ANSWERS

GEOGRAPHY SKILLS

UNLOCKED

AUSTRALIAN GEOGRAPHY TEACHERS ASSOCIATION
Chapter 1: Inquiring, questioning, investigating

GeoInquiry 1.1 (Page 1)
1. Which of the broad questions and issues in Figure 1.1 interest you the most?
   Responses will vary

2. What other issues would you add to this list from your own perspective? Possible issues could relate to geomorphological and meteorological hazards, population growth, the liveability of places, habitat loss, pollution, human impacts on biomes, food security, urbanisation, urban consolidation, population movements, land degradation, ocean exploitation, environmental management, environmental worldviews, issues related to human wellbeing, poverty and spatial inequality.

3. Compare your responses to the previous two questions with those of others.
   Responses will vary

GeoInquiry 1.2 (Page 2)
1. All of the inquiry questions in Figure 1.1 have connections to geography. Which of the issues you and others added in GeoInquiry 1.1, questions 2 and 3, are connected in some way with geography? Responses will vary

2. Try to link each of the inquiry questions in Figure 1.1 and the additional questions you have suggested with one or more of the key concepts of geography shown in Figure 1.2. Responses will vary

GeoInquiry 1.3 (Page 4)
1. Look at Figure 1.4. Suggest another area of geographic inquiry that relates to each of the key concepts. Example of possible responses:

<table>
<thead>
<tr>
<th>Place</th>
<th>What factors are important contributors to the perceived liveability of places?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space</td>
<td>Why do the types of agriculture practiced vary in different parts of the world?</td>
</tr>
<tr>
<td>Environment</td>
<td>How has the burning of fossil fuels affected the earth’s atmosphere?</td>
</tr>
<tr>
<td>Interconnection</td>
<td>How is technology transforming the ways people interact?</td>
</tr>
<tr>
<td>Sustainability</td>
<td>What types of forestry can be considered to be sustainable?</td>
</tr>
<tr>
<td>Scale</td>
<td>How does the use of plastic bags at your local supermarket impact on the world’s marine animals?</td>
</tr>
</tbody>
</table>
2. Look through the list of general skills. Name those in which you feel competent and those that you would like to develop further. Responses will vary
Chapter 2: Geography inquiry: The Stages

GeoInquiry 2.1 (Page 6)

1. Make a list of observations and questions that you think could be the start of an inquiry. Responses will vary but might, for example, include: Observation: an international hotel chain has applied to develop new resort complex on a beachfront site north of Sydney. Question: What impact will the proposed resort development have on the coastal dune ecosystem and the potential for coastal erosion?

2. Consider the following inquiry: ‘What are the effects of rapid urban growth on the water, land, atmosphere and environment?’ Think about the meaning and the implications of the inquiry, and split it into smaller questions, using Figure 2.3 as a guide.

- What are the causes and effects of rapid urban growth?
- What are the implications of rapid urban growth for environmental quality?
- What impact does urban growth have on local water quality?
- What is the impact of rapid urban growth on land use, especially on the periphery of the city?
- What is the impact of rapid urban growth on air quality?

GeoInquiry 2.2 (Page 8)

1. Look through the following list of facts that have been collected in relation to the following inquiry question: ‘In what ways has Byron Bay changed?’ All the facts are true, but only some are relevant to the inquiry question. Sort the facts into ‘relevant’ and ‘irrelevant’. Then sort the relevant facts by numbering them or grouping them from ‘most important’ to ‘least important’.

In what ways has Byron Bay changed?

Relevant and irrelevant facts about the changes in Byron Bay

- Byron Bay was once known as Cavanbah. Relevant
- The area was a meeting place for local Aboriginal peoples. Relevant
- The village was surveyed in 1884. Not relevant
- The dairy factory now is used as a recreation club. Not relevant
- A whaling station operated in the late 19th century. Relevant
- Byron Bay is the most easterly point on the Australian mainland. Not relevant
- The largest dairy factory in the southern hemisphere operated there in the early 20th century. Relevant
- Byron Bay is often praised for its ‘perfect’ climate. Not relevant
- Small farms growing avocados and macadamia nuts are now increasing. Relevant
- It was named by Captain Cook. Not relevant
- There is now an increasing number of hobby farms. Relevant
- Timber was shipped out using a jetty built in 1894. Relevant
- Tourism has become the main money-maker of the economy in the last 30 years. Relevant
• A railway line was built to the town in 1894. Relevant
• Resorts and other tourist accommodation have expanded in numbers over the last 30 years. Relevant

2. Use the guidance in Chapter 9 to suggest whether the statistics below would be best represented in a bar graph, a line graph or a pictorial diagram. A bar graph or pictorial diagram

**Origin of Australian visitors to Byron Bay, 2011**

<table>
<thead>
<tr>
<th>Location</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Queensland</td>
<td>41%</td>
</tr>
<tr>
<td>Sydney</td>
<td>22%</td>
</tr>
<tr>
<td>Regional NSW</td>
<td>20%</td>
</tr>
<tr>
<td>Victoria</td>
<td>12%</td>
</tr>
<tr>
<td>ACT</td>
<td>1%</td>
</tr>
<tr>
<td>Other places</td>
<td>4%</td>
</tr>
</tbody>
</table>

**GeoInquiry 2.3 (Page 9)**

1. Look at the map in Figure 2.10 and interpret the points it is making. The map is highlighting the epicenter of the 2011 Tohoku earthquake and the areas subject to ‘very strong shaking’ and ‘strong shaking, heavy damage’. It also shows the number of fatalities for specific locations.

2. Look at the photograph in Figure 2.11 and write your own interpretation of what it suggests about change. The photograph shows the construction of a sea wall to absorb the energy of storm waves. It is designed to protect coastal infrastructure.

**GeoInquiry 2.4 (Page 10)**

Read through the information below about latitude and longitude. Analyse the information by breaking it into smaller pieces. Which pieces give you historical information? Which pieces inform you about the lines on maps? The latter is highlighted in yellow. The balance is largely historical.
Information about latitude and longitude for analysis

Latitude and longitude lines are grid lines that are put on maps to help with accurate location of places.

Latitude

Latitude lines (or parallels of latitude) are always parallel to the equator. The equator is 0 degrees latitude. The North Pole is 90 degrees north latitude and the South Pole is 90 degrees south latitude.

The early explorers knew plenty about latitude. They knew that the closer they were to the equator, the higher the angle of the sun in the sky. They were able to measure this angle and calculate latitude by comparing the angle to tables of observations. Thus they knew at what latitude they were; they could not, however, give accurate locations without longitude.

Longitude

Longitude was more difficult for early explorers to calculate. Longitude lines (or meridians) measure angular distance east and west. It was impossible for sailors to measure longitude accurately until they had clocks that could keep accurate time aboard ships. In 1707, a victorious fleet returning to England from the Mediterranean Sea misjudged its longitude and was wrecked on the coast of Cornwall. The admiral of the fleet is said to have miraculously survived, only to be murdered by a local beachcomber who wanted to steal his emerald ring. Incidents such as this led to much pressure for a workable ship’s clock to be invented and a system of longitude to be established.

Such a clock was invented in 1760, but it was not until 1884 that the present system of longitude lines was instituted. There was an agreement made between nations that the 0 degree longitude line (the prime meridian) should be based on the Greenwich observatory in London. Longitude is measured in degrees east and west of this line, reaching a maximum of 180 degrees east and west on exactly the opposite side of the earth to the prime meridian. The 180 degrees east and west meridian is called the International Date Line. The date is one day earlier on the east side of the International Date Line than it is on the west side.

GeoInquiry 2.5 (Page 10)

Brainstorm with others a list of the many different ways in which conclusions from a geographic inquiry could be communicated. Once you have brainstormed a list, look at it from a personal point of view and mark each suggested method with one of the following ratings:

a. I am confident and skilled in using this method.

b. I would like to use this method but need some more skills.

c. I prefer not to use this method of communication.

Written report, oral report supported by a PowerPoint display, pictorial essay, wall display, short video, website, poster etc.
GeoInquiry 2.6 (Page 11)

After a discussion with others, make a list of as many ways of responding to the findings of an inquiry as you can imagine. Try to include small-scale personal actions and larger scale community responses in the list. Voting for candidate who think the way you do, circulating a petition, deputations to members of parliament, letter writing, protests and demonstrations, talkback radio, public meetings joining an NGO.

GeoInquiry 2.7 (Page 2.7)

To help develop skills in organising data, choose a project, assignment or task that you have to undertake in your geography class this year.

Research some of the different tools for storing data and work out which one is the best option for the task you chose. Consider what data you will need to store and the easiest ways to share access to that data with your teacher or with a group. ICT-based storage devices – Google Drive, Dropbox, Microsoft, One Drive, Box and Copy, laptop hard drives, smart phones, USBs, spreadsheets, pdf files, images, audio and visual files. Traditional, paper-based storage strategies.

GeoInquiry 2.8 (Page 12)

1. Use a free online tool to construct a mind map for a topic that you are covering in your classroom. Responses will vary
   a. What is the central theme?
   b. What are the main sub-themes that stem from that?
   c. What options are there to enable you to identify the different sub-themes?
   d. Can you use different shapes or colours?
2. Spend some time using Prezi to create a presentation. Examine some Prezi presentations that are publicly available to see what features you could include in your presentation. Responses will vary

GeoInquiry 2.9 (Page 14)

1. Add to Figure 2.14 by including the impacts created by the use of each of the energy sources. Responses will vary
2. Add another set of lines, radiating from these impacts, and add the effects of the impacts—for example: coal/acid rain/corrosion of buildings. Responses will vary
3. Add to your diagram by categorising subgroups with a colour code. Responses will vary
Geolnquiry 2.10 (Page 14)

Using the topic ‘Low population growth in more developed countries’, create a concept diagram using a similar format to the one in Figure 2.15. Responses will vary but issues addressed might include: aging population, workforce shortages, declining tax base, increase costs of aged care etc.
Geoskills and GeoInquiry 3.1 (Page 16)

Case study: North Adelaide—heritage and aesthetics

North Adelaide was planned out in 1836, at the same time as South Adelaide, which became the central business district of Adelaide. Both of these parts of central Adelaide are surrounded and separated by parklands. Very early on, North Adelaide became a residential area, and many early residences remain. This gives the suburb a distinctive character and sense of place.

North Adelaide now has two major business streets, which are dominated by more recently built shops and offices, but behind these ‘string streets’ there are many streetscapes that look much as they did in the 19th century.

The old houses, hotels and a few old shop buildings not only show what individual buildings and streets used to look like; they also demonstrate the geographical patterns of residential settlement. **North Adelaide has three distinctly different areas of relief.** The largest grid of streets is on a hill, while two other, smaller grids are at lower elevations. **When the land was being sold and settled in the mid-19th century, higher land was valued because it was not subject to floods and because it had views over the rest of the city. Wealthy people therefore bought land and built houses on the hill, and many of their mansions remain in that part of North Adelaide today.**

In the lower areas, the price of land was less. The early houses built there were cottages for workers. Often these were built in long lines of attached dwellings, in a similar way to those built in British cities at that time. Many of these rows of houses remain, but they are no longer workers’ cottages. In the last 50 years they have become gentrified, which means that they have been purchased by people wealthy enough to renovate them and make them into very desirable residences.

Read through the case study on North Adelaide and try some of the following thinking exercises to improve your own thinking skills. **Responses will vary**

1. Explaining. Reorder the information in the passage to write some brief notes that would help you explain the heritage features of North Adelaide to another person. **Responses will vary**

2. Analysing. Break up the case study into three or four smaller parts.

   Three distinct parts:
   • Locating North and South Adelaide
   • North Adelaide – general description
   • North Adelaide – relationship between topography and scale/type of housing

3. Seeing relevance. Choose only the facts from the passage that relate to ‘the size of houses’. List them. **See text highlighted in yellow.**
4. Logical reasoning. Use the information in the passage to explain in your own words, with logical reasoning, why the houses for workers were built on the lower land. The cottages of workers (typically low wage earners) were found on the cheapest area of land. The homes of the wealthy were built on the higher, more expensive, land.

5. Empathising. Look at Figure 3.1, which shows peak hour traffic in a village on the River Elbe in Germany. Write what might be the thoughts of the car drivers, the house owners and the tourist taking this photograph. The car drivers are probably experience the frustration of being caught in slow moving traffic. Homeowners might resent the traffic congestion because of the pollution (noise and air pollution) and any difficulties in accessing their home. Tourists my feel that the traffic congestion detracts from the amenity of the village.

6. Predicting. Look at Figure 3.2, which shows mesas in the Monument Valley desert area of the USA. Predict what this area might look like in 200 years and in 10,000 years. The landscape may be little changed over two hundred but possibly the road will be upgraded, have more traffic of have controls to limit private tourist car traffic. Over 10,000 years, however, one might expect that erosion may have brought about some changes to the erosional features of the valley such as falls of rock from the narrow pillars.

7. Discriminating. Look at Figure 3.3, which shows part of the US city of Sacramento. Make three lists of objects fitting into each of these categories: modern things; old (19th-century) things; things that are made to look old but are really modern.

- **modern things** – Multistory buildings in the background, asphalt roadway
- **old (19th-century) things** – Three-story brick buildings with verandahs
- **things that are made to look old but are really modern** – Carriage, some verandahs and decorations.

8. Transforming knowledge. Look at the atlas map in Figure 3.4. Transform the information given on the map into words. Could this information also be transformed into another form? Food security risks are highest in central Africa and southern Asia. Lowest levels of food security risk are found in the developed world – Australia, New Zealand, Western Europe, North America and Japan. The information could be presented in a table format.

**GeoInquiry 3.2 (Page 18)**

Look through the classification of skills from the team at the University of Melbourne. Which types of thinking listed above fit into the categories of this classification? Which overlap more than one category? There are multiple ways of categorising these types of thinking the following is just one such categorisation.
Ways of thinking

- Wondering and asking questions
- Considering different viewpoints and perspectives
- Reasoning with evidence
- Making connections
- Uncovering complexity and going below the surface of things.

Ways of working

- Wondering and asking questions
- Building explanations and interpretations
- Reasoning with evidence
- Making connections
- Considering different viewpoints and perspectives
- Capturing the heart of the matter and forming conclusions.
- Uncovering complexity and going below the surface of things
- Identifying patterns and making generalisations
- Generating possibilities and alternatives
- Evaluating evidence, arguments and actions
- Formulating plans and monitoring actions
- Identifying claims, assumptions and bias
- Clarifying priorities, conditions and what is known.

Tools for working

- Transforming knowledge
- Identifying cause and effect
- Being constructively critical

Skills for living in the world

- Wondering and asking questions
- Considering different viewpoints and perspectives
- Reasoning with evidence
- Making connections
- Uncovering complexity and going below the surface of things
- Capturing the heart of the matter and forming conclusions
- Uncovering complexity and going below the surface of things.
GeoSkill and GeoInquiry 3.3 (Page 18)

1. Look at the list of thinking skills on pages 15–16. Try to fit each of these skills into one or more of the levels in Bloom’s hierarchy (Table 3.5). Which skills overlap levels?
   - **Knowledge**: Remembering
   - **Comprehension**: Explaining, empathising, comparing
   - **Application**: Seeing relevance, discriminating, identifying cause and effect
   - **Analysis**: Critiquing, conceptualising, analysing
   - **Synthesis**: Creative thinking, transforming knowledge, synthesis, futures thinking
   - **Evaluation**: Logical reasoning, predicting, evaluating

2. Make a list of six ways in which you could use the information on the atlas map in Figure 3.6, ensuring that each of the six ways applies to the information a different thinking skill from Table 3.5.
   - **Evaluation** To judge or evaluate the accuracy of the predictions about the future made from the map evidence
   - **Synthesis** To spatially link the area cultivated with rice, the urban areas, and the area to be submerged, and the effects on the urban areas which would not be flooded
   - **Analysis** To investigate the relationship between rising sea level change and changing land use patterns
   - **Application** To reflect on the likely impacts of rising sea levels on communities dependent of rice cultivation and aquaculture.
   - **Comprehension** Identifying the principal land uses to be affected by rising sea levels by 2017
   - **Knowledge** To determine the area to be inundated by rising sea levels by 2017

GeoInquiry 3.3 (Page 20)

Discuss one of the issues for the future below. Make a list of (a) possible futures, (b) probable futures and (c) preferable futures for the issue you have chosen.

- Services and shops in your local area
- Damage to the coast in your state
- Conservation of the Great Barrier Reef
- Global climate change

Responses will vary
Look at the lists of thinking skills in this chapter. Choose some that you think would fit into each of the four sets of skills listed.

- information processing skills
- critical and creative thinking skills
- communicating skills
- reflective and metacognitive skills.

- information processing skills – Seeing relevance, discriminating, evaluating, synthesizing, conceptualising and comparing.
- critical and creative thinking skills – Creative thinking, critiquing, predicting, futures thinking.
- communicating skills – Explaining.
- reflective and metacognitive skills – Analysing, logical reasoning, transforming knowledge, predicting, empathising, identifying cause and effect.
Chapter 4: The elements of maps

GeoSkills 4.1 (Page 21)

Use the school map in Figure 4.1 (over page) to answer these questions.

1. Mark each of the BOLTSS features on the map by labelling them with their name.

2. Draw the symbols that have been used on the school map for each of these features:
   Responses will vary
   a. building
   b. shade tree
   c. first aid
   d. toilets.

3. Which building is closest to Plenty Road? How do you know this? The Hall and Office. You can use the linear scale to measure distances on the map.

4. Name the classrooms you would pass if you walked from the library to the first-aid room. D7, D6, D5 and D4

5. Make a table to list some of the similarities and differences between Plenty College and your school. Responses will vary
**GeoInquiry 4.2 (Page 22)**

**Drawing a mental map**

How well can you draw a sketch of your mental map? Follow these steps:

1. On a sheet of A3 paper, draw your home and the way to your nearest park or recreation area.
2. Neatly print the names of the streets and roads you have drawn.
3. Show the best way to the park using a dotted line.
4. Write a title at the top of the map.
5. Rule a border around the edge of the map.
6. Your map is a sketch so it will not be accurate. Write this label on your map: ‘Not to scale’.

*Responses will vary*

**GeoSkills 4.3 (Page 23)**

1. Study the map in Figure 4.2.

   a. Name the features shown by the following symbols:

   ![Symbols](image)

   **Car park**
   **Drinking water**
   **Picnic area**
   **Toilets**
   **First aid**

   b. Draw the symbol used to show the following features:

   - sealed roads **Solid black line**
   - walking track **Dotted solid red line**

   c. Draw a symbol you would use to show each of these features, using a suitable colour: *Responses will vary*

   - main road
   - freeway with route number
• suburban boundary
• suburb name
• railway station
• police station
• hospital
• barbecue
• swimming pool
• toilet
• wetland
• parkland.

Geoskills 4.5 (Page 26)

1. What compass direction is opposite to west? East
2. What compass direction is opposite to south-west? North-east
3. What direction is midway between east and south? South-east
4. If north is usually at the top of a map, where are south, east and west? Explain why.
   South is usually at the base of the map; east is to the right and west to the left. These are
   the cardinal points of the compass.
5. Direction is often used to describe areas of a country or region. Label a map of
   Australia like the one in Figure 4.8 to show the following regions.
   • Central Australia
   • North-western Australia
   • Northern Australia
   • North-eastern Australia
   • Eastern Australia
   • South-eastern Australia
   • Southern Australia
   • South-western Australia
   • Western Australia (Don’t confuse this with the name of the state)
6. Next to each region's name, write its bearing from the centre of Australia.

- Central Australia  NA
- North-western Australia  315°
- Northern Australia  0°
- North-eastern Australia  45°
- Eastern Australia  90°
- South-eastern Australia  135°
- Southern Australia  180°
- South-western Australia  125°
- Western Australia  270°

**Geonquiry 4.6 (Page 26)**

1. Name a feature of your school that is south of your classroom. **Responses will vary**

2. From your classroom, in what direction is:
   a. the school oval or green space **Responses will vary**
   b. the main office  **Responses will vary**
   c. the bike racks  **Responses will vary**
   d. the music room  **Responses will vary**
   e. your home?  **Responses will vary**

Responses will vary

4. In two minutes, list as many regions or parts of the world as you can think of with names that use directional terms; for example, South Island of New Zealand, East Gippsland, Northern Ireland. Share your results with the class so that your teacher can compile a list. Responses will vary

GeoInquiry 4.7 (Page 26)

1. Use the technique described above to find north without a compass from these places. Try it at different times of the day.
   a. The centre of the school playing field Responses will vary
   b. Your backyard Responses will vary
   c. The entrance gate to a local park Responses will vary

2. In what circumstances do you think this would be a helpful skill to have? If you were lost in the bush without a compass.

GeoSkills 4.8 (Page 27)

Examine the direction indicator shown in Figure 4.10.

1. Is grid north to the east or west of true north? East
2. Is magnetic north to the east or west of true north? East
3. What is the grid convergence? 0.5°
4. For what year is magnetic north correct? 2000
5. What is the grid magnetic angle? 3.5°
6. Will the grid magnetic angle have increased or decreased by 2010? Increased

GeoSkills 4.9 (Page 29)

1. Refer to Figure 4.12 and answer these questions in a table as shown.
   a. Measure the length of each sector.
   b. Calculate the bearing of each sector.
   c. Describe the features along the way.

2. What total distance will be walked in this course from checkpoint 2 to checkpoint 8? Approx. 1,000m (1km)

3. If you jogged this course at 10 kilometres per hour, with a 60-second pause at each checkpoint to take your next bearing, how long would the course take? 12 minutes
<table>
<thead>
<tr>
<th>Sector 2–3</th>
<th>Length in metres</th>
<th>Direction in degrees on map</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>195m</td>
<td>346˚</td>
<td>A walk along the riverbank pathway. A mix of open land and woodland.</td>
<td></td>
</tr>
<tr>
<td>Sector 3–4</td>
<td>100m</td>
<td>245˚</td>
<td>Woodland. Formal gardens to the right-hand-side.</td>
</tr>
<tr>
<td>Sector 4–5</td>
<td>140m</td>
<td>320˚</td>
<td>Some woodland but mainly open land</td>
</tr>
<tr>
<td>Sector 5–6</td>
<td>155m</td>
<td>70˚</td>
<td>Open land. Formal garden to the left.</td>
</tr>
<tr>
<td>Sector 6–7</td>
<td>190m</td>
<td>334˚</td>
<td>River on the RHS. Woodland.</td>
</tr>
<tr>
<td>Sector 7–8</td>
<td>180m</td>
<td>244˚</td>
<td>Open land. Formal plantings. Lake straight ahead at last stop.</td>
</tr>
</tbody>
</table>

GeoSkills 4.10 (Page 31)

1. Draw these linear scales. The lines for all of them should be 10 centimetres long.
   a. 1 cm to 100 m  Line divided into 10 equal divisions of 1 cm each representing 100m
   b. 1 cm to 10000 cm  Line divided into 10 equal divisions each representing 100m
   c. 1:50 000  Line divided into 10 equal divisions each representing 500m

2. Write these representative fractions as sentences.
   a. 1:50 000  1 centimetre represents 50,000 centimetres
   b. 1:100 000  1 centimetre represents 100,000 centimetres
   c. 1:1 000 000  1 centimetre represents 1,000,000 centimetres

3. The scales in Figure 4.17 are commonly used in street directories. Rewrite the linear scales as representative fractions.
   1:100,000
   1:200,000
**Geoskills 4.11 (Page 31)**

1. Consider the topographic maps in Chapter 7 (pages 82–3, 85, 87, 89). Draw and complete this table.

<table>
<thead>
<tr>
<th>Type of scale</th>
<th>Page</th>
<th>Name of map</th>
<th>Ratio scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large scale map</td>
<td>85</td>
<td>Coffs Harbour</td>
<td>1:25,000</td>
</tr>
<tr>
<td>Intermediate-scale map</td>
<td>87</td>
<td>Bogong Alpine Area</td>
<td>1:50,000</td>
</tr>
<tr>
<td>Small-scale map</td>
<td>82–83</td>
<td>Moorook</td>
<td>1:100,000</td>
</tr>
</tbody>
</table>

**GeoInquiry 4.12 (Page 31) Responses will vary from group to group**

1. Form teams of six people. Each team will need a compass, pen and paper with a backing board. Each of the people in the group has a specific task:
   - Number one is the scribe who will record all bearings and distances.
   - Two is in charge of the compass and will take the bearings.
   - Three is the pacer who will pace out the distances.
   - Four is the check pacer who will also step out the distances to check the pacer’s accuracy. Note: the pacer and check pacer will need to know the average length of their pace.
   - Five is the observer who will watch all the activities and provide advice.
   - Six is the leader who will direct the work.

2. Choose an area, such as a park or the school oval. Your task is to create an accurate map of the area.

3. Choose a start point and mark this on your piece of paper. Then collect data and compile it into a table similar to this one.

<table>
<thead>
<tr>
<th>Bearing in degrees</th>
<th>Number of paces</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>360</td>
<td>50</td>
<td>Park bench on the left</td>
</tr>
<tr>
<td>350</td>
<td>20</td>
<td>Pond on the right</td>
</tr>
</tbody>
</table>

4. It is up to each person in the group to check that everyone is doing their job and that the information is recorded correctly.

5. When you have finished gathering data, work with your team to draw a map from the data.

6. Make sure that you have BOLTSS on your map. The BOLTSS convention is described on page 21.

7. Display the maps on your class wall and discuss which ones give the best graphic
representation of the area mapped, and why.

**Geoskills 4.13 (Page 33)**

1. ‘As the crow flies’ is a phrase that is often used to describe straight-line distance between two places.
   
a. What do you think this phrase means? Birds supposedly fly in a straight-line. While this is not in fact true there are few obstructions to divert their flight path.
   
b. Are most distances that people use straight-line distances or not? Explain your answer. No. People need to maneuver around objects and obstructions.

2. Study the map of Penola (Figure 4.20). As the crow flies, how far is it from the:
   
a. cemetery to John Knox Oval? **Approx. 675m**
   
b. fire station (marked with an F symbol on Portland Street) to Penola High School? **Approx. 800m**
   
c. railway station (marked with a black circle at the west end of Lizzie Street) to Penola High School? **Approx. 1.1km**

3. Travelling by car, how far is it from the:
   
a. cemetery to Penola High School? **Approx. 1.2km**
   
b. fire station to John Knox Oval? **Approx. 1.6km**
   
c. railway station to Mary MacKillop Catholic School? **Approx. 1.5km**

**GeoInquiry 4.14 (Page 33)**

1. Estimate the distance you walk to get to school from your home. If you travel by transport, estimate the distance for just that part of the journey that you walk. What is the average distance walked by members of your class? **Responses will vary.**

2. On your way home, estimate the width of house blocks using paces. **Responses will vary.**

**GeoSkills 4.16 (Page 34)**

1. Examine the part of a map shown in Figure 4.21.
   
a. How many trees are in B5? **None**
   
b. What are the grid coordinates for the:
      
i railway station **C2**
      
ii windmill **D4**
      
iii point where the creek joins the river? **G3**
   
2. Describe the location of the trees close to the river. **The top right hand quadrant of the map (G1, H1, I1, G2, H2 and I2).**
Geoskills 4.16 (Page 34)

Study page 24 for the key to symbols that applies to the map in Figure 4.22.

1. Study the street directory map of Bondi (Figure 4.22).
   a. What community service is found at the following grid coordinates?
      i B4 Galilee Catholic Primary School
      ii B10 Marks Park
      iii E4 Sydney Water Bondi Sewage Treatment Plant
   b. What are the grid coordinates for Bondi Beach? B8, B7, C7, D7 and E7
   c. Give the grid coordinates for all the hotels in the area shown on the map. A9, A5 and B6
   d. What is the name of the sporting facility at E5? Bondi Golf Course
   e. Name where you might eat in A7. Bondi Blue

2. Bring a copy of a street directory to class. Write a treasure hunt using grid coordinates. Try to also use distance and direction in your instructions. When you have finished, exchange your work with someone in the class. Can they find your treasure? Responses will vary

GeoInquiry 4.17 (Page 36)

1. Work in pairs. Obtain a round balloon and an all-surface marker. Inflate the balloon and assume the knot is the North Pole. Mark in the:
   • equator
   • North and South poles
   • Tropics of Cancer and Capricorn
   • prime meridian
   • International Date Line. Responses will vary

2. Consult an atlas or globe and sketch on your balloon the approximate location of each continent. Responses will vary

GeoSkills 4.18 (Page 38)

1. Using the map in Figure 4.27, estimate the latitude and longitude of the following places and features.
   a. Palmerston North 40° 35’ S; 175° 60’ E
   b. Cape Campbell (on the South Island) 41° 73’ S; 174° 28’ E
   c. Rotorua 38° 14’ S; 176° 25’ E
   d. Mt Ruapehu 39° 28’ S; 175° 57’ E
   e. Hamilton 37° 79’ S; 175° 28’ E
   f. Mahia Peninsula 39° 16’ S; 177° 87’ E

2. Use the index entries on the map to give the latitude and longitude of these places, then find each in your atlas and describe its location.
   a. Wellington, Australia 32° 33’ S; 148° 59’ E
   b. Mt Wellington 42° 54’ S; 147° 14’ E
c. Welkom 27° 59’ S; 26° 44’ E
Chapter 5: The many types of maps

GeoSkills 5.1 (Page 40)

Use any of the map applications on a tablet/computer/ phone.

1. Open a map on a device. Look at the map shown and identify each of the elements of the map listed on page 39. Alter the scale, orientation, map type, borders and symbols. Responses will vary

2. Change the coverage of the map from the area around you to an area in another country. Look for familiar and unfamiliar features, and list them. Responses will vary

3. Change the scale of the map, and convert the map type to hybrid. What patterns are dominant on a large-scale map and on a small-scale map? Responses will vary

GeoSkills 5.2 (Page 42)

1. In pairs, make a list of maps you have used. Write why you used each map. Responses will vary

2. The table contains a list of different types of people and maps. Match each map with the person most likely to use that map.

<table>
<thead>
<tr>
<th>Taxi driver</th>
<th>Sea navigation map</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ship’s captain</td>
<td>Topographic map</td>
</tr>
<tr>
<td>Farmer</td>
<td>Atlas map of countries</td>
</tr>
<tr>
<td>Interstate truck driver</td>
<td>Gazetteer map of Asia</td>
</tr>
<tr>
<td>Forestry management officer</td>
<td>Street directory</td>
</tr>
<tr>
<td>Bushwalker</td>
<td>Weather map</td>
</tr>
<tr>
<td>Tourist planning an overseas trip</td>
<td>Road map of Australia</td>
</tr>
<tr>
<td>Geography student studying China</td>
<td>Vegetation map</td>
</tr>
</tbody>
</table>

GeoSkills 5.3 (Page 43)

1. Study the maps in Figures 5.3–5.10. Which ones might be used by someone studying:
   a. the weather Figure 5.10
   b. physical features in the Northern Territory Figure 5.3
   c. political boundaries? Figure 5.4

2. Work in small groups to collect at least 10 maps. Create a table that shows the title, map type and use for each map. Responses will vary
**GeoInquiry 5.4 (Page 45)**

Use your atlas and make a list of all the different projections used in it by completing the table. **Responses will vary**

<table>
<thead>
<tr>
<th>Projection</th>
<th>Page reference of a map using this projection</th>
<th>Description of a map using this projection</th>
<th>Scale</th>
<th>Possible reasons for the choice of this projection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Geoskills 5.5 (Page 56)**

1. Study the précis map in Figure 5.18. Identify and list the different ecosystems shown in the Australian National Botanic Gardens. **Cultivars, Sydney Region Gully, Western Mallee, She Oaks, Boronias, Grevilleas, Tea Tree, Paperbark Lawn, Daisies, Grasses and Lillies, Conifers, Banksias, Callitris and Eucalypts.**

2. Compare the précis maps in Figures 5.19 and 5.20. Which would be more useful for a:
   - a. walking tour of the city? Explain why. **Figure 5.19 – The map features the inner-area of Hobart. The map is at a scale that would facilitate walking.**
   - b. motoring tour of the city? Explain why. **Figure 5.20 – The map features the entire urban area of greater Darwin. The map is at a scale is such that driving is the only feasible way of touring.**

3. What makes satellite images both easy and difficult to interpret? What difficulties would there be in drawing the précis map in Figure 5.20 if you did not already know Darwin? **Satellite images show a large amount of detail which can make it difficult to draw a précis map. False colour images can, however, be difficult to interpret. Knowing the city’s physical layout would make it easier to identify features and patterns.**

4. Draw a précis map of the area within an approximate radius of 5 kilometres from your home. You can use a street directory. **Responses will vary**

**GeoInquiry 5.6 (Page 47)**

Compare the précis map in Figure 5.20 with the satellite image of Darwin (Figure 5.21). Work in pairs to list the benefits and limitations of each source. **Responses will vary but will include reference to the generalised patterns of land use, and elements of the biophysical environments, evident on the précis map. Satellite photograph is best for any examination of a detailed nature.**
**GeoSkills 5.7 (Page 48)**

Study the aerial photograph of Trinity Inlet, Cairns, in Figure 5.22 and the topographic map extract of the same area (Figure 5.23). Construct a précis map of Trinity Inlet using both sources of information. **Responses will vary**

- a. Decide which features you wish to include and which to leave out.
- b. Trace the key watercourses. Name these.
- c. Identify, trace and label any further physical features.
- d. Trace and label the built-up areas.
- e. Decide on a colour regime.
- f. Add a legend, title, border, north point and scale.

**Précis map of Trinity Inlet**

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**GeoSkills 5.8 (Page 49)**

Use the topographic map extract of Coffs Harbour in Figure 7.17 on page 85. Follow these steps to draw a précis map. **Responses will vary in terms of their detail and style.**

1. Draw a rectangle measuring half the length and half the width of the original map. This will reduce map size to one quarter of the original and provide a map at a scale of
1. Measure and rule up eastings and northings, giving a value to each line.

2. Use these grid lines to sketch the coastline. Label the Tasman Sea and coastal headlands, islands, points and beaches.

3. Sketch the course of Coffs Creek using the grid lines as a guide.

4. Label Coffs Coast State Park and Muttonbird Island Nature Reserve.

5. Sketch the extent of the built-up area. Draw the Pacific Highway (Highway 1 on the map) and the North Coast Railway Line.

6. Sketch the outlines of banana cultivations (shown as ‘Orchard, plantation or vineyard’).

7. Shade your map in these colours: blue (water features, including the Tasman Sea), orange (beaches), red (built-up area), yellow (banana plantations), brown (land over 100 metres) and green (lowland, racecourses, reserves, timbered country and farmland).

8. Give your map a title, and add an accurate scale, a legend and a north point.

**GeoSkills 5.9 (Page 50)**

1. Study the map in Figure 5.24b.
   a. A corner kick has just been taken, propelling the ball across the goal at the northern end of the pitch. Describe the position of players that appear to be unmarked (on their own). One player to the left of the player taking the corner. Another on the far left of the northern end of the field.
   b. How many players besides the goalkeeper (shown by a blue dot) are in the southern half of the field? Three
   c. How many metres will the ball have to travel from one goal to the other? 100m

2. Study the map in Figure 5.24c.
   a. The game has reached half-time. Which team appears to be most attentive to the instructions of the captain: the team in the northern half or the team in the southern half? Explain. The team in the southern half of the field. They are standing closer to the captain.
   b. A soccer team consists of 11 players. Which team has lost one player to be attended to at the first-aid post situated under the shade of a tree: the team in the northern half or the southern half? Northern half

3. If all players arrived in their own cars, how many would have to park on the street? 22

4. Draw your own dot distribution map to portray two time periods in a game of basketball, netball, hockey or football. Responses will vary
GeoSkills 5.10 (Page 51)

Study the sketch map of population distribution in Norway (Figure 5.25).

1. Describe the pattern of population distribution in Norway. Population is relatively evenly distributed, especially outside the principal urban areas in the southern parts of the country. One dominant urban centre with a population greater than 250,000.

2. Explain why are there generally more people living in the south of the country rather than the north. Use an atlas to help you answer in detail. The northern part of the country is relatively isolated and experiences harsher winters.

GeoSkills 5.11 (Page 51)

1. Use a blank outline map of Africa and an atlas to identify all Sub-Saharan African countries afflicted by the HIV/AIDS epidemic. Follow the steps above to draw a dot distribution map of the HIV/AIDS data in Table 5.26. Responses will vary. The following table will, however, assist in determining the correct answers.

<table>
<thead>
<tr>
<th>Sub-Saharan African Country</th>
<th>Adults and children with HIV/AIDS</th>
<th>Area (km2)</th>
<th>Density (Infected persons per km2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Southern Africa</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>1,200,000</td>
<td>390,757</td>
<td>3.07</td>
</tr>
<tr>
<td>Botswana</td>
<td>330,000</td>
<td>581,730</td>
<td>0.57</td>
</tr>
<tr>
<td>Zambia</td>
<td>950,000</td>
<td>752,618</td>
<td>1.26</td>
</tr>
<tr>
<td>Malawi</td>
<td>950,000</td>
<td>118,484</td>
<td>8.02</td>
</tr>
<tr>
<td>South Africa</td>
<td>5,700,000</td>
<td>1,221,037</td>
<td>4.67</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>9,130,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Eastern Africa</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kenya</td>
<td>1,400,000</td>
<td>581,309</td>
<td>2.4</td>
</tr>
<tr>
<td>Uganda</td>
<td>1,400,000</td>
<td>241,038</td>
<td>5.8</td>
</tr>
<tr>
<td>Tanzania</td>
<td>1,200,000</td>
<td>947,303</td>
<td>1.27</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>4,000,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Central Africa</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Congo</td>
<td>61,000</td>
<td>342,000</td>
<td>0.18</td>
</tr>
<tr>
<td>Dem. Rep. of Congo</td>
<td>390,000</td>
<td>2,345,409</td>
<td>0.17</td>
</tr>
<tr>
<td>Gabon</td>
<td>37,000</td>
<td>267,667</td>
<td>0.14</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>488,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Western Africa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>----------</td>
<td>----------</td>
<td>--------</td>
</tr>
<tr>
<td>Ivory Coast</td>
<td>390,000</td>
<td>322,463</td>
<td>1.21</td>
</tr>
<tr>
<td>Nigeria</td>
<td>3,000,000</td>
<td>923,768</td>
<td>3.25</td>
</tr>
<tr>
<td>Ghana</td>
<td>210,000</td>
<td>238,535</td>
<td>0.88</td>
</tr>
<tr>
<td>Senegal</td>
<td>37,000</td>
<td>196,712</td>
<td>0.19</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,637,000</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Answer these questions by referring to your map.
   a. Which country appears to have the lowest density of HIV/AIDS sufferers? **Gabon**
   b. Which country appears to have the greatest density of HIV/AIDS sufferers? **Malawi**.
   Which region—Southern, Eastern, Central or Western Africa—appears to have the greatest number of HIV/AIDS sufferers? **Southern Africa**
   c. Which region appears to have the lowest number of HIV/AIDS sufferers? **Central Africa**

**GeoSkills 5.12 (Page 52)**

Study the choropleth map in Figure 5.28.

1. Describe the value that is being mapped. **The percentage of dwellings with two or more cars, 2006**
2. How many categories of the value are there? **Five**
3. What is the area unit used? (Are they suburbs, local government areas or census collection districts?) **Local government areas**
4. Describe the pattern of car ownership in Sydney and suggest explanations for the pattern you describe. **Car ownership rates are greatest in the northwest and southwest—those areas that have the poorest access to public transport. Rates are lowest close to the city centre where access to public transport is greater.**

**GeoSkills 5.13 (Page 53)**

Study the two maps in Figure 5.30, which show population density in Melbourne in 1954 and 2011, and answer the following questions. Use the following words in your answers: centre, inner, outer, east, west, north, south.

1. Which areas have dense population in 1954 and 2011? **The central suburbs of Melbourne have the highest population densities in both 1954 and 2011. There is, however, some evidence decline in density of these inner-city suburbs in the period 1954 and 2011 – a result of suburbanisation.**
2. In which directions has the population mostly spread? **To the west, east and southeast**
3. What is the general pattern of population density from the centre to the outer suburbs? **Declining density**
**GeoInquiry 5.14 (Page 54)**

Print out a copy of a world map. Using the data in Table 5.31, draw a choropleth map of countries with the highest internet use in 2012. Follow the steps below the table to help you. **Responses will vary.**

1. Look carefully at the values in table 5.31. Clearly, China and the USA stand out in terms of overall use.

2. Decide on four or five categories of shading. Use the darkest colour for China and the USA. Then decide on gradings down to the lightest colour for Turkey. Use the next steps to help you decide on these.

3. Study the dispersion diagram in Figure 5.32 to help you plot the remaining 13 countries. The middle, or median, value is the seventh point reading from either end. Similarly, numbers can be divided into four quartiles (four parts) as shown.

4. Decide on colours or shadings for these four groups of countries. If you use colours, you could choose yellow for the lowest three (Iran, South Korea and Turkey) and shades of orange up to brown for countries in the remaining three quartiles. Each shade should be progressively darker for higher values.

**GeoInquiry 5.15 (Page 54)**

Draw a choropleth map of your schoolyard. **Responses will vary**

1. On the map show the population density of the areas used by students. Create a key that identifies densities—very high use, fairly high use, fairly low use, very low use.

2. What conclusions can you make from the map?

**GeoSkills 5.16 (Page 55)**

Match the isoline to identify the term with its correct definition.

<table>
<thead>
<tr>
<th>Isoline</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isobar</td>
<td>Joins places with equal value (also known as an isoline)</td>
</tr>
<tr>
<td>Isobath</td>
<td>Joins places of an equal journey time to the same location</td>
</tr>
<tr>
<td>Isochrone</td>
<td>Joins places with equal average cloudiness</td>
</tr>
<tr>
<td>Isohaline</td>
<td>Joins points of equal rainfall</td>
</tr>
<tr>
<td>Isohel</td>
<td>Joins places with the same atmospheric pressure</td>
</tr>
<tr>
<td>Isohyet</td>
<td>Joins places of equal temperature</td>
</tr>
<tr>
<td>Isoneph</td>
<td>Joins places in the ocean that have equal salinity</td>
</tr>
<tr>
<td>Isopleth</td>
<td>Joins places along the sea bed that have equal depth</td>
</tr>
<tr>
<td>Isotherm</td>
<td>Joins places with equal duration of sunshine</td>
</tr>
</tbody>
</table>
GeoSkills 5.17 (Page 55)

1. Study Figure 5.34 (over page).
   a. What type of isoline map is this? **Isohyet map**
   b. Estimate the latitude and longitude of the wettest area shown by the map.
      **Latitude 13.25°; Longitude 2.25°**
   c. Why do you think that rain gauges are clustered in some parts of the map rather than evenly spaced throughout? **It may reflect the population distribution**

2. Use an atlas with the world maps in Figure 5.35. Estimate the average summer and winter temperatures for these places. Display your data in a three-column table.

   • Atacama Desert
   • Brittany
   • Chicago
   • Ellesmere Island
   • Grand Canyon
   • Kalahari Desert
   • Mecca
   • Nagasaki
   • Tangier
   • Simpson Desert
   • Tierra del Fuego
   • Yana Bay

<table>
<thead>
<tr>
<th>Location</th>
<th>Average summer temp.</th>
<th>Average winter temp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atacama Desert</td>
<td>10°C–20°C</td>
<td>10°C–20°C</td>
</tr>
<tr>
<td>Brittany</td>
<td>10°C–20°C</td>
<td>0°C–20°C</td>
</tr>
<tr>
<td>Chicago</td>
<td>20°C–30°C</td>
<td>0°C–10°C</td>
</tr>
<tr>
<td>Ellesmere Island</td>
<td>0°C–10°C</td>
<td>Less than -30°C</td>
</tr>
<tr>
<td>Grand Canyon</td>
<td>Greater than 30°C</td>
<td>0°C–10°C</td>
</tr>
<tr>
<td>Kalahari Desert</td>
<td>20°C–30°C</td>
<td>10°C–20°C</td>
</tr>
<tr>
<td>Mecca</td>
<td>Greater than 30°C</td>
<td>20°C–30°C</td>
</tr>
<tr>
<td>Nagasaki</td>
<td>20°C–30°C</td>
<td>10°C–20°C</td>
</tr>
<tr>
<td>Tangier</td>
<td>20-30</td>
<td>10°C–20°C</td>
</tr>
<tr>
<td>Simpson Desert</td>
<td>Greater than 30°C</td>
<td>10°C–20°C</td>
</tr>
<tr>
<td>Tierra del Fuego</td>
<td>0°C–10°C</td>
<td>0°C–10°C</td>
</tr>
<tr>
<td>Yana Bay</td>
<td>Less than 10°C</td>
<td>Less than -30°C</td>
</tr>
</tbody>
</table>
3. Describe how isotherms move and change with the seasons. In the Northern Hemisphere the isotherms move to the north in summer (July) and south in winter (January). Winters in the higher latitudes of the Northern Hemisphere are very cold. In the Southern Hemisphere the isotherms move to the south in winter resulting in colder temperatures in southern Africa, South America and Australia.

**GeoSkills 5.18 (Page 57)**

1. Draw a layer-shaded relief isoline map of the Avalon dunes using the steps opposite.

![Layer-shaded relief isoline map of Avalon dunes]

2. Draw a sketch diagram of a cross-section across the dunes from the beach to the back of the dunes. Comment on what your map and diagram tell you. The map and cross-section show the relief of the Avalon dune system. At the back of the gentle sloping beach the dune rises quite steeply to a height in excess of 20m before sloping down to a height of just greater than eight metres above sea level.
Geolnquiry 5.19 (Page 58)

Study the map in Figure 5.38.

1. Who puts together the information shown on the chart? Meteorologists at the Bureau of Meteorology (BOM)

2. How is information gathered about the following:
   a. wind speed and direction Readings of atmospheric pressure. An anemometer is a device used for measuring wind speed. A wind vain is used to measure direction.
   b. areas where it is raining Satellite photographs and an analysis of atmospheric conditions. Rain gauges.
   c. air pressure temperature? Thermometers are used to measure temperature

3. What do meteorologists do with this information to produce a final weather chart? They analyse it using computer models that used weather patterns that occurred in the past to determine what is most likely to happen in the immediate (and medium-term) future.

4. How do television companies make use of the same information? They produce the weather forecasts which normally accompany the news broadcast.

GeoSkills 5.20 (Page 59)

Study the group of diagrams in Figure 5.39.

1. Define an isobar. What unit of measurement is shown on isobars? A line joining points of equal atmospheric pressure. Hectopascal (hPa)

2. What is the difference between a high-pressure cell and a low-pressure cell? In a low pressure cell the air pressure decreases towards the centre. In a high pressure air pressures increases towards the centre.

3. Describe the relationship between high and low pressure cells and wind movement in
the southern hemisphere. In low pressure systems the air moves in a clockwise direction. In high pressure systems it moves in an anti-clockwise direction.

4. What evidence of strong winds is there on a synoptic chart? The isobars are closely spaced.

5. What is the difference between a cold and a warm front? A cold front occurs when when cold air invades an area dominated by warmer air. Weather begins to deteriorate as the front approaches. A warm front is an advancing mass of warm air which rises over the colder retreating air. Increased humidity and rain often result.

6. What is an occluded front? These occur when a cold front overtakes a warm front, forming dense clouds.

GeoSkills 5.21 (Page 60)

Study the map in Figure 5.41.

1. Name the two oceans where tropical maritime air comes from. Indian and Pacific oceans

2. From which latitudes does equatorial air come? Within 10˚ of the Equator

3. What sort of air mass would cause a heatwave in Adelaide? Tropical continental

4. What sort of air mass would lead to heavy monsoonal rain in Darwin? Equatorial

5. What sort of air mass would cause light snow in Sydney? Polar maritime

6. What sort of air mass would refresh the Daintree rainforest in north-east Queensland? Tropical maritime

GeoSkills 5.22 (Page 61)

Study the summer weather map in Figure 5.43.

1. What was the air pressure of Tropical Cyclone ‘Dennis’? 995 hPa

2. How does this compare with the low pressure cell in the Tasman Sea? Not as low

3. Describe the direction in which the winds were spiralling in both these cyclones. Clockwise

4. Which cyclone was likely to extend further upwards into the atmosphere? Why? T.C. Dennis – it is drawing on a warm body of air – it is closer to the Equator

5. Compare and contrast the likely weather events that occurred over Cairns and Sydney. Cairns is likely to receive heavy rain and strong winds due to the proximity of T.C. Dennis. Sydney may receive some rain but it is at the southern margin of the coastline being impacted upon by the low pressure system which is some way off the coast.

6. Describe the likely weather in Hobart during the following 24 hours. Generally stable weather conditions with the possibility of the passage of a cold front late in the day. Currently the area is dominated by a high pressure system. These are associated with generally stable atmospheric conditions, clear skies
and gentle winds.
7. What wind direction and which air mass was affecting Alice Springs’s weather? Low air pressure system. Easterly winds.
8. What kind of weather was Albany, Western Australia, experiencing? Why? Clear skies, SE winds. Region is dominated by a high pressure system.
9. Why was Perth experiencing much higher temperatures than Darwin? Darwin likely to have had cloud cover associated with the low pressure system while Perth had clear skies and stable atmospheric conditions associated with the dominant high pressure system.
10. Where would the highest surfing waves have occurred? On the coast of NSW. Isobars are relatively close together. This is indicative of stronger winds.

2. Study the winter weather map in Figure 5.43.
   a. Describe the location of the high pressure system. How high was the pressure in its centre? South-central Queensland. 1021 hPa.
   b. How far across did this pressure system extend in kilometres? Approx. 3,000 km
   c. What sort of air mass dominated this area? High
   d. Describe the directions of winds around this high pressure cell. Anti-clockwise
   e. Describe the likely weather events affecting Perth in the previous 24 hours. Fine weathers followed by the passage of a cold front and associated rainfall.
   f. Forecast Melbourne’s weather for the next 1–2 days. Temperatures will fall following the passage of a cold front and possibly a continuation of rainfall.
   g. Describe the general relationship between pressure systems and cloud cover. Low pressure systems are more commonly accompanied by cloud cover than high pressure systems.
   h. Why was smoke haze reported over Darwin at this time of the year? It’s the dry season in northern Australia.
   i. Which of the state and territory capital cities was likely to experience the highest temperature? Explain. Darwin. While its winter in Australia, Darwin is still relatively close to the Equator so experiences higher temperatures than the other Australian capitals.
   j. Describe the likely surf conditions of Byron Bay. Seas would be relatively flat.

GeoSkills 5.23 (Page 62)
1. In order to represent an area of 100 square kilometres on a map in the shape of a square, how long would each side measure at these scales:
   a. 1:100 000? 10cm
   b. 1:50 000? 20cm
   c. 2 centimetres represents 1 kilometre? 20cm
2. Draw the next-sized proportional circle that would appear in Figure 5.45. 2400

3. Use Figure 5.46 to describe the pattern of road fatalities throughout Australia. You can find up-to-date data on this at the Department of Infrastructure and Regional Development website. Research the population of each state so that you can identify any relationship between fatalities and population. NSW (301–400) has the largest number of road fatalities followed by Victoria and Queensland (201–300). In general the larger the state/territory’s population the higher the number of fatalities.

GeoSkills 5.24 (Page 63)

1. Study the map in Figure 5.47.
   a. Which region had the greatest extent of human-induced soil degradation and which had the least? Asia has the most, Oceania the least.
   b. In which region was overgrazing the main cause of soil degradation? Africa
   c. In which region was vegetation removal the main cause of soil degradation? Asia (and South America)
   d. What is unusual about the causes of soil degradation in Europe? Agricultural activities are the principal cause.
   e. In which region were agricultural activities the main cause of soil degradation? Europe

2. Use the legend, a pair of dividers, a calculator and a protractor to calculate the total millions of hectares degraded by overexploitation in Asia. Approx. 63 million hectares

3. Why is overgrazing a primary reason for soil degradation in Oceania? Australia, the largest landmass in the region, has an extensive pastoral industry.

GeoSkills 5.25 (Page 65)

1. The famous London Underground map is an example of a cartogram. How does it differ from the cartograms shown on these pages? These maps are proportional representations (i.e. the area are based on qualitative data).

2. Study the cartogram in Figure 5.49.
   a. Rank the following countries according to their GDP: United States of America, China, Japan, Germany, France. USA, China, Japan, Germany and France
   b. Comment on the relative size of GDP for the United States of America and Australia. The USA’s GDP is about ten times greater than that of Australia.
**GeoInquiry 5.26 (Page 65)**

1. Draw a cartogram of the regional population of Africa from the data in Table 5.51. Positioning and shape of map segments will vary.

2. Stack your squares in the appropriate order to create a cartogram.

3. Add a title, north point, legend and border to your map.

4. Research: Use the internet to find Worldmapper maps. Find two maps that interest you, and bring these to class. Discuss what you have found interesting about each of the maps. Responses will vary.

**GeoSkills 5.27 (Page 66)**

Study the flowline map in Figure 5.52.

a. Which railway line first branches away from the main line? How many trains use this branch line? Branch C, 20 trains

b. According to the flowline map, how many trains travel towards the north-west? 50 trains

**GeoInquiry 5.28 (Page 66)**

Study the map in Figure 5.53.

1. Which region sends the largest volume of oil to the USA? Canada and Russia

2. Where does most of the Asia–Pacific’s oil come from? Middle East
3. Where does Western Europe get more of its oil— Russia or the Middle East? **Russia**

4. Which country receives North Sea oil? **USA**

5. Where does African oil flow to? **Europe and the USA**

**GeoInquiry 5.29 (Page 67)**

Follow these steps to construct a flowline map showing the movement of road traffic in your local area, around either your school or your home. **Responses will vary**

1. Use a street directory to trace an outline in pencil of roads and streets around your school.

2. Select points at which to measure traffic flow. Allocate people to each point.

3. Record the amount of traffic passing these points on the various routes. You can either show totals or group the data by types such as cars, bikes and vans.

4. Collect each person’s data. Present the data in a table.

5. Assess the maximum and minimum quantities involved and choose a scale of line thickness that is suitable for this map size.

6. Alternatively, a flowline map can be constructed using a single line of dots for 100 vehicles, a double line for 200 and so on. You could use black dots for traffic flowing in one direction and red dots for traffic flowing the other way.

7. Which flowline map is the most effective?
Chapter 6: Digital maps

GeoInquiry 6.1 (Page 69)

1. Research the GNSS network. Examine the additional GNSS networks being worked on by different countries. Which countries already have a satellite network? Which countries are planning to establish a satellite network? When will these networks be operational? Students note that GPS is the American subset of the GNSS. Many other countries have their own network. Europe has the Galileo network, Russia has GLONASS, Japan has QZSS and India has the IRNSS network. China has BeiDou, and plan to complete the entire second generation Beidou Navigation Satellite System (BDS or BeiDou-2, formerly known as COMPASS), by expanding current regional (Asia-Pacific) service into global coverage by 2020. The BeiDou-2 system is proposed to consist of 30 MEO satellites and five geostationary satellites. A 16-satellite regional version (covering Asia and Pacific area) was completed by December 2012. All of these networks, including GPS, come together to make GNSS. Specific details of this response will vary.

2. Countries spend a lot of money getting their satellite network into space and operational, yet anyone from any country can use them. How has sharing access to these GNSS technologies been of benefit to us all? Responses will vary but will include reference to equity issues and the sharing of the costs involved in developing wide coverage GNSS networks.

GeoInquiry 6.2 (Page 73)

Choose to examine one of the online collaborative disaster mapping services such as Ushahidi, Map Action or MapGive.

1. Examine their past maps relating to a natural disaster.

2. Propose reasons why these maps could be considered the best maps for immediate disaster response in the first few weeks after the disaster. The maps have real-time currency. They are generated at the time of the disaster. Authorities can use them to coordinate their response to the disaster. Resources can be directed to places of greatest need.

3. Why might other maps become more useful as time goes on? Other maps can act as a point of comparison. The nature and the extent of the changes caused by the disaster can be determined.
Chapter 7: Working with topographic maps

GeoSkills 7.1 (Page 75)
Refer to the topographic map in Figure 7.1 to answer the following questions.

1. What is the contour interval on the map? 50m
2. What is the spot height at the trig station at point A? 600m
3. What human feature is at point B? Railway Station
4. What feature is at point C? Lake or dam
5. Are points D and E at equal heights above sea level? Explain your answer. No. Point D is 500m above sea level. Point E is 150m above sea level.
6. Describe the slope from the trig station near point F to point G. The slope is initially steep but then the topography flattens out.
7. Will the contour lines on the map ever cross? Explain your answer. No. They join lines of equal height above sea level. The only time they might come together is when there is a vertical cliff.
8. Explain this statement: ‘Small-scale regional maps have a large contour interval and are less accurate. Very large scale maps used for engineering and planning have a small contour interval and are very accurate.’ Very large-scale maps cover a relatively small area of the earth’s surface. As a consequence they are able to show much greater detail.

GeoSkills 7.2 (Page 77)
1. Use Figure 7.6 to calculate the gradient between the following points. Express each gradient in the four different forms described on page 76.
   a. A to B $\frac{1}{24}$; a rise of 1 metre for every 24 metres; 1:24; 2°
   b. B to C $\frac{1}{5}$; a rise of 1 metre for every 5 metres; 1:5; 10°
   c. D to E $\frac{1}{9.5}$; a rise of 1 metre for every 9.5 (or rounded to 10); 1:9.5; 6°

2. State what type of activity each of the gradients in a. to c. above would be suitable for. Cycling, steep road and steep walking; steep road and steep walking; and upward limit of cycling and steep walking.
GeoInquiry 7.3 (Page 77)

Look at the photo in Figure 7.7 and state what activities you think different parts of the terrain would be suitable for, and why. Four-wheel (off road) driving and trekking. Relatively flat in the foreground; steep slopes in the background. No formal roadways or tracks.

Geoskills 7.4 (Page 79)

Refer to Figure 7.8 to answer these questions.

1. What are the area references for locations A, B, C and D in Figure 7.8A?
   A 2256
   B 2654
   C 2759
   D 2955

2. What are the grid references for locations A, B, C and D in Figure 7.8B?
   A 202606
   B 205603
   C 208608
   D 202601

Refer to Figure 7.9 to answer these questions.

3. What are the ARs for locations A, B, C and D?
   A 2806
   B 2611
   C 2409
   D 3106

4. What are the GRs for the same locations?
   A 282068
   B 265114
   C 244093
   D 315062

5. Which feature is located at GR 315105? Pine plantation

6. Give the GR for the highest point on the map. 315053

7. In which direction is the stream flowing? Explain your answer. The stream flows to the east. The waterway crosses the 300m and 200m contour lines as it does.

8. Calculate the gradient of the slope between campsite 1 and the caves in AR 2408. Advise a bushwalker about the suitability of this hike. 1:19. A relatively easy walk.
GeoSkills 7.5 (Page 79)

Refer to Figure 7.9 to answer these questions.

1. What is the straight-line distance between the lake and the highest point? **7.5 km**

2. What is the distance from campsite 1 to campsite 2? Describe what the walk would be like in relation to slope and features in the environment. **3.7m.** The walk would initially be through native forest followed by pine plantation and then native forest again. Over this distance the elevation changes from approx. 250m to 400m. That is, the walk is uphill.

GeoSkills 7.6 (Page 81)

Refer to Figure 7.12 to complete this activity.

1. Draw a line from point A to point B and complete a cross-section for this transect.

2. Draw a line from point A to point D and complete a cross-section for this transect.
3. Describe what each of the cross-sections reveals about Uluru. The A–B cross-section shows the elongated profile of Uluru. The slopes are less steep than those on the C–D cross-section.

**GeoSkills and GeoInquiry 7.7**

1. The tourist bureau has given you grid references of ‘must-see’ sights. Identify the features at each of the following grid references.
   - a. GR 484125 Lake Bonney
   - b. GR 380192 River (Wigley Reach)
   - c. GR 445114 Vineyards
   - d. GR 354179 Wigley Reach lagoon

2. You have to give the tourist bureau details of your trip before you go. Give the grid references for the following points.
   - a. Start point: caravan park on Lake Bonney GR 494149
   - b. Overnight stop: Ball Reach GR 377167
   - c. End point: Wigley Flat GR 304183

3. The owners of the houseboat need specific details of your trip. You will have to estimate the distance travelled on both days. How far did you travel on the longest day? **15.5km**

4. An attempt at a high-speed boat record was made at Lake Bonney in the 1960s. The size of Lake Bonney suddenly interests you. Using the topographic map, work out the lake’s area. **Approx. 18 sq km**

5. When you arrive at what you thought was an island, at GR 420157, you discover that the island is not there. What could this mean? What does this say about the time of year you are there? The island could be submerged by the waters of Nockburra Creek. Possibly due to heavy winter rainfall.

6. You check the map to see if you are in the right area. Taking a closer look, you discover the map indicates three north points. Explain the significance of each north. (Refer to the section on different north points on page 27.)
   - **True north** is the true direction of the North Pole.
   - **Grid north** is the direction in which the north–south grid lines are drawn on the topographic map. They do not form a true north–south position. Grid lines are parallel to each other. Grid north is used to read direction, because bearings are plotted from grid north. The difference between true north and grid north is called the grid convergence.
   - **Magnetic north** is the direction in which the north point of a compass needle points. It points to the magnetic North Pole. The south point of the needle points to the magnetic South Pole. The positions of the world’s magnetic poles change slightly over time. The direction of magnetic north varies from place to place on the earth, so always check the direction indicator on the topographic map for the area you are working on. The difference between magnetic north and grid north
is known as the grid magnetic angle.

7. You decide to stay the night at the homestead just north of Wigley Flat (GR 315189). Describe your view in each of the cardinal (main) directions. Include in your answer all built and natural features. To the north is flat cleared land. To the east the view includes an area subject to inundation and medium vegetation. To the south is the Wigley Reach and associated river flats. To the west is an area of land subject to inundation, Wigley Reach and areas of medium woodland.

8. Locate the highest and lowest contours on the map. What does this indicate about the topography of the land covered by the map? Highest contour line – 60m; and the lowest contour line is 40m. The area covered by the map is relatively flat.

Research

9. You look at the colour of the water and wonder if it is clean. Suggest three reasons why the quality of the river could be affected in this area. Heavy rainfall washes sediment into the waterways. Excessive irrigation results in drops in water flows. Runoff from agricultural and urban land uses.

10. The Murray River’s water level is a much-debated issue. Identify and explain how the local area of Barmera does or does not contribute to this. Extensive areas of irrigation draws water from the waterways of the Barmera region.

GeoSkills and Geolnquiry 7.8 (Page 84)

1. The director requires your assistance by answering these questions.
   
   a. What is the scale of the map you are using? 1:25,000
   b. What is the contour interval of the map? 10 metres

2. In scene 1 the director wants four cast members to parachute into Coffs Harbour, landing in various locations. Identify each location and assess the landing spot for its suitability. Say whether you think each site is suitable or not.

   a. GR 116485 Fitzroy Oval – Suitable
   b. GR 140487 Ocean just off Mutton Bird Island – Not suitable
   c. GR 132498 York Street playing fields – Suitable
   d. GR 128464 Sewage works – Not suitable

3. In scene 2, the director wants a high-speed boat chase. She would like you to determine the distance of the chase on Coffs Creek. It will begin at Vost Street Bridge (GR 131483) and end at Carralls Gully (GR 118485). Report back to the director on how far this will be. Approx. 3.9km

4. For the next scene, the director needs you to describe the settlement patterns around the Post Office (GR 132475) and the surrounding area at Diggers Beach Road (GR 130508). Describe both types of settlement. Post Office precinct is ‘built up’ with playing fields and Coffs Harbour High School nearby – grid street pattern. Diggers Beach precinct also ‘built up’. Non-grid street pattern indicative of a newer urban area. Likely ocean views.

5. Further planning by the director requires you to determine the directions for a series
of explosive fireworks over the city. The display will be staged at the Showground (GR 115488). Give the direction of the fireworks heading towards:

a. Diggers Head NE
b. Little Muttonbird Island East
c. Coffs Harbour Jetty SE
d. the racecourse. South

6. The director needs to know the main land-use patterns in Coffs Harbour. Examine the map and identify two possible local industries in Coffs Harbour. Explain how you came to this conclusion. Tourism – the number of tourism related features (caravan parks, golf courses and other sporting facilities, beaches, a marina and boat ramps). The presence of ‘orchard, plantation or vineyard’ in the NW quadrant of the map. We know, from our general knowledge, that Coffs Harbour is famous for the ‘Big Banana’ tourist attraction. From this we can deduce that the area features a number of banana plantations.

7. The director has asked you for help in planning the construction of a flying fox for an action scene. It will start at the high point at GR 123509 (top of the hill) to the end point at GR 137509 on the beach. You decide that the best way to determine the slope of the land is to create a cross-section from the start to the finish point. Ensure you label all built and natural features on your profile. This will give the director an indication of its suitability. Use a vertical scale of 1 centimetre to 25 metres. State the VE.

8. The film company has told you of its intention to thank Coffs Harbour with profits from the film. The director would like to build a theme park near GR 134495, between Ocean Parade and the beach. Discuss possible advantages and disadvantages of this gesture for Coffs Harbour. **Advantages** include the attractions of a scenic, beachfront location. The land is currently occupied by coastal dune vegetation. Access is relatively good – via Ocean Road. The theme park will add to the region’s existing tourist attractions and be a major economic boost to the community. Hundreds of jobs will be created. The principal **disadvantages** relate to the proposed site. The coastal dune system acts as a buffer to storm waves. The alteration of the dunes would accelerate coastal erosion. The development may also detract from the visual amenity of the beach.
Day 1

1. You familiarise yourself with the map before you depart.
   a. What is the scale of the map? 1:50,000
   b. What is the contour interval? 20m

2. The group plans to start from point GR 232382 along the vehicle track, up the Staircase Track and along the snow pole line to GR 292322, where you plan to set up camp.
   a. Identify the human and natural features at both grid references. **Starting point:** walker registration, parking and walking track. Surrounded by sub-alpine woodlands. **GR 292322:** Cleve Cole Memorial Hut (shelter), toilets, heathlands above the snowline, sub-alpine woodlands below.
   b. Estimate the distance the group hiked along the walking track on day 1. Approx. 9.8km
   c. Identify one natural and one built feature the group passed along the way. **Mt Bogong (AR2734) and Bivouac Hut (AR 2736)**

3. Your friends walk off from campsite 1 to collect water for your drink bottles. Where would they collect it, in which direction is the feature and how far is it from the campsite? **Creek at GR 298324, East, 0.6km.**

Day 2

1. The group is excited about walking to the highest point in Victoria—Mt Bogong. You check the map before you depart to locate your hiking route. You have made definite plans to walk from campsite 1 at GR 292322, backtracking a short distance to Mt Bogong, then along the walking track to campsite 2 at GR 247305. Which feature here would indicate the ground will be flat enough for you to pitch your tents? Explain. **The contour lines are relatively well spaced indicating a relatively gentle gradient.**

2. After breakfast at campsite 1 (GR 292322) you realise that one of the group has become very ill and needs to be evacuated urgently. You know that there is a helipad at T Spur Knob on the Australian Alps Walking Track, and you are able to use your mobile phone to arrange a helicopter evacuation. Give the GR of the intended evacuation point. **GR 306307 (note the helipad is not marked on this edition of the map)**

3. The group has to carry the sick member by stretcher to the evacuation point. How much further walking does this add? 3km (one way); 6km (return)

4. What is the distance as the crow flies to this point? 2km

5. Write a short story explaining how you chose to evacuate your sick group member. **Responses will vary.**

6. The group is back on track and resting at Mt Bogong taking in the view. What is the GR and elevation of this mountain? **GR 273347; 1986m.**

7. As the group passes Hooker Plateau, estimate its height. In which direction are you
walking? >1960m <1980m; SE.

8. The group is resting at Quartz Knob (GR 257330). Describe in six lines the landscape the group observes in all the cardinal directions. Include in your answer vegetation type, natural and built features.

North: View towards Hooker Plateau; alpine heathlands.
South: View along Quartz Ridge; deep valleys on either side: sub-alpine woodlands.
East: View across a deep valley covered in sub-alpine woodland.
West: Series of steep-sided valleys and spurs covered in sub-alpine woodland.

GeoSkills 7.10 (Page 88)

Pre-trip planning

1. How far is Dargo from Melbourne? How many hours would it take you to travel this distance? 316km; 4 hours (according to Google Maps)

2. Make a list of 10 items you need to pack for the adventure and 10 items you would definitely not need. **Needs**: Communication device suitable to the remote location, extra fuel, water, food, first aid kit, torch, suitable clothing, tent, sleeping bag, cooking stove and implements, soap towel etc. **Don’t needs**: Television, electronic games etc.

3. How far would you travel in your adventure to the Grant Historic Area? 27km (according to Google Maps)

4. Give area references of three places where a helicopter could land in an emergency. GR 147644 (relatively flat land); GR 094667 (Helipad); GR 120675 (Helipad).

5. Why would you still need to take a paper map of the area? There may not be smartphone connectivity.

6. Where would you buy this type of map? How much would it cost? What devices do many recent-model cars have that might assist in planning your journey? Map shop or local tourist information office; $10.00–$20.00; Sat. Nav.

7. What precautions would you need to take before a summer adventure in this area? Take note of fire hazard level warnings and notifications of fire bans. What precautions would you need to take before a winter adventure? Be prepared for sudden changes in weather including the possibility of snow.

8. Would you go to Jungle Creek Falls? Explain your decision. No. There are imited views from the walking track.
Day 1

1. Turn north-west and travel along McMillan Road. Turn east onto the Grant Track. This track is more rugged, but you were prepared for this because of the difference in symbols used on the map. Draw and label these symbols.

_________________________ Seal road

– – – – – – – – – – – – Minor track / 4WD

2. You pitch your tent at the campsite marked at GR 136673. What advantages does this site have as a first campsite for your adventure? The site is a large, recognised (official) camping ground. It is located on a stream/creek with ready access to a sealed road.

Day 2

1. In the morning you walk from the campsite to explore the old township of Grant, located at GR 138670. In what direction should you walk? NE

2. You hike further in a south-easterly direction, towards the old relics of a mine, chimney and cemetery. What are the names of these features? Give the grid reference of one site. Jolly Sailor Mine and Chimney (GR 1456650); Grant Cemetery (GR 144659)

3. You find yourself back on McMillan Road and call for your driver to pick you up. What grid reference do you give the driver? What means of communication would you use to contact the driver? How far have you walked? What would the terrain be like in the area you visited? GR 146654; satellite phone or CB radio. Relatively gentle slopes compared with the topography to the south-west of McMillan Road.

4. You turn north-west, with Ford 21 (GR 090712) as your destination.

5. How far do you travel from the cemetery to Ford 21? Approx. 11km

6. At what grid reference do you turn of McMillan Road towards Stonewall? GR 099692

7. This part of the drive becomes more dangerous and the driver slows down. Why? The minor / 4WD track goes downhill along the ridge of a spur. Relatively steep decline in elevation.

8. You are travelling north along what formation? What shape are the contour lines to show this landscape? Bulltown Spur – V or U-shaped contours.

9. At Stonewall you come across a river. What is the grid reference here? What is the name of the river? GR 102716; Crooked River.

10. How many river crossings are there before you reach the campsite? Four

11. How does this campsite symbol differ from the one you used last night? Small, may be unofficial.
GeoSkills 7.11 (Page 7.11)

1. Search online for Geoscience Australia’s MapConnect tool. This is an online map with lots of data, including contour lines across Australia at 50-metre intervals. Find your local area or a place you know well on this map. Responses will vary – experiential task

2. Search online for QTopo desktop and go to the Queensland Government’s online topographic mapping tool. Ensure you go to the desktop version. Here you can view a topographic map of any area in Queensland with down to 10 metres accuracy. No specific response – experiential task

3. Open Google Maps. Find and activate the ‘Terrain’ view. What information has been added to the map? Go to a geographically interesting location around the world, such as Mt Everest or Mt Kilimanjaro, and examine the topography in that area. Switch between the ‘Map’ view and the ‘Earth’ view. Use the Shift key and your mouse or trackpad to rotate the ‘camera’ around your chosen location to view it in 3-D. No specific response – experiential task
Chapter 8: Working with photographs

GeoSkills 8.1 (Page 92)

1. Brainstorm a list of the types of things geographers examine. Why do geographers use photos as a source of information? To identify: geographical processes and patterns; the natural and/or built features of places; patterns of urban and rural development; transport and communication patterns. They also facilitate the analysis of specific places at a specific time; changes over time; comparisons about change and study places where field trips are difficult. Geographers use photos as a tool to identify and record geographic features and information.

2. Who else uses photos of the environment? For what reasons do they use photos? Environmentalists and ecologists; urban planners; landscape architects; artists; interior designers etc.

GeoSkills 8.2 (Page 93)

Before you do this activity, you will need to refer to the steps in constructing a photosketch on pages 94–5. Examine the photos in Figures 8.3 and 8.4.

a. Complete a photosketch of each.

b. On your photosketch, annotate (label) the features listed below each photo.

GeoSkills 8.3 (Page 95)

Obtain a ground photo of a natural environment and one of a built environment. Draw an annotated photosketch of each. State the sources of your photos. Responses will vary
GeoSkills 8.4 (Page 8.4)

1. Examine the oblique aerial photo in Figure 8.9.
   a. Suggest where it was taken from on the vertical photo in Figure 8.12. Top left-hand corner
   b. Estimate the angle of obliqueness to the ground. 30°–45°
   c. Describe the distribution of natural and human features over the landscape. Natural features appear in the middle ground (Lake Burley Griffin) and mountains in the background. Cluster of office and residential buildings in the foreground. Parliamentary buildings in the background.

2. Study Tables 8.10 and 8.11, then list five types of detail that are most easily seen in oblique aerial photos (such as Figure 8.9) compared to a vertical photo, and five that are most easily seen in vertical aerial photos (such as Figure 8.12) compared to an oblique photo. Oblique aerial photograph: Detail of features in the foreground; greater area is included; you can gain an indication of the height of features; it’s easier to identify features of the built environment; topography. Vertical aerial photographs: Street patterns and road layout are easy to see; the distribution of land uses; direction and distance between features; and features are not obscured by taller structures or landforms.

GeoInquiry 8.5 (Page 8.5)

State whether you would use an oblique aerial photo or a vertical aerial photo, with approximate scales of 1:25000, for the following, and explain why:
   a. locating the private airstrip of a homestead in the hills outside Hobart Vertical aerial photograph
   b. estimating the height of a new office building in Melbourne Oblique aerial photograph
   c. examining the mouth of the Clarence River at Yamba in northern New South Wales Vertical aerial photograph
   d. measuring the distance along a freeway from one place to another Vertical aerial photograph
   e. locating a cliff face on a coastline and estimating its height Oblique aerial photograph
   f. getting an overview of a large farm divided into eight main areas. Vertical aerial photograph

GeoSkills 8.5 (Page 98)

1. Study the oblique aerial photo (Figure 8.13) and the street map (Figure 8.14) of Geordie Bay/Longreach Bay, Rottnest Island, Western Australia. Using the steps shown on pages 94–5, draw a photosketch of Rottnest from Figure 8.13. Note: the map’s orientation is north; the photo’s orientation is south. Annotate the following features:
   a. coastline (differentiate rocky areas from beaches)
   b. salt lake
   c. road network
d. beach houses  
e. tennis courts  
f. offshore wave-cut platform  
g. water storage tanks  
h. jetty.

2. Use the street map in Figure 8.14 to annotate the following on your sketch:

   a. Geordie Bay  
   b. Fays Bay  
   c. Longreach Bay.

Note: Photosketch generated using PicSketch software

**GeoSkills 8.7 (Page 99)**

Refer again to the section on scale on pages 29–31. Study the oblique photograph of Sydney’s Moore Park. Using the steps shown on pages 94–5, construct a photosketch by linking the oblique photo in Figure 8.15 to the street directory map in Figure 8.16. Note: the map’s orientation is north; the photo’s orientation is south-east. Annotate the following on your sketch:

   a. Sydney Football Stadium  
   b. Sydney Cricket Ground  
   c. Fox Studios  
   d. Centennial Park and Busbys Pond
e. Driver Avenue
f. Old Sydney Showground (Entertainment Quarter)
g. Kippax Lake.

Note: Photosketch generated using PicSketch software

GeoSkills 8.8 (Page 100)

1. Using grid coordinates, identify the area of Figure 8.18 shown in the aerial photograph (Figure 8.17). GR 135090; GR 135140; GR 200140; GR 200090

2. Estimate the area covered by the aerial photograph. Approx. 32.5 sq. km.

3. Compare the vertical aerial photo in Figure 8.17 with the topographic map extract of Melbourne in Figure 8.18. Use the map to help you identify the following features on the aerial photo:
   - West Gate Freeway
   - Fishermens Bend
   - Footscray Road
   - Williamstown Road
   - Spotswood
   - Port Melbourne
   - Hobsons Bay
   - Garden City
- West Melbourne
- Newport
- Yarraville.

4. The scale of the topographic map is provided in the caption line. Estimate the scale of the aerial photo. **Approx. 1:35,000**

5. Which of the two is smaller in scale, the aerial photo or the topographic map? Refer to
‘Scale’ on pages 29–31 to help you answer this question. The vertical aerial photograph has the smaller scale.

6. Locate Melbourne Docklands and Southbank in the top right-hand-corner of Figure 8.17. Undertake research using the internet to investigate the changing land uses of the precincts over time. Develop an annotated visual display to present the findings of your research. Responses will vary

**Geoinquiry 8.9 (Page 101)**

1. State whether Figure 8.17 or Figure 8.18 provides the better insight into the nature of the land uses in the area covered by Figure 8.17. Can you identify any landmarks that you are familiar with? Figure 8.17 provides greater detail in terms of land use. Possible features might include Etihad Stadium, Southern Cross Station, Docklands, Yarra River, Victoria Harbour, The Bolte Bridge etc

2. Examine the rail and road networks converging on Melbourne. How do the principal roads, freeways and rail systems differ from the pattern of the suburban roads? Suburban roads have a grid pattern. Principal roads and freeways cut across this rectangular grid.

3. State how using the aerial photo and the map has helped you make a mental picture of the city of Melbourne and its immediate surrounds. Explain if you think anything else would make the picture clearer. Why might residents of Melbourne have a better insight into the changing nature of the land uses in the area than is evident in the aerial photograph and the map? The map and aerial photograph provide the reader with a visual appreciation of the pattern of land uses and major landscape features. Ground level and oblique aerial photographs would enhance this appreciation. It would, for example, give an indication of the height and nature of buildings. Melbourne residents would have a better insight into the changing nature of the land uses in the area given that they would have been witness to these changes over time.

**GeoSkills 8.9 (Page 103)**

1. Select an image of your choice, then scan it and save it for onscreen use. Responses to this activity will vary depending on the nature of the image selected.

2. Using your computer tools, divide the image into foreground, middle ground and background. Responses will vary

3. Fully label the diagram, identifying landforms and cultural features. Responses will vary

4. Print a hard copy of your image and draw a fully annotated photosketch. Note: if you have a suitable program on your computer, you may want to transform the photo into a photosketch or line drawing using the electronic program.
Chapter 9: Working with statistics and graphs

GeoSkills 9.1 (Page 105)
Study Table 9.2 and answer the following questions.
1. What is the most popular activity for 6- to 18-year-olds? Snowboarding
2. What is the most popular activity for 30- to 54-year-olds? Downhill skiing
3. What is the least popular activity for those aged 55 and over? Skateboarding
4. Describe the trends of participation rates in these selected activities. The popularity of mountain biking, skateboarding and snowboarding generally decline with age while skiing increases at least until the 55+ age group.
5. What is the average participation rate for downhill skiing among 6- to over 55-year-olds? 17.6%

GeoSkills 9.1 (Page 106)

Use the technique for describing data to describe the patterns shown in the graph in Figure 9.5. The general patterns: Access to the internet is relatively high in developed countries when compared to that achieved in developing countries. Examples: Gambia, Mozambique and Sierra Leone in Africa, and Indonesia in SE Asia have low levels of access compared with eth UK, USA, Denmark and Australia. Anomalies: Argentina and Malaysia have relatively high levels of access even though they are considered developing countries. They are however much more developed than the African countries shown in the graph.

GeoSkills 9.2 (Page 107)

1. Use the data in Table 9.6 to draw a column graph.
2. Answer the following questions about the graph.
   a. What is this graph illustrating? The highest mountain on each continent.
   b. Which continents have the highest mountains? What are their names? Asia (Everest) and South America (Aconcagua).
   c. Which continents have the lowest mountains? What are their names? Australia (Kosciuszko) and Antarctica (Vinson Massif)
   d. What difference in height is there between the highest and lowest mountains? 6,620m.
GeoSkills 9.4 (Page 107)

Before you do this, study the technique for describing data on page 106. Examine the graph in Figure 9.7.

a. Describe the distribution of the world’s most populated countries in 2014 and 2050. China and India (both in Asia) are the world’s most populous countries. India will overtake China between 2014 and 2050.

b. Which countries have shown the greatest increase over this time? China, Pakistan, Nigeria and Dem. Rep. of Congo

c. What countries are predicted to decrease in population over this time? Japan

GeoSkills 9.5 (Page 108)

Use Figure 9.8 to answer these questions.

a. Which region currently has the greatest area of forest available for production? Russian Federation

b. What percentage of total forest area does forest area available for production represent in North America compared to Central America? 60% compared to about 40%

GeoSkills 9.6 (Page 109)

Examine the graph in Figure 9.10.

1. Describe the change in the contribution of source regions of tourists to Fiji over the period 2000–14. The proportion from Europe and the Americas has declined while those from the Asia and Oceania has increased.

2. Suggest possible reasons that may explain why these changes have occurred. The increase in the standards of living enjoyed by Asians.

3. Suggest factors that might explain ways in which this data may alter in future. Continued growth in tourist numbers from Asia, especially China.

GeoSkills 9.7 (Page 109)

Study the composite bar graph in Figure 9.11 of indicative sources of woodfuel.

1. Which countries derive most of their woodfuel from forest land? Nepal and India

2. Which countries derive most of their woodfuel from other land (mainly private)? Bangladesh, Indonesia, Pakistan, Philippines, Sri Lanka and Thailand.

3. Why does Thailand stand out as an anomaly in its sources of woodfuel among the selected countries shown in the graph? A significant percentage of woodfuel (approx. 38%) is sourced from public land.
Refer to Table 9.12.

1. Construct a graph showing the documented known and threatened mammal species in the selected countries for 2014. Decide on the best graph to represent this data.

![Known and Threatened Mammal Species in 15 Countries, 2014](image)

2. What does the graph reveal about the number of such species in the selected countries? Indonesia has the highest number of threatened species. Madagascar has the highest proportion of is known species classified as threatened.

GeoSkills 9.9 (Page 110)

1. Construct a divergence bar chart using the data in Table 9.15.
2. Describe the pattern of interstate migration shown on your graph. The populations of Queensland, Victoria and the ACT are growing while those of Tasmania, South Australia, Northern Territory and NSW are declining. Western Australia’s population declined in 2001 but increased sharply in 2011.

**GeoSkills 9.10 (Page 11)**

Use the data in Table 9.17 to complete the following activities.

1. Construct a histogram to show the number of fatal crashes, by time of day, that occurred in Australia during 1991–2005. Note: carefully consider the width of the class intervals or size groups on the horizontal axis.
2. Describe the pattern of fatal crashes shown by the time periods. Using data from Table 9.17, suggest possible explanations for the variation in fatalities and time periods. The deadliest time of day is 3.00pm–7.00pm. The least deadly is 12 midnight to 6.00am. More riders are likely to be riding in the late afternoon when roads are busiest.

**GeoSkills 9.11 (Page 112)**

Refer to the technique for describing data on page 106 to describe the patterns shown in the graph in Figure 9.18. **The general pattern:** Enrolments peaked in 2002 before declining before being relatively stable in the period 2003–2014; **Examples:** Enrolments peaked at 160 students in 2002 but declined to 195 in 2003 following the opening of St Patrick’s Primary School; **Anomalies:** Enrolments again dipped in 2006 following the opening of Steiner Primary School before steadily rising and stabilising at around 100 students.

**GeoSkills 9.12 (Page 113)**

1. Refer to Figure 9.19. Describe:
   a. the general pattern of population growth over the period 2002–07 Population growth in Sub-Saharan Africa was greater that that experienced in Central Africa.
   b. the population growth in terms of relative increase and decrease, and relative stability Population increased in Sub-Saharan Africa at faster state than Central Africa throughout the period.
   c. any anomalies in the pattern of population growth that you have identified. None apparent

2. Construct a multiple line graph using the data in Table 9.20.
GeoSkills 9.13 (Page 114)

Use Figure 9.23 to answer the following questions.

a. What is the title of this graph? World’s Regions Producing Rubber, 2011
b. Which region produces the most rubber? South-East Asia
c. What percentage of the world’s rubber does Asia produce? 93%
d. What quantity of the world’s rubber does Asia produce? 9,533,301 tonnes
e. What does the label ‘Latin America’ mean on this graph? South and Central America

GeoSkills 9.14 (Page 115)

Refer to Table 9.25, which shows the population size and distribution for Australian states and territories.

1. Draw a circular graph to show the actual percentage of total population in each state and territory in 2014.
2. Draw another circular graph to show the projected percentage of total population in each state or territory in 2056.

Distribution of the Australian Population by State and Territory, 2014

a. Which state or territory had, or is predicted to have, the largest share of the population in:
   • 2014? NSW
   • 2056? NSW

b. Which state or territory is projected to experience the largest proportional
GeoSkills 9.15 (Page 117)

Using the data shown in Table 9.28, draw a climatic graph for Athens, then answer the following questions.

1. Which month has the highest temperature? July (27.9˚C)
2. Which month has the lowest temperature? January (10.2˚C)
3. Which three months are the wettest? December (61mm)
4. What is the temperature range? 18.5˚C
5. State the total annual rainfall. 371.4mm
6. Which month would be the best time to holiday in this location? Why? July – the warmest and driest month.
7. In August 2004, Athens hosted the Olympic Games. Given the climate data, would you have selected August to hold the summer Olympics? Justify your answer. What other factors might be important in deciding when the Olympics will be held? Yes. Temperatures are relatively high but not too hot and there is little chance of disruptions caused by rain. Some events/athletes might find the average temperature a little high. It could impact on athletic performance. Other considerations: length of the day, wind conditions.

GeoSkills 9.16 (Page 117)

Look at the graphs in Figures 9.29 and 9.30 and answer the following questions.

1. In which hemisphere is each place located? How does the temperature graph reflect this? Colombo – Northern Hemisphere (temp. line rises in the middle of the year); Wellington – Southern Hemisphere (temperature line dips in the middle of the year).
2. Are they close to the equator, in the mid-latitudes or near the poles? What evidence in the temperature graph supports this? Colombo is close to the Equator – little variation in average temperature throughout the year. Wellington – mid-latitudes – distinct summer/winter average temperatures.
4. How many dry months does each city have? None.
GeoSkills 9.17 (Page 119)

1. Describe the shape of the population profile of the:
   a. total Australian population Stationary/contracting
   b. Indigenous Australian population. Expanding (Pyramid shaped)

2. Compare Figures 9.32 and 9.33. Australia as a whole has an aging population structure. The indigenous population structure on the other hand has a population pyramid shape indicative of a rapidly growing and relatively young population.

3. a. Calculate the percentage of Australia’s total Indigenous population who are in the:
   • under-15 age group Approx. 19%
   • over-65 age group. Approx. 15%

   b. What implications does the percentage of dependent population have for governments? Increasing welfare bill, shrinking workforce (tax base), and increased health costs associated with an aging population.

GeoSkills 9.18 (Page 119)

Refer to Table 9.31 to answer the following questions.

1. Construct a population profile for Singapore.

   Population Profile of Singapore(000s), June 2013

   ![Population Profile Graph]

   2. What percentage of males are in the 0–4 age group? 4.9%

   3. What percentage of females are in the 0–4 age group? 4.6%
4. What percentage of the population is in the aged category? Approx. 10.5%

5. Is Singapore’s population young or old?

6. Compare the population profiles of Australia and Singapore, outlining similarities and differences in the populations aged 0–14 years and over 65. Australia has a more ‘mature’ or aged population structure with 19% over the age of 65 years compared with Singapore’s 15%. Singapore’s under 14 years age group accounts for 26.4% of the population. In Australia, only 19% are under the age of 15 years.

7. Suggest reasons for the differences. As a newly developed country, Singapore is yet to achieve the aging population apparent in most developed countries.

**GeoSkills 9.19 (Page 122)**

On which axis (horizontal or vertical) would each of the following sets of variables be placed? Refer to page 120 to help you.

- a. air temperature (vertical) and altitude (horizontal)
- b. access to safe water (horizontal) and infant mortality rate
- c. sediment load (vertical) and stream velocity (horizontal)
- d. plant nursery sales (vertical) and number of months of drought (horizontal)

**GeoSkills 9.20 (Page 122)**

Examine the scatter graphs in Figures 9.40 and 9.41.
For each graph, respond to the following questions.

**Figure 9.40**

1. What type of correlation (relationship) is shown— perfect, positive, negative, no correlation? Positive correlation

2. Which variable is independent and which is dependent? Dependent: Sales of refrigerated drinks; Independent: Maximum daily temperature.

**Figure 9.41**

1. What type of correlation (relationship) is shown— perfect, positive, negative, no correlation? Negative correlation

2. Which variable is independent and which is dependent? Dependent: Soil erosion; Independent variable: Vegetation cover on 10° slope.

**Geoinquiry 9.21 (Page 122)**

Refer to Table 9.42, which shows the percentage of the population of different countries with access to safe water and the mortality rate for children under five years of age.
1. Construct a scatter graph using the data from the table.

Access to Safe Water and Mortality Rate for Children Under Five Years of Age, 2013

2. Draw a line of best fit.

3. Comment on the correlation (relationship) between the two sets of data as shown on the graph. Negative correlation. As access to safe water increases the mortality rate declines.

4. Identify any isolates (anomalies) that appear on the graph and suggest reasons why they differ from the trend. Chad and New Zealand are at the extremes of the correlation. Chad experience very high mortality and very low access to safe water. NZ, on the other hand, has almost 100% access to safe water and a very low, under five mortality rate.

5. Do you believe there is a relationship between access to safe water and child mortality? Justify your response. Yes. As water quality improves mortality rates decline.

6. Discuss: what other factors might contribute to child mortality? Factors such as mother’s health, access to health care and nutrition all impact on infant mortality rates.

Geoinquiry 9.22 (Page 123)

1. Select two maps with characteristics you wish to compare, and analyse the relative distribution patterns as a way of explaining what patterns exist. Responses will vary depending on the maps selected.

a. Draw a box scattergram similar to Figure 9.45, one that has the appropriate rows
and columns for the categories (from each key) of the maps being analysed.

b. Plot each record—for example, each country—in the ‘box’ that represents that record’s position on each map.

c. On completion, describe the results.

2. Can you indicate a line of best fit?

a. Does the line of best fit suggest a positive or a negative relationship between the characteristics of the two maps analysed?

b. How strong is the relationship suggested?

c. What records stand out as anomalies?

3. What conclusions can you draw about the relationship between the characteristics of the two maps?

**GeoSkills 9.23 (Page 124)**

Use the data in Table 9.47 to draw a ternary graph. Plot the points carefully and write an abbreviation for each country at its relative point.

**Labour Force by Economic Sector, Selected Countries, 2007–2008**

1. Which country has the greatest percentage of its workforce in agriculture? **Bhutan**

2. Which country has the greatest percentage of its workforce in industry? **Malaysia**

3. Which countries have the greatest percentage of their workforce in services? **United Kingdom**
4. What does this graph tell you about the workforce structure of the selected countries? The more developed the country the greater the role played by services. The least developed countries have a reliance on agriculture. Developing countries such as Malaysia have a significant focus on manufacturing.

5. What aspects of development could be assumed from this information? Refer to specific countries in your answer. Countries with high levels of economic development (Australia, Belgium, Germany and the UK) have moved beyond a reliance on manufacturing to have service-based economies. They also have low levels of employment in agriculture. Developing countries such as Malaysia now feature large manufacturing sectors. Less developed countries such as Bhutan, Egypt, Gambia and India still have a heavy reliance on agriculture.
Chapter 10: Working with diagrams

GeoSkills 10.1 (Page 129)

1. Using the photo in Figure 10.1, draw a soil profile, following the guidelines shown in Figure 10.2.

Soil Profile of a Podsol

![Soil Profile Diagram]

2. Describe the soil profile, including an estimate of the depth of each horizon. A Horizon: 40–50 cms – Upper part of the A Horizon features dark brown soil; lower layer is a pale grey colour indicative of leaching (downward movement of water removing minerals); B Horizon: 1 metre – dark red/brown with a blocked structure – featuring an accumulation of nutrients and minerals; C Horizon: Weathered parent material.

GeoInquiry 10.2 (Page 129)

Find a road cutting or embankment near your school or within your local area. Draw and label a soil profile using the same pointers as shown in Figure 10.2. Responses will vary depending on the site selected.

GeoSkills 10.3 (Page 130)

Draw a profile of the jarrah forest using Figure 10.4.

a. Show four main layers or storeys. Label these as follows, and include a vertical scale.
   - Canopy—maximum height: 20 m. Includes jarrah, karri and marri trees.
   - Lower tree layer—height: 10 m. Eucalypts, acacias, taller palms.
   - Shrub layer—height: 2 m. Zamia palms, grasstrees, saplings.
• Forest floor—bracken fern, leaf litter.

b. Create symbols to show the different plants.

c. Describe the features of each layer. For example:

• Is the canopy continuous or are trees widely spaced? (This influences the amount of light reaching the forest floor and therefore the variety of species found there.). Open forest with limited interlocking – the crowns of trees permit sunlight to penetrate promoting the growth of smaller trees bull banksia, sheoak, snottygobble, and woody pear.

• What shape are the tree crowns and shrubs? Umbrella-like but often irregular – rather spindly. Sunlight can penetrate.

• What types of plants and trees are there? If you do not know species, describe the plants. Jarrah, karri and marri trees; trees bull banksia, sheoak, snottygobble, and woody pear; Zamia palms, grasstrees, saplings
**GeoInquiry 10.4 (Page 131)**

1. Choose one of the vegetation types mentioned in Figure 10.5—for example, coniferous forest—and research the ways in which plants are adapted to the climatic conditions found in this environment. **Responses will vary based on which vegetation type is selected.**

2. Draw a diagram of a plant from that vegetation type. Annotate your sketch to show the adaptations this plant has developed to help it survive in the prevailing climatic conditions.

**GeoInquiry 10.5 (Page 133)**

Visit an area near your home or school where you could draw a vegetation transect. Follow these steps: **Responses will vary**

- Select somewhere where you can take a straight-line sample, avoiding any hazard or difficulty. This will be your transect.
- Place a measuring tape—or measure by pacing—along the line where the transect is to be drawn.
- Sketch the relief of the land—is it steep or gentle, or flat?
- Walk along the line and decide on a key that you will use to record different kinds of plants along your transect.
- Identify, and mark on your sketch, any trees and shrubs along your line of transect or within one or two metres of it. You may need to use a plant identification book to do this. Try not to collect leaves or stems of plants to take back to record, as they may be rare or protected species. Use the information in the ‘Drawing a transect’ section to complete your diagram.

**GeoSkills 10.6 (Page 133)**

Refer to Figure 10.7. Describe the changes in land use and settlement patterns that occur from Launceston to Ben Lomond. Using the annotated information provided, explain why these changes occur. **Land use changes from urban to intensive farming, extensive farming (sheep and cattle grazing), forestry and finally national park featuring a ski village near the summit. Settlement patterns change from the built up area of Launceston to farmhouses that become more disperse the further you travel from the city. There is no settlement in the national park.**

**GeoSkills 10.7 (Page 133)**

Refer to the topographic map in Figure 10.8. Draw a cross-section from point A to point B. Create an annotated transect by drawing a grid below the cross-section. Include a description of relief and landforms, vegetation and land use by using the information provided on the map.
Cross-section from Point A to Point B and Associated Transects

GeoInquiry 10.8 (Page 135)

Choose one of the types of urban transect mentioned in the text— for example, land use or housing styles. Draw an urban transect within your local area where it is possible to see changes in the feature being studied. Give your transect a title, give estimated or measured distances along the horizontal axis and create a key to represent the different land uses or styles of housing. Responses will vary according to the urban area selected.

GeoInquiry 10.9 (Page 135)

If you live in an urban area, draw an urban transect either from your school to the CBD or from your home to the CBD. Responses will vary according to the urban precinct selected.

a. Use similar labels to represent the different zones to the ones used in Figure 10.10.

b. Add approximate or measured distances on the horizontal scale.

c. Include photos around your transect that are representative of each zone.

d. Draw arrows from each photo to the relevant part of the transect and give each photo a title.
GeoSkills 10.10 (Page 136)
Describe the growth of Launceston from 1835 to 2008 shown in Figure 10.12. Include the general trend or pattern and any exceptions. Quantify the growth using the scale and direction. In 1835 the urban area of Launceston was confined to the eastern bank of the point at which the South and North Esk Rivers merge to form the Tamar River. By 1881 the footprint of the city had expanded around the original settled areas and spread across the river to occupy the area of land bound by the North Esk River and the Tamar River. By 1956, the original urban area had expanded further to the east and the area to the west of the river had expanded to the NNW. By 2008 the urban area of Launceston had spread further around the existing urban area and crossed the North Esk River to the north and NE.

GeoSkills 10.11 (Page 137)
2. Draw a table with two columns, one with the heading 1881 and the other 2008.
3. In the 1881 column, note what the area looked like then. In the second column, outline the changes that have occurred in features such as transport, use of arable land, vegetation cover, flow of water, housing and other land uses.

<table>
<thead>
<tr>
<th></th>
<th>1881</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transport</strong></td>
<td>A road in lower part of the block diagram.</td>
<td>Two roads associated with housing development.</td>
</tr>
<tr>
<td><strong>Vegetation</strong></td>
<td>A mix of tree types. Relatively dense.</td>
<td>Fewer trees, especially in the area occupied by housing.</td>
</tr>
<tr>
<td><strong>Housing</strong></td>
<td>No housing evident.</td>
<td>Numerous (eight) houses in the up-slope section of the illustration</td>
</tr>
<tr>
<td><strong>Land use</strong></td>
<td>Agricultural land uses evident (sheep grazing).</td>
<td>Urban and agricultural land uses.</td>
</tr>
</tbody>
</table>

GeoInquiry 10.12 (Page 137)
Refer to the timeline in Figure 10.15.
1. When was the one-child policy introduced? 1979
2. Timelines are not spatial. Describe an example of the use of a timeline for a geographic purpose. Timeline of responses to the threat of global climate change
GeoInquiry 10.13 (Page 137)
Using Figure 10.16 as a guide, construct a circular diagram that shows the months of the year, the types of weather conditions experienced in your area during the year, and the outdoor leisure activities in which you participate. Responses will differ according to location.

GeoSkills 10.14 (Page 138)
Write three paragraphs (one for each illustration) describing what is happening in the flow diagram in Figure 10.18.

In Diagram 1 the smoke caused by the burning of coal or wood dissipates into the atmosphere. It is a calm, clear night.

In Diagram 2 the radiation of heat from the earth’s surface creates a layer of warm air in the atmosphere. There are mountains on either side of the valley. This layer of warmer air (just like a doona) entraps the smoke caused by the burning of coal or wood dissipates into the lower layer of the atmosphere.

In Diagram 3 the layer of warmer air has entrapped an increasing amount of the smoke generated by the burning of coal or wood. There is now a layer of emissions trapped below the layer of warmer air.

GeoSkills 10.15 (Page 138)
1. Using Figure 10.19 as a general example, create a flow diagram that shows how water is supplied to households and the use of water in the home. Start with the water source, include the water exiting the house, and finish the diagram with the water entering the sewerage system or septic tank. Add small illustrations to your flow diagram.

Flow diagram Showing Household Water Use
2. Look at Figure 10.20. This shows the water cycle and is one of the most well-known flow diagrams. As the water cycle is a circular flow, there is not a beginning or end point. The sun provides the main energy source for the water cycle. There is a label missing from this diagram. It is ‘Transpiration’. What does it mean and where should it be placed? Transpiration is the process whereby plants absorb water through the roots and then give off water vapour through pores in their leaves. An example of transpiration is when a plant absorbs water in its roots. It should be placed next to the arrows indication moisture moving from plant life into the atmosphere.

**GeoSkills 10.16 (Page 138)**

Create a flow diagram that shows the effect on pasture of the increase in rabbit populations. You will need to put the following phrases in the correct order, and then replace the words with diagrams.

- Unstable soil erodes and burrows collapse
- Adult rabbits and their young feed on grass
- Young adults dig more burrows
- Rabbits dig breeding burrows in pasture
- Grasses die

Students add their own illustrations
Chapter 11: Using technology

Geoinquiry 11.1 (Page 142)

1. Reflect on how you use the internet as a research tool. Do you rely too much on one particular search engine? List the last three pieces of knowledge that you looked for online and write down how you found the information you were looking for. Responses will vary depending on the students’ searches.

2. What sources of information would you like to use more of? Use one of them to learn something new. Responses will differ

GeoSkills 11.2 (Page 145)

1. Find the location of the ‘ARGN and AuScope networks map’ and download the KML version to open in Google Earth. What are the three nearest stations to you? How far away from you are they? Responses will differ depending on location.

2. Describe the distribution of the ground stations across Australia using appropriate geographical terminology. Relatively evenly distributed across the continent with the exception of western South Australia. The eastern half of Western Australia. Other areas poorly covered include NE South Australia and SW NSW.
3. What is one innovation using GNSS technology that you would develop if money was no object to you? Describe what it is, what it does and what problem it solves. Accurately tracking and maneuvering unmanned aerial vehicles such as drones. More accurate positioning would add to the list of potential commercial applications – pizza deliveries for example.

**Geolnquiry 11.3 (Page 147)**

1. The field of spatial or geospatial technology is very broad. Do some research and discover three different occupations that use spatial technologies in a significant way. The Destination Spatial website may help you with this research. Spatial statistician, geospatial analysis, cartography, forestry, wildlife management, natural disaster responders, land management, surveyor, urban and regional planner, geologist, meteorologist, soil scientist etc.

2. How does each of the three jobs you chose contribute to our society? Responses will vary depending on the occupations selected.

3. What qualifications do you need to enter the spatial industry? Qualifications in spatial information services. Generally, however, a wide range of qualifications across a range of disciplines will equip people to enter the industry. Select one of your jobs from question 1 and find out what you need to study to be able to work in that role. Look for the ‘Explore study options’ tab on the Destination Spatial website to help you get started. Responses will vary depending on the occupation selected.

**Geolnquiry 11.4 (Page 148)**

The activities below require a working smart phone that is connected to the internet. Remember that downloading apps over mobile internet can quickly drain your data allowance; wherever possible, download and install apps only while you are connected to wi-fi.

1. While in the field (and out of doors), use the Google Maps app to select your location and then share that location with yourself by email. When you receive the email you sent, it should contain a link. Clicking on the link will take you to Google Maps online, where you will be provided with the latitude and longitude of the location you selected. Responses will differ depending on where the work in the field is undertaken.

2. Download to your mobile phone or tablet a geographical mobile application that you have never used before and start using it. Play with the app and consider what features are missing or not executed well. Provide considered feedback to the app’s creator. Responses will differ

3. Download an app that turns your phone into a GPS unit. ViewRanger is a very good free option to begin with. Use the app to record a track on your mobile device. If you are using ViewRanger, first synchronise your data between the phone and the online account. Then connect to the online account (‘My ViewRanger’) and view your data in Google Earth. Responses will differ
1. Try to list all of the activities in your typical day that would involve spatial technology in any way at all. Be creative; think about how such tools might work in the background. Responses will differ

2. Some examples have been provided in this chapter that show how geospatial tools can be used in the real world. Try and find an example of how GIS (or another spatial tool) has been used in your local area. What problem was solved by using it, and how? Responses will differ

3. Find out how satellite imagery is used to assist when bushfire strikes. Using dot points, list the different ways in which satellite images are being used to assist during a hazard event and in the aftermath of a bushfire hazard. Start your research with Geoscience Australia, Australia’s national mapping and surveying agency. Responses will differ
Chapter 12: Fieldwork

GeoInquiry 12.1 (Page 152) – No specific response. It depends on the nature of the fieldwork undertaken.

<table>
<thead>
<tr>
<th>Limitations</th>
<th>Successes</th>
</tr>
</thead>
<tbody>
<tr>
<td>What went wrong?</td>
<td>What techniques did I learn?</td>
</tr>
<tr>
<td>How could I improve the project?</td>
<td>What interest did I generate?</td>
</tr>
<tr>
<td></td>
<td>Which geographical concepts did I gain a better understanding of?</td>
</tr>
<tr>
<td></td>
<td>In what areas did I develop confidence?</td>
</tr>
</tbody>
</table>

GeoInquiry 12.2 (Page 153) – No specific response.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petitions to parliament</td>
<td>Petitions are written requests by people who are concerned about a particular issue. As part of parliamentary procedures, petitions are read out in parliament.</td>
</tr>
<tr>
<td>Deputations to members of parliament or local government representatives</td>
<td>Citizens often seek to gain the support of a member of parliament or local government representative through a deputation: a small group, representing the view of a larger group, meets with the member or representative. The member or representative then approaches the relevant minister or raises the issue in parliament or a local government forum.</td>
</tr>
<tr>
<td>Direct appeals to a minister or the head of the relevant local government authority</td>
<td>Many citizens attempt to lobby ministers (or mayors, etc.) or their senior advisers. Sometimes a citizen or a group of like-minded citizens will use the services of a professional lobbyist. This person is paid by the group to present the group’s point of view.</td>
</tr>
<tr>
<td>Letter writing</td>
<td>Letter-writing campaigns are used to persuade decision-makers that there is widespread community concern about a particular issue. Letters written to the editors of newspapers are also used to help shape public opinion.</td>
</tr>
<tr>
<td>Advertising</td>
<td>Some individuals and groups use various forms of advertising to promote their concerns. However, this can be very expensive. Think of inexpensive forms of advertising that you could use.</td>
</tr>
<tr>
<td>Talkback radio</td>
<td>Participating in talkback radio programs is a good way to influence public opinion.</td>
</tr>
<tr>
<td><strong>Protests and demonstrations</strong></td>
<td>Demonstrations and other forms of peaceful protest are used to attract the attention of the media. Individuals and groups hope that the publicity generated by these activities will help to shape public opinion.</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Public meetings</strong></td>
<td>Public meetings can be used to educate and inform the public about a particular concern.</td>
</tr>
<tr>
<td><strong>Other strategies</strong></td>
<td>As an activity, you could design issue-specific bumper stickers, posters and T-shirts with slogans.</td>
</tr>
</tbody>
</table>
Chapter 13 Using virtual fieldtrips

GeoSkills 13.1 (Page 157)

1. Begin by creating a VFT of the holiday you would take if you won the lottery. Visit at least five locations and, for each location, state why you want to go to that place. Include at least one image and at least one video for each location. Dream on! Responses will differ

2. Create a virtual field trip that highlights a topic you are addressing in the classroom right now. Your VFT needs to offer some insight into your topic by explaining what and where the issue is, how and why it is an issue, the impacts of your issue and suitable solutions that could be undertaken. As well as text, include suitable images and videos to make your VFT more interesting. Save your VFT and share it with your teacher. Responses will differ

3. Try using Odyssey.js to create your own customised VFT. For additional help on using markup language, try one of the following resources:

   • www.coderesort.com/about/wiki/HowTo/5MinutesWikiMarkup
   • www.w3schools.com/html/html_intro.asp
Chapter 14: Putting it together

GeoInquiry 14.1 (Page 159)
Choose a question in the list related to topics in your year level on pages 161–5. Using a brainstorm technique, think of other subsidiary questions that flow from the first question. Use the examples in Figures 14.2 and 14.3 as a guide. Answers will vary depending on the student’s year/stage of learning.

GeoInquiry 14.2 (Page 165)

1. Read through the inquiry questions that relate to your year level. Identify any questions or areas of inquiry that you think are particularly important or of interest to you. Are there other questions that you think should be included in the list? Answers will vary depending on the student’s year/stage of learning.

2. Which of the inquiry questions relating to your year level do you think could lead to the use of:
   a. maps
   b. statistics
   c. fieldwork
   d. diagrams
   e. photographs
   f. up-to-date researched information? Answers will vary depending on the student’s year/stage of learning.

3. Which of the inquiry questions relating to your year level are the most complex and far-reaching? How might you approach these differently from the more straightforward questions? Answers will vary depending on the student’s year/stage of learning.

4. Look at the photographs related to your year level. Write down a list of words and ideas that each of the photographs makes you think of. Develop these into an area of inquiry related to the photograph. Answers will vary depending on the student’s year/stage of learning.

5. Look at the sample newspaper headlines that relate to topics in your year level. Brainstorm other possible headlines that could relate to these topics. Answers will vary depending on the student’s year/stage of learning.