Know your world:
introduction to geography

Only study guide for GGH1501

DEPARTMENT OF GEOGRAPHY

UNIVERSITY OF SOUTH AFRICA, PRETORIA
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Welcome to the module *Know your world: Introduction to Geography* (GGH1501)

This module guides you to discover the world in a way that you might not have thought of up to now. Thinking geographically implies the ability to make connections between phenomena at different scales, from local to global. Looking at the uniqueness of different places in the world forms part of this, but at the same time places do not function in isolation. A further dimension is supplied by scale and connection, implying that what is happening locally can have consequences globally, while global processes can have effects locally as well. In all of this the role of distance features prominently, since places can be far from each other or close together, which needs consideration. People and environment forms the overarching context, with geography concerned with the link between the physical and the human world and to keep the world “whole” rather than to separate it in parts.

To kindle your interest on what to expect in this module, we invite you to watch the video clip *Geography is key*, which provides a visual showcase of the themes that you will be connecting with in GGH1501. This video clip is available at the following link: [https://www.youtube.com/watch?v=naK9_JkFAOk](https://www.youtube.com/watch?v=naK9_JkFAOk).

**GGH1501 OVERVIEW**

The teaching and learning process for GGH1501 requires you to use the features offered by the website for this module (referred to as the module site) on the myUnisa, learning platform as well as participation in the activities that will be taking place there. Learning unit 0 therefore not only provides background on the technical aspects of studying online, but also sets out expectations from the perspective of students and lecturers. After introducing the context and some cross-cutting themes in Learning unit 1, Learning unit 2 continues by providing a review of the physical systems of the Earth governing phenomena as precipitation, soil types, vegetation types, etc. and leading to distinct global patterns that can be distinguished in this regard. Learning units 3 and 4 cover a geographical view on respectively the world’s population and the various cultures found in the world, with emphasis on differences and similarities between places, the reasons why it’s like that and implications. Learning Unit 5 entails how people make or earn a living, which draws together many of the ideas in the previous learning units. The resource and sustainability perspective provided in Learning unit 6 provides a sensible framework to bring together many of the concepts and ideas engaged with in the previous learning units. Learning unit 7 concludes the module and deals with data on geographic phenomena that can be utilised in various ways, i.e. on maps, to assist us in making meaning of the world in terms of what we observe and what is happening.
HOW TO BEGIN WITH YOUR STUDIES FOR GGH1501

It is important to activate your myUnisa access as well your myLife e-mail address as soon as possible, so that you have access to the myUnisa module site for GGH1501 and will be able to communicate via email with your lecturers as well as the university.

The module site for GGH1501 on myUnisa provides a dedicated space to facilitate your learning for GGH1501. If you make a habit of checking this site regularly, you will be able to take full advantage of all the features that are offered and you will also get maximum value from you learning experience.

To get started with your studies for GGH1501, click on the Learning Units Tool (icon in the navigation panel on left side of the welcome page). Here you will find the learning units for GGH1501, which explain what to do, as you go along. Start with Learning unit 0, and work through it very thoroughly. This study guide supplies you with the equivalent of these online learning units, but in printed format.

You can also click on the Official Study Material Tool, where you should find PDF files for your tutorial letters, as they become available. Some or all of the tutorial letters might not be printed and posted to you, so it is in your best interest to visit the module site for GGH1501 regularly and check for any new tutorial letters.

If you click on the Prescribed Textbooks Tool, you will see the details of the prescribed book for this module. You can also check the details for the prescribed book in Tutorial Letter 101, and be sure to purchase the customised edition for Unisa.

In the Discussions Tool, you will find a topic called “General Discussions”. This is where you can talk with classmates about GGH1501. You will see that a topic to introduce yourself to your classmates and lecturers, has also been created, please use this opportunity! Once the semester has commenced, you will automatically be allocated to an e-tutor, and then you will participate in discussions via a dedicated e-tutor website.

Also useful is the Schedule Tool, with which you will be able to check your official assignment and examination dates. Later on we might add some more dates, if we feel that it is necessary.

Last but not least, the FAQ Tool (Frequently Asked Questions Tool) has been populated with a variety of questions which addresses matters which students are bound to wonder about and may lead to unnecessary uncertainty. Answers to these questions have also been supplied. So please consult this tool first when uncertain, which might eliminate the need for further enquiries.
0.1 INTRODUCTION

Welcome to GGH1501 – Know Your World: Introduction to Geography. This module will introduce you to the nature and scope of geography as a science. You will be equipped to view the world from a geographical (spatial) perspective. The geographical phenomena which will be studied (on a global scale) will include those related to globalisation, key processes related to the physical environment, population, and development as well as cultural aspects related to development and resources. Studying this module will also enhance your geo-literacy. It is important at this point to acknowledge the author of the first edition of the study material. Mr Christian Hamann wrote the original learning units in 2014/5. His work was edited by various academics in the second edition of the study material, and these academics are acknowledged at the beginning of each learning unit.

### WELCOME TO UNISA

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<tr>
<td>Use the following link to watch the video:</td>
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<td><a href="https://www.youtube.com/watch?v=kO2qW80EogM">https://www.youtube.com/watch?v=kO2qW80EogM</a> (1:01 minutes)</td>
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<th>Purpose</th>
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<tr>
<td>The video “Welcome to Unisa” introduces you to the concept of ODL and is the first video in a series of videos that will help you to successfully start with your studies at Unisa. Take note of the approach required from you in an ODL environment as you need to take control of your studies. In order for you to be successful in your studies, you need to be self-disciplined, have a sense of responsibility and have an internet connection which serves as an important portal of communication.</td>
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The open distance learning (ODL) environment at Unisa can be somewhat daunting to some of you, especially if you are studying via distance education for the first time. The idea of studying on your own might be intimidating and it may also be difficult to make sense of the vast online learning environment which you have at your fingertips. However, you may also be in a learning environment that is more comfortable than you might realise at this stage. This learning unit is intended to introduce you to the ODL environment at Unisa and guide you through some of the key aspects in order to ensure that you have the best possible learning experience. The learning unit also provides an overview of the module structure and what is required of you.
0.2 LEARNING OUTCOMES FOR GGH1501

This module has been developed with various outcomes in mind. Don’t be intimidated by these outcomes; right now they might appear like a huge mountain to climb, but with all the support that we will provide during the semester you will be able to excel in GGH1501. We want students to be able to:

- observe, describe and explain global phenomena from an integrated geographical perspective,
- integrate relevant theories with appropriate data sources and techniques to interpret various aspects of selected geographical themes on a global scale,
- explain what it means to be a geo-literate global citizen and how this impacts on your personal world view.

We suggest that you revisit these learning outcomes once you have worked through the entire module. At that stage you should be able to tick the outcomes with confidence. If you cannot, you will then have to spend a bit more time on the problem areas that you have identified.

0.3 KEY QUESTIONS FOR THIS LEARNING UNIT

You will not know the context of all the key questions at this stage and might not be able to answer all of these questions. Relax! Once you have worked through the MyStudies@Unisa brochure, Tutorial Letter 101 and this learning unit you should be able to answer all the key questions. Just keep these in mind and refer to them again once you have completed the learning unit.

- Have you registered as a myUnisa user and have a myLife e-mail account?
- Have you logged onto myUnisa and explored the GGH1501 module site and your e-tutor website?
- Do you know the contact information of your primary lecturer?
- Do you understand what is required of you in terms of participation in online activities?
- Do have the prescribed book?
- Do you know when your assignments are due?
- Do you know how to submit your assignments?
- Do you understand the implications of not submitting an assignment or submitting it late?
- Do you understand and realise the importance of well-phrased sentences and paragraphs and thorough proofreading?
- Do know how your final mark for this module will be calculated?
- Do you know the date and time of your examination?
- Do you know who to contact if you experience administrative problems with GGH1501?
- Have you compiled your personalised work schedule for GGH1501?
LEARNING UNIT 0: KNOW YOUR LEARNING ENVIRONMENT

These key questions have to be revisited once you have worked through Learning Unit 0. You should easily be able to tick each box. If you cannot, you will have to spend more time on familiarising yourself with the relevant information, processes and requirements of the module. This is essential to prevent any misunderstanding and to remove all uncertainties that you may have.

0.4 GRADUATENESS

When you finish your studies at Unisa you are expected to have achieved skills and competencies that are not directly related to your modules. As your lecturers we strive to produce well-rounded students who combine disparate qualities such as high-level cognitive abilities as well as an interest for self-development in order to be able to provide practical and feasible solutions to current problems in the world. Thus, you may not always understand why some activities have been included.

The reason may be that by means of some of the activities we are trying to teach you skills that will contribute to your “graduateness”. As a university we wish to produce students who have the attributes which the university associates with graduateness. A graduate from Unisa should be:

- an independent and critical thinker who is self-motivated and self-driven to achieve success,
- socially and personally responsive supported through moral and ethical values,
- computer and information literate,
- adaptable to social and economic demands of our time with specific reference to environmental awareness, and
- able to embrace new challenges with a sense of academic citizenship.

0.5 REQUIRED READING

You need to read the following sources of information attentively. These sources were provided to you by Unisa after your registration for GGH1501:

- MyStudies@Unisa brochure
- Tutorial Letter 101 of GGH1501
- Learning Unit 0 (online on myUnisa or part of this study guide)

While reading through these documents you need to take note of:

- the contact details of your lecturers, the Department of Geography and administrative departments within the university,
- the title of your prescribed textbook and where you can obtain it,
- student support services that are available,
- the study plan proposed for GGH1501,
- assessment matters such as the assessment plan, number and types of assessment opportunities, unique assignment numbers, relative contribution of assignments to your semester mark, due dates of assignments, assignment questions and format in which you may submit assignments,
- information on referencing sources and plagiarism, and
- examination matters such as admission to the examination, composition of your final mark, sub-minimum requirements, supplementary examinations, additional examination opportunities due to illness, and FI concession status.
It is very important for you to acquire the prescribed textbook as soon as possible. A list of official booksellers (both “real” stores and online stores) is available in your MyStudies@Unisa brochure and on the myUnisa website (see illustration below) on the left of the screen that you see prior to logging in with your user ID and password.

The bibliographic details of the prescribed textbook for GGH1501, also indicated in Tutorial Letter 101, are as follows:

**Title:** Introduction to contemporary Geography for GGH1501/XGH1501  
**Authors:** Rubenstein, JM; Renwick, WH; Dahlman, CT  
**Publisher:** Pearson  
**ISBN number:** 9781784484521  
**Year of publication:** 2015  
**Edition:** 1st

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**GETTING STARTED**

**Instructions**
- Use the following links to watch two videos in a video series on how to get started with your studies at Unisa:
  - Getting started – [https://www.youtube.com/watch?v=4Pm_32PyJZU](https://www.youtube.com/watch?v=4Pm_32PyJZU) (1:08 minutes).
  - Getting your student card – [https://www.youtube.com/watch?v=uMsMXA4j4R4](https://www.youtube.com/watch?v=uMsMXA4j4R4) (0:35 minutes)

**Purpose**
- The two videos above introduce you to the basics of getting started with your studies at Unisa by using the study package that you received.
- Remember that Tutorial Letter 101 and the online learning units (or study guide) are two of your most valuable resources for information on how to successfully navigate this module. In addition, you can consult the MyStudies@Unisa brochure for further clarification.
0.6 HOW TO STUDY THIS MODULE ONLINE

GGH1501 is not a fully online module but it has a very strong online component. The online component was introduced to improve your learning experience by exposing you to a wealth of information available on the internet and by providing opportunities for interaction with fellow students, your e-tutor, and your lecturer. It is very important that you try to do as many of the online activities as possible.

SUCCESSFUL ONLINE PARTICIPATION

Instructions

- Use the following links to watch three videos in a video series on how to get started using myUnisa:
  - Unisa going online [https://www.youtube.com/watch?v=Ul63esSzxOs](https://www.youtube.com/watch?v=Ul63esSzxOs) (1:41 minutes).
  - Registering on myUnisa [https://www.youtube.com/watch?v=yZoAZ71jzoU](https://www.youtube.com/watch?v=yZoAZ71jzoU) (1:33 minutes).
  - Basic computer skills [https://www.youtube.com/watch?v=1Ben2qLZkjc](https://www.youtube.com/watch?v=1Ben2qLZkjc) (3:54 minutes).

If you do not have personal access to the internet, consider visiting a Unisa regional centre, an internet café or a friend with internet access in order to view the videos.

Purpose

- These three videos provide information that will help you successfully finish your modules at Unisa, not just GGH1501.
- To remind you that myUnisa provides an interactive platform through which you can test your knowledge of the module content and practise your geography-related skills in order to be able to perform well in the different assessment opportunities for GGH1501.

0.6.1 Getting started on myUnisa

You need access to a computer or smart device that is linked to the internet in order to access Unisa’s online campus. Follow the five steps below (also displayed in figure 0.1) to connect to myUnisa and start your ultimate learning experience!

Step 1: Go to the myUnisa web page using any one of the following two paths:
  - Go directly to [https://my.unisa.ac.za/portal](https://my.unisa.ac.za/portal).
  - Go to the main Unisa website ([http://www.unisa.ac.za/default.html](http://www.unisa.ac.za/default.html)) and click on the orange block labelled **myUnisa**.
Step 2: Click on the **Claim UNISA Login** link and follow the steps shown on the screen.

![Claim UNISA Login](image)

Step 3: When you have a login name and password you need to login to myUnisa by entering your details in the relevant windows.

Step 4: Access your module site and e-tutor website by clicking the respective tabs at the top of your screen. Should you not see GGH1501, please click **More sites**.

Step 5: Access and personalise your myLife e-mail by clicking the tab labelled **myLife Email Access** (you might once again need to click on the tab **More Sites** to view the entire list of module sites to which you have access).

Should you encounter problems with myUnisa you can phone +27 (0) 11 471-2256, send an SMS to 43582 or send an e-mail to myUnisaHelp@unisa.ac.za. Should you need assistance with your myLife email address, you can send an e-mail to myLifeHelp@unisa.ac.za.

![How to get started on myUnisa](image)

**FIGURE 0.1:**

*How to get started on myUnisa.*
0.6.2 The relevant myUnisa sites for GGH1501

0.6.2.1 Your module site

Your module site is the site to which all students registered for the module have access. This is also the site managed by your primary lecturers and where you will find all the official module content (Official Study Material and Learning Units). You should visit this site at least twice a week. Your module site will be labelled as follows:

- GGH1501 – year (e.g. 17/18/19 etc) S1 (the site for Semester 1), or
- GGH1501 – year (e.g. 17/18/19 etc) S2 (the site for Semester 2).

0.6.2.2 Your e-tutor website

Each student will also be linked to an e-tutor website (also referred to as a group site) that is an additional site on myUnisa in which groups of students can participate in tutorials and various online activities. In the case of GGH1501 there could be up to ten such e-tutor websites. Each site is managed by an e-tutor and is the place where all your activities described in the learning units will take place and where you will be able to interact with fellow students. You should visit your e-tutor website at least twice a week. An e-tutor website is labelled as follows:

- GGH1501 – year (e.g. 17/18/19 etc) S1–1E: S1 stands for first semester and 1E stands for e-tutor number 1.
- GGH1501 – year (e.g. 17/18/19 etc) S2–5E: S2 stands for second semester and 5E stands for e-tutor number 5.

You will be automatically linked to an e-tutor website; therefore you do not need to do anything. However, if you have not been linked to an e-tutor website you should inform your lecturer as soon as possible.

0.6.3 The components of a myUnisa site

A myUnisa module site is made up of a number of components, all of which are important. The list below summarises the tools that you will encounter in GGH1501 and also provides a description of the purpose of each tool.

(a) Welcome page – This tool introduces you to your lecturer/e-tutor and communicates important general information about the website for this module and the activities that are taking place on the site.

(b) Schedule – This tool highlights important dates that you need to remember, especially dates on which you need to submit assignments or write the exam. You can also use the Schedule tool to assist you in planning and managing your time so that you can keep up with the various learning activities for this module.

(c) Announcements – This tool is the “noticeboard” in the virtual classroom. It communicates important information to you throughout the semester. Announcements notifies you of new documents, events or important information relevant to your studies. Check and read Announcements on your module- and e-tutor websites twice a week.
(d) **Official Study Material** – This tool only appears on your module site and contains electronic copies of tutorial letters. You can also find previous examination papers under Official Study Material, but these need to be used with caution (and in a responsible manner) since the structure of examination papers and what is required of you may change from semester to semester.

(e) **Learning Units** – This tool only appears on your module site and systematically guides you through the content of the module. Learning Units (such as the learning unit you are currently reading) include explanations of the module content, instructions about what you should read, references to additional material and class activities. These learning units are also provided in hardcopy format, an MO document that you will receive from Unisa.

(f) **Discussion Forums** – This tool is used to manage class activities on e-tutor websites. It is the place where you can interact with your e-tutor/lecturer and fellow GGH1501 students. Never create your own discussion forum – there will always be a relevant already-created discussion forum in which you can post your comments or questions. If you create your own discussion forums it creates confusion and the discussion will not be monitored, which means your comments will not be read and your questions will not be answered. A student lounge will be created where you will be able to create your own topics for discussion.

(g) **Additional Resources** – This tool is where you will find additional information and documents to assist you in your learning process. A typical example is additional material dealing with topics which students have identified as challenging or which we feel they struggle with.

(h) **FAQs** – Frequently Asked Questions is a tool on myUnisa which you can use should you have a generic question related to the module. Since the function contains the answers to questions frequently asked by students (e.g. Who is my lecturer?; What is the title of the prescribed book?; In what format must I submit my written assignments?; I missed the examination due to illness. What must I do now?), you might find that the answer to your question has already been answered in this forum.

**ACTIVITY 0.1: INTRODUCE YOURSELF ON MYUNISA**

**Instructions**

- Go to the **Discussions** tool on your e-tutor website. Go specifically to the forum for the **Student Lounge**.
- Here you will find a topic “Introducing yourself on myUnisa”.
- Click on this topic and then introduce yourself according to the task below.

**Purpose**

- To show you how to participate in a discussion on a topic in a discussion forum.
LEARNING UNIT 0: KNOW YOUR LEARNING ENVIRONMENT

- To introduce you to the myUnisa interface and format of online discussions on myUnisa.
- To welcome you to the e-tutor website and give you the opportunity to introduce yourself to the class.

Task
Introduce yourself. In your introduction we would like you to share the following:

- Your name and area of residence.
- Your current occupation.
- The degree you are studying and any other geography subjects that you are doing.
- Your expectation and goals for the module.

You are also encouraged to reply to the contribution of at least one of your fellow students and thank them for their contribution. Choose someone who has not yet received a reply so that everyone feels welcome.

0.7 THE STRUCTURE OF THE LEARNING UNITS

Each of the learning units following Learning Unit 0 (Learning Unit 1 to 7) is structured similarly. This will help you to study each learning unit in the same way and provide you with a familiar learning environment. The following section describes all the elements that you will encounter in each learning unit and explains how you should interact with each of these elements. Keep these explanations in mind as you work through the study material in the rest of the learning units and consult this learning unit again if something is unclear.

The learning units (in addition to Learning Unit 0) that you will need to cover for this module include:

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<thead>
<tr>
<th>Learning Unit</th>
<th>Title</th>
<th>Learning material</th>
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<tr>
<td>0</td>
<td>Know your learning environment</td>
<td>MyStudies@Unisa brochure</td>
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<td></td>
<td>Tutorial Letter 101</td>
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<td></td>
<td>Learning Unit 0</td>
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<td>(online or in this study guide)</td>
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<td>1</td>
<td>The nature of geography and geographical thinking</td>
<td>Learning Unit 1</td>
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<td></td>
<td>(online or in this study guide)</td>
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<td></td>
<td>Other resources to be added</td>
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<td>2</td>
<td>Key processes of the physical environment</td>
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<td></td>
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<td>(online or in this study guide)</td>
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<td>Other resources to be added</td>
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<td>3</td>
<td>Patterns and trends of the global population</td>
<td>Learning Unit 3</td>
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<td>(online or in this study guide)</td>
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<td>Other resources to be added</td>
</tr>
</tbody>
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## 0.7.1 Introduction

The intention of this section is to provide a brief overview of the learning unit.

## 0.7.2 Aim and learning outcomes

The learning outcomes inform the scope of the learning units. These provide an indication of what you should be able to do when you have completed each of the learning units. These are not as specific as key questions, but are general geographic insights that you are required to develop during the learning process. Continually test your understanding of the module against these outcomes. Your examination questions will typically be linked to these outcomes.

## 0.7.3 Prescribed material

This section refers you to the relevant sections in your prescribed textbook or Additional Resources that you need to read for the learning unit. It is advisable that you quickly read through the sections mentioned here before you start working through the rest of the learning unit content. In this way you will go through the work twice (once quickly and once more thoroughly), which will improve your ability to understand and remember what you have learnt.

You need to acquire the prescribed textbook as soon as possible. Without it you will not be able to work through this important section of the learning unit, which might also jeopardise your ability to pass the module. The relevant information related to the prescribed textbook is provided in Section 0.4 above and in Tutorial Letter 101.

<table>
<thead>
<tr>
<th></th>
<th><strong>The global cultural mosaic</strong></th>
<th><strong>Learning Unit 4</strong> (online or in this study guide)</th>
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<td>Other resources to be added</td>
</tr>
<tr>
<td>5</td>
<td><strong>Making (and earning) a living</strong></td>
<td><strong>Learning Unit 5</strong> (online or in this study guide)</td>
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<tr>
<td></td>
<td></td>
<td>Other resources to be added</td>
</tr>
<tr>
<td>6</td>
<td><strong>Resources: Use and abuse</strong></td>
<td><strong>Learning Unit 6</strong> (online or in this study guide)</td>
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<tr>
<td></td>
<td></td>
<td>Other resources to be added</td>
</tr>
<tr>
<td>7</td>
<td><strong>Geographical data: nature, sources and representation thereof</strong></td>
<td><strong>Learning Unit 7</strong> (online or in this study guide)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other resources to be added</td>
</tr>
</tbody>
</table>

An updated version of this table will be shared with you during the semester, in which the “other resources to be added” will be replaced with specific references (including the relevant internet addresses and/or links) to additional resources that are relevant for each learning unit. You can also visit the Additional Resources on the module site on myUnisa on a regular basis as we will upload all other sources and links in the relevant folders on the site.
0.7.4 Finding your way through the study material

Each learning unit includes this section and it is designed to guide you through the relevant content in the prescribed textbook. The purpose is to highlight important topics in the prescribed textbook and focus your attention on important aspects in each prescribed chapter. In some cases reference will also be made to additional resources where the information in the prescribed textbook is not sufficient. Additional examples and explanations of difficult concepts are also provided in these sections.

Throughout the learning units you will be guided in the following actions, identified by specific icons:

**Viewing**

This icon refers to viewing of videos (and other online content) that you should view (not memorise) in order to improve your understanding of the content in the learning unit. Each video that we refer you to has a specific purpose, mostly to provide a further explanation of a concept which might be clearer after watching the video than only by reading the study material text. Most videos are short and should not be difficult to access. If you do not have suitable infrastructure to view the videos on your own, you need to plan your study schedule in such a way to allow you to watch the videos from multiple learning units during one session when you visit a regional centre or an internet café in your area. These videos will truly improve your learning experience.

**Class activities**

Class activities are very important because they test your understanding of the content in some of the sub-sections in the learning units. The class activities are linked to specific **Discussion Forums** on your e-tutor website which you are required to participate in. Your participation in these activities and discussion forums will give your e-tutor and your lecturer an idea of your understanding of the module content and identify areas in which they need to provide additional explanations. It is also important that you learn with fellow students in a collaborative way. You can read and comment on the posts of others in the **Discussion Forums** in order to broaden your understanding of the world. In all **Discussion Forums** you need to use good academic language and focus on the topic of the discussion. Any comments that are not related to the discussion topic will be removed.

In some learning units you will be expected to access the Unisa library. Please click on the link below:

<table>
<thead>
<tr>
<th>UNISA LIBRARY</th>
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<tbody>
<tr>
<td><strong>Instructions</strong></td>
</tr>
<tr>
<td>• Use the link below to watch the following video in the video series on how to get started with your studies at Unisa:</td>
</tr>
<tr>
<td>◦ Unisa library –</td>
</tr>
<tr>
<td><a href="https://www.youtube.com/watch?v=_XLU41tR92g&amp;t=99s">https://www.youtube.com/watch?v=_XLU41tR92g&amp;t=99s</a> (4:12 minutes).</td>
</tr>
<tr>
<td><strong>Purpose</strong></td>
</tr>
<tr>
<td>• This video is useful since it provides an introductory explanation on how to use the Unisa library.</td>
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</tbody>
</table>
0.7.5 Capstone activity

This activity brings together the work you have studied in the specific learning unit. In some instances the activity will require you to refresh your knowledge of previous learning units. The purpose is for you to understand that each of the learning units must not be seen in isolation, but must be viewed holistically on a global scale and that understanding geographical problems relies on our understanding of the spatial patterns in the world.

0.7.6 Test yourself

This is the final way of determining if you are on track with the content dealt with in the learning unit. Answer the multiple-choice questions in this section to test your knowledge and insight on the material covered in the learning unit. These “tests” are not graded and you should not panic if you cannot get everything right, but they will provide you with a good indication if you have missed important details or still need to work on your understanding of some of the concepts in the learning unit.

0.7.7 Summary and reflection

This section will be covered close to the end of each learning unit. Here you will be required to make your own summary of the learning unit by referring back to the outcomes and key questions as formulated at the beginning of the learning unit. We also provide additional points or questions that should help you reflect on the learning unit and make sure that you have mastered the content. If there are any of the questions or comments in this section that seem unfamiliar to you, then you can contact your e-tutor or lecturer for an explanation.

0.8 GEO-LITERACY

In the module outcomes we mentioned geo-literacy. Many of you might wonder what this is and what it means. Geo-literacy is a term used to describe your general knowledge of locations and places in the world as well as your interpretation of relative and absolute location. Although this will not be tested in one specific learning unit, it is applicable throughout the whole module. You will encounter questions related to the location and interconnectedness of places, issues, events or questions which you will only be able to answer if you know the locations being referred to. Since you are taking this module, we expect you to take the time to continuously observe and understand the matters and events of a geographical nature occurring in the world, your country and in your area of residence.

In order to improve your geo-literacy, you need to practise. To practise you need to acquire an atlas in any one of the following forms:

- A hardcopy atlas (like your secondary school atlas or the Collins World Atlas or the National Geographic Student World Atlas or the Oxford Atlas of the World available from www.amazon.com or www.takealot.com)
You can use any of these sources (or others that you can find) to improve your geo-literacy by searching for any location that is mentioned in the learning material and even by searching for places that are mentioned in the media. It is very important that you continually expand your geo-literacy because you might be tested on this during the examination. It means that in the examination you might be required to cite relevant examples of places, events and issues, connected to their location. Do not panic, it does not mean that you need to know the location of every country and every city in the world, it just means that when you encounter the name of a region, country or city that you do not know that you familiarise yourself with its relative location.

0.9 WHAT WE COMMIT TO CONTRIBUTE

As lecturers we realise that we have an important role to play in guiding you through the study material. In order to fulfil this role, you can expect your lecturer and e-tutor to:

- respond to your queries as soon as possible,
- keep you informed of important module related events, notifications or changes through announcements and SMS’s,
- guide you through the prescribed textbook and module content by:
  - explaining difficult concepts where necessary,
  - providing additional resources where necessary,
  - ensuring that the learning material on myUnisa is up to date,
  - scheduling at least one video conference to as many venues as possible on a suitable date where you can interact with your lecturer/s AND/OR providing podcasts of short presentations by the lecturer/s on the main module site,
- provide fair and consistent grading of assignments,
- provide in-time and relevant feedback on assignments,
- provide relevant and helpful examination guidelines.

We envision that this commitment will provide you with a learning experience that will meet your expectations and allow you to perform at your best during the examination. However, studying and continued participation in online activities remains your responsibility.

0.10 WHAT IS EXPECTED OF YOU

You, as student, are expected to:

- work diligently through the study material from the beginning of the semester right up to the end,
- actively interact on myUnisa by:
  - regularly checking announcements,
  - acquiring the correct contact information of your lecturer and e-tutor, and
  - participating in the Discussion Forums and other online activities that we create,
- submit your assignments on time and in the right format,
- read all the relevant instructions and follow the correct communication protocols, and
- plan your time carefully.
Your continued participation and compliance with all the above requirements will make it much easier for us to determine if you are on track and if we need to change our approach in order to ensure that you perform well in the examination and in the module.

0.11 ASSIGNMENTS AND EXAMINATIONS

Your assignments are mandatory assessment opportunities for GGH1501 and your most important source of information for your assignments is Tutorial Letter 101. In Tutorial Letter 101 you will find:

- the unique number for each assignment,
- the date on which you need to submit your assignment,
- the various methods to submit your assignments, and
- the requirements and/or content for each assignment.

Furthermore, you can make your study experience (and our marking experience) infinitely easier by ensuring you comply with the following guidelines:

- Plan your study schedule around your assignments.
- Always submit your assignments on time.
- Ensure your assignment is submitted in the correct format (always .pdf for online).
- Follow the instructions for the assignments carefully and always make sure that you answer all the questions that are being asked.
- Submit your assignment via myUnisa. It is faster to mark and faster to provide feedback.

Your examination date will be in May/June for the first semester or in October/November for the second semester. The exact date of your examination will be communicated to you throughout the semester but the details should already be available on myUnisa. Check your examination date as soon as possible and use it to plan your study schedule! Do not underestimate the input required for your examination. From day 1 in the semester you need to make sure that you work towards exam admission and a good semester mark that can lift your final mark. A successful and satisfying examination is always within reach if you put in the required effort.

<table>
<thead>
<tr>
<th>ASSIGNMENTS AND EXAMINATIONS</th>
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<tbody>
<tr>
<td><strong>Instructions</strong></td>
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<tr>
<td>- Use the following links to watch two videos in the video series on how to get started with your studies at Unisa:</td>
</tr>
<tr>
<td>- Assignments – <a href="https://www.youtube.com/watch?v=TXelZ2HiI7k">https://www.youtube.com/watch?v=TXelZ2HiI7k</a> (2:04 minutes)</td>
</tr>
<tr>
<td>- Examinations – <a href="https://www.youtube.com/watch?v=93iwvvQBpTw">https://www.youtube.com/watch?v=93iwvvQBpTw</a> (1:31 minutes)</td>
</tr>
<tr>
<td><strong>Purpose</strong></td>
</tr>
<tr>
<td>- These two videos highlight various key aspects related to the submission of your assignments and how to approach the examinations.</td>
</tr>
<tr>
<td>- These tips are invaluable to your success in GGH1501.</td>
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0.12 TIME MANAGEMENT AND SUPPORT

The module is worth 12 credits, which in simple terms means that you need to spend at least 120 hours studying GGH1501 during the semester. This might seem a lot, but it is a guideline. You might need less time or even a bit more time than this. However, the most important thing is your own time management. If you manage your time efficiently and plan your study schedule well, you will always have enough time.

Tutorial Letter 101 contains a study schedule that, if you use it, will ensure that you cover all the module content at a decent and steady pace while allowing enough time for the completion of your assignments and your examination preparation. You can tailor this schedule to your personal context, but it is extremely helpful to have a schedule. A schedule is also an important part of your support structure for your studies.

<table>
<thead>
<tr>
<th>TIME MANAGEMENT AND SUPPORT</th>
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<tbody>
<tr>
<td>Instructions</td>
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<tr>
<td>• Use the following links to watch two more videos in the series on how to get started with your studies at Unisa:</td>
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<tr>
<td>◦ Scheduling your studies – <a href="https://www.youtube.com/watch?v=nI1pB67beJY">https://www.youtube.com/watch?v=nI1pB67beJY</a> (2:48 minutes)</td>
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<tr>
<td>◦ Support network – <a href="https://www.youtube.com/watch?v=cxy04SF6Y2o">https://www.youtube.com/watch?v=cxy04SF6Y2o</a> (2:44 minutes)</td>
</tr>
<tr>
<td>Purpose</td>
</tr>
<tr>
<td>• These two videos highlight the importance and benefits of a sound schedule as well as options for your own schedule.</td>
</tr>
<tr>
<td>• Your support structure is an essential part of your success at Unisa. Make the best of the support schedule that the Department of Geography (lecturers, e-tutors, librarians, etc.) provides and add your own personal touches whenever it is possible.</td>
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</table>

0.13 CONCLUSION

Your ODL experience depends on a number of variables that you will need to keep track of. Throughout this learning unit we introduced you to the various elements that are most important for your learning experience. We hope that the information was valuable to you and that you will use it throughout the semester. We hope that you will enjoy the rest of the journey through GGH1501 with us and that you will have an improved understanding (and interest) of how the world works.

ACTIVITY 0.2: BLOG YOUR STUDY EXPERIENCE

Instructions

• Go to the Blog tool on your e-tutor website.
• Start your own personal blog.
• Write a blog post entitled "My experience of the start of the semester".
• It is important to note that you might want to keep some of your posts private and thus you should take note of the privacy sections for each post.

Purpose

• To introduce you to the interface and format of blogs on myUnisa.
• To hear your experience regarding your studies in Geography at Unisa.
• To provide you with an opportunity of providing your continued feedback and experience as the module/semester progresses.

Task

Write a blog entry entitled “My Geography experience at the start of the semester”. In your blog we would like you to share the following:

• Your first impressions of studying at Unisa and studying GGH1501.
• The aspects of GGH1501 that excite you.
• The goals that you have for GGH1501.
• The challenges you face during your studies.

You are also encouraged to read the posts from other students to help each other improve your overall study experience at Unisa. We will refer back to this blog exercise during the semester and ask you to provide feedback on other experiences. This is a continued activity and it will be worth your while to reflect on your own progress throughout the semester and the module.
LEARNING UNIT 1

THE NATURE OF GEOGRAPHY AND GEOGRAPHICAL THINKING

Author: Chris Vlok
Academic editor: Melanie Nicolau

As a young man, my fondest dream was to become a geographer. However, while working in the customs office I thought deeply about the matter and concluded it was too difficult a subject. With some reluctance I then turned to physics as substitute.

(Attributed to Albert Einstein (1879–1955))

You can relax! Geography is not that difficult and the claim that Einstein said these words was debunked in the 1970s.

On a more serious note, reading through the bulleted list of definitions below, you should realise that geography is quite a diverse subject and that it can be described or explained in many different ways.

- The purpose of geography is to provide ‘a view of the whole’ earth by mapping the location of places. (Ptolemy (83 AD – 161 AD)
- If geography itself has any significance it is that we are made to lift our eyes from our small provincial selves to the whole complex and magnificent world. (Reportedly Richard Burton (1821–1890) to the Royal Geographical Society)
- Geography is a subject which holds the key to our future. (William Palin)
- Geography is the study of the interaction of all physical and human phenomena at individual places and how interactions among places form patterns and organise space. (A definition from your prescribed book – Section A:33)

At the Department of Geography at Unisa, we subscribe to the slogan: “Geography for a better World”.

1.1 INTRODUCTION

What is geography? What does it mean to think geographically? For those of you who did not take Geography at senior certificate level, these questions may not be easy to answer. No need to be concerned! This learning unit is designed to help you
answer these questions. Today the word “Geography” is much more than only writing about the Earth as originally defined by the Greek scholar Eratosthenes. Modern geography is a science and involves the exploration, description and explanation of the world we live in, specifically where natural environments and human activities occur, what the characteristics of such environments are, why they occur in specific locations and how they interact with each other. As an integrative and holistic (taking all elements that are relevant into consideration and concerned with the integrated “whole” rather than separation into independent parts) discipline that brings together the physical and human dimensions of the world, geography’s subject matter consists of the study of people, places and environments and the interactions between them. On the one hand, geographers are interested in examining the earth’s surface and the natural and human processes that shape it. On the other hand, geographers are also interested in the relationships between people and their environment (which includes not only cultural, religious and economic connections but also relationships with nature) and interactions between different places. We can summarise these relationships and interactions with the word “interconnected” which you will come across quite often in this module. Studying module GGH1501 does not mean that you need to memorise an endless number of facts, but rather that you ask geographical questions and view a situation critically and holistically in order to contribute to solving problems that are experienced in the world. The vast array of geographic investigations according to which problems in the world can be explored is framed by a few basic questions and concepts that you need to understand. This learning unit will introduce these basic questions and concepts to you and set you on your journey through the rest of the module.

**ACTIVITY 1.1: MY VIEW OF GEOGRAPHY**

**Instructions**
- Go to the Blog tool on your e-tutor website.
- Create a new personal blog topic.
- Write a blog post entitled “My view of geography”.

**Purpose**
To create a platform where you can document your reason for registering for this module (GGH1501) and the continuous development of your knowledge of the nature of Geography.

**Task**
Share with fellow students:

1. what made you register for module GGH1501, and
2. what your understanding is of Geography as a discipline.

You are encouraged to expand your blog at least on a two-weekly basis so that it reflects how your knowledge of the nature of geography is changing and developing during the semester.

We encourage you to now view the YouTube video referred to in the following activity, after which you can expand your blog.
WHY SHOULD I CARE ABOUT GEOGRAPHY

Instructions
- Use the following link to watch the video:
  https://www.youtube.com/watch?v=PI8OOlKxKys&list=PL17BEC9ACF84779C (2:06 minutes).

Purpose of video
- To introduce the numerous and diverse range of topics that are relevant to geography and which you will encounter throughout the module.
- To highlight aspects that are related to human geography and physical geography.
- To make you aware of the type of questions geographers ask about phenomena. Note that we regard a geographical phenomenon as a phenomenon which can be linked to a point, line or area on the Earth's surface and which varies across space (it is not the same everywhere).
- Help you to understand that Geography is not just about memorising place names and the location of the physical phenomena in the world.

1.2 AIM AND LEARNING OUTCOMES

The aim of this learning unit is to assist you in acquiring the skill of applying a geographical perspective when observing, describing and analysing the world in which you live. Once you have completed this learning unit, you can use these outcomes to assess the quality of your learning experience. Make sure that you can meet each of the aims and outcomes with confidence. If you are unable to answer each outcome accordingly, we suggest that you then spend a bit more time on those you are still having trouble with or do not understand properly.

At the end of this learning unit, you should be able to:
- appreciate the various dimensions and applications of geography,
- provide geographic descriptions of phenomena by applying the geographical perspective,
- explain why each location on earth is unique, how locations are interrelated and interconnected, and why and how geographic regions are demarcated,
- explain the geography of a phenomenon by referring to its spatial location, distribution and variation, and explain how it is related or connected to other phenomena,
- showcase your understanding of how people relate to, influence and interact with their environment,
- distinguish between contemporary geographical analytical methods.

1.3 PRESCRIBED MATERIAL

Your study material for this learning unit comes from two chapters in your prescribed book as well as a series of supportive What is Geography? videos by Dr Heath Robinson of Geomindz which you have to watch and summarise by making brief notes about the main messages. The Geomindz videos are on a DVD Rom which forms part of your study material.
1.4 FINDING YOUR WAY THROUGH THE STUDY MATERIAL

Geography is a very diverse field of study. In essence geographers study any phenomena that are associated with a specific location or space, including the uniqueness and interrelatedness of locations and characteristics of human-environment interaction. Geographic inquiries could range from topics as diverse as problems confronting human populations, climate change and its potential impacts to the role of politics in the use or allocation of resources. The question therefore arises how we can make sense of all these dimensions of geography. This section systematically guides you through the various themes on the nature of geography and geographical thinking that is covered in the prescribed textbook and the “What is Geography?” videos, and will help to improve your understanding of what contemporary geography is about.

1.4.1 Making meaning of Geography

Geography as a science is a vast field of study, but there are basic spatial concepts that are relevant to all geographic investigations. In this sub-section we will use a variety of video links to explore some of these concepts.

The first video is very short and is simply an introduction providing the broader context of the video series.

The second video

- distinguishes between two traditions in Geography: (1) Geography as a description of unique phenomena of the Earth’s surface, and (2) Geography as a science going beyond mere description towards making predictions and placing emphasis on the discovery of general laws;
- elaborates on what the most fundamental geographic question, namely “Where?, entails.

In the third video, Dr Heath Robinson advocates that we should focus on the core of a discipline as opposed to the boundaries or limits of a discipline. According to him, disciplines tend to blend as one moves away from the core of a discipline. He argues quite correctly that very often a problem needs to be approached from a multi-disciplinary perspective – a single discipline may not have all the answers.

In the fourth video, Dr Robinsons defines Geography as “a holistic and comprehensive understanding of the entire world”. He then goes on by explaining how this holistic and comprehensive understanding of the entire world can be narrowed down by focusing on:
- a specific place, location or region,
- scale (for example, the entire world vs a continent, a country, a city or a neighbourhood).
LEARNING UNIT 1: THE NATURE OF GEOGRAPHY AND GEOGRAPHICAL THINKING

The “Where is?” question is only the beginning of geographic enquiry. In the fifth video Dr Robinson introduces three deeper analytical questions, namely “What is it like?”, “Why?” and “To what effect?”

**What is it like?** Answering these questions brings the similarities of and differences between places to the fore. Another term often used when describing what something is like, is the word “attribute”. The attributes refer to the non-spatial characteristics of a place or region.

**Why?** This question can be asked with relation to both the “Where is” and “What is it like” questions. In other words:

- “Why is it where it is?” Why are the Himalayas where they are? To answer this question we need to understand internal earth forces such as plate tectonics shaping the Earth which will be dealt with in Learning Unit 2.
- “Why is it like it is?” Why are the Himalayas like what they are and why are the Ural mountains like they are?

**To what effect?** Such questions lead us to unravelling the effect that a phenomenon has on its surroundings and also the effect that the surroundings have on a phenomenon. The actions and processes leading to these effects are the result of interaction and exchange between phenomena and their environments. Dr Robinson makes the statement that the world we live in is interconnected and that everything happens in some context – never in a vacuum.

In the sixth and seventh videos Dr Robinson focuses on the three major ways how Geography can be subdivided:

1. Place, location and region being studied
2. Theme or subject
   a. Physical geography
   b. Human geography
   c. Biological geography
3. Methodology or technique
   a. Remote sensing
   b. GIS
   c. Geo-statistics
   d. Qualitative methods
   e. Cartography

Now read What is Geography (Section A: page 34) and Welcome to Geography (Section B: pages 4–5) in your prescribed textbook. Pay specific attention to:

- the basic information one gathers from answering “Where?” questions,
- the various ways of defining or describing geography,
- the difference between physical geography and human geography,
- basic concepts used in geography (such as place, region, scale, space, spatial patterns and connection), and
- geography’s role in everyday decision-making.

Because it offers a unique way of viewing phenomena, Geography plays an important part in our daily lives – often without us realising that this is the case. Consider the situation when you are planning your activities for a particular day. Many of the decisions you make will be based on geographic realities. These could include:

- the weather forecast and the most appropriate clothing for the day (physical geography/climate);
– the timing of your activities, taking into consideration vehicle and pedestrian traffic (movement patterns/spatial processes);
– the most appropriate outlet to buy your household supplies (relative location or situation), capacity (site) and accessibility (connection); and
– the route that you will follow to get there (navigation).

Although the video referred to below was filmed in the United States of America, it does illustrate the interconnected world that we live in and will help you to put on your Geography glasses before venturing out of your home every day. While watching the video, think of a typical day in your life and what you see and experience every time you leave your home. During this semester it is important that you get into the habit of observing what is around you and to think of the interconnectedness of everything around you – as this will be your most fundamental step in thinking like a geographer.

GEOGRAPHIC THINKING

Instructions
• Use the following link to watch the video:
https://www.youtube.com/watch?v=_FdhEKADqH8 (5:31 minutes).

Purpose of video
• To highlight numerous geographic realities which can be identified when walking around in any environment, including where you work or stay. Although this video is based on the American context, it remains relevant to your understanding of geography.
• To point out the numerous spatial references and other themes in geography, like physical geography, human geography, climatology, geology, resource availability, etc.
• To broaden your insight into geography so that you can refine your blog about your view of geography.
• To enable you to get into the habit of putting on your geographical glasses every day.

ACTIVITY 1.2: GEOGRAPHICAL PHENOMENA IN MY LOCAL ENVIRONMENT

Instructions
• Go to the Discussions tool on your e-tutor website.
• Go to the Forum for Learning Unit 1: Specific Questions and Discussions.
• Open the discussion topic: Activity 1.2: Geographical phenomena in my local environment.
• Provide your answers on the activity detailed below.

Purpose
To understand what a geographical phenomenon is and to create awareness of geographical phenomena present in your local environment.
Task instructions
First reflect on what a geographical phenomenon is and then walk or drive through your neighbourhood, suburb, town or city and list one phenomenon from the natural environment and one phenomenon from the human environment which in your opinion is geographical in nature and worthwhile investigating.

Task
(1) Share your observations with the class on your e-tutor site and give reasons why you believe that the selected phenomena are geographical in nature and worthwhile investigating.
(2) Do not forget to also comment on the contributions of other students.

1.4.2 Geography through the ages
Geography is not a new science – some will even argue that geography is one of the oldest sciences. Hence, Geography has developed significantly through the ages and it has played a key role in exploring (seeking answers to the Where? and What is it like? questions) the world as we know it today. The positive relationship between geography and exploration of the world means that geographic knowledge enhances further exploration, while similarly further exploration also improves geographic knowledge.

Read Ancient and Medieval Geography (Section B: pages 6–7) in your prescribed textbook while taking note of the following:
• the origins and evolution of geography,
• the purpose and application of geography during this era (remember technology was rather limited – no mobile phones, internet, GPSs, aircraft, drones), and
• the relationship between geography and exploration.

Over the ages Geography developed into a science from the initial desire to know the world (with emphasis on remembering locations and navigating safely to destinations) to the current emphasis on contributing to solving problems (the Why? questions) the world is facing. Although the aspects of location and navigation are still important up to today, the application of Geography has diversified immensely through the ages. Modern applications include urban planning and development, economics, disaster management, tourism, politics, climate modelling, environmental management, biogeography and much more.

1.4.3 Geographic descriptions of location
For centuries maps have been the most important medium to describe where phenomena are, how they vary across space, what spatial patterns they display and with which other phenomena they connect. Knowledge of maps and the process of making maps (cartography) are thus important. Geographic descriptions of locations are mostly done through maps but also through relative descriptions using spatial concepts such as direction, distance and time – more about this in Learning Unit 7.

Read Reading maps, The Geographic Grid and Geography's Contemporary Analytical Tools (Section B: pages 8–13) in your prescribed textbook and make notes about the following:
• What is a map and the two main purposes of a map.
• The necessity to draw maps at a certain scale; the different ways in which we express scale; and the relationship between scale and level of detail shown on a map.
• The purpose of map projections and the four types of distortions associated with projections.
• The main function (a reference to accurately describe location) and elements (lines of latitude and longitude) of the geographic grid, and the relationship between latitude and time.
• Contemporary analytical tools such as remote sensing, global positioning systems (GPSs) and geographic information systems (GIS) used for gathering, analysing and presenting spatial data of the Earth.

The content related to maps, scale, map projections, location and geographic technologies will be discussed in more detail in Learning Unit 7, but it is important to take note of these aspects at this stage already.

To conclude this sub-section we would like to define some spatial concepts which will feature throughout the learning units.

• **Spatial location** (Where?). It refers to where a phenomenon is situated. It can either be given in absolute terms (e.g. the geographical coordinate of the port of Cape Town is located at 33°54′17"S; 18°26′02"E) or relative terms. Relative location is described using descriptive words which locate the place, facility or feature in relation to other features. For example, the port of Cape Town is located 2 km north of the Cape Town central business district.

• **Spatial variation** (What is it like?) of a phenomenon. Think about climate as a spatial phenomenon. It is not the same everywhere. It varies across space. Some areas are dry and desert-like with sparse vegetation while other areas are humid and covered with dense tropical forests.

• **Spatial distribution** (Why is it where it is?). Think about the phenomenon of South African harbours. When we study the locations of all the harbours we will detect a certain distribution pattern. The harbours are not distributed all over the country – they are linearly distributed along the coastline.

• **Spatial association** (Why is it where it is? To what effect?). In order to explain the locations, spatial variations and distributions we observe, it is often necessary to also look at one or more other phenomena. It may be that the distribution pattern of these other phenomena may hold the key to unravelling the “Why is it where it is?” question about the phenomenon we are investigating. In Learning Unit 2 you will learn that earthquakes and volcanoes are associated with the boundaries of tectonic plates.

### 1.4.4 Places and regions: unique geographic locations

Every place on earth is unique. It has a unique name and a special character. This special character is the result of:

1. a unique location (the term used in your prescribed book is situation).
2. a combination of human behavioural and environmental factors. These factors define the site characteristics (or attributes) of a place and give it a distinctive character. In essence the site characteristics provide the answers to “What is it like?”.

These characteristics are similar and extend beyond one location, one can use it to demarcate regions with similar characteristics. Why would we want to demarcate regions? Remember that the world out there is vast and complex. Demarcation of regions is an attempt to simplify reality in terms of one or more distinctive characteristic/s for a specific purpose. Note that such a demarcated area is not homogenous in all aspects – it is only relatively homogenous in terms of the criteria used to demarcate or define the region.
LEARNING UNIT 1: THE NATURE OF GEOGRAPHY AND GEOGRAPHICAL THINKING

Read Contemporary Geography (Section A: pages 37–39, 42–43) as well as Place: A Unique Location and Region: A Unique Area (Section B: pages 14–17) in your prescribed textbook and pay attention to:

- the nature (focus area) of area analysis, spatial analysis and systems analysis as three prominent contemporary analytical methods employed by geographers,
- using toponymy, situation and site characteristics to distinguish between places,
- the meaning of the term “cultural landscape”,
- the three different types of regions that can be distinguished, how each is defined and relevant examples.

ACTIVITY 1.3: ANALYTICAL METHODS

Instructions

Summarise the three analytical methods popular among contemporary geographers.

Purpose

To practise summarising the main aspects of learning material.

Task instructions

Create a table as shown below and then populate the table with:

1. the names of the three analytical methods popular among contemporary geographers,
2. a short summary of the main/distinctive characteristics of the analytical method,
3. a listing and brief explanation of important theoretical concepts relevant to the analytical method.

<table>
<thead>
<tr>
<th>Analytical method</th>
<th>Main/distinctive characteristics of the method</th>
<th>The most important theoretical concepts relevant to the method and an explanation thereof.</th>
</tr>
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<tbody>
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</table>

Our experience is that students have difficulty understanding the concept of vernacular regions. They tend to associate it solely with language. We suspect that it is probably due to the reference on page 42 of section A in your prescribed book, namely that vernacular means “everyday language”. Think about a vernacular region
as a perceptual region which exists only in the mind – it does not have a sharp fixed boundary along which we can walk or drive or which we can point out with 100% confidence. Where it is will also differ in the minds of different people – it thus has an element of vagueness. An example: As an ex-Capetonian I always had the feeling that I left the Cape behind once I came out of the Huguenot Tunnel travelling north to Unisa. It thus came as a surprise to hear from a colleague that they were going on holiday to the Cape and then to learn that their actual destination might be some 400 km east of the Mother City (Cape Town).

Regions also play an important role in South Africa and various types are evident in the country (refer to the examples in the accompanying table – use the last line to write down three more examples from your local environment). Regions can be defined in a variety of geographic scales and serve various purposes, like fulfilling administrative functions or shaping and preserving cultural identity.

<table>
<thead>
<tr>
<th>Functional or nodal regions</th>
<th>Formal or uniform regions</th>
<th>Vernacular or perceptual regions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newspaper regions <em>(Pretoria News in Gauteng; Die Burger in the Western Cape)</em>.</td>
<td>Nine provinces of South Africa.</td>
<td>The Moot area in Pretoria/Tshwane (region traditionally characterised by a middle-class Afrikaans-speaking population and numerous religion’s denominations).</td>
</tr>
<tr>
<td>Radio stations (94.7 Highveld Stereo in Gauteng; K-fm in Cape Town; O-fm in central South Africa). Note that audio streaming has made these functional regions more accessible – implying that figuratively spoken, the world has become “smaller”.</td>
<td>Climate regions – see Figure 2.10.1 in your prescribed book illustrating world climate regions.</td>
<td>Use the link to view the map entitled “Cape Town City Centre according to the locals” for examples of vernacular regions in the Cape Town CBD: <a href="http://www.travelstart.co.za/blog/15-maps-cape-town-will-help-make-sense-mother-city/">http://www.travelstart.co.za/blog/15-maps-cape-town-will-help-make-sense-mother-city/</a>.</td>
</tr>
</tbody>
</table>

### 1.4.5 Scale: from global to local

Geographers view the world in a variety of scales and in each scale there are different dynamics at work. One process that has influenced almost every scale and location on earth is globalisation, which is constantly shaping spaces due to the increased interaction between locations. When studying a phenomenon at a global scale, the focus is on broad patterns (thus a small-scale map with less detail). On the other hand, studying the same phenomenon on a local scale (thus a large scale) requires attention to detail and a desire to establish what is unique.

Read Scale: From Global to Local (Section B: pages 18–19) in your prescribed textbook and make sure that you understand and can explain or define the following:

- globalisation – note the idea of the shrinking world (an increasing ability to interact),
LEARNING UNIT 1: THE NATURE OF GEOGRAPHY AND GEOGRAPHICAL THINKING

- the role of technology in globalisation,
- the spatial impact of the globalising economy, and
- the impact of cultural globalisation.

Globalisation is having an increasingly important impact on the South African economy – one of the best examples being the mining industry. Numerous companies from around the world have developed mines in South Africa and this has increased foreign investment in numerous areas in the country thus shaping the national economy. The South African society is also more and more exposed to global cultural influences in retail (for example: McDonald’s, Burger King, SubWay), religion (for example: Hindu, Buddhist temples) and politics (for example: embassies, the United Nations and World Bank influence).

GLOBALISATION

Instructions
- Use the following link to watch the video: https://www.youtube.com/watch?v=JJ0nFD19eT8 (4:18 minutes).

Purpose of video
- To show, in a simplified way, that globalisation is a process which allows increased interaction (and thus interconnectedness) between people and places, mainly through technology.
- To highlight some potential negative impacts associated with globalisation.
- To reiterate that globalisation is not inherently good or bad.

1.4.6 Time and space: the distribution of features

The arrangement of phenomena in space is an important notion in geographic thinking and analysis. This sub-section provides you with the opportunity to expand on this notion by focusing on the properties of spatial distribution, and which will assist you to improve your spatial thinking. Earlier we very briefly referred to the distribution pattern of the harbours of South Africa. Your next reading exercise will delve deeper into the meaning and relevancy of spatial distribution and the distribution of phenomena.

Read the section Space: Distribution of Features (Section B: pages 20–21) in your prescribed textbook, with specific emphasis on density, concentration and pattern as key properties of the spatial distribution of a phenomenon. Pay attention to the text referring to Figure 1.9.1. Also revisit the section Spatial Analysis (Section A: pages 44–50). You should note that the focus on distribution patterns is a characteristic of the analytical method of spatial analysis.

Note that density is a function of size and numbers. Think about the 750 m² mansion of a childless couple and the 12 m² shack occupied by a family of four people. In the case of the mansion, the household density is one person per 375 square metres whereas it is one person per 4 square metres in the case of the shack. The population density of a country is a very important and handy geographical variable. It can be calculated by dividing the total number of people by the land area. Along the
same lines one could divide the population of a country by the number of medical

doctors (or hospital beds) in order to have a standardised index by means of which

one can compare countries or cities regarding the provision of health care. With

regard to the concentration of distributions you must note that you need to compare

apples with apples when comparing concentrations. To compare, for example, the

concentration of houses in two neighbourhoods, both the number of houses and

the area of the two neighbourhoods should be more or less the same and the areas

of the same area size. With regard to pattern note that natural phenomena tend to

have irregular patterns while man-made phenomena tend to have regular geometric

shapes. Other terms used to describe distribution patterns are the following: random,

regular, irregular, clustered, dense, dispersed, circular, linear, rectangular, and

concentric. Examples: the harbours of South Africa are distributed linearly along

the coastline of South Africa or the universities in South Africa tend to be clustered

in large metropolitan areas.

1.4.7 Interaction between places

In much the same way that every location on earth is unique, it is also true that

no location exists in isolation. You have already learnt about spatial location and

distribution earlier in this learning unit. This sub-section is intended to improve

your understanding of spatial interaction between places and regions by elaborating

on the important aspect of diffusion.

Read Distance Decay and Diffusion (part of Spatial Analysis) (Section A: pages

46–47) as well as Connection: Interaction between Places (Section B: pages

22–23), both in your prescribed textbook, and pay specific attention to the following:

• Relocation and expansion diffusion as the two main types of diffusion and how

  the diffusion process takes place (spread).

• The explanations of spatial interaction and distance decay.

The occurrence of spatial interaction means that all places on earth are interconnected

in some or other way and that there are constant influences on and changes taking

place at any location. Spatial interaction can be triggered when one place (region) has

something on offer which is desired or in demand at another place (region). Depending

on the distance between the two places (regions) and the value of the commodity

on offer (being desired), a supply and demand relationship can thus develop. For

example, if the spatial interaction between the port of Durban and Johannesburg

did not exist, the transfer of imported products (specifically oil and gas) would not

take place. This in turn would mean that either Durban or Johannesburg would

have had different development paths and might not have reached their current

prominence. Due to spatial interaction, both locations continually shape the nature

and development of the other.

ACTIVITY 1.4: EXPLORING INTERCONNECTEDNESS – OUR

FOOD

Instructions

• Go to the Discussions tool on your e-tutor website.

• Go to the Forum for Learning Unit 1: Specific Questions and Discussions.

• Open the discussion topic: Activity 1.4: Exploring interconnectedness – our food.

• Provide your answers on the activity detailed below.
LEARNING UNIT 1: THE NATURE OF GEOGRAPHY AND GEOGRAPHICAL THINKING

**Purpose**
To provide you with the opportunity to establish whether you understand concepts such as interconnectedness and interaction.

**Task instructions**
Next time you have a meal, establish where the food was produced or processed (you can use the packaging if relevant) and from where it was distributed for the retail market or where the local vendor purchased the ingredients. Critically think about who benefits from you buying the food, and where they are located. In the task below, you are required to explain the concepts of interconnectedness and interaction by referring to the last meal you had.

**Task**

(1) Use the labelling of the package to establish the “Where?” element of the food. Plot the answers to your “Where” questions on a map. If you do not have the packaging of the ingredients – ask the person selling the food where they obtained the ingredients.

(2) Speculate about the infrastructure that has to be in place in order for you to buy the food.

(3) Write down who benefits directly and indirectly from you purchasing the food.

(4) Briefly explain the concepts of interconnectedness and interaction by referring to your answers to items 1 to 3.

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1.4.8 The Earth’s physical systems

All human activities take place against the unique backdrop of the earth’s physical environment. The four spheres in the earth’s physical environment work in harmony to create a suitable habitat that sustains all forms of life on Earth.

Read Geographic Systems Analysis (Section A: pages 49–52) and Earth’s Physical Systems (Section B: pages 24–25), both in your prescribed textbook. Make sure that you pay sufficient attention to:

- the fact that geographic systems analysis is one of the contemporary analytical methods earlier identified,
- what a system is and why systems analysis helps geographers to see how things are interrelated,
- the four systems comprising the earth’s physical environment, and
- the role and characteristics of an ecosystem.

The four spheres of the earth’s physical environment are connected and are all equally important. Any disruptions in one sphere will have an impact on one or more of the other spheres. Due to this interrelatedness it is very important to approach geographic decision making holistically, in other words it is important to consider all spheres. You will encounter these four spheres again, focusing on their application in different contexts, which will improve your understanding of their functioning. By the way, do you still remember what the word “holistically” means? We purposefully did not explain it again. A responsible student who does not understand the word will either Google its meaning or use a dictionary to find out what it means.

1.4.9 Human-environment interaction

On page 24 (Section B) in your prescribed textbook the authors refer to the four spheres of the earth’s physical environment. There is another Earth sphere called the anthroposphere (sometimes also referred to as the technosphere). This is the part of the environment that is made or modified by humans for use in human activities and human habitats. The relationship between humans and their environment is complex and it has been associated with both innovation and disaster throughout history. Examples of innovations include energy harnessing and developments in previously uninhabitable areas, while examples of disasters include floods, droughts, landslides, etc.

Read Human-Environmental Interaction and Human Culture and Cultural Landscapes (Section A: pages 51–52) and Human-Environment Interaction (Section B: pages 26–27), both in your prescribed textbook, with specific emphasis on the following:

- the impact of the environment on humans,
- possibilism and environmental determinism as two approaches to explaining human-environment interaction,
- the impact of humans on the environment, and
- the meaning of the concept of cultural landscape.

Human-environment interaction is a two-way relationship. It is definitely not just related to the way in which humans use (and more often than not abuse) the environment. An important part of this relationship is also how the environment enables or inhibits the activities of humans. Natural characteristics such as elevation, water flow, climate, weather and resources often determine how the environment can be used and in many cases cause disasters which severely inhibit human activities. In the same way natural characteristics can also positively influence human activities, the most common example being tourism benefits as a result of an attractive natural environment.
ACTIVITY 1.5: THE ESSENCE OF AN HOLISTIC APPROACH

Instructions

• Go to the Discussions tool on your e-tutor website.
• Go to the Forum for Learning Unit 1: Specific Questions and Discussions.
• Open the discussion topic: Activity 1.5: The essence of a holistic approach.
• Share your views and answers on the activity detailed below.

Purpose

To establish your understanding of what a holistic view entails about a geographical problem such as water security in South Africa.

Task instructions

For this task, you will need to reflect on and think about all the factors that impact on water security in South Africa.

Task

Think about and then very briefly list and explain in one or two sentences at least five factors which should be taken into consideration and be addressed when researching water security on a national scale in South Africa.

(1) List at least five factors that should be taken into consideration and addressed when researching water security on a national scale in South Africa.

(2) Briefly explain (in one or two sentences) the relevancy of each of the factors you have listed.

1.5 CAPSTONE ACTIVITY

ACTIVITY 1.6: APPLYING THE GEOGRAPHICAL PERSPECTIVE

Instructions

• Go to the Discussions tool on your e-tutor website.
• Go to the Forum for Learning Unit 1: Specific Questions and Discussions.
• Open the discussion topic: Activity 1.7: Applying the geographical perspective.
• Provide your answers on the activity detailed below.

Purpose

To give you the opportunity to showcase your comprehensive and holistic understanding of an area or geographical phenomenon at a scale of your choice.

Task instructions

For this task you will need to liaise first with your e-tutor to establish whether you are on the right track with your selection of a phenomenon or area worthwhile investigating. Have a look at the detailed task description below and make sure that you will be able to address all the elements of the task.
Task

1. Explain why the selected area or phenomenon is worthwhile investigating and is geographic in nature.

2. Phrase a question (based on your selected area or phenomenon) for each of the traditional questions asked by geographers – these questions are dealt with in number 2 and 4 of the “What is Geography?” video series. Do not forget about the “To what effect?” question and the need to provide context.

3. Although not compulsory, you can consider attending to the “where will” and “how ought” questions referred to on page 37 of Section A in your prescribed book.

4. Ask your e-tutor to comment on your attempt. Do not expect your e-tutor to grade your answers. They will only provide feedback on whether you are on the right track and where you can improve.

As a student in a first-year geography module, we will not expect you to provide the answers to the questions you are going to ask. On the other hand, it would do no harm if you made an attempt to answer your questions.

1.6 EXPLORE AND PRACTISE

Contemporary geography is a dynamic science and new information becomes available every day. You can keep up with new trends and information through various internet sources which might also improve your understanding of the concepts discussed in this learning unit. Although it is not mandatory, we encourage you to explore (you will have to register by providing your e-mail address) and make use of the following material related to contemporary geography:

- Visit the website of the National Geographic Society (http://www.nationalgeographic.com/) and explore some of the geographic news that is famously covered by the society. Search for the article entitled “Eight Million Tons of Plastic Dumped in Ocean Every Year” (http://news.nationalgeographic.com/news/2015/02/150212-ocean-debris-plastic-garbage-patches-science/) and consider the various geographic perspectives that are implied in the article, including the relative location of polluting countries, the situation of these countries, the geography of the ocean and human-environment interaction.

- Google Earth Blog can be accessed via the following link: http://www.gearthblog.com/. The blog provides examples of how the software enables you to explore and analyse a wide variety of themes.

1.7 SUMMARY AND REFLECTION

After doing all the activities in this learning unit, you should now be able to create your own summary of the learning unit. Your summary should be guided by the learning outcomes and the key questions that were provided at the beginning of the learning unit.

In addition you can use the following questions to reflect on the content of the learning unit:
• What are some modern applications of geography that you encounter daily?
• Can you explain spatial interaction by referring to something you did today or during the week?
• To what extent do human interactions with the environment aggravate, or even cause, natural disasters?

Your newly acquired knowledge and experience of geography as a science should help you to formulate your own ideas on these questions, and although they are not critical to the understanding of the learning unit they are very important for your understanding of how the world works.

1.8 TEST YOURSELF

The following multiple-choice questions are intended to test your knowledge of the basic concepts discussed in this learning unit. You can use these questions as a self-evaluation exercise to test your own knowledge of the learning unit. This is not graded and does not contribute to your semester or year mark. The feedback to these questions will be provided on myUnisa once the learning unit is completed according to the schedule provided in Tutorial Letter 101. You should try to complete these questions before this date in order to evaluate yourself and gain the most from the learning experience.

1. Which one of the following descriptions provides the best example of the relative location of a geographic phenomenon?
   (1) The Piton de la Fournaise (“Peak of the Furnace”) volcano is located on an island in the Indian Ocean.
   (2) The Unisa Bloemfontein Regional Service Centre is situated at 161 Zastron Street, Bloemfontein.
   (3) The tallest tree in the world is located in the Redwood National Park which is situated at approximately 41°18′N; 124°00′W.
   (4) The Parliament of South Africa, in Cape Town, is located at 33.927086ºS; 18.42044ºE.

2. The basic concepts which geographers use to explain interrelatedness are …
   (1) maps, remote sensing and geographical information systems (GIS).
   (2) place and region.
   (3) scale, space and connection.
   (4) geographical coordinates, absolute location and distance.
   (5) distance, area and location.

3. Which one of the following properties can be regarded as characteristic of spatial distribution?
   (1) towns, cities and states
   (2) people, buildings and cars
   (3) density, concentration and pattern
   (4) area analysis, spatial analysis and geographic systems analysis

4. Which one of the following is not a function of the geographic grid?
   (1) describing location
   (2) navigation
   (3) naming places
   (4) determining universal time
5. A uniform region is defined by …
   (1) politicians.
   (2) common natural or human characteristics that exist throughout the region.
   (3) the amount and type of natural resources available in an area.
   (4) a central focus or node in the area.

6. Which one of the following statements regarding the Earth’s life-supporting spheres is false?
   (1) The biosphere, lithosphere, hydrosphere and atmosphere are interconnected.
   (2) The biosphere is a biotic system.
   (3) The only sphere we can possibly do without is the atmosphere.
   (4) These spheres continuously interact implying that human-environment studies need to be conducted holistically.
   (5) In order to be classified as an ecosystem, an environment must include living organisms.

7. The spread of ideas from nodes of power to other places is an example of …
   (1) stimulus diffusion.
   (2) natural contagious diffusion.
   (3) relocation diffusion.
   (4) hierarchical diffusion.
   (5) expansion diffusion.

8. Which one of the following concepts is used in contemporary geography to explain the relationship between humans and the environment?
   (1) possibilism
   (2) human determinism
   (3) environmental determinism
   (4) spatial interaction

1.9 CONCLUSION

Contemporary geography is a dynamic science seeking an understanding of how the world works and what the best ways are to address the numerous challenges that we face. This learning unit introduced a variety of geographic concepts, geographic tools and geographic relationships, all of which will remain relevant throughout the module. As you will see in the rest of the module, these concepts, tools and relationships can be applied and used in various contexts to view phenomena in the world from a geographic perspective.
LEARNING UNIT 2

KEY PROCESSES IN THE PHYSICAL ENVIRONMENT

Author: Arina Lotz
Academic editor: Melanie Nicolau

2.1 INTRODUCTION

The physical environment of the Earth is both diverse and dynamic. It is diverse in the sense that no two locations are exactly the same and is dynamic due to the variety of processes that are constantly shaping the physical environment. In the previous learning unit we introduced you to the nature of geography and the way geographers think. Learning Unit 2 focuses on the physical environment. You will study themes such as the processes determining, shaping, influencing and connecting the Earth's weather, climate, landscapes and spheres that eventually determine the distribution of life on Earth. All phenomena will be viewed from a geographical perspective, on a global scale (refer to Learning Unit 1) in order to enhance your geo-literacy. You will be exposed to different sources and representations of geographic data and learn how to interpret real-world phenomena using contemporary geographical tools.

As a resident of planet Earth you have already accumulated a large amount of observations and experience on the topics you will explore in this learning unit. But how aware are you of your knowledge? Many times we only need to think of the appropriate questions before we realise we actually know some of the answers already and with just a little bit more awareness and study we can make sense of the whole picture. Take a look at the following video clip giving a beautiful illustration of the world we live in, and which is available at: https://www.youtube.com/watch?v=B8WHKRzkCOY (2:04 minutes). The video clip provides highlights of the physical (abiotic) and biological (biotic) components found on our planet and showcases various phenomena of weather, climate, landscapes and spheres encountered on earth. Try and identify as many phenomena of weather, climate, landscapes and spheres as you can see. Consider where these scenes are taken. What do you think about their relative distribution on the planet? How do the weather, climate, landscape and spheres determine the types of life you see?
2.2 AIM AND LEARNING OUTCOMES

The aim of this learning unit is to explore 1) processes determining climate, weather and climate change, 2) processes shaping the Earth’s landscape, and 3) processes and connections in the Earth’s spheres influencing the distribution of life on Earth. Within each of these major topics there are subtopics that look into the specific process and outcomes of the physical and biological systems.

After working through this learning unit, you should be able to achieve the following learning outcomes through identifying, describing and explaining:

- the specific location and occurrence of weather and climate phenomena,
- how processes do not function in isolation, but in connections and interactions,
- how places can be organised into climatic regions,
- how and why regions differ from each other,
- the spatial location, variation and distribution of weather and climate as it is represented on maps,
- human-climate interactions,
- the role of time associated with internal and external processes shaping the landscape,
- the spatial location, variation and distribution of internal and external processes shaping the landscape,
- the detailed workings of processes relating to triggers, controls, products, consequences and resultant landforms,
- how biogeochemical cycles, food webs and chains do not function in isolation, but in connections and interactions,
- how places can be organised into soil and biome regions,
- how and why biomes differ from each other,
- the spatial location, variation and distribution of soils and biomes as represented on maps,
- human interactions with biogeochemical cycles and the biosphere,
- the detailed workings of biogeochemical cycles, food webs and chains relating to triggers, controls, products and consequences

Make sure that you can meet each of the outcomes with confidence. If you have not mastered each outcome properly, we suggest that you revisit the areas that you are still having trouble with or do not understand properly.

2.3 PRESCRIBED MATERIAL

Study the following pages in your prescribed textbook:

- **Weather, Climate, and Climate Change**: Section B, chapter 2, pages 32–63.
- **Landforms**: Section B, chapter 3, pages 64–91.
- **Biosphere**: Section B, chapter 4, pages 92–115.

At the end of each chapter key terms are defined. Ensure that you can explain these key terms in your own words and that you can provide relevant examples for each. By doing so you will acquire an improved understanding of not only the content being dealt with, but also of Geography as a science.
LEARNING UNIT 2: KEY PROCESSES IN THE PHYSICAL ENVIRONMENT

2.4 FINDING YOUR WAY THROUGH THE STUDY MATERIAL

In this section you will be guided through various topics and sub-sections aimed at improving your understanding of the content and to simplify your learning process. Each of these sub-sections is related to pages in the prescribed textbook that you need to study.

2.4.1 Processes determining climate, weather and climate change

The first topic of this learning unit deals with how energy flows through the Earth-atmosphere system and the effects of this energy flow on weather and climate phenomena. The energy from the Sun does not reach the Earth’s surface in a random manner and it is also not distributed randomly. Various characteristics of the Earth-Sun geometry as well as the energy exchange mechanisms are known and therefore make the Earth’s energy budget predictable. For example, the length of day and night and the timing of different seasons are known and predictable. Weather results from energy exchanges within the Earth-atmosphere system. The energy that is exchanged is received from the Sun. Due to the rotation of the Earth around its imaginary axis and the changing relative position of the Earth with respect to the Sun, different locations on Earth receive different amounts of energy during different periods of the year. Over long periods of time, and due to the influence of temperature, air pressure, precipitation and atmospheric circulation, weather can be generalised into the climate of a region.

The Sun is the primary source of energy for all things on Earth. Every form of energy available to us can be traced back to the Sun. The distribution of energy over the Earth is determined by the position of the Earth with respect to the Sun. The resulting dynamics lead to the creation of the seasons and associated weather conditions. This is related to variations in the receipt of energy from the Sun, which contributes to the creation of high and low pressure systems. In this way various processes are set into action, such as evaporation (which leads to the formation of clouds and precipitation), ultimately leading to the creation of weather and climate.

Read the sections Earth-Sun Geometry (section B: pages 34–35) relating to energy flow through the Earth-atmosphere system, Variations in Temperature (section B: pages 40–41), Global Atmospheric Circulation (section B: pages 44–45) relating to weather, as well as Global Climates, Diversity of Climates, Global Warming and Global Warming Consequences (section B: pages 52–59) relating to global climates and climate change.

By the end of this section you should be able to describe, explain and discuss:

• the specific location and occurrence of weather and climate phenomena
• how processes do not function in isolation, but in connections and interactions
• how places can be organised into climatic regions
• how and why regions differ from each other
• the spatial location, variation and distribution of weather and climate as it is represented on maps
• human-climate interactions

Please take note that you will not be examined on the sections Energy Exchange Mechanisms (section B: pages 36–37), Latent Heat (section B: pages 38–39), Convection and Adiabatic Processes (section B: pages 42–43), Oceanic circulation (section B: pages 46–47), Causes of Precipitation (section B: pages 48–49); however,
these sections will provide you with valuable background knowledge for the rest of the learning unit. You can exclude the section on Storms (section B: pages 50–51).

### ATOMIC CIRCULATION

**Instructions**
- Use the following link to watch a video explaining atmospheric circulation: https://www.youtube.com/watch?v=Ye45DGkqUkE (2:24 minutes).
  
  *Although the video depicts a map of North and South America, the situation is exactly the same if the map had depicted Africa and Europe.*

**Purpose of video**
- The video highlights the process of air circulation in the atmosphere. It also provides an explanation of the following:
  - the reasons why air circulates,
  - how air circulates,
  - the influence air circulation has on rainfall in some regions of the globe,
  - the influence of air circulation on creating specific climate zones around the globe,
  - the Coriolis Effect and how this affects trade winds, and
  - the effect of temperature at the North and South poles on atmospheric circulation.

### ACTIVITY 2.1: TEMPERATURE, CLIMATES AND GLOBAL WARMING

**Instructions**
- Go to the Discussions tool on your e-tutor website.
- Go to the Forum for Learning Unit 2: Specific Questions and Discussions.
- Open the discussion topic: Activity 2.1: Temperature, Climates and Global Warming.
- Provide your insight on the questions that are outlined below.

**Purpose**
To provide an opportunity for you to apply your knowledge of the Earth’s systems and how they pertain to the spatial location, variation and distribution of temperature and climate by using geographical tools such as maps or images.

**Task**
Study the world maps on the following:
- Global annual temperature ranges (figure 2.4.3 on p 41),
- World climate map (Figure 2.11.1 on pp 54-55),
- Worst case projection of global annual mean surface warming (on p 61).

Provide short, explanatory answers to the following questions provided for this discussion topic:

(a) Study the annual temperature range found in Serbia. Give the temperature range and discuss the factors that influence the temperature variation in this specific region, e.g. latitude, effects of land and water, global circulation and air pressure.
(b) Identify the major climate of Serbia and give a description of the climate.
(c) Give the temperature increase for the worst case projected annual mean surface warming for Serbia. Remember the map does not give the actual temperature but the predicted increase above the actual temperature. Also, because Serbia is quite a large area, the predicted range can be over more than one temperature interval.
(d) Now, considering the worst case projected annual mean surface warming for Serbia, what will the new annual temperature range be? For example: In Namibia the current annual temperature range is 3–4.9°C. The worst case projected annual mean surface warming is 3.5–4.5°C. Thus, the new annual temperature range would be 6.5–9.4°C.
(e) How do you think this increase in annual temperature range will influence the climate classification?

2.4.2 Processes shaping the Earth’s landforms

The shape of the Earth’s landscape changes constantly. You might not have lived in one area long enough to observe significant changes to the landforms. Over longer periods of time (and possibly by studying old land surveys of an area) you would be able to observe changes in the landforms. Every landform that you see can be traced to a certain process or conditions at one point in time and the changes that occur (sudden or gradual) can inhibit or promote human-environment interaction. This section of the learning unit will introduce you to the various internal (endogenic) and external (exogenic) processes shaping the Earth’s landforms.

The internal forces are referred to as endogenic forces and are usually associated with the formation, destruction and deformation of the Earth’s crust. The immense amount of energy that is contained within the Earth’s core has a significant influence on shaping the Earth’s landforms. The results of these forces have a sudden, and often unexpected, impact which can be devastating to both the natural environment and human activities. The common endogenic phenomena are plate tectonics, earthquakes and volcanoes.

The external forces are referred to as exogenic forces which break down the landforms on the Earth’s crust created by the internal forces. These forces mostly shape the landforms, mostly over long periods of time, through weathering and erosion by agents such as wind and water. Some events such as mass movements can occur suddenly under the force of gravity and can also have a devastating effect on both the natural environment and human activities.

Read the sections Catastrophic Earthquakes, Plate Tectonic Framework, Geological Hazards: Volcanoes and Earthquakes (section B: pages 66–71) relating to internal processes and landforms, as well as Slopes and Weathering, Mass movements, Surface Erosion, Streams, Fluvial Landscapes and Coastal Processes and Landforms (section B: pages 74–85) relating to external processes and landforms.

By the end of this section you should be able to describe, explain and discuss:

- the role of time associated with internal and external processes shaping the landscape,
- the spatial location, variation and distribution of internal and external processes shaping the landscape,
• how processes do not function in isolation, but in connections and interactions,
• the detailed workings of processes relating to triggers, controls, products, consequences and resultant landforms.

Please take note that you will not be examined on the section Bedrock Geologic Settings (section B: pages 72–73); however, it will provide you with valuable background knowledge for the rest of the learning unit. You can exclude the sections on Glacial Process and Glacial Landforms (section B: pages 86–89).

<table>
<thead>
<tr>
<th>WEATHERING AND EROSION</th>
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<tbody>
<tr>
<td><strong>Instructions</strong></td>
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<tr>
<td>• Use the following link to watch a video explaining mechanical and chemical weathering and erosion: <a href="https://www.youtube.com/watch?v=guYOWhoaG7c">https://www.youtube.com/watch?v=guYOWhoaG7c</a> (7:00 minutes).</td>
</tr>
<tr>
<td><strong>Purpose of video</strong></td>
</tr>
<tr>
<td>• The video highlights the processes involved in mechanical and chemical weathering and erosion.</td>
</tr>
<tr>
<td>• This video gives more information than the textbook does on this topic and you will not be examined on the video, but it gives very good examples and explanations for you to understand weathering a little better. Please note that you do not have to know the different rock types mentioned in the video, for example feldspar.</td>
</tr>
<tr>
<td><strong>Take specific note of the following:</strong></td>
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<tr>
<td>◦ the difference between mechanical and chemical weathering,</td>
</tr>
<tr>
<td>◦ the different types of processes in mechanical weathering, e.g. mechanical weathering due to expansion and contraction during heating and cooling, the effect of water freezing inside rocks, the effect of abrasion between material once it is being eroded,</td>
</tr>
<tr>
<td>◦ the different types of processes in chemical weathering, e.g. chemical weathering due to the dissolving of salts and oxidation of iron and copper,</td>
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<tr>
<td>◦ the effect of water and wind in weathering and erosion.</td>
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<thead>
<tr>
<th>ACTIVITY 2.2: PROCESSES SHAPING THE EARTH’S LANDFORMS</th>
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<tr>
<td><strong>Instructions</strong></td>
</tr>
<tr>
<td>• Go to the Discussion tool on your e-tutor website.</td>
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<tr>
<td>• Go to the Forum for Learning Unit 2: Specific Questions and Discussions.</td>
</tr>
<tr>
<td>• Open the discussion topic: Activity 2.2: Processes shaping the earth’s landforms.</td>
</tr>
<tr>
<td>• Provide your insight on the questions that are outlined below.</td>
</tr>
<tr>
<td><strong>Purpose</strong></td>
</tr>
<tr>
<td>• To discuss the importance of location and occurrence of internal and external processes shaping the Earth’s landforms.</td>
</tr>
<tr>
<td>• To consider the role of time in the processes associated with determining, shaping and influencing the Earth’s landforms.</td>
</tr>
</tbody>
</table>
Task 1
Study the sections on internal processes and landforms:
• Plate tectonic framework
• Geological hazards

Provide short, explanatory answers to the following questions provided for this discussion topic:
(a) Name the three different types of plate boundaries and explain the location and processes taking place at each. Give an example of each.
(b) Discuss the spatial correlation between plate tectonics, earthquakes and volcanoes.

Task 2
Study the section on external processes and landforms:
• Mass movement

Provide short, explanatory answers to the following questions provided for this discussion topic:
(c) Give and explain an example of a mass movement type that is common and gradual.
(d) Give and explain an example of a mass movement type that is rare and sudden.
(e) What influence does slope angle and water content have on mass movement?

2.4.3 Processes and connections in the Earth’s spheres influencing the distribution of life on Earth

All forms of life on Earth depend on biogeochemical cycles for their existence – “bio” meaning life, “geo” meaning Earth, “chemical” meaning it involves elements and reactions, and “cycles” meaning it is a process that constantly repeats itself. These cycles by which the Earth’s physical systems interact with each other help to distribute energy and provide nutrients and ultimately food sources that help to create the ecosystems that sustain all forms of life on Earth. This section of the learning unit will introduce you to the various cycles and processes that are important for our existence. It is important to realise that the functioning of these cycles is interlinked with the flow of energy between the Sun, Earth and atmosphere.

While reviewing the information in the prescribed textbook dealing with soil, it is important to realise that soil is the link between air, water, rocks, and organisms within ecosystems. Soil is also responsible for many different functions in ecosystems, including regulating air quality and composition, regulating temperature, assisting the carbon and nutrient cycles, facilitating water cycling and quality, facilitating natural “waste” (decomposition) treatment and recycling, and serving as a habitat for most living organisms and their food. Thus, it is evident that we could not survive without these soil functions and that soil quality determines the life supporting quality of ecosystems and the global distribution of biomes.
You will learn about the correlation between the distribution of biomes and the various other maps of physical characteristics that have been mentioned so far in this learning unit (temperature, atmospheric circulation, soil, etc.). As a geographer you should be able to identify these correlations and explain the interrelationships that are evident.

Read the sections Biogeochemical Cycles and Ecosystems, Hydrological Cycle, Carbon Cycles, Nutrient Cycles (section B: pages 94–97 and pages 100–103) relating to biogeochemical and hydrological cycles, Food Chains and Webs, Soil, (section B: pages 104–107) relating to the connections between matter, energy and ecosystems as well as Diversity of Biomes, Major Biomes and Human-dominated Systems (section B: pages 108–113) relating to the distribution of life on Earth.

By the end of this section you should be able to describe, explain and discuss:

• how biogeochemical cycles, food webs and chains do not function in isolation, but in connections and interactions
• how places can be organised into soil and biome regions
• how and why biomes differ from each other
• the spatial location, variation and distribution of soils and biomes as represented on maps
• human interactions with biogeochemical cycles and the biosphere
• the detailed workings of biogeochemical cycles, food webs and chains relating to triggers, controls, products and consequences

Please take note that you can exclude the section on Local Water Budgets (section B: pages 98–99).

### BIOGEOCHEMICAL CYCLES

**Instructions**

- Use the following link to watch a video explaining the various biogeochemical cycles on Earth: https://www.youtube.com/watch?v=Bn41lXKyVWQ (8:34 minutes).

**Purpose of video**

- The video provides a summary of all the important biogeochemical cycles that help to sustain life on Earth.
- Take note of the nitrogen and phosphorous cycles explained in the video. These are dealt with in the prescribed textbook in the next sub-section, but by taking note of them at this stage it will be easier to understand the content of the prescribed textbook. You do not need to be concerned with the sulphur cycle at this stage.
FOOD CHAINS AND WEBS

Instructions
- Use the following link to watch a video explaining food chains and webs: https://www.youtube.com/watch?v=KI7u_pcfAQE (3:50 minutes).

Purpose of video
- The video provides a summary of what food chains and webs are, the different components and how they are connected.
- It also explains how the biogeochemical cycles and food chains and webs fit in with each other. Carbon, nitrogen and phosphor all cycle through the biosphere. Thus these nutrients were all part of some food chain or web at one part of their cycles.

ACTIVITY 2.3: BIOCHEMICAL CYCLES

Instructions
- Go to the Discussions tool on your e-tutor website.
- Go to the Forum for Learning Unit 2: Specific Questions and Discussions.
- Open the discussions topic: Activity 2.3: Cycles, biomes and soil.

Purpose
To provide an opportunity for you to apply your knowledge on and establish the relationship between cycles, biomes and soil.

Task
(1) Speculate on the main source of your drinking water (ground water or surface water).
(2) Explain how water and nutrients flow through ecosystems.
(3) Briefly describe how soil is created.
(4) Explain how living material is cycled through ecosystems.
(5) Using Brazil as an example, speculate on the relationship between climate (Section B, page 52/53); soil (Section B, page 106/107) and biomes (Section B, page 110/111).

2.5 CAPSTONE ACTIVITY

ACTIVITY 2.4: CLIMATE, SOIL AND BIOME RELATIONSHIPS

Instructions
- Go to the Discussions tool on your e-tutor website.
- Go to the Forum for Learning Unit 2: Specific Questions and Discussions.
- Open the discussion topic: Activity 2.4: Climate, soil and biome relationships.
- Provide your insight on the questions that are outlined below.
Purpose

- Explain how and why regions differ from each other in terms of weather, climate, landforms and the biosphere.
- Infer and/or observe the spatial location, variation and distribution of weather, climate, landscapes and spheres by using geographical tools such as maps or images.
- Explain the fact that phenomena in weather, climate, landforms and the biosphere exist at a particular place at a particular time for particular reasons.
- Anticipate and describe the realities associated with processes not functioning in isolation, but in the context of connections and interaction between the physical and biological systems on Earth.

Task

Study the following world maps:

- World climate map (Figure 2.11.1 on pages 54–55)
- World soil map (Figure 4.7.2 on pages 106–107)
- Major biomes map (Figure 4.9.1 on pages 110–111)

Also consider the location of the Karoo area in South Africa (the area inside the white outline).


Provide short, explanatory answers to the following questions provided for this discussion topic:

(a) Identify the climate category for the area of the Karoo according to five major climate categories.

(b) Identify the main soil type of the area of the Karoo. (Hint: If you struggle to read the coloured map legend, read the descriptions of each soil type to help you identify the soil type.)
LEARNING UNIT 2: KEY PROCESSES IN THE PHYSICAL ENVIRONMENT

(c) Identify the major biome of the area of the Karoo.
(d) Discuss how the climate influences the soil type of the area of the Karoo. (Hint: Think of the factors according to which climate is categorised as well as the factors that determine soil properties.)
(e) A biome is defined as a large grouping of ecosystems characterised by particular plant and animal types. Discuss how the climate category and soil type link to the major biome of the Karoo.

2.6 TEST YOURSELF

The following multiple-choice questions (MCQs) are provided to test your comprehension of the basic concepts discussed in this learning unit. These questions serve as an opportunity for you to evaluate your understanding of the learning unit content in terms of preparation for the examination. You will not be awarded marks for your answers of these questions, and by answering them no credit towards your semester or year mark will be earned. The feedback to these questions will be provided on myUnisa when the learning unit is completed according to the schedule provided in Tutorial Letter 101. You should try to complete these questions before the feedback is provided and so gain the most from the learning experience.

1. Which one of the following statements describing the position of the Sun in June each year is true?
   (1) The Sun will be directly above the equator.
   (2) The Sun will be directly above the Tropic of Cancer.
   (3) The Sun will be directly above the Tropic of Capricorn.
   (4) The Sun will be directly above the 40° north latitude.

2. Which option is not a reason for uncertainty related to expected global warming?
   (1) We have limited understanding of the climate system and how to model it accurately.
   (2) Future conditions like the rate of carbon dioxide emissions are unknown.
   (3) The Intergovernmental Panel on Climate Change is politically influenced and not objective.
   (4) It is possible that unforeseen tipping points could affect the climate.

3. For which one of the following combinations of continents is it true to state that the highest average atmospheric pressure occurs in January and the lowest average atmospheric pressure in July?
   (1) Europe and Africa
   (2) South America and Asia
   (3) Asia and Africa
   (4) North America, Europe and Asia
   (5) Africa and North America

4. At which one of the following types of tectonic plate boundaries is new crust created?
   (1) A divergent boundary
   (2) A convergent boundary
   (3) A transform boundary
   (4) A subduction boundary
5. Which statement related to earthquakes is false?
   (1) Earthquakes occur along tectonic plate boundaries.
   (2) The intensity of an earthquake is measured on a 0 to 9 logarithmic scale.
   (3) Damage to structures are greatest further away from the epicentre.
   (4) Thousands of earthquakes occur every day.

6. Which one of the following factors does not contribute to soil properties?
   (1) The variation in day length.
   (2) The parent material from which the soil is formed.
   (3) The topography of the area.
   (4) The timespan of the soil formation.

7. Which one of the following biomes is not found in South Africa?
   (1) Mediterranean woodland shrub and grassland.
   (2) Desert shrub.
   (3) Tropical savannah, mixed grassland and woodland.
   (4) Broadleaf or mixed broadleaf and coniferous forest.

8. Phosphorus is not found in the …
   (1) atmosphere.
   (2) hydrosphere.
   (3) biosphere.
   (4) lithosphere.

9. Which one of the following statements relating to biogeochemical cycles is true?
   (1) The phosphorus cycle involves the atmosphere, hydrosphere, lithosphere and the biosphere.
   (2) Photosynthesis produces carbon dioxide which is then stored in biomass.
   (3) Evaporation, condensation, precipitation and run-off are the physical processes that complete the hydrological cycle.
   (4) The nitrogen cycle involves the atmosphere, hydrosphere, lithosphere and the biosphere.

10. Which one of the following processes is not an example of mechanical weathering?
    (1) Frozen water causing rocks to crack and break.
    (2) Plants roots cracking and breaking rocks.
    (3) Mechanical drills cracking and breaking rock.
    (4) Intense and sustained heat from the sun cracking and breaking rocks.

2.7 CONCLUSION

This learning unit introduced you to a wide variety of key processes in the physical environment of the Earth and it is evident that the Earth's ability to sustain life and constantly reshape its landscape is no simple process. The wide variety of individual processes are interconnected and driven by the energy from the Sun to create a life-supporting environment on Earth. The weather, climate, endogenic and exogenic processes, landforms, biogeochemical cycles and ecosystems are all equally relevant to our existence, and disruptions in any one of these systems could have dire consequences for human activities.
After reviewing all the topics and completing all the activities, you should now be able to create your own summary of the learning unit and use it during your preparation for the examination. The focus of your summary should reflect the learning outcomes provided at the beginning of the learning unit.

We trust that this learning unit significantly improved your understanding of how the world works, especially in terms of aspects and processes that are not tangible or visible on a local scale. In the next learning unit the focus will shift towards the human environment, where the patterns and trends of the global population will be considered. You will have to keep this learning unit in mind as you will discover that many processes of the physical environment have a significant impact on the location, distribution and activities of human populations.
The world’s population is larger than ever before and its characteristics are more dynamic than ever before. The dynamic nature of population is influenced by variations in birth rates and death rates around the world as well as population characteristics and the patterns of movement in and between countries. Population patterns and trends are very important dynamics to consider because they influence the sustainable use of resources within a country or region and also because they are related to aspects of economic growth, political stability and cultural diversity. Geographers are users of population data and make a very important contribution to understanding this data – which emphasises the importance of this learning unit. The geographical perspective on contemporary population dynamics and issues around the world therefore provides the focus for this learning unit. You will also be introduced to skills that can be applied on the global and local geographic scale in the context of population studies. Maps and graphs are important tools for population data representations and will feature throughout the learning unit. As part of this introduction, and as a way of introducing world population, please click onto the following link https://www.youtube.com/watch?v=rDgcflii8sRA (1:17 minutes) (IntractiuSchool, 2011).
3.2 AIM AND LEARNING OUTCOMES

The aim of this learning unit will be for you to understand what global population is and its trends, characteristics and how its spatial distribution is interrelated to a number of factors that influence population concentration, distribution and density. It is also important for you to understand migration and its implications in connection to the global population and its influence on different regions and societies.

At the end of this learning unit you should be able to achieve the following learning outcomes:

• describe the dynamics of the spatial distribution of global population,
• provide reasons for the nature/characteristics of global population distribution,
• distinguish between population concentration and population density,
• analyse and interpret population structure and the components of population change,
• interpret population trends by means of population pyramids,
• describe and interpret global migration trends,
• explain the various reasons for migration,
• discuss the reasons for and implications of migration control.

We suggest that you revisit these learning outcomes once you have worked through the learning unit. You then need to evaluate your ability to respond to each of the outcomes with confidence. If you are not comfortable with each outcome, we suggest that you then spend a bit more time on the problematic area(s) that you have identified by thoroughly revising the appropriate parts of the prescribed study material.

3.3 PRESCRIBED MATERIAL

Study the following pages in your prescribed textbook:

• Population: Section B, Chapter 5, pages 116 to 139.
• Migration: Section B, Chapter 6, pages 140 to 163.

At the end of each of these two chapters there is a list of key terms that you need to acquaint yourself with. Make sure that you understand these terms and are able to explain them in your own words. Understanding them will also make it easier for you to understand the chapter content and answer any questions.

3.4 FINDING YOUR WAY THROUGH THE STUDY MATERIAL

As you work through this learning unit, it will become evident from the prescribed study material that patterns and trends related to the global population are influenced by a variety of factors and can be measured and described by an almost greater variety of methods. How can we make sense of all these trends and methods? The following sub-sections include a review of the various topics on population dealt with in the prescribed material. Working diligently through this will help to improve your learning experience and lead to a better understanding of the broad topic of the global population.
3.4.1 Population concentrations

An understanding of where people live, why they live there and how populations change over time can be regarded as fundamental to human geography. Therefore, your first task in this learning unit is to familiarise yourself with the spatial distribution of the global population and various aspects related to this. While doing so, it is a good idea to keep the previous learning units in mind as they provide an important part of the context in which population dynamics has to be viewed.

Read the section Population concentrations (Section B: pages 118–119) and pay attention to the following:

- the spatial pattern of the global population distribution,
- the relative locations of high and low population densities, and
- the reasons provided for the global population distribution.

### POPULATION DISTRIBUTION AND DENSITY

#### Instructions

- Use the following link to watch a video (1:04 minutes) on population distribution and density:
  [https://www.youtube.com/watch?v=s9dFy6xB0BM](https://www.youtube.com/watch?v=s9dFy6xB0BM) (Saint George’s School, 2011).

#### Purpose of the video

- It provides further insight into global population concentrations and distributions, and should help to enhance your understanding of the population map as well as other maps supplied in the prescribed textbook.

Spatial distributions and spatial patterns are an important focus area in this part of the learning unit. Note that the population concentrations in Asia (specifically China and India) are significantly higher than in the rest of the world. Furthermore, in North and South America population concentrations are higher on the eastern and western sides of the continents than in the central parts and also much less dense towards the far north and far south of these two continents. Similarly, note that the highest population concentrations in North Africa are close to oceans and sources of water (although not for the Sahara Desert), while the South African population is also concentrated mostly on the eastern side of the country.

### ACTIVITY 3.1: POPULATION DISTRIBUTION, DENSITY AND POPULATION CONCENTRATIONS

#### Instructions

- Consult Section B in your prescribed textbook, pages 118 to 119 and Figure 5.1.1.
- Consult Section B in your prescribed textbook, pages 120 and Figure 5.2.1.
- Go to the Discussions tool on your e-tutor website.
- Open the discussion topic, Activity 3.1: Population distribution, density and population concentrations.
- Provide your answers on the activities detailed below.

#### Purpose of the task

To provide you with an opportunity to establish the interrelationship between population distribution, density and concentrations.
Tasks

(1) Using Figure 5.2.1 state which continent is the most densely populated.

(2) Compare Southern Africa and Central Africa on both maps and speculate which of the two is more densely populated.

(3) Speculate on the reasons why the one area is more densely populated than the other.

(4) Explain the relationship(s) between the global population distribution, density and concentration.

(5) Select one region of “cold lands” and speculate on the reasons for the distribution of the population and the population density (persons per square kilometre) in your selected region.

3.4.2 Population density, structure and components of change

When discussing the global population distribution, it is essential to refer to population density, population structure and changes in the population. Consideration of these three components will provide insight into the reasons why population characteristics vary among regions. In addition, the integrated analysis of populations at the hand of these components leads to insights into a phenomenon such as overpopulation and requirements for improved sustainability.

<table>
<thead>
<tr>
<th>POPULATION STRUCTURE/PYRAMIDS</th>
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<tbody>
<tr>
<td>Instructions</td>
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<tr>
<td>• Use the following link to watch a video (5:02 minutes) entitled “Population pyramids: Powerful predictors of the future” <a href="https://www.youtube.com/watch?v=RLmKf-xwWQTE">https://www.youtube.com/watch?v=RLmKf-xwWQTE</a> (Preshoff, 2014).</td>
</tr>
<tr>
<td>Purpose of the video</td>
</tr>
<tr>
<td>◦ Provides a very helpful and important perspective on three important types of population pyramids and provides insight on how you can gather information from each type of population pyramid.</td>
</tr>
</tbody>
</table>

Read the sections Population density, Components of change and Population structure (Section B: pages 120–125) and specifically note:

• the three measures of population density,
• the difference between the spatial representation of population distribution and population density calculations,
• the three indicators of population change,
• the components that make up the structure of a population, and
• the use of population pyramids.

In all of the above characteristics of population, you should specifically note the distinctive characteristics of the Global South and the Global North. Remember that the spatial distribution of population and the factors that contribute to population change can be used to explain the reasons for the different population structures in the Global North and the Global South. You should also realise that the population dynamics of countries/regions can be represented by or inferred from population pyramids.
3.4.3 Demographic transition and population futures

Demographic transition refers to the process of population change that is applicable to each country in the world. This process influences the economic and social development state of a country and determines the future population structure of the country.

Read the sections: The demographic transition, Declining birth rates and Population futures (Section B: pages 126–131), with specific focus on the following:

- the four main stages of demographic transition and their characteristics,
- the presentation of each stage of demographic transition in terms of a characteristic population pyramid,
- the factors that contribute to declining birth rates,
- the implications of population dynamics on population futures, and
- the influence of policies on population futures.

Your ability to interpret and describe demographic transition is directly related to your understanding of the components of population change and population structures. Population pyramids (which indicate birth/death rates and population futures) are important tools which are used to represent and interpret population growth/decline trends and to predict future trends and can be applied to any geographic scale for which appropriate data are available.

ACTIVITY 3.2: CRUDE BIRTH RATES AND CRUDE DEATH RATES

Instructions

- Consult Section B in your prescribed textbook, page 123 and Figure 5.3.4.
- Consult Section B in your prescribed textbook, page 123 and Figure 5.3.5.
- Go to the Discussions tool on your e-tutor website.
- Open the discussion topic, Activity 3.2: Crude birth rates and crude death rates.
- Provide your answers on the activities detailed below.

Purpose of activity

To provide you with an opportunity to establish the spatial distribution of crude birth and death rates on a global scale.

Tasks

1. Name a country that has a crude birth rate of 40 and above per 1000 persons.
2. Does the northern or southern hemisphere have the highest numbers for crude birth rates?
3. The African continent has a high crude death rate. Why is this the case?
4. A wealthy country in the Northern Hemisphere usually has a higher CDR than one of the poorest countries in the Southern hemisphere. Is this statement true or false?
5. Give a reason for your answer to question 4 above.
3.4.4 Sources and destinations of modern population migration

Migration is a prominent characteristic of the global human population, and the modern era is characterised by unconstrained migration across boundaries. The reasons for migration are many and in some cases migration is not voluntary but forced by factors such as warfare or environmental disasters. Migration can occur on any geographic scale and is closely related to population distributions and resource availability. Watch the following video clip (5:04 minutes) introducing the topic of migration and its implications: https://www.youtube.com/watch?v=5m0mAZ8mYdk&nohtml5=False (A Level Revision; 2015).

Read the sections Sources and destinations (Section B: pages 146–147) and Residential mobility (Section B: pages 154–155) and pay attention to the following:

- prominent source and destination areas of migration,
- the difference between global/regional migration (migration between countries) and local/internal migration (migration within countries),
- how the characteristics of migration vary on different geographic scales (global and local),
- prominent push and pull factors acting as triggers for migration,
- relocation within countries and interregional versus intraregional migration, and
- the nature of migration between rural areas, urban areas and suburban areas.

Any process of migration has a source (the location from which people are moving) and a destination (the location to which people are moving). Sources and destinations are created through certain push and pull factors which are in essence characteristics that make one place or region more attractive or less attractive to others. Although residential mobility refers to migration on a local scale, it is characterised by push and pull factors very similar to those associated with global migration and could therefore be interpreted in a similar way to regional migration.

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**GLOBAL MIGRATION**

**Instructions**

- Use the following link to watch a video (2:29 minutes) on changing world migration: https://www.youtube.com/watch?v=RMtI6UTWdi0 (OECD, 2012).

**Purpose of video**

- The video entitled “Changing world of migration” describes new trends of global migration, specifically the impact that employment and education opportunities have on migration. Note how the trends and impacts of migration differ between regions and how the governments of both source and destination areas have to respond in terms of appropriate policies.

3.4.5 Reasons for migration

Migration is caused by a wide variety of factors, with some of these being more obvious than others. Push and pull factors come into play here, as the characteristics of some regions make them more attractive than others in terms of, for example, the labour market and tourism opportunities.
Read the sections **International labour migration**, **Forced migration** and **Tourism migration** (Section B: pages 148–153), with specific reference to the following aspects:

- the reasons triggering each of these three types of migration, and
- the consequences of each of these three types of migration.

The type of migration will have specific impacts on the population pyramids of the source and destination regions (i.e. labour migrants leave children behind while forced migrants include the whole family), while some forms of migration have a strong temporal component (seasonal migrants or migration for the purpose of vacation). Remember that the impacts are relevant to both the source and the destination areas that are involved.

**ACTIVITY 3.3: FORCED MIGRATION**

**Instructions**

- Consult Section B in your prescribed textbook, page 150 and Figure 6.5.1.
- Go to the Discussions tool on your e-tutor website.
- Open the discussion topic, Activity 3.1: Forced migration.
- Provide your answers on the activities detailed below.

**Purpose of activity**

To investigate the phenomenon of forced migration on a global scale.

**Tasks**

1. Name a country that lost over 1 000 000 of its people due to forced migration in 2008. Give at least two names of the countries that might have received these migrants.
2. Look at Figure 6.5.1. Explain the meaning of the regions that have been shaded in yellow.
3. Is the following statement true or false? “The smallest movements of refugees are within poor and conflict prone regions.” Give reasons for your answer.
4. Is the following statement true or false? “Figure 6.5.1 reflects that in 2008, France lost 500 000 of its inhabitants due to global warming.” Give reasons for your answer.
5. Is the following statement true or false? “Figure 6.5.1 reflects that in 2008, Ethiopia received just under 999 999 international refugees; the reason for the forced migration is not reflected on the Figure.” Give reasons for your answer.
6. What is the most common cause of forced migration?

**3.4.6 Controlling migration**

The significance and impact of migration cannot go unnoticed and therefore it is also very important to control migration to some extent. Migration control is achieved mainly through policy interventions. The nature of migration policies ultimately hinges on a fine balance between positive and negative effects on source and destination areas.
LEARNING UNIT 3: PATTERNS AND TRENDS OF THE GLOBAL POPULATION

Read the section **Controlling migration (Section B: pages 160–161)** and pay attention to:

- the encouraging and restraining functions of migration policies, and
- the different reasons for migration control.

South Africa is a prime example of where the lack of strong migration policies has led to civil unrest and to various situations which put a strain on local resources. Various communities in South Africa have been disrupted by xenophobic attacks which were sparked by the number of foreigners living and working among the South African population. These situations can be prevented by drafting migration policies, but nevertheless have an impact on population dynamics (the economy and population structure) in both the source and destination areas.

### 3.5 CAPSTONE ACTIVITY

Global population patterns and trends are constantly changing and vary across the globe. There are many interesting and valuable data representations of population patterns and trends which you can explore and which will undoubtedly excite you and improve your understanding of the concepts discussed in this learning unit.

#### ACTIVITY 3.4: OVERPOPULATION

**Instructions**

- Go to the Discussions tool on your e-tutor website.
- Go to the Forum for Learning Unit 3: Specific Questions and Discussions.
- Open the discussion topic: Activity 3.4: Overpopulation.
- Share your insights and answers on the task provided for this activity.

**Purpose of activity**

- To represent the meaning of overpopulation and to explain the implications of overpopulation.
- To provide you with the opportunity to discuss methods that will help with the issues of overpopulation.

**Task**

Watch the video entitled “7 Billion: How Did We Get So Big So Fast?” https://www.youtube.com/watch?v=VcSX4ytEfE (2:33 minutes) (NPR) and then answer the following questions:

1. Do you think the world is over- or underpopulated? Give reasons for your answer.
2. What were the most important reasons for the rapid growth in the world population in 1804?
3. Name the three regions (specified in the video) in the world with the highest population numbers.
4. Using your list of three regions (task 3 above) of the most populous regions in the world, compare the information provided in the video with the spatial distribution of population in Figure 5.1.1 on page 118/119 in your prescribed book. Write a few notes on whether the two sources provide the same (or different) spatial pattern.
5. Explain the relationship between the birth rate, the death rate and population growth.
6. Select a country that is overpopulated and compare it to a country that isn’t and tabulate the main differences between these two countries.

3.6 TEST YOURSELF

The following multiple-choice questions are intended to test your knowledge of the basic concepts discussed in this learning unit. You can use these questions as a self-assessment exercise to test your knowledge of the learning unit. This exercise is not marked and will not contribute to your semester or year mark. The feedback on these questions will be provided on myUnisa when the learning unit is completed according to the schedule provided in Tutorial Letter 101. You should try to complete these questions before this date in order to assess yourself and gain the most from the learning experience.

1. Which one of the options best describes the population trends in Region 7 of the City of Tshwane Metropolitan Municipality of South Africa based on the population pyramid shown in the figure below?

![Population Pyramid for Planning Region 7](image)

*Population pyramid for the City of Tshwane Metropolitan Municipality in 2011 (City of Tshwane 2011)*

(1) The region has experienced consistent high birth rates (high growth) and is characterised by a large, predominantly male, economically active population.
(2) The region experiences very high death rates and is characterised by a very young and economically inactive population.
(3) The region has an equal number of males and females with low literacy levels.
(4) The region is highly developed, in stage 4 of demographic transition, and will experience a decline in population in the near future.

2. Based on figures 5.2.2, 5.2.5 and 5.2.7 (pages 120–121 in your prescribed textbook) and your understanding of overpopulation, which one of the following countries would you consider as the closest to being overpopulated?
LEARNING UNIT 3: PATTERNS AND TRENDS OF THE GLOBAL POPULATION

3. In terms of figure 5.2.1 (page 120 in the prescribed textbook), which one of the following options identifies two countries with the highest population densities in the world?

(1) China and Pakistan
(2) India and Russia
(3) India and Germany
(4) Egypt and Italy
(5) USA and Nigeria

4. A population pyramid provides insights into the population dynamics within a country. Which one of the following is not illustrated by a population pyramid?

(1) Birth rate
(2) Literacy rate
(3) Death rate
(4) stages of demographic transition

5. Overpopulation refers to a situation where …

(1) the number of people in an area causes unsustainable development.
(2) people live very close to one another and there is very little living space.
(3) the number of people in an area causes diseases to spread faster.
(4) people’s need for resources to support a decent quality of life cannot be met by the environment.

6. Which one of the following statements about population distribution is true?

(1) Population density is the greatest in poor countries.
(2) South Asia’s population is greatest along its coastal margin, mostly on a series of islands.
(3) Most people in the USA live in the eastern half of the country.
(4) Japan’s population density is similar to that of New Zealand.

7. People moving away from one country into another country is described as …, while people moving between cities in the same region of a country is described as … migration.

(1) immigration; intraregional
(2) emigration; intraregional
(3) immigration; interregional
(4) emigration; interregional

8. Which one of the following statements related to international labour migration is true?

(1) Labour migrants favour growing economies and will cause an increase in birth rates.
(2) People only migrate to areas that have high agricultural productivity.
(3) Labour migrants favour growing economies and will cause an increase in the 20–40-year age groups of a country’s population pyramid.
(4) Labour migrants prefer the Northern hemisphere for the favourable climate conditions.
9. Which one of the following options is not a trend associated with global migration in recent decades?

(1) Global migration is occurring at an increased rate.
(2) Global migration involves a net out-migration from North America and Europe.
(3) Global migration has led to a brain drain from developing countries.
(4) Global migration involves large flows of migrants from Asia to North America and Europe.

10. According to the map in figure 6.3.2 (pages 146–147 in your prescribed textbook), which one of the following countries has a net migration rate above 100?

(1) Saudi Arabia
(2) Ireland
(3) Chile
(4) Australia

3.7 SUMMARY AND REFLECTION

After working through the study material for this learning unit, and having completed all the activities, you should now be able to create your own summary of the learning unit, which will be useful during your examination preparation. Your summary should be guided by the learning outcomes and the key questions that were provided at the beginning of the learning unit.

At this stage you can use the questions that are supplied here to reflect on the content that has been covered in this learning unit. Also make notes which you can use if you are challenged by a similar question in real life, an assignment or the examination.

- What causes the disparity between population dynamics in the Global South and the Global North?
- Is the world overpopulated?
- How do countries approach the risk of overpopulation and which of the strategies being used would you regard as applicable?
- What are the reasons for people changing their residential location either by emigrating or by moving from rural to urban areas?

Your newly acquired knowledge of and insight into population patterns and trends should help you to formulate your own opinion when answering these questions. Although they are not critical to understanding the learning unit, they are very important for your understanding of how the world works.

3.8 CONCLUSION

The key message of this learning unit is that population growth is dynamic and varies significantly across the world, and there is constant population movement within and between countries. Both these situations have a significant impact on the population composition of a country as well as the cultural and economic functioning of a region. You have been introduced to several concepts, situations and dynamics, including global population concentrations, methods for representing population characteristics, demographic transition, population growth control and the challenges related to migration.
LEARNING UNIT 3: PATTERNS AND TRENDS OF THE GLOBAL POPULATION

You should be aware of the various population global challenges and should have an improved understanding of their geographic interpretation. Insight into all of these population realities should have made you aware of the importance of the geographical perspective on interpreting current population dynamics and predicting future population trends. To check whether you have mastered this geographic interpretation of population dynamics and migration, make sure that you can tick all the boxes of the learning outcomes as well as answer the key questions at the beginning of the learning unit. If you have any further questions, contact your e-tutor or your lecturer, preferably via myUnisa, and share your questions with the class.

3.9 REFERENCES

Saint George’s School, 2011. Intro to World population. InteractiuSchool.
https://www.youtube.com/watch?v=rDgcfrl8sRAA

Saint George’s School, 2011. Animated video about population distribution and density https://www.youtube.com/watch?v=s9dFy6xBOBM


Cole A., 2011. NPR: 7 Billion, how did we get so big so fast https://www.youtube.com/watch?v=VcSX4ytEfcE
Before we delve into the details of the global cultural mosaic, you should ask yourself: What defines culture? You can use the following video link “Major elements that define culture” (7:14 minutes) to clarify some of the ideas that you may have on this topic: https://www.youtube.com/watch?v=jt2tikGSu98 (Desoriente, 2014). Although this video is a lesson for a sister discipline (Sociology), the contents of the video are also relevant to assisting geographers with an understanding of human behaviour across the globe. This video introduces you to the elements and diversity of culture, and highlights that no two cultures are exactly the same. The video has reference to the United States of America; however, when watching the video try to relate what you are seeing with your own culture in terms of symbols, language, values and norms.

Globally, language, religion, ethnicity and politics constitute the fundamentals of cultural diversity. In addition, globalisation has allowed cultures to interact on levels that were not possible in previous centuries; nevertheless, globalisation has implications that are not all fully understood yet. An improved understanding of cultural dynamics is required to promote cultural appreciation and tolerance, and geography can contribute to this understanding by viewing these dynamics in a spatial and in a human-environmental interaction context. You should acquire a sense of understanding that one’s cultural backdrop includes norms, ethics, religion, values and language which shape a person’s upbringing and how they interact with one another and with the environment. In addition, it is important that you develop an understanding of the link between political states, boundaries and conflicts with religions and languages around the world and how these affect each other.
4.2 AIM AND LEARNING OUTCOMES

The essence of this learning unit is firstly to determine and describe the differences and similarities between cultures, how they are distributed across the world globe as well as the reasons for their distribution. Secondly, this learning unit aims to improve your understanding of the political geography of the world.

At the end of this learning unit you should be able to:

- represent the meaning of culture and cultural diversity,
- present and describe the global spatial distribution pattern of major languages and religions,
- explain various processes of cultural differentiation with reference to the growth, use and decline of languages,
- distinguish between different types of religions, their geographic distribution pattern and the implications for societal relations,
- provide an analysis of how the world’s lands and seas are politically divided and how this affects the spatial and other relations and interactions between these divided units.

Once you have worked through the entire learning unit, you need to revisit these outcomes to determine how your insight into the global cultural mosaic has improved. If you are still unsure about anything, we suggest that you spend a bit more time on the problematic area(s) that you have identified.

4.3 PRESCRIBED MATERIAL

Study the following pages in your prescribed textbook:

- **Languages and Religions**: Section B, Chapter 7: pages 164 to 193.
- **Political Geography**: Section B, Chapter 8: pages 194 to 219.

At the end of each of these two chapters in the prescribed textbook, there is a list of key terms that you need to acquaint yourself with. Make sure that you understand these terms and are able to explain them in your own words. A proper understanding of these terms will also make it easier for you to grasp the message of the chapters and interpret any questions asked about it correctly.

4.4 FINDING YOUR WAY THROUGH THE STUDY MATERIAL

It is evident that the world is comprised of a wide variety of places which are shaped by different cultures and religions and governed by different intentions and political structures. How do you make sense of all the cultures, religions and political entities in the modern world and what are the implications of these levels of diversity? The following sub-sections will guide you through these and other topics on world culture and politics dealt with in the prescribed textbook. If you work through this material attentively, you will not only improve your learning experience, but also better understand the topics involved.

4.4.1 The distribution pattern of languages and multilingual states

A large number of languages (and dialects of the same language) are spoken throughout the world. The distribution pattern of these languages (and dialects)
provides important insights into the cultural geography of the world. An appreciation of the spatial distribution pattern of certain language families is particularly important for your understanding of the global cultural mosaic.

Rubenstein, JM; Renwick, WH and Dahlman, CT. 2016.

Read the sections Distribution of languages (Section B: pages 168–169) and Multilingual states (Section B: pages 176–177) and pay attention to:

- the number of language families in the world and their spatial distribution and,
- the relationship between language distribution and culture distribution.

It is important to note that the global distribution pattern of languages can be linked to the events characteristic of the Age of Exploration, which aided the diffusion of languages to different locations through the migration of the speakers of these languages. The diversity of languages, especially referring to a specific region, leads to challenges associated with the different needs of different language groups. In this case effective communication needs to accommodate as many of the languages as possible.

4.4.2 The origin and dominance or fall of languages

All of the main languages spoken in the world originated in different locations. Since their original establishment many of these languages have spread across the world, while some underwent significant change and either became increasingly dominant or declined in importance.

Read the sections Origin and Diffusion of Languages and Dominant and Endangered Languages (Section B: pages 170–173). While reading these sections focus your attention on the following aspects:

- the reasons for the diffusion (spread) of languages, and
- the reasons for the development of different dialects.

Note that the history of the development of languages and the current spatial distribution of languages has important implications in the context of several global issues that we are currently experiencing. Cultural differences (which often present challenges) are usually associated with different language families which had their origin long ago. An example of this issue relates to language diversity which has a significant influence on South Africa’s cultural make-up and political environment.
DISTRIBUTION OF LANGUAGES AND CULTURES

Instructions

• Use the following link to watch the video “If the world were a village of 100 people” (3:11 minutes)
  https://www.youtube.com/watch?v=FtYjUv2x65g (Master Communications, 2010).

Purpose of the video

◦ It represents how cultures and languages are distributed around the world. It also helps link the previous study unit of population with a language and cultural context.
◦ Did you notice the link between the various elements of culture from the introductory video for this learning unit in this video?

4.4.3 The spatial distribution pattern of religions

Similar to languages, the cultural mosaic of the world is also influenced by religions. From experience you might agree that religious differences present greater challenges to manage than language differences and therefore contribute significantly to the cultural richness of the world and even to the global political geography. One of the reasons for this, which you constantly need to keep in mind, is the different ways through which religions may influence the use of space.

Read the sections Distribution of Religions (Section B: pages 178–179) and Religious Conflicts in the Middle East (Section B: pages 190–191) in the prescribed textbook. While doing so, you might find it useful to focus your attention on the following aspects:

• the large number of religious divisions,
• the spatial distribution pattern of the major religions,
• the difference between universalising and ethnic religions,
• the diversity/dominance of religions on some continents,
• the correlation between religious distributions and national (political) boundaries, and
• the regions with a higher incidence of religious conflict.

Although modern societies have an increasingly cosmopolitan religious composition, the attachment to places of religious importance and the use of space in terms of religious requirements remain issues of contention. In addition to historical religious conflicts, recent examples include conflicts of a religious origin in certain regions of Africa and several incidents in and outside the Middle East which are fuelled by tensions between religions and certain belief systems, for instance the role of the movement Islamic State of Iraq and al-Sham (ISIS). This also relates to the theme of conflict and terrorism, which will be dealt with later on in this learning unit.

ACTIVITY 4.1: DISTRIBUTION OF LANGUAGES AND RELIGIONS

Instructions

• Consult Section B in your prescribed textbook, pages 168 to 169 and Figure 7.2.1.
• Consult Section B of your prescribed textbook, pages 178 to 170 and Figure 7.7.1.
• Go to the Discussions tool on your e-tutor website.
• Go to the Forum for Learning Unit 4: Specific Questions and Discussions.
• Open the discussion topic, Activity 4.1: Distribution of languages and religions.
• Provide your answers on the activities detailed below.

Purpose of the task
To establish the spatial relationship between language and religion.

Tasks
(1) Figure 7.2.1 depicts the spatial distribution of languages in the world. Compare the language families of Dravidian, Japanese and Korean, and identify which of these three language families has the smallest number of language speakers.
(2) Speculate on the reason why this language family (the smallest number of language speakers identified in 1) is spoken less when compared to the English and Arabic language families.
(3) Compare figures 7.2.1 and 7.7.1 and explain the spatial relationship between language and religion distribution.
(4) Compare figures 7.2.1 and 7.7.1 and speculate on the relationship between the history and origin of languages in South America with the types of religions practised in South America.

4.4.4 The geography and diffusion of religions
At this stage it should be evident to you that the global cultural mosaic is significantly shaped by language and religion. In addition to the main religious divisions, there are further divisions (in the form of branches, denominations and sects) that differentiate cultural groups from one another. When studying the diffusion of religions through the world, you will note that it is also closely related to the history of modern exploration (which is similar to what has been observed for the diffusion of languages).

Read the sections Geographic Branches of Religions (Section B: pages 180–181) and Diffusion of Universalising Religions (Section B: pages 184–185). Note the following while reading through these two sections:
• the three largest universalising religions and their places of origin,
• the branches of these universalising religions, and
• the impact of the diffusion of universalising religions on the global spatial distribution pattern of religions.

Universalising religions typically pay honour to their founders, to holy places related to their founders and to structures used as an expression of their religious principles. Associated with the diffusion of these religions through the world, their associated structures and characteristic utilisation of space are now found in many parts of the world. However, the most well-known holy places of the universalising religions are place-based, for instance the holy city of Mecca for Muslims and the Sikh holy place of Darbar Sahib at Amritsar in India. In South Africa, the utilisation of spaces in urban areas frequently accommodates diverse religions, with mosques (for the Muslim religion) and Christian churches that may be found in relative close proximity.
### THE DIFFUSION OF RELIGIONS

**Instructions**
- Use the following link to watch a video about the diffusion of religions where the animated map shows how religion spread around the world (2:35 minutes): https://www.youtube.com/watch?v=AvFl6UBZLvu4 (Business Insider, 2015)

**Purpose of video**
- This video showcases the diffusion of religions throughout the world. Take note of how certain religions spread faster than others, and also how some religions remain confined to one area while others have spread across the world. Furthermore, note the influence of the Age of Exploration as well as colonialism in aiding the diffusion of certain religions.

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### 4.4.5 Ethnic religions and the landscape

The global cultural mosaic is further diversified by ethnic religions. Ethnic religions are different from universalising religions mainly because they are linked to specific groups of people and because they are characterised by strong links with the physical environment of particular places.

Read the section **Ethnic religions and the Landscape (Section B: pages 188–189)** and pay particular attention to:
- defining ethnic religions and examples of such religions,
- the spatial distribution pattern of ethnic religions in the world,
- the typical confined nature of ethnic religions, and
- the grounding of ethnic religions in the physical environment/landscape.

Ethnic religions may be considered as prime examples of the unique relationship that can exist between humans and the environment. They also remind us that not all cultural features occur according to neatly organised patterns, but are also found in geographically limited areas.

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### ACTIVITY 4.2: UNIVERSALISING AND ETHNIC RELIGIONS

**Instructions**
- Consult Section B in your prescribed textbook, pages 178 to 188.
- Go to the Discussions tool on your e-tutor website.
- Go to the Forum for Learning Unit 4: Specific Questions and Discussions.
- Open the discussion topic, Activity 4.2: Universalising and ethnic religions.
- Provide your answers on the activities detailed below.

**Purpose of the task**
Distinguish between universalising and ethnic religions.

**Tasks**
1. Compile a table where you compare the universalising and ethnic religions. The headings in your table must include the following: differences between
4.4.6  A world of states and state space

Countries or states may rigorously be defined as territories in the world that are independently managed by established governments representing their respective resident populations in a variety of local and global affairs. In this way every piece of land on Earth actually “belongs” to some individuals or to some group or to a government, having control over the activities that take place in their space or areas of jurisdiction.

Read the sections A World of States, State Space and Non-state Spaces (Section B: pages 196–201) with specific reference to the following aspects:

• the difference between state and non-state spaces,
• how the world is politically organised,
• the number of sovereign states in the world,
• reach of a state’s territory and implications thereof,
• the distribution, ownership and governance of non-state spaces,
• the effect of the physical shape of a state on governance and administration, and
• the implications of claiming space by states.

Associated with the claiming of space, states frequently control areas occupied by cultural groups or political movements that are campaigning for a separate state for them. This can eventually lead to the formation of new states, although this is not necessarily the case, often resulting in conflict. Some examples in this regard are mentioned in Section B: pages 196–197 in the prescribed textbook. In addition to culture and politics, states also influence movement (people and resources), the utilisation of resources and the general “peacefulness” of the world. One of the most unique implications of the world divided by states is that some territories are landlocked which can complicate movements and developments if relations with neighbouring territories are not good.

4.4.7  Boundaries and internal state organisation

Since the world is divided into states/territories, the boundaries (referred to as borders) between these entities can be regarded as a crucial element of the political organisational system. In addition, states/territories require a government and associated governance structures, both at national and local level, to act as a steering mechanism for their respective societies, to regulate relationships between internal members of a society as well as between society and outsiders, and to make decisions for and on behalf of a society to achieve goals and to maintain order.

Read the sections Boundaries and Governing States (Section B: pages 202–205) in the prescribed textbook, with specific attention to the following aspects:

• the two main types of boundaries between states and examples of each type,
• the practical implications (pros versus cons) associated with each type of boundary,
• the difficulties related to the creation of boundaries,
• the main types of government structures (referred to as regimes) in the world,
• where these different types of regimes occur and examples of each, and
• trends in how regimes change.
Although all boundaries are equally significant, their initial determination, establishment and eventual acceptance may involve a long, difficult and often controversial process. The ideal is that boundaries need to be practical and efficient in all types of environments (dry and sparsely populated areas and dense urban settlements). The reality, however, is that this is frequently not achieved. The diversity of regime types to choose from and the internal organisation of states present an even more complex issue. Regime types are related to, among other things, power relationships, cultural practices and belief systems, and may have far-reaching (even global) implications; while internal organisation simplifies management and empowers different societies with more direct local influences.

ACTIVITY 4.3: STATE SHAPES, BOUNDARIES AND TERRITORIES

Instructions
- Consult Section B in your prescribed textbook, pages 198 to 199, 202 to 203, 214-215, page 150 (Figure 6.5.1).
- Go to the Discussions tool on your e-tutor website.
- Go to the Forum for Learning Unit 4: Specific Questions and Discussions.
- Open the discussion topic, Activity 4.3: State shapes, boundaries and territories.
- Provide your answers on the activities detailed below.

Purpose of the task
To sharpen your map-reading skills and to understand how the various shapes and different borders/boundaries and territories each have their unique pros and cons. Here you will learn that different implications arising from this for each country.

Tasks
1. Select five countries in Africa, each with a totally different state shape.
2. Provide a brief description for each shape and discuss a political advantage and challenge for each shape.
3. Explain why desert boundaries are normally effective political boundaries.
4. Provide an example of an ethnic boundary in the world. Briefly describe how the boundary in your selected example was formed.
6. Figure 6.5.1 on page 150 in your prescribed textbook provides a graphic representation of significant refugee flows in 2008. Given your explanation on the conflict and genocide in the Sudan (question 5), speculate on the origin and destination of refugees in the Sudan and surrounding states.

4.4.8 Conflict and terrorism

Conflict between cultural groups and different nations is not something new, but has occurred since ancient times and still continues today. Many conflicts are in some way related to religious disagreements (mentioned earlier in this learning unit) but can also be the result of clashes related to ethnicity and nationality.
VIEWING: CONFLICT IN AFRICA

Instructions
- Use the following link to watch the video “Decoding African conflict trends” (3:57 minutes) https://www.youtube.com/watch?v=HjgD4GgKF2k (ISSAfricaTV, 2014).

Purpose of video
- Explains recent conflict trends in Africa and the various reasons for conflict from poverty, regimes, inequality and terrorism. Points out conflict from neighbouring countries because of a lack of border control.
- Discusses contemporary African conflicts and introduces conflict of resources and concludes with positive suggestions for the future of Africa.

Read the sections Conflicts in Western Asia, Ethnic Cleansing in the Balkans, Conflict and Genocide in Africa and Terrorism (Section B: pages 210–217). While reading through these case studies on conflict and terrorism, take brief notes on the following aspects:
- the complex spatial distribution of ethnic groups in regions riddled with conflict,
- reasons for and consequences (geographic impact) of ethnic cleansing and genocide,
- the difference between conflict and terrorism, and
- modern trends associated with terrorism.

All forms of conflict have specific geographic implications, especially in terms of demographic change and population movement, and have had a lasting impact on affected regions. For example, conflict in Sudan could only be resolved upon the creation of a separate sovereign entity “South Sudan” in 2011. Terrorism, however, is a more modern occurrence and has a global reach but with a smaller initial geographic impact (as the attacks in the USA on September 11, 2001). What influence do you think globalisation has had on the spread of terrorism? Is it just coincidence that countries that are hit by terrorism are in many respects more globalised than other countries?

4.5 CAPSTONE ACTIVITY

ACTIVITY 4.4: CULTURAL MOSAIC

Instructions
- Go to the Discussions tool on your e-tutor website.
- Go to the Forum for Learning Unit 4: Specific Questions and Discussions.
- Open the discussion topic: Activity 4.4: Cultural Mosaic.
- Provide your opinion and answers on the task outlined for this activity.

Purpose of activity
After participating in this activity you will see that everyone has their own opinion and that there is cultural diversity even within this course that you are
You will also understand that cultural diversity leads to certain implications but also that there are means of ensuring a peaceful coexistence within a cultural mosaic.

Task

In the introduction to this learning unit you viewed a video that described the elements that define culture. In summary these elements are symbols, language, values and norms. With the four different elements in mind, your task is to answer the following questions:

- What is a cultural mosaic and how are you a part of it?
- What are the implications of a cultural mosaic?
- In your lifeworld you see symbols every day that reflect both your culture and the culture of other members in your community. Share at least four of such symbols on the discussion forum with a brief explanation of your understanding of the meaning of the symbol.
- How is ethnicity and nationality related to the cultural mosaic?
- Explain the relationship between the cultural mosaic and political conflict in the world today.
- What are your suggestions on how to keep a peaceful coexistence in a cultural mosaic?

4.6 TEST YOURSELF

The following multiple-choice questions are intended to test your knowledge of the basic concepts discussed in this learning unit. You can use these questions as a self-assessment exercise to test your own knowledge of the learning unit. This exercise is not marked and will not contribute to your semester or year mark. The feedback on these questions will be provided on myUnisa when the learning unit is completed according to the schedule provided in Tutorial Letter 101. You should try to complete these questions before this date in order to assess yourself and gain the most from the learning experience.

1. Which language family is the most dominant (in terms of spatial extent of the areas in which it is spoken) in the world?
   (1) Indo-European
   (2) Niger-Congo
   (3) Nilo-Saharan
   (4) Austronesian

2. ... is one of the ... countries on the African continent that is considered as landlocked.
   (1) Malawi; 16
   (2) Mali; 10
   (3) South Africa; 16
   (4) Togo; 10

3. ... is one of the ... countries that shares its border with Nepal.
   (1) Bangladesh; 2
   (2) China; 4
   (3) Australia; 4
   (4) India; 2
4. Which **one** of the following language families is found in South Asia?
   (1) Sino-Tibetan
   (2) Afro-Asiatic
   (3) Altaic
   (4) Nilo-Saharan

5. In which **one** of the following ways does English in the United States differ from English in the United Kingdom?
   (1) pronunciation and spelling
   (2) spelling
   (3) vocabulary, pronunciation and spelling
   (4) vocabulary and spelling

6. The predominant religion of South America is …
   (1) Eastern Orthodoxy.
   (2) Roman Catholic.
   (3) Protestantism.
   (4) Animist.

7. Which **one** of the following statements is **false**?
   (1) Gambia has an elongated shape.
   (2) Zambia is a landlocked state.
   (3) Kenya is a compact state.
   (4) Lesotho is a perforated state.

8. Which **one** of the following alternatives does **not** present a possible physical boundary of a state?
   (1) a desert
   (2) a river
   (3) a border fence and border post
   (4) a mountain range

9. Which **one** of the following statements is **true**?
   (1) Darfur, the westernmost region of Sudan, has been devastated by a genocide involving the killing of 480,000 black farmers.
   (2) The conflict in Sudan ended with the establishment of the independent state of South Sudan in 1962.
   (3) The conflict in Rwanda involved Hutus who were herders and Tutsis who were farmers growing crops in the fertile hills and valleys of Rwanda and Burundi.
   (4) Genocide in sub-Saharan Africa has occurred in Sudan and Egypt.

10. How many countries on the African continent have become members of the United Nations from 1980 onwards?
    (1) 9
    (2) 4
    (3) 7
    (4) 1
4.7 CONCLUSION

After working through the study material on the world’s cultural mosaic for this learning unit and having done the related activities, you should now be able to write a summary in your own words of the major topics that we have covered. This summary will also be useful during your examination preparation. Your summary should be guided by the learning outcomes that were provided at the beginning of this learning unit.

The focus of this learning unit has been the global cultural mosaic. We introduced you to the cultural diversity that we experience in the modern world and the implications (positive and negative) that cultural diversity holds for governments. Your knowledge of the distribution of languages and religions, cultural differentiation, boundaries, territories and conflict should help you to understand how the world works and how to interpret cultural diversity from a geographic perspective. Ultimately people shape their environment to suit their desired lifestyles but because we all have individual desires, challenges easily develop. In this learning unit we showcased these challenges in the form of governance issues as well as conflict and terrorism. You should understand that culture, although it is not tangible, still has a very specific spatial (geographic) impact and it is your geographic knowledge that will help you interpret the cultural mosaic of the world.

4.8 REFERENCES

Elements of culture: https://www.youtube.com/watch?v=jt2tikGSu98 (Desoriente0, 2014) (7:15 minutes)

World a village: https://www.youtube.com/watch?v=FiYjUv2x65g (Master Communications, 2010) (3:11 minutes)


Decoding African conflict trends: https://www.youtube.com/watch?v=HjgD4GgKF2k (ISSAfricaTV, 2014) (3:58 minutes)
This learning unit will focus on aspects related to making and earning a living. But before we begin with the concepts surrounding this topic, take a moment to watch the following video entitled “If the world were 100 people”: https://www.youtube.com/watch?v=QFrqTFRy-LU (3:50 minutes). This video will introduce you to some of the global development disparities that exist in our world. You should also take note of the global distribution of wealth. This video demonstrates that if the world were a village of 100 people, then one person in our global village would control 50% of the entire world’s wealth. What would this mean for the rest of us? What could we do to try to minimise the gap that exists between rich and poor?

Before we can even begin to answer these questions, we first need to understand what development really means, what the relative spatial distribution of developed and developing countries are, as well as the characteristics of the primary, secondary and tertiary economic sectors in different parts of the world. Making a living is more than just staying alive but also relates to improving one’s standard of living. A person generally has a choice of making their living from the primary, secondary or tertiary economic sectors. However, this choice is more often than not determined by a person’s social capital (language, culture, education, networks, etc.) and the economic approach and level of development of the country where the person is staying. Throughout the learning unit it is important to keep the content of the previous learning units in mind because aspects such as climate and other physical environmental features, population distribution and dynamics as well as culture all have a significant bearing on the level of development in a country.
5.2 AIM AND LEARNING OUTCOMES

The aim of this learning unit is to introduce you to the myriad factors that determine the level of development in a country, the effect that this has on the global distribution of wealth and development and ultimately the prospects provided by these aspects for making a living.

Outcomes

- describe and explain global development disparities,
- discuss the indicators used to compare the level of development of countries,
- identify and explain global disparities between developed and developing countries in terms of their standards of living, access to knowledge, health and well-being and gender equality,
- explain and discuss the strategies that developing countries can employ in order to improve their level of development,
- explain the key characteristics and trends of global food production,
- discuss how farmers could improve the sustainability of their activities,
- describe the global spatial distribution of economic activities,
- provide a geographic perspective on the location of industries and businesses,
- discuss the relative importance of rural and urban areas,
- explain the relative impact and importance that the primary, secondary and tertiary economic sectors have on a region's level of development.

Once you have completed this learning unit, you can use these outcomes to assess your understanding of the learning unit content on making and earning a living. However, if you are still unsure about anything, we suggest that you spend a bit more time on the problematic areas that you have identified.

5.3 PRESCRIBED MATERIAL

Study the following pages in your prescribed textbook:

- Food and Agriculture: Section B, Chapter 10: pages 244 to 271.
- Industry: Section B, Chapter 11: pages 272 to 293.
- Services and Settlements: Section B, Chapter 12: pages 294 to 317.

At the end of each of these four chapters in the prescribed text book, there is a list of key terms that you need to study. Make sure that you understand the various terms and are able to explain them in your own words. A proper understanding of these terms will make it easier for you to master the learning unit.

5.4 FINDING YOUR WAY THROUGH THE STUDY MATERIAL

This learning unit is based on four chapters in the prescribed textbook and is one of the larger learning units for this module. However, in order to assist you through this unit, some sections within the prescribed chapters are compulsory reading while others are additional reading. Please note that the additional reading sections will NOT be examined. These different sections will be identified to you as you progress through the learning unit. The sections that have been excluded from the examination provide additional background information and will provide insight into the learning unit. We therefore recommend that you do not skip them.
5.4.1 Global development trends

From the introductory video, you will have noticed that not all countries share the same level of wealth and development. A general distinction is made between developed and developing countries, but what is it that defines a country as developed or developing, and what are the major challenges to development? The causes of uneven development can be related to the spatial distribution of resources, historic events (such as conflict and colonialism) and current socio-cultural, political, economic and environmental situations and/or interactions. The causes and consequences of uneven development are too broad to consider here in totality and therefore we will only elaborate on a few key aspects related to development.

Measuring and comparing levels of development

The most common way to measure and compare levels of development is through the Human Development Index (HDI), which is influenced by the standard of living, levels of education and levels of healthcare in a country.

Read the compulsory reading sections Human Development Index, Standard of Living and Access to Knowledge, Health Indicators, Gender-Related Development (Section B: pages 222–231). Take note of the following aspects when working through these sections:

- the distinctions that exist between developed and developing countries,
- the Human Development Index (HDI) and the Inequality-adjusted Human Development Index (IHDI),
- the factors considered and used for measuring development,
- the spatial distribution of developed and developing countries, and
- the income, economic structure, productivity, and education characteristics that differentiate between a developed country and a developing country,
- the continuing strong relationship between countries with good healthcare and their higher level of development compared to countries with poorer healthcare,
- the spatial distribution pattern of gender inequality in development, and
- the relationship between the level of gender inequality in development and the state/level of development in a country.

It is important to note that HDI was developed in order to take the focus off economic growth as the sole factor associated with human development. HDI helps us realise that while economic growth is important to enhance a country’s level of development, it is not the only factor that affects development. For example, Saudi Arabia is a very wealthy nation, however, its HDI score is less than that of its equally rich peer nations. Thus, factors such as human, physical and educational wellbeing all play a role in a country’s HDI score.

### HUMAN DEVELOPMENT INDEX

**Instructions**

- Use the links below to watch two videos related to the Human Development Index:
  - Video1: http://www.investopedia.com/video/play/human-development-index-hdi/ (1:27 min)
Video 2:
https://www.youtube.com/watch?v=HwqZQ1DgG3 (2:40 min)

Purpose of videos

- Video 1 explains what is measured by the HDI and illustrates some of the drawbacks associated with using HDI. For example, it notes some variables that are not considered by HDI.

- Video 2 explains the relationship between sustainability and the Human Development Index. It also takes note of the fact that HDI tries to relate to a qualitative, dignified life by taking the focus off economic growth and focusing instead on human, physical and educational wellbeing. Also take note of the idea of sustainable human development.

Now that we have discussed the concept and use of the HDI, let us unpack this concepts a bit more with an activity.

**ACTIVITY 5.1: THE HUMAN DEVELOPMENT INDEX**

**Instructions**

- Go to the **Discussions** tool on your e-tutor website.
- Go to the **Forum** for Learning Unit 5: Specific Questions and Discussions.
- Open the discussion topic: Activity 5.1: The Human Development Index.
- Provide your answers on the activity detailed below.

**Purpose**

To understand the global development disparities that exist and the impact of these in developed and developing countries.

**Task instructions**

For this task, you will need to compare the identified maps in Section B, page 222 in your prescribed textbook, with the map of the nine world regions (Figure 9.1.3) on page 223. You may also want to refer to the world states map (Figure1-8: Political Map of the World) in Section A, page 40.

**Task**

1. Refer to Figure 9.1.1: Map of global HDI levels. Identify the country with the highest HDI level in the East Asian region.
2. Refer to Figure 9.1.2: Map of global inequality-adjusted HDI. Identify two countries with the lowest IHDI level in the Latin American region.
3. Using the three countries that you have identified in questions 1 and 2 above, briefly highlight these countries’ literacy rates, expenditure on healthcare and gender inequality levels.
4. Consult Figure 9.2.1: GNI per capita (page 224) for the two previously identified countries. What conclusions can you draw about a country’s level of income or wealth and its relationship to the HDI? Explain your answer with reference to the criteria you used in question 3 above.
Development paths and world trade

In the introduction to this learning we mentioned that history has a significant bearing on a country’s current state of development. Apart from historic influences it is also important to consider the development path chosen by a country and the ability to trade with other countries. Both these aspects have a significant impact on the development trends in the country.

Read the compulsory readings sections Two Paths of Development, World Trade, Financing Development and Fair Trade (Section B: pages 232–239) and take note of the following:

- the characteristics and shortcomings of development through self-sufficiency (with examples),
- the characteristics and shortcomings of development through international trade (with examples),
- the role of the World Trade Organisation (WTO) in promoting trade,
- the geographic distribution and impact of foreign direct investment and transnational corporations,
- the spatial distribution of countries providing aid and those receiving aid,
- the key principles of fair trade.

It is important to understand that either of the two most common development paths can lead to progressive development. Both approaches mentioned in the textbook have advantages and disadvantages, but ultimately it boils down to the contextual application of the choice being made to ensure success.

Millennium development goals

Progressive development (specifically in reducing the gap between the “rich” and the “poor”) can only be achieved through collaborative efforts from all parties that are involved, regardless of whether it is on a local or a global scale. Subsequently the United Nations (UN) have proposed eight Millennium Development Goals (MDGs) that are intended to reduce the gap between developed and developing countries.

Read the compulsory readings section: Millennium Development Goals (Section B: pages 240–241), and focus your attention on the following:

- the reasons for the establishment of the millennium development goals, and
- the eight millennium development goals proposed by the United Nations.

Enormous progress has been made on the MDGs, showing the value of a unifying agenda underpinned by goals and targets. Despite this success, the indignity of poverty has not been ended for all. The new Sustainable Development Goals (SDGs) have been developed to replace the MDGs. The SDGs, also known as Global Goals, are aimed at an array of issues that include slashing poverty, hunger, disease, gender inequality, and access to water and sanitation. The SDGs seek to further the sustainability agenda and go much further than the MDGs to address the root causes of poverty and the universal need for development that is beneficial for all people.
SUSTAINABLE DEVELOPMENT GOALS

Instructions

- Use the links below to watch two videos related to the Human Development Index:
  - Video 1: https://youtube.com/watch?v=5_hLuEui6ww&feature=youtu.be (3:02 min)
  - Video 2: https://www.youtube.com/watch?v=5G0ndS3uRdo&feature-youtu.be (1:00 min)

Purpose of videos

- Video 1 discusses the current progress that has been made on the MDGs as well as the need for (or reasons behind) the development of the SDGs.
- Video 2 briefly introduces you to the SDGs proposed by the UN, their global relevance, and the support required to achieve these goals. Please note of the SDG’s potential to have far-reaching impacts on societies due to the fact that they incorporate numerous aspects of development and sustainability.

5.4.2 Food and agriculture

People need food to survive. Growing population numbers mean that the earth must be able to feed and sustain over 7 billion people. The challenge lies in producing and distributing enough food to feed the global population. This challenge is faced by every country’s agricultural sector. No matter how well developed a country may be, it will still be dependent on its agricultural sector (or on that of another country’s) in order to provide its citizens with enough food to ensure progressive development. This section of Learning Unit 5 introduces the importance of the agricultural sector and the characteristics and challenges related to global food production.

Origin and importance of agriculture

The Agricultural Revolution signified an important shift in human civilisation as it enabled people, for the first time in history, to step away from their nomadic existence, settle down in suitable locations and focus on producing enough food to support settlements. It is also evident that different locations lend themselves to different agricultural possibilities. This is due to the role of climate, combined with the influence of culture. These aspects diversify the requirements and preferences for food production around the world. We should also note here that continuous population growth, uneven global development and (more recently) climate change have meant that some regions in the world do not have sufficient nutrition to support an acceptable standard of living for the population.

Read the compulsory readings sections Origin of Agriculture, Diet, Food Preferences and Nutrition and Hunger (Section B: pages 246–253) and concentrate on the following aspects:

- the development from hunter gatherer to agricultural societies,
- the environmental and cultural factors promoting the development of agriculture,
The aspects that influence diets around the world,
the spatial pattern associated with the distribution of leading sources of food around the world,
social and environmental influences on food preferences,
the definition of food security,
the spatial association between dietary energy consumption and income spent on food,
the relationship between food production and population growth in Africa.

The global distribution pattern of undernourishment indicates that Africa, South America and parts of Asia are affected to a large extent by the impact of food shortages. It is important to note that in countries where undernourishment is a concern, it is evident that people spend a very high percentage of their income on the little food that they do consume. When these two dynamics are coupled with underdevelopment and generally high levels of poverty, it severely aggravates the challenge for governments to reduce hunger.

Agriculture regions and types of agriculture

There are two main types of agriculture, namely, subsistence agriculture and commercial agriculture. There are key differences between these two methods for producing food, including the infrastructure, investment, skill levels and labour requirements. Due to the importance of this sector, the success of a country’s agriculture also has a direct bearing on the level of development of a country.

Read the sections Agricultural Regions, Comparing Subsistence and Commercial Agriculture, Subsistence Agriculture Regions, Commercial Agriculture Regions, as well as Fishing (Section B: pages 254–263). While studying these sections, please take note of the following aspects:

• the spatial distribution of subsistence agriculture compared to the spatial distribution of commercial agriculture,
• the spatial association between commercial agriculture and developed countries,
• the spatial association between subsistence agriculture and developing countries,
• the principal characteristics of and differences between commercial agriculture and subsistence agriculture, and
• the differences in fish consumption between developed and developing countries and the risks of overfishing.

ACTIVITY 5.2: AGRICULTURAL PRACTICES IN SOUTH AFRICA

Instructions

• Go to the Discussions tool on your e-tutor website.
• Go to the Forum for Learning Unit 5: Specific Questions and Discussions.
• Open the discussion topic: Activity 5.2: agricultural practices in South Africa.
• Provide your answers on the activity detailed below.

Purpose

To understand the role that agriculture plays in the level of development of a country.

Task

(1) Refer to Figure 10.8.1: Maize Production; Figure 10.8.3: Milk Production; Figure 10.8.5: Wheat Production; Figure 10.8.6: Meat Production; and Figure 10.9.1: Fish Production (Section B: Pages: 260, 261 and 262 respectively).
(2) Based on these figures, would you classify South Africa as a primarily commercial or primarily subsistence agricultural region?

(3) Now refer to Figure 10.6.1: Labour Forced Engaged in Agriculture (Section B: Page: 256). What conclusions can we draw about the level of development of South Africa? Hint: Consider the number of people engaged in agricultural practices in South Africa as compared to the majority of sub-Saharan Africa.

Agriculture and sustainable development
The concept of sustainable agriculture has risen in popularity recently. The reasons for this is that sustainable agriculture practices preserve important natural resources (like water and soil). In this way crop yield is more likely to remain reliable and sufficient, with a sustainable supply of food that can be provided to the population.

Read the sections Subsistence Agriculture and Population Growth (Section B: pages 264–265) and Sustainable Agriculture (Section B: pages 268–269), and take note of the following:

• the four strategies by which developing countries can increase their food supply, and
• the three main strategies used to improve sustainable agriculture.

As you are aware by now, the Earth has a limited amount of arable land and it is not possible to increase this as the population increases. The balance between population numbers and arable land is further complicated by the fact that people are inclined to settle close to arable land and thus also use the land as a living space. Sustainable agricultural practices serve as a solution to this problem. Remember that sustainable agricultural practices extend well beyond simply using as little as possible resources.

The section on Commercial Agriculture and Market Forces is one of the additional readings sections and therefore will not be examined but is simply there for your information.

5.4.3 Industry
The industrial sector took off after the Industrial Revolution and propelled numerous countries into a higher level of development. This section of Learning Unit 5 focuses on the characteristics and distribution of industry around the world.

The Industrial Revolution and the spatial distribution of industry
Aside from the Agricultural Revolution, the Industrial Revolution has been one of the most important events in human history. As with the Agricultural Revolution, the Industrial Revolution significantly and permanently altered human history and the environment.

Read the compulsory readings sections The Industrial Revolution and Distribution of Industry (Section B: pages 274–277), and pay attention to the following:

• the events that lead to the Industrial Revolution,
• the geographic impact of the Industrial Revolution, and
• the spatial association between industrial areas and favourable physical environments.
From the required reading sections you should note that industrial development, resource availability (especially water and in many cases also coal and iron) and the general level of development in a region all correspond positively with each other. These aspects signify the core causes and consequences of a successful industrial sector. The challenge for developing countries, despite many of them having the same amount of natural resources as developed countries, is to combine these resources with human capital to uplift their state of development. This has become increasingly possible in many parts of the world.

Choosing locations for industry

The location of an industry is a very important factor that can affect the success of the industry. Depending on the type of industry, it may be very important to be located near natural resources, supporting industries and markets. This subsection introduces the various considerations, in terms of the situation and the site, that need to be taken into account when locating an industry.

Read the compulsory readings sections Situation Factors in Locating Industry (Section B: pages 278–279), Ship by Boat, Rail, Truck or Air (Section B: pages 284–285) and Site Factors in Industry (Section B: pages 286–287). While studying these sections, take note of the following:

- the favourable situational characteristics required to locate an industry,
- the spatial association between the availability (and concentrations) of transport routes and the spatial distribution of industrial regions and developed countries, and
- the favourable site characteristics required to locate an industry.

When reviewing the favourable characteristics for the location of an industry, it should be noted that globalisation has made it possible to combine the characteristics of numerous sites to produce a single product (consider the example of the production of an iPhone). Subsequently, an industry which is able to harness the potential of more than one site is more likely to be successful than other industries.

ACTIVITY 5.3: CHOOSING AN INDUSTRIAL LOCATION

Instructions

- Go to the Discussions tool on your e-tutor website.
- Go to the Forum for Learning Unit 5: Specific Questions and Discussions.
- Open the discussion topic: Activity 5.3: Choosing an Industrial Location.
- Provide your opinion on the activity outlined below.

Purpose

To consider and understand the factors that go into selecting an appropriate destination for an industry.

Task

Consider the following scenario:

A major, multi-national car manufacturing corporation has hired you to identify a location for their new factory in sub-Saharan Africa. Based on the situational and site factors associated with choosing a new location for an industry, which sub-
Saharan country would you recommend your car company choose for their new factory? Give two reasons for your choice.

Industry and its location is changing in the 21st century as more and more countries start to catch up with the progress made by developed countries. You may read about this in the additional readings sections of Changing Steel Production and Changing Auto Production (Section B: pages 280–283). You may also read about Textile and Apparel Production and Emerging Industrial Regions (Section B: pages 288–291). In this section, take note of the regions, especially Mexico and the BRIC(S) countries that are making significant progress in terms of industrial development. Also note that each section mentioned here falls within the additional readings sections and will not be examined.

5.4.4 Services and settlements

At this stage of the learning unit we have dealt with two economic sectors, namely the primary sector (agriculture) and the secondary sector (industry). The last section of the learning unit introduces the tertiary sector, which is focused on providing services. The service sector symbolises the next level of development where countries that have excelled in agriculture and industry have accumulated enough financial and intellectual capital and resources to focus on tertiary services while other countries take over their former production functions in an attempt to follow the same progressive development path. This does not mean that developed countries do not have primary and secondary economic sectors, but it does mean that developed countries employ more people in the tertiary sector because of their well-established primary and secondary sectors.

Services in urban areas

Services are predominantly located in urban areas where they are close to consumers and where infrastructural networks (telecommunication and transport) extend the reach of the services beyond conventional boundaries.

Read the compulsory readings sections Types of Services, Central Place Theory and Hierarchy of Consumer Services (Section B: pages 296–301) and pay specific attention to the following aspects:

- the key characteristics of the three types of services,
- the relationship between the state of development of a country and its income from services,
- how the market area, range and threshold of a service determines the most efficient location for that service (central place theory),
- how the hierarchy of services can shape the global business landscape,
- the relationship that exists between the global importance of a city and the layout of the infrastructure such as transport,
- how different ranks of cities interact with each other to create a network of services that support the whole population.

As additional readings you may read Market Area Analysis (Section B: pages 302–303), Business Services in Developing Countries and Economic Bases (Section B: pages 306–309). Remember that these sections will not be examined but are simply there to enhance your learning experience.
Rural-urban interaction

Rural and urban settlements play an important role in the functioning of modern society, even though the function of both types of settlements has changed considerably over the years. The pattern of rural settlements is distinctly different from the pattern of urban settlements. It is important to understand that each settlement fulfils distinct functions in modern societies. This final subsection of this learning unit focuses on the role that rural and urban areas play in development.

Read the sections Rural Settlements, Settlements in History and Urbanisation (Section B: pages 310–315) and pay specific attention to the following:

- the functions of rural settlements,
- the spatial patterns of rural settlements,
- trends in urbanisation, especially differences among developed and developing countries, and
- the spatial distribution of large urban settlements.

You should note that there is a clear relationship between the number of people living in urban settlements and a country’s level of development. This relationship is especially evident when comparing urban populations and the state of development in countries in North America and Europe to urban populations and the state of development in countries in Africa, for example.

**IVORY COAST’S GOLD RUSH**

**Instructions**

- Use the link below to watch the video: Inside Ivory Coast’s Gold Rush: https://www.youtube.com/watch?v=6R6WFAvzgvE&feature=youtu.be (5:40 minutes)

**Purpose of video**

- This video briefly documents the changing landscape of earning a living in the Ivory Coast. You will note that the local people have adapted from a primarily agricultural-based lifestyle to more secondary and tertiary-based activities. Note the accompanying development of the landscape from a more rural environment to one that very quickly became more urbanised.

**CAPSTONE ACTIVITY**

As you are aware, each learning unit ends with a capstone activity. The purpose of this capstone activity is to demonstrate to you that the various concepts surrounding making and earning a living are all related.

**ACTIVITY 5.4: SUSTAINABLE AGRICULTURAL PRACTICES**

**Instructions**

- Go to the Discussions tool on your e-tutor website.
- Go to the Forum for Learning Unit 5: Specific Questions and Discussions.
- Open the discussion topic: Activity 5.4: Capstone Activity.
- Provide your opinion on the debate in the activity described below.
LEARNING UNIT 5: MAKING (AND EARNING) A LIVING

Purpose
To help you understand the relationships that exist between various concepts within this learning unit.

Task
- Identify the key criteria surrounding sustainable agricultural practices.
- Identify the key criteria of the fair trade model of development.
- Based on the criteria that you have just identified, discuss a possible relationship between sustainable agricultural practices and the fair trade model of development.

5.6 TEST YOURSELF

The following multiple-choice questions are intended to test your knowledge of the basic concepts discussed in this learning unit. You can use these questions as a self-assessment exercise to test your knowledge of the learning unit. This exercise is not marked and will not contribute to your semester or year mark. The feedback on these questions will be provided on myUnisa when the learning unit is completed according to the schedule provided in Tutorial Letter 101. You should try to complete these questions before this date in order to assess yourself and gain the most from the learning experience.

1. Which one of the following countries has the highest known inequality adjusted HDI?
   (1) Argentina
   (2) Botswana
   (3) Germany
   (4) Vietnam

2. Which one of the listed economic sectors or combinations thereof made an almost equally significant contribution to economic growth in both developed and developing countries during the late 1980s?
   (1) primary and secondary sectors
   (2) tertiary sector
   (3) secondary sector
   (4) secondary and tertiary sectors

3. Which one of the following characteristics is generally not associated with a developed country?
   (1) less than 10 expected schooling years
   (2) high literacy rate
   (3) high healthcare expenditure
   (4) high Human Development Index value

4. The reason why the populations in developed countries have a wider spectrum of food choices is because …
   (1) developed countries have favourable climates where any food source can be cultivated.
   (2) developed countries have the infrastructure to import more varieties of food than developing countries.
(3) people in developed countries do not conform to social and religious restrictions in terms of food consumption.
(4) governments of developed countries do not impact hugely on the international food trade.

5. Which **one** of the following statements on the cultivation of crops is **false**?
(1) Wheat is the principal cereal grain consumed in Europe and North America.
(2) Maize, the leading crop in the world, is grown exclusively for human consumption.
(3) Rice is the principal cereal grain consumed in East, South and Southeast Asia.
(4) Some sub-Saharan African countries depend on the production of millet, cassava, plantains and sweet potatoes.

6. ... experienced the greatest increase in their global share of steel production between 1980 and 2000, while ... experienced the greatest decrease in their global share of steel production over the same period.
(1) China; United States
(2) China; Japan
(3) United States; Russia
(4) Japan; Russia

7. Global textile and apparel production is **predominantly** located in ...
(1) Asia.
(2) North America.
(3) North Africa.
(4) Europe.

8. The maximum distance that a consumer is willing to travel for a service is known as its ...
(1) threshold.
(2) central place.
(3) range.
(4) market.

9. Which factors are used to identify a city as a world city?
(1) Cultural, political, infrastructural and economic
(2) Only political and economic
(3) Only infrastructural and economic
(4) Only cultural, infrastructural and economic

10. According to **figure 12.5.1 (Section B: page 304)**, Cape Town is classified as a ... level city.
(1) Alpha+
(2) Gamma+
(3) Beta+
(4) Alpha–
5.7 CONCLUSION

Development is a complex process due to the variety of factors that need to be considered, combined and balanced in order to promote development and also because of the risks that need to be taken into account in a competitive business environment. Throughout this learning unit the focus has been on the spatial distribution of development and the relationship between developed and developing countries. Much attention was also given to the various ways in which we can earn a living. In other words, we looked at the influence of the primary, secondary and tertiary economic sectors in development. The answers to development questions cannot be provided only in this learning unit but your geographic perspective on development issues is crucial in determining possible solutions for future development challenges.
6.1 INTRODUCTION

Throughout the module we have discussed ways of viewing the Earth from a geographic perspective, processes that shape the Earth and sustain life on Earth as well as the interactions between humans and the environment and how these influence population characteristics and distributions. However, none of these processes and activities would be possible without the precious natural resources that the Earth provides. All human activity relies on the Earth in one form or another. To this end, we will begin this learning unit with the following video entitled “Man vs Earth”: https://www.youtube.com/watch?v=VrzbRZn5Ed4&feature=youtu.be (stop at 4:00 minutes). After watching this video, you will realise that we are all connected. You, as an individual, are a global citizen. The choices you make in your immediate environment can have an impact on the global level. Therefore, we each have a role to play in the use (and often abuse) of natural resources. In this learning unit we will discuss the use and value of natural resources, the spatial distribution of natural resources and the sustainability of our reliance on natural resources.
6.2 AIM AND LEARNING OUTCOMES

The aim of this learning unit is to introduce you to the idea of resources, how they are defined, where they are situated and the impact of our continued reliance on these resources on a global level.

Outcomes

The learning outcomes for this learning unit are as follows:

- distinguish between renewable and non-renewable natural resources,
- explain the process through which natural resource are valued,
- describe the global spatial distribution of important natural resources and the consequences thereof,
- discuss how the world’s energy usage demands have changed since the Industrial Revolution,
- describe the relationship between resource use and state of development,
- explain the potential impacts of resource abuse,
- motivate the need to preserve resources for future generations,
- discuss the advantages and disadvantages of the various forms of alternative energy production used globally, and
- explain what sustainability and sustainable development implies.

Once you have completed this learning unit you can refer back to these learning outcomes. When doing so, you should make sure that you are able to respond with confidence to each outcome. If some of the learning outcomes remain difficult to grasp, we suggest that you then spend a bit more time studying the problematic sections.

6.3 PRESCRIBED MATERIAL

Study the following pages in your prescribed textbook:

- **Resources**: Section B, Chapter 14: pages 342 to 367.

At the end of this chapter in the prescribed textbook there is a list of key terms that you need to understand. Study the various terms and make sure that you understand them and are able to explain them in your own words. Your improved geography vocabulary gained from these terms will improve your understanding of the learning unit and your ability to respond in an informed way to the learning outcomes. Unlike Learning Unit 5, this learning unit consists of only one chapter. This makes the learning unit very short. Therefore all readings are compulsory.

6.4 FINDING YOUR WAY THROUGH THE STUDY MATERIAL

Our daily activities depend on an immense amount of natural resources, some of which are used directly (like air and water) while others are created from raw natural resources (like petrol and electricity). The use of natural resources seems so simple that we rarely think about it. However, there are numerous complexities that need to be resolved before a natural resource can in fact be used in our daily activities. These complexities include the value, the applications, the distribution and sustainability of natural resources. In order to make sense of these complexities, the following sections will guide you through the content of the prescribed textbook and highlight the most important aspects that you need to focus on.
6.4.1 Understanding resources and their value

Natural resources are important to all the inhabitants of Earth. However, access to natural resources varies among regions and ultimately adds different values to certain resources. The value of a resource is determined by culture, technology and the economy. Resource accessibility, competing interests and resource overuse are all factors that complicate the management of natural resources. This section focuses on the realisations and principles that should be considered in order to understand the value and use of natural resources.

Read the sections Resource Concepts and Balancing Competing Interests (Section B: pages 344–347) and focus on the following:

- the identification of a natural resource and the distinction between a renewable resource and a non-renewable resource,
- the aspects that define the use and value of a natural resource,
- multiple uses for the same resources, and
- strategies used to balance competing interests in natural resources.

Competing interests for natural resources cannot be fully understood without also understanding the value of natural resources. The value of a natural resource is very dynamic because changes in technology and the economy can easily increase or reduce the value of a specific resource. For example, the value added to wind through technology means it has become a valuable resource for electricity in many locations around the world. This in turn also adds value to land areas where sufficient wind is available for energy production.

**RENEWABLE AND NON-RENEWABLE RESOURCES**

**Instructions**

- Use the link below to watch the video: Renewable and Non-Renewable Resources: [https://www.youtube.com/watch?v=xzzybh8_Ago&feature=youtu.be](https://www.youtube.com/watch?v=xzzybh8_Ago&feature=youtu.be) (1:42 minutes)

**Purpose of video**

- This video provides definitions of renewable and non-renewable resources. Additionally, the different types (or forms) of both renewable and non-renewable resources are identified.

6.4.2 The spatial distribution of the world’s resources

The Earth provides us with a vast array of natural resources that we can use, ranging from the air that we breathe to the food we consume and the commodities we use to complete our daily activities. These resources are not distributed evenly throughout the world, which creates a need for trade and results in development differences. The focus of this subsection is on the spatial distribution of natural resources over the world. In order to highlight this spatial distribution we will focus on the use of energy, minerals, water and forest resources.

Read the section Fossil Energy, Alternative Energy, Mineral Resources and Water Resources (Section B: pages 350–357) as well as Forest Resources (Section B: pages 362–363) and take note of the following:
LEARNING UNIT 6: RESOURCES: USE AND ABUSE

- the relative location of the major oil exporting and importing countries,
- the rate at which the world is consuming non-renewable resources,
- the various options for alternative energy as well as the potential benefits and drawbacks of these alternatives,
- the spatial distribution pattern of minerals around the world,
- the variables influencing water resource availability,
- the main uses of water and the respective opportunities to re-use water,
- the spatial distribution pattern of deforestation and forest growth around the world, and
- the most important uses of forests.

From the spatial distribution pattern of natural resources you should be able to guess the reasons for the uneven global development. Global development has been dealt with in the previous learning unit but it is important to realise that natural resources provide a springboard for development, especially industrial development. The spatial distribution of natural resources also has a significant impact on our ability to extract and use natural resources. The extraction of certain natural resources, like oil and natural gas, requires skill and specific infrastructure. Given the characteristics of development and populations explained thus far in the module and the location of natural resources, it is evident that some resources become “more accessible” than others and that the redistribution of resources is often unbalanced. It also means that in future, the search for alternative forms of energy will have a significant impact on the distribution of development in the world.

ACTIVITY 6.1: FOSSIL FUELS

Instructions
- Go to the Discussions tool on your e-tutor website.
- Go to the Forum for Learning Unit 6: Specific Questions and Discussions.
- Open the discussion topic: Activity 6.1: Fossil Fuels.
- Provide your answers on the activity detailed below.

Purpose
To understand the role that external factors can play in the prices of fossil fuels.

Task
1. Study Figure 14.4.3: Oil Price History (page 351).
2. Identify two oil price increases that occurred after 1975.
3. Provide one reason why these price increases occurred.

6.4.3 Resource use and abuse

Our dependence on natural resources does not come without consequence. Extracting resources means altering the natural environment in which they occur and potentially disrupting the processes that allow natural resources to regenerate. The consequences of using natural resources for development are both positive and negative. Thus, it becomes crucial to determine whether the negative impacts outweigh the positive impacts. The following sub-section focuses on this balance, the ways in which natural resource use causes pollution, and the need, in some cases, to determine alternatives to improve sustainability.
Read the sections **Energy Use (Section B: pages 348–349)**, **Water Pollution** and **Air Pollution** (Section B: pages 358–361) and take specific note of the following:

- the most prominent energy sources and changes therein, in terms of significance,
- the demand and supply relationship for natural resources and the implications of increased demand and reduced supply,
- the main sources of water pollution,
- possible solutions to water pollution,
- the main sources of air pollution,
- possible solutions to air pollution, and
- the spatial distribution pattern of global air pollution.

The required reading sections in the prescribed textbook clearly illustrate the vulnerability of natural resources. It is vitally important that resources are used as efficiently as possible and with the least amount of negative effects on the environment (especially in terms of pollution). As a result a great deal of emphasis (also highlighted briefly in the previous learning unit) has been placed on the sustainable use of natural resources. The next sub-section will deal with the concept of sustainability.

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### FOSSIL FUELS

**Instructions**

- Use the links below to watch the following videos:
  - Video 1: Fossil Fuels 101
    https://www.youtube.com/watch?v=zaXBVYr9li0&feature=youtu.be (2:42 minutes)
  - Video 2: 300 Years of Fossil Fuels in 300 Seconds:
    https://www.youtube.com/watch?v=cJ-J91SwP8w&feature=youtu.be (5:38 minutes)

**Purpose of video**

While watching these videos take note of the following:

- These videos will provide you with the definition and types of fossil fuels. You will also be introduced to alternative forms of energy, the need for alternative energy as well as what the future looks like for a fossil fuel-based society.

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### ACTIVITY 6.2: ENERGY USE

**Instructions**

- Go to the **Discussions** tool on your e-tutor website.
- Go to the **Forum** for Learning Unit 6: Specific Questions and Discussions.
- Open the discussion topic: Activity 6.2: Energy Use.
- Provide your answers on the activity detailed below.

**Purpose**

To understand the various aspects related to the use of fossil fuels to provide energy.

**Task 1**

1. Study Figure 14.5.1: World Production of Nuclear Power (page 352).
(2) Study Figure 14.5.1 to identify the top five countries that make use of nuclear energy.
(3) Give one reason why a country might choose to use nuclear energy and one reason why they may not choose to use nuclear energy.

Task 2

(1) Identify the top four regions/countries of the world with the highest concentration of air pollution based on Figure 14.9.2 (page 360).
(2) Compare the countries that you have just identified with the information given in Figure 14.4.2 (Production and Reserves of Fossil Fuels, page 354) regarding coal reserves.
(3) What conclusions can you draw about your identified countries’ fuel source and their associated air pollution levels?

6.4.4 Sustainability

You have previously learned how resources are used and defined. You will have noticed that more often than not these resources have also been abused. As a result of this abuse and its associated impacts, people realised the need to preserve resources so that future generations may also make use of them. In this section we will look at the highly topical issue of sustainability and sustainable development.

Read the section Sustainability (Section B: pages 364–365) and take specific note of the following:

• the definition of sustainability,
• the characteristics and implications of the concept of sustainability,
• the definition of sustainable development,
• the key criteria for sustainable development.

Remember that sustainability does not merely involve using fewer resources; but it also considers the physical, social and economic context of the present and the future when determining the sustainable use of natural resources. You will encounter sustainability in more detail if you enrol for GGH1502 and the geographic perspective that you have acquired throughout this module will be invaluable for the interpretation of sustainable practices.

<table>
<thead>
<tr>
<th>SUSTAINABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Instructions</strong></td>
</tr>
<tr>
<td>• Use the links below to watch the following videos:</td>
</tr>
<tr>
<td>◦ Video 1: Sustainability easily explained</td>
</tr>
<tr>
<td><a href="https://www.youtube.com/watch?v=_5r4loXPyx8&amp;feature=youtu.be">https://www.youtube.com/watch?v=_5r4loXPyx8&amp;feature=youtu.be</a> (4:01 minutes)</td>
</tr>
<tr>
<td>◦ Video 2: Sustainable Development – An Introduction:</td>
</tr>
<tr>
<td><a href="https://www.youtube.com/watch?v=RCN6i0LZvY&amp;feature=youtu.be">https://www.youtube.com/watch?v=RCN6i0LZvY&amp;feature=youtu.be</a> (4:46 minutes)</td>
</tr>
</tbody>
</table>
Purpose of video

- These videos will highlight the origin of and need for sustainable development. Furthermore, these videos will help you define and explain the concept of sustainable development, including the three tiers of sustainable development. Finally, take note of the way in which we can integrate farming practices and development with the concept of sustainable development.

6.5 CAPSTONE ACTIVITY

As you are aware, each learning unit ends with a capstone activity. The purpose of this capstone activity is to demonstrate to you that you, as an individual person, can have an impact as a global citizen.

ACTIVITY 6.3: SUSTAINABLE DEVELOPMENT GOALS

Instructions

- Go to the Discussions tool on your e-tutor website.
- Go to the Forum for Learning Unit 6: Specific Questions and Discussions.
- Open the discussion topic: Activity 6.3: Capstone Activity.
- Provide your opinion on the debate in the activity described below.

Purpose

To help you understand the impact that you can have on your environment on a global environmental scale.

Task

- Take note that this goal deals with ensuring sustainable consumption and production patterns.
- Give your opinion on the possibility of reaching this sustainable development goal.
- Identify one way in which you can help to contribute to reaching this goal.
- What impact do you think your individual contribution will have on the global goal?

6.6 TEST YOURSELF

The following multiple-choice questions are intended to test your knowledge of the basic concepts discussed in this learning unit. You can use these questions as a self-assessment exercise to test your knowledge of the learning unit. This exercise is not marked and will not contribute to your semester or year mark. The feedback on these questions will be provided on myUnisa when the learning unit is completed according to the schedule provided in Tutorial Letter 101. You should try to complete these questions before this date in order to assess yourself and gain the most from the learning experience.
1. Food preferences and taboos serve as an example of how ... influences determine the value of a natural resource.
   (1) technological
   (2) economical
   (3) cultural
   (4) natural

2. The monetary value acquired by a natural resource is determined by ...
   (a) the accessibility of the resource.
   (b) the supply and demand for the resource.
   (c) the price of externalities associated with the use of the resource.
   (d) the number of different uses for the resource.
   (1) Only (a) and (b)
   (2) Only (c) and (d)
   (3) Only (a), (b) and (d)
   (4) Only (a)
   (5) (a), (b), (c) and (d)

3. A cap-and-trade system refers to a market system ...
   (1) in which caps are produced and traded.
   (2) used to cap the amount of pollution emitted by a company.
   (3) that is based on the principles of fair trade.
   (4) in which natural resources can be traded.

4. For which one of the following countries did no change occur in the percentage of land area devoted to forests between 2005 and 2010?
   (1) Nigeria
   (2) China
   (3) Ecuador
   (4) South Africa

5. The largest oil exporters in the world are located in ... , while the largest oil importers in the world are located in ...
   (1) The Middle East; Europe.
   (2) West Africa; Europe.
   (3) China; Japan.
   (4) Middle East; Mexico.

6. Which one of the following countries produces the least amount of lithium?
   (1) Chile
   (2) Australia
   (3) Brazil
   (4) Argentina

7. Which one of the following statements about the use of water as a natural resource is false?
   (1) The biggest demand for the use of water comes from industry.
   (2) Water is a renewable resource.
   (3) Water is a crucial resource for both hydropower and nuclear power.
   (4) Water quality is directly related to its ability to dissolve and transport chemicals.
8. Which one of the following statements related to the use of minerals is true?

(1) Cartels are established when numerous countries have the ability to produce a required mineral.
(2) Once the use of a mineral has been established and globally accepted, it cannot be substituted by any other minerals.
(3) The prices of minerals are determined without any consideration of political stability.
(4) Technological advancements have a potentially significant influence on the price of minerals.

9. From the world map showing the spatial distribution pattern of nitrogen dioxide in the troposphere (Figure 14.9.2, Section B, page 360 in the prescribed textbook) it can be deduced that ...

(1) the worst air pollution occurs in the less densely populated parts of the world.
(2) air pollution is evenly distributed all over the world.
(3) there is a spatial association between areas with high air pollution levels and a high population density.
(4) air pollution patterns are changing over time.

10. What is the main difference between sustainability and conservation?

(1) Sustainability concerns renewable resources while conservation concerns non-renewable resources.
(2) Sustainability is a multidimensional development concept while conservation is focused on one aspect at a time.
(3) Sustainability concerns non-renewable resources while conservation concerns renewable resources.
(4) Sustainability is a long-term concept and conservation is a short-term concept.

6.7 CONCLUSION

Natural resources constitute a crucial part of our existence. However, as much as natural resources aid our daily activities, their perpetual use threatens the long-term sustainability of our lifestyles. In this learning unit you have been introduced to the value of natural resources, the complexities of their use and spatial distribution as well as the importance of the sustainable use of resources. Ultimately natural resources have a significant bearing on numerous other human-environment interactions and a geographic perspective (focusing on spatial locations, spatial distributions, spatial variations and people-environment interactions) is essential in viewing the use of natural resources. The different ways in which natural resources are used is increasingly determined by principles of sustainability, primarily due to the limited availability of natural resources and the consequences of their use, referring specifically to pollution. After working through this unit, we hope that you are now able to realistically evaluate our ability to reach the 4th second, as discussed in the introductory video.
LEARNING UNIT 7

GEOGRAPHIC DATA: NATURE, SOURCES AND REPRESENTATION

Author: Chris Vlok
Academic editor: Melanie Nicolau

7.1 INTRODUCTION

In Learning Unit 1 you were introduced to the nature of Geography and geographical thinking. An important part of geographical thinking is to understand how to use geographic data to describe the location, distribution and nature of phenomena. In Learning Units 2 to 6 you encountered a number of maps, images and graphics; in this final learning unit for this module we will look at the nature, sources and representation of geographic data.

What is geographic data, what is its purpose and what is it that is represented on maps? Geographic data can assist in answering the questions: Where?, What is it like? and Why? Firstly, this means that geographic data can assist in determining the relative and absolute location of a place (where?). Secondly, geographic data can assist in providing information on the name, size or character of a location or geographic phenomenon (what is it like?). Finally, geographic data can support explanations why phenomena are located in specific places and not in others in association with certain human-environment interactions (why?). This includes explaining interrelationships and spatial associations between geographic phenomena.

The nature of geographic data is such that it is mostly possible to represent it in the form of maps. Although geographic data is linked to specific locations, which may be represented on maps, geographic data can also be represented in tables, charts and sketches. Geographic data can be obtained from interviews, statistics, images, photographs and through manipulation of existing data by using software applications such as GIS. The data from these sources can be represented in diverse ways, many of which you will encounter in the prescribed textbook for this module. General aspects related to geographic data to be discussed in this learning unit include types of geographic data, the geographic grid, time zones, types of maps, map projections, scale, symbolisation and how technology is used to make geographers’ lives easier. All of these can be applied in the process to derive real world information from maps, which is an essential skill that you are going to learn in this learning unit.
7.2 AIM AND LEARNING OUTCOMES

The aim of this learning unit is to provide you with an understanding of the nature of geographic data and maps – the most important source of geographic data and medium of communicating spatial messages. We would like you to be able to use maps to derive elementary data from maps and to understand the value and application of maps, remote sensing and GIS.

At the end of this learning unit you should be able to achieve the following learning outcomes:

- distinguish between different types of geographic data
- describe the use of maps and explain map elements such as scale, coordinate system, projection and symbolisation
- distinguish between different types of maps, i.e. thematic maps and topographical maps
- use the geographic grid to describe absolute location and determine universal time
- distinguish between the characteristics and uses of different map projections
- use maps to derive data such as longitude and latitude, direction, distance and area by basic procedures and calculations
- describe the use of maps, remote sensing technology and geographic information systems (GIS) in contemporary geography

We suggest that you revisit these learning outcomes once you have worked through the learning unit. You then need to evaluate your ability to respond to each of the outcomes with confidence. If you are not comfortable with a specific outcome, we suggest that you then spend a bit more time on the problematic areas that you have identified by thoroughly revising the appropriate parts of the prescribed study material.

7.3 PRESCRIBED MATERIAL AND REQUIRED ACTION

In this learning unit you will be required to master elementary skills related to maps such as determining the absolute location of a place, calculating map scales, calculating the distance between places, calculating the area covered by a phenomenon, and explaining direction in terms of bearing. To really master these skills you need to make measurements and apply arithmetic calculations (note that we don’t expect you to do mathematics, just some basic calculations like adding, subtracting, multiplying and dividing). In other words, you need to do more than just reading. Practise makes perfect and this applies also to mastering map skills. You will notice that this learning unit is substantially longer than other learning units. Do not let it put you off. The length is largely due to the fact that we know that not all of our students took Geography at school. We thus have to cater for students who have never been confronted with the map work skills that will be dealt with in this learning unit. We have thus decided to give you a thorough explanation of map work to give you the best possible chance to master these skills.

Study the following pages in your prescribed textbook:

- Introduction to Geography: Section A, Chapter 1, specifically pages 52 to 72.
- Thinking Geographically: Section B, Chapter 1, specifically pages 8 to 13.
You will notice that there is additional material (available on myUnisa as well as on the DVD which you should have received as part of your study material) related to mapwork skills which have been prepared for students who require additional explanation and practise.

The file names of the additional material for Learning Unit 7 which can be found on myUnisa under Additional Resources are:

1. How to_Calculate absolute location.
2. How to_The Metric system.
3. How to_Calculate real distance and real area.
4. How to_Calculate true bearing and magnetic bearing.

7.4 FINDING YOUR WAY THROUGH THE STUDY MATERIAL

The nature, sources and representation of geographic data are an important part of Geography as a science. In order to cover this broad sphere within Geography you will need to know more than just the contents of relevant sections in your prescribed textbook, and thus we have provided more detailed guidance in the following sections of this learning unit.

7.4.1 The nature of geographic data

In the following subsections of this learning unit we deal with maps as important tools used by geographers. However, in this section dealing with the nature of geographic data, we will already refer to maps and map symbols to provide a context. For reference purposes we have thus included an extract of the official 1:50 000 topographical map 3319BC DE DOORNS (see Appendix 7.1) and the legend (reference) accompanying the maps (see Appendix 7.2). Note that colour versions of the appendices are available on myUnisa.

Before we explore the value and nature of maps, photographs and satellite images as possible data sources, we first need to:

- distinguish between data and information,
- briefly revisit the term “geographic phenomenon” and explain what a geographic variable is, and
- establish the nature of geographic data.

7.4.1.1 Data versus information

Data can be regarded as unprocessed facts whereas information refers to data that has been processed in order to add value. For example: Consider the number of males (say 2 500) and females (say 10 000) in a certain neighbourhood. This is unprocessed raw data. Using these raw numbers and by doing a simple calculation we can generate valuable information such as females account for 80% (derived from

\[
\frac{\text{number of females}}{\text{total population}} \times 100
\]

of the population in that specific neighbourhood.

7.4.1.2 Geographic phenomenon versus geographic variable

Geographic phenomenon: This refers to any phenomenon which we can use to study spatial characteristics such as location, distribution and variation. Note that
with regard to distribution we can distinguish between two types of geographical phenomena: continuous and discrete (non-continuous).

- Phenomena that have continuous distributions are present everywhere. Think about atmospheric pressure, height above sea level, temperature.
- Phenomena that have discrete distributions are not present everywhere. Think about sport fields, roads, nature reserves and dams.

**Geographic variable:** This refers to a measurable property/characteristic of a geographic phenomenon. Think of rainfall as geographic phenomenon, with its characteristics varying across space. Not all places on Earth receive the same amount of rain through the year. The variable “amount of rainfall” can be measured at various places to establish how the **quantity** of rainfall varies across space on a certain day or during a period such as a year.

### 7.4.1.3 The nature of geographic data

Geographic data can be described in terms of its **spatiality**, **temporality**, **scale** (or resolution), **dimensionality** and the **scale of measurement** in terms of which the data is captured.

**Spatiality:** This refers to the fact that all geographical phenomena have an absolute and relative location, a spatial distribution and vary across space.

**Temporality:** The concept refers to the reality that the location of phenomena and their characteristics can vary over time. Think about the tiny settlement Jan van Riebeeck established at the Cape in 1652 and the modern cosmopolitan city of Cape Town today. Thus it is important that when obtaining data it should ideally be for the same moment or period in time. It would be a futile exercise to compare incidences of HIV/AIDS across Africa if the years during which the data has been collected in the different countries do not coincide.

**Scale:** Since the concept of scale has been addressed in Learning Unit 1 and will again be dealt with later in this learning unit, we will only highlight a few crucial aspects here.

- Scale refers to the size of the geographical area being mapped. The scale of a map indicates the extent to which reality has been reduced to fit on the map. For example, the De Doorns area represented on the map in Appendix 7.1 has been reduced by 50 000 to show the Geography of the area on a sheet of paper.
- There is a direct relationship between scale and the level of detail on a map (revisit pages 55 and 56 in Section A in your prescribed book and also study figure 7.1 below). Think about an area to be mapped on an A4-size paper. The larger the area (e.g. the entire world) to be mapped, the less detail can be shown (and the smaller the scale). The smaller the area to be mapped (e.g. a property with a house on it), the more detail (and the larger the scale) that can be shown on the map. The words “macro”, “meso” and “micro”, meaning “large”, “medium” and “small” respectively, imply that scale can also be referred to in relative terms.
- When looking at scale and the level of detail, consider how literacy levels vary across Africa on one map, and the provinces of South Africa on another map. The map of South Africa is at a higher level of resolution and thus offers more detail than the map of Africa. In addition, we cannot infer the literacy levels of provinces in South Africa from the map providing literacy level per country in Africa. We thus cannot “upgrade” low resolution data to a higher level of resolution. However, we
can use the data on a map providing literacy levels per province of South Africa to infer the average literacy level that is displayed for South Africa, and then to show that on a map of Africa. Thus data can be generalised by “downgrading” it from a higher to a lower level of resolution.

![Figure 7.1: The relationship between area being mapped, scale and level of detail.](image)

**Dimensionality**

In the context of map symbolism, dimensionality refers to aspects such as the size or aerial extend of phenomena displayed on a map. Look at the summary in Table 7.1, where it is explained how geographic data being gathered and shown on a map (or listed in a table) can be categorised in terms of four levels of dimensionality:

- zero-dimensional
- one-dimensional
- two-dimensional
- three-dimensional

**TABLE 7.1**

*Dimensionality of geographic data*

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>zero-dimensional</td>
<td>Think about a circle on a small scale map showing where Bloemfontein is, with the intention to simply indicate the approximate location only, and not the areal extent of the city.</td>
</tr>
<tr>
<td>one-dimensional</td>
<td>Examples are roads, railway lines or the boundaries of a country. The length of the thick red/blue lines used on an official South African 1:50 000 map to show where national roads are can be measured to get an indication of the total length (one dimension) of all the national roads.</td>
</tr>
<tr>
<td>two-dimensional</td>
<td>Consider the boundaries depicting the area of the Kruger National Park. Such a feature has two distance dimensions (length and width), which can be used to calculate the area on the Earth’s surface covered by the national park. Note that the dimensionality of symbols used to depict phenomena on maps is a function of the scale of the map. On a large scale map showing Bloemfontein, one will rather use a two-dimensional symbol (e.g. an area coloured in grey) as opposed to the small circle we referred to earlier.</td>
</tr>
</tbody>
</table>
### Dimension Example

Three-dimensional data is also referred to as volume data. Consider the shape of the undulating landscape. It is not flat. Points in the landscape can be described in terms of their location (an $x$- and $y$-coordinate) while the height of these points can be described in terms of a third variable, for example height above sea level, mean annual rainfall, level of employment or literacy.

### Scale of measurement

Measurements of geographic data can be done in terms of four scales of measurement, namely the nominal, ordinal, interval and ratio scales. An explanation and an example of each scale of measurement is summarised below.

#### TABLE 7.2

**Different scales of measurement**

<table>
<thead>
<tr>
<th>Measurement scale</th>
<th>Definition/explanation</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal</td>
<td>This is the lowest (least detailed) scale of measurement. It depicts qualitative characteristics as opposed to quantitative characteristics – in other words, you only know what type of phenomenon is represented.</td>
<td>Locate the symbol (♀) on the 1:50 000 map of De Doorns depicting one of the many schools in the area. The symbol simply gives us an indication where a school is situated – we do not know the size of the school or whether it is a primary or a secondary school. Note that numbers (quantitative values) can be used to depict qualitative characteristics of phenomena. Think about a “1” being used to indicate churches and a “2” to indicate schools. Also note that these codes cannot be added or subtracted.</td>
</tr>
<tr>
<td>Measurement scale</td>
<td>Definition/explanation</td>
<td>Example</td>
</tr>
<tr>
<td>-------------------</td>
<td>------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Ordinal</td>
<td>Ordinal data make it possible to compare the relative sizes or level of importance of different observations. By looking at the data we can infer whether an observation is equivalent to, smaller than (&lt;), or larger than (&gt;) another observation.</td>
<td>Consider the categories of roads shown in the legend of the official 1:50 000 maps of South Africa. From the width of the lines it can be inferred that the national roads (——) are more important than the arterial roads (–). Another example: Think of towns classified as large, medium and small in terms of population size. This can be depicted with symbols of varying size (● vs ● vs ●). Codes can also be used to distinguish between large (1), medium (2), and small (3) towns. As with nominal data these codes are qualitative in nature, implying that they cannot be used in calculations and that it cannot be established exactly by how much observations differ relative from each other.</td>
</tr>
<tr>
<td>Interval</td>
<td>As opposed to the nominal and ordinal scales of measurement, data being measured on the interval scale is quantitative in nature. Note that zero (0) on the interval scale is an arbitrary value and not a fixed value.</td>
<td>A good example of interval data is temperature measurements. Suppose the noon temperature of three towns in South Africa was 10 °C (Town A), 10.2 °C (Town B) and 20 °C (Town C). We can infer that: • the temperature of Towns A and B is virtually the same. • Town A recorded the coldest temperature while Town C recorded the hottest temperature. • the difference in temperature between Town A and C is 10 °C. Note that we did not state that Town C is twice as hot as Town A. The reason is that the zero of the Celsius temperature scale is not fixed but arbitrary. A temperature of 0 °C does not mean the place has no temperature – it is simply the point at which pure water freezes.</td>
</tr>
</tbody>
</table>
### Measure-ment scale

<table>
<thead>
<tr>
<th>Ratio</th>
<th>Definition/explanation</th>
<th>Example</th>
</tr>
</thead>
</table>
| Ratio | The ratio scale represents the highest level of measurement, is quantitative in nature, and has a fixed zero. We can apply any mathematical or statistical manipulations to ratio data. | Examples of ratio data are the measurements of height above sea level associated with contour lines, trigonometric stations and spot heights, as appearing on the extract of the De Doorns 1:50 000 map. From the map we can infer that:  
- trigonometric station 194 ($^{194}_{602.2}$) in Block C4 is 602.2 m above sea level.  
- the spot height (• 710) in Block E5 is 710 m above sea level.  
It can thus be inferred that the spot height is:  
- 107.8 m higher than trigonometric station 194.  
- approximately 1.2 times as high as the trigonometric station. |

Do remember that one can generalise interval and ratio data to lower levels of measurement. It is, however, impossible to “upgrade” any measurements taken at the nominal or ordinal scales to a higher level.

### 7.4.2 Representations of the Earth

Maps represent one of the most important tools used by geographers to show where things are located and represent geographic phenomena or situational contexts. There are a few key points related to maps that you need to be aware of:

- Maps are scaled, two-dimensional representations of the spherical Earth and are therefore **reduced** and somewhat **distorted** representations of a portion of the Earth.
- Maps cannot show everything on the Earth’s surface with perfect accuracy and are therefore **generalisations** of reality.
- Maps serve as a universal geographic **reference** and **communication** tool.
- The information represented on a map is selected by the cartographer and is determined by the purpose of the map, which is therefore a **simplified** representation of reality.

The data that is represented on maps, through the legend, scale, geographic grid and symbology, aid map users in deriving real-world information from maps. Contour lines and indications of spot heights and trigonometric beacons allow map users to derive heights above sea level, and gradients of land forms. To illustrate the use of these map elements, they are linked to specific practical applications and map calculations in the following sub-sections of this learning unit.

One of the most important things to consider is that map work can (and should) be applied in real-life situations to inform real-life decisions. Remember that you are deriving real-world information from geographic data being represented on maps.
You should therefore not be surprised when you are required during assessment tasks to apply your map work skills, for example, to measure the perimeter of a camp containing game and calculate what it would cost to fence the camp. These questions/challenges still require basic map calculations, of which the answers can then be used to inform real-life decisions.

In order to be successful in the map calculations section of the assignments and the examination you require the following tools:

- a pencil,
- a ruler,
- a protractor, and
- a calculator.

7.4.3 Describing locations of places on Earth

The geographic grid, also referred to as the geographic coordinate system, is the most important reference system used to describe the absolute location of places on earth. This is done with reference to the point where the Greenwich Meridian and the equator intersect. This is then used to help us answer “where” questions. The geographic grid is universally accepted and is also used to determine universal time. This subsection highlights the most important aspects that you need to know about the geographic grid.

Read the sections The Geographic Grid (Section A: Chapter 1, pages 52–55) and The Geographic Grid (Section B: Chapter 1, pages 10–11), and take note of the following:

- the purpose of the geographic grid,
- the different characteristics of latitude (parallels) and longitude (meridians),
- the format in which absolute location is given, and
- how the geographic grid is used to determine universal time and date.

Lines of longitude help us to standardise time throughout the world by creating time zones. The world is divided into 24 time zones, of which each is one hour earlier or later than the previous (depending on the direction in which you travel over the Greenwich Meridian). In addition to time zones you should understand the significance and purpose of the International Date Line. This line (which, with a few exceptions coincides with the 180° line of longitude) determines the day of the year in the different halves (hemispheres) of the globe. Crossing this line would mean that you either lose or gain one day – depending on the direction from which you cross the International Date Line.

ACTIVITY 7.1: GETTING FAMILIAR WITH THE GEOGRAPHIC GRID

Instructions

- Go to the Discussions tool on your e-tutor website.
- Go to the Forum for Learning Unit 7: Specific Questions and Discussions.
- Open the discussion topic: Activity 7.1: Getting familiar with the geographic grid.
- Share your insights on the task that is provided.
Purpose of activity

- To improve your understanding of absolute location and the use of the geographic grid in the South African context.

Task

For geographic grid references in South Africa, locations will always be between the latitudes of 22° and 35° South and between the longitudes of 16° and 33° East. Based on this information and your general knowledge of the geographic grid at this stage, share your response to the following questions on the discussion topic:

- Provide estimates of the approximate absolute locations of South Africa’s four largest coastal cities, shown in Figure 7.2. Your estimates of the absolute locations only need to include degrees (°) and approximate minutes ('). Following this activity, a detailed explanation of determining absolute location is provided.
- The geographical coordinate of Bloemfontein is approximately 29°07'15"S;26°12'50"E. Your GPS requires coordinates to be captured in decimal degrees. Express the geographical coordinate in decimal degrees.

![FIGURE 7.2](image_url)

**FIGURE 7.2**
The geographic grid superimposed on a map of South Africa

### 7.4.3.1 Determining absolute location

Absolute location refers to the point where a line of latitude intersects with a line of longitude – it is the universally accepted convention of describing the location of places on Earth. This point is also referred to as a geographical coordinate. Despite technology such as the GPS and GoogleEarth being able to provide you with the absolute location of a place, you need to be able to determine absolute location from a map without the use of technology.

The discussion which follows is based on the assumption that you:

- know that there are 60 minutes (') in a degree (°) and 60 seconds (") in a minute,
• know that latitude can vary between 0° (representing the equator) and 90° (representing the poles),
• know that longitude can vary between 0° (representing the Greenwich Meridian) and 180° (representing the International Date Line),
• are familiar with the conventional format in which a location (coordinate) referenced in terms of latitude and longitude is communicated:
  • it is degrees, minutes, seconds followed by (but no space) S (representing south) or N (representing north); degrees, minutes, seconds followed by (but no space) E (representing east) or W (representing west).
  • An example is 21°15’21”S;33°49’12”E.

You need to be able to apply basic arithmetic. Note the following: You will be required to make measurements on maps using a ruler. Our experience is that very often the scale of maps changes during the production process of printed material resulting in your measurements differing from our measurements. We are aware of the dilemma and make provision for such deviations in marking guidelines.

How do we go about determining geographical coordinates if we do not have a GPS (global positioning system)? We use a map on which the location of a place and the lines of latitude and longitude (with their degree values) are shown. Depending on the function of a map, one will often find that a geographic grid is superimposed on the map. The detail of the grid is of course determined by the scale of the map. Figure 7.3 is a mini extract from the 1:50 000 extract shown in Appendix 7.1. You will note that the geographic grid shown on the map allows you to read off two digits of latitude and two digits of longitude. In other words – you can read off the degrees and the minutes but have to calculate the digit referring to seconds. From the figure we can immediately see that spot height 710 is situated between 33°29’S and 33°30’S latitude and between 19°41’E and 19°42’E longitude.

![Figure 7.3](image-url)

**FIGURE 7.3**

*Determining the latitude and longitude of spot height 710*

Our next example is a bit more challenging in the sense that you are required to do more calculations to determine absolute location. Study the simplified map depicted in Figure 7.4 of an area in South Africa. Do you agree that the windmill which is indicated as A on the map is located between 20° East and 21° East (i.e. in the
Eastern Hemisphere) and between 31° South and 32° South (i.e. in the Southern Hemisphere)? However, we want to know the windmill’s absolute location, or geographical coordinate, more exactly (we are also interested in minutes and seconds). We will explain how you can calculate the longitude of the windmill. We have left space for you to calculate the latitude. We are serious! You will never master mapwork skills by just reading about it – at some stage you must work through the steps and do the calculations by yourself.

**FIGURE 7.4**

*Calculating the absolute location of point A (the windmill)*

<table>
<thead>
<tr>
<th>Suggested reasoning and steps to calculate the absolute location of point A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Calculating the longitude</strong></td>
</tr>
<tr>
<td>1. The windmill in Figure 7.4 is between 20° and 21° East.</td>
</tr>
<tr>
<td>2. On the map the distance between 20° and 21° is 40 mm. Measure it yourself with a ruler. One degree (or 60 minutes) is thus represented by 40 mm.</td>
</tr>
<tr>
<td>3. On the map the windmill is located 35 mm east of the 20° East line of longitude.</td>
</tr>
<tr>
<td>4. Because we know that 1° is equal to 60 minutes and that in this instance 60 minutes are equal to 40 mm, we can now apply the following logic:</td>
</tr>
</tbody>
</table>
### Suggested reasoning and steps to calculate the absolute location of point A

<table>
<thead>
<tr>
<th>Calculating the longitude</th>
<th>You are required to calculate the latitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. 40 mm on the map is equivalent to 60 minutes</td>
<td></td>
</tr>
<tr>
<td>∴ 35 mm on map = 60 \times (35 + 40) (∴ means “therefore”)</td>
<td></td>
</tr>
<tr>
<td>= 52.5' or 52.5 minutes</td>
<td></td>
</tr>
<tr>
<td>6. The decimal portion which we calculated in step 5 means 0.5 of a minute, which is half a minute. Remember that there are 60 seconds in a minute. The 0.5 therefore actually means 0.5 of 60 seconds.</td>
<td></td>
</tr>
<tr>
<td>7. 0.5 x 60 seconds = 30 seconds</td>
<td></td>
</tr>
<tr>
<td>8. The longitude of the windmill is therefore 20 degrees + 52 minutes + 30 seconds East. We write it as 20°52'30&quot; East. Without indicating “East” we would not know whether the windmill is in the Western or the Eastern hemisphere.</td>
<td></td>
</tr>
</tbody>
</table>

After you have calculated the latitude of the windmill you can write down its absolute location. The absolute location is 20°52'30" East.

To conclude this section dealing with calculating absolute location, let us revisit Figure 7.3 and the calculation of the latitude and longitude of spot height 710. We will explain how to calculate the latitude while you will have to calculate the longitude.

### Suggested reasoning and steps to calculate the absolute location of spot height 710

<table>
<thead>
<tr>
<th>Calculating the latitude</th>
<th>You are required to calculate the longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Spot height 710 in figure 2.3 is between 33°29' and 33°30' south.</td>
<td></td>
</tr>
<tr>
<td>2. On the map the distance between 33°29' and 33°30' S is 37.2 mm. Measure it yourself with a ruler. One minute (60 seconds) is thus represented by 37.2 mm.</td>
<td></td>
</tr>
<tr>
<td>3. On the map the spot height 710 is located 13.0 mm south of 33°29'S.</td>
<td></td>
</tr>
</tbody>
</table>
**Suggested reasoning and steps to calculate the absolute location of spot height 710**

<table>
<thead>
<tr>
<th>Calculating the latitude</th>
<th>You are required to calculate the longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Because we know that 1° (one minute) is equal to 60 seconds and that in this instance one minute is equal to 13.0 mm, we can now apply the following logic:</td>
<td></td>
</tr>
</tbody>
</table>
| 5. 37.2 mm on the map is equivalent to 60 seconds  
\[ \therefore 13.0 \text{ mm on map} = 60 \times (13 \div 37.2) \]  
\[ = 20.9^\prime \text{ or } 20.9 \text{ seconds} \] | |
| 6. The latitude of spot height 710 is therefore 33 degrees + 29 minutes + 20.9 seconds. We write it as 33°29'20.9"S. | |

After you have calculated the longitude of spot height 710 you can write down its absolute location. The absolute location is

### 7.4.3.2 Determining relative location

In addition to absolute location, the location of a place can also be described in relative terms. In other words, the location of a place can be described in relation to the location of another place. In addition to the descriptions of relative location that have been dealt with in Learning Unit 1, it is also possible to use direction to describe relative location.

Direction can be described in two ways: Cardinal compass directions and bearing.

**Cardinal compass directions**: We assume that you are familiar with cardinal compass directions. Figure 7.5 has been drawn to refresh your memory. Based on the figure we can state that:

- place B is north-east of our position at A,
- place C is south-east of our position at A,
- place D is west of our position at A.
Bearing

Alternatively one can express direction as an angle measured clockwise with a protractor from a base line (0°). When working with maps the base line is the line pointing to north (the geographical north pole). Also note that we refer to north on maps as true north. Since it is the most widely used method, we will only focus on full-circle bearing (a bearing which varies between 0° and 360°).

From Figure 7.5 we can infer that

- place B is 45° from our position at A, the true bearing is thus 45°;
- place C is 135° from our position at A, the true bearing is thus 135°;
- place D is 270° from our position at A, the true bearing is thus 270°.

We are sure that you are aware of the use of magnetic compasses as a navigation tool in the field or on the oceans. The needle of a magnetic compass always points to the magnetic north pole. The dilemma is that confusion can arise because, due to electric currents (and resultant magnetic fields) present within the molten material of the Earth’s core, the magnetic north pole and geographic north pole are not at the same location. When navigating to a place or providing the direction of a place to somebody else we thus need to make sure we are on the same wavelength – true north or magnetic north.

Allow us to illustrate the practical implications. Imagine that you received the following SMS from a friend:

“Please help! Strained ankle! Am about 2.5 km straight east of where my car is parked (at the picnic spot where we had the braai last Saturday after our hike).”

What your friend did not tell you is that he purchased a magnetic compass during the course of the week and that the direction he gave you was taken from the compass reading. If you are going to use a map (like you used the previous week!) you will probably not find your friend. The reason is that in South Africa magnetic north is always west of true north (suppose it is 25° west of true north in this instance). By using the map (plotting a line pointing to east) and walking due east you will walk in a direction which is south of where your injured friend is. This point is illustrated in Figure 7.6. Study the annotation very carefully.
Fortunately it is quite easy to deal with the dilemma we have pointed out. The graphic item below (Figure 7.7) has been extracted from the map of De Doorns shown in Appendix 7.1. Each and every official 1:50 000 map of South Africa contains such information. Study the graphic and note the following:

- The information given applies to October 2015.
- The mean magnetic declination is 25°10 west of true north. Note that magnetic declination is simply the angle describing the difference between the location of true north and magnetic north.
- The extent to which the magnetic declination changes over time (shown on maps as mean annual change).
- The magnetic variation is 6' west. It means that magnetic declination changes 6' westwards on an annual base. In this particular case it implies that the magnetic declination gets larger. If the annual change was eastwards, it implies that the magnetic declination gets smaller. If you are reading this text in October 2017 (two years after 2015) you should realise that the magnetic declination for the De Doorns area will be 25°22' west of true north (derived from 25°10 + (2 years × 6').

Before we go further by providing you with a step by step worked-out example of how to answer a question related to describing direction in terms of bearing, we want to make 100% sure that you understand the terms base line, point of observation, the point on which we take a bearing, the line of bearing and the angle of bearing. Study the figure below.
We want to calculate the October 2017 magnetic bearing from spot height 802 (block C5) on spot height 710 (block D5) as shown in Appendix 7.1 (the extract from the 1:50 000 map of De Doorns). For explanatory purposes we created the figure below to show the location of the two spot heights plus an additional spot height on which we will base an additional question which you can do to cement your skill in calculating magnetic bearing.

There are two strategies which you can go about calculating the magnetic bearing from spot height 802 on spot height 710. We will illustrate and explain both:

1. **Strategy 1: Determining true bearing and then adding the magnetic declination**

   We will explain this strategy first because the first two steps are identical to when you need to calculate magnetic bearing as opposed to true bearing.

   (a) Draw the true north base line for measuring true bearing as well as the line of bearing going through spot height 710 – see Figure 7.10 below.

   (b) Measure angle BAC. It is 63° and represents true bearing from spot height 802 on spot height 710.
We now need to bring the magnetic declination into the equation. It was given as 25°10' west. Note, however, that this was true for October 2015. We are required to calculate the October 2017 declination. It was stated that the annual change is 6' westwards per year.

(c) Calculate the number of years from October 2015 to October 2017. The answer is two years.

(d) Multiply the number of years (2) with the annual change (6'). The answer is 12' over a period of two years.

(e) You need to either add the 12' to the 2015 magnetic declination (given as 25°10') or subtract it. Since it was stated that the annual change of the position of magnetic north is westwards, it implies that the magnetic declination gets bigger. You must therefore add the annual change. The answer is 25°22' (derived from 25°10' + 12').

(f) The October 2017 magnetic bearing from spot height 802 on spot height 710 can now be calculated. All you have to do is to add the October 2017 magnetic declination (25°22') to the true bearing (63°). The answer is 88°22'.

2. **Strategy 2: Calculate the magnetic declination and then measure the angle of magnetic bearing**

(a) We already established that the October 2017 magnetic declination is 25°22' west of true north.

(b) Draw the angle of magnetic declination (25°22' west of true north) on the map. It is illustrated in Figure 7.11.

(c) Measure angle DAC. It represents the magnetic bearing from spot height 802 on spot height 710. The answer is 88°22'.
ACTIVITY 7.2: CALCULATING BEARING

Instructions

- Go to the Discussions tool on your e-tutor website.
- Open the discussion topic, Activity 7.2: Calculating Bearing.
- Provide your answers on the activities detailed below.

Purpose

To practise providing direction in terms of true and magnetic bearing.

Task instructions

After you have done the task you need to share the steps you have followed as well as the final answers with your e-tutor and class. They will not grade your answers but will indicate whether you were on the right track or not.

Task

(1) Use Figure 7.5 to calculate the true bearing from point A on point F.

(2) Use Appendix 7.1 (or Figure 7.9) to calculate the October 2020 magnetic bearing from spot height 686 on spot height 802.

(3) Suppose that the 2014 magnetic declination for the area shown in the accompanying figure is 20° west of true north. The annual change is 30’ eastwards. Which one of points 1 to 4 represents a 2018 magnetic bearing of 273° taken from spot height 710?

![Diagram showing points and direction angles]
To conclude: Remember that in South Africa, magnetic declination is always west of true north. If the annual change is westwards, the magnetic declination will get bigger. If the annual change is eastwards, the magnetic declination gets smaller. Bearing is also measured clockwise from a base line.

<table>
<thead>
<tr>
<th>MAGNETIC BEARING AND MAGNETIC DECLINATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructions</td>
</tr>
<tr>
<td>1. Use the following link to watch a video explaining how to calculate magnetic bearing: <a href="https://www.youtube.com/watch?v=sL1vqADAW4U">https://www.youtube.com/watch?v=sL1vqADAW4U</a> (5:41 minutes).</td>
</tr>
<tr>
<td>Purpose of video</td>
</tr>
<tr>
<td>The video provides an additional explanation of magnetic bearing. If you are still uncertain about the explanations provided and how to calculate magnetic bearing, it will be especially helpful to watch this video.</td>
</tr>
<tr>
<td>2. Use the following link to watch this video on how to calculate the magnetic declination: <a href="https://www.youtube.com/watch?v=ISFvfcLLQWw">https://www.youtube.com/watch?v=ISFvfcLLQWw</a> (9:42 minutes).</td>
</tr>
<tr>
<td>Purpose of video</td>
</tr>
<tr>
<td>This video provides further explanation of the magnetic declination and factors to consider when calculating the magnetic declination.</td>
</tr>
</tbody>
</table>

7.4.4 Map projections

Transforming a spherical object (as the Earth) onto a flat surface (as a map) is not easy and therefore cartographers use mathematical projections to accommodate the required transfer. It can easily be done by using appropriate computer software. The transformation of a spherical object to a flat surface will distort some of the properties of the globe, such as distances, shapes, areas or directions. It is impossible to retain all these properties on one map. Therefore, it is the choice of the cartographer to decide which of these properties need to be preserved to support the purpose of the map. Thereafter, a projection is selected and used to preserve the desired globe property decided upon.

Read the sections Projection (Section A: pages 56–59) and Reading Maps (Section B: page 9) and make a summary of the following aspects related to map projections:

- the classification of projections according to the geometric principles on which the projection depends (specific attention is drawn to Section A, page 57, figure 1-25), and
- the classification of projections in terms of the properties of the globe that are preserved: size (equal area or equivalent projections), distance (equidistant projections), shape (conformal projections) and direction (azimuthal or zenithal projections) – Section A, pages 57–59.

Note the following:

(1) Distortion increases in relation to the surface area of the Earth that is being represented on a map. This happens because representing a larger area (like a
continent) means that a larger part of the Earth’s curve is being represented and thus more distortion is caused. A map of a residential neighbourhood does not extend beyond the visual curve of the Earth (if the observer is standing within the area being mapped), but a map of the world includes the full curvature of the Earth and will therefore be more distorted.

(2) Measuring distances and directions on a map can be tricky issues – especially on small scale maps. Directions are only true when taken from a predetermined central point on the map. The same applies to distances. “In equidistant map projections, accurate distances (constant scale) are maintained only between one or two points to every other point on the map. Also in most projections there are one or more standard lines along which scale remains constant (true scale). Distances measured along these lines are proportional to the same distance measurement on the curved reference surface. Similarly if a projection is centred on a point, distances to every other point from the centre point remain accurate. Equidistant projections are neither conformal nor equal-area, but rather a compromise between them” (Source: http://geokov.com/education/map-projection.aspx). Rather refrain from using the world maps shown in your prescribed book for calculating distances. Most of the world maps used in your prescribed book are for example only true to scale along the equator.

(3) The graticule (lines of latitude and longitude) can be used to detect distortions.

(a) The lines of longitude should converge at the poles. If not, areas closer to the poles are enlarged (exaggerated).

(b) Along any single parallel, the distance on the map between meridians should be constant; for different parallels, the distance should decrease to zero towards the poles.

(c) Any two grid “cells” bounded by the same two parallels should enclose the same area.

(d) The equator and all meridians should be straight unbroken lines, since they don’t change direction on the Earth’s surface.

(e) Any meridian should cross all parallels at right angles. If not, direction is distorted.

7.4.5 The language of maps

What is meant with “the language of maps”? The language of maps refers to the way in which maps communicate information to map users. The map language is primarily determined by the type of map, the data depicted on the map and the symbols used on the map to represent important information. In order to interpret a map correctly you need to understand, among other things, its locational context and orientation.

The locational context can be derived from the map title and the geographic data represented on the map. Being sure of the map’s orientation is important for descriptions of relative location and also because north is not necessarily towards the “top” of the map. The most basic indication of orientation is provided by cardinal directions (see Figure 7.5) dealt with earlier. It is represented on the map by either a compass or simply a north arrow. Orientation can also be inferred from the geographic grid in cases where it is superimposed on a map.

– The symbols that are used to represent real world objects on a map can be classified as point, line and area symbols. Turn to Appendix 7.2 and familiarise
yourself with the symbols used to depict real features on the official 1:50 000 maps of South Africa.

- **Point symbols** are used to represent real world phenomena found in fixed locations in the area being mapped and generally take the form of dots, circles, letters or icons.

- **Line symbols** are used to represent real world phenomena which have a linear character (i.e. roads or rivers). Line symbols generally take the form of lines, dot strings, double lines, contours and hatched lines.

- **Area symbols** (also called polygons) are used to represent two-dimensional objects – such objects have a width and a length (think about a dam, a nature reserve, a shopping centre, a house). Area symbols are differentiated by shading, colouring, crosshatching and dot patterns.

The basic properties which distinguish all map symbols from each other include *colour, shape, size* and *orientation*. All these symbols are defined in the map legend, along with other important information related to the map.

For your convenience we created a graphic summary (see Figure 7.12) of the data characteristics to which you were introduced in subsection 7.4.1 (The nature of geographical data) and symbols that can be used to depict such data on a map. Note that a colour version of the figure is available on myUnisa (you will also find it under “Additional Resources” on myUnisa).
LEARNING UNIT 7: GEOGRAPHIC DATA: NATURE, SOURCES AND REPRESENTATION

FIGURE 7.12
Symbols associated with nominal, ordinal, interval and ratio data representing points, lines and areas.
There are different types of maps and you should be able to differentiate between a topographic or physical map and a thematic map. A topographic map represents the physical characteristics of the Earth, like rivers, mountains, roads, towns, cities, etc. A thematic map is focused on a specific geographic phenomenon (like rainfall, climate regions, population density, life expectancy, etc.) and displays the spatial extent, variation and pattern of that geographic phenomenon. The most common types of thematic maps include dot distribution maps, qualitative maps, graduated symbols maps, choropleth maps, flow maps, cartograms and isoline maps (you can see what these maps look like in your prescribed book, Section A, page 60, Figure 1-27).

ACTIVITY 7.3: CATEGORISING THEMATIC MAPS

Instructions

(1) Go to the Discussions tool on your e-tutor website.
(2) Open the discussion topic, Activity 7.3: Categorising thematic maps.
(3) Provide your answers on the activities detailed below.

Purpose
To create awareness of how data can be presented on maps.

Task instructions
Page through your prescribed textbook and find at least one example for each of the types of thematic maps listed below. Complete the table by writing down the relevant page numbers.

<table>
<thead>
<tr>
<th>Type of map</th>
<th>Section/page number/figure number</th>
</tr>
</thead>
<tbody>
<tr>
<td>graduated symbol map</td>
<td></td>
</tr>
<tr>
<td>cartogram</td>
<td></td>
</tr>
<tr>
<td>flow map</td>
<td></td>
</tr>
<tr>
<td>choropleth map</td>
<td></td>
</tr>
<tr>
<td>isoline maps</td>
<td></td>
</tr>
<tr>
<td>qualitative map</td>
<td></td>
</tr>
</tbody>
</table>

7.4.6 Map scale

You should be aware by now that maps are scaled representations of the real world. A map scale is printed on all maps for the purpose of relating the map back to the real world, thereby enabling the map user to derive accurate real world information from the map. This subsection is focused on different types of map scales and their applicability in terms of practical situations.

Read the section Scale (Section A: pages 55–56) as well as Reading maps (Section B: page 8) and make thorough notes about:

- the three different types of scales (specific attention is drawn to Section A, page 56, figure 1-23),
LEARNING UNIT 7: GEOGRAPHIC DATA: NATURE, SOURCES AND REPRESENTATION

- the difference in the use of and the detail represented on a small-scale map and a large-scale map (specific attention is drawn to Section A, page 57, figure 1-24).

The map scale is one of the first things you need to establish when you start working with a map. Without knowledge of the scale of the map you will not be able to form an accurate picture in your mind of the size of phenomena or how far apart places are when reading a map. Also do not forget that as a geographer you should also communicate your spatial messages to potential users by means of maps. How will you determine the scale of the map and how will you communicate the scale to potential users of your maps? These users may not be experienced map users – you need to cater for such a situation.

There are a few key points (outlined below) to take note of concerning map scales that are not covered in detail in the prescribed textbook:

- The map scale indicates the relationship between any distance on the map and the corresponding real distance on the Earth’s surface. This relationship does not depend on the measuring unit being used and is expressed as a ratio. For example, on a 1:10 000 scale map, 1 mm on the map equals 10 000 mm in reality and in the same way one length of your cell phone on the map equals 10 000 lengths of your cell phone in reality.

- The accuracy of map measurements has important implications for small-scale maps. Consider the implications if the map measurement that you made is 2 mm longer or shorter than the correct measurement. If using a 1:1 000 scale map, the real distance will be wrong by 1 m. However, on a 1:500 000 scale map, the real distance will be wrong by 1 000 m or 1 km.

- Also remember the following:
  - A word scale is ideal for novice map users. It should always be simplified to represent easy-to-interpret real distances. Specific attention is drawn to the examples of word scales in Section A, page 57, figure 1-24. Never indicate a word scale as “one centimetre is equivalent to a thousand centimetres”, but rather as “one centimetre is equivalent to ten metres”.
  - A ratio scale, on the other hand, uses the same measurement unit before and after the colon (when represented as a ratio such as 1:10 000) or the same measurement unit for both the numerator and denominator (when represented as a fraction such as $\frac{1}{10 000}$).

Converting map scales from one type to another is an important skill for a geographer and is based on a thorough understanding of scale and simple metric conversions. Map scale is also used to calculate real distances and real areas from a map. You should be able to convert such distances and areas from one metric unit to another.

7.4.6.1 Converting distance and area

Converting measurements between different metric units is a basic skill that you are required to have in order to derive accurate real world information from a map. Metric conversions are relevant to scale conversions as well as to distance and area calculations. Use the following rhyme to remember the relationship between the various metric units in which real distance can be expressed.

<table>
<thead>
<tr>
<th>King</th>
<th>Henry (of) Denmark</th>
<th>makes</th>
<th>delicious</th>
<th>chocolate</th>
<th>muffins</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kilometre</td>
<td>Hectometre</td>
<td>Decametre</td>
<td>metre</td>
<td>decimetre</td>
<td>centimetre</td>
</tr>
<tr>
<td>km</td>
<td>hm</td>
<td>dam</td>
<td>m</td>
<td>dm</td>
<td>cm</td>
</tr>
</tbody>
</table>
You can use this table to easily convert distances that you have calculated between different metric units. Consider this example: Suppose you need to convert 6 200.5 millimetres to metres. Your answer would be 6.2005 metres because you need to move the decimal comma from after “mm” (for millimetre) to after “m” (for metre).

<table>
<thead>
<tr>
<th>km</th>
<th>hm</th>
<th>dam</th>
<th>m</th>
<th>dm</th>
<th>cm</th>
<th>mm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td>2</td>
<td>0</td>
<td>0.5</td>
</tr>
<tr>
<td>km</td>
<td>hm</td>
<td>dam</td>
<td>m</td>
<td>dm</td>
<td>cm</td>
<td>mm</td>
</tr>
<tr>
<td>6.</td>
<td>2</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Consider another example: Suppose you need to covert 10.75 km to centimetres. Your answer will be 1 075 000 centimetres because you need to move the decimal point from after “km” (for kilometre) to after “cm” (for centimetre).

<table>
<thead>
<tr>
<th>km</th>
<th>hm</th>
<th>dam</th>
<th>m</th>
<th>dm</th>
<th>cm</th>
<th>mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.</td>
<td>7</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>km</td>
<td>hm</td>
<td>dam</td>
<td>m</td>
<td>dm</td>
<td>cm</td>
<td>mm</td>
</tr>
<tr>
<td>10</td>
<td>7</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Converting the size of an area from one metric unit to another is done a bit differently than for distance conversions. You can use the same rhyme to convert the size of areas from one metric unit to another but you need to remember that, since we are dealing with two dimensions, we need to enter two digits under each metric unit. As illustrated below, an area of 10.7 km² is equivalent to 10 700 000 m².

<table>
<thead>
<tr>
<th>km²</th>
<th>hm²</th>
<th>dam²</th>
<th>m²</th>
<th>dm²</th>
<th>cm²</th>
<th>mm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.</td>
<td>70</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>km²</td>
<td>hm²</td>
<td>dam²</td>
<td>m²</td>
<td>dm²</td>
<td>cm²</td>
<td>mm²</td>
</tr>
<tr>
<td>10</td>
<td>70</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
</tr>
</tbody>
</table>

An alternative method to convert a number representing an area from one metric unit to another is illustrated in Figure 7.9.

![Figure 7.13: Converting metric units for areas](image)

Consider this example: Suppose you need to convert 6.4 square kilometres to square metres. Your answer would be 6 400 000 m² because you need to multiply
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the number representing area in square kilometres by 1 000 000 to obtain the area in square metres.

Consider another example: Suppose you need to convert 8 750 square metres to hectares. Your answer would be 0.875 hectares because you need to divide the number representing area in square metres by 10 000 to obtain the area in hectares.

7.4.6.2 Converting scale

You have already encountered the different types of scales and their unique characteristics earlier on in this learning unit. At some point in your geography studies you will be required to convert a map scale from one type to another in order to complete a map calculation. This skill will also help you to add an accurate scale to a map that you have compiled. Table 7.5 provides examples of how you can convert a map scale from one type to another.

<table>
<thead>
<tr>
<th>TABLE 7.5</th>
<th>Converting various types of map scales</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Converting from a ratio scale to a word scale</strong></td>
<td></td>
</tr>
<tr>
<td>In order to convert a ratio scale to a word scale, a statement that is easy to interpret needs to be provided. Consider the following ratio scale: 1:50 000. It would not make sense to tell a friend that 1 centimetre on the map represents 50 000 centimetres on the Earth's surface because very few people can contextualise 50 000 centimetres and be able to use it to assist them in a sensible way. Therefore the word scale needs to be simplified.</td>
<td></td>
</tr>
<tr>
<td><strong>Step 1:</strong> If 1 cm = 50 000 cm, it follows that 1 cm is equal to 500 m (remember the rhyme used to convert metric units).</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2:</strong> The word scale can be completed by stating that 1 centimetre on the map is equal to 500 metres on the Earth's surface. It can also be stated that 1 centimetre on the map is equal to 0.5 kilometres on the Earth's surface.</td>
<td></td>
</tr>
<tr>
<td><strong>Converting a ratio scale to a graphic scale</strong></td>
<td></td>
</tr>
<tr>
<td>A graphic scale has the advantage that the scale remains correct should one enlarge or reduce the scale of the map. This is definitely not the case with word or ratio scales. In order to convert a ratio scale to a graphic scale, the ratio scale first needs to be simplified (as in the previous example), and then an accurate sketch to indicate the scale of the map needs to be drawn. A ratio scale of 1:50 000 will be used as illustration.</td>
<td></td>
</tr>
<tr>
<td><strong>Step 1:</strong> Use a ruler to draw a straight line of an appropriate length (4 to 6 cm). Mark the line with one centimetre increments (as shown below).</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2:</strong> Now each centimetre increment on this line needs to be labelled correctly. Based on the word scale, one centimetre on the map (or in this case the map scale) is equal to 500 m on the Earth's surface. Therefore the first increment on the map scale will be labelled as “500”, the second as “1 000”, the third as “1 500” and the fourth as “2 000”. Remember to also label the beginning of the line as “0”. Also note that the unit of measurement (in this case m) has been included on the right-hand side of the graphic scale.</td>
<td></td>
</tr>
</tbody>
</table>
Converting from a graphic scale to a ratio scale

Step 1: Use a ruler to measure the map distance of one or more of the scale increments shown on the graphic scale. Our example is based on measuring either one (see line a on the scale) or more (see line b on the scale). Note that theoretically speaking, the longer the map distance you measure, the higher the accuracy of your final answer.

Step 2: Write down your measurement and the corresponding real world distance associated with the measurement. Examples based on lines a and b on the graphic scale are provided below.

Suppose line a is 2 cm long. We can then infer that:
2 cm on the map is equivalent to 10 km in reality.

Suppose line b is 8 cm long. We can then infer that:
8 cm on the map is equivalent to 40 km in reality.

Step 3: Convert the metric unit (in this case it is km) of the graphic scale to the same metric unit as your measurement (cm). Remember to use the tables provided earlier to convert the distance in kilometres to a distance in centimetres. We can argue as follows:

if 2 cm on the map/graphic scale is the equivalent of 10 km in reality, it can be written as
2 cm = 1 000 000 cm.

if 8 cm on the map/graphic scale is the equivalent of 40 km in reality, it can be written as
8 cm = 4 000 000 cm.

Step 4: Remember to always simplify the ratio scale (especially if the entire graphic scale has been used and not just one unit or increment on the graphic scale, like the example using a measurement of 4 cm). This means that the ratio scale should be written as a ratio of “1” to “something”. Therefore, in this case (regardless of which increment(s) have been measured on the graphic scale) the final answer for this example should be 1: 500 000 (see following calculations.)

Example based on line a
If 2 cm is equivalent to 1 000 000 cm
Then, 1 cm = 1 000 000 ÷ 2
Answer: 500 000

Example based on line b
If 4 cm is equivalent to 4 000 000 cm
Then, 1 cm = 1 000 000 ÷ 4
Answer: 500 000
Converting from a word scale to a ratio scale

In order to convert a word scale to a ratio scale, steps 3 and 4 of the previous example need to be used if the word scale is already provided. Suppose the word scale is: 5 centimetres on the map is equal to 10 kilometres on the Earth’s surface.

**Step 1:** Remember that a ratio of “1” to “something” needs to be obtained. Thus, simplify the word scale by dividing both numbers by 5. This means 5 cm = 10 km can also be written as 1 cm = 2 km.

**Step 2:** Ensure that the metric units are the same. Use the rhyme provided earlier to convert the distance in kilometres to a distance in centimetres. If 1 cm = 2 km, it can also be written as 1 cm = 200 000 cm.

**Step 3:** The ratio scale will be **1:200 000**.

If you are able to do the scale conversions explained in Table 7.5, you should be able to do any other conversions as well. Remember that practise makes perfect. Simply apply the principles as outlined in these examples and make sure that you convert your metric units correctly.

### 7.4.6.3 Calculating real distance and real area

Calculating real distance or real area presents some of the most basic calculations that you will be required to do in this module. Your understanding of real distance calculations will also prove valuable in other map calculation exercises, like gradient calculations. The most important things to remember when doing these map calculations are outlined below:

- Always read the question or task carefully and make sure your final answer is in the required unit of measurement.
- Always show all your steps and calculations because you can be rewarded for the logic shown in these steps even if your final answer is incorrect.
- Although we do allow for a small margin of error in map measurements (usually ± 2 mm) we encourage you to strive towards a high level of accuracy.

The importance of using map calculations to provide “practical” answers to questions or solutions to problems needs to be emphasised. If someone enquires about the distance from one point to another, it would not make sense to say that “it is 450 000 cm”, because such a number is difficult to perceive. It would make more sense to indicate that the distance is 4 500 m, or even better, 4.5 km. The same principle should apply to answers in assignments and in the examination. You must remember to include the unit of measurement for the metric unit in your answer (for example, write “2 km” and not just “2”). When dealing with areas you need to remember to use the superscript “2” to indicate that the number refers to an area (e.g. 5 km²) as opposed to length (e.g. 5 km). A step-by-step example of calculating real distance and real area is provided in Table 7.6. When calculating real area, you need to remember the following:

- Make sure that you use the correct scale for you calculations. Do not assume that the scale is 1:50 000. Read the question carefully and have a thorough look at the map to be used.
- Always convert your answers for the real length and width to the correct metric unit (the same metric unit as required in your final answer) as soon as possible. **Doing this will require fewer and also less complicated calculations.**
• Always calculate the real length and the real width separately and then multiply them with each other. Many students make the mistake of multiplying their map measurements for length and width with each other and then multiplying their answer with the scale factor. This is wrong. Please follow the steps indicated in Table 7.6.

The following example has reference to the explanation provided in Table 7.6. You are required to calculate the real area (in square kilometres) of a maize field measuring 5 cm in length and 4 cm in width on a map of which the scale is 1:10 000.

### TABLE 7.6

**Calculating distances in order to determine real area**

<table>
<thead>
<tr>
<th><strong>Step 1:</strong> Calculate the real length of the maize field</th>
<th><strong>Step 2:</strong> Calculate the real width of the maize field</th>
<th><strong>Step 3:</strong> Calculate the real area of the maize field</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real length is calculated by multiplying the map distance (in this case 5 cm) with the scale factor (in this case 10 000) and converting the answer to the required metric unit. Note that since the question stated “square kilometres”, our answer is expressed in km. Thus 5 cm x 10 000 = 50 000 cm = 500 m = 0.5 km</td>
<td>Real width is calculated by multiplying the map distance (in this case 4 cm) with the scale factor (in this case 10 000) and converting the answer to the required metric unit. Note that since the question stated “square kilometres”, our answer is expressed in km. Thus 4 cm x 10 000 (the map scale) = 40 000 cm = 400 m = 0.4 km</td>
<td>Real area is calculated by multiplying the real length with the real width. Thus 0.5 km x 0.4 km = 0.2 km²</td>
</tr>
</tbody>
</table>

### DISTANCE AND AREA CALCULATIONS

**Instructions**

- Use the following links to watch videos explaining real distance and real area calculations:
  - Distance – [https://www.youtube.com/watch?v=Zim7_YQf98s](https://www.youtube.com/watch?v=Zim7_YQf98s) (4:44 minutes)
  - Area – [https://www.youtube.com/watch?v=QUldk4Nzt4M](https://www.youtube.com/watch?v=QUldk4Nzt4M) (2:18 minutes)

**Purpose of videos**

The videos provide additional explanations of real distance and real area calculations with a specific focus on assessment tasks that you might be required to do. If you are still uncertain about the explanations provided and what to do, it will be especially helpful to watch these videos.
ACTIVITY 7.4: USING AND PRESENTING MAP SCALES

Instructions
- Go to the Discussions tool on your e-tutor website.
- Open the discussion topic, Activity 7.4: Using and presenting map scales.
- Provide your answers on the activities detailed below.

Purpose
To provide an opportunity for you to become confident in using and presenting map scales.

Task instruction
After you have done the task you can ask your e-tutor to comment on your answers. Your e-tutor will not grade your answers but will indicate whether you were on the right track or not.

The tasks
1. You have a map of your neighbourhood but unfortunately the scale is not indicated. Fortunately the soccer field which is down your street is clearly shown. On the map the length is shown as 10.5 mm. You know that the length of the soccer field is 105 m. What is the scale of the map?

2. Suppose the answer to task 1 is 1:20 000 or \( \frac{1}{20,000} \).
   (a) Express the scale as a word scale in which you refer to mm and metres.
   (b) Convert the ratio scale to a line scale.

3. It is 16:50 in the afternoon. You are travelling by car from Johannesburg to Cape Town. You intend to sleep over at Bloemfontein and also watch an international sports event which is scheduled to start at 17:00. The 1:250 000 road map you are using indicates that you are approximately 5.5 cm from the lodge where you intend to sleep over and also watch the sports event. You are driving at 60 km/hour. Would you be in time to watch the start of the event? Share all your calculations with your e-tutor.

4. The 1:1000 plan of your house shows that the size of the driveway is exactly 14 mm \( \times \) 6 mm. You intend paving the driveway with bricks measuring 222 mm \( \times \) 106 mm. How many bricks would you need?

7.4.7 Interpolation
When writing this section in November 2015, large areas of South Africa experienced an extreme heat wave with temperatures reaching the high thirties and even exceeding 40 °C. Many people were asking, “How hot was it today?” or “How hot will it be tomorrow”? You will agree that it is impossible for the South African Weather Service to measure temperature at each and every household. The temperatures shared with us via weather forecasts are based on automatic measurements taken at weather stations (thus places) across the country. These measurements are then processed in order to predict temperatures for the areas situated between the weather stations. This strategy of using real measurements (quantitative values), captured at points in order to predict or estimate the quantitative values for areas between the places where measurements have been made, is known as interpolation.
The technique of interpolation relies on a theory postulated in 1970 by Waldo Tobler. His theory (“All places are related, but nearby places are more related than distant places”) is today known as the first law of geography. To illustrate the essence of the theory we would like you to imagine the following scenario and then answer the questions below.

**The scenario:** It is 13h00. You are standing in the shade on the southern side of a building on the Florida Science campus of Unisa. By using a thermometer you measured the temperature as 23ºCelsius.

**Questions:**

(1) What would the temperature be of a place (still in the shade) 10 cm (100 mm) to your left?

(2) What would the temperature be when standing 100 metres to your right in the middle of a tarred road?

(3) What would the temperature be when standing in the shade of one of the buildings of the Unisa regional centre in Parow in the Western Cape?

**Do you agree that:**

- question (1) is easy? One would expect that there would be no change in temperature over so short a distance.
- question (2) is a bit more difficult? The temperature of the tarred road would be a degree or two higher. Let’s say 26ºCelsius.
- Without additional information it is a shot in the dark to estimate the temperature in Parow based on our measurement 1 400 km to the north.

Remember the following about data gathering and interpolation:

- It is not always possible, economical or necessary to collect data at each and every point in the area in which we conduct a survey or research.
- When interpreting maps one should establish whether the shared information is based on interpolation or not.
- The information on maps depicting phenomena that have a continuous distribution is in most cases derived from interpolation. Think about height above sea level, atmospheric pressure, temperature, rainfall, relative humidity, et cetera.
- Drawing contour lines to illustrate the three-dimensional shape of the landscape is an application of interpolation which we are sure you are familiar with. This will be the focus of our next sub-section.

### 7.4.8 Mapping the relief of landscapes

After studying Learning Unit 2 you should be fairly well acquainted with the internal and external forces shaping the landscape. These forces give rise to the undulating three-dimensional landscape of plains, valleys, majestic mountain ranges, escarpment, and plateaus. We will now very briefly touch on how the shape of three-dimensional landscapes is represented on maps. The four most common landscape representations used in atlases and topographic map series are hill shading, hypsometric colouring, spot heights and contour lines.

- **Hill shading.** Figure 1.6 in Section A in your prescribed textbook is an example of where hill shading has been added as a grey background to enhance the Rocky and Appalachian Mountains.
• **Hypsometric colouring** (layer tinting). The figure on pages 30 and 31 (Section B) in your prescribed textbook shows how different colours are used to indicate different height categories. The techniques of hill shading and hypsometric colouring are often used in combination to enhance effectiveness.

• **Spot heights.** Large-scale topographic maps are based on accurate surveys. The measurement of the height above sea level of prominent landmarks is one of the functions of such surveys. We call the indication of such a measurement of height on a map a *spot height*. Turn to Appendix 7.1 and look for spot height 710 in block D5. You will see that it is a small dot with a height value indicated alongside it. A second form of spot height is a trigonometrical station. Turn to Appendix 7.2 to see what the symbol for a trigonometrical station looks like in the legend accompanying an official 1:50 000 map of South Africa. It is a small open triangle. The value which appears below the triangle (or sometimes on the left-hand side of it) is the height of the beacon above sea level. The value on the right-hand side is the number of the beacon.

![](A spot height.png)  ![A trigonometrical beacon](274.png)

• **Contour lines.** This technique will be discussed in slightly more detail under section 7.4.8.1.

7.4.8.1 *Mapping relief through contour lines*

The most unique feature of a topographic map is probably the presence of contour lines to show how height above sea level varies across the mapped area. A contour line is a line which joins points of the same height above a base level which, in most cases, is sea level. A contour map (see Figure 7.14 (b) below) is the orthogonal representation (as if you were looking at something from directly above it) of evenly spaced contour lines on a flat surface like a map.

![](A contour map is an orthogonal representation of the three-dimensional reality.png)

**FIGURE 7.14**

*A contour map is an orthogonal representation of the three-dimensional reality.*

From where do we derive the contour lines? When plotted on a map, the height values associated with spot heights and trigonometrical stations serve as basis for estimating the height of the areas between the spot heights and trigonometrical stations which have not been surveyed. This process of estimation (see Figure 7.15 below) is exactly the same as the technique of interpolation which we introduced earlier.
FIGURE 7.15

From spot heights to contour lines

Now view the video clip described below.

HIGHLY RECOMMENDED VIEWING: INTERPRETING A CONTOUR MAP

Instructions

- Use the following link to watch a video explaining basic concepts of contour maps and mapping:
  https://www.youtube.com/watch?v=zqPMYGDxCr0 (11:43 minutes).

Purpose of video

- The video provides an introductory explanation on topics such as index contours, contour intervals, the distance between contour lines as indication of steepness and contour patterns as an indication of the shape of the land (e.g. a hill, a river valley, flat land, et cetera).

Let us summarise some “contour rules”.

1. Contour lines never cross one another.
2. A contour line is always a closed line which either joins itself again or is drawn to the edge of the map on the assumption that it continues on the adjoining map.
3. Contour lines must always be given height values, or otherwise the height of every fourth or fifth contour line must be indicated so that the map user can easily read the values of the lines in between. On the extract from map 3319BC De Doorns (see Appendix 7.1) you will see that every fifth contour line is thicker to make it easier for the user to count the lines. Such a contour line is called an index contour.
4. The correct way to indicate the height values of contour lines is to write them either in the middle of the line (e.g. — 400 —) or on the “higher” side of the line. The contour values should be indicated in such a way that the map user can read them in the direction of the increase in height.
5. Contour lines should be “evenly spaced”. This means that the height difference between any two adjoining contour lines should be the same everywhere on the map. In other words, the vertical difference in height between adjoining contour lines must always be the same everywhere on the map.
Inferring steepness from the spacing of contour lines.

The video pointed out that the horizontal distance between contour lines is an indication of the steepness of the landscape.

- The steeper the slope, the smaller the distance between the contours. Have a look at the contour lines associated with the mountainous area to the north and south on the map extract of De Doorns (Appendix 7.1).
- The more gentle the slope, the larger the distance between the contours. Again have a look at the map of De Doorns. Along the valley between the mountains the contour lines are spaced much further apart.

In Figure 7.16 below we illustrated how very basic shapes in the landscape can be inferred from the spacing of contour lines. In element (b) of the sketch we drew side views of the areas depicted by the four contour maps. Note that the technique of drawing side views is for illustrative purposes only – how to draw side views will be covered in another geography module, ie. GGH2603.

We can describe steepness using qualitative terms such as gentle, moderate, steep or challenging, but such terms are subjective and thus open for misinterpretation. Fortunately there is a solution. We can use a contour map to describe steepness in an unequivocal manner in terms of gradient. A gradient is an indication of steepness between two points expressed as the ratio between difference in height and distance. Imagine that Figure 7.17 represents the side view of a hiking trail between points A and C. Point B is mid-way between points A and C. Can you see that is steeper from point B to C than from point A to B? The question is: How do we prove it in a quantitative manner?
We mentioned that a gradient is the ratio between the difference in height between two places and the distance between the two places. This ratio can be expressed as a simple formula:

\[ \text{Gradient} = \frac{\text{VI}}{\text{HE}}, \]

where VI represents the vertical interval (difference in height between two places) and HE represents the distance between the same two places.

From Figure 7.17 we can infer the data shown in the table below.

<table>
<thead>
<tr>
<th></th>
<th>VI (m)</th>
<th>HE (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>From point A to B</td>
<td>25 m</td>
<td>800</td>
</tr>
<tr>
<td></td>
<td>Note that point A is halfway between 0 m and 50 m</td>
<td></td>
</tr>
<tr>
<td>From point B to C</td>
<td>150 m</td>
<td>800</td>
</tr>
<tr>
<td></td>
<td>(derived from 200 m – 50 m)</td>
<td></td>
</tr>
</tbody>
</table>

We can now calculate the two gradients.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Gradient between point A and B</th>
<th>Gradient between point B and C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write down the formula.</td>
<td>Gradient = \frac{\text{VI}}{\text{HE}}</td>
<td>Gradient = \frac{\text{VI}}{\text{HE}}</td>
</tr>
<tr>
<td>Substitute VI and HE with their real values.</td>
<td>Gradient = \frac{25}{800}</td>
<td>Gradient = \frac{150}{800}</td>
</tr>
<tr>
<td>Express the ratio in its simplest form – the numerator should be “1”. This can be achieved by dividing both the numerator and denominator by the value of the numerator.</td>
<td>Gradient = \frac{1}{32}</td>
<td>Gradient = \frac{1}{5.3}</td>
</tr>
</tbody>
</table>
How do we interpret a gradient? The smaller the value of the denominator of the final answer, the steeper the landscape. Section BC is thus steeper than section AB. In the case of section BC, for every one unit in the vertical plane, you only cover 5.3 units in a horizontal plane. In the case of section AB, you cover 32 units in a horizontal plane for every one unit in the vertical plane. This is illustrated graphically by means of right-angled triangles in Figure 7.18 below.

![Figure 7.18](image)

**FIGURE 7.18**

*Section BC is steeper than section AB*

### INDIVIDUAL ACTIVITY

#### ACTIVITY 7.5: CALCULATING GRADIENT FROM A CONTOUR MAP

**Task instructions**

After you have completed the task, you need to share the steps you have followed as well as the final answer with your e-tutor. The tutor will not grade your answers but will indicate whether you were on the right track or not.

**Purpose**

To practise calculating a gradient by using a contour map.

**Task**

You are required to calculate the average gradient between points A and B shown in the accompanying figure. You can turn to Appendix 7.1 to view the colour version of the map – the map below has been extracted from Appendix 7.1.

Some hints:

- The VI value is read from the contours. The HE value must be calculated.
- The scale of the map is 1:50 000.
- The contour interval is 20 m.
- Point A is situated halfway between two contour lines. You will have to estimate the height of point A.

Refer to the accompanying road sign and explain the value of being able to calculate a gradient for road construction purposes.
7.4.9 Remote sensing technology

In essence remote sensing refers to the process during which information is gathered about a geographic object over a distance without the object and measuring device being in physical contact. In other words, you are observing it from a distance. This includes observing the Earth from space, the atmosphere and even just from lower heights like the top of a building or a mountain.

The first vertical aerial photograph was taken of a French village from a hot air balloon in 1858. Although this aerial photograph does not exist anymore, other aerial photographs taken shortly afterwards still do exist. Later in the 1800s, aerial photographs were taken using pigeons, kites and rockets, while aeroplanes were first used in the early 1900s (Professional Aerial Photographers Association, 2015). Aerial photographs were first used in map making and surveying, both of which paid dividends during the first and second world wars. The most recent development in the field of aerial photography is the use of unmanned aerial vehicles (UAVs or drones). For example, a farmer can manage a farm by flying a remotely-controlled mini-aircraft over the farm and feed the captured images directly into a GIS.

In 1960, the development of new methods and technologies to survey the Earth from a distance led to the introduction of the term “remote sensing” which included the use of satellites to survey significantly larger parts of the Earth (Baumann, 2009). Today, geo-spatial technologies allow us to gather visual satellite data of the Earth on almost a continuous basis and at very high levels of resolution and then to use this data in an integrative manner within a geographic information system (GIS).

Read the sections Satellite Technology (Section A: Chapter 1, pages 61–65) and Geography’s Contemporary Analytical Tools (Section B: Chapter 1, pages 12–13) with specific focus on the following:

- the type of data that can be gathered through remote sensing,
- the technologies used to gather remotely sensed data,
- common applications of data obtained through remote sensing, and
- the use of satellites and GPS technology in navigation and determining absolute location.

Satellite technology and the vast network of satellites that have been established provide numerous opportunities for gathering and sharing information across the globe. One simply needs a connection to the global satellite network to obtain and share information. One of the most common everyday uses of this network is GPSs (global positioning systems). A GPS uses satellites to determine the time of events and absolute location of objects (think about a person, a vehicle, a rhino, a house). The main application is related to navigation and real-time tracking of people, vehicles, aircrafts, ships, goods, et cetera. Since its initial development in the early 1970s for military purposes, the applications of GPS technology have only expanded and became so user-friendly (think about location-based services accessible through GPS-enabled smartphones) that it is currently very popular in the private domain and an essential element in many business operations.
Applications of Aerial Photography

Instructions

- Use the following link to read an article about the applications of aerial photography:
  https://sites.google.com/site/aerialphotograpydisasters/resource-centre/applications-for-aerial-photos

Purpose of link

- This link does not refer you to a video, as usual, but rather to an article explaining the various applications of aerial photography. Scan through the various applications and reflect on how aerial photography (as a potential source of spatial data) can enhance geography and cartography and how many of the applications have had an impact in your life or your home town.

7.4.10 Geographic information systems

A geographic information system (GIS) is a system which uses hardware and software to capture and analyse spatial data, and display such spatial data in a variety of formats (especially maps). GIS is eminently suited to monitor and analyse different but related phenomena that are spatial in nature in an integrated manner.

Read the sections Geographic Information Systems (Section A: pages 66–72) and Geography’s Contemporary Analytical Tools (Section B: pages 12–13). Make sure that you pay attention to:

- the components and functions of a GIS,
- the layered structure of a GIS, and
- the applications of GIS in everyday life.

GIS has come to play an increasingly significant role in the way in which governance and business is conducted around the world. Many governments and organisations rely on GIS to inform decision-making processes while GIS is also a very important component in the planning and monitoring of development projects and environmental management.
THE APPLICATION OF GIS SOFTWARE

Instructions

- Use the following link to view a gallery of maps created with GIS software:
  https://www.arcgis.com/home/gallery.html#c=esri&t=maps&o=modified&page=3

Purpose of link

The above link does not refer you to a video, as usual, but rather to a gallery where you can view a variety of maps (on a global and a local scale) that was created after gathering geographic data (through remote sensing and/or GPS technology) and then processing the data with GIS software. The representations include historic maps, conventional static representations of geographic phenomena, real-time representations of geographic phenomena and projections of possible future geographic conditions.

7.5 EXPLORE AND PRACTISE

- Visual representations of the Earth are constantly improving (it gets more realistic) and new information about the Earth and its inhabitants is becoming available on a daily basis. Although it is not compulsory, we encourage you to explore the following resources for an improved understanding of some of the topics discussed in this learning unit as well as the applications of maps.
  - Visit the site www.geoawesomeness.com and search the site for the series of articles entitled “The Hidden Meanings of Maps” for more information on how maps are used and how their characteristics vary to depict information in various ways. The choice of a map projection and orientation can for example significantly influence how a location is perceived.
  - Visit the website www.jasondavies.com/maps/transition/ to view world maps drawn on different projections.
  - Map users often form a wrong perception of the size of countries relative to one another due to the fact that maps are often used for purposes other than what they were intended for. Visit http://thetruesize.com/ and explore (using equal area projections) the true size of some countries in the word. Did you know that Greenland would “fit” inside India or that Brazil would almost cover the 48 adjoining U.S states or that Australia is in fact larger than the whole of Central Europe?

7.6 SUMMARY AND REFLECTION

Now that you worked through the entire learning unit and have completed all the activities, you should be able to create your own summary of important aspects of the learning unit. Your summary should be guided by the learning outcomes.

At this stage you can use the following questions to reflect on the topics that have been covered in this learning unit:

- What has changed in terms of the purpose, application and accessibility of maps since the first maps were created?
LEARNING UNIT 7: GEOGRAPHIC DATA: NATURE, SOURCES AND REPRESENTATION

- Why is it more appropriate to show the scale of a map as a graphic scale as opposed to a ratio scale or a word scale?
- What are the main differences between a small-scale map and a large-scale map?
- What information can you derive from a map that would assist you in solving everyday “problems” and how would you derive such information?
- What are the main differences between a map, an aerial photograph and a satellite image?
- What is the nature of a GIS?

Your improved understanding and experience of the ways in which geographers represent the real world should enable you to respond to all these questions with confidence. The above questions are not compulsory, and you will therefore not receive general feedback on them. However, by incorporating these questions into your study schedule, you will undoubtedly benefit from the additional practise and get a greater understanding of Geography as a science.

7.7 TEST YOURSELF

Multiple-choice questions (MCQs) provide a quick and effective way of determining your comprehension of the learning unit content and outcomes. The MCQs provided here serve exactly this purpose. The purpose is not to provide an additional formal assessment opportunity – it is merely a self-assessment opportunity. This is a voluntary exercise to be completed in your own time. We strongly advise you to complete these questions before the scheduled completion of the learning unit (as per the schedule in Tutorial Letter 101), as this is also the date on which the answers to the questions will be provided to you via myUnisa.

1. Which one of the following is not an attribute of all paper maps?
   (1) The use of symbols as map language.
   (2) A 1:1 scale.
   (3) The presentation of spatial data.
   (4) A two-dimensional flat-surfaced representation of reality.

2. Which one of the following word scales describing the relationship between the distance on a small-scale map and the corresponding distance in reality may be true?
   (1) 1 centimetre on the map represents 500 kilometres in reality.
   (2) 1 centimetre on the map represents 1 centimetre in reality.
   (3) 10 kilometres on the map represents 1 centimetre in reality.
   (4) 1 centimetre in reality represents 1 kilometre on the map.

3. Which one of the following statements about the geographic grid is false?
   (1) Every meridian has the same length and the same beginning and end points.
   (2) Parallels are drawn around the globe parallel to the equator at right angles to the meridians.
   (3) The term used to indicate the location of parallels is called longitude.
   (4) The equator runs parallel with the largest circumference, and all places situated on this line have 12 hours of daylight every day.

4. On an official 1:50 000 topographic map of an area in South Africa, the symbol for a recreational ground will be shown as a … symbol, a police station will be shown as a … symbol and a fence will be shown as a … symbol.
5. An equal-area map projection preserves … while a conformal map projection preserves … and distorts …
   (1) shape; shape; direction
   (2) shape; size; shape
   (3) size; direction; shape
   (4) size; shape; size

USE FIGURE 7.19 TO ANSWER QUESTIONS 6 TO 10.

6. Which one of the following word scales correctly represents the ratio scale of the map in Figure 7.19?
   (1) 1 cm on the map is equal to 5 000 cm in reality.
   (2) 1 cm on the map is equal to 500 m in reality.
   (3) 1 cm on the map is equal to 5 km in reality.
   (4) 1 cm on the map is equal to 50 m in reality.

7. The real distance between point A and point B on the map in Figure 7.19 is …
   (1) 0.55 km.
   (2) 2.75 km.
   (3) 550 m.
   (4) 275 m.

8. How many families would be able to have a picnic on the beach if each family occupies 10 m² of the picnic area (see Figure 7.19).
   (1) 750
   (2) 15
9. The January 2022 magnetic declination for the map area depicted in Figure 7.19 is …

- (1) 4°36' west of true north.
- (2) 3°24' east of true north.
- (3) 4°36' east of true north.
- (4) 3°24' west of true north.

10. The January 2022 magnetic bearing from point A on point B is …

- (1) 273°24' west of true north.
- (2) 93°24' west of true north.
- (3) 266°36' west of true north.
- (4) 86°36' west of true north.

7.8 CONCLUSION

The content of this learning unit focused on how geographers use spatial data to answer the questions of where, what is it like, and why in terms of geographic phenomena. The explanation led to a discussion about data characteristics and representations of the Earth (including types of geographic data, the geographic reference system, time zones, map projections, map scales, map symbols and types of maps) as well as a discussion about the use and application of modern technology available to geographers. A significant part of the learning material looked at how to derive real-word information from maps and how to calculate the real-world dimensions of geographic phenomena represented on maps. All of these aspects combine into an important geographic skills set, that will allow you to interpret the world through graphic representations (maps, photographs, images).

You have now worked through all the learning material for module GGH1501. To conclude Learning Unit 7 and indeed the module we compiled two additional tasks:

- We are aware that many students tend to stress when confronted with the map work calculations dealt with in this learning unit. However, we also know that once these map work calculations are mastered, it is easy to achieve full marks in the examination for questions related to map scales, gradients, interpolation, et cetera. We believe that practise makes perfect. We have thus compiled a set of questions based on map work which you can use as preparation for the examination. The relevant file (Practising mapwork skills) can be found on myUnisa under Additional Resources/Additional Learning Unit Resources/Learning Unit 7. You should do the tasks on your own. The discussion forum, Practising Mapwork Skills, may only be used to ask advice when totally lost but final answers should not be shared on the forum. When done, you can e-mail your answers to your e-tutor for evaluation and comments on your answers.
- Activity 7.6 is a capstone activity integrating the content of all the learning units.
**ACTIVITY 7.6: COMPARING THE GEOGRAPHICAL WORLDS OF TWO COUNTRIES**

**Purpose**
The title of the module is “Know your world: An introduction to Geography”. Through this activity you get the opportunity to convince us that you know and can compare the geographical worlds of two specific countries of your choice.

**Broad task instruction**
For this task you will need to liaise with your e-tutor to first establish whether you are on the right track with your selection of countries. Make sure that you will be able to address all the elements of the task for your selected countries.

Upon completion of the task, you can submit it to your e-tutor for commenting. The tutor will not grade your answers but will indicate whether you are on the right track or not. A detailed task description and format for the task is provided below.

**Detailed task description**
1. You need to follow the compulsory framework and guidelines mentioned in the table below to complete the task. You have to select two countries of your choice and compile a comparative geographical study in which you describe how their particular geographical situations either limit or enhance their potential for development.
2. The comparison needs to be based on a selection of relevant theories, perspectives and approaches of geography that are dealt with in GGH1501. It is very important that you use the appropriate maps in your prescribed book and interpret these accurately and provide proper references. Although you are encouraged to use the internet to source additional information, your prescribed book (and the maps it contains) should be your primary reference source.
3. Your comparison needs to be in the format of a structured, well-organised report of approximately 3 000 to 4 000 words in which you present the results of your comparative study. The report needs to include a cover page, a table of contents, a list of figures, tables and graphs, and a list of sources consulted. Read the document (it is available on myUnisa under Additional Resources) Guidelines for referencing _UJ Fairhurst.pdf for guidelines on how to present such a list of sources.
4. Note that the use of work presented by other persons whether this work is in the form of writing, pictures, graphs or data or any other format, should be properly referenced in the text.
5. Note the declaration of originality (see page 141) which should be signed and inserted as the last page of your report.
6. Other guidelines:
   - The two countries have to be from different hemispheres.
   - One country needs to be a less developed country (thus from the Global South), the other one should be a more developed country (thus from the Global North).
   - The two countries need to be representative of different cultural frames of reference.
   - The two countries should not differ hugely in terms of size – it does not make sense to compare a very small country with a very big country.
The following websites offer guidelines and advice on report writing:

- How to write a comparative analysis:
- How to write a report:
  - http://library.bcu.ac.uk/learner/writingguides/1.02%20Reports.htm
- Report writing:
  - http://www.deakin.edu.au/students/study-support/academic-resources/report-writing
- Report writing – academic tip sheet:

Table outlining the framework for the report referred to in Activity 7.6

Important: It is important for you to focus on how the geographical situations (items 3 to 7 below) of the two countries you have selected either limit or enhance their potential for development. Note that your e-tutor will not grade your report – the mark allocation is simply to give you an indication of weights of the individual sections and aspects that would have been considered in the case of a formal assignment or in an exam question.

<table>
<thead>
<tr>
<th>Section number</th>
<th>Section title</th>
<th>Mark allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction. This should include the aim of your study, the names of the two selected countries, motivation for your choice and a description of the relative location of the selected countries.</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>The geographical perspective: What is entailed when doing a study of this nature from a geographical point of view?</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>Discuss the locational and landscape setting of the two selected countries.</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>Discuss the physical geography of the two selected countries.</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>Discuss the population situation and dynamics of the two countries.</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td>Discuss the resources (natural and human) and economic realities of the two countries.</td>
<td>10</td>
</tr>
<tr>
<td>7</td>
<td>Discuss the cultural and political landscapes of the two countries.</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>8</td>
<td>Discuss the major differences and similarities of the two countries, including development constraints and opportunities.</td>
<td>10</td>
</tr>
<tr>
<td>9</td>
<td>Conclusion</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>90</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Additional aspects to attend to</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The relevance of sources consulted and whether they are presented technically correct in the text as well as in the reference list (the list of sources consulted).</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>Language – remember to proofread your document!</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>Use of relevant visual material (also remember to reference).</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>Adherence to guidelines for selection of countries.</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>The appeal of the final product.</td>
<td>10</td>
</tr>
</tbody>
</table>

**Grand total for document reporting on comparative study** | **140** |
DECLARATION OF ORIGINALITY

I, _______________________________ hereby declare that this report, which I have completed as part of the assessment for GGH1501, University of South Africa, is my own work.

I further declare that this report does not contain any work presented by other persons be it in written, pictorial, graphical form, or data or any other information without acknowledgement of the source.

Student signature:

Date:
7.10 REFERENCES


APPENDIX 7.1

Extract from official 1:50 000 topographical map 3319BC DE DOORNS.

Extracted on 23 October 2015 from the electronic version of the official 1:50 000 topographical map 3319BC DE DOORNS, produced by the Chief Directorate: National Geo-spatial Information (NGI), Department of Rural Development and Land Reform. Magnetic data provided by Space Science Facility of the South African National Space Agency.
# APPENDIX 7.2

*Extract from the legend of the official 1:50 000 topographical map 3319BC DE DOORNS*

<table>
<thead>
<tr>
<th>REFERENCE</th>
<th>VERKLARING</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Freeway; National Route</td>
<td>Hoofwegen; Nationale Route</td>
</tr>
<tr>
<td>Arterial Route</td>
<td>Hoofwegen; Nationale Route</td>
</tr>
<tr>
<td>Main Road</td>
<td>Hoofpad</td>
</tr>
<tr>
<td>Secondary Road; Bench Mark</td>
<td>Sekundaire Pad; Hoogtemark</td>
</tr>
<tr>
<td>Other Road; Bridge</td>
<td>Andere Pad; Brug</td>
</tr>
<tr>
<td>Track and Hiking Trail</td>
<td>Drieweg en Veetekantpad</td>
</tr>
<tr>
<td>Railway; Station or Siding</td>
<td>Spoorweg; Stasie of Syllyn</td>
</tr>
<tr>
<td>Other Railway; Tunnel</td>
<td>Andere Spoorweg; Tunnel</td>
</tr>
<tr>
<td>Embankment; Cutting</td>
<td>Opvulling; Deursgraving</td>
</tr>
<tr>
<td>Power Line</td>
<td>Kragboog</td>
</tr>
<tr>
<td>Built-up Area (High, Low Density)</td>
<td>Gebouwe Gebied (Hoë, Lô Digtheid)</td>
</tr>
<tr>
<td>Buildings; Ruin</td>
<td>Geboue; Muraste</td>
</tr>
<tr>
<td>Post Office, Police Station; Store</td>
<td>Postkantoor; Polisieasiese; Winkel</td>
</tr>
<tr>
<td>Place of Worship; School; Hotel</td>
<td>Plek van Aanbieding; Skool; Hotel</td>
</tr>
<tr>
<td>Fence; Wall</td>
<td>Draadheining; Muur</td>
</tr>
<tr>
<td>Windpump; Monument</td>
<td>Windpomp; Monument</td>
</tr>
<tr>
<td>Communication Tower</td>
<td>Kommunikasietoring</td>
</tr>
<tr>
<td>Mine Dump; Excavation</td>
<td>Mylhoop; Uitgraving</td>
</tr>
<tr>
<td>Trigonometrical Station; Marine Beacon</td>
<td>Pelikaan; Seevaartbaken</td>
</tr>
<tr>
<td>Lighthouse and Marine Light</td>
<td>Vuurtoring en Seevaartfog</td>
</tr>
<tr>
<td>Cemetery; Grave</td>
<td>Begraafplaas; Graf</td>
</tr>
<tr>
<td>International Boundary and Beacon</td>
<td>Internasionale Grens en Baken</td>
</tr>
<tr>
<td>Provincial Boundary</td>
<td>Provinciale Grens</td>
</tr>
<tr>
<td>Protected Area</td>
<td>Bewarings Gebied</td>
</tr>
<tr>
<td>Perennial River</td>
<td>Standhoudende Rivier</td>
</tr>
<tr>
<td>Non-Perennial River</td>
<td>Nie-standhoudende Rivier</td>
</tr>
<tr>
<td>Dry Water Course</td>
<td>Nie-standhoudende Water</td>
</tr>
<tr>
<td>Marsh and Viel</td>
<td>Droë Loop</td>
</tr>
<tr>
<td>Pipeline (above ground)</td>
<td>Moeras en Vlei</td>
</tr>
<tr>
<td>Water Tower; Reservoir; Water Point</td>
<td>Watteroring; Reservoir; Waterpunt</td>
</tr>
<tr>
<td>Coastal Rocks</td>
<td>Kaslynroete</td>
</tr>
<tr>
<td>Prominent Rock Outcrop</td>
<td>Prominente Klipbank</td>
</tr>
<tr>
<td>Erosion; Sand</td>
<td>Erosie; Sand</td>
</tr>
<tr>
<td>Woodland</td>
<td>Bevertakte Land</td>
</tr>
<tr>
<td>Orchard or Vineyard</td>
<td>Ontspanningsterrein</td>
</tr>
<tr>
<td>Recreation Ground</td>
<td>Ryf Bome</td>
</tr>
</tbody>
</table>

Extracted on 23 October 2015 from the electronic version of the official 1:50 000 topographical map 3319BC DE DOORNS, produced by the Chief Directorate: National Geo-spatial Information (NGI), Department of Rural Development and Land Reform.