

# Study & Master

Support Pack | Grade 12

CAPS

# Geography

## Climate and Weather

This support pack for the **Climate and Weather** topic in the **Geography Grade 12 CAPS curriculum** provides valuable practical activities. All activities have the answers provided.

Learners can work through these individually at home or these could form the basis of a catch-up class or online lesson.

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# Climate and Weather

## QUESTION 1

Refer to Figure 1.36 and then answer the questions that follow.

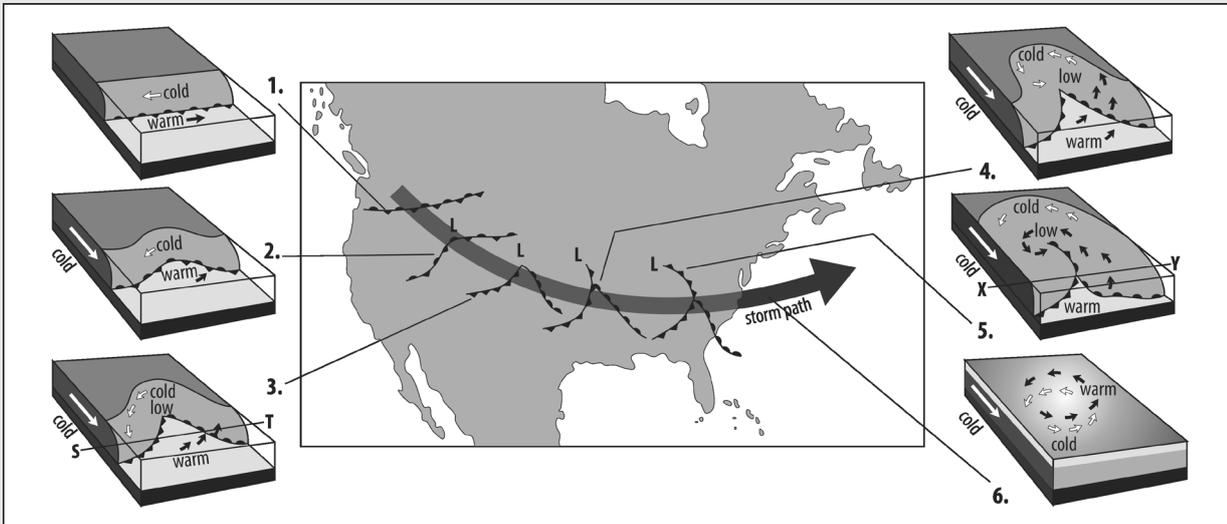


Figure 1.36 The development and path of a weather system

1. Describe:
  - a) the direction in which this mid-latitude cyclone spirals (1)
  - b) the general direction in which it travels. (1)
2. Match the stages (1–6) with the following descriptions (A–F):
  - A Cyclone degenerates.
  - B Occlusion begins.
  - C Winds begin to spiral.
  - D Wave forms in polar front.
  - E Front develops.
  - F Occluded front is developed. (6×1)
3. Explain the term 'occlusion'. (2)
4. Draw cross-section views for:
  - a) S–T
  - b) X–Y.

Label the fronts and the cold and warm sectors of air in both cross-sections. (2×5)

[20]

## QUESTION 2

Cyclone Eline struck the Mozambique coast in February 2000 (Figure 1.37 shows a satellite image of the cyclone).

1. Describe:
  - a) the direction in which a southern hemisphere cyclone spirals (1)
  - b) the general direction in which it travels. (1)
2. Explain why cyclone Eline formed in late summer. (2)

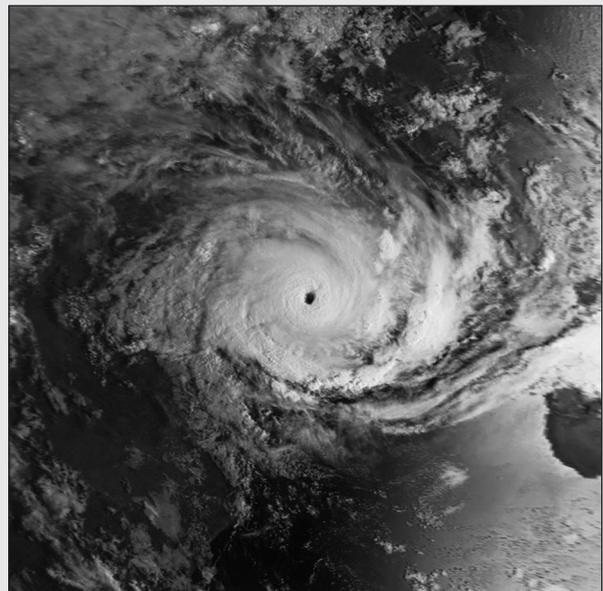


Figure 1.37 Satellite image of cyclone Eline

3. Identify in Figure 1.37:
  - a) the stage of the cyclone (1)
  - b) the eye and spiral rainbands. (2)
4. Draw a simple diagram to illustrate how a tropical cyclone would be shown on a synoptic chart for southern Africa. Indicate a low-pressure centre of 950 hPa and show wind directions at three points using station models. (5)

[12]

### QUESTION 3

Refer to Figure 1.38 and then answer the questions that follow.

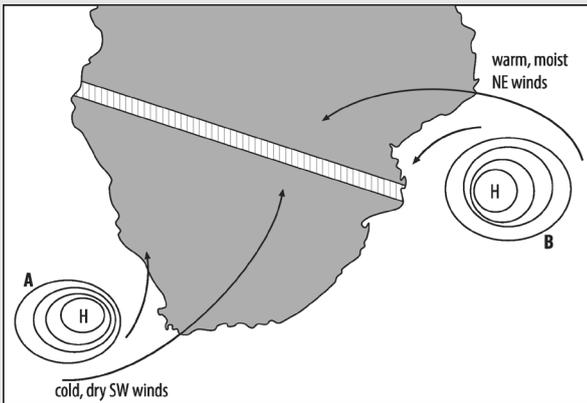


Figure 1.38 How a line thunderstorm develops

- Identify:
  - high-pressure cells A and B (2)
  - the season. (1)
- Give the reason for the difference in moisture content of the two winds. (2)
- What is the name for the band of low pressure that stretches over the interior and along which the thunderstorms form? (1)
- Explain why thunderstorms and rain occur along the band. (2)
- On which side of the band of low pressure do the line thunderstorms form – the eastern or western side? (1)
- Suggest two negative impacts line thunderstorms have on farming. (2)
- Classify the rain from a line thunderstorm as frontal, convection or orographic. (1)

[12]

### QUESTION 4

Refer to Figure 1.39 below and then answer the questions that follow.

- When do coastal lows occur, and what weather conditions do they bring? (3)
- In which season are berg winds most likely to occur? (1)
- Name two conditions necessary for the formation of a berg wind. (2)
- Explain why berg winds are hot and dry. (2)
- Name an environmental hazard associated with berg winds. (1)
- The arrival of which weather system brings an end to the berg wind? (1)

[10]

### QUESTION 5

Refer to Figures 1.40 and 1.41 below, and then answer these questions.

- Refer to Figure 1.40.
  - Explain the difference in the vegetation on the two slopes. (3)
  - Draw a simple side-view diagram to show how the Sun's rays fall on the two slopes. (2)
- For Figure 1.41, explain why the snow has melted faster on slopes A than on slopes B. (3)

[8]

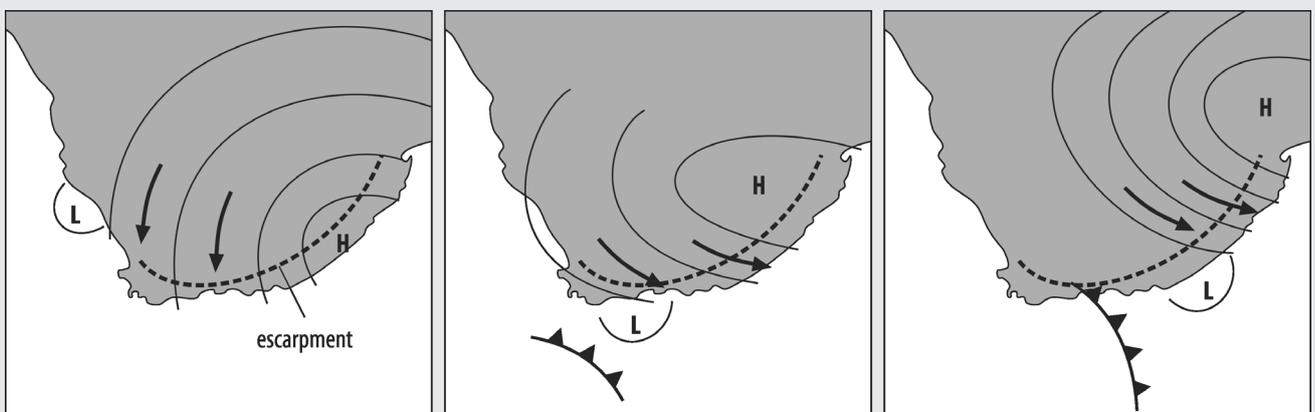


Figure 1.39 The formation and movement of a berg wind, together with a coastal low



Figure 1.40 A slope in South Africa

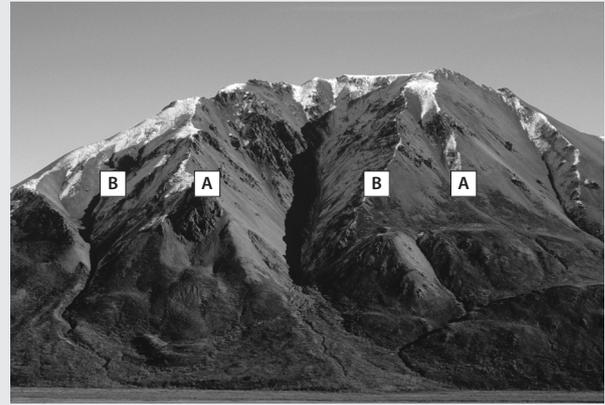


Figure 1.41 Canadian mountain slopes

### QUESTION 6

Refer to the table and then answer the questions that follow.

Weather element	Difference in urban areas relative to rural areas	Weather element	Difference in urban areas relative to rural areas
sunshine duration	5 to 15% less	total precipitation	5 to 10% more
annual mean temperature	0,5 to 1,0 °C higher	number of days with rain	10% more
winter maximum temperatures	1 to 2 °C higher	number of days with snow	14% fewer
occurrence of frosts	2 to 3 weeks fewer	cloud cover	5 to 10% more
relative humidity in winter	2% lower	occurrence of fog in winter	100% more
relative humidity in summer	8 to 10% lower	amount of condensation nuclei	10 times more

Differences in weather elements of urban areas relative to rural areas

1. Why do cities get less sunshine than rural areas? (1)
2. Why, if cities get less sunshine, are they generally hotter than rural areas? (1)
3. Which of the weather elements listed in the table can be classified as temperature differences? (4)
4. Why is there more fog in cities than in rural areas? (2)
5. Why might there be less humidity in cities than in rural areas, but more precipitation? (3)
6. '100% more': Does this mean double, ten times, or a hundred times more? (1)
7. '10 times more': Is this the same as 10%, 100% or 1 000% more? (1)

[13]

[Total: 75 marks]

# Answers

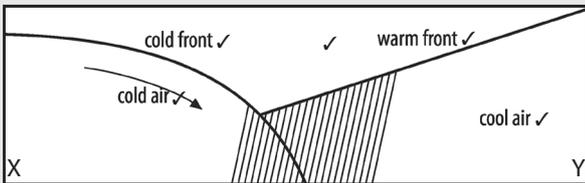
## QUESTION 1

1. a) anti-clockwise ✓ (1)
- b) eastwards/from west to east ✓ (1)
2. 1E, 2D, 3C, 4B, 5F, 6A ✓✓✓✓✓✓✓; OR A6, B4, C3, D2, E1, F5 ✓✓✓✓✓✓✓ (6)
3. The cold front catches up with the warm front ✓ and lifts air off the ground ✓. (2)
4. a) (2)



Allocate 1 mark for each label, provided fronts are correctly drawn. (5)

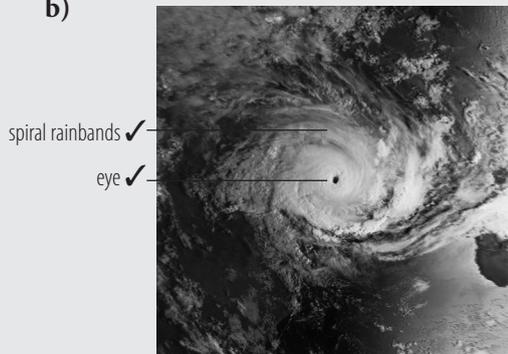
b)



Allocate 1 mark for each label, provided fronts are correctly drawn. (5) [20]

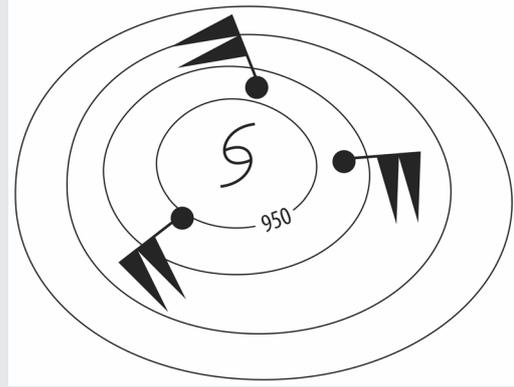
## QUESTION 2

1. a) clockwise ✓ (1)
- b) westwards/from east to west ✓ (1)
2. Sea temperatures need to be high to fuel high levels of evaporation ✓. Sea temperatures peak only after the summer solstice because water heats up more slowly than land ✓. (The phenomenon is called seasonal lag.) (2)
3. a) mature stage ✓ (1)
- b) (1)



(2)

4.



Allocate 1 mark for each of following: a set of concentric circles/isobars ✓; cyclone symbol in centre ✓; 950 in innermost isobar ✓; wind direction as clockwise ✓; station models showing high wind speeds and cloudy conditions ✓. (5) [12]

## QUESTION 3

1. a) A = South Atlantic High ✓; B = South Indian High ✓ (2)
  - b) summer ✓ (1)
  2. The air mass that forms over the warm Mozambique/Agulhas Current ✓ of the Indian Ocean holds more moisture than the air mass that forms over the cold Benguela Current ✓ of the Atlantic Ocean. (2)
  3. moisture trough ✓ (1)
  4. Warm, moist air is forced to rise fast and high ✓. There is extensive cooling and condensation ✓. (2)
  5. eastern side ✓ (1)
  6. Any two: They bring rain, but heavy rain and hail can cause flooding ✓, soil erosion ✓, and crop and livestock damage ✓. Lightning causes fires ✓. (2)
  7. convection ✓ (1)
- [12]

## QUESTION 4

1. They occur in both summer and winter ✓. Onshore winds bring moist, cloudy conditions (rain along the coastline or fog on the west coast) ✓. Offshore winds on the other half of the cell bring warm, dry conditions ✓. (3)

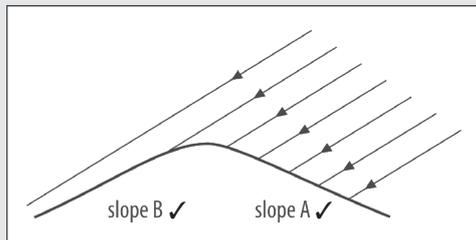
- 2. winter ✓ (1)
- 3. a high-pressure cell over the interior/the presence of the Kalahari high-pressure cell ✓ and a coastal low ✓ (2)
- 4. The descending air of the anticyclone is already warm and dry ✓. It is heated further by adiabatic descent/compression ✓. (2)
- 5. veld fires ✓ (1)
- 6. mid-latitude cyclone ✓ (1)

[10]

**QUESTION 5**

- 1. a) The slope on the left is bare of vegetation ✓ because it is north-facing (has a northerly aspect) ✓, which means it is hotter and drier ✓. (3)

b)



Allocate one mark for showing slope A in direct sunlight and one mark for showing slope B in the shadow zone. (2)

- 2. In the northern hemisphere, south-facing slopes (slopes with a southerly aspect) receive more direct sunlight than

north-facing slopes ✓. The A slopes are south-facing ✓ and so are warmer than the B slopes, which lie in the shadow zone in winter ✓. (3)

[8]

**QUESTION 6**

- 1. Tall buildings block out sunlight/put streets and pavements in shadow ✓. (1)
- 2. Cities absorb more heat because of the materials (such as tar and concrete) with which they are built ✓. (1)
- 3. annual mean temperature ✓; winter maximum temperatures ✓; occurrence of frosts ✓; number of days with snow ✓ (4)
- 4. There is more fog because there are more condensation nuclei in the air ✓, i.e. there are more smoke or dirt particles ✓ that water vapour can stick to and condense on. (2)
- 5. There is less plant cover or vegetation (e.g. trees) in cities than in rural areas ✓. This means that there is less transpiration (the process by which plants lose water through little holes in their leaves) ✓, and so there is less water vapour in the air ✓. (3)
- 6. double ✓ (1)
- 7. 1 000% ✓ (1)

[13]

[Total: 75 marks]