MA99 EDUCATION

Geography: Practice Paper 1

01

NSW GEOGRAPHY 11-12 SYLLABUS 2022

FOR HSC 2028 AND LATER

1. General instructions

General instructions

- Reading time: 5 minutes. Working time: 3 hours.
- Total marks: 100. Write using black pen. A calculator and a ruler may be used.
- **Section I (20 marks):** Attempt all 20 multiple choice questions. Allow about 30 minutes.
- **Section II (40 marks):** Attempt all questions. Show all working for calculations. Allow about 1 hour and 10 minutes.
- **Section III (40 marks):** Attempt BOTH extended response questions. Allow about 1 hour and 20 minutes.



Figure 1 · How the 100 marks are split across the sections. Your time should follow the same split.

2. Section I · Multiple choice

20 marks. Attempt all questions. Select the alternative (A), (B), (C) or (D) that best answers each question.

> Read every option before you choose. The best answer, not just a correct one.

Question 1

1 MARK

A drainage basin that receives inputs of energy and matter and passes outputs on to other systems is best described as:

A an isolated system
B a closed system
C an open system
D a static system

Question 2

1 MARK

The proportion of incoming solar radiation that a surface reflects back to space is called its:

A insolation
B albedo
C the lapse rate
D aspect

Question 3

1 MARK

At a convergent plate boundary where oceanic crust meets continental crust, the denser oceanic crust is:

A created as the plates move apart
B left unchanged
C slid horizontally past the continental crust
D subducted beneath the continental crust

Question 4

1 MARK

The downward movement of water from the surface into the soil is called:

A infiltration
B surface runoff
C transpiration
D condensation

Question 5

1 MARK

As energy passes from one trophic level to the next in an ecosystem, most of it is:

A recycled to the producers
B lost as heat
C gained by the consumers
D stored permanently in body tissue

Question 6

1 MARK

The moderating effect that large oceans have on the temperature of nearby coastal places is called:

A continentality
B seasonality
C latitude
D maritime influence

Question 7

1 MARK

The gradual, orderly replacement of one plant community by another over time is called:

A erosion
B weathering
C ecological succession
D deposition

Question 8

1 MARK

The rate of natural increase of a population is calculated by:

A subtracting the crude death rate from the crude birth rate
B adding the birth and death rates together
C dividing the number of births by the land area
D adding net migration to the birth rate

Question 9

1 MARK

In the demographic transition model, a country in Stage 2 typically has:

A low birth rates and low death rates
B high birth rates and high death rates
C falling birth rates and low death rates
D high birth rates with falling death rates

Question 10

1 MARK

According to the United Nations, the world's population reached 8 billion people in the year:

A 2011
B 2016
C 2022
D 2037

Question 11

1 MARK

A city that provides advanced financial and command services to the global economy is best described as:

A a primate city
B a world city
C a megacity
D a capital city

Question 12

1 MARK

People who have been forced to flee their country and cannot return safely because of persecution are classified as:

A refugees
B economic migrants
C internally displaced people
D voluntary migrants

Question 13

1 MARK

The enhanced greenhouse effect is caused mainly by:

A a natural fall in solar output
B volcanic eruptions
C changes in the Earth's orbit
D additional greenhouse gases released by human activity

Question 14

1 MARK

Which of the following provides evidence of climate conditions from thousands of years ago?

A weather forecasts
B census records
C ice cores
D satellite images

Question 15

1 MARK

Building a sea wall to protect a coastal town from rising sea level is an example of:

A mitigation
B adaptation
C carbon capture and storage
D emissions trading

Question 16

1 MARK

Renewable sources supplied what share of Australia's main grid electricity generation in the 2024 calendar year?

A 39 per cent
B 19 per cent
C 9 per cent
D 59 per cent

Question 17

1 MARK

A map that shows the density of a variable across areas using shading of different intensity is:

A a flowline map
B a topographic map
C a cartogram
D a choropleth map

Question 18

1 MARK

On a topographic map, contour lines that are drawn close together indicate:

A flat land
B a gentle slope
C a steep slope
D an area of open water

Question 19

1 MARK

A bearing is a direction measured in degrees clockwise from:

A north
B east
C the equator
D the nearest high point

Question 20

1 MARK

A system that captures, stores, analyses and displays layers of spatial data is known as:

A a GPS receiver

B a geographic information system (GIS)

C a climate graph

D a population pyramid

3. Section II · Short answer

40 marks. Attempt all questions. Answer in the spaces provided in your writing booklet. Show all working for calculations.

Question 21

6 MARKS

Refer to Figure 2.

(a) Define the term open system. (2 marks)

(b) Using Figure 2, explain how the hydrosphere and the atmosphere interact within the water cycle. (4 marks)

Question 22

5 MARKS

On a 1:50 000 map, the road shown in Figure 3 measures 6 centimetres. The slope beside it rises 200 metres over a horizontal distance of 4 kilometres (4000 metres) (hypothetical data).

(a) Calculate the ground distance of the road in kilometres. Show your working. (2 marks)

Stimulus for Section II

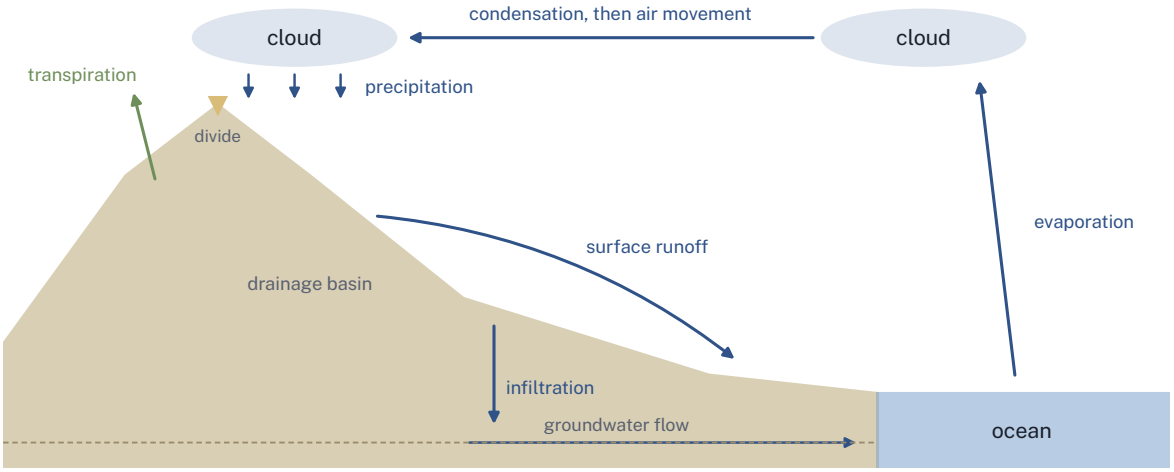


Figure 2 · The water cycle in a drainage basin.

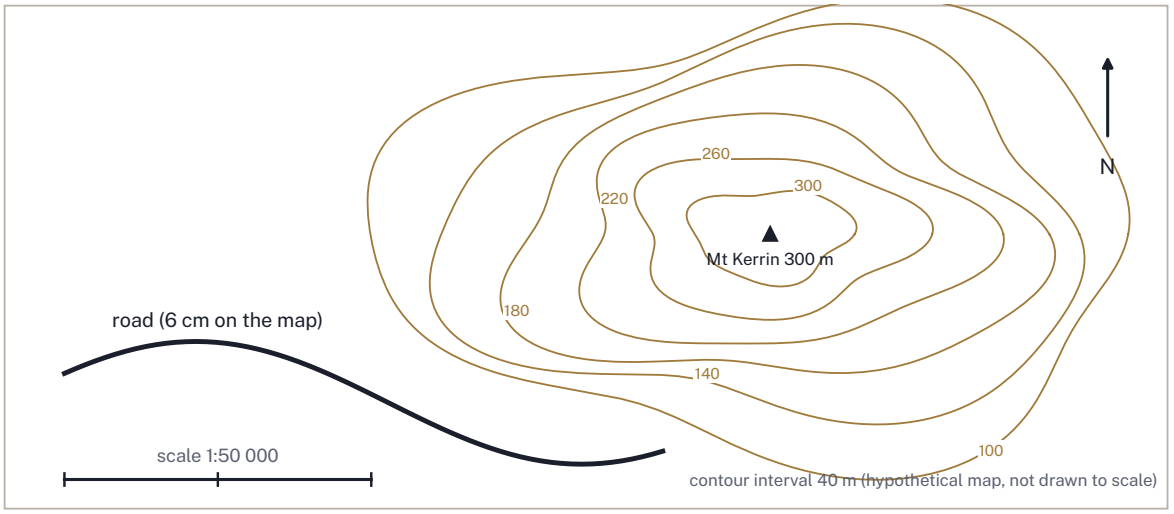


Figure 3 · Extract from a 1:50 000 topographic map (hypothetical).

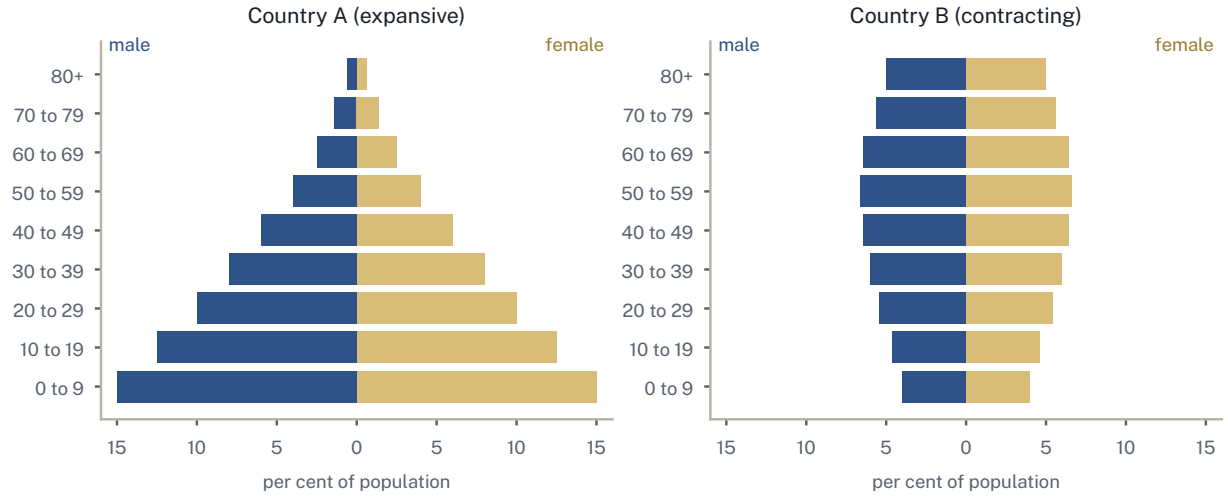


Figure 4 · Population pyramids of two countries (hypothetical data).

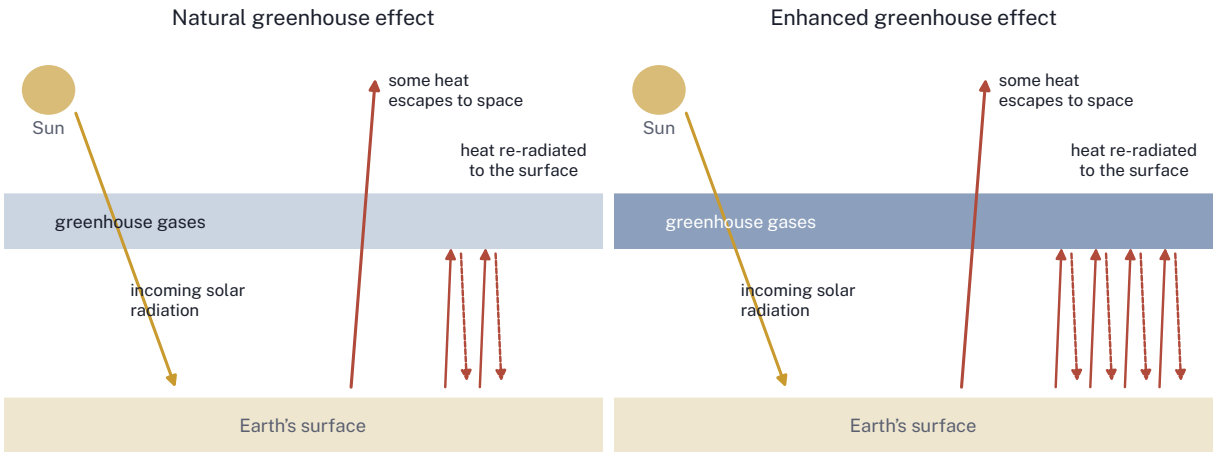


Figure 5 · The natural and the enhanced greenhouse effect.

(b) Calculate the gradient of the slope as a ratio. Show your working. (2 marks)

(c) State one way a steep gradient can influence land use. (1 mark)

Question 23

7 MARKS

A region has 50 000 people living in an area of 2500 square kilometres. The country in which the region lies has a crude birth rate of 25 and a crude death rate of 9 for each 1000 people (hypothetical data).

(a) Calculate the population density of the region. Show your working. (2 marks)

(b) Calculate the rate of natural increase as a percentage. Show your working. (2 marks)

(c) Refer to Figure 4. Describe one feature of an expansive population pyramid and identify one challenge it presents. (3 marks)

Question 24

6 MARKS

A regional town in Australia grew from 20 000 people to 23 000 people over five years (hypothetical data).

(a) Calculate the percentage change in the town's population. Show your working. (2 marks)

(b) Net overseas migration added 311 000 people to Australia's population over the year to 30 September 2025, the largest contributor to population growth. Explain one effect this pattern of migration can have on the distribution of people within Australia. (4 marks)

Question 25

8 MARKS

Refer to Figure 5.

(a) Describe the enhanced greenhouse effect and explain how human activity has strengthened it. (4 marks)

(b) Distinguish between mitigation and adaptation as responses to climate change, using one example of each. (4 marks)

Question 26

8 MARKS

Human activity is changing land cover across the Earth.

(a) Identify two sources of palaeoclimate evidence and outline what each can reveal about past climate. (4 marks)

(b) Explain how large-scale change in land cover, such as clearing forest for farmland, can affect natural systems and climate. (4 marks)

4. Section III · Extended response

40 marks. Attempt BOTH questions. Answer each question in a separate writing booklet. Marks are awarded for a sustained, well organised response that uses geographical terminology, concepts and specific evidence.

Question 27

20 MARKS

Explain how interactions between the atmosphere, hydrosphere, lithosphere and biosphere shape one natural system.

Question 28

20 MARKS

Assess the effectiveness of responses to climate change at a range of scales, using specific evidence.

5. Marking guidelines and exemplar answers

5.1 Section I · Answer key

Q	ANS	Q	ANS	Q	ANS
1	(C)	8	(A)	15	(B)
2	(B)	9	(D)	16	(A)
3	(D)	10	(C)	17	(D)
4	(A)	11	(B)	18	(C)
5	(B)	12	(A)	19	(A)
6	(D)	13	(D)	20	(B)
7	(C)	14	(C)		

5.2 Worked solutions for the calculations

22 (a) [2]: ground distance = map distance × scale = 6 × 50 000 = 300 000 cm = 3 km. One mark for the multiplication, one for converting to kilometres.

22 (b) [2]: gradient = rise / run = 200 / 4000 = 1 in 20 (5 per cent). One mark for the ratio in the same units, one for the simplified answer.

23 (a) [2]: density = people / area = 50 000 / 2500 = 20 people for each km^2. One mark for the working, one for the answer with its unit.

23 (b) [2]: rate of natural increase = birth rate − death rate = 25 − 9 = 16 for each 1000 = 1.6 per cent. One mark for the subtraction, one for expressing it as a percentage.

24 (a) [2]: percentage change = (change / original) × 100 = (3000 / 20 000) × 100 = 15 per cent increase. One mark for the change over the original, one for the percentage.

5.3 Section II · Marking notes for the short answer questions

21 (a) [2]: An open system exchanges both energy and matter with its surroundings, receiving inputs and passing outputs on to other systems (for example a drainage basin or one of the four spheres). One mark for the exchange of energy and matter, one for the idea of inputs and outputs.

21 (b) [4]: Explains a clear interaction of the hydrosphere and the atmosphere: water evaporates from the ocean and land (hydrosphere) into the atmosphere, where it cools, condenses and forms cloud, then returns to the surface as precipitation. Two marks for correctly naming and linking the two spheres, two for a clear cause and effect explanation of the exchange of water.

22 (c) [1]: Any one valid point, for example a steep gradient limits building and farming, speeds up runoff and erosion, or raises the cost of roads, so the land is often left as forest or open space.

23 (c) [3]: An expansive pyramid has a wide base, showing high birth rates and many young people, and narrows quickly toward the top. One challenge is the pressure it places on schooling, health care, food and future jobs. Two marks for a feature correctly described, one for a relevant challenge.

24 (b) [4]: Explains one clear effect, for example that high net overseas migration concentrates growth in the major cities where most migrants first settle, increasing demand there for housing and transport, while many regional areas grow more slowly. Up to four marks for a developed effect clearly linked to the distribution of people within Australia.

25 (a) [4]: Describes the enhanced greenhouse effect: greenhouse gases in the atmosphere absorb and re-radiate outgoing heat, keeping the surface warm; burning fossil fuels and clearing land have added extra greenhouse gases, strengthening this effect and raising temperatures. Up to two marks for the natural process, up to two for the human contribution.

25 (b) [4]: Mitigation reduces the causes of climate change by cutting greenhouse gas emissions or building carbon sinks, for example renewable energy, which supplied 39 per cent of Australia's main grid electricity in 2024 (Clean Energy Regulator). Adaptation adjusts systems and behaviour to cope with impacts already occurring, for example flood defences or drought resistant crops. Two marks for each clearly explained with an example.

26 (a) [4]: Any two sources, each with what it reveals, for example: ice cores trap ancient air bubbles that record past greenhouse gas levels and temperature; tree rings show year to year growth linked to past climate; ocean sediments and corals record past sea temperatures. Two marks for each source correctly linked to the evidence it provides.

26 (b) [4]: Explains how clearing forest for farmland removes vegetation that stored carbon and returned water to the air, so more carbon dioxide enters the atmosphere, soils erode more easily, runoff and river sediment increase, and local temperature and rainfall can change. Up to four marks for a clear chain of cause and effect linking land cover change to natural systems and climate.

5.4 Section III · Marking criteria and exemplar answers

Criteria (Question 27)

MARKS	CRITERIA
17 to 20	Sustained, logical response that explains in detail how all four spheres interact within one clearly identified natural system. Accurate, integrated use of geographical terminology and concepts (interconnection, scale, change) with specific supporting evidence.
13 to 16	Well organised response that explains the interaction of the four spheres within a named system. Sound terminology and concepts with some specific evidence.
9 to 12	Describes the spheres and some of their interactions within a system. Generally accurate but with limited integration, terminology or evidence.
5 to 8	Identifies some spheres and makes general statements about a natural system, with little linkage between them.
1 to 4	Makes a few relevant points about spheres or systems, with little structure, terminology or evidence.

QUESTION 27 · EXEMPLAR ANSWER

Outline: define a natural system and select one specific example, a drainage basin such as the Murray-Darling Basin. Name the four spheres. Explain in turn how the atmosphere (insolation and precipitation), the hydrosphere (the water cycle, river flow and groundwater), the lithosphere (rock, soil, weathering, erosion and deposition) and the biosphere (vegetation, roots and nutrient cycling) each contribute, and show how they interconnect through flows of energy and matter across scales and over time. Conclude by tracing how a change in one sphere passes through the others.

A natural system is a set of interacting components through which energy and matter flow. A drainage basin, the area of land drained by a river and its tributaries, is a clear open system because it receives inputs, transfers and stores water and sediment, and passes outputs on to the ocean. The Murray-Darling Basin in south-eastern Australia covers about 1 million square kilometres, roughly one seventh of the nation's land area (Australian Government Department of Climate Change, Energy, the Environment and Water, accessed 2026), and produces about 40 per cent of Australia's food and fibre (Murray-Darling Basin Authority). Within any drainage basin the atmosphere, hydrosphere, lithosphere and biosphere are constantly interacting.

The atmosphere drives the system. Insolation, the incoming solar radiation, heats the surface and evaporates water, while precipitation delivers water to the basin. This links the atmosphere directly to the hydrosphere: rain becomes surface runoff, infiltrates the soil to become groundwater, and flows through the river channel back toward the sea, completing the local part of the water cycle. The volume and timing of that flow depend on atmospheric conditions, so a dry period reduces river discharge right across the basin.

The lithosphere provides the physical framework. The underlying rock and soil control how much water infiltrates and how quickly the land erodes, while moving water weathers and erodes rock, transports sediment and deposits it downstream, slowly shaping the valley and floodplain. The biosphere interacts with all of these: vegetation intercepts rainfall and slows runoff, plant roots bind the soil and reduce erosion, and transpiration returns water to the atmosphere. Nutrients cycle between the soil, plants and river, supporting the ecosystems that more than 50 First Nations and about 2.3 million people depend on (Australian Government Department of Climate Change, Energy, the Environment and Water, accessed 2026).

These interactions show the concept of interconnection at work: no sphere functions alone. Because the spheres are linked, a change in one flows through the others across a range of scales. Clearing vegetation (biosphere) exposes soil (lithosphere) to erosion, increases runoff into rivers (hydrosphere) and can alter local humidity (atmosphere). In this way the drainage basin is shaped continually by the coupled behaviour of the four spheres, and stays in a dynamic balance that changes over time.

Criteria (Question 28)

MARKS	CRITERIA
17 to 20	Sustained response that makes and justifies a clear judgement about the effectiveness of responses at international, national and local scales. Accurate terminology and concepts integrated with specific, dated evidence.
13 to 16	Well organised response that assesses responses at more than one scale and reaches a judgement. Sound terminology with some dated evidence.
9 to 12	Describes responses at one or more scales with a limited judgement. General rather than specific evidence.
5 to 8	Outlines some responses to climate change, with little assessment or evidence.
1 to 4	Makes a few relevant points, with little structure, judgement or evidence.

QUESTION 28 · EXEMPLAR ANSWER

Outline: state a clear judgement, that responses have strengthened at every scale but remain insufficient to stop the observed change. Define mitigation and adaptation. Assess responses at three scales: international (the Paris Agreement and global emissions), national (Australia's legislated targets and its rising share of renewable energy) and local (household and community action). Weigh strengths against limits using dated evidence, and finish with an overall judgement.

Responses to climate change have become stronger and more coordinated at international, national and local scales, yet, judged against the evidence, they remain only partly effective because greenhouse gas concentrations and global temperatures are still rising. At the international scale, the Paris Agreement commits countries to limit warming to well below 2 degrees Celsius. This is a real strength because it sets a shared goal, but its pledges are voluntary and the results so far are limited: the global average concentration of carbon dioxide reached 419.2 parts for each million in 2023, and the global average surface temperature has risen by about 1.2 degrees Celsius since 1850 (State of the Climate 2024).

At the national scale, Australia has moved from weak to firmer commitments. The Climate Change Act 2022 legislated a cut in greenhouse gas emissions of 43 per cent below 2005 levels by 2030 and net zero emissions by 2050, and in September 2025 the government announced a 2035 target of a 62 to 70 per cent reduction below 2005 levels (Department of Climate Change, Energy, the Environment and Water). This is supported by a rapid shift in energy: renewable sources supplied 39 per cent of Australia's main grid electricity in the 2024 calendar year (Clean Energy Regulator). Such measures are effective mitigation because they cut the causes of warming. Even so, Australia has still warmed by 1.51 plus or minus 0.23 degrees Celsius since 1910 (Bureau of Meteorology and CSIRO), showing that national action has not yet reversed the trend.

At the local scale, households and communities contribute through rooftop solar, energy efficiency and revegetation, while councils adapt through flood defences and heat plans. Adaptation adjusts systems and behaviour to cope with impacts already occurring, which is necessary because some change is now unavoidable: the 2022 eastern Australia floods, which caused overall losses of about US$6.6 billion, roughly 9.6 billion Australian dollars (Munich Re, 2022), show this, and the Great Barrier Reef suffered its fifth mass bleaching in eight years in 2024 (Australian Institute of Marine Science). Local responses reduce harm but cannot address the global causes on their own.

Overall, responses at every scale are moving in the right direction, and the strongest results come when international goals, national law and local action reinforce one another. Yet the effectiveness of these responses remains limited while carbon dioxide concentrations and temperatures continue to rise. The evidence therefore supports the judgement that current responses are necessary and improving, but not yet sufficient to prevent further climate change.

Attempt record

Come back every few weeks and date it. Improvement in a written subject is invisible from the inside, which is why students who are getting better so often believe they are not.

DATE	MARK OUT OF 100	THE ONE THING TO FIX NEXT TIME

Fill one row every time you sit a set. A tracker with three rows in it is worth more than a perfect one you never started, because the pattern you are looking for only shows up across attempts, not inside one.

About this resource

MA99 EDUCATION

Scope

NSW Geography, Year 11. Written to the NSW Geography 11-12 Syllabus 2022, all three focus areas, for students sitting the HSC in 2028 and later years.

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