Mapwork

“Maps are essential. Planning a journey without a map is like building a house without drawings.”

– Mark Jenkins
# Book 3 - Map Work

**Grade 7**  
**Term 1/2**  
*(Social Science - Geography)*

## THEMES
- What Kind of Map?  
- Map Symbols  
- Direction Finding  
- Magnetic Declination  
- Latitude and Longitude  
- Conquering Co-ordinates  
- Scale Work

## ESSENTIAL QUESTIONS
1. Why does the climate change?  
2. What causes the earth’s magnetic field to change?

## SKILLS
- **Thinking and Reasoning** - analysing sources and answering questions insightfully  
- **Investigation** - explore, deduce and record finds  
- **Research and Recording** - selecting specific material from given content  
- **Problem Solving** - interpret data, appraise evidence

## CONCEPTS
- **Evidence** - working with evidence and finding connections  
- **Location** - understand location within South Africa, Africa, the world

## ATTITUDES AND VALUES
- **Group Processing** - Working effectively with peers  
- **Responsibility and Meeting Deadlines** - tasks completed on time, group and peer respect

## ASSESSMENTS, TASKS AND PROJECTS
- What Kind of Map? (10)  
- Map Symbols 1 (10)  
- Map Symbols 2 (15)  
- Direction Finding (15)  
- Latitude and Longitude (20)  
- Map of Africa (20)  
- Map of Europe (15)
Complete the table below by filling in the missing definitions. You also need to draw a picture to describe each term. Make use of the information provided by your teacher, as well as the Google search engine to complete this task.

*Extension: Try to complete this task using the Pages app on your iPad. Alternatively, your teacher will print a version of this table for you to complete in your Thematic Book.*

<table>
<thead>
<tr>
<th>My Geographical Dictionary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cardinal Points</strong></td>
</tr>
<tr>
<td><strong>Cartographer</strong></td>
</tr>
<tr>
<td><strong>Magnetic Declination</strong></td>
</tr>
<tr>
<td><strong>Co-Ordinates</strong></td>
</tr>
<tr>
<td><strong>Equator</strong></td>
</tr>
<tr>
<td><strong>Prime Meridian</strong></td>
</tr>
<tr>
<td><strong>International Date Line</strong></td>
</tr>
<tr>
<td><strong>Latitude</strong></td>
</tr>
<tr>
<td><strong>Longitude</strong></td>
</tr>
<tr>
<td><strong>Scale</strong></td>
</tr>
</tbody>
</table>
What Kind of Map?

Maps are pictures or representations of the Earth's surface. They show how places are related to each other by distance, direction, and size. Maps are a way of showing a part of the Earth's surface on a flat piece of paper. Remember, the Earth is spherical in shape. This can cause what is called distortion (changes in the shape of an object). The areas of a map closest to the equator have little distortion. The closer a map moves towards the poles the more distorted the map becomes. For example, Greenland appears to be much larger on a map than it really is. A person who makes maps is called a cartographer. Most maps include a compass rose, which indicates which way we can find north, south, east and west. They also include a scale so you can estimate distances.

There are several different map types:

1. **Political Map**

A political map shows a province/country/continent, its boundaries and all the capital cities. A capital city is usually marked with a star.

When drawing or colouring in a political map, there are a few rules to remember:

- A country’s name should be in CAPITALS.
- As shown above, there are no specific colours used in a political map, **BUT** - a country near the ocean should not be blue **AND** two neighbouring countries cannot be the same colour.
2. **Physical Map**

Physical maps illustrate the physical features of an area, such as the mountains, rivers, deserts and lakes. The water is usually shown in blue. Colours are used to show relief—differences in land elevations. Green is typically used at lower elevations, and orange or brown indicate higher elevations.

3. **Topographic Map**

A topographic map is similar to a physical map in that it shows different physical landscape features. They are different however because they use contour lines instead of colours to show changes in the landscape. Contour lines on topographic maps are normally spaced at regular intervals to show elevation changes (e.g. each line represents a 100 foot (30 m) elevation change) and when lines are close together the terrain is steep.
4. **Road Map**

A road map is one of the most widely used map types. These maps show major and minor highways and roads (depending on detail) as well as things like airports, city locations and points of interest like parks, campgrounds and monuments. Major highways on a road map are generally red or blue and larger than other roads, while minor roads are a lighter colour and a narrower line.

5. **Climate Map**

These maps give general information about the climate and precipitation (rain and snow) of a region. Cartographers, or mapmakers, use colours to show different climate or precipitation zones.
6. **Thematic Map**

A thematic map is a map that focuses on a particular theme or special topic and they are different from the other maps because they do not just show natural features like rivers, cities, political subdivisions, elevation or artificial features such as highways. If these items are on a thematic map, they are background information and are used as reference points to enhance the map’s theme.

An example of a thematic map would be one showing population change.

![Population Map](image)

7. **Economic or Resource Map**

These maps feature the major types of natural resources or economic activity in an area. Cartographers use symbols and keys to show the locations of natural resources or economic activities.

![Economic Map](image)
Choose one map type to describe. Using Tellagami, create a 30 second oral to teach your class about your chosen map. (Alternative task: use tablet’s camera facility)

You can customise your character and change the background. Tip: Make the background for your Gami the map that you are going to use in your oral. You will need to download an appropriate picture from Google. Search for the type of map needed. Now, hold down on the image until a speech bubble pops up, allowing you to save your image to your iPad.

Total: 10
Map Symbols

A map symbol is any character or graphical representation that may be used on a map to indicate an object or property. These symbols include letters, numbers, diagrams and even shadings to indicate a number of things such as railway lines, monuments, footpaths and pipelines.

Map symbols are normally presented in a key. A map key is a list of words or phrases or colours, usually within a box in the corner of the map. They explain the symbols that are found on the map itself.

Maps of a bigger area will have symbols such as power lines, roads and buildings. Smaller maps, such as one for Ratanga Junction, can indicate toilets, picnic areas and restaurants.

Here are some examples of the different types of map symbols that are commonly used:
Instructions:

1. Click on the Google Earth icon on your iPad and launch the app.

2. Click on the icon located top left of the page (see indicated in red below) and ensure that the following layers are selected: places and businesses.

3. Search for Fish Hoek using the search bar in the top right hand corner.

4. Draw the symbol in your book for:
   a) The police station
   b) The hospital
   c) The library

5. To what do you think the following symbols refer?
   a) A briefcase
   b) The two children
   c) A cross
   d) The bed

6. When were these images taken? How do we know this?

7. What does this symbol enable you to do when working with Google Earth?

Total: 10
1. Create a key for this map (mountain range, airport, town, railway line, lighthouse, station, river) (7)

2. Write down the names of two dams. (2)

3. What island is found off Cape Town? (1)

4. What is the southern most point on the map? (1)

5. What kind of a map is this? How do you know? (2)

6. How many lighthouses are there on this map? (1)

7. How many mountains ranges can you see on this map? (1)

Total: 15
Click on the picture below to launch the video.

This video recaps the work learned thus far - using music and singing to try to embed the information in your minds. Did you know that making up a song or rap when studying is a good way to memorise information? It will “stick” for longer and helps make studying more fun!

Finished with your work? Try to complete the puzzle. Click on the icon below to launch the application.
A compass always points to **magnetic north**. That doesn’t mean that it always points to the “N” on a compass but rather to the direction that represents North in the world. Let’s investigate further ...

The Earth behaves as if there is a giant bar magnet running through its middle from pole to pole. This affects all magnetic material that comes within its reach. If you hold a magnet so that it can rotate freely, it always ends up with one end pointing to the Earth’s North Pole and the other to the South Pole. This is how a compass works- the needle automatically swings to the North. The Earth's magnetism comes from its inner core of iron and nickel.
True North (geographic North Pole) is the northernmost point on the earth's surface. It has a known, fixed position of 90°. The North Pole is about 450 miles (725 km) north of Greenland in the middle of the Arctic Ocean. Most of the time, sea ice covers the North Pole.

Magnetic North is the place where compass needles actually point. Magnetic north is located hundreds of miles south of the geographic North Pole.

James Clark Ross (1800-1862), commander in the British Navy and an experienced Arctic explorer, discovered the Magnetic North Pole on 1 June 1831.

When the magnetic north pole was revisited in 1904, explorers found it had moved by 50km (31 miles) from where it had been when first discovered in 1831.

In 1989 it sped up again, and in 2007 scientists confirmed that the pole is now galloping toward Siberia at about 60 kilometres a year.

Extension - Why does the North Pole move? Click on the icon below to find out.
Note: The top of a map is always north unless north is shown to be in a different place.

1. Look at the map and see if you can complete these sentences. Use the eight most important compass directions. The first one has been done for you. (10)

a) Cape Town lies **west** of Port Elizabeth.
b) Port Elizabeth lies ____________ of Cape Town.
c) East London lies ____________ of Port Elizabeth.
d) Upington lies ____________ of East London.
e) Bloemfontein lies ____________ of Johannesburg.
f) Pretoria lies ____________ of Kimberley.
g) East London lies ____________ of Johannesburg.
h) Bloemfontein lies ____________ of Port Elizabeth.
i) The Indian Ocean lies ____________ of Umtata.
j) ________________ lies south-west of Bloemfontein.
k) Pretoria lies north-east of ________________.
2. Look at the world map and complete the sentences. (5)

a) Australia lies to the _______________ of South Africa.
b) The continent of _______________ lies north of South Africa.
c) The United States of America lies _______________ of South Africa.
d) South Africa is _______________ of Argentina.
e) The _______________ Ocean is west of South Africa and east of South America.

Total: 15

Click on the video below to hear a song that teaches the names and locations of all of the continents. Extension task - create your own version of the continent song in groups.
Magnetic Declination

Magnetic declination refers to the angle between the direction in which the compass needle points (magnetic north) and the north pole (true north).

Magnetic declinations vary from place to place, depending on the intensity of the Earth's magnetic fields. For instance, if you hold out a compass in New Zealand, magnetic north will be about 20 degrees east of true north, whereas the declination in Los Angeles is 12 degrees.

One of the simplest ways to find true north is with a GPS. A GPS recognises your location by compiling the location information provided by multiple satellites that orbit the Earth. If you have one, you can select a 'true north' setting on your GPS, enter your destination, and it takes care of the rest.

Magnetic declination is measured in degrees east or west of true north. The magnetic declination at Cape Town is 24°2'W (24 degrees and 2 minutes).
Lines of Latitude, also called parallels of latitude, wrap around the earth parallel to the equator. They are always the same distance apart and are listed as North or South based on their position relative to the equator.

Lines of Longitude, also called Meridians, run from the North Pole to the South Pole. They are closer together at the poles and furthest apart at the equator. They are listed as East or West based on their position relative to the Prime Meridian, which runs through London.

**Word Associations**

One “trick” to remember the difference between longitude and latitude is to use word associations. Think of the "long" in "longitude." Longitude lines run "long" from the North Pole to the South Pole. Think of "latitude" as "ladder"-tude. The east-west latitude lines are like the rungs of a ladder, creating horizontal lines around the earth.
The most important line of latitude is the **equator** (0º). It divided the earth into two halves or hemispheres - the **Northern Hemisphere** to the north of the equator and the **Southern Hemisphere** to the south of the equator.

The most important lines of longitude are the **Prime Meridian (or Greenwich Meridian)** (0º) and the **International Date Line** (180º). The Prime Meridian divides the earth into two halves - the **Western Hemisphere** and the **Eastern Hemisphere**.

Other important lines of latitude are:

<table>
<thead>
<tr>
<th>Latitude</th>
<th>Degree(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The North Pole</td>
<td>90° N</td>
</tr>
<tr>
<td>The Arctic Circle</td>
<td>66.5° N</td>
</tr>
<tr>
<td>The Tropic of Cancer</td>
<td>23.5° N</td>
</tr>
<tr>
<td>The Tropic of Capricorn</td>
<td>23.5° S</td>
</tr>
<tr>
<td>The Antarctic Circle</td>
<td>66.5° S</td>
</tr>
<tr>
<td>The South Pole</td>
<td>90° S</td>
</tr>
</tbody>
</table>

**Click on the link below to view a world map showing important lines of latitude:**

![World Map Link](image)
1. Complete the following sentences: (10)

a) On a map the east-west lines are known as lines of _______________________ or __________________ of latitude. They are parallel and are measured in ____________________ north or south of the ____________________.

b) The north-south lines are known as lines of _______________________ or _______________________ and pass through the North and South ____________________.

c) The most important line of latitude is the _____________________. The two most important lines of longitude are the _______________________ and the _______________________.

2. Label the most important lines of latitude and longitude: (8)

a)

66.5°N

b)

66.5°S

c)

23.5°N

d)

23.5°S

e)

0°

f)

g)

h)

3. What is another name for the Prime Meridian? ________________________ (1)

4. Through which city does the Prime Meridian run? ________________________ (1)

Total: 20
Let's explore Google Earth and consolidate the work that has been covered so far:

1) Check that you have the following layers ticked: places, businesses, borders and labels, 3D buildings, oceans.

2) Zoom in to Africa. What kind of a map is this? How do you know?

3) If you zoom in closer, the names of each country will appear. There are also little stars dotted around the map. What do these represent?

4) Zoom in until you find South Africa. Name the provinces and their capitals.

5) Lesotho appears to be in South Africa but has a yellow border surrounding itself. Why?

6) With your finger, trace the direction in which lines of latitude would run. Now do the same for the lines of longitude - buddy check to see whether you are correct.

7) Try to find Sun Valley Primary School. Can you find your house? You can find these places by typing a location into the search bar or by moving around the map manually. Look at them in Street View as well.

8) Find the V&A Waterfront. Go into Street View and explore the area. You should notice that the buildings and mountain ranges appear in 3D if you move up and down.

Click on the link below to watch a video describing the concepts of latitude and longitude.
Conquering Co-ordinates

Co-ordinates are made up of two measurements: **degrees north or south of the equator** and **degrees east or west of the Prime (Greenwich) Meridian**.

If you take a map of the world and then draw in the equator and Prime Meridian, you divide the earth into 4 sections:

- northern and eastern
- northern and western
- southern and eastern
- southern and western

Any place on earth can be described in terms of two hemispheres. For example, Cape Town is southern and eastern. Co-ordinates give the precise location within these hemispheres.

**Cape Town is 34º S 18.5º E**

*This means that Cape Town is 34º South of the equator and 18.5º East of the Prime Meridian.*
Look at the map of Africa and answer the questions on the next page:
1. Name 4 countries that lie on the 20° E meridian.

________________________________________________________________________________

________________________________________________________________________________

2. Name 4 countries that lie on the equator.

________________________________________________________________________________

________________________________________________________________________________

3. Through which desert does the 20° N parallel pass?

________________________________________________________________________________

4. Which countries lie on the Prime (Greenwich) Meridian?

________________________________________________________________________________

________________________________________________________________________________

5. Through which sea does the 40° E meridian pass?

________________________________________________________________________________

6. Name 2 countries that lie on the Tropic of Capricorn.

________________________________________________________________________________

7. Name 2 countries that lie on the Tropic of Cancer.

________________________________________________________________________________

8. Name 2 countries that lie on the 10° S parallel.

________________________________________________________________________________

Total: 20
Look at the map of Europe and answer the questions on the next page:
1. Find the following positions. Write down the name of the country. (5)

a) 39° N 23° E __________________________________________________________________

b) 51° N 5° E ___________________________________________________________________

c) 42° N 13° E __________________________________________________________________

d) 47.5° N 15° E _________________________________________________________________

e) 52° N 6° E ___________________________________________________________________

2. Write the co-ordinates for the centre of the following countries. (10)

a) Poland _______________________________________________________________________

b) Yugoslavia __________________________________________________________________

c) Germany ______________________________________________________________________

d) France ________________________________________________________________________

e) Spain ____________________________________________________________

Total: 15

Revision task - can you name the map? Click on the icon below to launch the test.

Why do we learn about different map types? How will we use this knowledge in the future?
Scale Work

Remember that a map is a visual representation of a much larger area of land. In order to be useful, a map must be small enough to be handled by an individual. Imagine drawing a map of the Earth that was full-size. Of course this is ridiculous. A full-size map of the Earth would not only be too large to be useful, but it would also be impractical to make. Maps are scaled down so that they fit on the available paper or screen. When scaling down a map, every part of the map is scaled by the same amount. This ensures that every object on the map is the same proportion as everything else on the map.

Because the Earth is round and maps are flat, it is impossible to create a map with a perfect scale. Some parts of the map will be too large, while others will be too small. The larger a territory represented by a map, the greater that the distortions in scale will be.

It is important that we recognise how to read, understand, and utilise scale as we examine the various maps that we encounter. There are three common methods used by map makers to depict scale. These methods are referred to as the graphic method, the verbal method, and the fractional method.

The Graphic Method

A Graphic Scale depicts distance using a linear scale - it looks a lot like a ruler. It is used to change distances on the map to real world distances.

There are many benefits to using a linear scale. First and foremost, it is a straight forward, easy way to determine scale. Secondly, if a map’s size is enlarged or decreased, the scale is also enlarged or reduced, meaning that it is still accurate.
The Verbal Method

The verbal method of depicting scale simply uses words to describe the ratio between the map's scale and the real world. For example, a map might say something like, “one centimetre equals eight kilometres.

The Fractional Method

The fractional method makes use of a ratio scale. It is very accurate. In the example below we can see that 1 unit on the map represents 50 000 units in real life.

So, 1 cm on the map = 50 000 cm in real life.

2 cm would be 100 000 cm and 2.5 cm = 125 000 cm (half a centimetre = 25 000 cm)

We can convert these distances to a simpler measurement because we know that 50 000 cm = 500 m.

Therefore 2 cm on the map would = 1000 m in real life.

Discuss with the person next to you: what would 4.5 cm on the map be in real life?
Using the map distances and ratios below, calculate the real life distances. The first one has been done as an example for you.

1. Distance: 3.4 cm  Scale: 1:75 000

1:75 000
3.4 cm = 75 000 x 3.4 cm
= 3.4 cm x 0.75
= 2.55 km

2. Distance: 2.9 cm  Scale: 1:50 000

3. Distance: 5.6 cm  Scale: 1:100 000

4. Distance: 4.8 cm  Scale: 1:60 000

5. Distance: 3.9 cm  Scale: 1:85 000

Use the calculator below to help work out the answers. Click on the picture below to launch the app.