and captions are clear and in the correct places. See the graph below.
 - b The answers will vary from school to school.



Bar graph showing percentage of South African learners who have access to services and facilities

District	Area (in km ²)	Population	Population density per km ² (people per km ²)
Whale Bay	3	240	80
Klipspringer	27	162	6
Elangeni	40	40	1
Northern District	24	36	1,5
South-Western District	49	0	0
Total	143	478	3,34

- 3 By now learners should be familiar with gathering data and presenting it as a graph. You could use this activity as a project for assessment.
- 4 a-b (see table above)
- c You will need to check that learners have coloured their maps correctly.

Answers to worksheet activities

Worksheet 1 (page 33)

Make sure learners understand that they must colour the roof of each building in the left column, then choose the correct plan of the building and colour that.

- The correct plan is in the third column (the circular plan).
- The correct plan is in the second column (the plain rectangular plan).
- The correct plan is in the third column (the plan with two circles).
- The correct plan is the T-shaped plan in the second column.

Worksheet 2 (page 34)

Teachers will need to check learners' maps.

Worksheet 3 (page 35)

Answers will depend on what province the learners live in (or go to school in).

Worksheet 4 (page 36)

- Capital city: Several answers are possible. Learners can choose a symbol from, for example, the key on page 17, or from pages 33-41 (where the name in underlined capital letters denotes each provincial capital), or the star symbol on the continent maps (pages 44-49).

River: a blue line

International boundary: Learners can choose to show the fairly thick purple line from pages 16-17, or 33-41, or the red lines used on the continent maps (pages 44-51).

Large town: see the symbol for cities in the keys on pages 44-49; or the symbols for built-up areas, pages 33-41, in which larger towns are shown by larger squares or patches

Railway: see symbols on pages 16-17, and 33-41

Built-up area: see symbols on pages 33-41

Airport: aeroplane symbol, see pages 16-17, 33-41; also page 7.

Sunflower farms: symbol on page 25

Sheep farms: symbol on page 25

Gold: symbol on page 26; or page 56

Diamonds: symbol on page 26

Copper: symbol on page 26; or page 56

- Sea: blue
 - Rivers and dams: blue
 - Highest land: brown
 - Lowest land: green
- Many answers are possible. Here are some ideas:
 - South Africa: provinces, towns, and cities; pages 16-17. A traveller who wants to know what places can be reached by train and aeroplane.
 - South Africa: provinces, towns, and cities; pages 16-17. Someone who owns a long-distance taxi-service, and who wants to know where the national roads are, and what distances will have to be covered.
 - Mpumalanga and Limpopo; pages 37 and 41. Someone who wants to visit the Limpopo Transfrontier Park (Kruger National Park).
- This will need to be checked by the teacher.

Province	Capital	Population	Main home language
Northern Cape	Kimberley	1 145 861	Afrikaans
Western Cape	Cape Town	5 822 734	Afrikaans
Eastern Cape	Bhisho	6 562 053	isiXhosa
KwaZulu-Natal	Pietermaritzburg & Ulundi	10 267 300	isiZulu
Mpumalanga	Nelspruit	4 039 939	siSwati
Free State	Bloemfontein	2 745 590	Sesotho
Gauteng	Johannesburg	12 272 263	isiZulu
North West	Mahikeng	3 509 953	Setswana
Limpopo	Polokwane	5 404 868	Sesotho sa Leboa

Worksheet 5 (page 37)

On the map, the two capital cities to be marked are Cape Town and Pretoria. The Indian and Atlantic Oceans must be labelled. To check flag colours, see the flag on page 16.

Population: 51,8 million (Census 2011)

Area: 1 219 912 square kilometres

Highest point: Mafadi (3 450 metres above sea level)

Longest river: Orange River

Windiest place: Cape Point

Driest place: Alexander Bay

Wettest place: Entabeni (near Makhado, Limpopo)

National flower: protea

National animal: springbok

National tree: yellowwood

National fish: galjoen

National bird: blue crane

1	Namibia	Windhoek
2	Botswana	Gaborone
3	Zimbabwe	Harare
4	Mozambique	Maputo
5	Swaziland	Mbabane
6	Lesotho	Maseru

Worksheet 6 (page 39)

1-6: The teacher will need to check answers.

- 7
- United States of America
 - Brazil
 - India
 - Sudan
 - Canada
 - Algeria

Worksheet 7 (page 40)

- 1 Teachers will need to check answers.
- 2
- The west side of South America has the highest land.
 - The western part of North America has the highest land.
 - An area along the eastern part of South Africa has the highest land.
 - In Australia most of the land is between 150 and 750 metres above sea level.
 - Mount Everest; the mountain range is the Himalayas, and the continent is Asia.

Worksheet 8 (page 41)

Accept very approximate answers for this; the map is too small for it to be possible to work out very accurate distances.

bird	a. distance of one migration	b. direction	c. direction of return flight	e. total distance of two migrations
1 Eurasian swallow	10 000 km	south-east	north-west	20 000 km
2 Steppe buzzard	13 500 km	south-west	north-east	27 000 km
3 Arctic tern	18 750 km	south-east	north-west	37 500 km
4 sand plover	9 000 km	south-west	north-east	18 000 km
5 white stork	9 750 km	south	north	19 500 km

Glossary

aerial – from above; in the air

altitude – height above sea level

arid – dry; deserts and other areas of the world that receive very little precipitation are called arid lands

atmosphere – the layer of air around the Earth

boundary – the edge of any area; boundaries of countries are called international boundaries

climate – the pattern of weather recorded in an area over a period of many years

communications – the ways in which people travel, or pass ideas and information from place to place. Roads, railways, and telephone systems are examples of communications networks

conventional sign – special symbols developed and used on all maps in a particular country

co-ordinates – the numbers and/or letters used to give position in a grid reference

hemisphere – half of a sphere; the southern hemisphere is the southern half of the Earth, i.e. the part south of the equator; the northern hemisphere is the half north of the equator

horizontal – level with the horizon; running at right angles to the vertical

key – an explanation of the signs and symbols used on maps

landform – one of the features found on the surface of the Earth; rivers, hills, and mountains are all landforms

legend – another name for a map key

location – where a place is; location can be given by grid references, or in relation to landforms

meridian – another name for a line of longitude. The Greenwich Meridian (0°) is a line of longitude that runs through Greenwich near London

orientation – the way in which a map is held relative to the real world; most maps in the *Junior Atlas* are oriented north

perspective – point of view; a way of looking at something

plan view – a view seen from above

pole – a point on the Earth's surface that is as far north (North Pole) or as far south (South Pole) as you can go

population – the total number of people who live in an area

precipitation – the ways in which water gets to Earth; this includes rain, hail, snow, and sleet

resources – the things that people can use; natural resources are those that come from the earth, such as gold, forests, rocks and soil

scale – the relationship between distances on a map and the same distances in the real world

sphere – a round, solid shape; the shape of a ball

symbol – a small, simple drawing used to represent something else, for example a cross may be used as a symbol for a church

vegetation – the plant life of a particular area considered in general terms

vertical – upright, running at right angles to the horizontal