

A Guide to Working with Maps

Teaching Approach

The work in this series of lessons builds on what learners have already studied in Grade 10 Maths Literacy. What is different in Grade 11:

- **Scale:** learners will use bar scales and numbers scales to estimate measurements on a plan or model, not only to calculate actual distances. They also need to decide on the most appropriate scale to use in different situations.
- **Finding positions and directions:** the kind of map we work with now is expanded to include street maps, national road maps and grid reference systems for street maps.
- **Planning journeys:** learners now use information about distances to plan journeys, including calculations to do with quantities of fuel used, time taken and practical considerations such as rest stops.

Scale

Learners may need to revise ratios and conversions between units of length before doing this section. Give them plenty of practice in converting between scales written in different ways.

Guide them carefully through the steps in writing a scale of 1 : 1 000 to 1 cm = 10 m. When working with scales on maps, we are estimating rather than working with accurate distances, as any small discrepancy in measurement on the map results in a large error in the actual distance.

Learners worked with different scales in Grade 10, so it would be worthwhile to revise this work. The CAPS for Grade 11 requires more complex maps.

Finding Positions and Directions

In this lesson, learners need to practise working with coordinate grids first. Make sure that they understand how to read a coordinate grid before proceeding. Explain to learners that working with a street map helps them to see how dividing a larger area into a grid helps us to determine location. The reference system for a street map will be more complex than others they have dealt with so far, as they are in effect working with two referencing systems. Once learners have found positions on a street map, they need to give directions in the usual way to explain how to get from one position to another.

Planning Journeys

Learners have calculated average speed by taking speed limits and distances on maps into account, but here they need to think more practically about a journey. A strip map is a more convenient starting point for planning a journey than an ordinary map, as it shows the whole route in detail, and in a linear way. The distances between places are shown, which gives the traveller a way to estimate how long it will take to get from one place to the other. This integrates with work on rates (speed, cost rates) and general calculations (fuel consumption).

Video Summaries

Some videos have a 'PAUSE' moment, at which point the teacher or learner can choose to pause the video and try to answer the question posed or calculate the answer to the problem under discussion. Once the video starts again, the answer to the question or the right answer to the calculation is given.

Mindset suggests a number of ways to use the video lessons. These include:

- Watch or show a lesson as an introduction to a lesson
- Watch or show a lesson after a lesson, as a summary or as a way of adding in some interesting real-life applications or practical aspects
- Design a worksheet or set of questions about one video lesson. Then ask learners to watch a video related to the lesson and to complete the worksheet or questions, either in groups or individually
- Worksheets and questions based on video lessons can be used as short assessments or exercises
- Ask learners to watch a particular video lesson for homework (in the school library or on the website, depending on how the material is available) as preparation for the next days lesson; if desired, learners can be given specific questions to answer in preparation for the next day's lesson

1. Number and Bar Scales

Learners use number and bar scales in the context of a school outing to a zoo. They learn about the difference between these two kinds of scales and how to use them to estimate an actual distance on the ground.

2. Finding Positions and Giving Directions

The lesson contrasts simple maps, such as the map of a campground, where it is easy to find the destination, and more complex maps such as street maps, where we need a reference system to find a location.

3. Planning a Road Trip

In this lesson we compare an ordinary map of national roads to a strip map for a trip from Uppington to East London. Learners need to read both directions and distances on these maps. They then use this information to plan a real journey.

Resource Material

Resource materials are a list of links available to teachers and learners to enhance their experience of the subject matter. They are not necessarily CAPS aligned and need to be used with discretion.

| | | |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| 1. Number and Bar Scales | http://geokov.com/education/map-scale.aspx | A summary of how different types of scales work, with some more complex information than in our lesson. |
| | http://m.everythingmaths.co.za/grade-10-mathematical-literacy/06-scale-maps-and-seating-plans/06-scale-maps-and-seating-plans-02.cnxmlplus | The Siyavula Grade 10 lesson on number and bar scales. This is good revision before starting Grade 11 work. |

| | | |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | http://www.wikihow.com/Draw-a-Floor-Plan-to-Scale | Practical information on how to choose a scale and draw a floor plan to scale. This is useful for making models and for drawing plans. Learners will need to think metric. |
| 2. Finding Positions and Giving Directions | http://www.openstreetmap.org/ | This website allows you to choose map areas and download images of them, giving the scale. |
| 3. Planning a Road Trip | http://www.aa.co.za/travel/route-planner/ | Trip planning tools from the Automobile Association that gives information, including maps and distance tables on how to plan your route. It also includes maps for download |

Task

Question 1

Write these bar scales as number scales.



Question 2

Calculate the real life length represented by one centimetre in these ratios. Write your answer in an appropriate unit of measure

2.1 1 : 1 000 000

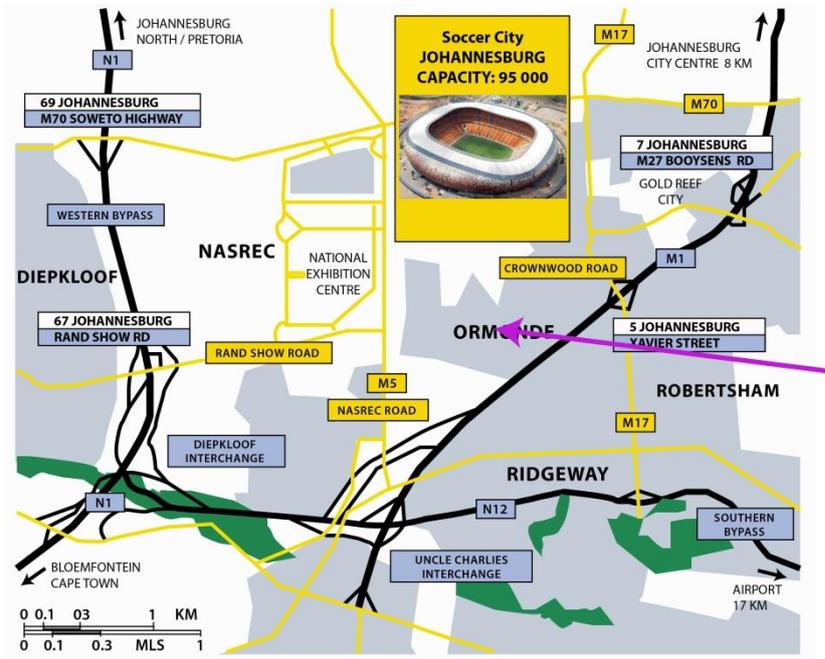
2.2 1 : 500

Question 3

Use the scale on this map of the southern area of Johannesburg to estimate the following distances:

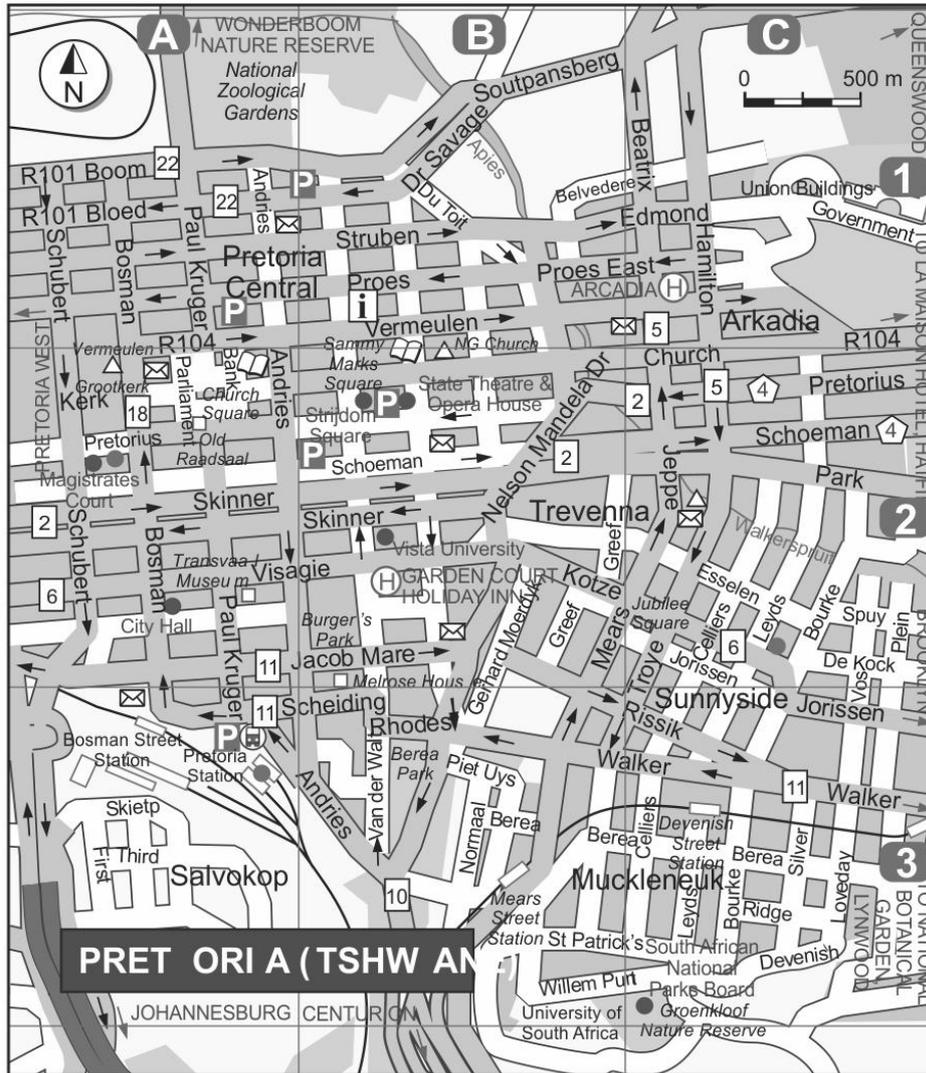
3.1 from NASREC to Gold Reef City

3.2 from the Diepkloof interchange to Soccer City



Question 4

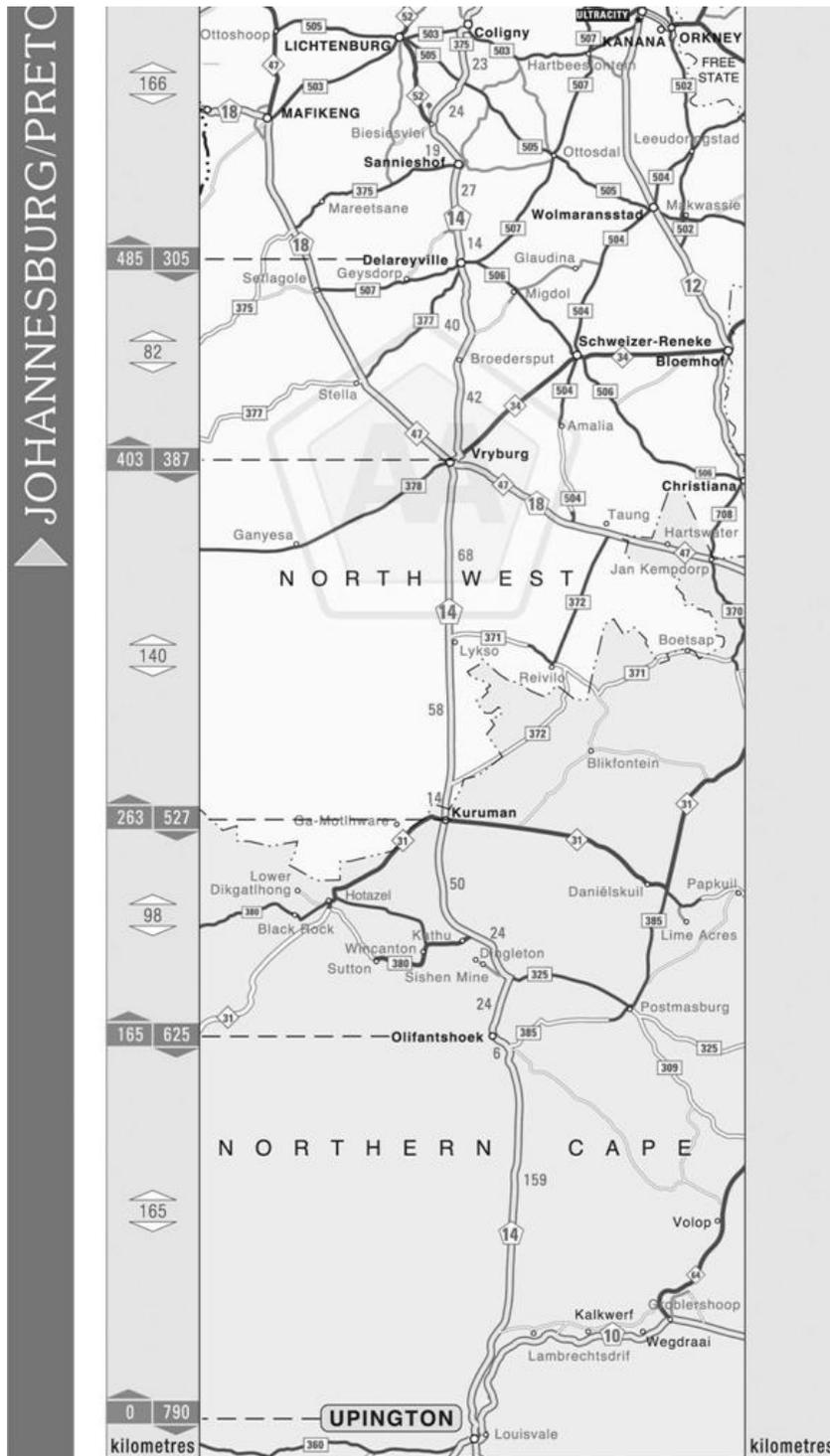
Look at the street map below and answer the questions that follow.



- 4.1 Give the coordinates for the blocks in which you would find:
 - 4.1.1 The Bosman Street station
 - 4.1.2 The Magistrates Court
 - 4.1.3 The State Theatre
- 4.2 There are post offices in B2 and in A2. Describe routes to get to each of these from the Wonderboom Nature Reserve and estimate the distances.

Question 5

Use the strip map of an area of the North West province and the Northern Cape to answer the questions.



- 5.1 Describe directions to get from Lichtenburg to Bloemhof.
- 5.2 How long would this journey take if the car's average speed is:
 - 5.2.1 90 km/h
 - 5.2.2 110 km/h?
- 5.3 If the car consumes 10,5 litres of petrol per 100 km at these speeds, and the cost of petrol is R13,20 per petrol, what will the petrol cost for this trip?

Task Answers

Question 1

1.1 $1,5 \text{ cm} : 100 \text{ m}$

$\therefore 1 : 66\,667 \text{ m}$

1.2 $1 \text{ cm} : 1 \text{ km}$

$\therefore 1 : 100\,000$

Question 2

2.1 $1 \text{ cm} : 10 \text{ km}$

2.2 $1 \text{ cm} : 5 \text{ m}$

Question 3

2.3 about 5 km

2.4 about 8 km

Question 4

4.1 A3

4.1.1 A2

4.1.2 B2

4.2 From Wonderbook Nature Reserve to post office in B2:

- turn left into Paul Kruger Street
- turn left into the fifth road (Vermeulen Street)
- turn right into Andries Street
- then three blocks along, turn left into Schoeman street
- The post office will be on your left, two blocks along.

The distance is approximately 3 km.

- From Wonderbook Nature Reserve to post office in A2:
- turn left into Paul Kruger Street
- cross over three streets and then turn right into Proes Street
- Turn left into Bosman Street
- The post office is on your left hand side at the corner of Vermeulen Street.

The distance is just less than 2 km.

Question 5

5.1 From Lichtenburg, travel along the R52. Get onto the N14 highway and travel 60 km. Then take the R506 offramp to Schweizer-Reineke. In Schweizer-Reinecke, turn left to get onto the R34, which takes you to Bloemhof.

5.2 The total distance is approximately 170 km.

5.2.1 1,89 hours or 1 h 53 min

5.2.2 1.55 h or 1 h 33 min

5.3 The cost of the petrol will be R235,62.

Acknowledgements

Mindset Learn Executive Head
Content Manager Classroom Resources
Content Coordinator Classroom Resources
Content Administrator
Content Developer
Content Reviewer

Dylan Busa
Jenny Lamont
Helen Robertson
Agness Munthali
Karen van Niekerk
Gerrie Durrheim
Helen Robertson

Produced for Mindset Learn by Traffic

Facilities Coordinator
Production Manager
Director
Editor

Presenter
Studio Crew

Graphics

Cezanne Scheepers
Belinda Renney
Ariette Gibbs
Nonhlanhla Nxumalo
Sipho Mdhuli
Talitha Ndimma
James Tselapedi
Abram Tjali
Jenny van der Leij
Wayne Sanderson



This resource is licensed under a [Attribution-Share Alike 2.5 South Africa](http://creativecommons.org/licenses/by-sa/2.5/za/) licence. When using this resource please attribute Mindset as indicated at <http://www.mindset.co.za/creativecommons>