

I N S T R U C T I O N S

- Postcode**
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| 2 | 9 | 5 | 0 |
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| 2 | 9 | 5 | 0 |
| 7 | 1 | 1 | 6 |
| 8 | 2 | 2 | 2 |
| 3 | 3 | 2 | 9 |
| 5 | 2 | 4 | 5 |
| 6 | 0 | 4 | 6 |
| 7 | 7 | 7 | 2 |
| 4 | 2 | 4 | 6 |
| 2 | 4 | 4 | 9 |





Figure 1

© D. Dalet, d-maps.com

Start at Question 1 if you are **under 16 years** old on 31 August 2010. Start at Question 16 if you are older.

1 Which is Africa's highest mountain, located at the triangle in Figure 1?

- A Mount Cook
- B Mount Everest
- C Mount Fuji
- D Mount Kilimanjaro
- E Mount Kosciuszko

2 Which ocean is located in the eastern part of Figure 1?

- A Arctic
- B Atlantic
- C Indian
- D Pacific
- E Southern

3 The lakes in Figure 1 are located along which geological feature, stretching from Syria in the north to Mozambique in the south?

- A Great Rift Valley
- B Mariana Trench
- C Mid Atlantic Ridge
- D Ring of Fire
- E San Andreas Fault



Figure 2. Serengeti Plain

© V. Willett

4 Which type of vegetation dominates the Serengeti Plain (see Figures 1 and 2)?

- A alpine
- B heath
- C rainforest
- D savanna
- E tundra

5 Which of these characteristics is typical of a developing country such as Kenya?

- A high gross national product per capita
- B high rates of energy consumption
- C low infant mortality rates
- D low proportion of the workforce in agriculture
- E low volume of exports of manufactured goods

6 What has changed in the Central Highlands of Kenya to cause its incidence of malaria to increase dramatically since 1989?

- A decrease in population density
- B drainage of swamps
- C improved drug treatments
- D increase in average temperature
- E reduced average rainfall

7 Which language facilitates communication between the different cultural groups in Tanzania?

- A Afrikaans
- B Cantonese
- C French
- D Swahili
- E Tamil

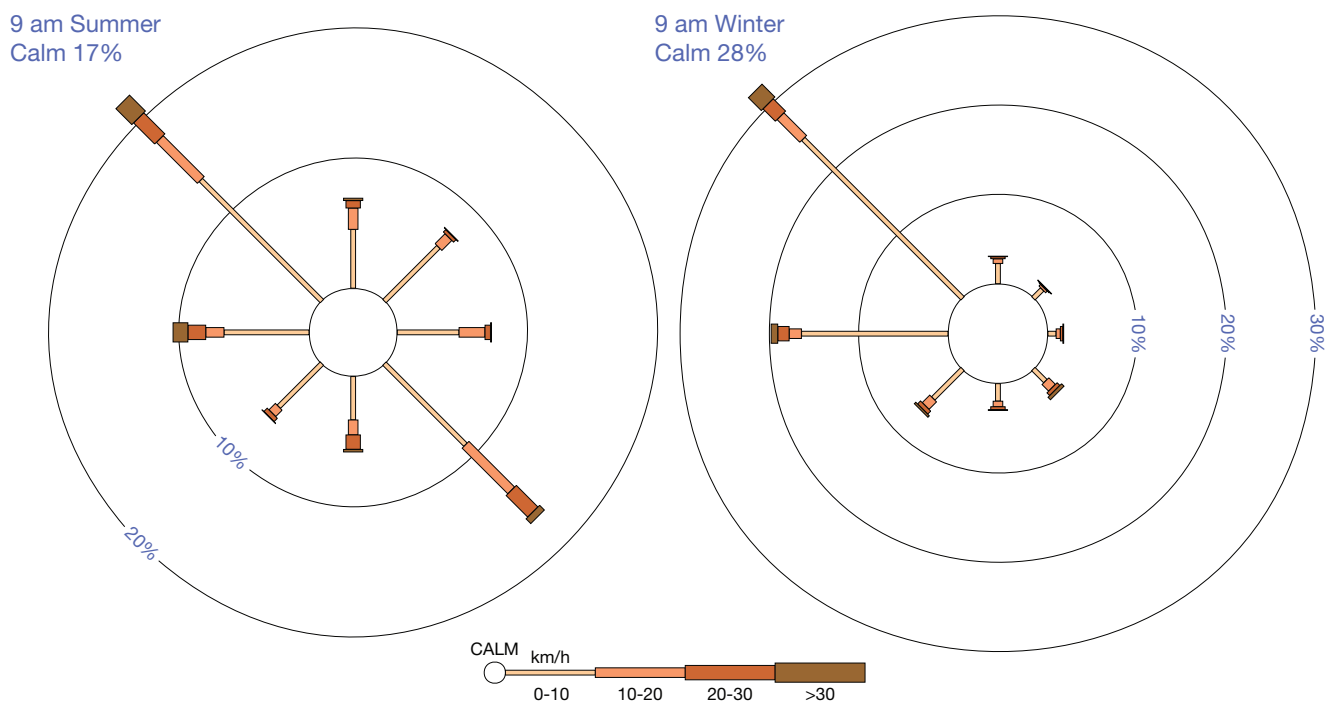


Figure 3. Wind roses for St Helens, Tas

Source: Bureau of Meteorology

- 8 From Figure 3, which statement about 9.00 am wind conditions at St Helens is correct?**
- A Northwesterly winds are the most common in winter.
 - B On average, winds are stronger in winter than in summer.
 - C Southeasterly winds are the most common in summer.
 - D Strong winds occur more frequently than light winds.
 - E Westerly winds occur 10% of the time in winter.



Figure 4. Angkor Wat

© B.C. Torrissen

- 9 In order to increase its capacity to export iron ore, BHP Billiton is duplicating its rail line to which port?**
- A Port Arthur, Tas
 - B Port Douglas, Qld
 - C Port Hedland, WA
 - D Port Lincoln, SA
 - E Port Macquarie, NSW
- 10 Which is the highest level in Australia's new fire danger rating scale?**
- A catastrophic
 - B dangerous
 - C disastrous
 - D extreme
 - E severe
- 11 In which country is the world-heritage-listed religious complex of Angkor, shown in Figure 4?**
- A Cambodia
 - B China
 - C Egypt
 - D India
 - E Peru
- 12 Which river supplies water to Menindee Lakes?**
- A Darling
 - B Goulburn
 - C Hunter
 - D Murray
 - E Swan

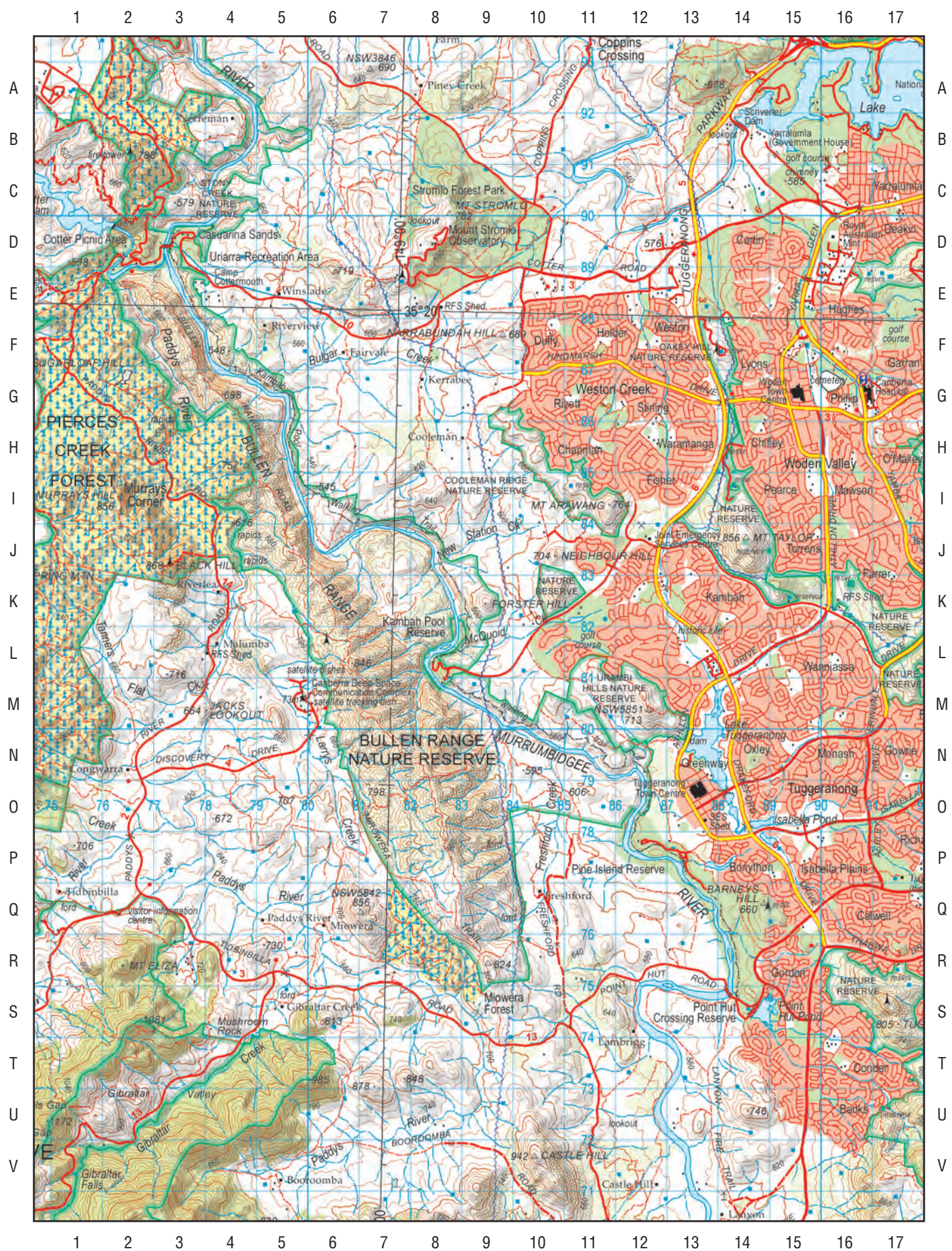
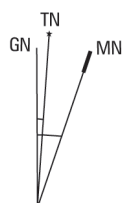


Figure 5. Topographic map

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Legend

Dual carriageway; Distance in kilometres.....	
Principal road; Locality; Built-up area.....	
Secondary road; Bridge; Causeway.....	
Minor road (access & condition not assured).....	
Vehicle track (access & condition not assured).....	
Route marker: National, State.....	
Gate; Stock grid; Foot or bridle track.....	
Embankment; Cutting.....	
Airport; Heliport.....	
Multiple track railway; Station or siding.....	
Single track railway; Bridge; Tunnel.....	
Powerline (66 kV and over).....	
Homestead; Building/s; Ruin.....	
Chimney; Silo; Tower.....	
Fence; Levee; Quarry.....	
Mine; Windpump; Yard.....	
Contour with value; Depression contour.....	
Horizontal control point; Spot elevation.....	
Sand; Sand dunes.....	
Sand ridges; Pinnacle; Cliff.....	
Orchard or vineyard; Windbreak.....	
Rainforest; Urban recreation parkland.....	
Plantation: Hardwood, Softwood.....	
Forest, wood or shrubland: Sparse, Dense, Closed.....	
Bore or well; Spring; Tank or small dam.....	
Watercourse (presence of water not implied).....	
Subject to inundation; Swamp.....	
Lake; Perennial, Non-perennial; Waterhole.....	
Foreshore flat; Lighthouse.....	
Shoal; Tidal ledge or reef; Mangrove.....	
Rock: Submerged, bare or awash; Breakwater.....	
Jetty or pier; Wharf; Saline coastal flat.....	
State or Territory border.....	
Reserved area boundary.....	
Prohibited area boundary.....	



TN True North
GN Grid North
MN Magnetic North

Kilometres 0 1 2 3 4 5 6

Scale 1:100 000

20 metre contour interval

© Commonwealth of Australia (Geoscience Australia) 2009

13 The map in Figure 5 shows a portion of:

- A Australian Capital Territory
- B Northern Territory
- C South Australia
- D Tasmania
- E Western Australia

14 Which is the most southerly suburb of the city shown in Figure 5?

- A Banks
- B Castle Hill
- C Duffy
- D Lanyon
- E Yarralumla

15 Pierces Creek Forest (H1 in Figure 5) is a:

- A dense forest
- B hardwood plantation
- C nature reserve
- D softwood plantation
- E urban recreation parkland

Start at Question 16 if you are **16 to 18 years** old on 31 August 2010. If you are younger, continue answering questions.

16 In Figure 5, 1 cm on the map represents how much on the ground?

- A 1 m
- B 1 km
- C 10 m
- D 10 km
- E 100 m

17 What best describes the relief in square K6?

- A floodplain
- B gently undulating
- C hilly
- D river terraces
- E steep and rugged

18 Which of these is obscured from view from the summit of Mt Taylor (J14)?

- A Bullen Range Nature Reserve (N8)
- B Deep Space Complex (M5)
- C Mount Stromlo (C8)
- D Narrabundah Hill (F9)
- E Tuggeranong Town Centre (O13)

Fold this page back on itself to see the map at the same time.



Figure 6

© 2009 Google

19 The area shown in Figure 6 is largely within which map square in Figure 5?

- A D14
- B F17
- C J11
- D K11
- E R16

20 What is the distance from the summit of Mt Taylor (J14) to the river crossing on Point Hut Road (S14)?

- A 8.4 km
- B 8.9 km
- C 9.4 km
- D 9.9 km
- E 10.4 km

21 Which of these factors does NOT support the argument that the city in Figure 5 is highly planned?

- A curvilinear street pattern
- B discrete town centres
- C gradual transition from urban to rural areas
- D high percentage of suburban area dedicated to parkland
- E large number of dual carriageways

22 Mercator, Peters and Bonne are names of:

- A dry winds
- B earthquake scales
- C map projections
- D settlement models
- E urban geographers

23 During an earthquake on 15 July 2009, Australia and New Zealand moved about 30 cm closer together because the:

- A northeast part of Victoria shifted westwards
- B northeast tip of New Zealand shifted eastwards
- C overall diameter of the earth decreased
- D southeast part of NSW shifted eastwards
- E southwest tip of New Zealand shifted westwards

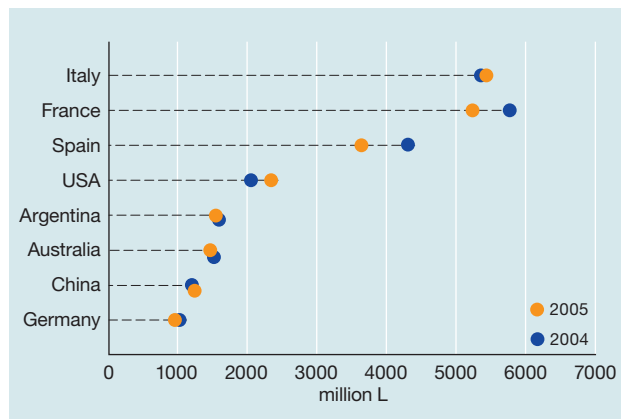


Figure 7. Production of wine, principal countries

Source: Office International de la Vigne et du Vin

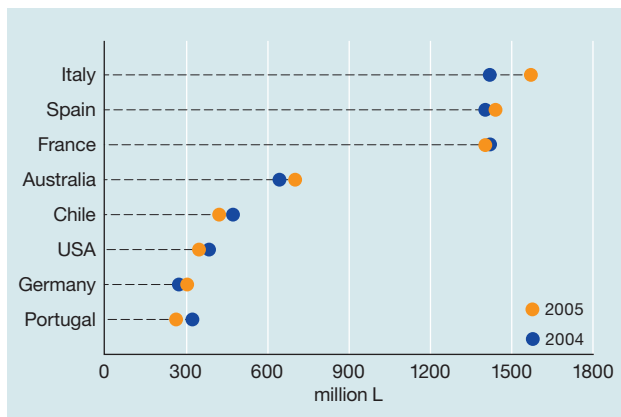


Figure 8. Exports of wine, principal countries

Source: Office International de la Vigne et du Vin

24 From Figure 7 and/or 8, how much wine did Spain produce in 2005?

- A 1404 million L
- B 1445 million L
- C 3616 million L
- D 4299 million L
- E 5402 million L

25 From Figure 7 and/or 8, which of these countries exported the largest percentage of its wine production in 2004 and 2005?

- A Australia
- B France
- C Italy
- D Spain
- E USA

26 What influences the variations in animal biodiversity among the islands in Torres Strait?

- A distance to other land
- B geology of the island
- C size of the island
- D vegetation of the island
- E all of the above



Figure 9. Enchanted Rock, Texas, USA © W. Poon

27 Figure 9 illustrates the weathering process known as:

- A chemical weathering
- B denudation
- C exfoliation
- D granular disintegration
- E waxing

28 The type of rock in Figure 9, commonly associated with this weathering process, is:

- A basalt
- B granite
- C limestone
- D sandstone
- E shale

29 Which of these cities shares the same time zone as Melbourne?

- A Beijing, China
- B Colombo, Sri Lanka
- C Dacca, Bangladesh
- D Jakarta, Indonesia
- E Port Moresby, Papua New Guinea

Table 1. World Consumption of Primary Energy

Resources Source: USA Energy Information Administration

Fuel Type	Average Power in TW ¹		
	1980	2004	2006
Oil	4.38	5.58	5.74
Coal	2.34	3.87	4.27
Gas	1.80	3.45	3.61
Hydroelectric	0.60	0.93	0.99
Nuclear power	0.25	0.91	0.93
Geothermal, wind, solar energy, wood	0.02	0.13	0.16
Total	9.5	15.0	15.8

¹ 1 terawatt (TW) = 10¹² watts = 1 million megawatts

30 According to the data in Table 1, how many terawatts of power were supplied by fossil fuels in 2006?

- A 4.27
- B 8.52
- C 10.01
- D 13.62
- E 15.8

If you are **under 14 years** old on 31 August 2010 you may stop at Question 30 or continue to Question 40 to be eligible for major prizes.

31 Using the data in Table 1, which statement is correct?

- A Consumption of energy from oil had the strongest growth rate of any fuel type.
- B Consumption of fossil fuels is declining.
- C The growth of geothermal energy has outpaced that of wind energy.
- D Renewable energy sources are a minor component of energy consumption.
- E Total world energy consumption grew by 6.3% between 1980 and 2006.

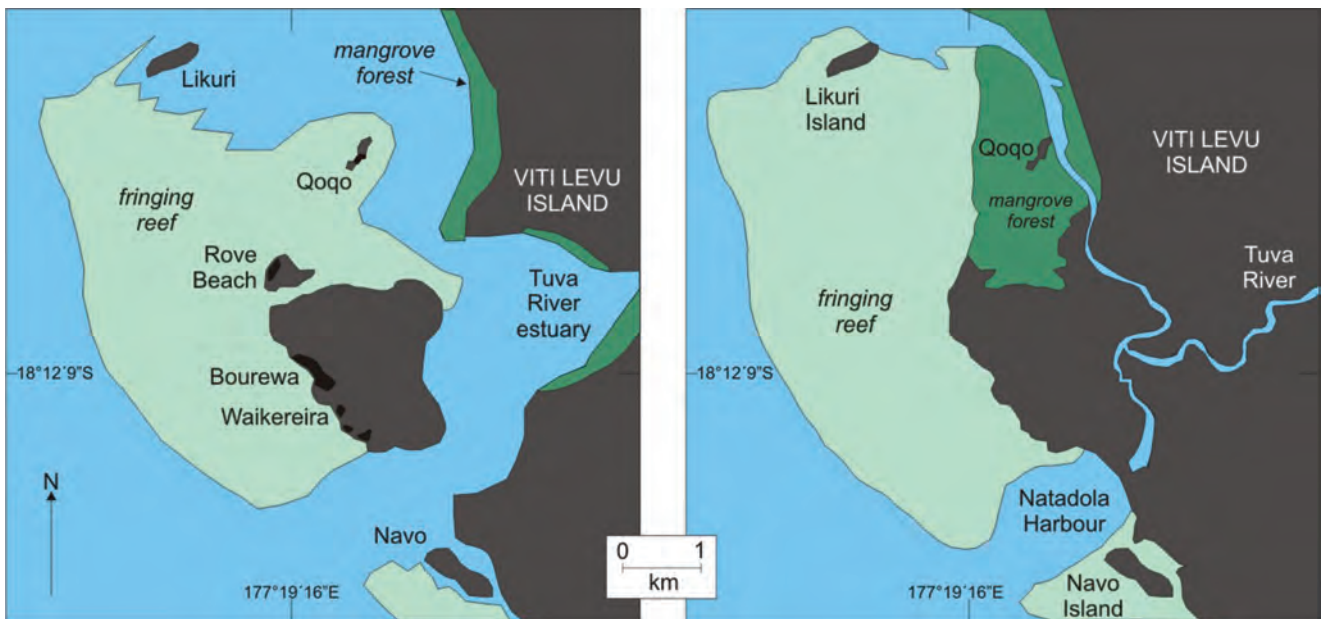


Figure 10. Southwest Viti Levu 3000 years ago (left) and present day (right)

Source: P.D. Nunn

32 What is the main cause of the changes in the coastal geography of Viti Levu over the last 3000 years, as shown in Figure 10?

- A erosion
- B sea level fall
- C sea level rise
- D tsunami
- E weathering

33 Viti Levu is part of which island group?

- A Fiji
- B Hawaii
- C Maldives
- D Philippines
- E West Indies

34 Which country has overtaken Germany as the world's largest exporter, by value?

- A Australia
- B China
- C France
- D India
- E United States of America

35 With which nation does Haiti share the island of Hispaniola?

- A Cuba
- B Dominican Republic
- C Jamaica
- D Puerto Rico
- E Trinidad

36 Geologist Bernie Joyce has warned that Australia's next volcanic eruption is "well overdue". The Australian mainland's last major volcanic activity occurred about 5000 years ago in the area of:

- A Glasshouse Mts, Qld
- B Mt Gambier, SA
- C Mt Warning, NSW
- D Mt Wellington, Tas
- E Organ Pipes, Vic

For the Yolngu people, there is no fixed boundary between land and sea, but a dynamic zone of interaction. In the summer wet season, the rivers flow kilometres offshore carrying freshwater, silt and debris from the land into the deep sea, whilst in the winter dry season the saltwater pushes into the rivers many kilometres inland. Coastal swamps, floodplains and mangroves are places where land, sea and river merge.

Figure 11. Yolngu saltwater country

Source: adapted from F. Morphy, H. Morphy, M. Barber

37 The country of the Yolngu people (see Figure 11) includes:

- A Blue Mud Bay, NT
- B Coffin Bay, SA
- C Jervis Bay, NSW
- D Portland Bay, Vic
- E Storm Bay, Tas

38 The coastline in Yolngu country is best described as:

- A erosional
- B high energy
- C low energy
- D wave dominated
- E none of the above

39 The Earth's weather systems and surface winds occur in the:

- A ionosphere
- B magnetosphere
- C stratosphere
- D thermosphere
- E troposphere

40 The population of which of these countries grew in 2009, after declining since 1995?

- A Australia
- B China
- C Japan
- D Russia
- E United States of America

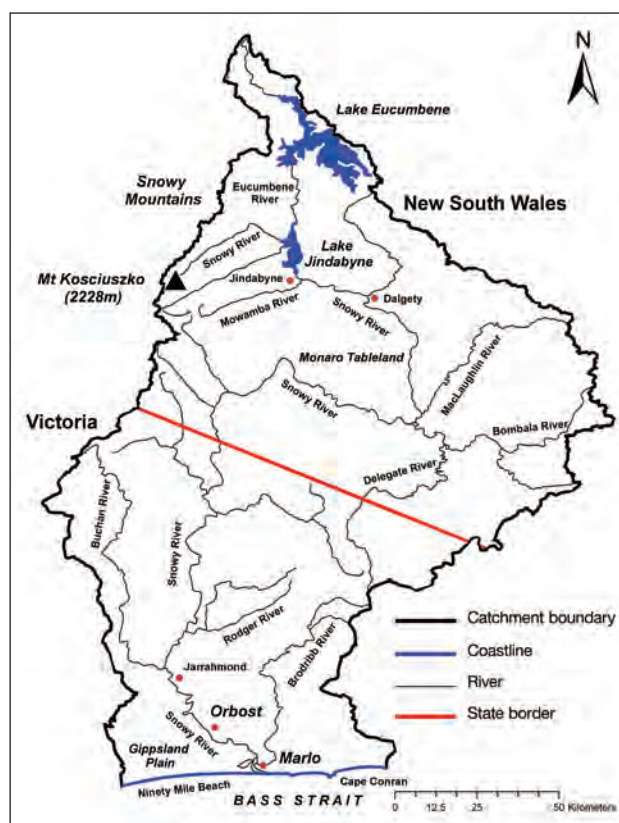


Figure 13. Snowy River catchment

Source: P.J. Wheeler et al

If you are **under 16 years** old on 31 August 2010 stop at Question 40. If you are older, continue to Question 50.

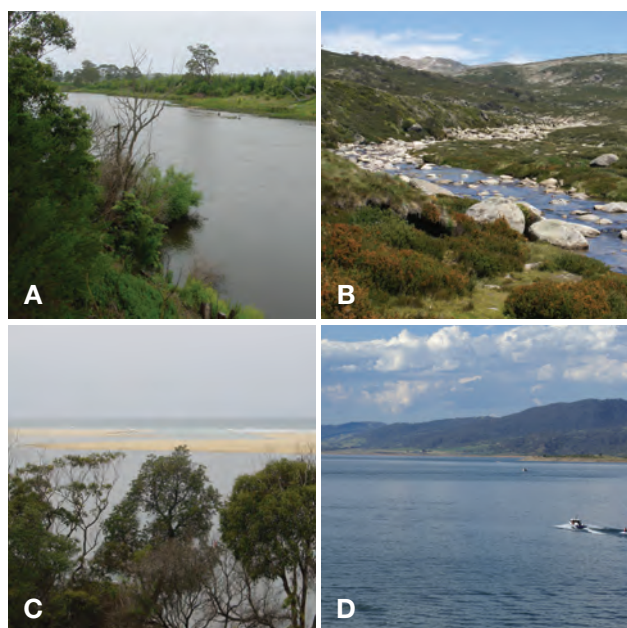


Figure 12. Four reaches of the Snowy River

Source: C. Grant

The Snowy River rises on the slopes of Mount Kosciuszko in south-east NSW and falls steeply for about 30 km to the Monaro Tablelands. The river then enters gorge country until reaching the river flats and mouth at the Victorian coastline near Orbost.

As part of the development of the Snowy Mountains Hydro-electric Scheme during the 1950s and 1960s, dams were built in the headwaters of the Snowy River system. The scheme captures water for electricity generation and diverts the water to the Murrumbidgee and Murray valleys for irrigation. The development of the scheme has profoundly changed flow conditions in the Snowy River and its tributaries, with diversion of 99% of the Snowy River's natural flow at Jindabyne Dam.

Figure 14. Snowy River

Source: adapted from National Water Commission

41 Using Figures 13 and 14, which is the correct sequence of photos in Figure 12 to show the Snowy River from source to mouth?

- A A B C D
- B A B D C
- C B D A C
- D C A D B
- E D A B C

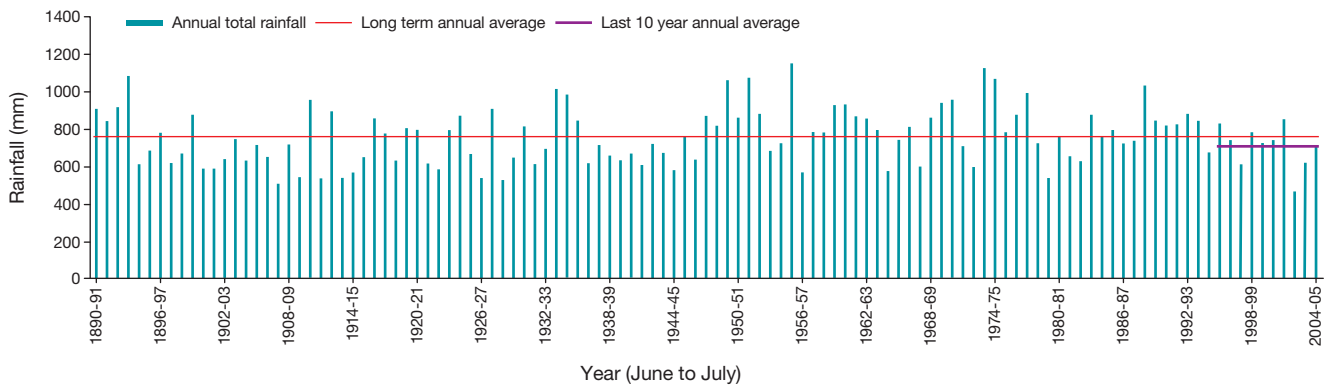


Figure 15. Annual rainfall, Snowy River catchment

Source: National Water Commission

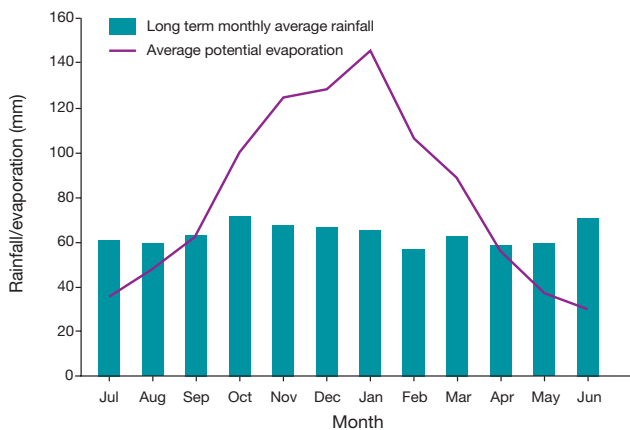


Figure 16. Monthly rainfall and evaporation, Snowy River catchment

Source: National Water Commission

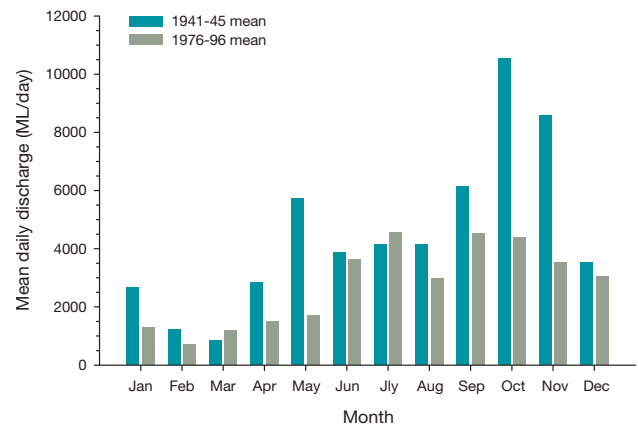


Figure 17. Mean daily flow of Snowy at Jarrahmond

Source: I. Reinfelds & S. Williams

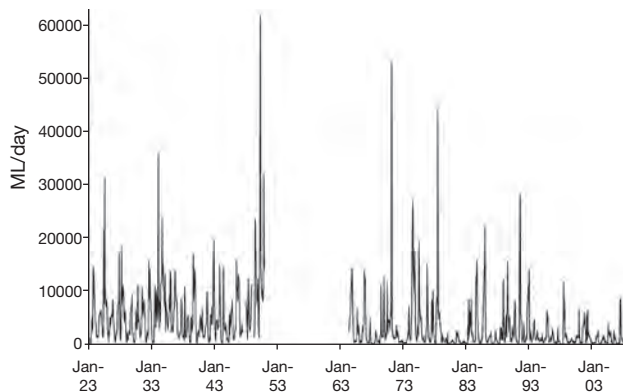


Figure 18. Mean flow of Snowy at Jarrahmond (no data c. 1951-64)

Source P.J. Wheeler et al, data from Vic Dept of Sustainability and Environment

At the mouth of the Snowy River a sand barrier encloses an elongated lagoon. The entrance channel through this barrier to the sea periodically opens and closes, depending on the respective dominance of the fluvial and coastal processes. Channel closure occurs naturally, but in recent times it has become more frequent. Channel opening is also a natural process, but increasingly a closed channel is deliberately cleared by human means (e.g. bulldozer).

Another factor illustrating the dynamic nature of this part of the coast is that the channel migrates along an east-west axis of up to 8 km. Flooding promotes relocation of the entrance, by cutting through the low sandy barrier closer to the main valley.

Figure 19. Snowy River entrance

Source: derived from P.J. Wheeler et al

To answer Questions 42 to 50 use the information in Figures 12 to 23 and your own knowledge.



Figure 20. Vertical aerial image, Snowy River entrance area

Source: P.J. Wheeler et al

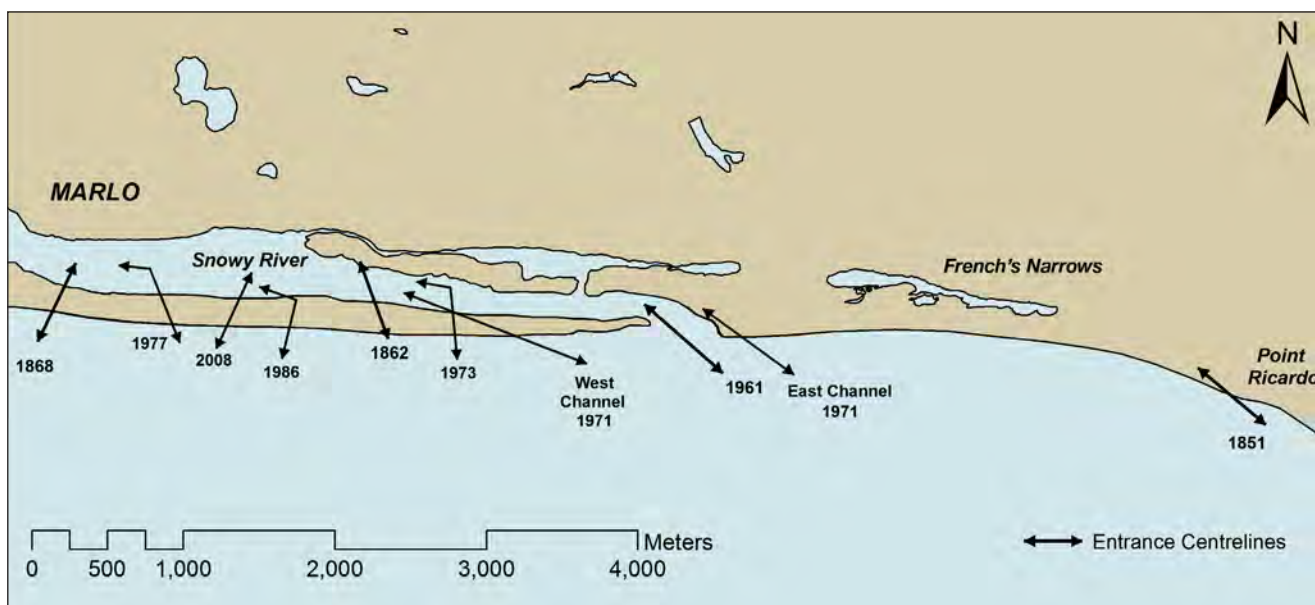


Figure 21. Selected positions of Snowy River entrance channel on 1961 base map

Source: P.J. Wheeler et al

- 42** The large differences in the Snowy's streamflow at Jarrahmond in 1941-45 compared to 1976-96 (see Figure 17), are because:
- A 1941-45 was a high rainfall period
 - B the Brodribb River was dammed in 1971
 - C eastern Australia was in drought 1984-93
 - D Jindabyne Dam was completed in 1967
 - E all of the above
- 43** The natural streamflow of the Snowy is highest on average in October because of:
- A less water removed for irrigation
 - B lower evaporation
 - C melting snow
 - D releases from Lake Jindabyne
 - E significantly higher rainfall
- 44** Why has the Snowy's entrance channel closed more frequently in the last 10 years than in the 1980s?
- A decreased rainfall in its catchment
 - B greater streamflow in its tributaries
 - C longshore drift changed direction
 - D more intense storms at sea
 - E water diversion to the Murray began
- 45** In which year was the aerial image in Figure 20 taken? (Study the entrance channels in Figure 21.)
- A 1961
 - B 1971
 - C 1973
 - D 1986
 - E 2008



Figure 22. French's Narrows Source: P.J. Wheeler et al

46 It is becoming unlikely that any future channel will open naturally through French's Narrows, as since 1851 this part of the lagoon has undergone:

- A deepening and widening along its entire length
- B hardening into sedimentary rock
- C lagoon segmentation and dune consolidation
- D major sea level change
- E transformation into wading bird habitat

47 A flood in Marlo in 1971 was caused by:

- A collapse of the Jindabyne Dam
- B heavy rain in the Snowy's headwaters
- C heavy rain in the Snowy's middle/lower catchment
- D heavy snowfall on Mt Kosciuszko
- E a storm surge from Cyclone Nargis

48 During periods of heavy river flooding, the entrance channel will most likely:

- A migrate to the east and close
- B migrate to the east and stay open
- C migrate to the west and close
- D migrate to the west and stay open
- E not noticeably change

49 Which of these usually occurs downstream as a result of the construction of dams?

- A decreased summer water temperature
- B encroachment of vegetation onto previous channel
- C greater availability of aquatic habitat for flora and fauna
- D increased variability of streamflow
- E river channel morphology remains constant



A



B

Figure 23. Snowy River entrance, photos taken 9 months apart Source: P.J. Wheeler et al

50 Which statement puts Photos A and B (Figure 23) in the order they were taken, and best explains the observed changes?

- A A before B. Given the strong outflow through the entrance channel in B, it represents a flood situation in progress.
- B A before B. The Snowy flooded shortly before A was taken, producing a wide entrance channel. There was no major flooding between the times the photos were taken.
- C B before A. The shoals in the lagoon in B prevent tidal and fresh water flow between the lagoon and sea. Thus no lagoon flushing occurred between the times the photos were taken.
- D B before A. There was no major flooding between the times the photos were taken. Erosive wave action during that time caused a significant widening of the entrance channel.
- E None of these explanations fits the photos.

Thank you for taking part in the
2010 National Geographic Channel
Australian Geography Competition.