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Matthew Goniwe
SCHOOL OF LEADERSHIP & GOVERNANCE

SSIP 2016 SEPTEMBER

**GEOGRAPHY MAPWORK
GRADE 12**

PARTICIPANTS' MANUAL

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TOPICS COVERED

No	Topic	ATP Weighting	Paper
1	Mapwork - calculations	5%	2
2	Mapwork – grid reference	1%	2
3	Mapwork – Cross sections	1%	2
4	Mapwork –interpretation	6%	2
5	Mapwork – GIS	4%	2
6	Mapwork - Synoptic weather Maps – Mid Latitude Cyclones	5%	1
7	Mapwork - Synoptic weather maps & paper GIS – tropical cyclones	5%	1 & 2

TOPIC 1: MAP WORK

MAP CALCULATIONS

CAPS CONTENT

Learners must be able to do the following calculation:

- Distance
- Area
- Gradient
- Vertical exaggeration
- Magnetic bearing
- Speed time and distance

WEIGHTING AND TIME

Mapwork should be taught on a continuous base and should be integrated with theory. At least one period per week should be spent on mapwork (about 40 minutes).

METHODOLOGY

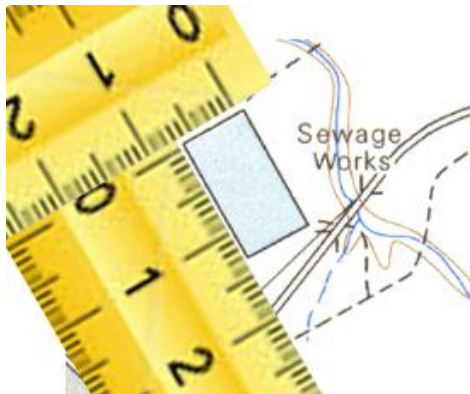
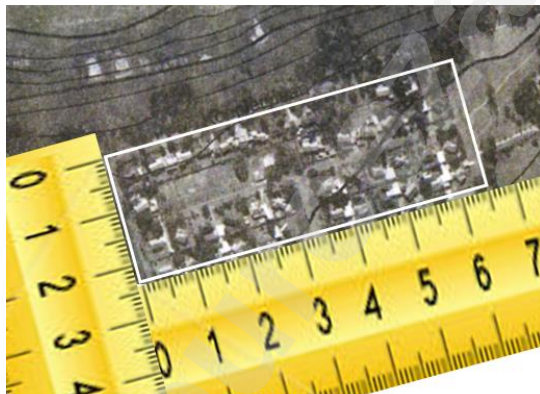
Ensure that learner bring their mapwork equipment to school in order to practice the calculation skills regularly. Do not assume that learners know how to use a ruler, protractor and calculator. Show them properly how to measure correctly and emphasise that accuracy is of utmost importance. Teach them the measurement rules related to mapwork as you explain and let them practice.

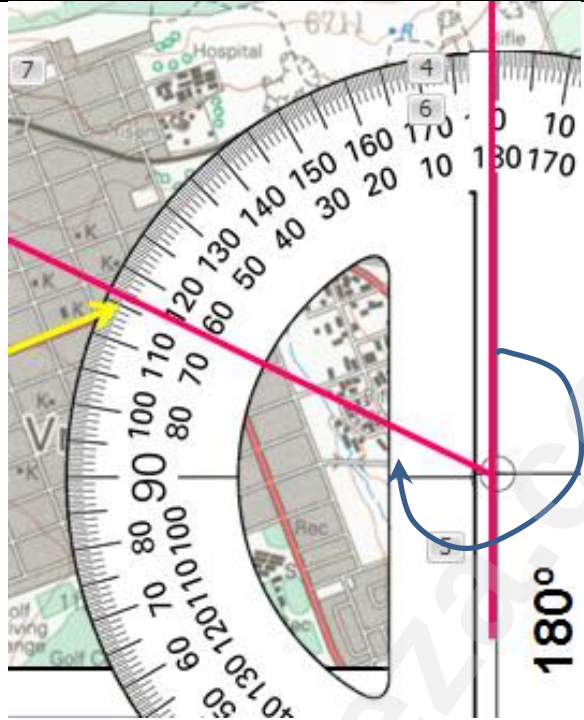
Group work can be very effective when teaching mapwork. Extract your strongest candidate and teach an extra lesson on what you want to teach to the rest of the class to them. Use these learners in class as group leader of groups of not more than four to ensure all learners can practically do what you explain systematically in class. This does not imply that they must do all the teaching. The teacher should demonstrate and explain and each group should then work on two examples together, before each learner must do an example on their own to gain confidence.

ADDITIONAL NOTES

The table below is a short summary of how to measure and do calculations.

CALCULATION	FORMULA	EXAMPLE
DISTANCE (on map)	Distance = map distance x scale 	$D = MD \times S$ $= 3,5 \text{ cm} \times 0.5$ $= 1.75 \text{ km}$ $D = MD \times S$ $= 3,5 \text{ cm} \times 500$ $= 1750 \text{ m}$
DISTANCE (on orthophoto)	Distance = map distance x scale 	$D = MD \times S$ $= 6,5 \text{ cm} \times 0.1$ $= 0,65 \text{ km}$ $D = MD \times S$ $= 6,5 \text{ cm} \times 100$ $= 650 \text{ m}$
GRADIENT	GRADIENT = $\frac{\text{HEIGHT}}{\text{DISTANCE}}$ 	HEIGHT (H) $= 1515\text{m} - 1431\text{m}$ $= 84 \text{ m}$ Distance: (D) $= 1.9\text{cm} \times 500$ $= 950 \text{ m}$ $G = \frac{H}{D} = \frac{84 \div 84}{950 \div 84}$ $1: 11,3 \quad \text{Steep}$ For every 11,3m one walk forward the land rises with 11,3m

		Land rises quickly in a short distance
AREA (MAP)	AREA = LENGTH X BREADTH 	Length = 1,3 cm x 0,5 = 0,65 m Breadth = 7 cm x 0,5 = 350 m A = L X B = 0,65 km x 0,35 km = 0,2275 km²
AREA (ORTHPHOTO)	AREA = LENGTH X BREADTH 	Length = 2,3 cm x 100 = 230 m Breadth = 6,5 cm x 100 = 650 m A = L X B = 230 m x 650 m = 149 500 m²
VERTICAL EXAGGERATION	Vertical exaggeration of cross sections VE = $\frac{\text{Vertical scale (VS)}}{\text{Horizontal scale (HS)}}$ VS: given or read from cross section HS: map or photo scale	VS 1cm represent 20m Change to ration scale 1cm: 20 x 100 = 2000cm 1: 2000 VE = $\frac{1}{2000} \times 50\ 000$ = 25 times larger
MAGNETIC DECLINATION	Mean magnetic declination 16°47' West of True North(July 2002). Mean annual change 7' Westwards(2000–2005). Supplied by Hermanus Magnetic Observatory. Find this information on the map at the bottom of the map. Present year Year on map (minus) Multiple with annual change Total change Add previous 2016 - 2002 14 years x 7'W 98'W = 1°38'W +16°47'W	

	Present magnetic bearing	18°25'W
Measuring true bearing		1. Find the place from where the measurement must be done. 2. Draw a line parallel to the sides of the map and perpendicular to the top or bottom of the map through the point of departure. Accuracy is very important. 3. Connect the two place in question. 4. Place the protractor on the place of departure and measure the angle in a clockwise direction from true north.

GROUP ACTIVITY

Use the map clip below to do the following calculations:

2829AA EERAM

1:50 000

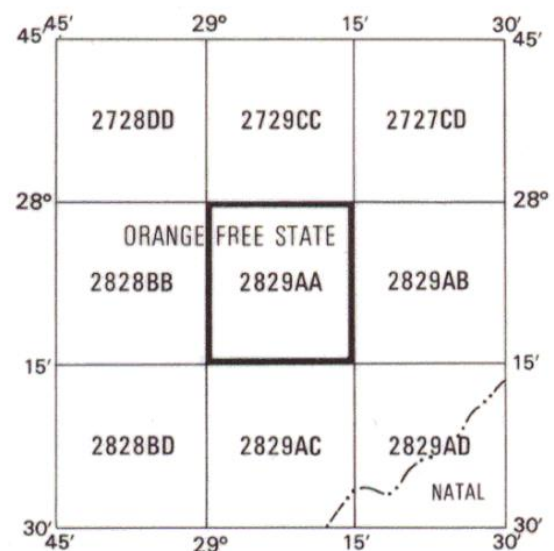
**SOUTH AFRICA
SUID-AFRIKA**

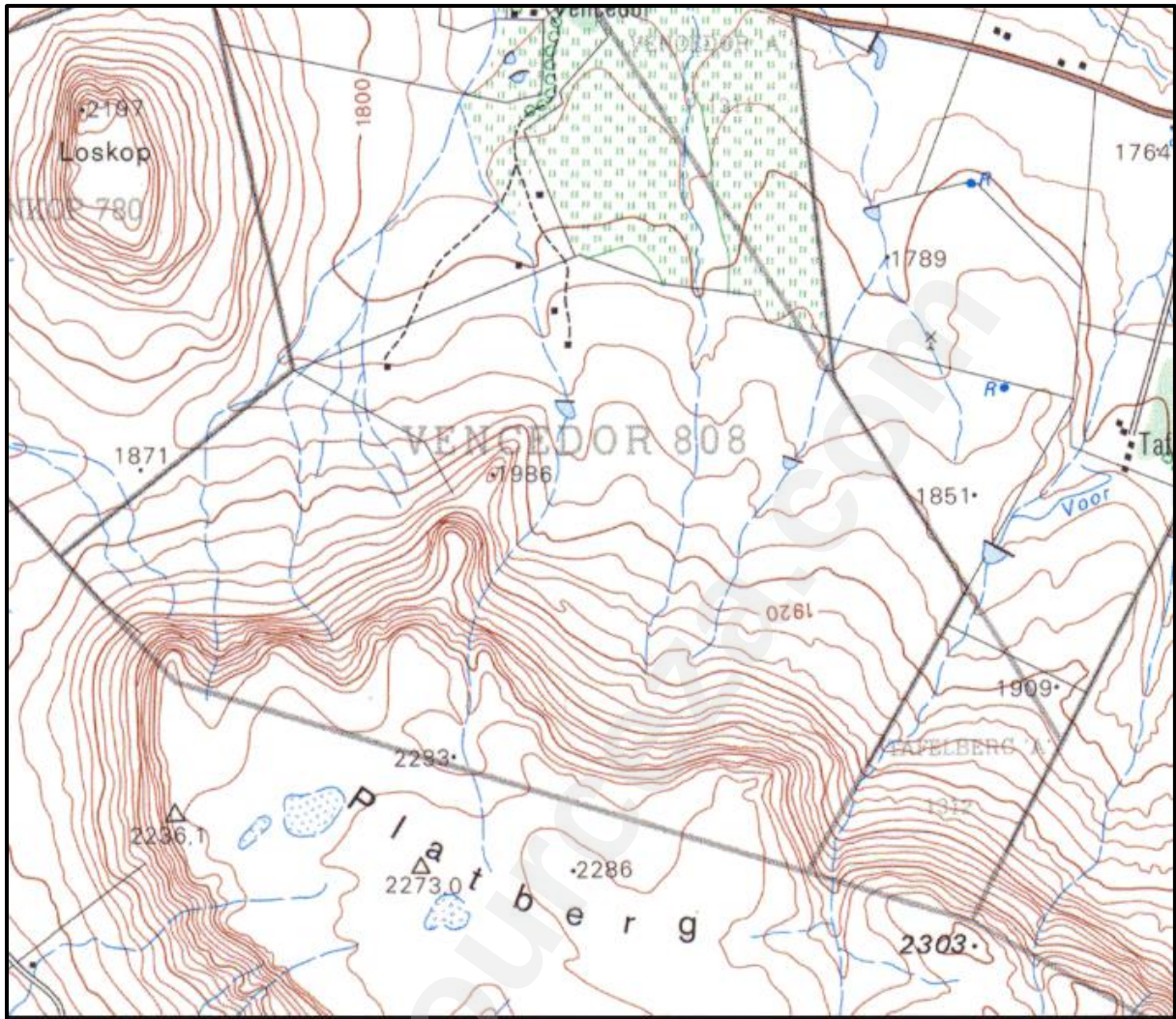
Mean magnetic declination 18°,7 West of True North (1989,0). Mean annual change 4' Westwards (1985 -1987)



INDEX TO SHEETS

INDEKS VAN VELLE





- 1.1 Calculate the distance between spot height 2197 on Loskop and spot height 2293 on Platberg. Show all steps in your calculation.

- 1.2 Explain how the real ground distance will differ from the distance you calculated.

- 1.3 Draw a simple labelled freehand cross section between the two points mentioned in question 1.1 to substantiate your answer in 1.2.



- 1.4 Calculate the vertical exaggeration of a similar accurate cross-section of the vertical scale is 1 cm represents 100m.

- 2.1 Calculate the area that the map clip cover in km^2 . Show all steps in you calculation.

- 2.2 Explain why the entire area is not used for agricultural purposes.

- 3.1 Identify the land forms named Loskop and Patberg.

- 3.2 Explain how these landforms developed by referring to the rock structure of the area and the erosion processes involved in the formation of the land scape.

4.1 Calculate the gradient between the following places and compare the gradient in the table below:

Spot heights 1789 and 1851	Spot heights 1909 and 2303
4.2 Explain what the answers means about the gradient of the slopes.	
4.3 Identify the geomorphological processes that will occur on each slope.	
4.4 Draw two simple freehand cross sections to illustrate the shape and gradient of these two slopes.	
4.5 Identify two ways in which each slope can be utilised by man.	

5.1 Calculate the present magnetic declination for the EERAM map area.

5.2 Measure the true bearing between the following places:

From spot height 1986 to sport height 1909	To spot height 1871 from spot height 1986
5.3 Calculate the present magnetic bearing for the places in question 5.1.	

5.4 Explain why the calculation of magnetic bearing is important and give useful example of magnetic bearing.

- 6.1 Draw a freehand cross section from spot height 2293 on Patberg to post height 1764 in the northeast of the map clip.



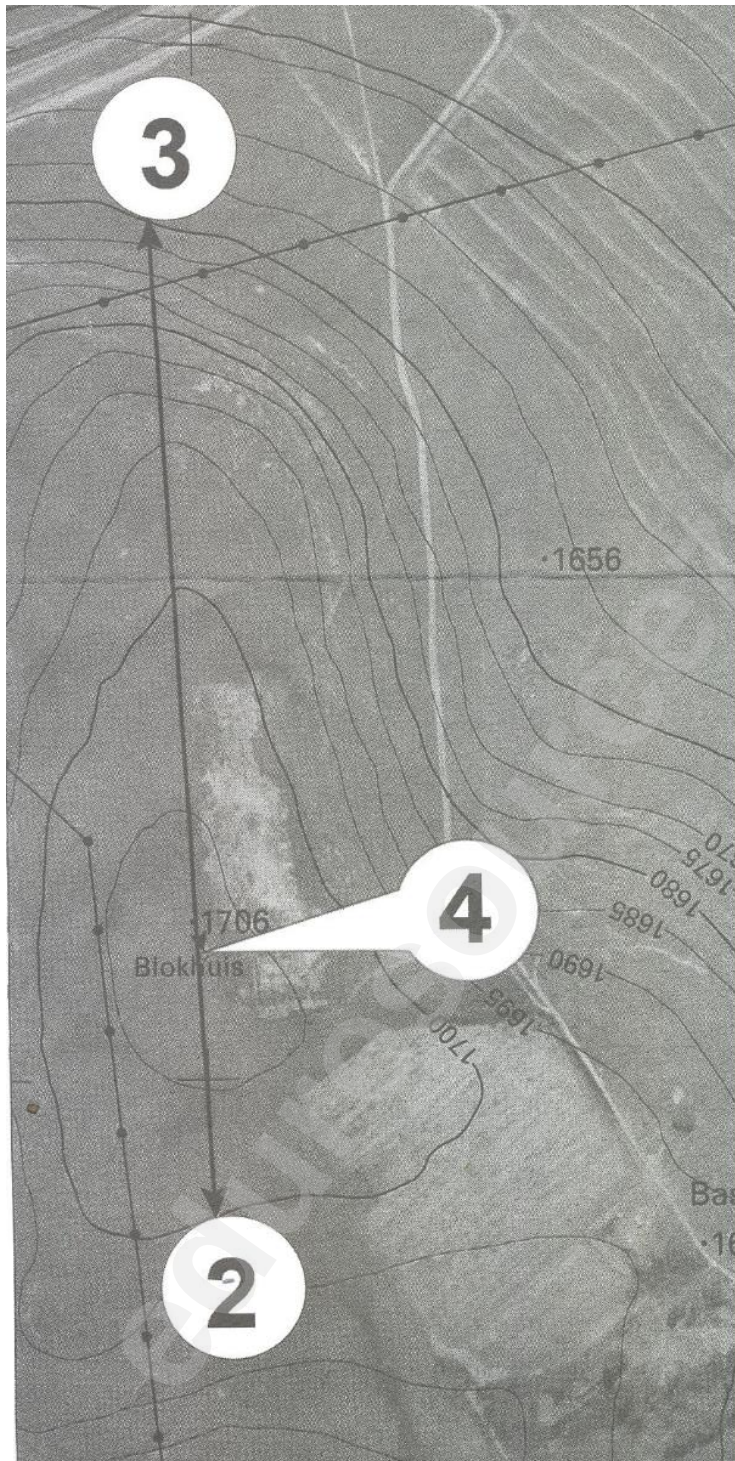
- 6.2 Identify the slope elements with labels on your sketch.

- 6.3 Complete the table below describing the slope elements that you have drawn.

Slope element	Shape	Most prominent process on slope element

EXAM TYPE QUESTIONS – INDIVIDUAL ACTIVITY

Refer to the orthophoto clip below with a scale of 1: 10 000 to answer the questions.



Mean magnetic declination 20°35' West of True North(July 2001).

Mean annual change 6' Westwards(1995–2000).

Supplied by Hermanus Magnetic Observatory.

1.1 Calculate the distance between the 2 and 3 in meter.

1.2 Explain why the real ground distance and calculated distance will differ.

1.3 Draw a simple freehand cross section from point 2 to point 3.



1.4 Identify the landform that you have drawn.

1.5 Describe the slopes on either side of Blokhuis.

1.6 Is two visible from three? Motivate your answer.

1.7 Calculate the vertical exaggeration for an accurate cross section similar to your freehand cross-section in 1.3 if the vertical scale is 1cm: 5m.

- 2.1 Calculate the area covered by the orthophoto in m^2 . Show all steps in your calculation.

- 2.2 How can the farmer utilising this land use are calculations to assist him with planning his farming activities.

- 3.1 Calculate the gradient between spot height 1706 and 1656. Show all steps in your calculations. Clearly indicate the correct units.

3.2 With reference to your calculated answer, explain why this will not be a suitable route for a new road.

4.1 Calculate the magnetic bearing to spot height 1706 from 1656. Show all steps in your calculation.

- 4.2 Identify the instrument needed to use magnetic bearing when you do fieldwork and explain how this instrument and you calculate answer will be useful when you are working in this area doing land use surveys.

Explain how these activities can be used to assist learners to improve their mapwork skills.

TOPIC 2: MAPWORK

GRID REFERENCE / COORDINATES / POSITION

CAPS CONTENT

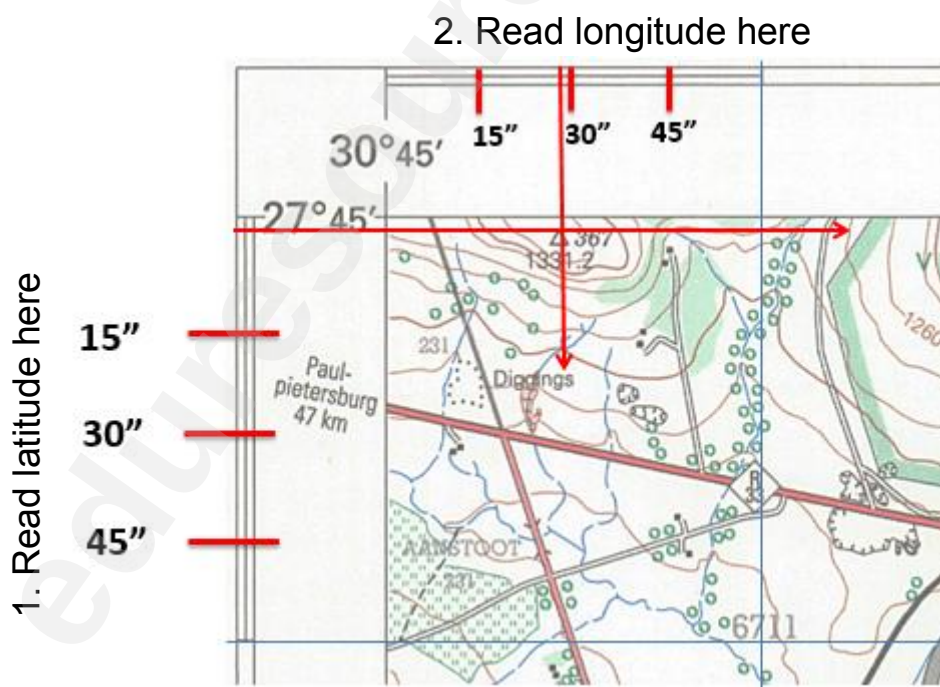
Learners must be able to give the accurate grid references of features on a topographic map in degree, minutes and seconds or as a decimal of minutes.

Learners must be able to find features on a topographic map when given the accurate grid references in degree, minutes and seconds or as a decimal of minutes.

WEIGHTING AND TIME

Very little time is allocated to this sub topic, but if learners don't practice this often they will not be able to remember how to do it.

ADDITIONAL NOTES



Write the answer like this – be accurate – use a ruler.

27°45'03" S; 30°45'28" E OR 27°45,1' S; 30°15,5' E

METHODOLOGY

Grid reference is used to pin point any position on Earth accurately. To find the exact position of a feature we need to establish how far it is north or south of the equator (latitude) and then how far east or west it is from the Greenwich meridian (longitude).

Steps to follow give the grid reference of a place:

- ✓ Find the place in question on the map
- ✓ Draw a perpendicular pencil line from the place to the nearest side of the map
- ✓ Read the latitude of the side of the map in degrees, minutes and seconds or as a decimal of minutes. Use the method illustrated above to estimate the seconds.
- ✓ Draw a perpendicular pencil line to the top or bottom of the map through the feature in question
- ✓ Read the longitude of the top or bottom of the map in degrees, minutes and seconds or as a decimal of minutes. Use the method illustrated above to estimate the seconds.

Learners need to practice this often in order to improve accuracy and confidence to do this.

The learners must be able to find a place / feature on the map from a given grid reference. In this case, use the draw pencil lines of latitude and longitude to see where it cross and then find the feature at this crossing point.

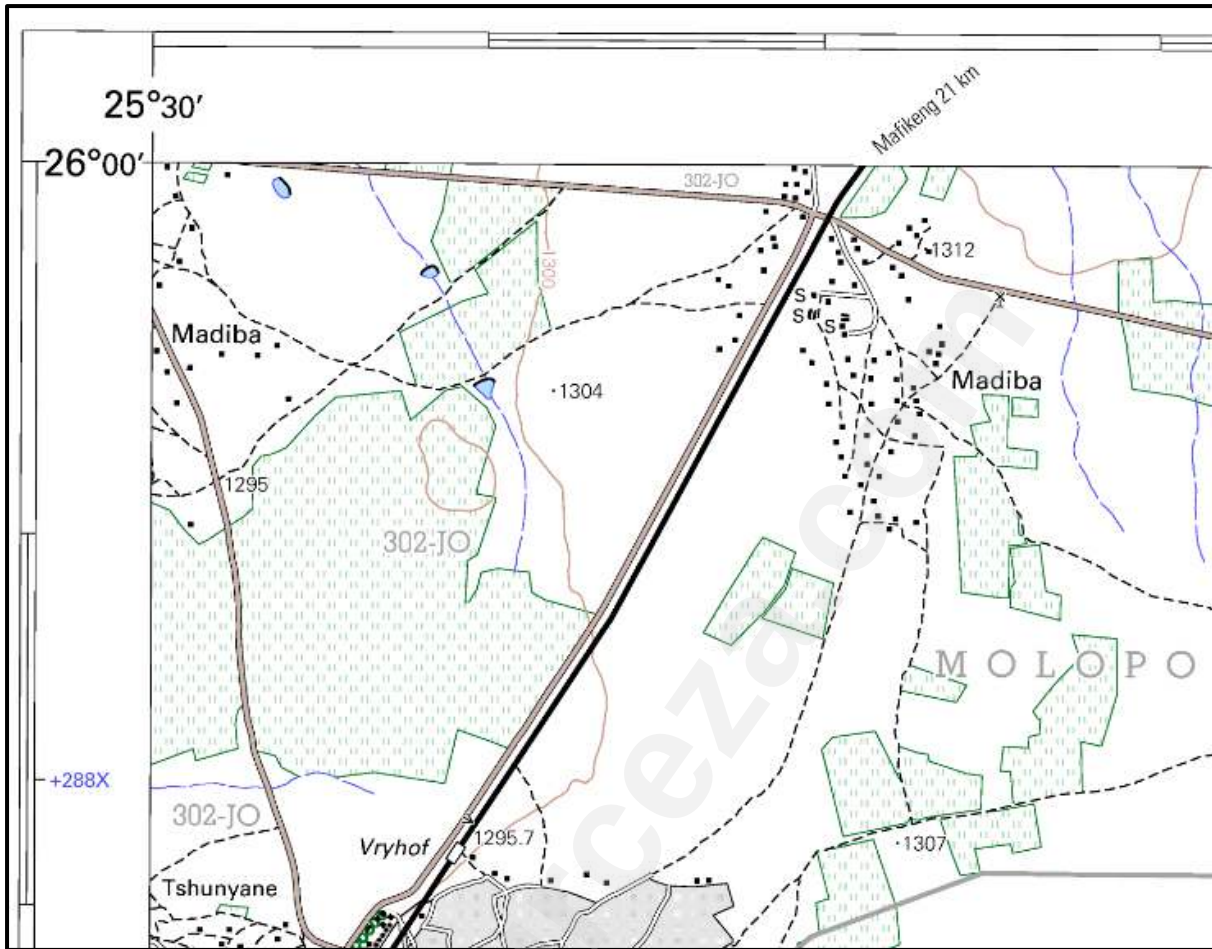
GROUP ACTIVITY

Use the following two map clips to design a lesson on fixing position / grid reference.

Include in your lesson:

- ✓ Baseline assessment activity / questions (small scale map / globe)
- ✓ Explanation of how to do grid reference
- ✓ Activity to give grid reference and how it is used in reality
- ✓ Activity to find features from provided grid reference
- ✓ Try to include map interpretation in your activities.

Map Clip 1



Complete the tables below:

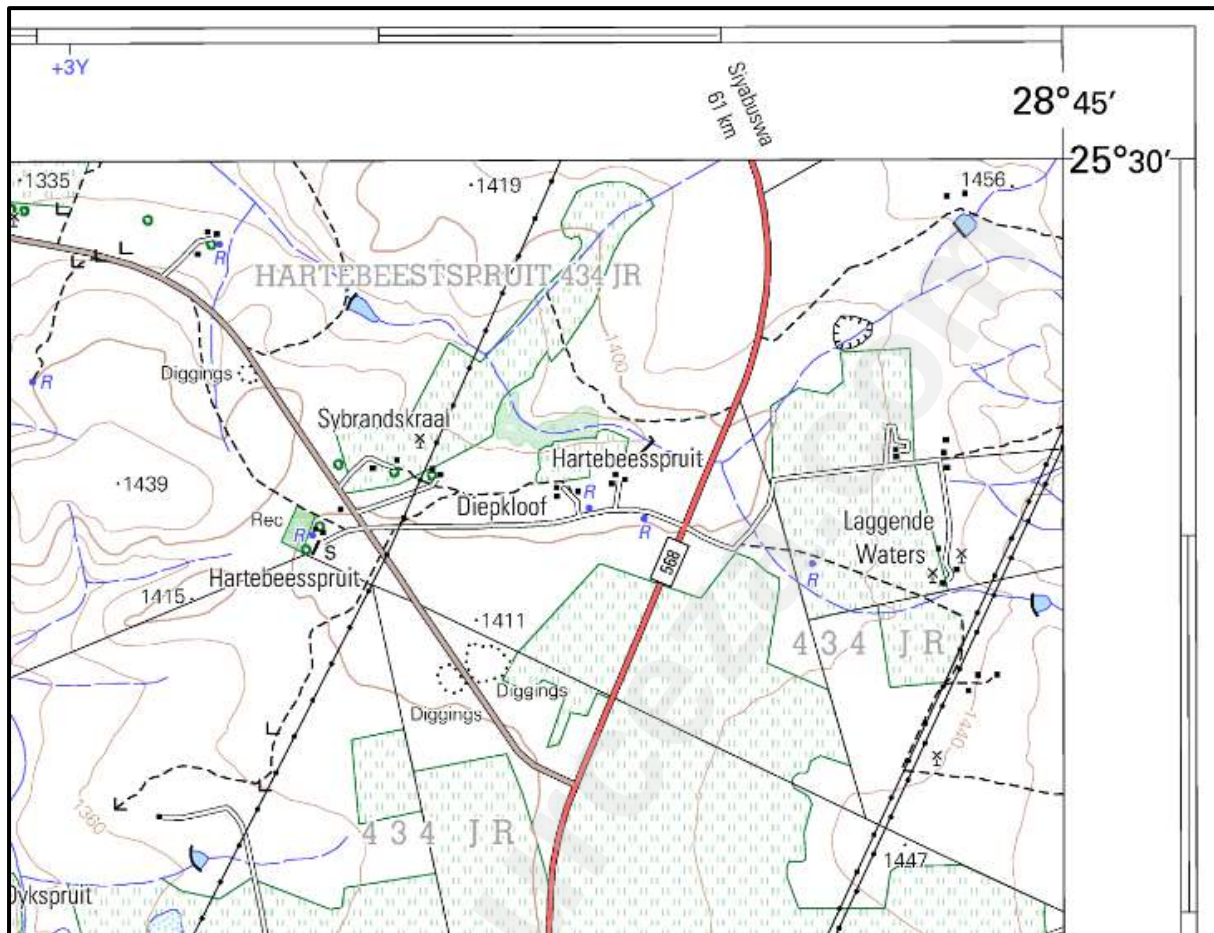
Give the grid reference of the following features:

Feature	Latitude	Longitude
Vryhof station		
Spot height 1304		
Spot height 1307		

Identify the feature at the following grid reference: (Complete activity)

Latitude	Longitude	Type of Feature	Feature (answer)
		Service	
		Infrastructure	
		River type	
		Settlement type	
		Land use	

EXAM TYPE QUESTIONS



Set a class test on grid reference to prepare learners for exams

TOPIC 3: MAPWORK

DRAWING CROSS SECTIONS

CAPS CONTENT

Learners must be able to draw freehand and accurate cross sections.

WEIGHTING AND TIME

Drawing cross sections is time consuming and the time allocated to it in the CAPS / ATP may be too limited to do it properly.

There is about 2 hours allocated to it in the ATP, but it usually take about 4 hours to teach it.

This is also a skill that needs to be practiced regularly to remember all the steps and build up confidence.

ADDITIONAL NOTES

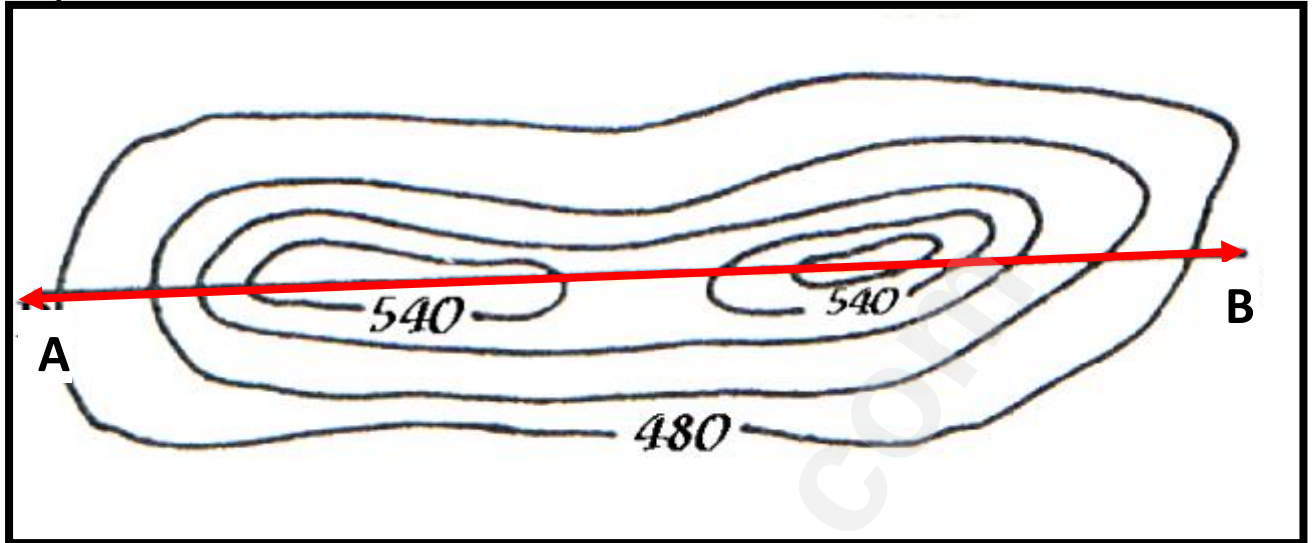
1. Introduction

We draw cross section of the landscape to see what the relief or topography looks like. Distance on Earth is much more significant than altitude and to show the altitude we need to exaggerate the vertical scale of the cross sections. This means we reduce distance more than height on the cross sections. You must also be able to draw a freehand cross section from looking at the contours and then drawing the landform. You can refer back to the unit on slopes and land forms in this module.

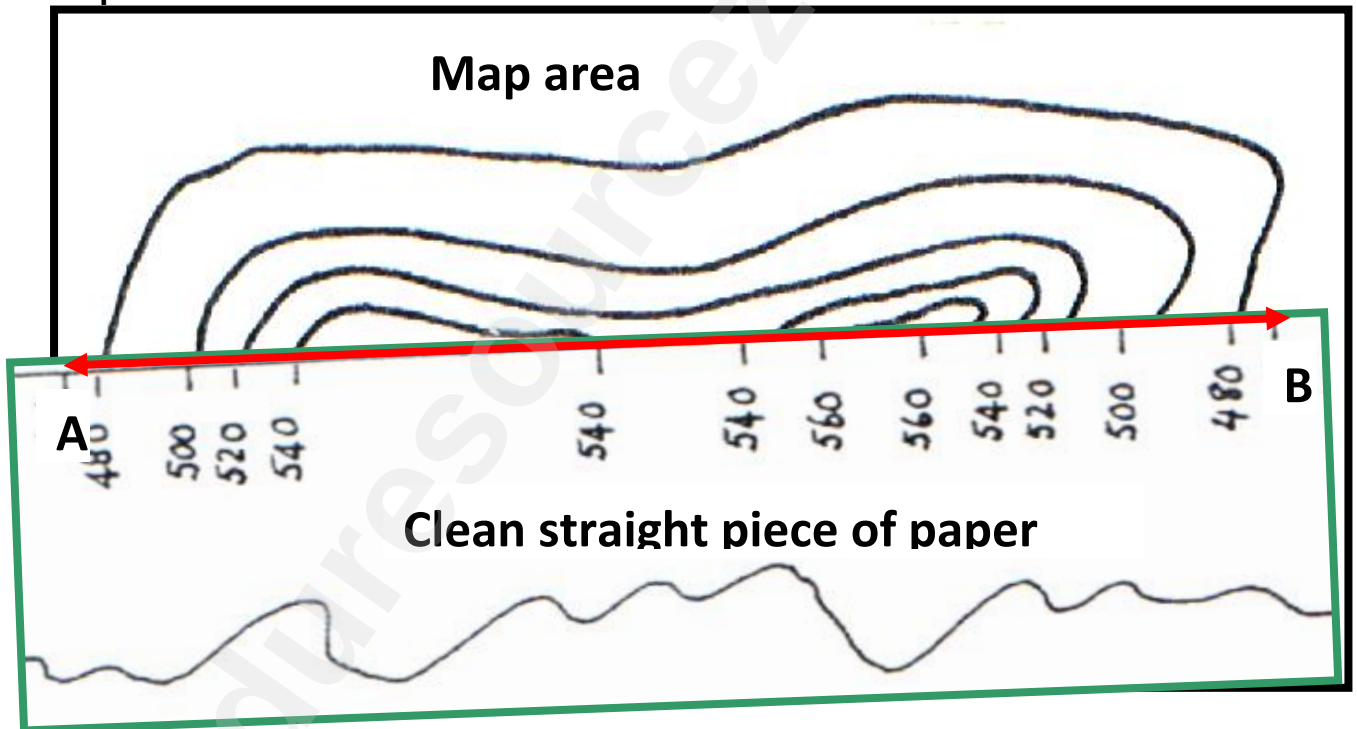
2. Drawing Cross Sections

- **Step 1:** Locate the place from where and the place to where you must draw the cross section. (In this case From A to B)
- **Step 2:** Connect the 2 places with a pencil line and take paper (see green frame on map below) and put it from A to B along the line.
- Mark of where any contour lines disappear under the paper.
- Find the values of the contour lines you have marked. Look under the paper and further away to find the values of the contours. In this example all the values are under the paper. Compare the map above and below.
- **Step 3:** Then take the piece of paper and mark the contours and the values onto graph paper with a vertical axis (on the left of the paper) and a horizontal axis (at the bottom of the paper) already indicated on it.
- **Step 4:** Add in the vertical scale which will be given to you in the form of a word scale or on a half completed cross section and the map scale as the horizontal scale.
- Plot the values of the contours from the bottom of the sketch at the correct altitudes.
- Connect the points with your freehand. (Never with a ruler)
- Give the cross section a heading.

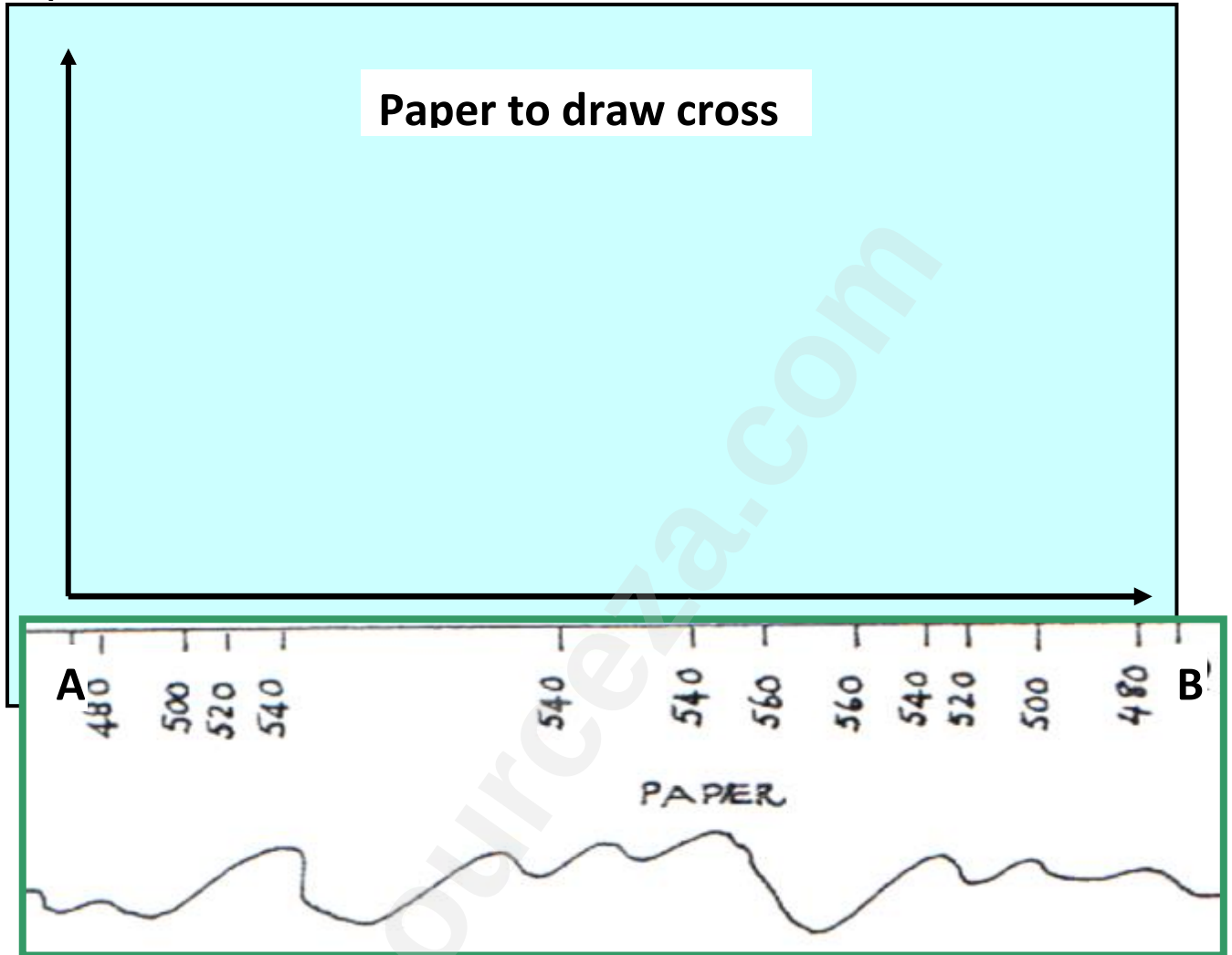
Step 1



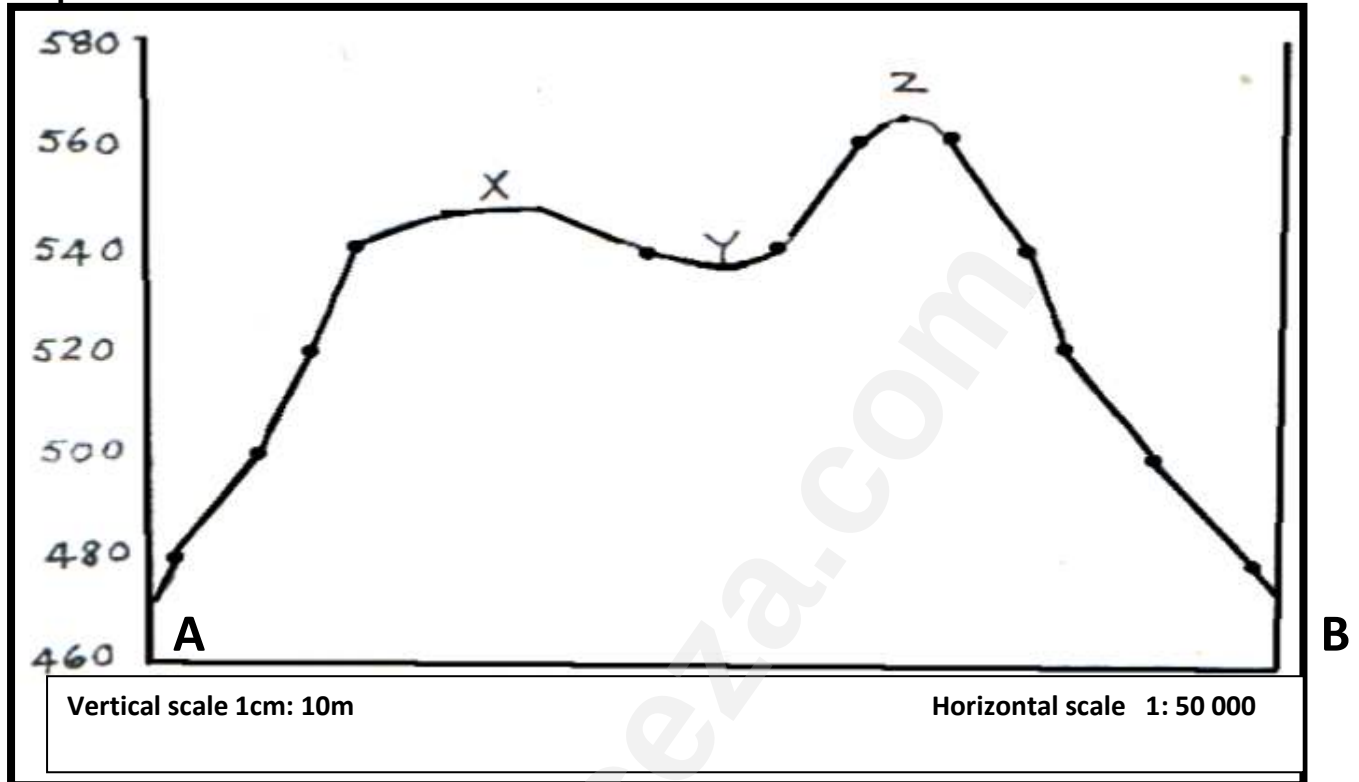
Step 2



Step 3



Step 4: A cross section From A to B



Use the map and the cross section to identify the landforms on the cross section. Land forms X and Z are peaks on the ridge or watershed. Y is a neck or a saddle.

3. Vertical exaggeration

Calculate how much larger is the vertical scale than the horizontal scale. First change the vertical scale into a ratio scale.

1cm: 10 m (change the m to cm)
 1: 1000 (if the units on either side of the scale are the same it can be cancelled)

Vertical exaggeration = $\frac{\text{Vertical scale}}{\text{Horizontal scale}}$

$$= \frac{1/1000}{1/50\,000}$$

$$= \frac{1}{1000} \times \frac{50\,000}{1}$$

$$= 50$$

(The vertical scale is 50 x larger than the horizontal scale)

METHODOLOGY

Drawing cross sections can be daunting for learners. The idea is to start with simple examples and then move to examples that are more complicated.

Learners must be able to find altitude on a map before they can attempt cross sections. They must be able to read and interpret contour lines, trigonometrical station, spot heights and benchmarks to find altitude. This should be included in the baseline assessment at the beginning of the lessons.

There are too many steps in drawing a cross section to first show the entire process and then expect learners to draw a cross section. Let learners follow you systematically from the first example, so that when you finish your first example, they must have evidence of their own attempt.

It may be a good idea to teach the skill of drawing cross sections to a small number of stronger learners beforehand and use these learners as group leaders that can assist individuals to follow your explanation correctly. Teaching cross section require the teacher to check each step before going on and this is not always possible with large classes. The pre-taught learners can in this case make useful peer teaching contributions to ensure all learners follow the steps correctly.

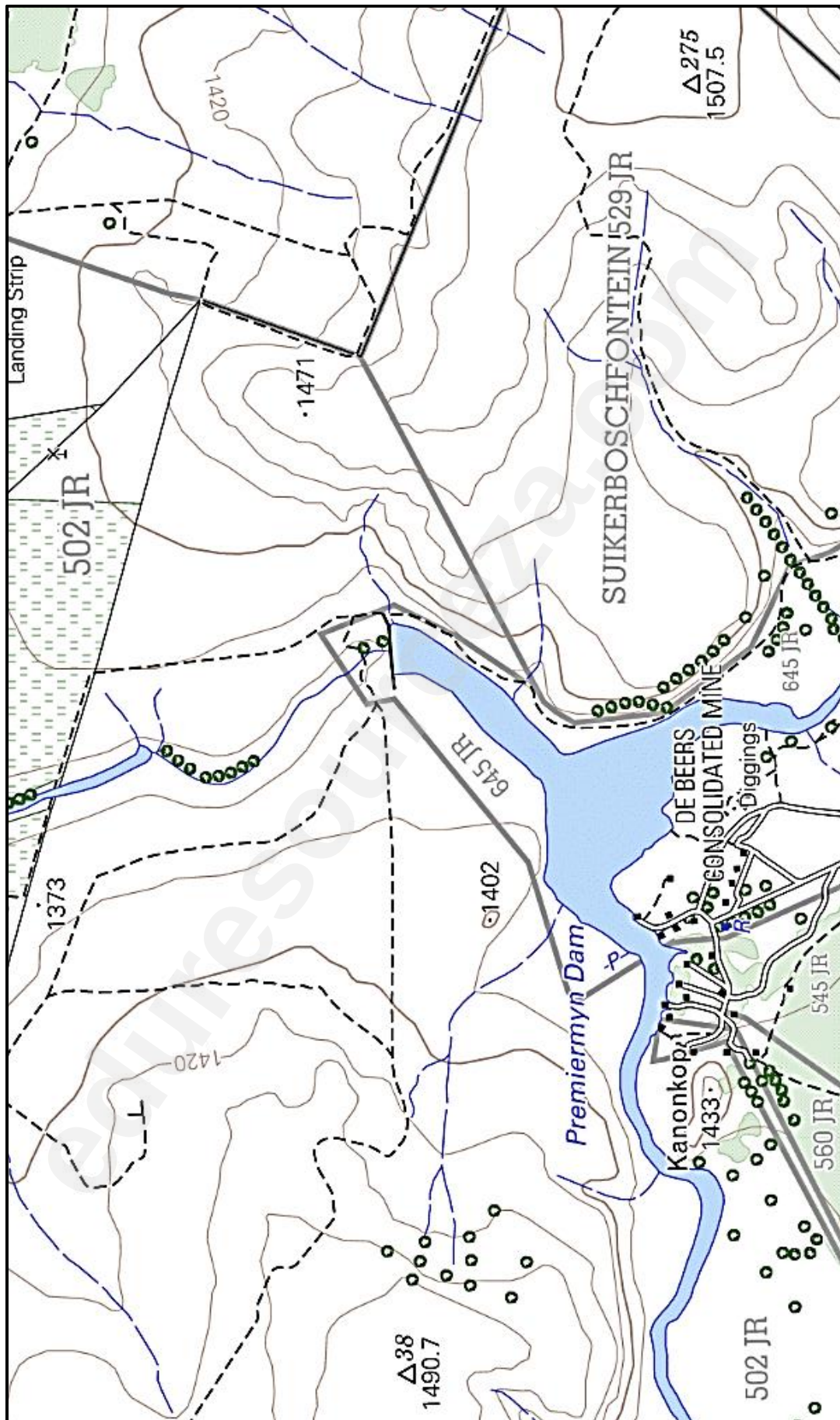
GROUP ACTIVITY

Use the map clip below to design a lesson on drawing cross sections. Set up at least 5 different cross sections to let learners practice the skill in class.

Start with step-by-step explanations and them following you and then allow them to do it more independently.

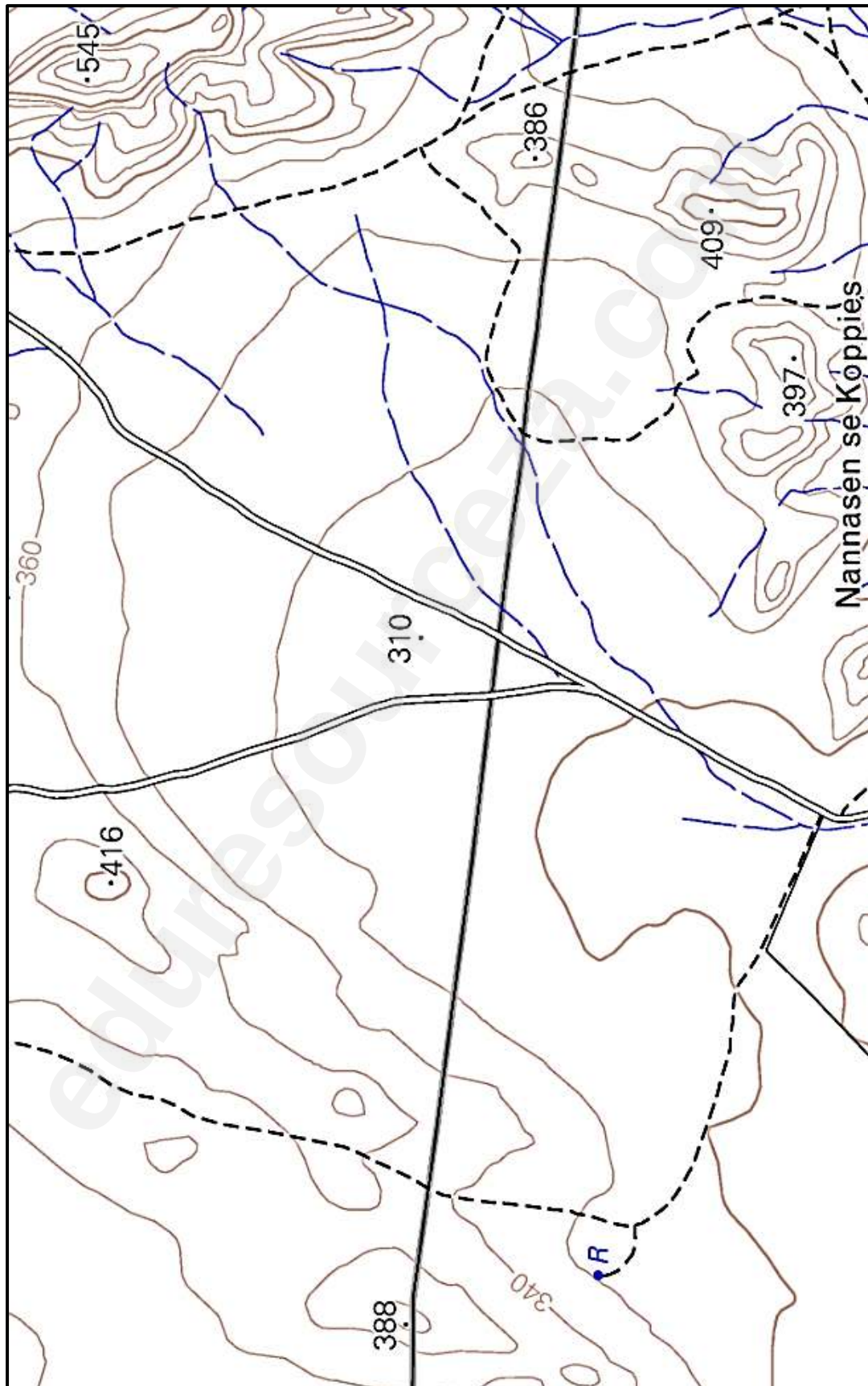
Change the vertical scale for some of the cross sections and let learners calculate the vertical exaggeration for each cross section. Explain why vertical exaggeration is necessary and point out how the cross sections change with different vertical scales.

Emphasise accuracy and neatness when drawing cross sections.



Lined area for writing, featuring horizontal ruling lines and a diagonal watermark reading "eduresourceza.com".

Set exam questions on cross sections and vertical exaggeration using this map clip.



A blank sheet of lined paper with horizontal ruling lines. A diagonal watermark reading "eduresourceza.com" is visible across the page.

TOPIC 4: MAPWORK

MAP INTERPRETATION

CAPS CONTENT

Map interpretation cover all theory related to the 1: 50 000 topographic map series of South Africa. All theoretic content can be assessed in the mapwork exam paper.

WEIGHTING AND TIME

Map interpretation should be include weekly as consolidation activities on the theory taught that can be related to topographic maps.

METHODOLOGY

Teachers should use variety of topographic maps to their disposal from previous exams to show learners how to interpret theory on the maps. We often take for granted that learners will be able to see the spatial processes and patterns we teach in theory intuitively on the topographic maps and orthophoto maps. Map and photo interpretation is a skill that can be improved substantially with enough practice by teachers and learners. Always study the map and ask yourself and the learners questions like:

- ✓ What is this? (identify, name, label, give, describe, list)
- ✓ Why is it here? (Explain spatial relations.)
- ✓ How did it develop / form? How will it change / affect
- ✓ What is its function?
- ✓ What does it tell us about the climate, geomorphology, and economy of the area?

ADDITIONAL NOTES

REFERENCE		VERKLARING
National Freeway; National Route.....		Nasionale Deurpad; Nasionale Roete
Arterial Route		Hoofverkeersroete
Main Road		Hoofpad
Secondary Road; Bench Mark.....		Sekondêre Pad; Hoogtemerk
Other Road; Bridge		Ander Pad; Brug
Track and Hiking Trail.....		Dowwe Pad en Voetslaanpad
Railway; Station or Siding.....		Spoorweg; Stasie of Syllyn
Other Railway; Tunnel		Ander Spoorweg; Tonnel
Embankment; Cutting.....		Opvulling; Deurgrawing
Power Line.....		Kraglyn
Built-up Area (High, Low Density).....		Beboude Gebied (Hoë, Lae Digtheid)
Buildings; Ruin		Geboue; Murasie
Post Office; Police Station; Store.....		Poskantoor; Polisiestasie; Winkel
Place of Worship; School; Hotel		Plek van Aanbidding; Skool; Hotel
Fence; Wall		Draadheining; Muur
Windpump; Monument.....		Windpomp; Monument
Communication Tower.....		Kommunikasietoring
Mine Dump; Excavation		Mynhoop; Uitgraving
Trigonometrical Station; Marine Beacon.....		Peilbaken; Seevaartbaken
Lighthouse and Marine Light.....		Vuurtoring en Seevaartlig
Cemetery; Grave		Begraafplaas; Graf

REFERENCE		VERKLARING
International Boundary and Beacon.....		Internasionale Grens en Baken
Provincial Boundary.....		Provinsiale Grens
Protected Area.....		Bewarings Gebied
Perennial River		Standhoudende Rivier
Perennial Water.....		Standhoudende Water
Non-perennial River.....		Nie-standhoudende Rivier
Non-Perennial Water.....		Nie-standhoudende Water
Dry Water Course		Droë Loop
Dry Pan		Droë Pan
Marsh and Vlei		Moeras en Vlei
Pipeline (above ground)		Pyplyn (bo die grond)
Water Tower; Reservoir; Water Point.....		Watertoring; Reservoir; Waterpunt
Coastal Rocks		Kuslynrotse
Prominent Rock Outcrop.....		Prominente Klipbank
Erosion; Sand.....		Erosie; Sand
Woodland		Beboste Gebied
Cultivated Land.....		Bewerkte Land
Orchard or Vineyard		Boord of Wingerd
Recreation Ground.....		Ontspanningsterrein
Row of Trees.....		Rye Bome

GROUP ACTIVITY

2829AA EERAM

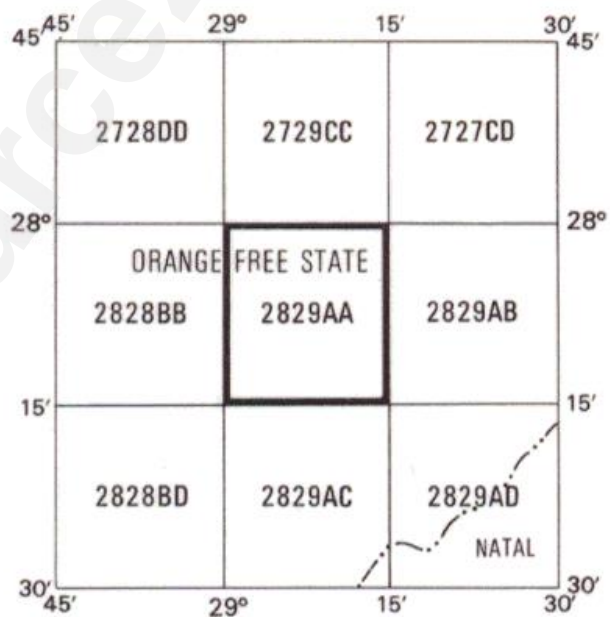
1. Complete the table below to describe the map reference above.

Latitude	
Longitude	
Big block	
Small block	
Settlement	

2. Give the map reference of the following maps

N	
NE	
E	
SE	
S	
SW	
W	
NW	
Province this map is in	
Province SE of this map	

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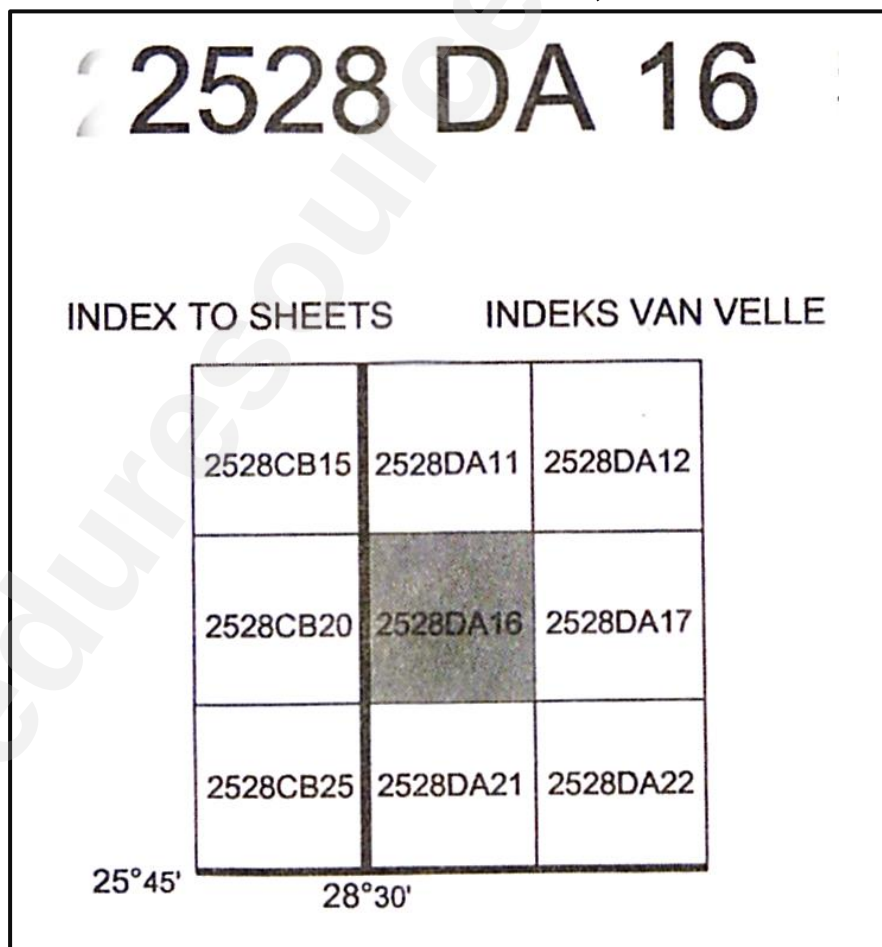
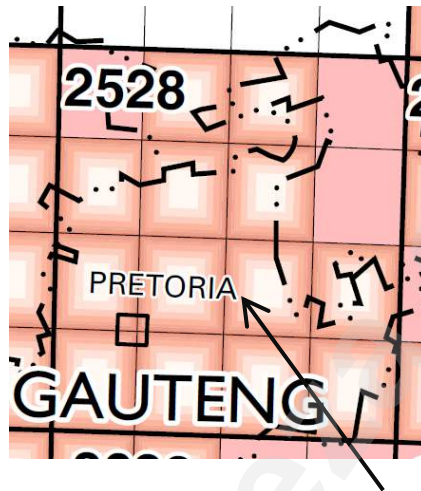
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Heights are in metres above mean sea level

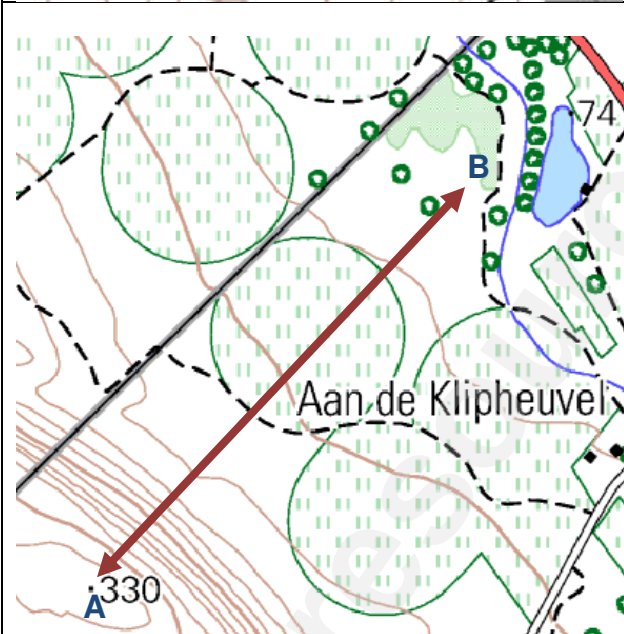
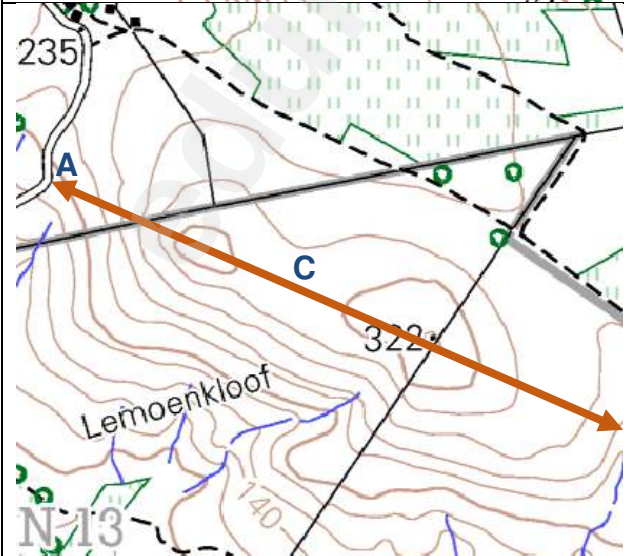
CONTOUR INTERVAL 20 METRES KONTOERTUSSENRUIMTE 20 METER

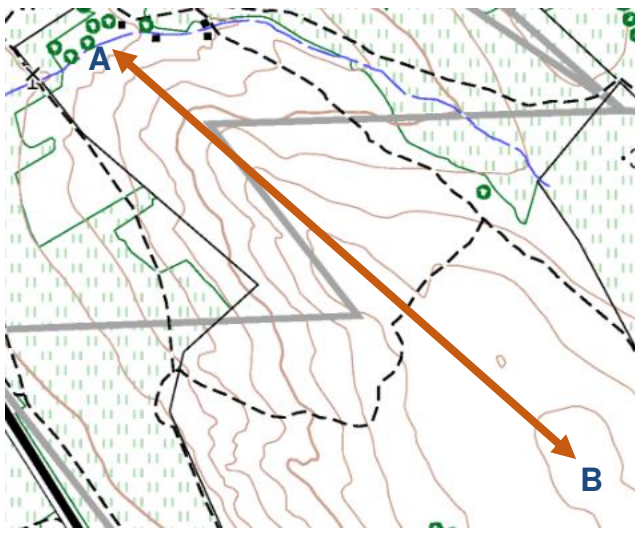
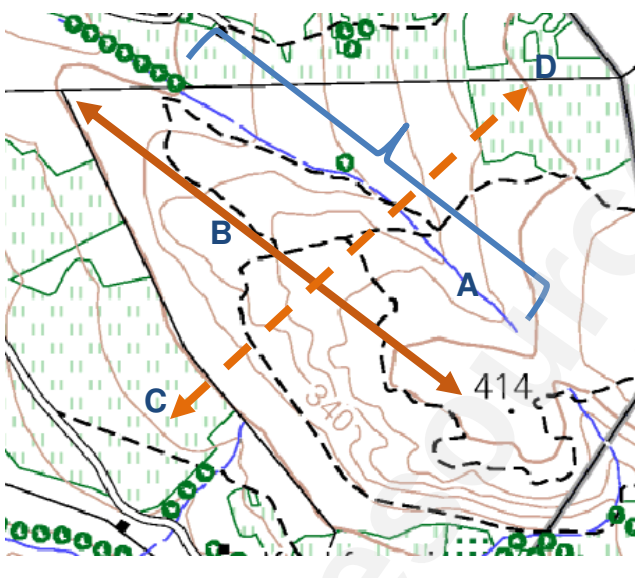
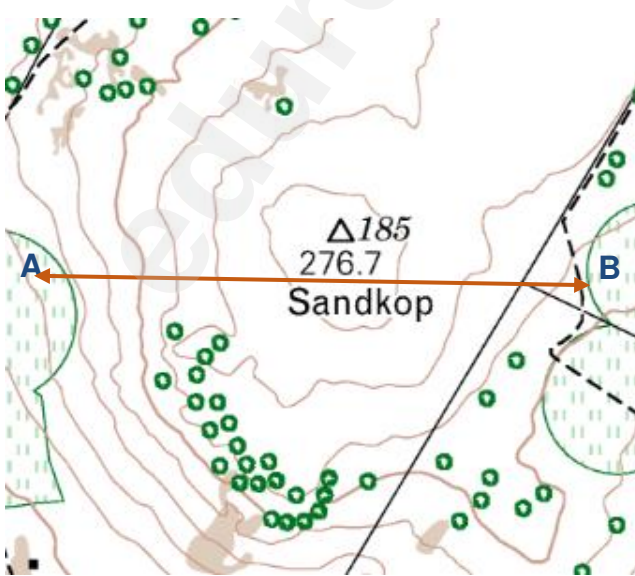
ORTHOPHOTO REFERENCE NUMBER SYSTEM

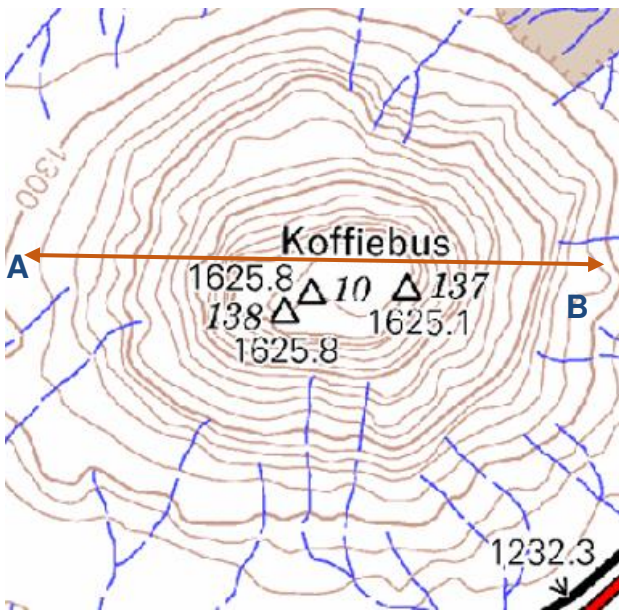
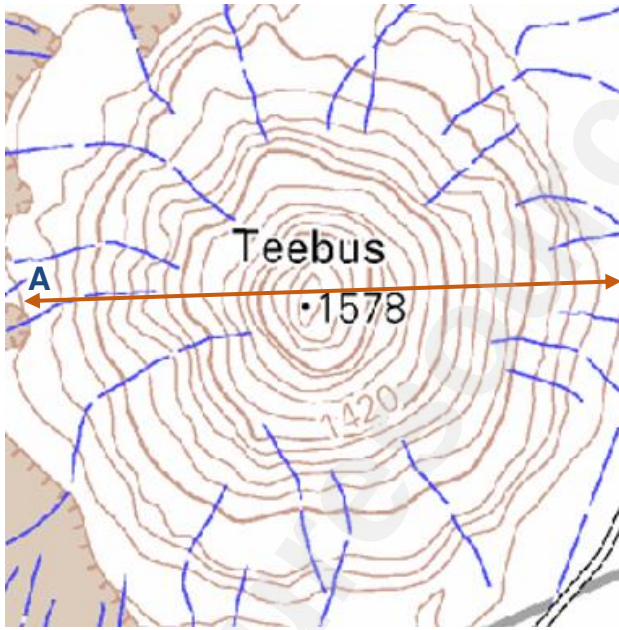
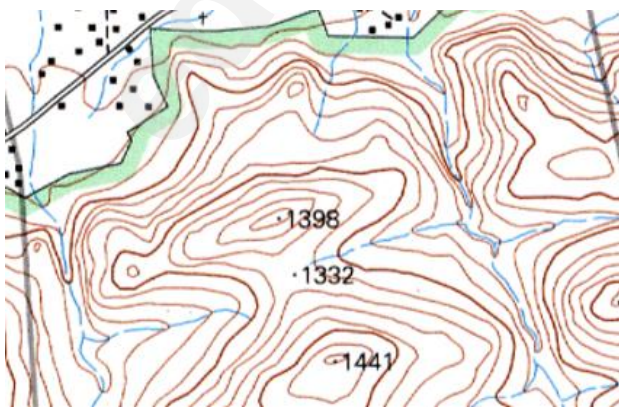
Each of the blocks in the 2528 degree block below, represent one topographic map with a scale of 1: 50 000. The orthophoto has a larger scale namely 1: 10 000. This means that each orthophoto only show a small part of one topographic map (3' by 3'). One topographic has 25 orthophotos covering the map. These photos are numbered from left to right from top to bottom in five row and five columns form 1 – 25. The orthophoto reference has this number next to the map code.

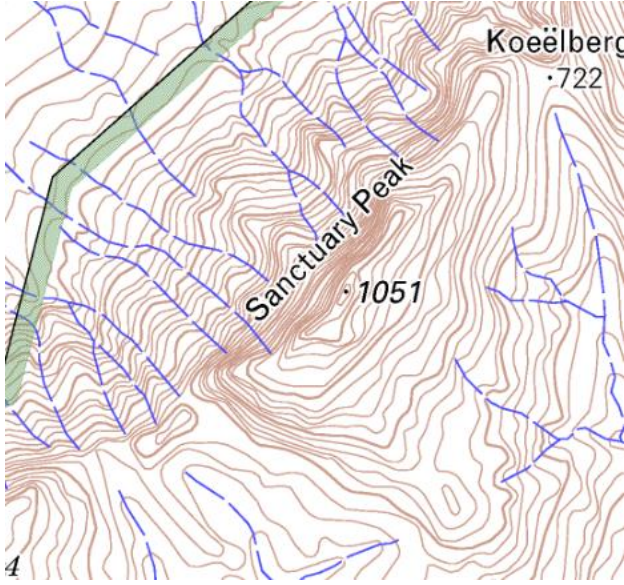
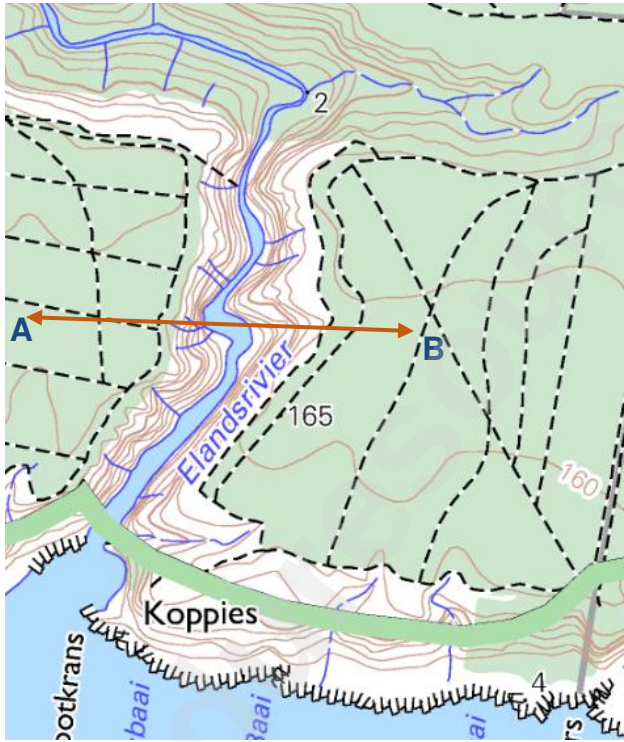
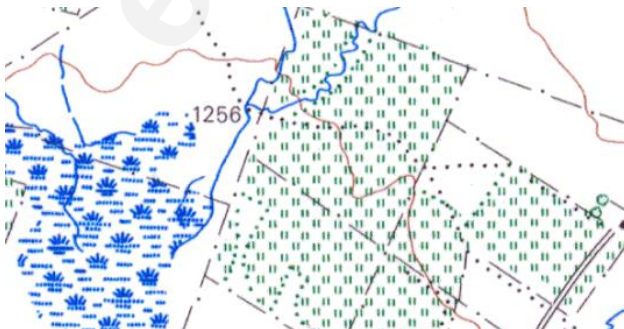


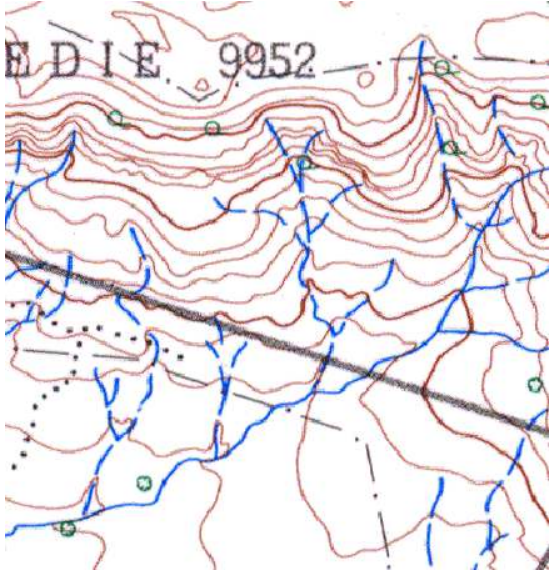
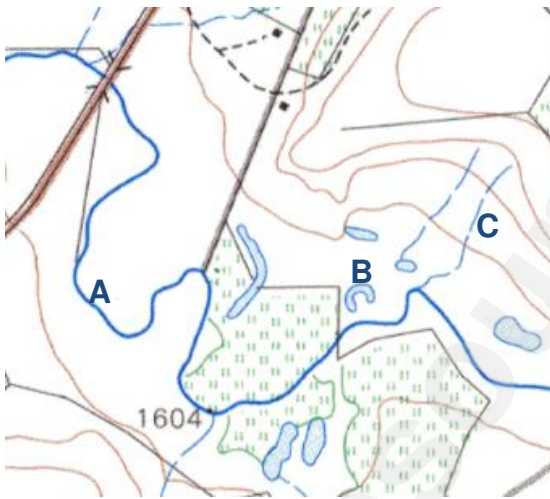
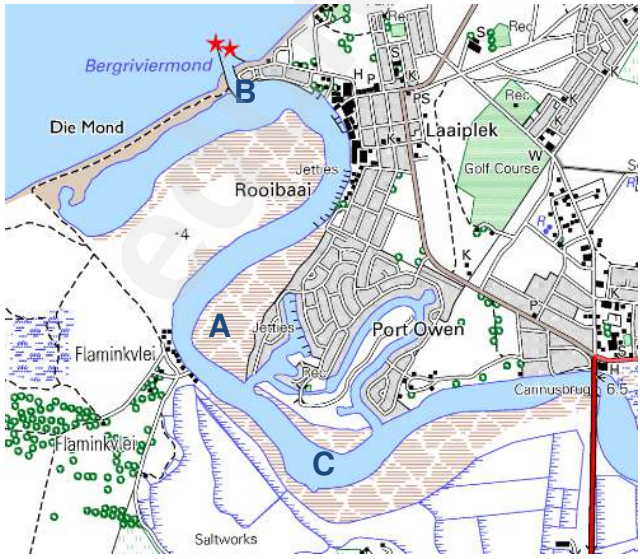
Landforms and other map interpretation examples.

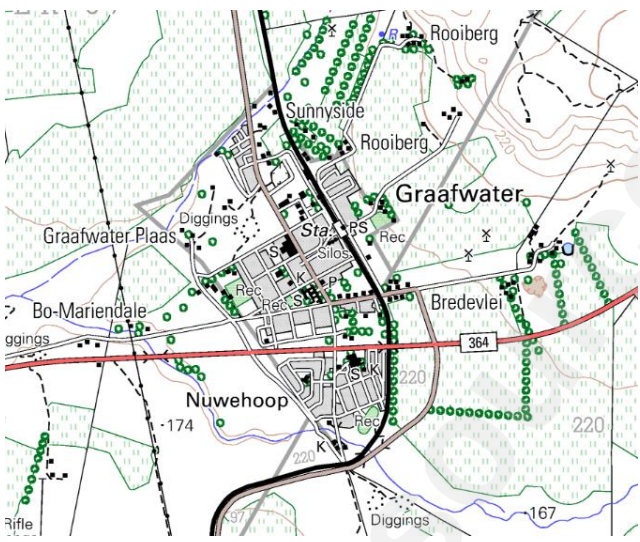
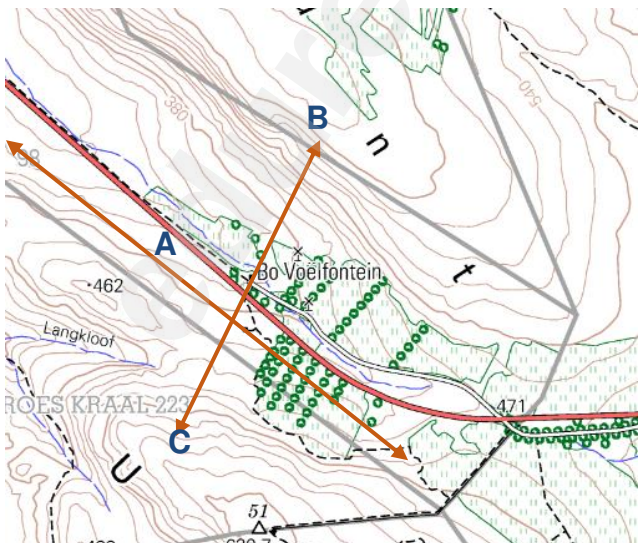
	Give all contours values Identify the type of slopes. Describe the type of slope.
	Identify the type of slopes along line A to B. List human uses of the slope at A and B respectively. Draw a free hand cross section from A to B.
	Identify the landform at C. Draw a free hand cross section from A to B.

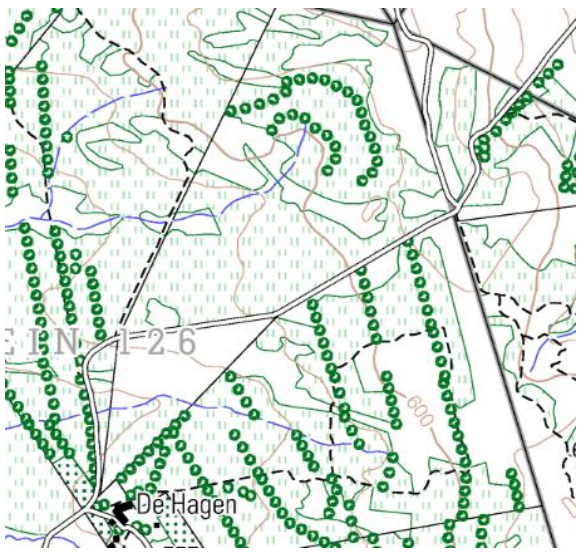
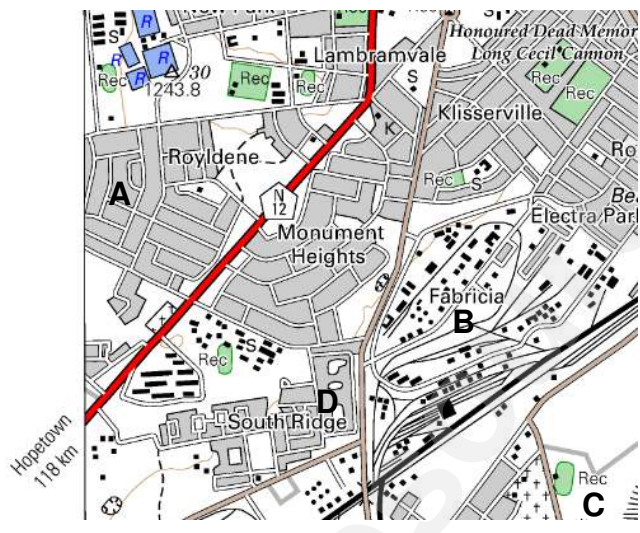
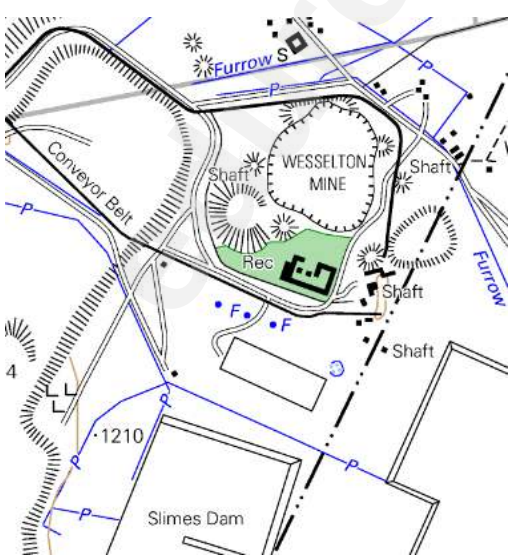
	Indicate which side of the arrow is high and low respectively. Identify slope along the arrow Identify the landform along the arrow. Draw a free hand cross section from A to B.
	Identify the landforms A and B In what direction does the river labelled A flow? What is the function of the row of trees along the river? Draw a free hand cross section from C to D.
	Identify the landform Sandkop. What is the altitude of the trig station? Draw a free hand cross section from A to B.

	Identify the landform Koffiebus. What is the altitude of the trig stations? Identify the stream pattern that developed on this landform. Draw a free hand cross section from A to B.
	Identify the landform Teebus. What is the altitude of the trig stations? Describe the stream pattern that developed on this landform. Draw a free hand cross section from A to B.
	Identify the stream pattern that developed in this area. Describe the stream pattern that developed in this area. Account for the development of this stream pattern.

	Define the term watershed. Draw a line on the map to indicate the main watershed in this area. Give the stream order at B.
	Draw across section from A to B. River rejuvenation too place in this river. Support this statement with evidence from the map clip.
	Describe the gradient of this land. Account for the marches and vleis to the west. Identify the type of farming to the east.

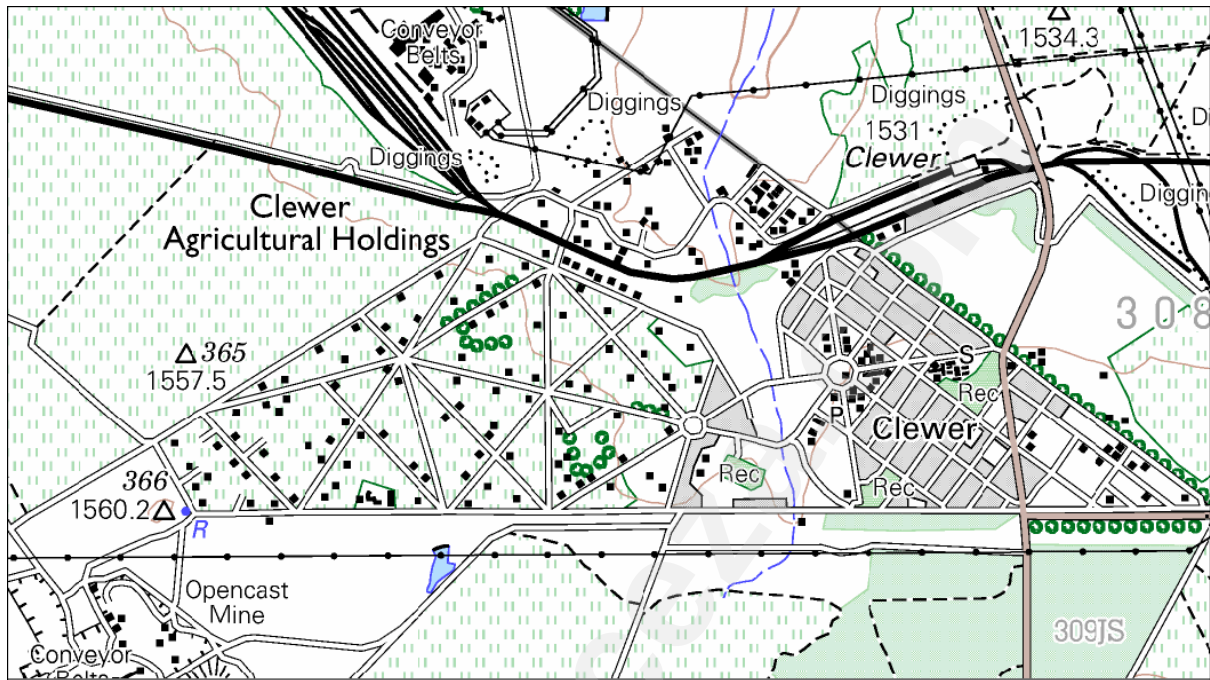
 A topographic map showing a stream network. The streams are represented by blue lines, and the contour lines are brown. A road is shown as a black line. The map is labeled 'E D I E. 9952'.	Identify stream pattern in this area. Identify the stage of the river in this area. Give characteristics of this stage by referring to map evidence.
 A topographic map showing a river with fluvial landforms labeled A, B, and C. The river is represented by a blue line, and the contour lines are brown. The map is labeled '1604'.	Identify stream pattern in this area. Identify the fluvial landforms labelled, A, B and C. Identify the stage of the river in this area. Give characteristics of this stage by referring to map evidence. Explain why farming is located next to the river.
 A map of Port Owen showing a river with fluvial landforms labeled A, B, and C. The river is represented by a blue line, and the landforms are labeled A, B, and C. The map includes labels for 'Bergriviermond', 'Die Mond', 'Rooibai', 'Laaiplek', 'Port Owen', 'Flaminkvlei', 'Saltworks', and 'Carnusbrug'.	Identify stream pattern in this area. Identify the fluvial landforms labelled, A, B and C. Identify the stage of the river in this area. Give characteristics of this stage by referring to map evidence.

 A topographic map showing a firebreak (dashed line) running horizontally across the top. Below it is a blue area labeled 'Sirkelsvlei'. To the right is a hill labeled 'Russouwskop'. Contour lines are visible, with labels 107 and 103.	What is the function of a fire break? Describe the drainage in this area. Discuss the factors influencing drainage in this area.
 A detailed topographic map of a town area. The town is labeled 'Graafwater'. Other labels include 'Rooiberg', 'Sunnyside', 'Graafwater Plaas', 'Bo-Mariendale', 'Nuwehoop', 'Bredevlei', and 'Diggings'. Contour lines are shown with labels like 220, 174, and 167. A road labeled 364 is visible.	Graaf water is a central place town. Support this statement with evidence from the map.
 A topographic map of a mountainous area. A road is shown running diagonally. Three points are marked: 'A' on a slope, 'B' at a peak, and 'C' on another slope. Other labels include 'Bo Voelfontein', 'Langkloof', and contour lines with values like 462, 471, 51, 620, and 640.	Identify the landform labelled A on the map. Explain why the road was built along this landform. Draw a freehand cross section from B to C and identify and draw the winds that occur along these slopes at night.

	Identify the economic activity on the map clip. Explain why this area is suited for this economic activity. What is the function of the rows of trees in this area?
	How far is Hopetown from Kimberley? (This map) Identify the land use zones at A: B: C: D: Identify the street pattern at D and give advantages and disadvantages of this pattern.
	Identify the economic activity on the map clip. What transport method is used to transport raw materials in this area. There is both opencast and shaft mining in this area. Support this statement with evidence from the map.

EXAM TYPE QUESTIONS

1. Refer to the map clip below to answer the questions that follow.
Area near Witbank



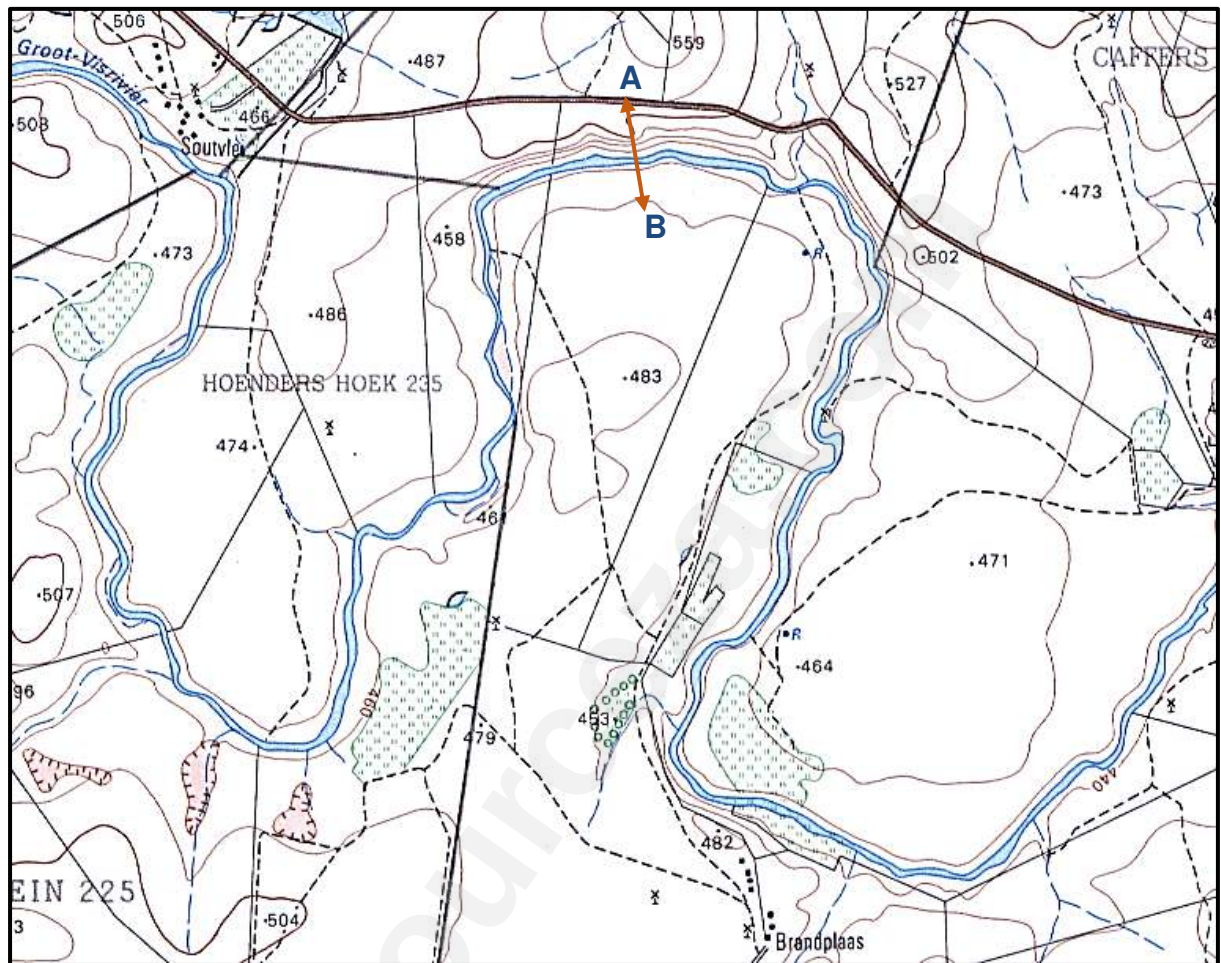
- 1.1 This area occurs just outside Witbank. Identify the urban land use zone of this area.

- 1.2 Account for your answer in question 1.1.

- 1.3 List two rural and two urban activities that are practiced in this area.

- 1.4 Explain why this area is suitable for both agricultural activities and settlements to develop here.

2. Refer to the map clip below and answer the following questions.



2.1 Compare the Great Fish river with its tributaries in the table below:

	Great Fish River	Tributaries
Type of river		
Volume		
Erosive capacity		
Order		
Gradient		
Type of flow		

2.2 Identify the stage that the Great Fish River is in at this point.

2.3 Substantiate your answer in question 2.2 with evidence from the map.

2.4 In what general direction is the Great Fish river flowing?

2.5 Motivate your answer with evidence from the map.

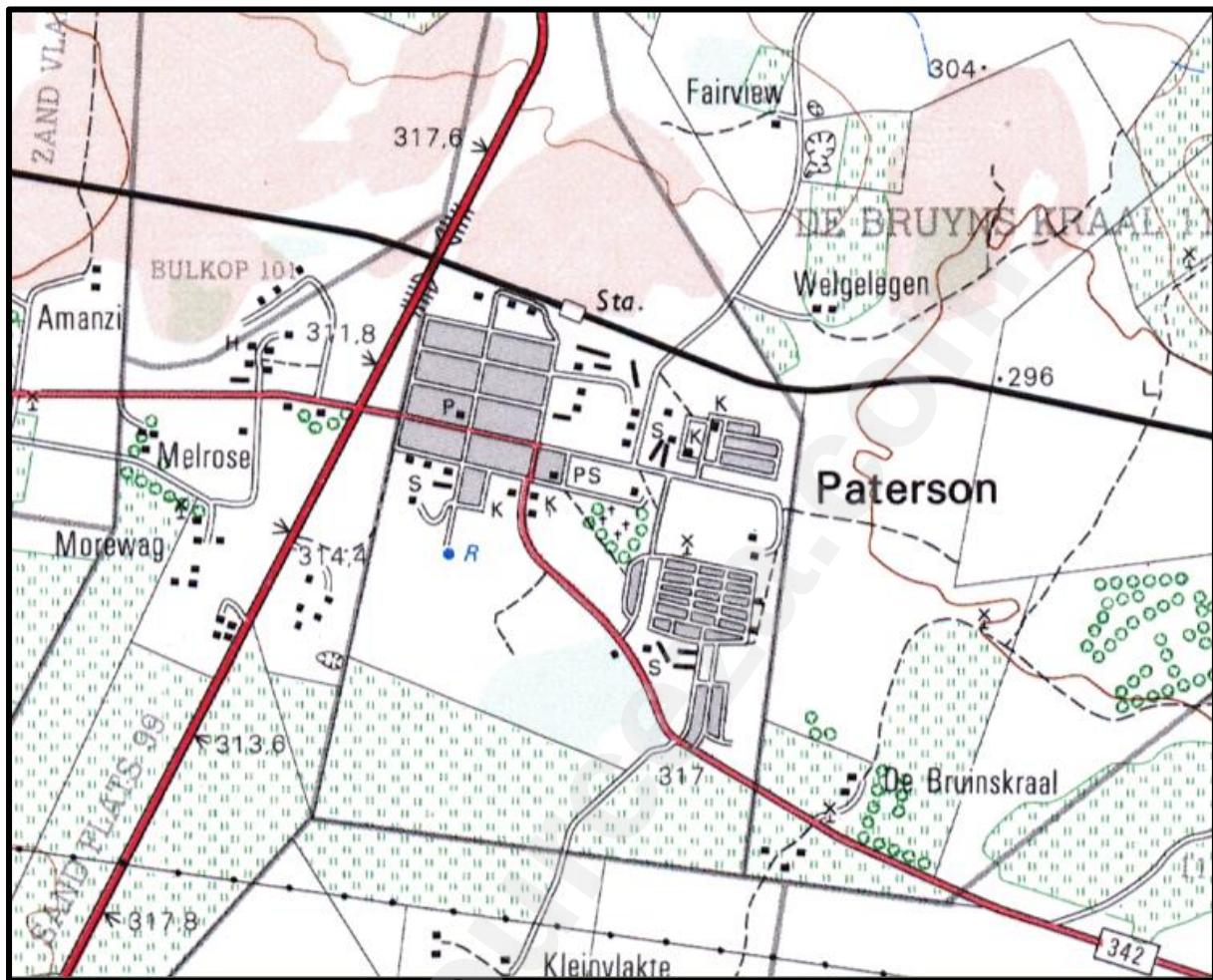
2.6 In a paragraph, explain how the meanders in the river will change over time and how it will widen the valley.

- 2.7 Draw a simple freehand cross section from A to B through the Great Fish River. Identify and label the slopes on either side of the river.



- 2.8 Write a paragraph to explain how the slopes at A and B differ and explain why it differ.

3. Refer to the map clip below and answer the questions that follow.



Paterson, Eastern Cape Municipality in South Africa
Paterson is a settlement in the Sarah Baartman District
Municipality in the Eastern Cape province of South Africa.
It is some 80 km north-west of Alexandria and 21 km north of
Ncanaha.
Area: 4.3 km² Population: 5,582 (2011)
Weather: 13°C, Wind W at 6 km/h, 86% Humidity Wikipedia

3.1 List the factors that influenced the site of Paterson.

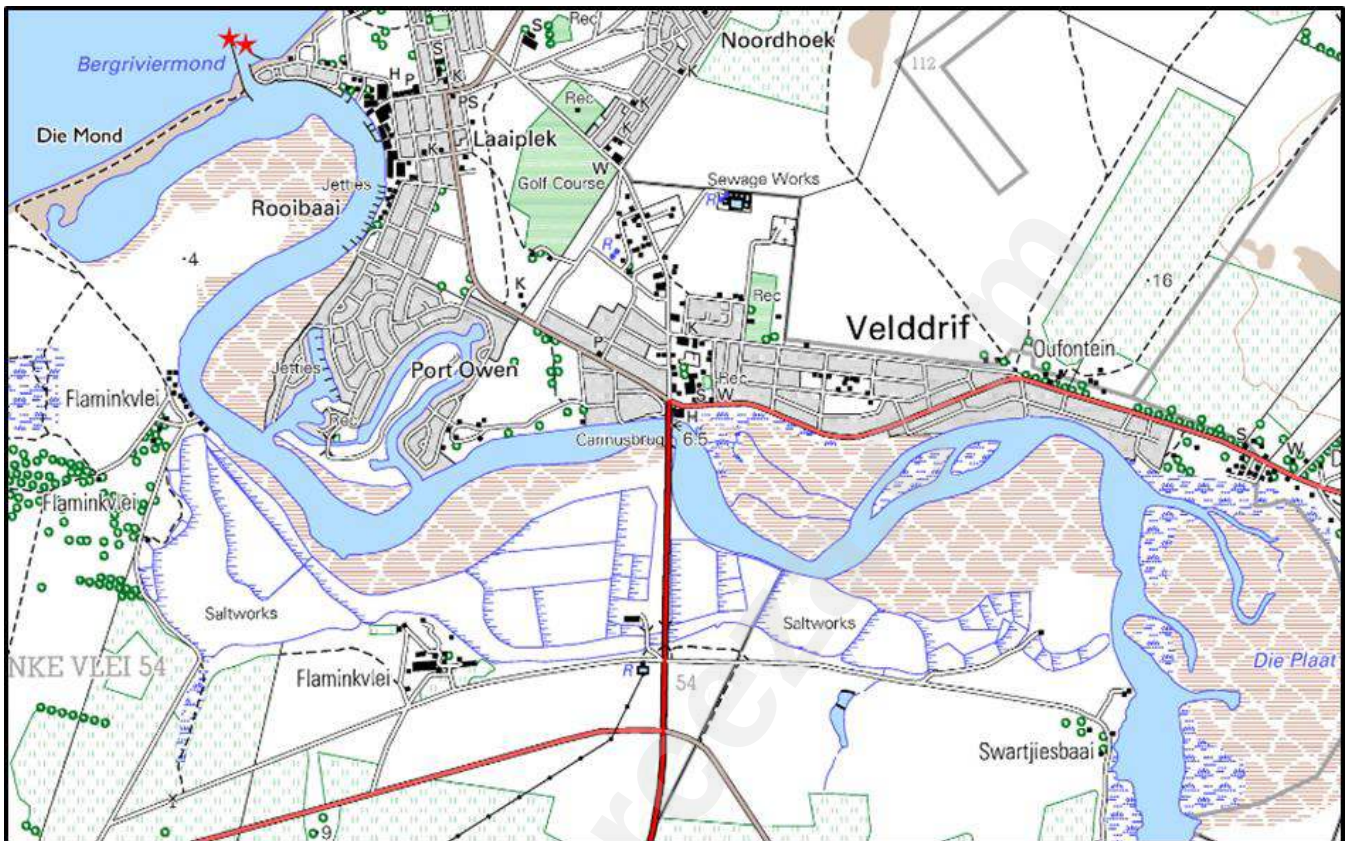
3.2 Discuss the advantages and disadvantages of the situation of Paterson.

3.3 Paterson can be identified as a central place town. Define the term central place town.

3.4 Give evidence from the map to prove that Paterson is indeed a central place town.

3.5 Paterson has three spatially separated suburbs with different sized street blocks. Account for this by referring to the South African city models of the past. Present your answer in a paragraph that can be used on a website about the town.

4. Refer to the map clip below to answer the questions that follow.



Laaiplek used to be a thriving fishing community where many made a living from harvesting the rich Atlantic Ocean resources. There was a productive fish processing plant employing a number of people from the community. Due to pressure on and decline of the resources the South African Government has largely reduced fishing permits in the area. Today many fishing schooners lie idle in the harbour stripped of all valuable equipment awaiting a slow process of sinking.

Port Owen has been developed as an upmarket security village for retirees, freelancers and commuters who want to escape the hustle and bustle of the Cape Town metropolitan area.

4.1 Explain why Laaiplek had the ideal location for a harbour.

4.2 Explain why the Berg River estuary is so important for sustainable fishing in the area.

4.3 Explain how the reduced fishing permits would affect the socio economy of the Laaiplek community.

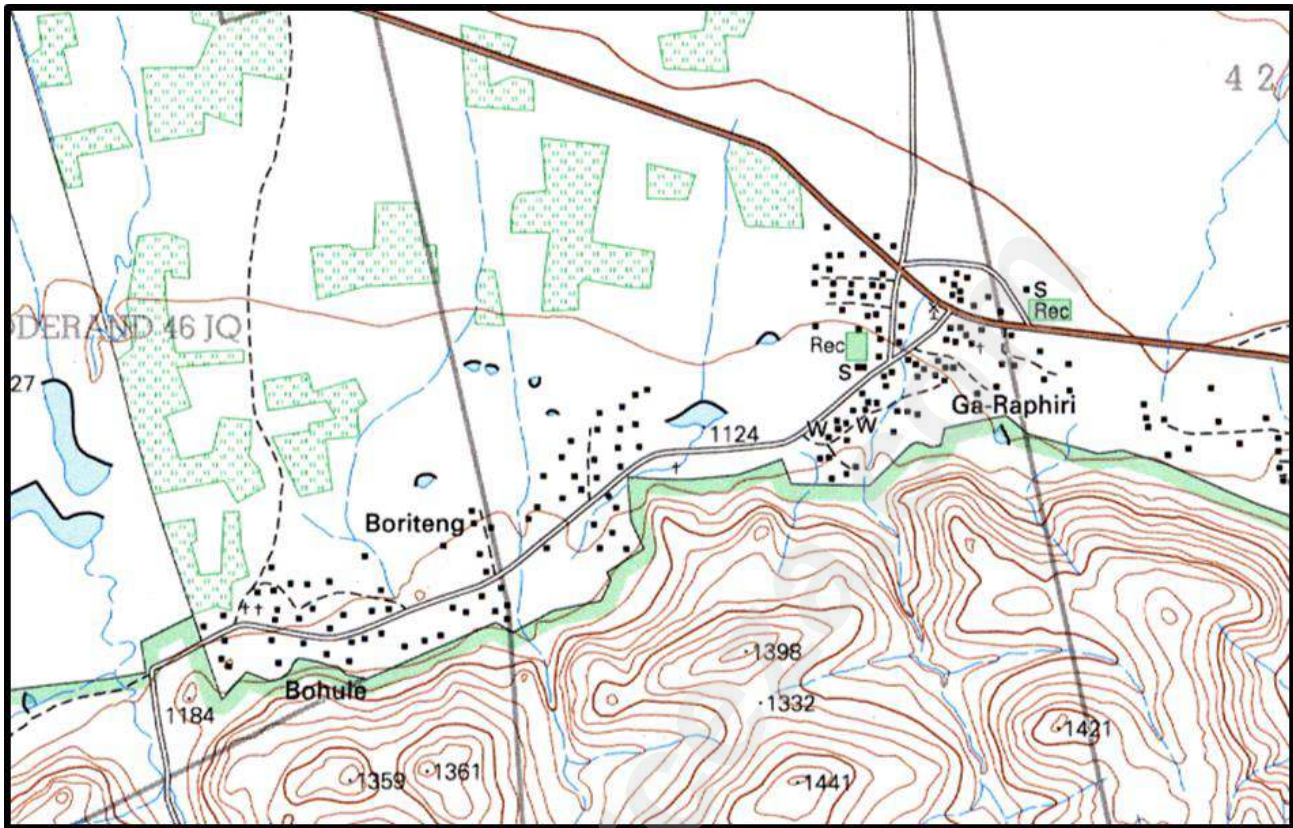
4.4 Suggest new ways in which the community can create an income for themselves.

4.5 Identify the stage of the Berg River in this area.

4.6 Give evidence from the map to substantiate your answer in question 4.5.

4.7 Explain why this southern bank of the Berg River is ideal for the Salt works.

5 Refer to the map clip below and answer the questions that follow.



5.1.1 Identify and describe the pattern on the settlement on this clip.

5.1.2 List two advantages and two disadvantages for people living in a settlement with such a pattern.

5.1.3 Describe and account for the shape of the settlement on this map.

5.2.1 The inhabitants of the rural area are involved in primary activities. Write a paragraph to explain how this community sustains itself and explain why it would be very vulnerable to the effects of climate change.

5.2.2 The community of this village is very negatively affected by rural urban migration. Explain in a paragraph how and why this type of rural communities are so hard hit by rural urban migration.

5.3.1 Identify the drainage pattern of the rivers in the south of this map clip.

5.3.2 Account for the development of this drainage pattern in this area.

5.3.3 How can the mountainous area be utilised by the community to gain extra income?

5.4 Due to the topography of the land, opposite winds will develop during the day and during the night over the settlement. Complete the table below to describe the winds that the area will experience.

Identify the winds that occur here.	
Day:	Night:
Explain how these winds develop	
Day:	Night:
Explain how the wind will influence the village.	
Day:	Night:

TOPIC 5: MAPWORK

GEOGRAPHIC INFORMATION SYSTEMS

CAPS CONTENT

Learners must know the concepts in GIS as set out in the additional notes below. They must also be able

PLEASE NOTE:

You are also expected to be able to do the following, but not in the exam.

- Developing a 'paper GIS' from existing maps, photographs and other sources of information on layers of tracing paper

You need to be able to apply the concepts to new situations:

- Identify and interpret concepts by using given data such as satellite images, topographic maps, orthophoto maps, aerial photographs, pictures and statistics indicated on graphs and tables

WEIGHTING AND TIME

About 8 hours should be used for GIS, but it should be integrated with mapwork and theory through the year.

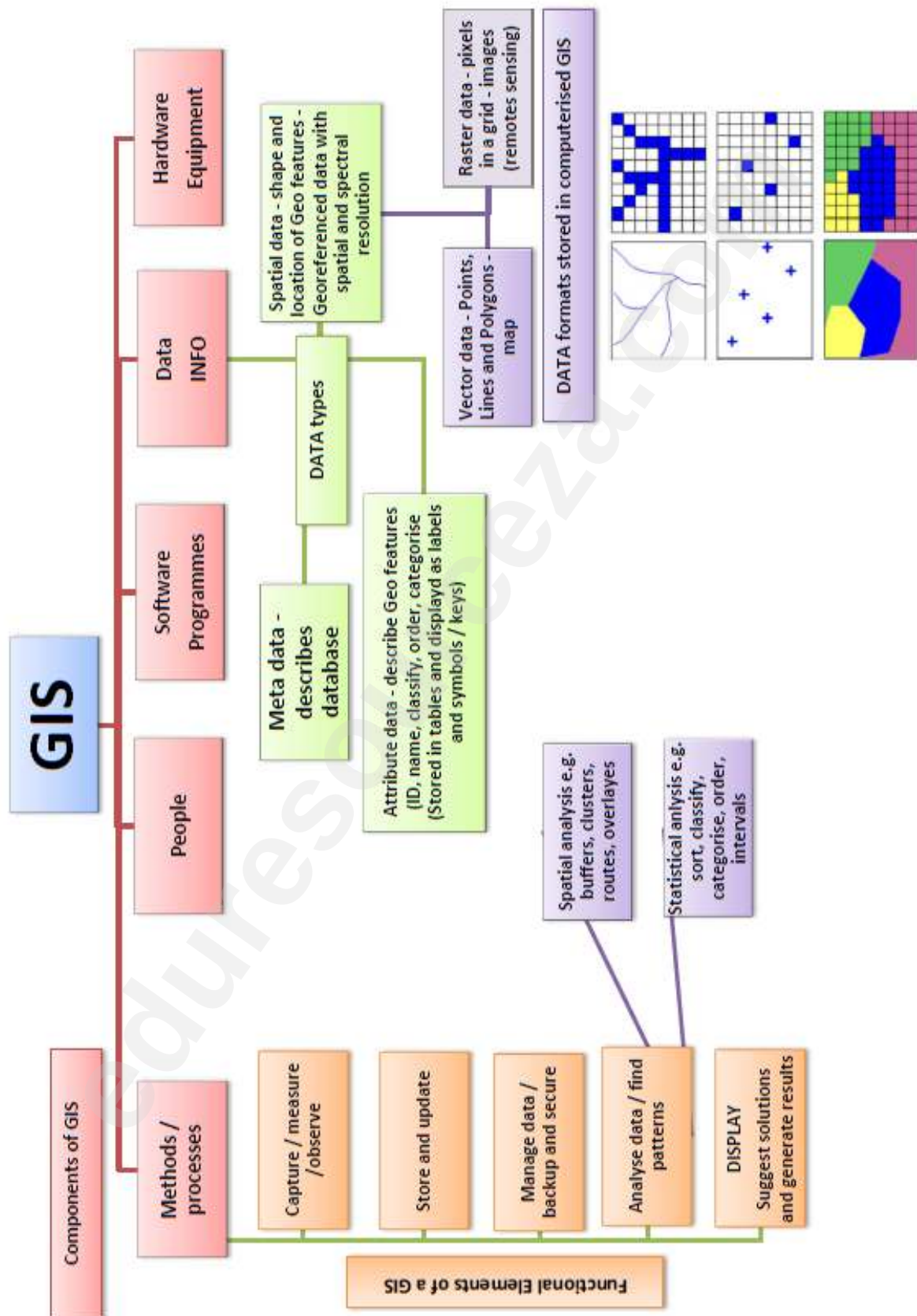
METHODOLOGY

The concepts of GIS are often just given to learners to study. Learners cannot make sense of the concept in this way. Today GIS is used around us daily. There is a GIS map system on most smart phones, in shopping centres to find your way in our cars when we drive on the television to show where news events are taking place.

Use these examples to teach the concepts of GIS but always refer back to topographic maps and orthophoto maps, as this is what learners will face in the final exams.

You do not need a computer to teach basic GIS concepts.

ADDITIONAL NOTES



1. Concepts of

1.1. GIS – Geographic information systems

Definition: GIS is a collection of computer hardware, software, data, people and processes designed to capture, store, update, manipulate and analyse spatially referenced data.

1.2. Remote sensing: observations from a distance e.g. satellite images and aerial photographs

Resolution: The amount of pixels making up an image which determines the quality / detail for the image - the smaller the pixels the clearer the image.

Pixels: the small squares making up a photograph or image – arranged in a grid.

Spatial resolution: the size of the pixels in an image or the amount of features in a vector data set.

Spectral resolution: the number of bands of the electromagnetic spectrum captured in a satellite image. The spatial resolution increase if more band are captured. (Some sensors on satellites can capture wavelengths that are not visible to the naked eye.)

1.3 Spatial and attribute data

A GIS stores two types of data namely

Spatial data: the shape and the location of geographical features.

Attribute data: the characteristics of geographic features e.g. name, value, intensity, type, classification etc. The labels on the maps often show the attributes.

1.4. Vector and raster data is how spatial data can be stored in a GIS on a computer.

Raster data consist of pixels in a grid – images and aerial photographs are examples of raster data.

Vector data consists of point, line and area symbols illustrating geographical features in a GIS or a map.

- ✓ Spatial objects are geographical features with location and shape.
 - Points – a geographical feature that is stored as one set of coordinates in a GIS
 - Nodes – points that form the basis of a line or polygon. Nodes are connected by arcs to form lines and polygons.

- Lines – a range of connected x,y coordinates representing a linear geographic feature like roads, railways and rivers.
- Area/polygons: a range of connected x,y coordinates in a GIS where the first and last nodes are connected to encircle an area. This resemble features that take up areas e.g. dams, cultivated land etc.

1.5 Concept of layering of information – this is when the different geographical features are place over each other to organise them in the GIS. Layering shows the relationship between different geographical features

1.6. Components of GIS: hardware, software, data, people and processes

Functional elements: capture, store, update, manipulate and analyse spatially referenced data

1.7. Sources of information for GIS:

Remote sensing – aerial photos and satellite images

Survey data – roads, railways, altitude

Census data

Measure data e.g. rainfall, temperature, air pressure ect.

Other maps

1.8. Data manipulation and analysis

- ✓ Concept of data manipulation – to change the data to make it more useful
- ✓ Data integration – to put a range of features or data set together in one GIS.
- ✓ Buffering; to draw an area around a geographic feature to show a zone of influence or exclusion.
- ✓ Querying: to investigate the data and find answers about specific parts of the dataset.
- ✓ Statistical analysis: this is when statistical data like population data is sorted and categorised to display spatial patterns which is not clear in the table or captured attributes. Statistical analysis is used to make patterns in number data visible on a

map e.g. average rainfall maps are based on statistical analysis.

1.9. Data standardisation means to make the data similar to other data set so allow data sharing.

1.10. Data sharing: to make data available for other users to access. Data collection is a laborious and expensive task. Companies rather use data which was already captured by experts like land surveyors.

1.11. Data security: to ensure that data is safe from tampering and anybody do not have access to sensitive data or data that can be manipulated to obtain a different outcome to the GIS analysis. Backing up data for disaster recovery is also an important part of data security.

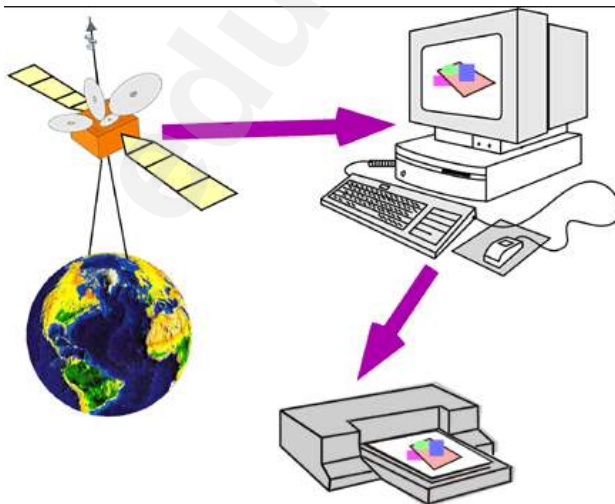
1.12 Application of GIS by the

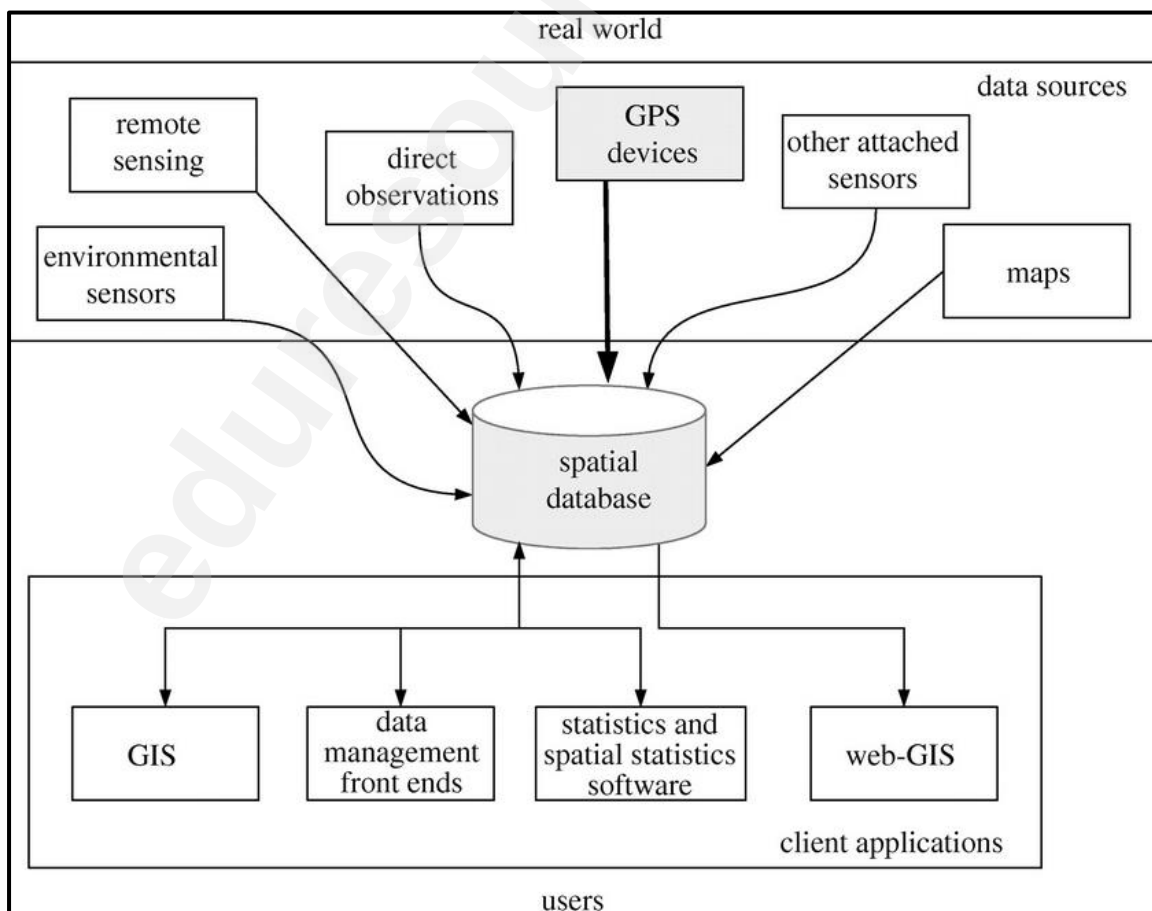
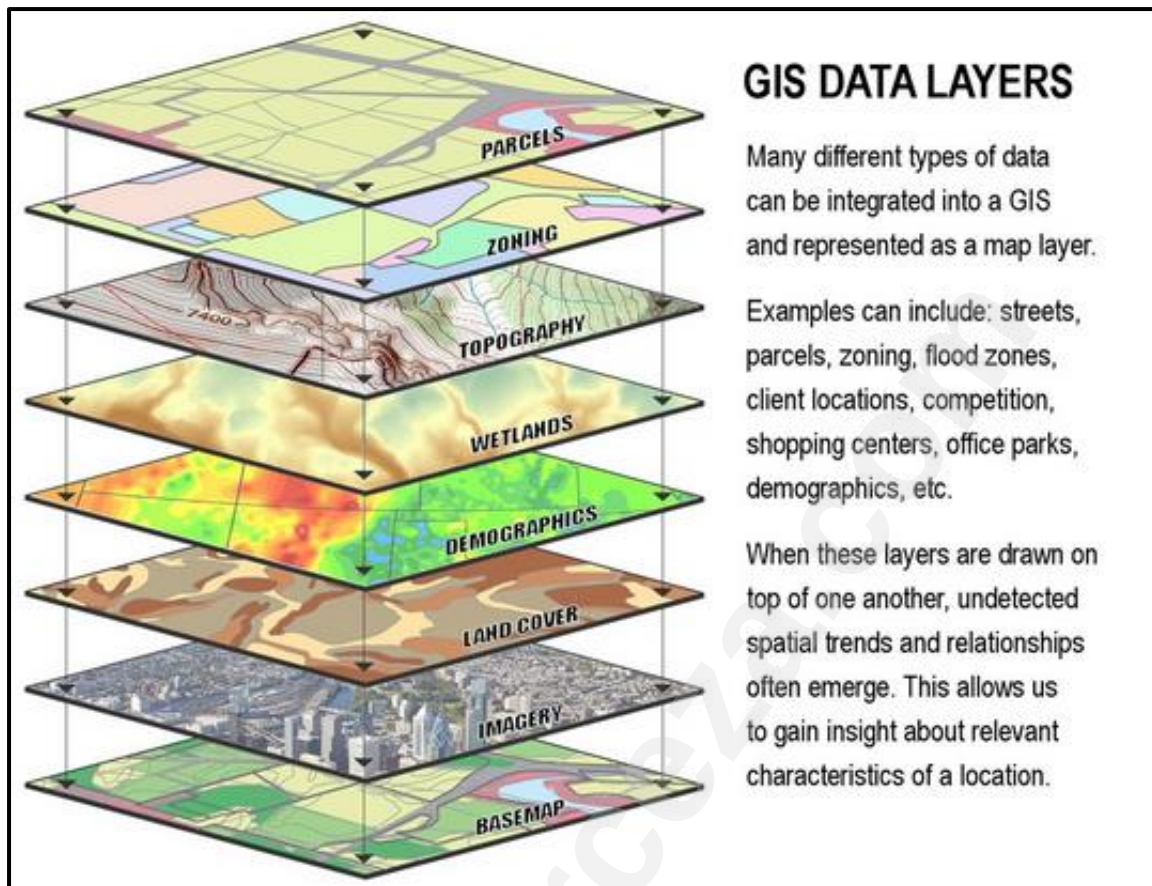
- ✓ Government: census, elections, planning, budgeting, research, problem solving.
- ✓ Private sector: used to improve productivity and solve any geographical query.

GROUP ACTIVITY

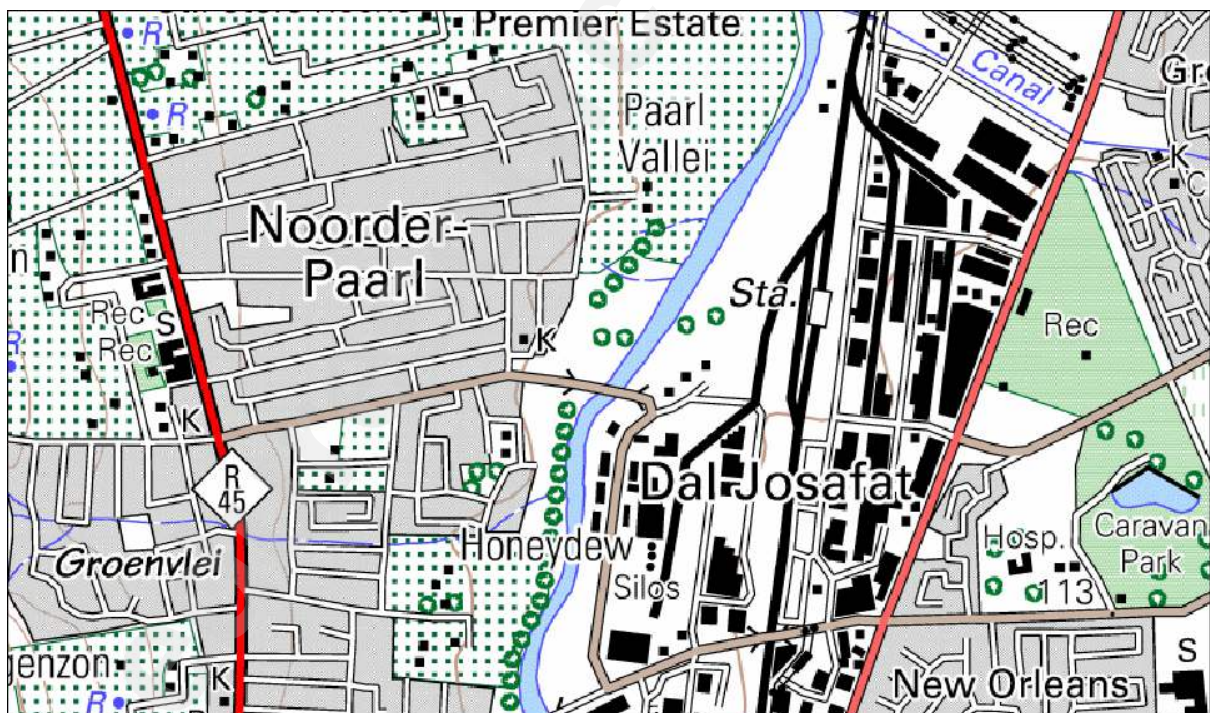
Design a lesson to teach the GIS concepts in class.

Use the same resources that learners will have access to in exams as your LTSM. (Topographic map and orthophoto map.)





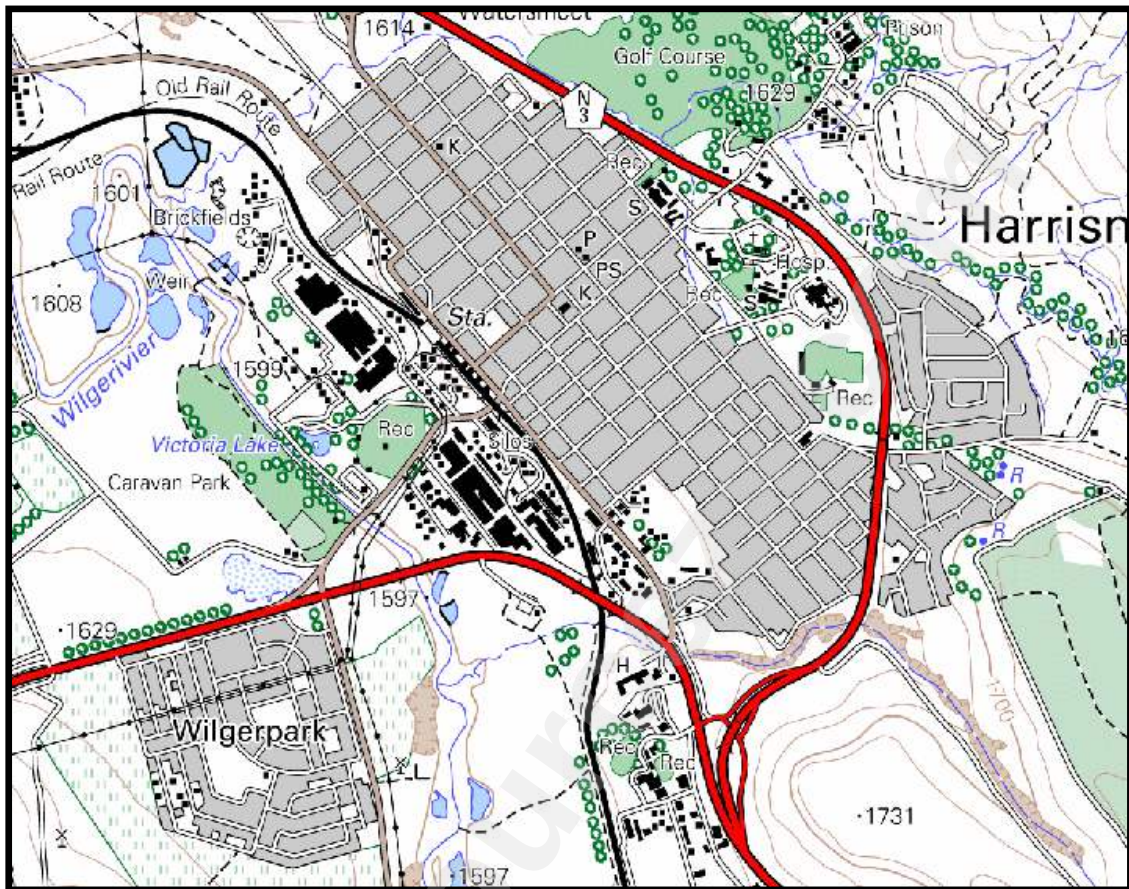
These clips are from the Paarl map and orthophoto



Lined area for writing, featuring horizontal ruling lines and a diagonal watermark reading "eduresourceza.com".

EXAM QUESTIONS

Map clip – Harrismith



Orthophoto clip Wilgerpark (Harrismith)





eduresourceza.co

Lined area for writing, featuring horizontal ruling lines and a diagonal watermark reading "eduresourceza.com".

TOPIC 6: CLIMATOLOGY INTEGRATED MAPS

READING AND INTERPRETING OF SYNOPTIC WEATHER MAPS

CAPS CONTENT

Reading and interpreting satellite images and synoptic weather maps that illustrate weather associated with mid latitude and tropical cyclones as well as weather associated with subtropical anticyclonic conditions.

Exam guidelines: Interpretation of Synoptic Weather Maps

- Use of international symbols
- Identification and characteristics of high- and low-pressure cells
- Interpretation of the impact of high- and low-pressure cells
- Reading and interpretation of station models
- Satellite images - reading and interpretation
- Compare satellite images to synoptic weather maps

Exam Guidelines: Mid Latitude Cyclones

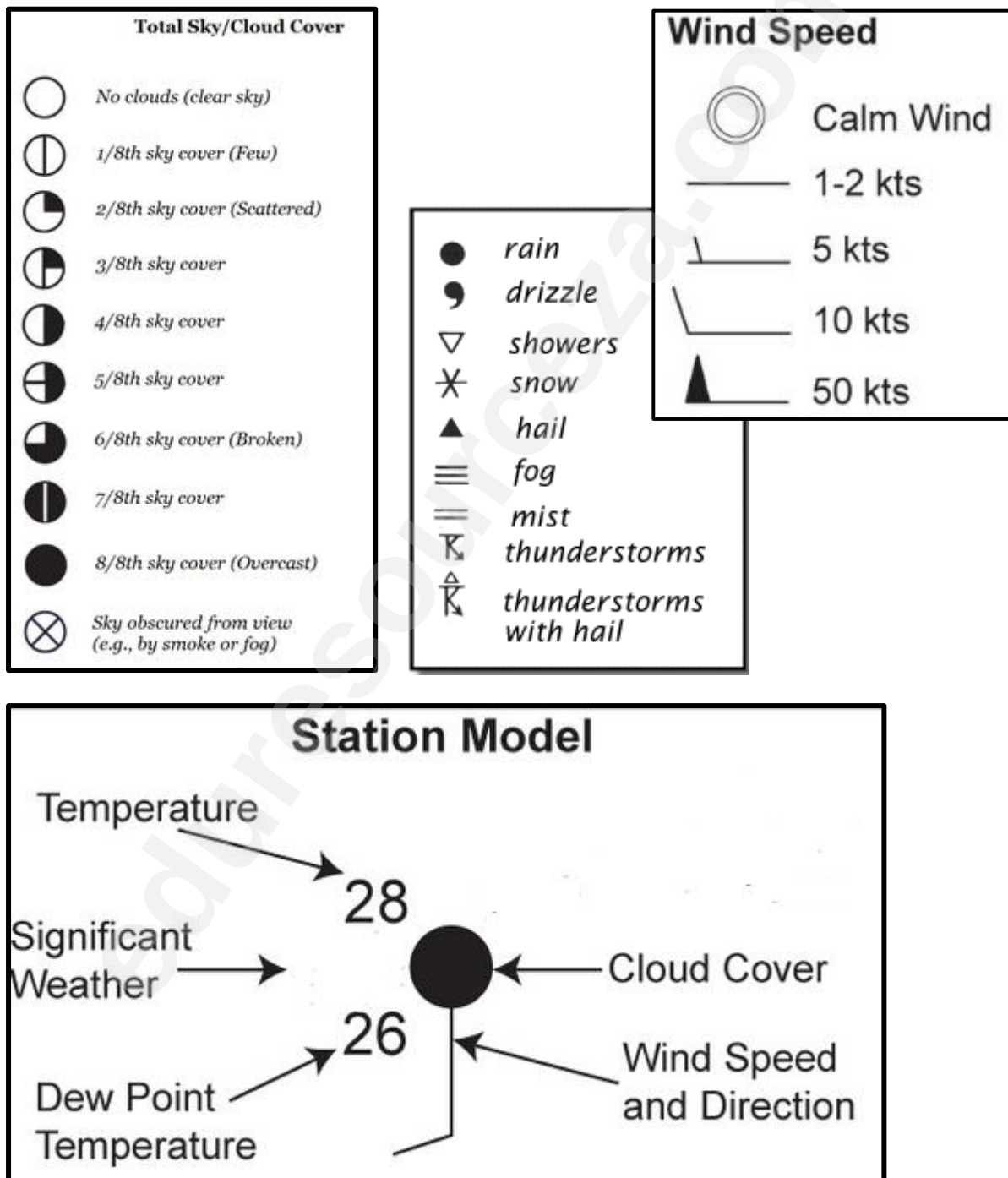
- General characteristics
- Areas of formation
- Conditions necessary for formation
- Stages in the formation
- Associated weather patterns
 - o Cold front conditions
 - o Warm front conditions
 - o Occluded front conditions
- Cyclone families
- Impact on human activities and the environment
- Possible pre-cautionary and management strategies
- Identification on synoptic weather maps and satellite images
- Identification of stages of development on synoptic weather maps
- Interpretation of weather symbols, predicted weather and impact

WEIGHTING AND TIME

Integrated with the teaching time of mid latitude and tropical cyclones and subtropical anticyclonic conditions.

ADDITIONAL NOTES -

SYNOPTIC WEATHER STATION INFORMATION



METHODOLOGY

Use synoptic weather maps to integrate and revise the regional climate topics. Learners must be able to read synoptic weather maps from grade 10. Revise the symbols and make sure all learners can read a synoptic weather map. Copy a synoptic weather map for the learners so that they can identify all features on the map. Point out all the information, description and features on a synoptic weather map. Let learners label and colour the map to show the different weather features on the map. Let them past the map over a double page in their workbooks so that they can make sketches and summaries and add descriptions around the map as you explain the work.

Use the last two exam type questions to discuss how to empower learners to answer paragraph questions better.

GROUP ACTIVITY

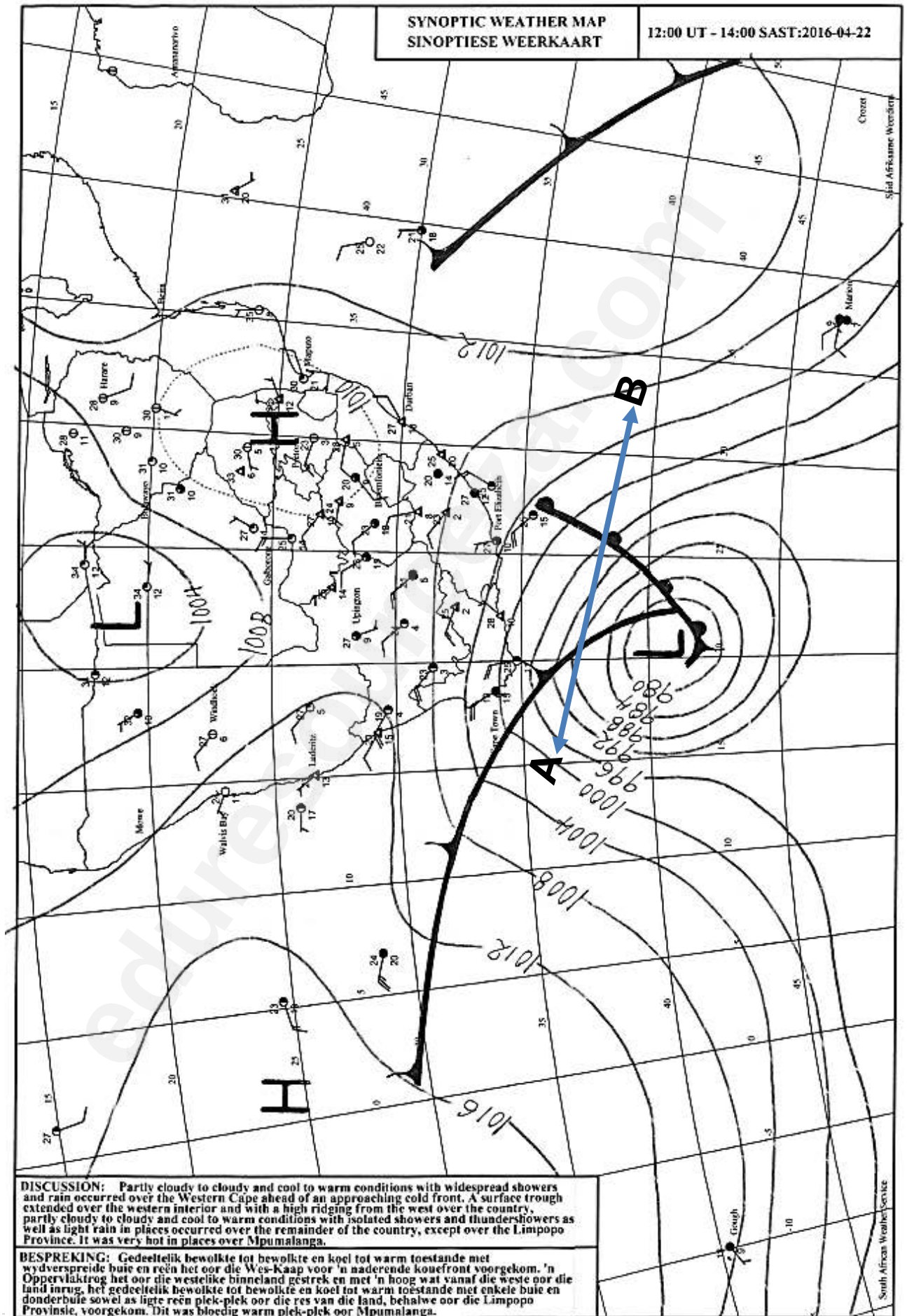
Mid Latitude Cyclones – Synoptic Weather maps

Refer to the synoptic Weather map on the next page to answer the following questions.

Label the following features on the synoptic weather map Figure 1 of 2016-04-22.

- ✓ Season of the map
- ✓ Pressure Cells
- ✓ Fronts
- ✓ Wind Belts
- ✓ Air masses (Cool, cold, warm)
- ✓ Air movement around pressure cells
- ✓ Weather system
- ✓ General movement of weather systems
- ✓ Pressure gradient and associated wind speeds
- ✓ Geostrophic flow

(Use PowerPoint to mark this)



EXAM QUESTIONS

- 1.1. Refer to the synoptic weather map of 2016-04-22, above. Account for the cloudy conditions over the plateau.

Refer to at least 3 reasons.

(3 x 2) (6)

- 1.2. Draw a simple annotated cross section from A to B.

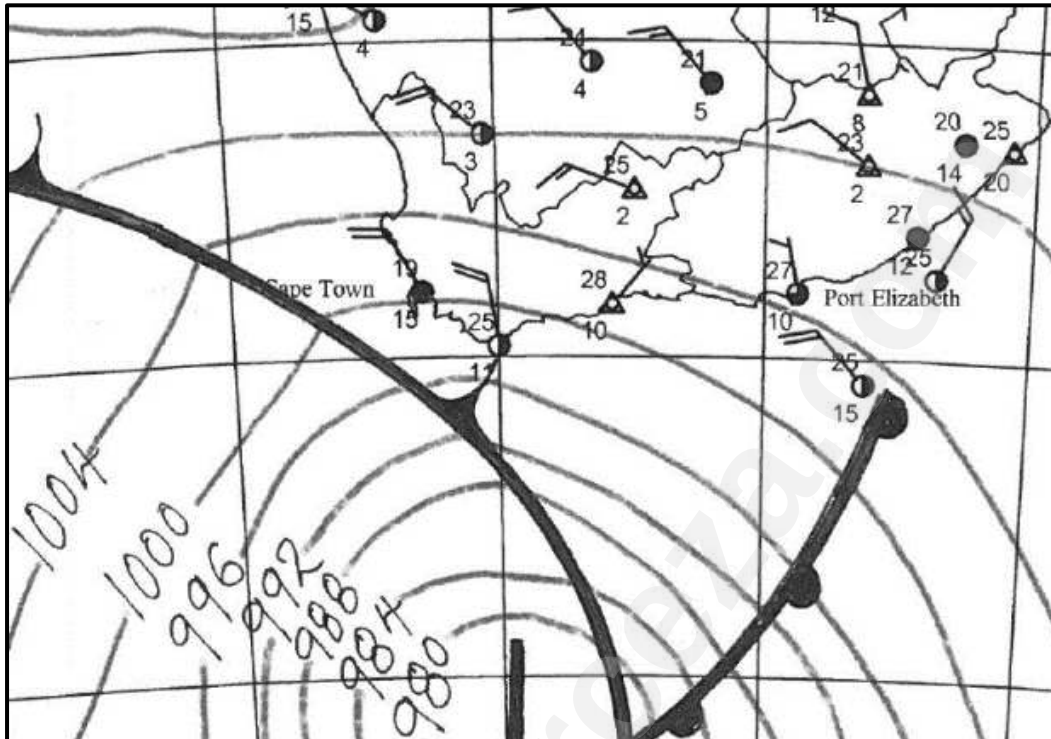
(Clouds, Air movement, Fronts, air masses)

(8 x 1) (8)



1.3. Refer to FIGURES 1.3 A and 1.3 B below and answer the questions:

FIGURE 1.3 A: EXTRACT OF 2016-04-22



Describe and account for the weather at Cape Town and Port Elizabeth by completing the following table: Description (7 x 1) (7) Account (7 x 2) (14)
CAPE TOWN

Weather Element	Description	Account – Reason why weather is like it is.
Temperature		
Wind Direction		
Wind speed		
Cloud cover		
Dew Point temperature		
Humidity / moisture content		
Air Pressure		

Port Elizabeth

Description (7 x 1) (7)

Account (7 x 2) (14)

Weather Element	Description	Account – Reason why weather is like it is.
Temperature		
Wind Direction		
Wind speed		
Cloud cover		
Dew Point temperature		
Humidity / moisture content		
Air Pressure		

FIGURE 1.3 B. EXTRACT FROM 2016-04-23

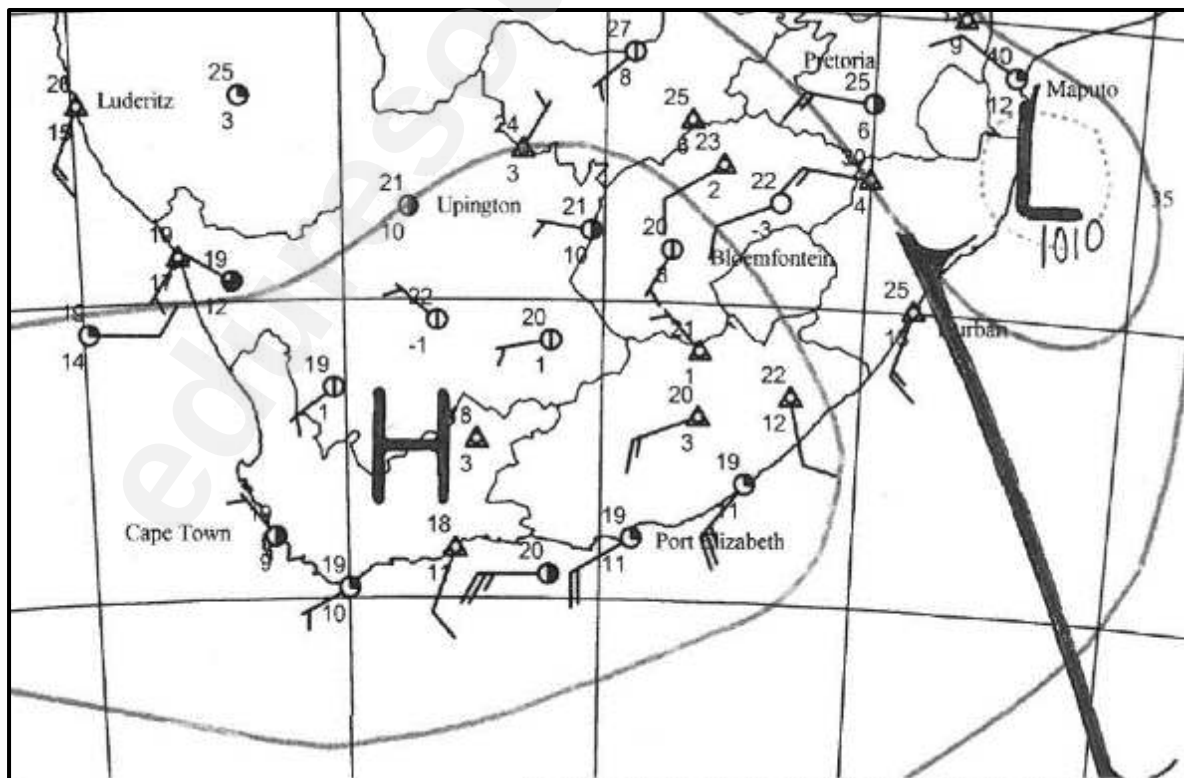


Figure 1.3 B illustrate the weather one day later than in FIGURE 1.3 A. Describe and account for the weather at Cape Town and Port Elizabeth by completing the following table:

CAPE TOWN

Weather Element	Description	Account – Reason why weather is like it is.
Temperature		
Wind Direction		
Wind speed		
Cloud cover		
Dew Point temperature		
Humidity / moisture content		

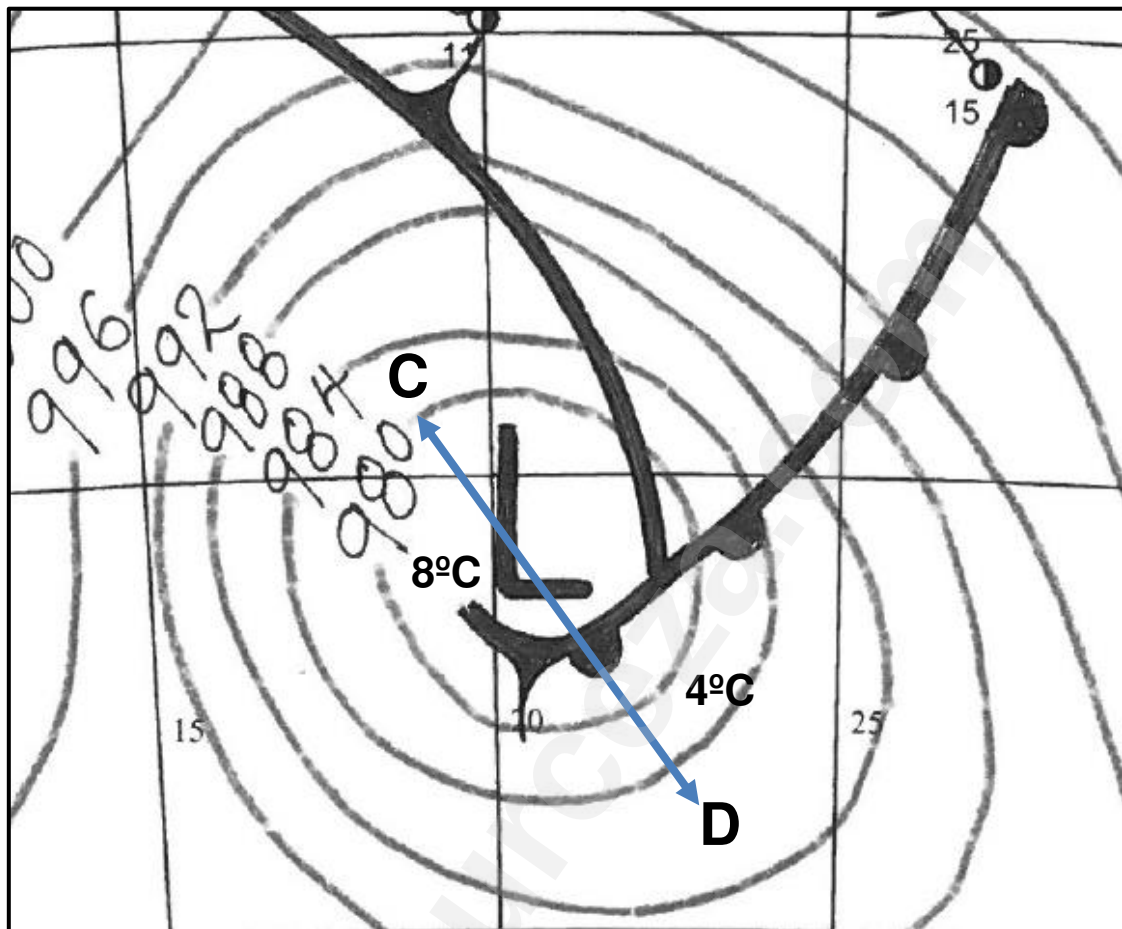
Port Elizabeth

Description (7 x 1) (7)

Account (7 x 2) (14)

Weather Element	Description	Account – Reason why weather is like it is.
Temperature		
Wind Direction		
Wind speed		
Cloud cover		
Dew Point temperature		
Humidity / moisture content		

FIGURE 1.4: 2016-04-22 Extract



1.4.1 Draw a simple annotated cross section from C to D. (6 x 1) (6)

(Clouds, Air movement, Fronts, air masses, air temperatures)

HEADING: (1 x 2) (2)



- 1.4.2 Write a paragraph to explain how the occlusion that you draw in 1.4.1 developed. (4 x 2) (8)

- 1.4.2 The passing of mid latitude cyclones over the Cape flats where many people live in informal settlements leads to disastrous conditions. Write a paragraph to outline how the city council of Cape Town can reduce the havoc caused by these frequently occurring weather systems. (4 x 2) (8)

TOPIC 7: CLIMATOLOGY AND MAPWORK

TROPICAL CYCLONES ON SYNOPTIC WEATHER MAP – A GIS

CAPS CONTENT

1.1 TROPICAL CYCLONES: INTEGRATE WITH SYNOPTIC WEATHER MAP

Exam Guidelines: Tropical Cyclones

- General characteristics
- Areas of formation and associated terms
- Conditions necessary for formation
- Stages in the formation
- Associated weather patterns
- Impact on human activities and the environment (including impact of floods)
- Pre-cautionary and management strategies to manage the effect of tropical cyclones (including floods)
- Identification on synoptic weather maps and satellite images
 - Identification of stages of development on synoptic weather maps
 - Interpretation of weather symbols
- Case study of ONE recent tropical cyclone that affected Southern Africa

Subtropical Anticyclones (High-Pressure Cells) and the Resultant Weather over South Africa

- Location and identification of the THREE high pressure cells that affect South Africa
 - South Atlantic/St Helena high-pressure cell
 - South Indian/Mauritius high-pressure cell
 - Kalahari/Continental high-pressure cell
- General characteristics of the THREE high-pressure cells
- Influence of anticyclones on South Africa's weather and climate
- Interpretation and reading of information related to the THREE high-pressure cells on synoptic weather maps
- Development of travelling disturbances associated with anticyclonic circulation
 - Moisture front and line thunderstorms
 - Coastal low pressure
 - South African berg wind
- Resultant weather and impact associated with moving disturbances
- Identification of moving disturbances on synoptic weather maps and satellite images
- Reading and interpretation of synoptic weather maps and satellite images that illustrate weather associated with anticyclonic conditions

WEIGHTING AND TIME

This should be taught as in integrated and revision activity after the completion of tropical cyclones and GIS concepts have been completed in term one.

ADDITIONAL NOTES

1. TROPICAL CYCLONES

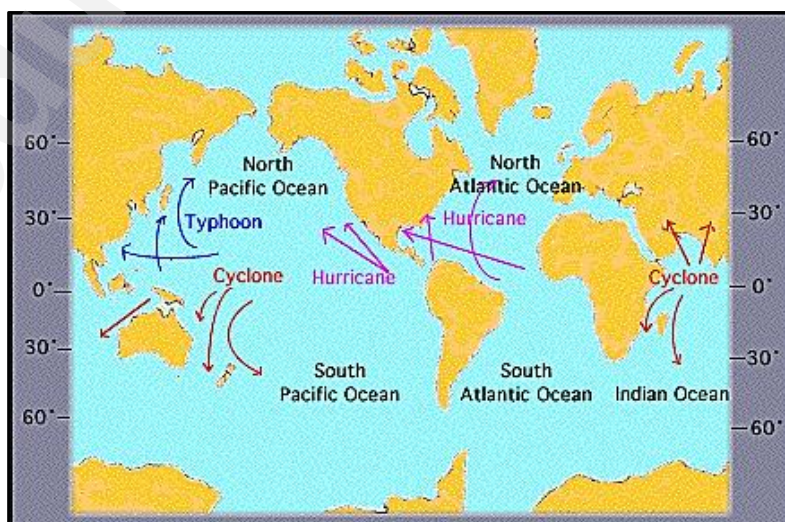
1.1. GENERAL CHARACTERISTICS

- Intense low pressure spiralling storms that develop over tropical oceans hit the east coast of continents
- About 600 km in diameter in mature stage (smaller than MLC)
- Low pressure in centre is so intense that an eye develops where a vortex sucks down air to form an eye
- The air in the eye heats up adiabatically as it moves down
- Associated with torrential rain (heavy continuous rain) which causes flooding.
- Hurricane strength winds which cause large swells at sea and a storm surge which floods coastal areas.
- The storm surge and consequent flooding is responsible for 9/10 deaths associated with tropical cyclones
- Named alphabetically per season
- Occur in late summer and early autumn – when sea water in the area has reached its highest temperatures
- Develop over warm oceans
- Strikes the East coasts of continents in the tropical areas

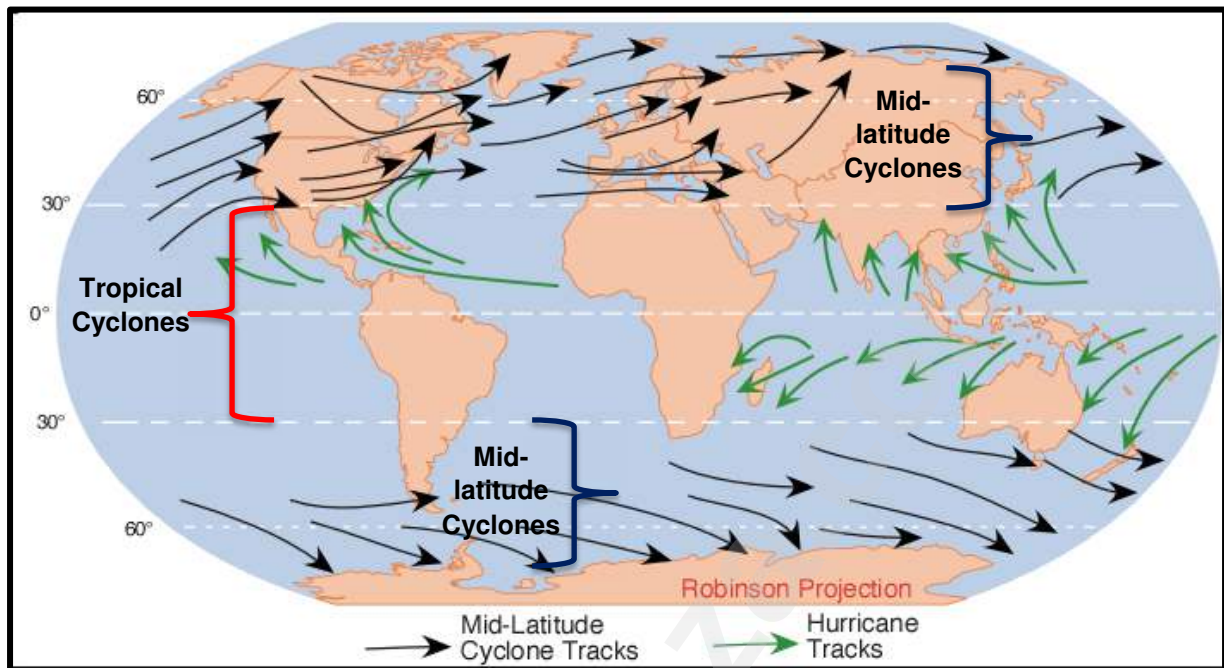
1.2. AREAS OF FORMATION AND ASSOCIATED TERMS

- Start at the ITCZ (Inter Tropical Convergence Zone)
- Start outside 5° N & S as it needs Coriolis force
- Do not develop on the Equator due to the lack of Coriolis force
- Dissipate over land and outside 30° N & S
- Develop in the Tropical / Hadley circulation cell
- Occur in the Tropical Easterly wind belts and move from East to West with the tropical Easterlies
- Develops over ocean masses with temperatures $<27^{\circ}\text{C}$

The names given to tropical cyclones in different parts of the World



The areas affected by Tropical cyclones and mid-latitude cyclones respectively



<http://www.physicalgeography.net/fundamentals/7s.html>

1.3. CONDITIONS NECESSARY FOR FORMATION

- Tropical cyclones develop over the sea in the tropical areas.
- The water must be warmer than 27°C which
- Large scale evaporation forms very hot, humid, unstable air.
- The hot air starts rising and forms an intense low pressure on the surface.
- The tropical jet stream causes an upper air divergence and this intensifies the low pressure on the surface.
- Air is sucked into the low pressure – strong pressure gradient – fast winds
- Outside 5°N and S, Coriolis force will cause the winds to spiral towards the low pressure. This intensifies the low pressure to such an extent that a clear funnel, called the eye of the cyclone, develops.
- Condensation releases latent heat in the atmosphere which makes the air more unstable and contributes to more rising. This causes large cumulonimbus clouds to form, and torrential rain.

1.4. STAGES IN THE FORMATION

STAGE 1: FORMATIVE STAGE

- Very strong up draughts which cause a low pressure to develop.
- The cyclone is not very large yet and there is no clear eye yet.
- The gale force winds start spiralling.
- Not very large yet and no clear eye

STAGE 2: IMMATURE STAGE

- Low pressure intensifies to less than 1000 hPa
- Wind speed increases to hurricane strength
- Increase in size and the eye start to develop.

This sketch illustrates the different stages in the development of a hurricane in the northern Atlantic Ocean.



ed101.bu.edu/StudentDoc/Archives/ED101fa06/mattwall/Weather Geography.html

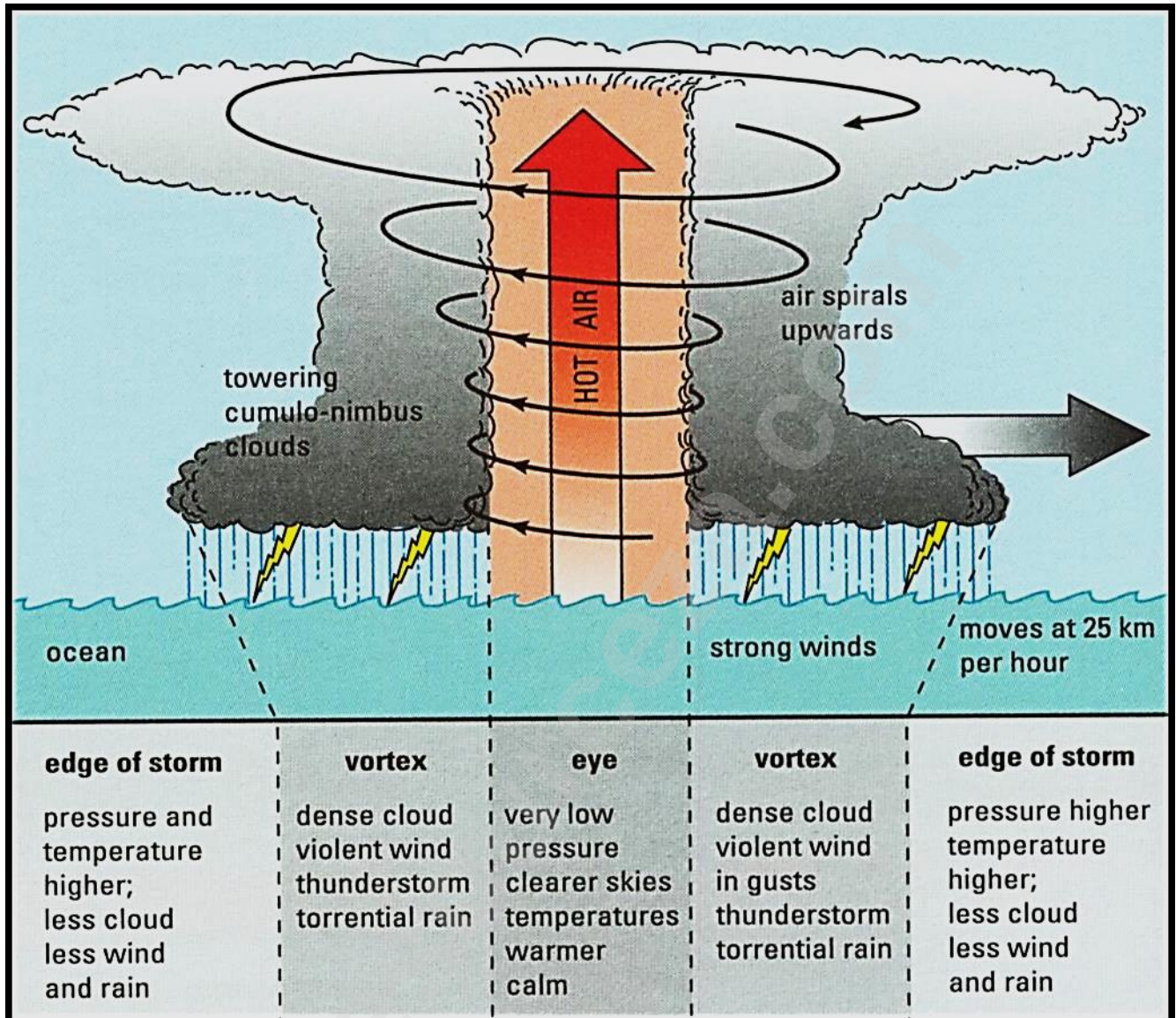
STAGE 3: MATURE STAGE

- The pressure gradient is very strong and wind speeds reach hurricane strength
- The calm, clear eye is well developed
- Air pressure is less than 950hPa.
- The South Western quadrant is the most destructive as the winds and the Tropical Easterly winds are coinciding.
- Large - 300km from the eye.
- Moves South West from the equator then turns South East at about 20° south.
- The low pressure and the fast wind over the ocean masses cause a storm surge (bulge of sea water) which leads to further flooding of the coastal areas hit by the cyclone.

STAGE 4: DISSIPATING STAGE

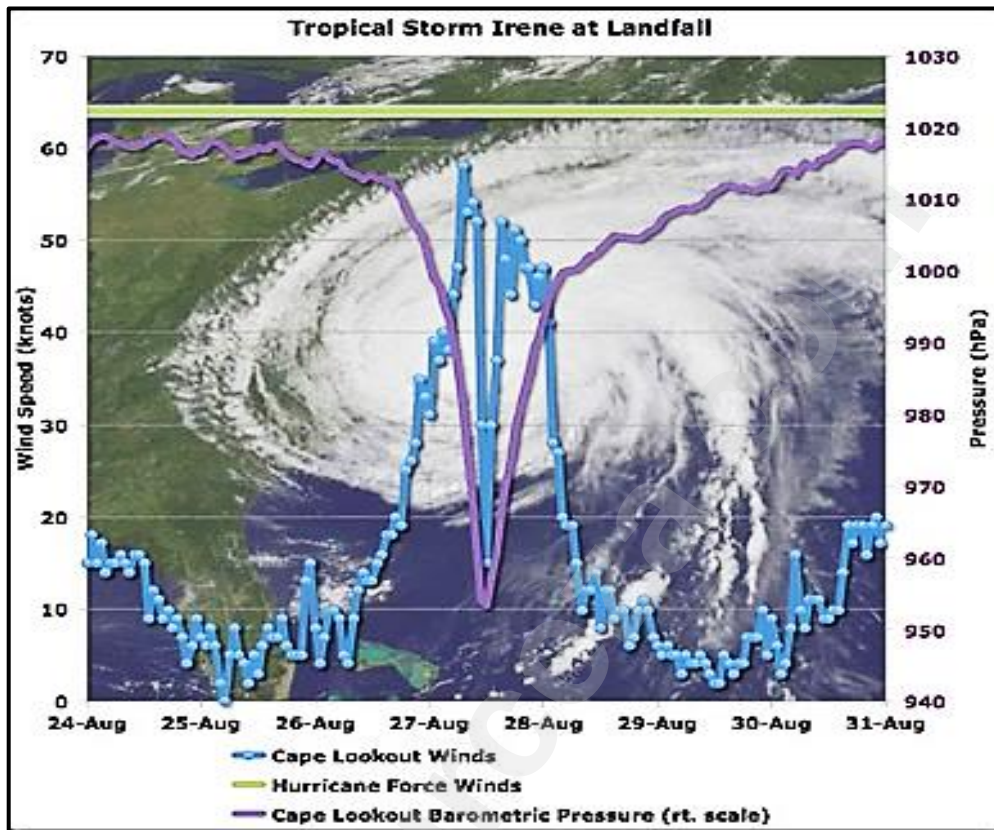
- Tropical cyclone moves over land
- Wind is slowed down by friction
- Less evaporation over land and over cooler ocean masses
- Moves into cooler sub-tropical areas and the air pressure increases
- Stable air conditions returns
- The weather clears up

1.5. ASSOCIATED WEATHER PATTERNS



	1	2	3	4	5
Air pressure	Dropping	Drops	< 950hPa	Rises but still low	normalises
Temperature	$\pm 26^{\circ}\text{C}$	Drops due to cloud cover	Rises to $\pm 28^{\circ}\text{C}$ due to adiabatic heating in eye	$\pm 26^{\circ}\text{C}$	normalises
Wind speed	Fast	Hurricane strength winds – Strongest in cyclone	Calm in eye	Hurricane strength winds	Slow down and Normalises
Rainfall	Light rain	Torrential rain	Clear up	Torrential rain	Softer rain that clears up

The graph below shows the drop in air pressure towards the centre of the cyclone and the increase and the sudden drop in winds in the eye.



1.6. IMPACT ON HUMAN ACTIVITIES AND THE ENVIRONMENT (INCLUDING IMPACT OF FLOODS)

Human impact

- Flooding of islands and coastal areas – damage to housing and infrastructure
- Loss of livestock, and crops on farms
- Destruction of infrastructure
- Dangerous conditions on sea due to large waves and strong winds
- Contamination of water sources and disease
- Isolation due to communication structures that are destroyed

Environmental impact

- Heavy rain – flooding of habitats
- Erosion due to flooding
- Flooding by the ocean surge (bulge of sea water under the Low Pressure)
- Wind damage

1.7. Pre-cautionary and management strategies to manage the effect of tropical cyclones (including floods)

- Research to improve forecasting
- Improve early warning systems
- Evacuation and disaster management plans
- Do not allow new development in cyclone prone areas
- Breakwater walls to reduce flooding from storm surge
- Build away from the coastline

METHODOLOGY

The idea of this activity is to make sure the learners understand what they have been taught about tropical cyclone, synoptic weather maps and GIS, by involving them in an integrated group activity. Learners must be able to read, understand and interpret a variety of resources.

GROUP ACTIVITY

ACTIVITY 1:

Tropical cyclones on synoptic weather maps - integration of other topics and a number of resources.

Read the provide fact file about tropical cyclone Chedza that occurred in January 2015 and complete the activities. Complete the activities placed with specific resources in the fact file.

Use the fact file to set up a set of questions based on what is required from learners of the exam guideline.

Keep the following in mind when you set up the questions

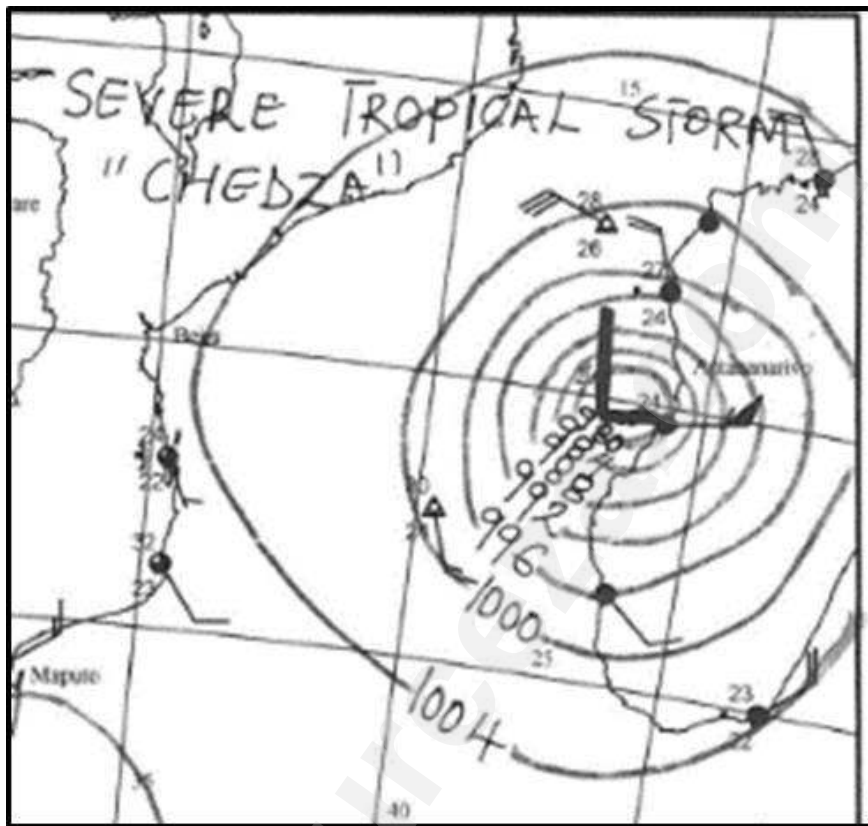
- ✓ Set question at a lower cognitive level and low level of difficulty – All learners must be able to answer this type of questions. 25% (10 Marks)
- ✓ Set questions at a low cognitive demand but learners who studied should be able to answer the questions. 25% (10 Marks)
- ✓ Set Questions where learners who studied and understand the work, will be able to answer the questions. 25% (10 Marks)
- ✓ Set questions that only the very clever learners with a wide range of general knowledge will be able to answer. 25% (10 Marks)

Your activity must include a variety of questions and must guide learners to practice different levels of competency / cognition, numeracy, literacy and spatial literacy.

Supply model answers to your questions.

TROPICAL CYCLONE FACT FILE:

Read through the following information and set your own exam mirroring questions.

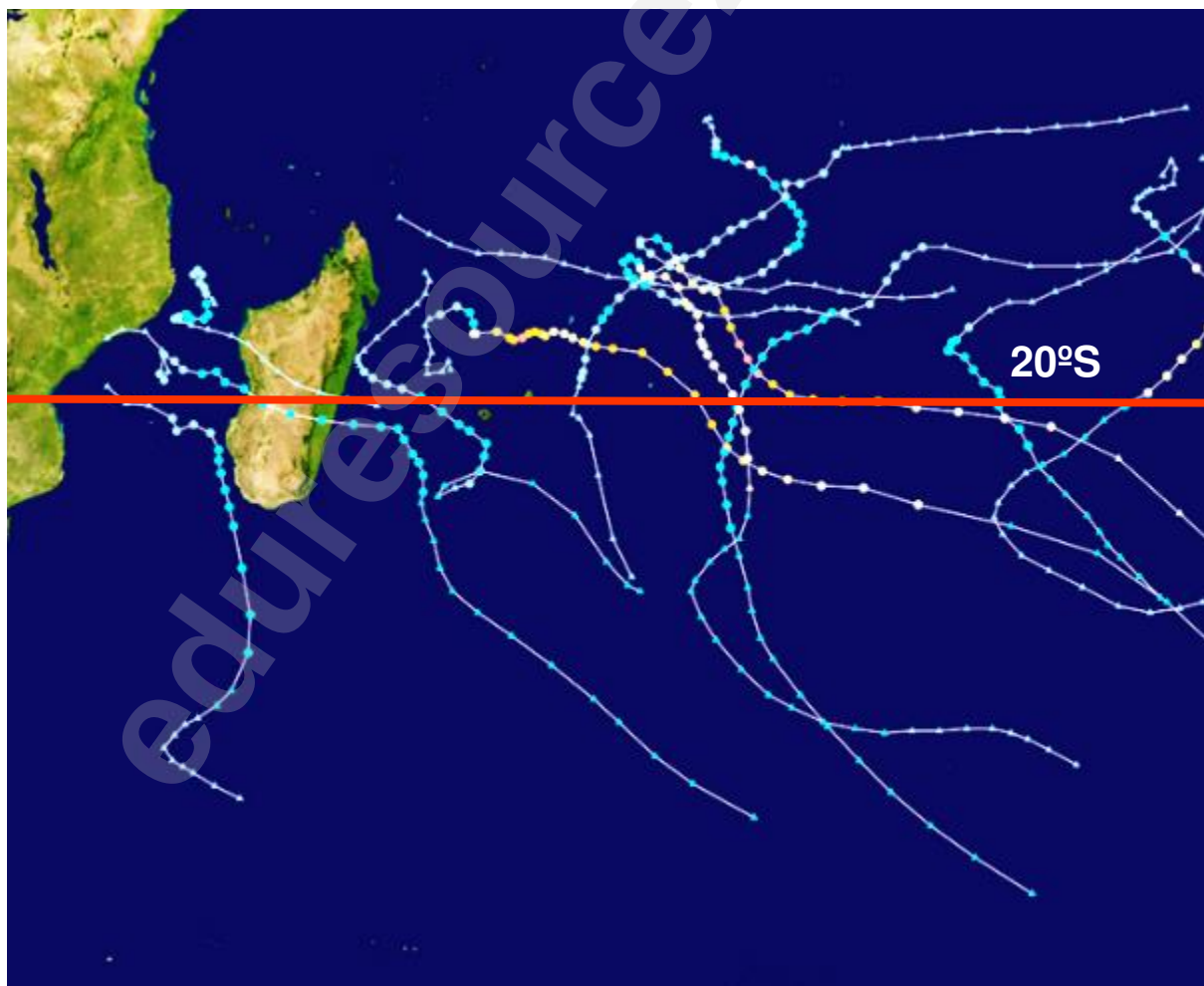


The path of cyclone Chedza – January 2015



First system formed	November 15, 2014
Last system dissipated	April 11, 2015
Strongest storm¹	Eunice – 900 hPa (mbar), 240 km/h (150 mph) (10-minute sustained)
Total disturbances	14
Total depressions	13
Total storms	11
Tropical cyclones	5
Intense tropical cyclones	3
Very intense tropical cyclones	2
Total fatalities	111 total
Total damage	\$46.4 million (2015 USD)

The map below illustrates the paths of all the tropical cyclones that occurred in the 2014/2015 cyclone season over the Indian Ocean.

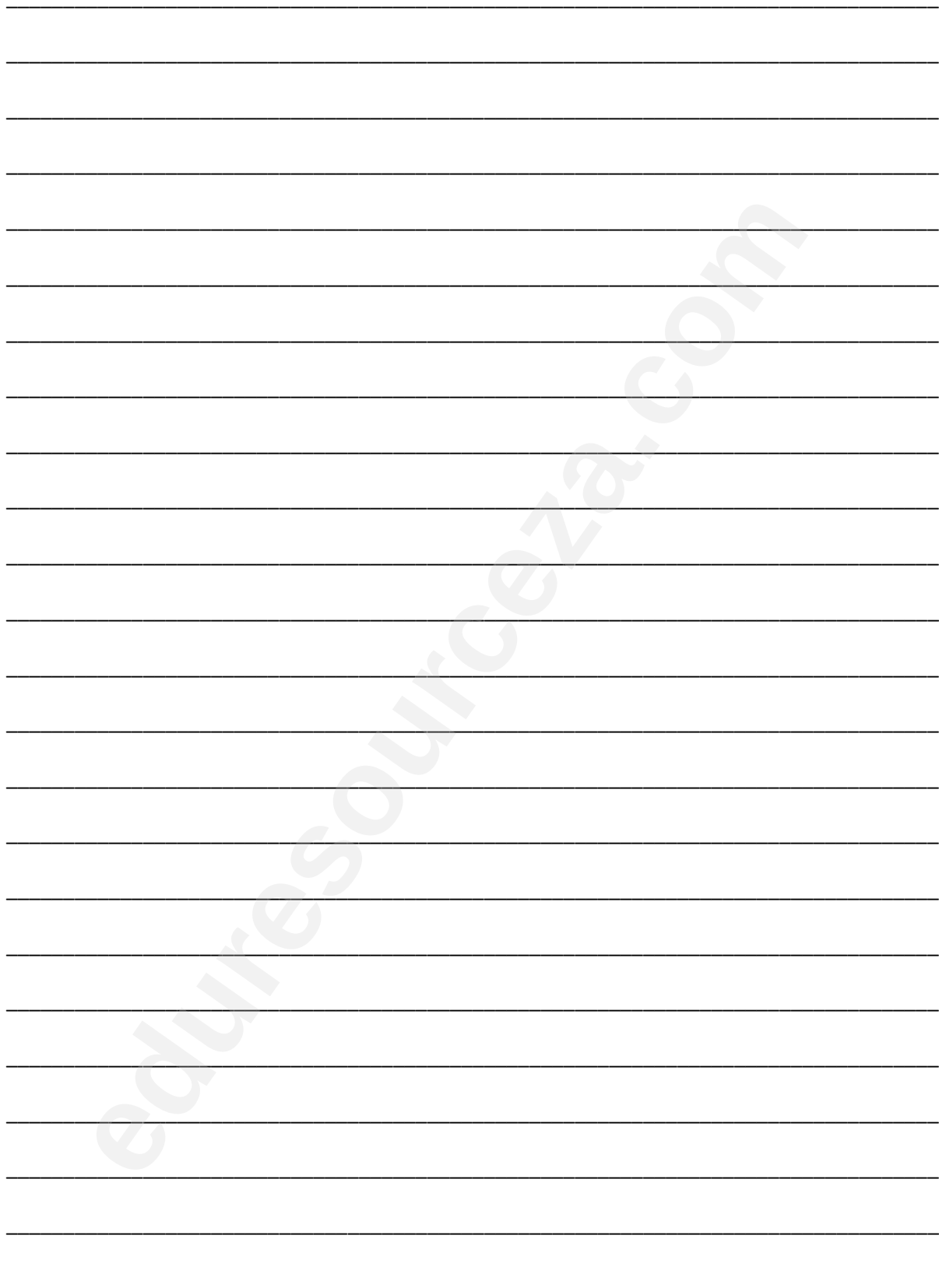


January 11, a weak tropical disturbance started east of Mozambique. On January 14, it was upgrade from a low-pressure system east of Mozambique to a zone of disturbed weather, and the system became a tropical disturbance late on the same day. On January 15, the disturbance was upgraded the system to a tropical depression. Later the next day, it intensified into a moderate tropical storm, receiving the name Chedza, later to be upgraded to a tropical storm. On the same day, it was upgraded to a Severe Tropical Storm. Later that day, it made landfall over Madagascar. On January 17, it left Madagascar and went to the South-West Indian Ocean. On the next day, it re-intensified to a Severe Tropical Storm. On January 19, Chedza began to undergo an extratropical transition. Consequently, a final warning was issued about Chedza, before it started clearing up.

The formative stages of Chedza brought rainfall to an already flooded region across southeastern Africa. Weeks of heavy rainfall killed 117 people in Mozambique and 104 in neighbouring Malawi, where it was the worst floods in 24 years. In Madagascar, Chedza struck after weeks of heavy rainfall, causing rivers to increase and flooding widespread areas of crop fields. In the capital city of Antananarivo, the deluge damaged the main water pump that controlled water levels in the region. The rainfall caused mudslides and damaged roads. Across the country, flooding from Chedza displaced 54,792 people, after destroying 4,430 houses and flooding another 3,442, mostly in Vatovavy-Fitovinany in the southeastern portion. Chedza killed 80 people and caused about \$40 million in damage (2015 USD). Later, the storm brought heavy rainfall and strong winds to the mountainous peaks of Réunion.

https://en.wikipedia.org/wiki/2014%E2%80%9315_South-West_Indian_Ocean_cyclone_season

Lined area for writing, featuring horizontal ruling lines and a diagonal watermark reading "eduresourceza.com".



ACTIVITY 2: TROPICAL CYCLONES ON SATELLITE IMAGES – GIS INTEGRATION

Use the provide satellite image of tropical cyclone Chedza that occurred in January 2015 and complete the paper GIS activity.

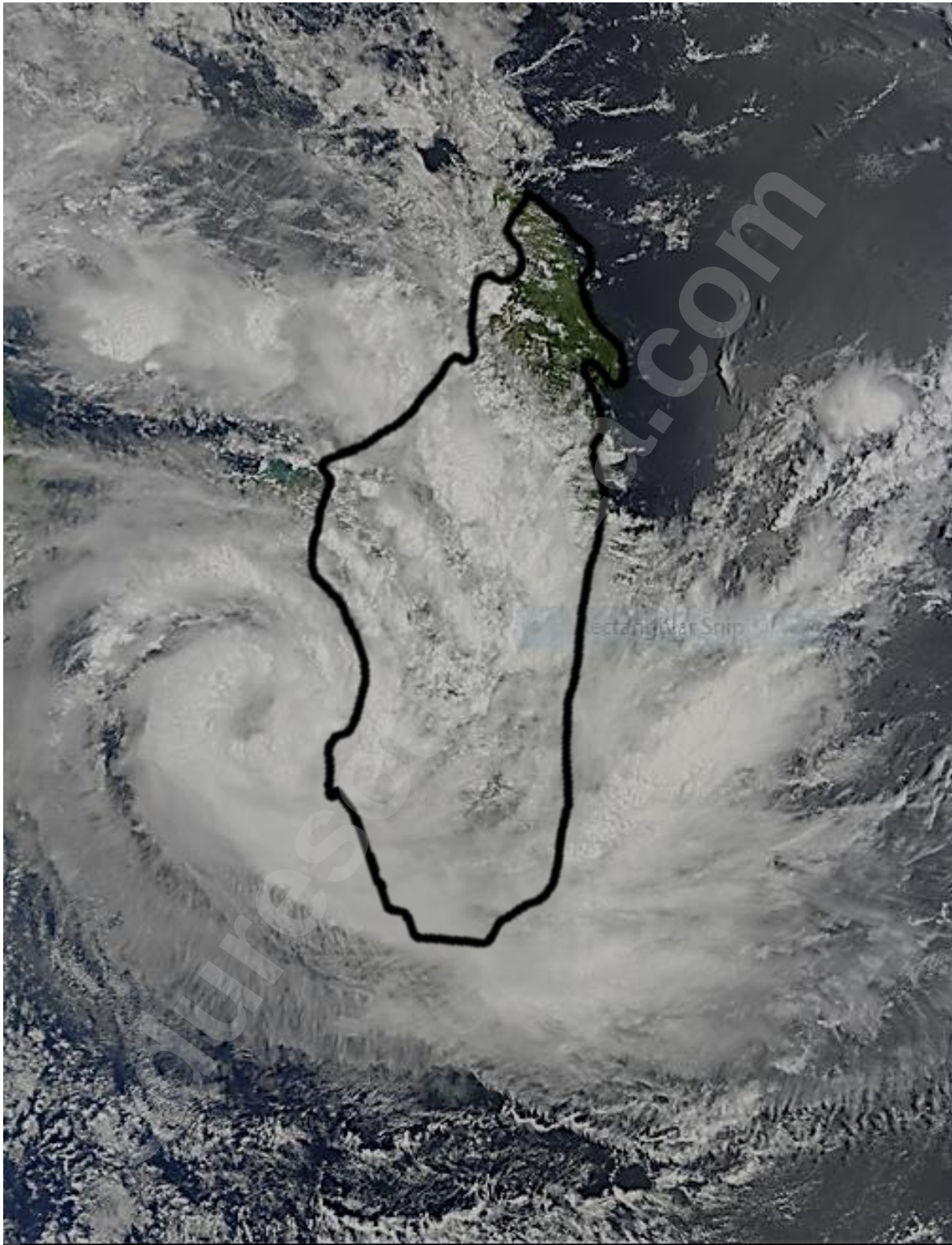
- a) Identify the spatial data that is already visible on the map.
- b) Add vector data in the form of points, lines and polygons to show the shape and the location of the following geography features:
 - ✓ Cloud mass of the tropical cyclone
 - ✓ The eye of the cyclone
 - ✓ At least three large cities on Madagascar
- c) Add the following attribute data in the form of labels or a key / legend to you GIS:
 - ✓ Names of island and surrounding ocean
 - ✓ Name of towns
 - ✓ types of clouds
 - ✓ arrows to indicate air movement in the cyclone
 - ✓ Areas of heavy rainfall.
- d) Mark the area that will be most severely hit by the cyclone.
- e) Explain why you think this are will be hit most severely.

f) Write warning to the citizens of this area on how to stay safe.

g) Write paragraph to explain how this GIS was compiled. Refer to the following terms in your paragraph. (5 x 2) (10)

- Data capture
- Data storage
- Database
- Data layering
- Data display

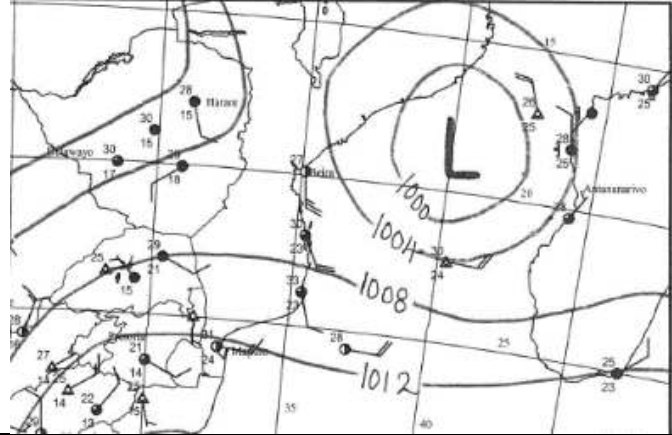
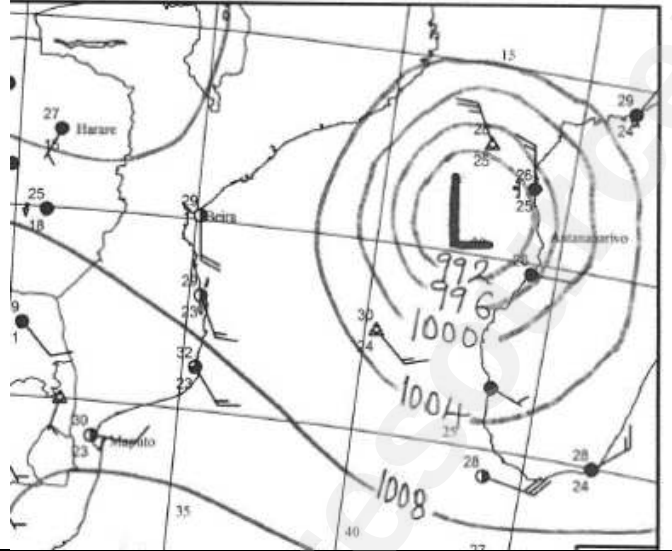
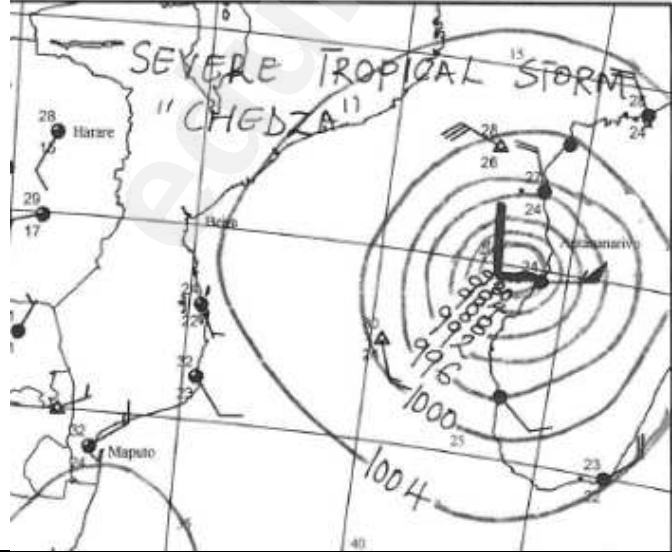
Satellite image of Cyclone Chedza – January 2015



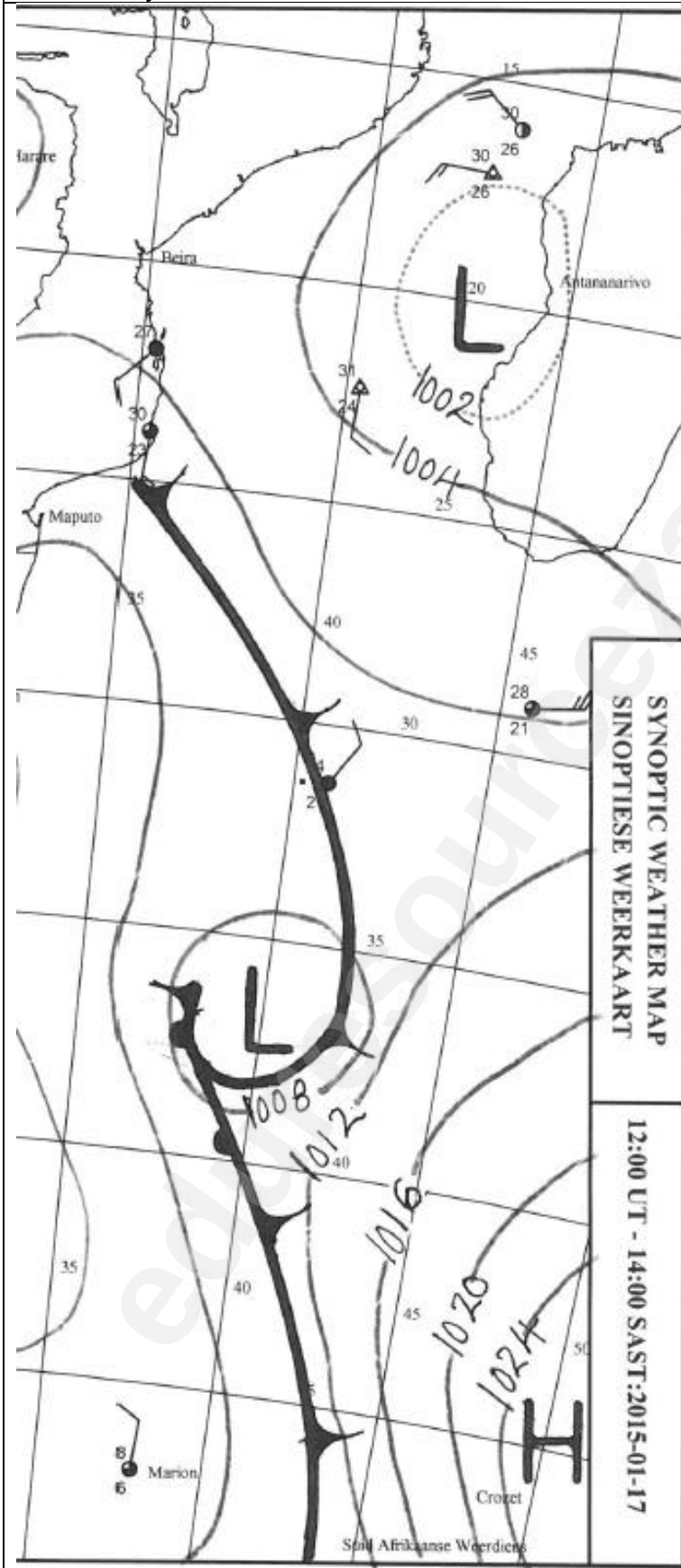
[https://upload.wikimedia.org/wikipedia/commons/4/43/Chedza Jan 16 2015 0655Z.jpg](https://upload.wikimedia.org/wikipedia/commons/4/43/Chedza_Jan_16_2015_0655Z.jpg)

A SUMMARY TO PREPARE LEARNERS FOR EXAM QUESTIONS

1. Complete the table on the next page to summarize the stages, characteristics and weather associated with tropical cyclones.

14 January 2015 	Stage: Characteristics: Weather:
15 January 2016 	Stage: Characteristics: Weather:
16 January 2016 	Stage: Characteristics: Weather:

17 January 2015



Tropical Cyclone Stage:

Characteristics:

Weather:

Discuss the influence of the mid-latitude cyclone on the life cycle of the tropical cyclone:

Mid-Latitude Cyclone Stage:

Characteristics:

Weather:

2. Write a paragraph to explain how tropical cyclones obtain the energy to be such destructive storms. (4 x 2) (8)

3. Some tropical cyclones never reach land and dissipate over the oceans. Some tropical cyclones reach land with devastating consequences and soon after dissipates. In a paragraph, discuss all the reasons why tropical cyclones dissipate over land and sea.
