

Landforms and landscapes

The Earth's surface is made up of a vast number of elements that have been brought together to create amazing shapes and formations. To study and understand all these formations, geographers organise them into groups based on characteristics that are similar. These different groups are referred to as landscapes. There are many different types of natural landscapes on Earth – including mountain landscapes, coastal landscapes and riverine landscapes. Landscapes created by people are called built landscapes. Natural landscapes are made up of a variety of geographical features known as landforms such as hills, caves and valleys.



1.1

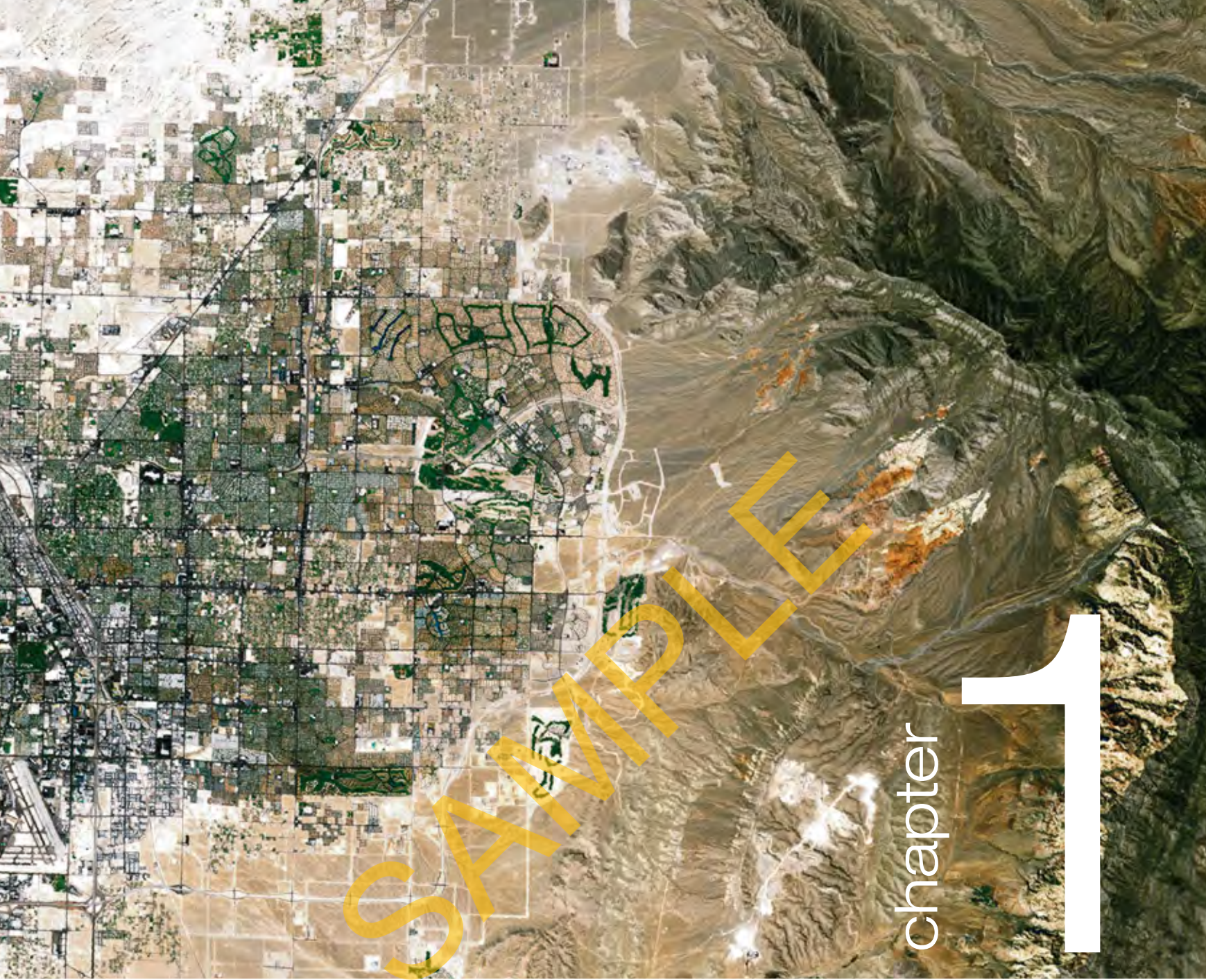
What are landforms and landscapes?

- 1 Use Source 1.1 to identify two different landforms and two types of landscapes.
- 2 Think about the place in which you live. Can you identify two different landforms and two types of landscapes that you see every day?

1.2

How are landforms and landscapes valued by people?

- 1 What value do you think landscapes and landforms have for people?
- 2 Think about one of the landscapes mentioned above. Describe why this landscape is important to you.



Source 1.1 This satellite image of Las Vegas shows many different landscapes and landforms.

1.1

What are landforms and landscapes?

The Earth's landscapes

A **landscape** is part of the Earth's surface. It consists of a variety of geographical features that are characteristic of an area. Landscapes are divided into two main categories – natural and human. Natural landscapes (for example, mountains and deserts) are mainly unaffected by human

activity and typical to particular areas of the world. Human landscapes (for example, cities and farms) have been created and modified by people. Human landscapes are sometimes also referred to as cultural landscapes. Some different types of landscapes are described below.

WORLD: EXAMPLES OF DIFFERENT LANDSCAPES





Source 1.3 The Himalayas in Asia are an example of a mountain landscape.

1 Mountain landscapes

Mountain landscapes are formed by **tectonic plates** on the Earth's surface pushing against each other. This movement and pressure causes the shape of the land to change. The land is pushed up in a vertical direction and over time forms mountains. Mountains rise high above their surroundings. Mountains can stand alone, be grouped in ranges, or form ridges. We will explore mountain landscapes in more detail in Chapter 2.

2 Coastal landscapes

The coast is where a land mass meets the sea. Coastal landscapes are shaped by the natural forces of the wind and waves. These geographical forces erode (wear away) or construct (build up) the natural environment, constantly changing its shape. Features of coastal landscapes include beaches, dunes, bays, cliffs, platforms, spits and lagoons. We will explore coastal landscapes in more detail in Chapter 3.



Source 1.4 Peggy's Cove in Nova Scotia, Canada, is an example of a coastal landscape.



Source 1.5 The Whanganui River system in New Zealand is an example of a riverine landscape.

3 Riverine landscapes

A riverine is a landscape formed by the natural movement of a water system such as a river. A riverine landscape includes the **ecosystems** (all living things including plants and animals) in and around the area of a river. A riverine may also be defined as a network of rivers and the surrounding land. Riverine landscapes are excellent for agricultural uses such as farming because the land is rich and fertile. They are a valuable resource for growing food.

4 Desert landscapes

A desert is defined as an area of land which receives no more than 25 millimetres of rain per year. Deserts cover about one-third of the Earth's surface and contain some of the most uninhabitable regions on Earth. There are two types of deserts – hot deserts and cold deserts. Hot deserts are located along the tropics of Cancer and

Source 1.6 The Sahara desert in North Africa is an example of a desert landscape.



Capricorn (the latitude lines to the north and south of the Equator). Cold deserts are located closer to the Arctic and Antarctic Circles (the circles of latitude in the far north and far south). Because of the lack of rain they have little vegetation (plant life). Instead deserts are characterised by sand dunes, rock and gravel.

5 Karst landscapes

A karst landscape is formed when easily dissolvable bedrock (the rock below the surface of the land, such as limestone) is worn away by slightly acidic water, from an underground source or a source on the Earth's surface. These flows of water form unique features such as caves, stalactites, springs and sinkholes. Karst landscapes are extremely unstable areas of land. Sinkholes are formed when rock beneath the Earth's surface has eroded away and sections of land on the surface collapse. Sinkholes can range in size from a few metres to over 1 kilometre deep and have been known to occasionally collapse, swallowing up everything on the surface including cars and buildings.



Source 1.7 The Skocjan Caves in Slovenia are an example of a Karst landscape.

6 Tropical rainforest landscapes

Tropical rainforests are lush forests which can be found along the Equator. Rainforest landscapes receive lots of sunlight and rainfall – at least 1500 millimetres per year. This abundance of rainfall and sunlight means that vegetation grows rapidly. Rainforest ecosystems are complex and highly productive. They are home to a wide variety of species of flora (plants) and fauna (animals), about 50 to 70 per cent of all the species on Earth. Tropical rainforests cover about 6 per cent of the Earth's surface.

7 Built landscapes

Unlike the types of naturally occurring landscapes described above, built landscapes are created by humans. Built landscapes provide evidence of human settlement and occupation of an environment. Features of built landscapes include elements of infrastructure such as buildings, roads, transport, energy, sewerage and telecommunication systems. The construction of built landscapes often results in the damage or destruction of natural landscapes but commonly incorporates some natural geographical features in its design, for example harbours and mountains.



Source 1.8 The capital city of China, Beijing, is an example of a built landscape.



Source 1.9 The Amazon is an example of a tropical rainforest landscape.

Check your learning 1.1

Remember and understand

- 1 What is the meaning of the geographical term 'landscape'?
- 2 Which types of landscapes are found around the Tropics of Cancer and Capricorn?
- 3 Why do you think built landscapes are included in the definition of the word 'landscape'?

Apply and analyse

- 4 Look carefully at Source 1.2
 - a How many different types of landscapes are shown on this map?
 - b What types of landscapes can you identify in Australia?
 - c Write a description of the location of desert landscapes. Give possible reasons to explain why they are found there.


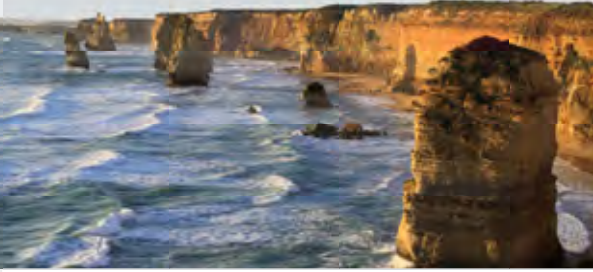

Evaluate and create



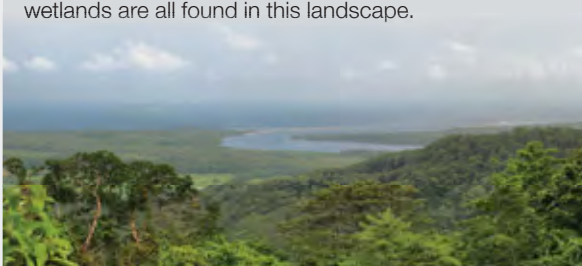
- 5 Research one landscape that interests you. Your chosen landscape might be on the World Heritage List (such as karst in The Skocjan Caves Regional Park) or in your local area. Investigate what makes this landscape unique, and provide information about how it is used. Present your research in the form of a brochure, poster or webpage.

The Earth's landforms

A **landform** is a natural geographical feature or shape that appears on the Earth's surface. Large landforms include mountains, plains and rivers, while small landforms include hills and billabongs. Landforms are created and shaped by geographical forces of nature, such as **tectonic plate** movement and **erosion**. Natural landscapes are made up of a variety of landforms. Often landforms are not unique to a single landscape; for example, a hill can be found in many different landscapes.

Source 1.10 Some common landforms found in different landscapes, with an Australian example

Landscape type	Some common landforms found in that landscape	An Australian example
Mountain landscape	<ul style="list-style-type: none"> • Mountain – a large elevation on the Earth's surface • Ridge – a long, narrow, elevated surface • Valley – a low area enclosed by mountains 	<p>At a height of 2228 metres above sea level, Mt Kosciuszko in NSW is the highest mountain in Australia</p> 
Coastal landscape	<ul style="list-style-type: none"> • Stack – a vertical column of rock • Beach – a sandy or pebbly shore • Headland – a high, rocky outcrop of land 	<p>The Twelve Apostles is a group of limestone stacks off the shore of the Port Campbell National Park in Victoria. They were created by erosion.</p> 
Riverine landscape	<ul style="list-style-type: none"> • Flood plain – a low-lying area regularly flooded by a river • Riverbed – the channel in which the river flows • Billabong – an arm of a river which forms a pool, only joining with the river in times of flooding 	<p>The Riverina area in NSW is made up of flat flood plains irrigated by the Murrumbidgee, Edward and Lachlan rivers. It is a key food-producing area in Australia.</p> 

Landscape type	Some common landforms found in that landscape	An Australian example
Desert landscape	<ul style="list-style-type: none"> Inselberg – an isolated steep-sided rock hill on a plain Oasis – a supply of groundwater in the desert Grassland plains – a large, flat area sparsely covered with grasses 	<p>Uluru is a large sandstone rock formation in the southern part of the Northern Territory, known as an inselberg. It has great spiritual significance for the local Aboriginal people and is a popular tourist attraction.</p> 
Karst landscape	<ul style="list-style-type: none"> Spring – a basin in the rock allowing water to come to the Earth's surface Cave – a large hollow underground with an opening Stalactite – a formation that hangs from the ceiling of a cave, formed by dripping water and minerals 	<p>The Wombeyan Caves in NSW consist of nine limestone caves with spectacular stalactites and other formations.</p> 
Tropical rainforest landscape	<ul style="list-style-type: none"> Mountain – a large elevation on the Earth's surface Valley – a low area enclosed by mountains Wetlands – a swamp or similar area of land that stays wet 	<p>The Daintree Rainforest is a tropical rainforest on the north-east coast of Queensland. It is approximately 1200 square kilometres in size. Mountains, valleys and wetlands are all found in this landscape.</p> 

Check your learning 1.2

Remember and understand

- 1 What is the meaning of the geographical term 'landform'?
- 2 In which two landscape types would you find valleys?
- 3 In which Australian location would you find an inselberg?

Apply and analyse

- 4 Look carefully at Source 1.10.
 - a How many different types of landforms are included in this table?
 - b Why do you think Australia has so many different landforms?

- c Write a short description of the image of the Riverina flood plain in NSW. Describe the advantages and disadvantages of living in this area.

Evaluate and create

- 5 Create a travel brochure for the Tourist Authority in your state or territory promoting one of the landforms listed in Source 1.10. Conduct some research to provide a description of this landform, including information about how it was formed. You should include a persuasive text that aims to encourage tourists to visit your chosen landform type.

1.1 bigideas: broadsheet

Uluru: an iconic Australian landform

Uluru is an iconic symbol of the Australian outback and one of the most visited landforms in Australia. Part of the desert landscape and close to the continent's geographical centre, Uluru attracts around 200 000 visitors a year.

Uluru rises approximately 348 metres above the ground and measures about 10.6 kilometres around its base. It is a sacred place for the local Aboriginal people, the Anangu.

Although the Northern Territory has the smallest population of any Australian state or territory, it has by far the highest percentage of Indigenous Australians. Around one in three people there (33 per cent) are of Indigenous heritage.



Source 1.11 Uluru is Australia's most recognisable landform.

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Constructing a population pyramid

In order to better understand a group of people living in the same place (i.e. a population), geographers often need to analyse and compare the different groups within that population (for example the number of men versus women, or young people versus old people). They do this by representing population data visually on a population pyramid.

Although population pyramids are a type of bar graph, they are a little different. While standard bar graphs have one horizontal axis (or x-axis) and one vertical axis (y-axis), population pyramids have one y-axis and two x-axes, like graphs back to back. The y-axis runs vertically through the middle separating the data for males on the left and females on the right.

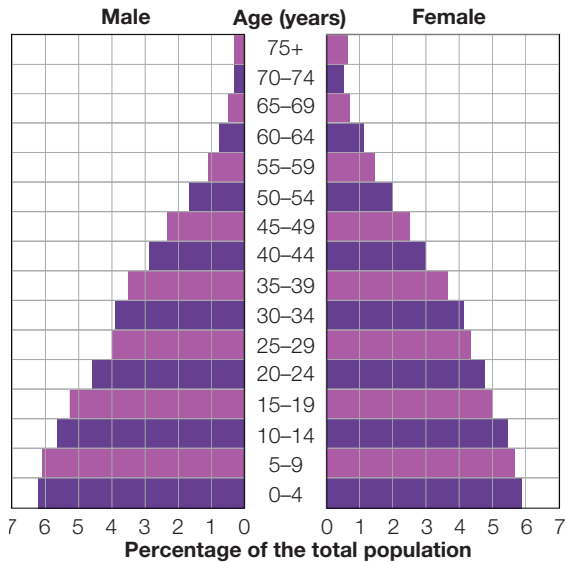
Rather than show the actual numbers of men and women at each age group, population pyramids show each of these groups as a percentage of the total population. This makes it easier for geographers to identify trends and changes in different areas of the population.

Population pyramids are created from a table of data. Source 1.12 is the data for the Northern Territory's Indigenous Population and Source 1.13 is the population pyramid. For more information on population pyramids refer to section GT.1 of The geographer's toolkit.

Source 1.12 The Northern Territory's Indigenous population

Northern Territory	Indigenous population %	
Age group (years)	Males	Females
0–4	6.2	5.9
5–9	6.1	5.7
10–14	5.7	5.4
15–19	5.3	5.0
20–24	4.7	4.8
25–29	4.0	4.3
30–34	3.9	4.1
35–39	3.5	3.7
40–44	2.9	3.0
45–49	2.3	2.5
50–54	1.7	2.0
55–59	1.1	1.4
60–64	0.8	1.1
65–69	0.5	0.7
70–74	0.3	0.5
75+	0.3	0.6

Source 1.13 Population pyramid for the Northern Territory's Indigenous population



The steps to construct a population pyramid using the statistics in Source 1.12:

Step 1 Using 5 mm grid paper, rule your axes as follows:

Vertical y-axis: There are 16 age groups in our example. The age groups start at the bottom, with the 0–4 age group, and finishing at the top with the 75+ age group. Keep this in mind while completing your y-axis, because the table shows the age groups from lowest to highest going down the page. However, the population pyramid shows the age groups from lowest to highest going up the page. Label the top of your y-axis, 'Age (years)'.

Horizontal x-axes (left and right): Find the highest percentage of both Males and Females. In our example, this is 6.2. Round this up to the nearest whole number, which is 7. Use two 5 mm grids per unit to create two 7 cm axes. Rule your x-axes with a scale from 0 to 7 from each side of the central y-axis to the left and right. Label the left side 'Male' and the right side 'Female' and write 'Percentage of the total population' along the bottom.

Step 2 Using a sharp lead pencil, create your bar graphs for each gender – first Males, then Females. Be as accurate as you can, and use the millimetre marks on a clear plastic ruler. First draw 5 mm high vertical strokes to end each individual bar. You can rule up the horizontals of each bar later.

Step 3 Choose two different colours; alternate with one colour and then the other. This makes it easier to read the graph.

Step 4 Give your population pyramid a title.

Apply the skill

- 1 Construct a population pyramid using the second set of data (Source 1.14) on Northern Territory's non-Indigenous Population, following steps 1–4.

Source 1.14 The Northern Territory's non-Indigenous population

Northern Territory Age group (years)	Non-Indigenous population %	
	Males	Females
0–4	3.5	3.3
5–9	3.4	3.1
10–14	3.4	3.2
15–19	3.2	2.9
20–24	3.9	3.5
25–29	4.3	4.2
30–34	4.6	4.3
35–39	4.6	4.2
40–44	4.6	4.0
45–49	4.4	3.9
50–54	4.0	3.5
55–59	3.7	2.8
60–64	2.4	1.7
65–69	1.5	1.0
70–74	0.7	0.5
75+	0.8	0.8

Extend your understanding

- 1 Use your population pyramid to answer the following questions:
 - a Which age group has the largest percentage for both males and females?
 - b Which is the smallest age group for each gender?
 - c What is the total percentage for the 0–4 age group?
 - d What is the total percentage for the 35–39 age group?
 - e What is the total percentage for the 70–74 and 75+ age groups?
- 2 Compare your population pyramid with Source 1.13 and answer the following questions:
 - a Describe the key differences that you can see between the population pyramids. What does this tell you about the Indigenous and non-Indigenous populations in the Northern Territory?
 - b Research the 'standards of living' and 'life expectancy' of Indigenous people in Australia. Does this help to explain the differences in the shapes of the population pyramids?

1.2 How are landforms and landscapes valued by people?

Valuing landforms and landscapes

Landforms and landscapes around the world are valued by many different people for many different reasons. Some people may feel a deep personal connection to a particular landscape, while others are more interested in the money that can be earned from it. The value a person attaches to a particular landscape often depends on factors such as their age, occupation, education, cultural background and experiences. In general, geographers divide the ways in which people value landforms and landscapes into four categories:

- cultural value
- spiritual value
- aesthetic value
- economic value.



Source 1.15 This poster for the film *Australia* reflects the colours of the Australian outback. It is an example of how the Australian landscape has cultural value.



Source 1.16 Karlukarlu (also known as The Devil's Marbles) is sacred to Indigenous Australians. This is an example of how landforms can have spiritual value.

Cultural value

Cultural value is linked to the importance of landforms and landscapes as expressed by people through creative means such as poetry, literature, art and films. Australia's landscapes and landforms have shaped Australian culture and identity. The film *Australia*, shown in Source 1.15, was a box-office hit in Australia. Set in northern Australia at the start of World War II, the film features the vast, unforgiving landscapes of the outback, as well as the tropical landscape of the Far North. These unique landscapes have a transformative effect on the English Lady Sarah Ashley, and by the end of the film she feels Australian.

Indigenous Australians express the importance of the land to them through Dreamtime stories, song and dance, and their art. Nearly all Aboriginal art relates to the landscape and maps the landscape and the landforms of importance to the Indigenous community.

Spiritual value

For Indigenous Australians the spiritual value of land is expressed through the concept of 'Country'. Indigenous peoples believe that the myths of their Dreamtime bind them to the land. They also believe that their ancestors live on through the land and ensure their continued connection with it. Landscapes contain many sacred sites of spiritual importance. Uluru, for example, is a sacred place to the Anangu people who live in the area. They believe that in the Dreamtime, a great sand hill was transformed into this rock along with the Kunia people who lived there.



Source 1.17 Unique and beautiful landscapes along the Australian coast are an example of aesthetic value.

Aesthetic value

The aesthetic value of a landscape is closely linked to its beauty and uniqueness. The aesthetic value attached to a place is always subjective (personal). People are drawn to places for many reasons. Being surrounded by the beauty of the landscape may give someone a sense of freedom, stability and wellbeing. An individual might be drawn to a particular landform because of its overwhelming majesty, creating a personal connection to that place.

The aesthetic value of the landscape to the community has been recognised through the creation of national parks, where land has been set aside for the public's use and enjoyment. The first national park in Australia, the Royal National Park, south of Sydney, was established in 1879. There are now 516 national parks.

Economic value

Economic value is a measurement of how financially important landscapes and landforms are. Economic value is particularly relevant to the tourism and mining industries in Australia. Tourism Victoria, for example, wants regular visitors to its state because people who travel spend money on accommodation, transport, food, souvenirs and activities. This money provides income for the tourism and hospitality industries and the State of Victoria. The Great Ocean Road is a landscape in Victoria with a high economic value due to its popularity with tourists.

Mining is the process of extracting natural resources from within the earth. These resources are sold, processed and used to manufacture a variety of goods – from jewellery to toys, to construction materials. The mining industry attaches economic value to landscapes that contain sought-after metals and minerals like coal and gold.



Source 1.18 Landscapes with high mineral and metal deposits are an example of economic value.

Competing values

The same landscape can be valued by different people for different reasons. To a mining corporation, the economic value of a landscape might be most important. To an Indigenous Australian community, however, the spiritual value may be most important. Then again, an artist might appreciate the aesthetic value of a landform. All these values are important to consider when deciding on how a landscape is best put to use.

Check your learning 1.3

Remember and understand

- 1 Describe the concept of 'value'.
- 2 What does it mean for a landscape to have aesthetic value?
- 3 What does it mean for a landscape to have cultural value?

Apply and analyse

- 4 Look carefully at Source 1.18.
 - a Which value is being attached to this source?
 - b What groups of people are most likely to have a different opinion as to the value of this landscape? Create a table to show the groups and their possible opinions.
 - c What reasons might you list to account for, or explain, these differences of opinion?

Evaluate and create

- 5 Research a book, poem, movie or website that has cultural value for Australia, or a country or place that you feel connected to. Create a digital poster on Glogster (<http://edu.glogster.com/>) or use another design program to present your findings. Include the title of the work, its author, a blurb about it and an image to represent it. Most importantly, provide three reasons why you feel it has particular cultural significance.

1.2 bigideas: broadsheet

The Chinese tourism boom in Australia

The unique landscapes and landforms in Australia attract tourists from around the world. Landscapes and landforms such as Uluru, the Great Ocean Road, Kakadu National Park and Sydney Harbour not only have cultural, spiritual and aesthetic value, they also have an economic value to Australia because of tourism.

In recent years, there has been a significant increase in the number of tourists coming to Australia from China. In 2012, China became Australia's second-largest tourism market, after New Zealand. Many of these tourists come because they want to see landforms and landscapes that are different from those they see at home.



Source 1.19 Chinese tourists in Australia enjoying the aesthetic value of the Twelve Apostles on the Great Ocean Road.

In terms of economic value, Chinese tourists are the biggest spenders in Australia, contributing \$3.5 billion a year to the Australian economy. Tourism researchers are predicting that the number of Chinese visitors coming to Australia will continue to increase, and that by 2020 this number will exceed 850 000 a year.

skilldrill

Analysing statistics

Many organisations collect information that geographers can use to describe and explain human activities. Sometimes this information is in the form of numbers, known as statistics. By learning a few simple techniques you can use this information to better understand changes and trends. Follow these steps to learn how to identify maximum and minimum in order to rank entries as well as calculate averages.

- Step 1** Look carefully at the title of the statistics so you understand exactly what has been measured. Note the date in particular.
- Step 2** Consider the source of the information. Statistics collected by government agencies such as the Australian Bureau of Statistics are generally more reliable than those collected by individuals and companies.
- Step 3** To identify the maximum and minimum, list the statistics in order from the largest to the smallest. This list is known as the rank, and the position of each country within it is known as a ranking or rank score.
- Step 4** To calculate the average, add all the numbers together and divide this total by the number of countries in the table. Take note of the title of each column in the table as this will inform you of the quantities being counted – for example, it may be in thousands (000) or billions of dollars (\$ billions).
- Step 5** You can calculate averages of each row as well as each column. For example, by dividing the economic value of each country by the number of visitors from that country you will find out the average value to Australia of each person from that country.
- Step 6** Use the numbers you have calculated – average, rank, maximum and minimum – to make some statements about the statistics. In particular, focus on trends or changes that you can identify as these can be used to make predictions about future changes.

Source 1.20 Tourist arrivals in Australia from the top 10 countries, 2011

Country of origin	Economic value to Australia (\$ billions)	Number of tourists (000)	Change in visitor numbers from 2010 (%)
China	3.5	542	+19.5
United Kingdom	2.6	608	-6.0
New Zealand	2.0	1173	+0.9
USA	1.8	456	-3.4
Japan	1.1	333	-16.5
South Korea	1.1	198	-7.6
Singapore	1.0	318	+3.4
Malaysia	0.9	241	+1.7
India	0.9	148	+6.9
Germany	0.7	154	-4.0

Source: Australian Bureau of Statistics and Tourism Research Australia.

Apply the skill

- The statistics in Source 1.20 are for which year?
- What is the source of these statistics? How do you think they were collected?
- Rank the 10 countries in Source 1.20 from most tourists to Australia in 2011 to least tourists.
 - What is the rank score of Singapore?
 - Which country contributed the most number of tourists?
 - Of the top 10, which contributed the least tourists?
- Calculate the average economic value to Australia of these 10 countries.
- Which country's visitors contribute the highest economic value per person?
- What are Australia's two fastest growing tourism markets?

Extend your understanding

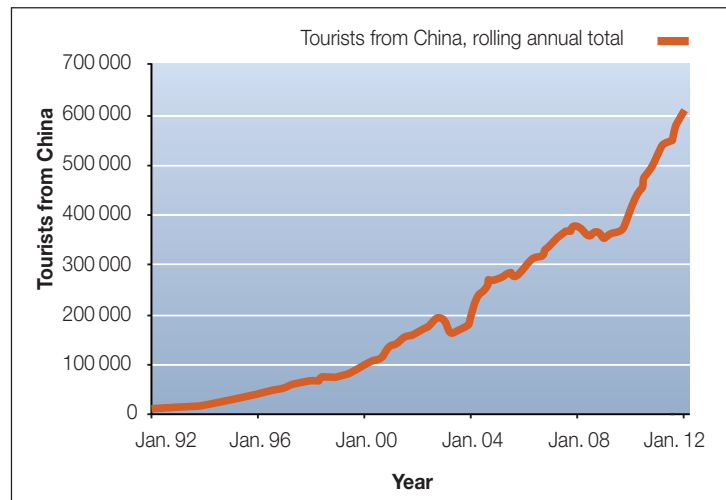
- Using Source 1.22 describe the growth in the number of Chinese tourists visiting Australia from 1992 to 2012.
- Brainstorm possible reasons for this growth.
- Tourist researchers classify international tourists into groups so that people who work in the tourism industry, such as hotel owners and tour operators, can better understand their clients. The following five groups have been identified among Chinese tourists:

Source 1.21 Types of Chinese tourists to Australia

Name of group	Description	Percentage of Chinese tourists
Self-challengers	An inner drive to learn about other cultures through travel	22
Family connections	Holidays are driven by family connections beyond all other reasons for travel	13
Sightseers	The guarantee of seeing world famous sights in a comfortable, secure fashion	18
Ready to leave	Keen to see more of the world beyond South East Asia	25
Close to home	Somewhere familiar and welcoming to relax and feel safe	22

Source: Tourism Research Australia: *The Chinese Traveller* (2005)

- Which of these five groups do you believe are the biggest spenders in Australia? Give some reasons for your answer.
- Which do you believe are the lowest spenders? Give some reasons for your answer.
- Tourism Australia is keen to attract more Chinese visitors to Australia. On which of these five groups do you think they should focus?
- Create a poster, brochure or web page that is designed to attract this group to Australia.



Source 1.22 Growth in numbers of Chinese tourists to Australia