12

GLOBAL INTERACTIONS

YEAR 12

Grant Kleeman
David Hamper
Helen Rhodes

Pearson

Global Interactions Year 12

The fully revised and updated *Global Interactions Third Edition* series is written for the NSW Stage 6 Geography syllabus. The text aims to help develop students' knowledge, understanding, skills, attitudes and values in relation to the biophysical and human environments. Students using *Global Interactions* will be well placed to realise their full academic potential in Year 12 Geography.

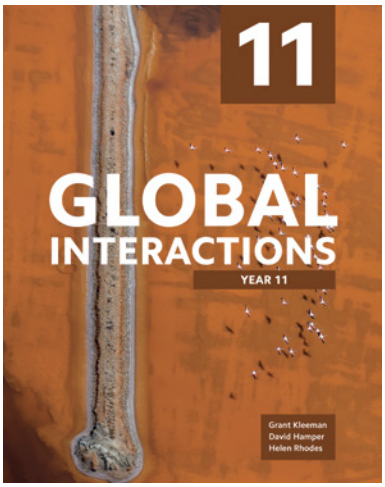
Student book

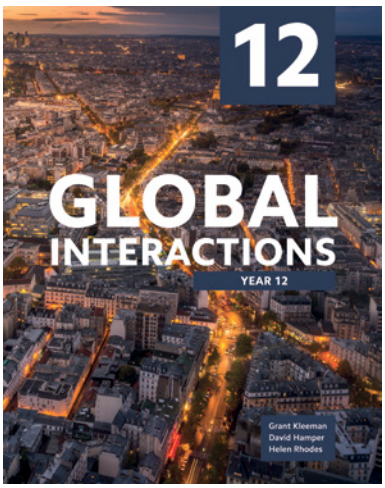
- Chapter titles and units reflect the NSW Stage 6 Geography syllabus
- Full-colour text with engaging and highly visual design
- Dynamic and relevant images, textual examples, graphs and maps
- Topic-based units written in accessible language with clear and concise explanations of key terms and concepts
- A variety of learning activities for regular revision and consolidation
- Case studies that describe and encourage in-depth investigation
- End-of-chapter glossary for reference and exam-style questions
- Written by an experienced author team:
  - **Grant Kleeman** (lead author) is an experienced teacher educator, geography teacher, author, curriculum consultant and examiner. Grant has been closely involved in the development of the geography curriculum at the state and national level. He is the coordinating author of several texts, including the Pearson Geography NSW series.
  - **David Hamper** is an experienced geography educator and is currently Deputy Principal at International Grammar School, Sydney. David has also contributed to several geography texts including the Pearson Geography NSW series.
  - **Helen Rhodes** is an experienced geography educator and is currently a Master Assisting in Geography at Shore, North Sydney. Helen has also contributed to several geography texts including the Pearson Geography NSW series.

The Publishers wish to thank James Forrest for his contribution to *Global Interactions 12 Second Edition*.

Reader+

- Use online or offline
- Read the student book with bonus multimedia content
- Add, edit, and delete highlights and notes
- Synchronise state and data across multiple devices even when the user is offline
- Access both student and teacher resources





Contents

How to use

Case studies

Case study units relate to a specific event or location; and are written to extend students' knowledge and understanding.

CASE STUDY

Natural and human-induced stress

The following are examples of either natural or human-induced environmental stress.

Mt St Helens eruptions

In 1980, Mt St Helens (see Figure 1.3.8A) had been dormant for over a century. In April–May scientists had become concerned about tremors beneath the mountain. Aerial observers had noted an opening on the summit of Mt St Helens where ice quickly blackened with ash. What caused most concern was the development of a bulge on the side of the mountain's northern slope.

On 18 May at 8.32 a.m., an earthquake measuring 5.1 on the Richter Scale rocked the earth directly below the mountain. The earthquake initiated an avalanche, which was followed by a massive blast of gas, rock, ash and ice shown in Figure 1.3.8B. One part of the avalanche slammed into Spirit Lake, causing the water level to rise 60 metres. Another mass of debris crashed down into the Toutle River, filling it to a depth of 45 metres in minutes.

The effects on the surrounding ecosystem were devastating:

- as120 metres of the summit vanished, leaving in its place a crater 2 kilometres wide, 4 kilometres long and 1.5 kilometres deep, as seen in Figure 1.3.8C.
- as380 square kilometres of land to the north of the mountain was devastated by the blast and covered by hot volcanic debris
- stelarge areas of coniferous forest were destroyed (see Figure 1.3.9) and countless numbers of wild animals were killed
- stevolcanic ash, carried by the prevailing winds, was spread for 1500 kilometres to the west
- as100 people lost their lives.

Within just a few years of the eruption scientists found evidence that pioneering flora and fauna were starting to colonise the ash-grey volcanic landscape seen in Figure 1.3.10. Plants such as lupin, Indian paintbrush, pearly everlasting and fireweed took root among the coarse grey rock. Willow and elder trees had grown to a height of 1–2 metres. The roots and decaying leaves and stems of the vegetation provided the organic material needed to convert volcanic grit into sustaining soil.

The plants and trees had adapted to the extremes of season and altitude, and were equipped to stake a claim in the harsh conditions. Lupins played a key role; bacteria on their roots released nitrogen, necessary to all plants. Alders produced winged seeds that could ride the wind. Birds and animals helped the process by eating, transporting and depositing seeds in their droppings. Burrowing gophers penetrated the ash blanket and brought former topsoil to the surface.

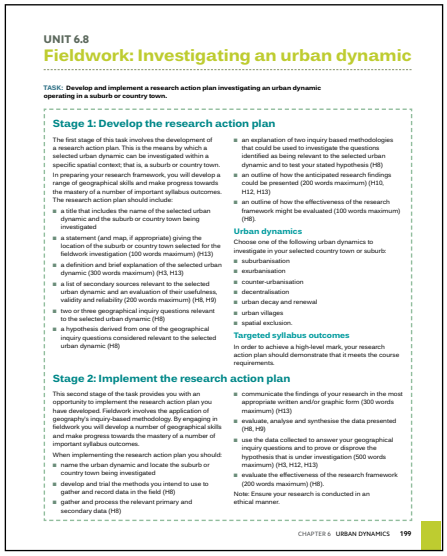
3.1.8 The Mt St Helens eruption was a source of natural stress. **A** Mt St Helens prior to the eruption, **B** Mt St Helens erupting, **C** Mt St Helens following the eruption.

The area represents a miniature fast-forward version of what happened over vast time frames in our planet's evolution. Scientists have enjoyed an unparalleled opportunity to observe the cycles of regeneration.

22 GLOBAL INTERACTIONS 12

Fieldwork

The fieldwork section provides a step-by-step guide to undertaking and evaluating fieldwork.



UNIT 6.8

Fieldwork: Investigating an urban dynamic

TASK: **Develop and implement a research action plan investigating an urban dynamic operating in a suburb or country town.**

Stage 1: Develop the research action plan

The first stage of this task involves the development of a research action plan. This is the means by which a selected urban dynamic can be investigated within a specific spatial context; that is, a suburb or country town.

In preparing your research framework, you will develop a range of geographical skills and make progress towards the mastery of a number of important syllabus outcomes. The research action plan should include:

- a title that includes the name of the selected urban dynamic and the suburb or country town being investigated
- a statement (and map, if appropriate) giving the location of the suburb or country town selected for the fieldwork investigation (200 words maximum) (H13)
- a definition and brief explanation of the selected urban dynamic (300 words maximum) (H3, H13)
- a list of secondary sources relevant to the selected urban dynamic and an evaluation of their usefulness, validity and reliability (200 words maximum) (H8, H9)
- two or three geographical inquiry questions relevant to the selected urban dynamic (H8)
- a hypothesis derived from one of the geographical inquiry questions considered relevant to the selected urban dynamic (H8)
- an explanation of two inquiry based methodologies that could be used to investigate the questions identified as being relevant to the selected urban dynamic and to test your stated hypothesis (H8)
- an outline of how the anticipated research findings could be presented (200 words maximum) (H10, H12, H13)
- an outline of how the effectiveness of the research framework might be evaluated (100 words maximum) (H8).

Urban dynamics

Choose one of the following urban dynamics to investigate in your selected country town or suburb:

- suburbanisation
- exurbanisation
- counter-urbanisation
- decentralisation
- urban decay and renewal
- urban villages
- spatial exclusion.

Targeted syllabus outcomes

In order to achieve a high-level mark, your research action plan should demonstrate that it meets the course requirements.

Stage 2: Implement the research action plan

This second stage of the task provides you with an opportunity to implement the research action plan you have developed. Fieldwork involves the application of geography's inquiry-based methodology. By engaging in fieldwork you will develop a number of geographical skills and make progress towards the mastery of a number of important syllabus outcomes.

When implementing the research action plan you should:

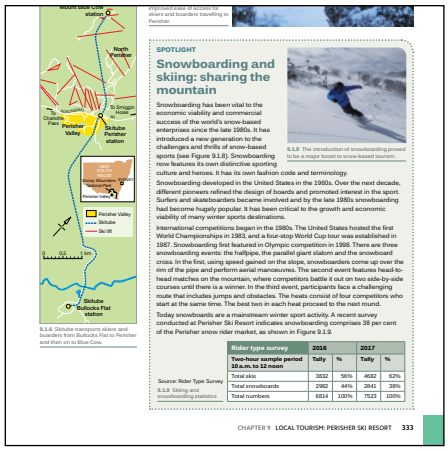
- name the urban dynamic and locate the suburb or country town being investigated
- develop and trial the methods you intend to use to gather and record data in the field (H8)
- gather and process the relevant primary and secondary data (H8)
- communicate the findings of your research in the most appropriate written and/or graphic form (300 words maximum) (H13)
- evaluate, analyse and synthesise the data presented (H8, H9)
- use the data collected to answer your geographical inquiry questions and to prove or disprove the hypothesis that is under investigation (500 words maximum) (H3, H12, H13)
- evaluate the effectiveness of the research framework (200 words maximum) (H8).

Note: Ensure your research is conducted in an ethical manner.

CHAPTER 6 URBAN DYNAMICS 199

Spotlight

Spotlight boxes focus attention on a place, an issue or a concept relating to the unit. They are designed to develop students' knowledge and understanding of the concepts and processes that are central to the study of geography at this stage of learning.



SPOTLIGHT

Snowboarding and skiing: sharing the mountain

Snowboarding has been vital to the economic viability and commercial success of the world's snow-based enterprises since the late 1980s. It has introduced a new generation to the challenges and thrills of snow-based sports (see Figure 9.1.8). Snowboarding now features its own distinctive sporting culture and heroes. It has its own fashion code and terminology.

Snowboarding developed in the United States in the 1960s. Over the next decade, different pioneers refined the design of boards and promoted interest in the sport. Surfers and skateboarders became involved and by the late 1980s snowboarding had become hugely popular. It has been critical to the growth and economic viability of many winter sports destinations.

International competitions began in the 1980s. The United States hosted the first World Championships in 1983, and a four-stop World Cup tour was established in 1987. Snowboarding first featured in Olympic competition in 1998. There are three snowboarding events: the halfpipe, the parallel giant slalom and the snowboard cross. In the first, using speed gained on the slope, snowboarders come up over the rim of the pipe and perform aerial manoeuvres. The second event features head-to-head matches on the mountain, where competitors battle it out on two side-by-side courses until there is a winner. In the third event, participants face a challenging route that includes jumps and obstacles. The heats consist of four competitors who start at the same time. The best two in each heat proceed to the next round.

Today snowboards are a mainstream winter sport activity. A recent survey conducted at Perisher Ski Resort indicates snowboarding comprises 38 per cent of the Perisher snow rider market, as shown in Figure 9.1.9.

Rider type survey	2016		2017	
Two-hour sample period 10 a.m. to 12 noon	Tally	%	Tally	%
Total skis	3832	56%	4692	62%
Total snowboards	2982	44%	2841	38%
Total numbers	6814	100%	7523	100%

Source: Rider Type Survey

9.1.9 Skiing and snowboarding statistics

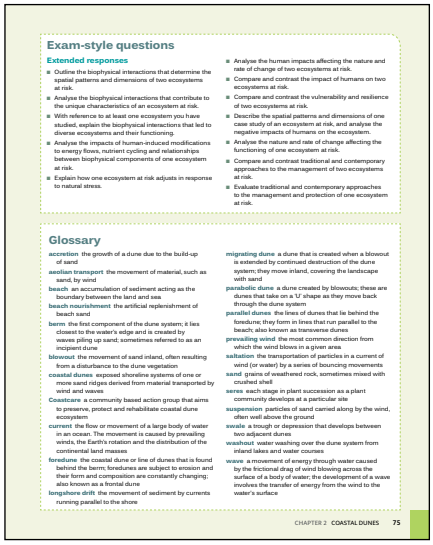
9.1.8 The introduction of snowboarding proved to be a major boost to snow-based tourism.

9.1.6 Skitube transports skiers and boarders from Bullocks Flat to Perisher and then on to Blue Cow.

CHAPTER 9 LOCAL TOURISM: PERISHER SKI RESORT 333

Exam-style questions

Exam-style questions are a variety of extended responses which enable students to practise and develop their exam skills.



Exam-style questions

Extended responses

- Outline the biophysical interactions that determine the spatial patterns and dimensions of two ecosystems at risk.
- Analyse the biophysical interactions that contribute to the unique characteristics of an ecosystem at risk.
- With reference to at least one ecosystem you have studied, explain the biophysical interactions that led to diverse ecosystems and their functioning.
- Analyse the impacts of human-induced modifications to energy flows, nutrient cycling and relationships between biophysical components of one ecosystem at risk.
- Explain how one ecosystem at risk adjusts in response to natural stress.
- Analyse the human impacts affecting the nature and rate of change of two ecosystems at risk.
- Compare and contrast the impact of humans on two ecosystems at risk.
- Compare and contrast the vulnerability and resilience of two ecosystems at risk.
- Describe the spatial patterns and dimensions of one case study of an ecosystem at risk, and analyse the negative impacts of humans on the ecosystem.
- Analyse the nature and rate of change affecting the functioning of one ecosystem at risk.
- Compare and contrast traditional and contemporary approaches to the management of two ecosystems at risk.
- Evaluate traditional and contemporary approaches to the management and protection of one ecosystem at risk.

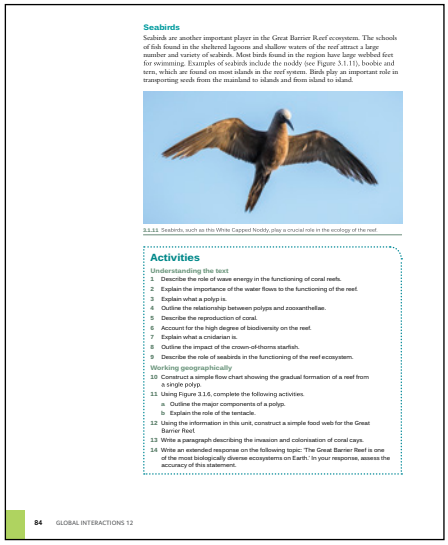
Glossary

accretion the growth of a dune due to the build-up of sand
aeolian transport the movement of material, such as sand, by wind
beach an accumulation of sediment acting as the boundary between the land and sea
beach nourishment the artificial replenishment of beach sand
berm the first component of the dune system; it lies closest to the water's edge and is created by waves piling up sand; sometimes referred to as an incipient dune
blowout the movement of sand inland, often resulting from a disturbance to the dune vegetation
coastal dunes exposed shoreline systems of one or more sand ridges derived from material transported by wind and waves
Coastcare a community based action group that aims to preserve, protect and rehabilitate coastal dune ecosystem
current the flow or movement of a large body of water in an ocean. The movement is caused by prevailing winds, the Earth's rotation and the distribution of the continental land masses
foredune the coastal dune or line of dunes that is found behind the berm; foredunes are subject to erosion and their form and composition are constantly changing; also known as a frontal dune
longshore drift the movement of sediment by currents running parallel to the shore
migrating dune a dune that is created when a blowout is extended by continued destruction of the dune system; they move inland, covering the landscape with sand
parabolic dune a dune created by blowouts; these are dunes that take on a 'U' shape as they move back through the dune system
parallel dunes the lines of dunes that lie behind the foredune; they form in lines that run parallel to the beach; also known as transverse dunes
prevailing wind the most common direction from which the wind blows in a given area
saltation the transportation of particles in a current of wind (or water) by a series of bouncing movements
sand grains of weathered rock, sometimes mixed with crushed shell
series each stage in plant succession as a plant community develops at a particular site
suspension particles of sand carried along by the wind, often well above the ground
swale a trough or depression that develops between two adjacent dunes
washout water washing over the dune system from inland lakes and water courses
wave a movement of energy through water caused by the frictional drag of wind blowing across the surface of a body of water; the development of a wave involves the transfer of energy from the wind to the water's surface

CHAPTER 2 COASTAL DUNES 75

Activities

Activities have been carefully selected to cater for the full range of student abilities. Many activities are based on the stimulus material presented and aim to facilitate the development of the skills used by geographers.



Seabirds

Seabirds are another important player in the Great Barrier Reef ecosystem. The schools of fish found in the sheltered lagoons and shallow waters of the reef attract a large number and variety of seabirds. Most birds found in the region have large webbed feet for swimming. Examples of seabirds include the noddy (see Figure 3.1.11), booby and tern, which are found on most islands in the reef system. Birds play an important role in transporting seeds from the mainland to islands and from island to island.

3.1.11 Seabirds, such as this White Capped Noddy, play a crucial role in the ecology of the reef.

Activities

Understanding the text

1 Describe the role of wave energy in the functioning of coral reefs.
2 Explain the importance of the water flows to the functioning of the reef.
3 Explain what a polyp is.
4 Outline the relationship between polyps and zooxanthellae.
5 Describe the reproduction of coral.
6 Account for the high degree of biodiversity on the reef.
7 Explain what a cnidarian is.
8 Outline the impact of the crown-of-thorns starfish.
9 Describe the role of seabirds in the functioning of the reef ecosystem.

Working geographically

10 Construct a simple flow chart showing the gradual formation of a reef from a single polyp.
11 Using Figure 3.1.6, complete the following activities.
  a Outline the major components of a polyp.
  b Explain the role of the tentacle.
12 Using the information in this unit, construct a simple food web for the Great Barrier Reef.
13 Write a paragraph describing the invasion and colonisation of coral cays.
14 Write an extended response on the following topic: 'The Great Barrier Reef is one of the most biologically diverse ecosystems on Earth.' In your response, assess the accuracy of this statement.

84 GLOBAL INTERACTIONS 12

Understanding the text

These questions guide students towards an understanding of the content (knowledge and understanding) specified by the syllabus.

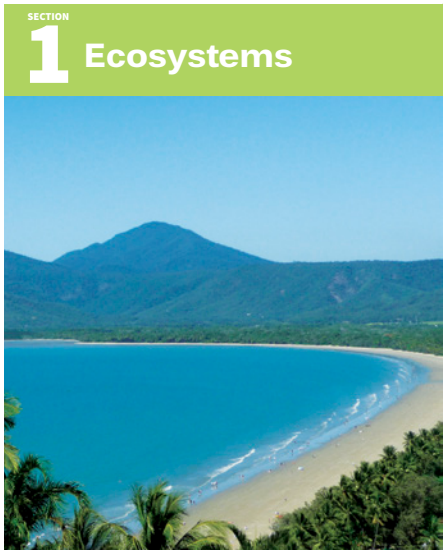
Working geographically

These tasks extend students beyond the text and involve them in a variety of learning experiences.

Using Global Interactions Year 12: Third Edition

Structure

This text is divided into three sections corresponding with the Stage 6 syllabus.



Section 1: Ecosystems

The focus of this section is a geographical investigation of the functioning of ecosystems at risk, and their management and protection. Students are provided with two case studies:

- coastal dunes
- the Great Barrier Reef.

Section 2: Urban places

The focus of this section is a geographical investigation of world cities, megacities and the urban dynamics of large cities and urban localities. Sydney is used as an example of a developed world city.

Section 3: People and economic activity

This section focuses on a geographical investigation of economic activity integrating local and global contexts. Students can choose from one of the following case studies:

- global tourism
- Perisher Ski Resort
- the global viticulture and winemaking industry
- First Creek Wines.

Year 12 Outcomes matrix

	Syllabus outcomes												
	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12	H13
Section 1: Ecosystems	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓
Section 2: Urban places	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Section 3: People and economic activity	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓