

GEOGRAPHY BULLETIN

VOLUME 52 No 2 2020

SUPPLEMENT



The
Geography Teachers Association
of NSW & ACT Inc.

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- Grassland Biomes

STAGE 5: ENVIRONMENTAL CHANGE

- Tundra Investigative Study
- Sydney Harbour Estuary

STAGE 5: SKILLS

**STUDENT
ACTIVITIES**



**The
Geography Teachers Association**
of NSW & ACT Inc.

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of NSW & ACT Inc**

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GEOGRAPHY BULLETIN

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NOTE: PPTS with larger versions of complex images are provided for some activities to assist students working digitally.

STAGE 4: LANDSCAPES AND LANDFORMS

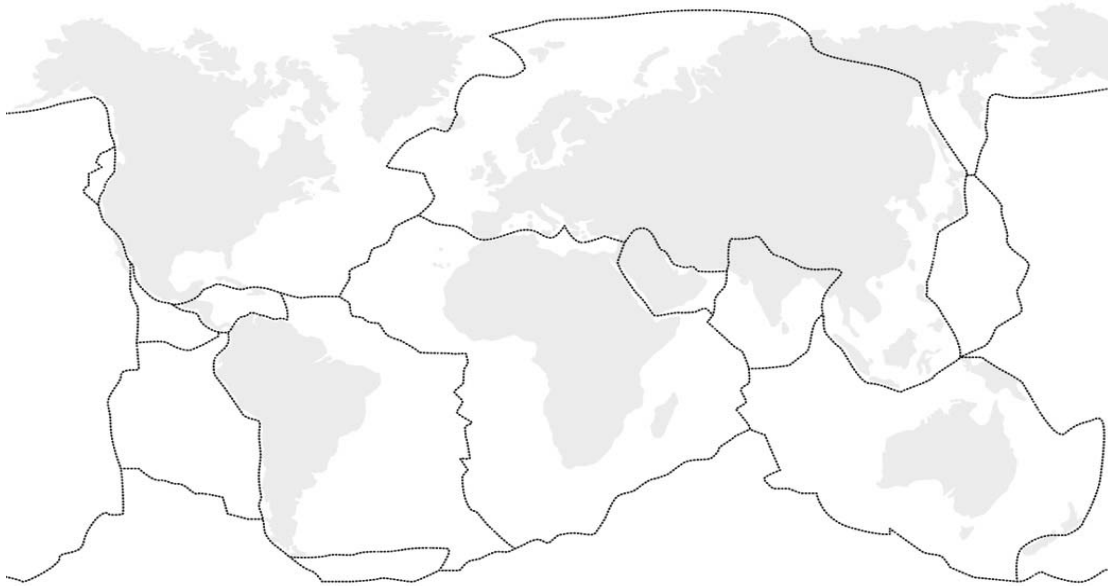
SNAPSHOT 1: Geomorphic processes

To complete the following activities students will need the GTANSW & ACT Bulletin Article titled *"SNAPSHOT 1: Geomorphic processes that shape landscapes and landforms"* (Edition 52, Volume 2, 2020).

Activity 1: Begin the 'Speak Geography' Worksheet on page 3

Activity 2: Earths tectonic plates

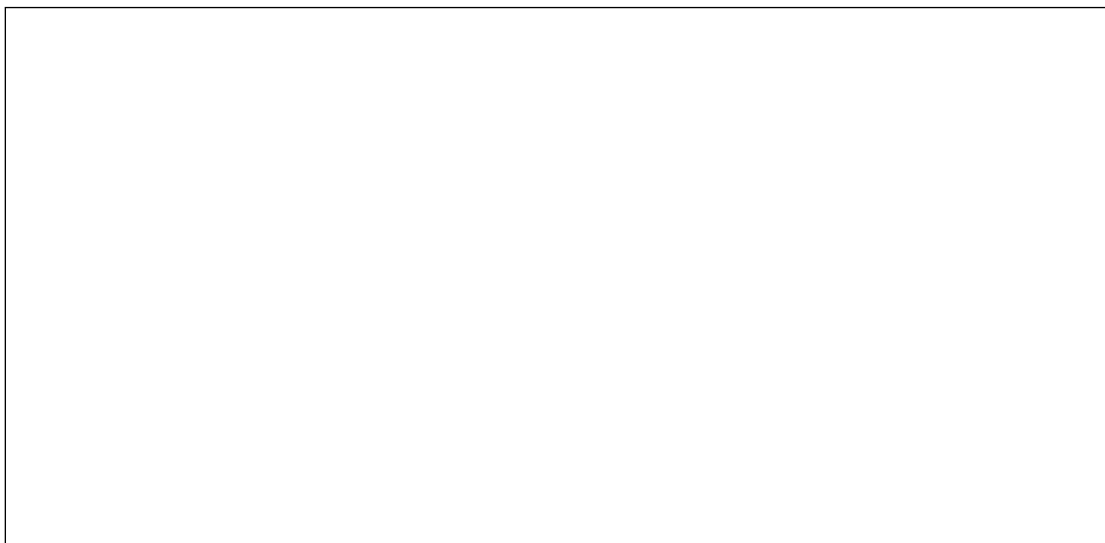
- Identify and label the tectonic plates
- Show the direction of movement of the plate Australia is located on.
- Use a colour to mark the plate boundary that sits along the west coast of North America.



ID 173450228 © Boris15 | Dreamstime.com

Activity 3: Create

Draw a simple diagram to show what happens at a 'convergent' plate boundary. Label with landform features created by the moving plates on this type of boundary.



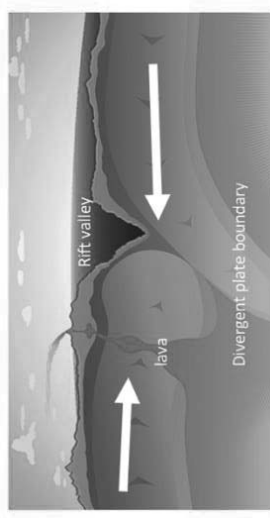
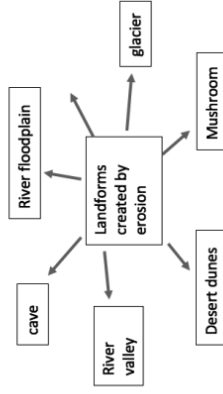
Activity 4: Complete *Geomorphic processes: It's wrong can you fix it?* Worksheet on page 4

SPEAK  GEOGRAPHY	A	B	C	D	E
LANDFORMS and LANDSCAPES Geomorphic processes	F	G	H	I	J
Instructions <i>As you learn:</i> Record geographical concepts and terms used throughout the topic as you learn.	K	L	M	N	O
<i>On completion:</i> *Put an asterisk beside the terms you can define right now without looking them up. <u>Underline</u> terms you do not know or understand.	P	Q	R	S	T
	U	V	W	XY	Z

Created by Lorraine Chaffer for GTANSW & ACT Bulletin 2, 2020 Adapted from Twitter

GEOMORPHIC PROCESSES

ITS WRONG! CAN YOU FIX IT?

A landscape is a natural environment containing landforms, vegetation and wildlife.	Geomorphic processes are natural and human ways by which landscapes and environments change.	A natural hazard is a disaster caused by nature.	Tectonic plate movement can cause volcanic eruptions, beach erosion and tidal waves.
Tectonic plates are sections of Earth's crust that float on water and are moved by ocean currents.	Earth's tectonic plates move in two directions – towards each other or away from each other.	New crust is formed where two tectonic plates collide (Convergent boundaries) and form mountains.	Australia sits across the boundary of two tectonic plates.
Erosion is a geomorphic process during which rocks react to air and water and break apart.	Beaches and river valleys are formed by the process of deposition.	The Mid Pacific Ridge, East Asia Rift Valley and Australian Alps are all landforms on tectonic plate boundaries.	Fluvial landscapes are formed and shaped by the action of ice.
Fix the map 	Fix the diagram 	Fix the flow chart <pre>graph TD A[Tectonic plates separate] --> B[Plates get stuck] B --> C[Tension builds] C --> D[Plates move suddenly] D --> E[Volcanic eruption]</pre>	Fix the mind map 

Instructions: Find the mistake (s) in each statement. Write the item(s) in the space below.

Cross out incorrect labelling on images and replace with corrected text or arrows.

Created by Lorraine Chaffer for GTANSW & ACT Bulletin 2, 2020 Adapted from Twitter

STAGE 4: LANDSCAPES AND LANDFORMS

SNAPSHOT 2: Landscape diversity and change

To complete the following activities students will need the GTANSW & ACT Bulletin Article titled "SNAPSHOT 2: Landscape diversity and change" (Edition 52, Volume 2, 2020).

1. Define geomorphic processes

2. How might climate change influence geomorphic processes in the future?

3. What does the quote 'landscapes and rock formations hold clues to Earth's past and future' mean?

4. Study SOURCE A.

a. Circle the type of landscape at A, B, C and D

- | | | | | |
|----|---------------|--------------------|---------|----------|
| A. | desert (arid) | riverine (fluvial) | coastal | mountain |
| B. | desert (arid) | riverine (fluvial) | coastal | mountain |
| C. | desert (arid) | riverine (fluvial) | coastal | mountain |
| D. | desert (arid) | riverine (fluvial) | coastal | mountain |

b. Imagine how ONE of these landscapes looked in the past. Describe changes that could have occurred over time to this landscape.

Predict what this landscape might look like in the future

c. Are there similar landscapes to your chosen example in Australia? Name some.

STAGE 4: LANDSCAPES AND LANDFORMS

5. Topographic Maps

a. Why are topographic maps valuable tools for studying landscapes and landforms?

b. Use SOURCE C to describe the location of Uluru and Uluru-Kata Tjuta National Park.

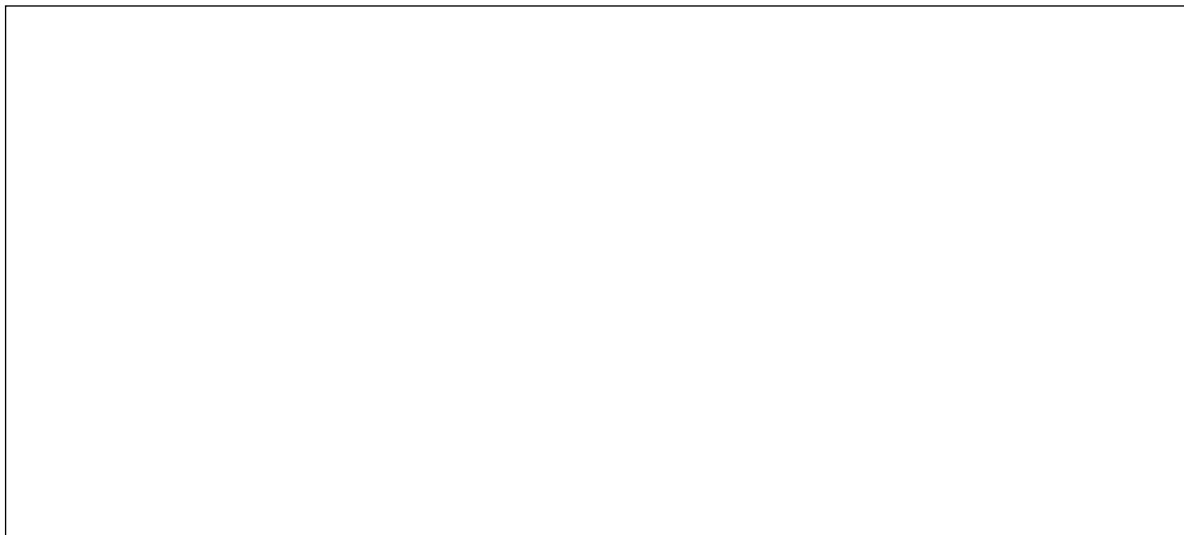
c. Describe the landscape and landforms shown in SOURCE C.

d. Research: Investigate the formation of Uluru using scientific and indigenous explanations. Present the explanations about the formation of Uluru in diagrams.

6. Desert landscapes

a. Explain the importance of wind and water in forming and shaping desert landscapes and landforms. Use examples of landforms in your answer.

b. Draw a line drawing (photo sketch) of SOURCE F.
Use dashed lines - - - - to show the original height of the land.



STAGE 4: LANDSCAPES AND LANDFORMS

7. River landscapes

Refer to **SOURCE O**

- a. Briefly explain how river landscapes change from the mountains to the sea. Refer to river valleys and use the terms erosion and deposition in your answer.

Refer to **SOURCES P and Q**

- b. Define the term 'meander'. Where in a river landscape do meanders occur?

- c. Identify areas of erosion and deposition. Suggest reasons why erosion occurs on the outside bend of a river channel and sand bars form on the inside bend.

- d. In your own words, explain how an oxbow lake forms on a floodplain.

** Complete SNAPSHOT 3 on meandering rivers including 'Create a Flipbook' on page 10*

8. Coastal landscapes

- a. Name the factors that cause coastal weathering.

- b. Where does the sediment deposited on beaches come from?

- c. Name one coastal landform shaped mainly by wind.

STAGE 4: LANDSCAPES AND LANDFORMS

Refer to **SOURCES G, H and I.**

- a. Name coastal landform features on the Port Campbell coast.

- b. Imagine how the Port Campbell coast looked in the past. Predict how it will look in 500 years. Explain your response.

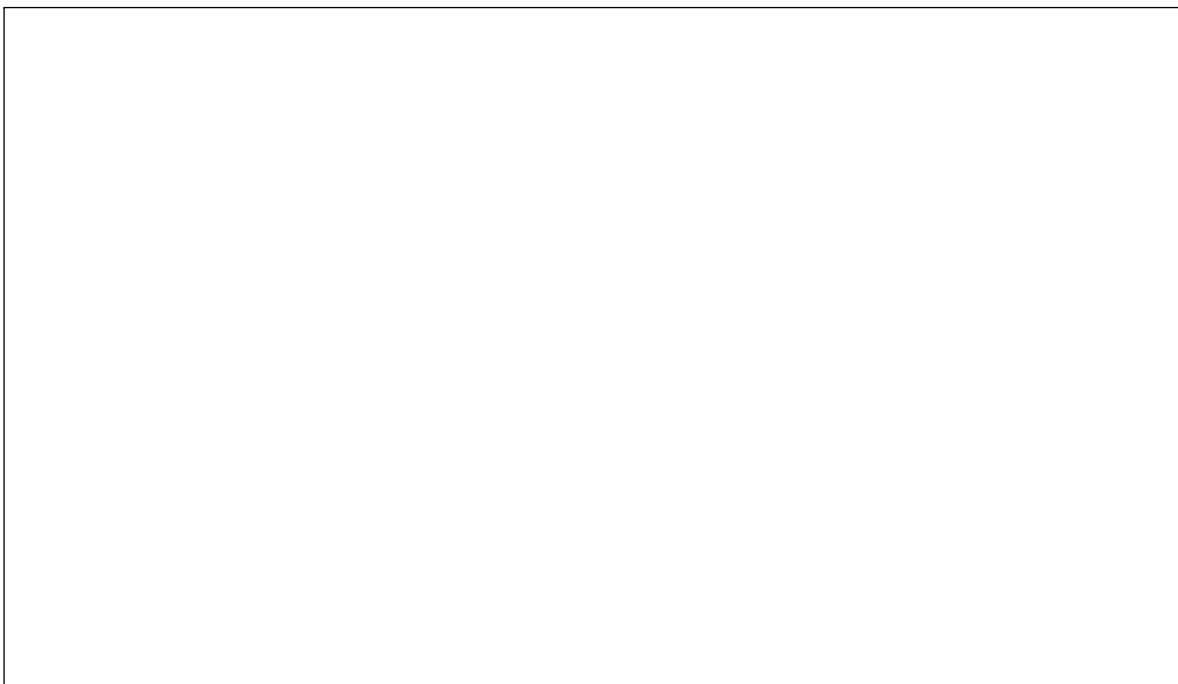
9. Glacial landscapes

- a. State two ice formations that create glaciated landscapes.

- b. Describe the features of a valley eroded by a glacier

- c. Describe how a warming climate will change the two Canadian landscapes shown.

- d. Draw a photo sketch of the Icelandic landscape in SOURCE L. Label a glacier, glacial lagoon, horn, arete, moraine



STAGE 4: LANDSCAPES AND LANDFORMS

10. Karst landscapes

a. Describe the processes that form caves in limestone rock.

b. What values do the Jenolan caves have for Gundungurra people?

c. Why are karst landscapes often hard to recognise?

CHALLENGE QUESTION:

“The processes of weathering, erosion and deposition will result in a flatter earth in the future.” Do you agree or disagree with this statement? Justify your answer.

[illegible]

STAGE 4: LANDSCAPES AND LANDFORMS

SNAPSHOT 3: Meandering rivers

To complete the following activities students will need the GTANSW & ACT Bulletin Article titled "SNAPSHOT 3: Meandering rivers" (Edition 52, Volume 2, 2020).

- a. Explain the difference between braiding and meandering. Identify an example in SOURCE A.

- b. CREATE FLIPBOOKS for the Ucayali (coloured pages) and Mamore (B & W) Rivers using the resources provided.

- c. Describe the main river landform feature each flipbook illustrates.

CHALLENGE

1. Create a *FLIPBOOK* to show change over time in one landscape or landform eg SOURCE L.

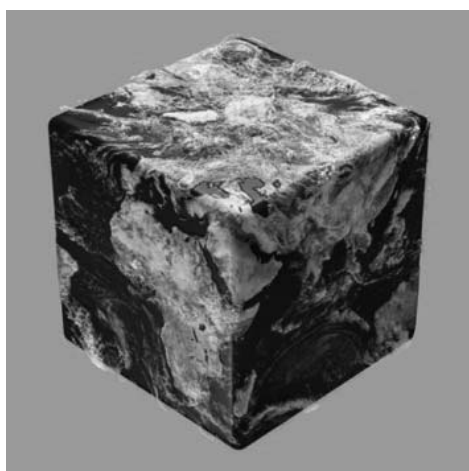
These resources may help you get started:

<https://www.wikihow.com/Make-a-Flipbook>

<https://www.youtube.com/watch?v=fpQ4Eiq-0Bg>

OR

2. Create a *GEOCUBE*



ID 65511493 © Vitaga | Dreamstime.com

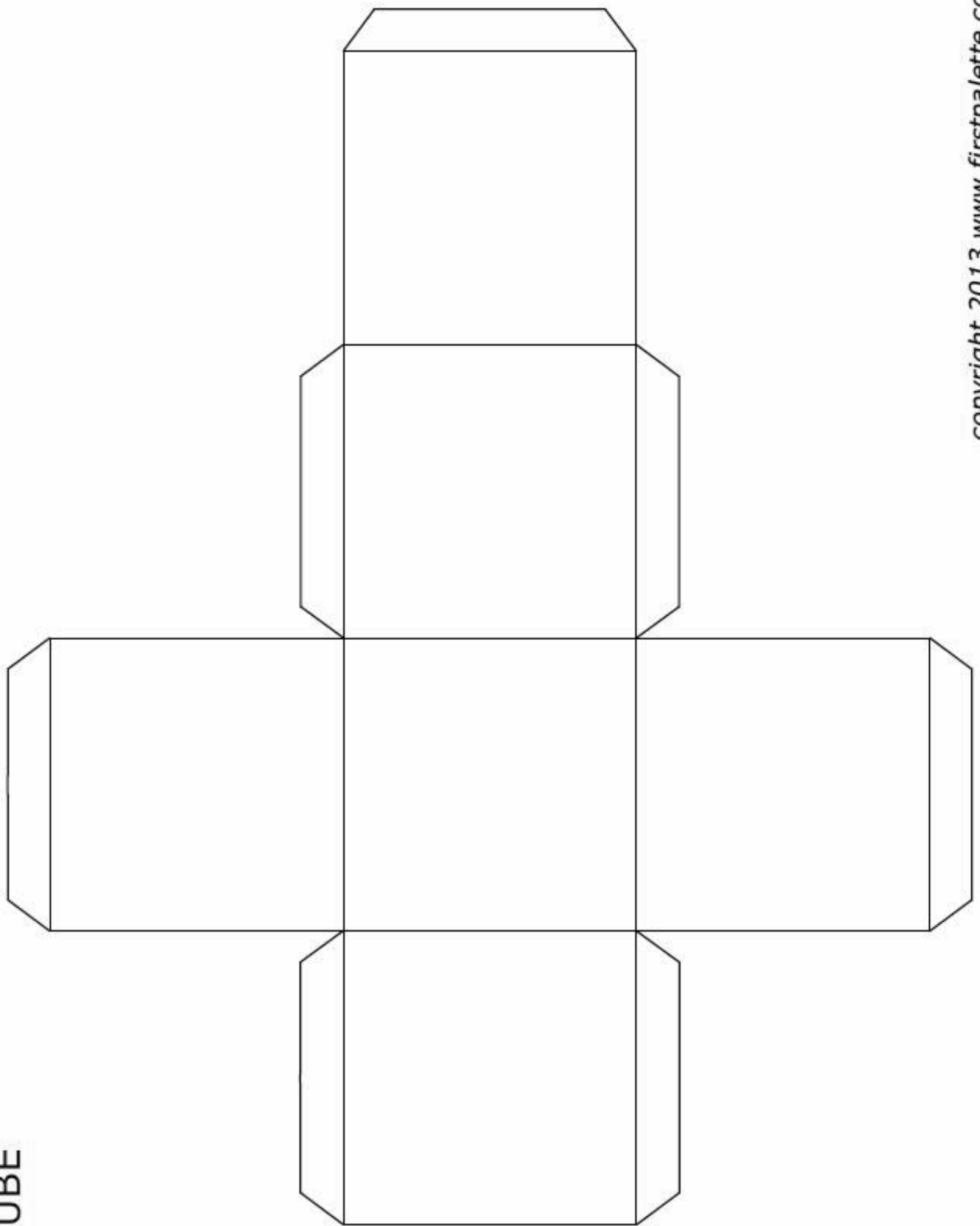
- Print the full-page template on the following page
- On each of the SIX sides of the cube draw diagrams of landforms from one or more landscapes.
- Create your cube.
- Roll the cube.
- Explain how and why the landform that appears on the top has changed over time and will change in the future.

Note: Your cube will have a different landform or landscape on each side

Template: <https://www.craftsuprint.com/projects/paper-craft/origami/how-to-make-a-paper-cube.cfm>

STAGE 4: LANDSCAPES AND LANDFORMS

CUBE



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STAGE 4: LANDSCAPES AND LANDFORMS

SNAPSHOT 4: Earthquakes

To complete the following activities students will need the GTA NSW & ACT Bulletin Article titled "SNAPSHOT 4: Earthquakes" (Edition 52, Volume 2, 2020). Digital version – <https://www.visualcapitalist.com/visualizing-the-power-and-frequency-of-earthquakes/>

1. Create a column graph to show the earthquakes on the infographic ranked from highest to lowest in magnitude. Give the graph a title and label each axis.

2. Analysis

a. How many of the earthquakes in the graph are on tectonic plate boundaries (You may need to refer to a map showing plate boundaries such as the map in Snapshot 1.)

b. Explain what happens at plate boundaries to cause earthquakes

c. In pairs. Discuss why the creator of the infographic chose to show the information about earthquakes in a pyramid shape.

d. List THREE facts from the infographic that you did not previously know

e. The earthquakes outlined here considered to be natural disasters as well as geomorphic hazards. Explain why.

STAGE 4: LANDSCAPES AND LANDFORMS

CANADA INTRODUCTION: What do you know?

Activity 1: True / False QUIZ. Circle the correct answer

- | | |
|--|-------|
| 1. The capital of Canada is Vancouver | T. F. |
| 2. Canada has a land border with two other countries | T. F. |
| 3. Australia is larger than Canada in area | T. F. |
| 4. Canada is larger than Australia in Population | T. F. |
| 5. Canada is the 5 th largest country in the world | T. F. |
| 6. Canada and Australia are in the same hemisphere | T. F. |
| 7. The Tropic of Cancer runs through Canada | T. F. |
| 8. The arctic Circle crosses through Canada | T. F. |
| 9. Canada has the longest coastline in the world | T. F. |
| 10. Niagara Falls is in Canada | T. F. |
| 11. There are polar bears in Canada. | T. F. |
| 12. Canada has the highest rainfall of any country in the world. | T. F. |
| 13. The Rocky Mountains are in eastern Canada. | T. F. |
| 14. Three Oceans surround Canada – Pacific, Atlantic and Arctic | T. F. |
| 15. Greenland belongs to Canada. | T. F. |

Activity 2: Canada Map

- Refer to Sources B and C and an Atlas or digital map
- Label the following places on the map of Canada
- USA, Greenland, Pacific, Atlantic and Arctic Oceans, Hudson Bay, Baffin Island, Arctic Circle, Great Lakes, Ottawa
- Create a symbol for mountains e.g. MMM and use this to show the Rocky and Appalachian Mountains



STAGE 4: LANDSCAPES AND LANDFORMS

CANADA 1: Major landforms, geomorphic processes and geomorphic hazards

To complete the following activities students will need the GTANSW & ACT Bulletin Article titled “CANADA 1: Major landforms, geomorphic processes and geomorphic hazards” (Edition 52, Volume 2, 2020).

Activity 1: Major landform divisions and their features

Read about each landform to identify the geomorphic processes that have shaped the land.

Landform regions	Major landforms	Geomorphic processes <i>Select from: tectonic activity (T), river erosion (R), glacial erosion (G), deposition (D),</i>
Mountains and highlands	Western Cordillera	
	Appalachian Mountains	
	Canadian shield	
Lowlands and plains	Interior plains	
	The Great Lakes & St Lawrence Lowlands	
	The Arctic and Hudson Bay Lowlands	

Activity 2: Knowledge and understanding

1. List factors that help explain why Canada has a diversity of landscapes and landforms.

2. **Research:** Locate a map showing Australia’s main landform divisions.
 - a. Draw simple sketch maps to show the main landform divisions for each country

STAGE 4: LANDSCAPES AND LANDFORMS

b. Compare the major landforms in Australia and Canada.

3. Explain the connection between tectonic forces, earthquakes and volcanoes in Canada.

4. Explain why Vancouver Island and the Pacific Coast of British Columbia are vulnerable to earthquakes and tsunamis. Use appropriate *Geography Speak*.

5. Discuss how British Columbia is responding to the threats caused by tectonic plate movements.

6. a. Identify any geomorphic hazards that you know occur in Australia.

b. Write a statement that compares the vulnerability of Australia and Canada to large geomorphic hazards.

c. Suggest a reason for these differences

STAGE 4: LANDSCAPES AND LANDFORMS

CANADA 2: Unique landforms and geomorphic processes

To complete the following activities students will need the GTANSW & ACT Bulletin Article titled “CANADA 2: Unique landforms and geomorphic processes” (Edition 52, Volume 2, 2020).

1. **Show** the approximate location of the following landforms and features on the shadow map below

OR

Create a digital map using GoogleMaps or GoogleEarth.

- Lake Louise
- The Great Lakes
- Niagara Falls
- The Rocky Mountains
- Fraser River Canyon
- Maligne Canyon
- Mount Garibaldi
- USA



1. Select ONE landform featured from the list above for geographical inquiry OR one landform of your choice approved by your teacher.
 - a. Examine the geomorphic processes that created the landform
 - b. Identify the value of the landform to people and / or the environment
 - c. Explain how the landform is managed and / or protected.
 - d. Present as a written report incorporating diagrams, maps and photographs.

STAGE 4: LANDSCAPES AND LANDFORMS

CANADA 3: Landscape values and protection

To complete the following activities students will need the GTANSW & ACT Bulletin Article titled “CANADA 3: Landscape values and protection” (Edition 52, Volume 2, 2020).

1. List the values of Canada’s landscapes and landforms to Canadians and the global community

2. Describe the spatial distribution of Canada’s National Parks and World Heritage sites.

- a. National parks

- b. Natural World Heritage sites

3. **Inquiry:** Find a map showing Australia’s National Parks and World Heritage sites. Compare the number and location of these protected areas to those in Canada.

4. **Inquiry:** Investigate one of Canada’s protected areas (National Park, World Heritage Site or Wildlife Protected Area).

- a. Identify the landscape, landform or biome being protected
- b. Outline the reasons for protection.
- c. Identify issues associated with human interactions with the protected area.
- d. Present as a photo story or webpage.

Weblinks

Canada’s 44 National Parks – <http://www.cbc.ca/news2/interactives/map-canada-parks/>
Canadian World Heritage – <https://whc.unesco.org/en/review/50/>

STAGE 4: WATER IN THE WORLD

SNAPSHOT: Connections and concepts

To complete the following activities students will need the GTANSW & ACT Bulletin Article titled "SNAPSHOT: Concepts and connections" (Edition 52, Volume 2, 2020).

1. List SIX reasons for understanding the importance of water and the water cycle.
RANK these reasons from most to least important. Justify the reason you ranked first.

2. Complete the *Conceptual knowledge and understanding* activity sheet on page 20.

3. Answer these True or False questions (Circle the correct answer)

- | | | |
|---|---|---|
| i. Water can exist as a gas, liquid or solid substance | T | F |
| ii. A catchment has a finite amount of water that does not change | T | F |
| iii. The world has a finite amount of water that does not change | T | F |
| iv. Australia has low rainfall variability | T | F |
| v. Cold ocean currents result in higher precipitation | T | F |
| vi. A Rainshadow is caused by a mountain range | T | F |
| vii. The water cycle begins with evaporation from the ocean | T | F |
| viii. Surface and groundwater flow downhill to the lowest altitude possible | T | F |
| ix. Most of Australia is not in a low latitude location | T | F |
| x. Marine environments are degraded through water cycle | T | F |

4. Precipitation: Climatic Graphs

Use the *Climate Graph* template on page 20 to plot the climate statistics for the TWO locations in Australia below.

Alice Springs, Australia Latitude: 23.82 S Longitude: 133.88 E

Statistic	Units	Metric Units											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maximum Temperature	°C	36.20	35.10	32.40	27.90	22.90	19.90	19.50	22.40	26.60	30.90	33.70	35.60
Minimum Temperature	°C	21.30	20.60	17.50	12.50	8.30	4.90	3.70	6.00	9.90	14.70	17.80	20.00
Precipitation	cm.	4.21	3.74	5.17	1.69	1.83	1.40	1.63	1.17	1.09	1.93	2.73	3.59

STAGE 4: WATER IN THE WORLD

Mackay, Australia Latitude: 21.12 S Longitude: 149.22 E

Statistic	Units	Metric Units											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maximum Temperature	°C	29.90	29.40	28.40	26.60	24.10	21.80	21.10	22.40	24.90	27.30	29.00	29.80
Minimum Temperature	°C	23.30	23.10	22.20	20.00	17.00	13.60	12.60	13.80	16.40	19.60	21.70	22.90
Precipitation	cm.	26.85	30.24	31.23	15.41	11.52	6.37	4.83	2.93	1.51	3.90	8.83	19.71

Source <https://www.climate-charts.com/Countries/AUSTRALIA.html>

Use the ‘Describing Climate’ guide on page 22 to describe differences in precipitation between the two locations.

5. Suggest reasons for the differences in precipitation. You may refer to altitude, latitude, distance from the sea, ocean currents and orographic effect where relevant.

CONCEPTUAL KNOWLEDGE AND UNDERSTANDING: Water in the World

Definition	Characteristics / Draw
Catchment	
Examples	Non-Examples

Definition	Characteristics / Draw
Rainfall variability	
Examples	Non-Examples

Definition	Characteristics / Draw
Orographic rainfall	
Examples	Non-Examples

Definition	Characteristics / Draw
Low air pressure	
Examples	Non-Examples

Definition	Characteristics / Draw
Low latitude	
Examples	Non-Examples

Definition	Characteristics / Draw
Altitude	
Examples	Non-Examples



The Geography Teachers' Association
1988-2018

Complete the Frayer Models to show your understanding of six concepts linked to the water cycle

Climate graph 1

Station: _____ Country: _____

Latitude: _____ Longitude: _____ Elevation: _____

[illegible]

Climate graph 2

Station: _____ Country: _____

Latitude: _____ Longitude: _____ Elevation: _____

[illegible]

Describing climate

Figures 4–8 provide the terminology needed to describe the climate of places.

Average monthly temperatures	
Temperature range	Description
above 30°C	very hot
20°C–30°C	hot
10°C–20°C	warm
0°C–10°C	cool
-10°C–0°C	cold
below -10°C	very cold

Figure 4: Describing average monthly temperatures

Annual temperature range	
Temperature range	Description
below 5°C	small
5°C–15°C	moderate
15°C–30°C	large
above 30°C	very large

Figure 5: Describing annual temperature range

Annual precipitation		
Cold to warm climates	Description	Hot to very hot climates
below 250 mm	slight	below 375 mm
250 mm–500 mm	small	375 mm–625 mm
500 mm–1000 mm	adequate	625 mm–1125 mm
1000 mm–1500 mm	large	1125 mm–1750 mm
above 1500 mm	very large	above 1750 mm

Figure 6: Describing annual precipitation (rainfall)

Monthly average rainfall	
Amount	Description
below 50 mm	dry month
50mm to 150 mm	wet month
above 150 mm	very wet month

Figure 7: Describing monthly averages

Rainfall distribution
Summer rainfall maximum: over 60 per cent in the summer half of the year
Winter rainfall maximum: over 60 per cent in the winter half of the year
Evenly distributed rainfall: no summer or winter maximum

Figure 8: Describing distribution

STAGE 4: WATER IN THE WORLD

CANADA 4: Water resources and hazards

To complete the following activities students will need the GTANSW & ACT Bulletin Article titled “CANADA 4: Water resources and hazards” (Edition 52, Volume 2, 2020).

1. Explain why Canada is considered a water rich country.

2. Differentiate between visible and invisible water resources using Canadian examples.

3. Use examples to illustrate the aesthetic value of Canada’s water resources.

4. Compare First Nation people’s perspective on Canada’s water resources to that of scientists.

5. Explain the economic value of water in Canada using examples and statistics.

6. The Bow River wetlands have environmental value – what does this mean?

7. Suggest why flooding is the most common hydrologic hazard in Canada.

STAGE 4: WATER IN THE WORLD

8. Inquiry activity

- a. Choose one aspect of Canada's water resources e.g. rivers, precipitation, icefields and glaciers, a hydrologic or atmospheric hazard.
- b. Conduct an inquiry to compare Australia and Canada for the selected topic.
- c. Communicate your results in a short 2-minute presentation to the class with at least **one** but no more than **five** visual resources to support your report.

In the space below create a plan for this inquiry activity using several steps.

List the resources you will search for to compare Australia and Canada.

STAGE 4: WATER IN THE WORLD



Stella Maris

COLLEGE MANLY

Assessment Notification – Year 8

Subject: Geography

Year: 8

Weighting: 25%

Marks: 25

Task type: Investigative Study

Task Number: 3

Date Due: Week 10

Task written by Christina Kalinic – HSIE Department Stella Maris College

Outcomes Assessed

- GE4-1:** locates and describes the diverse features and characteristics of a range of places and environments
GE4-2: describes processes and influences that form and transform places and environments
GE4-3: explains how interactions and connections between people, places and environments result in change
GE4-5: discusses management of places and environments for their sustainability
GE4-7: acquires and processes geographical information by selecting and using geographical tools for inquiry
GE4-8: communicates geographical information using a variety of strategies

Task Description



Earth Journalism Network is seeking groups of 2 to 3 Year 8 Geography students to develop a Natural Hazards documentary series to premiere at the Stella Maris College, Star of the Sea Theatre this September!

Each group will be allocated ONE of the following hydrological and atmospheric hazards to develop a 4 - 5 minute documentary;

Episode 1 (weather event): Floods

Episode 2 (weather event): Heatwave

Episode 3 (storm event): Tropical cyclone

Episode 4 (storm event): Hurricane

Episode 5 (storm event): Typhoon

Episode 6: (storm event): Tornado

Episode 7 (storm event): Thunderstorm

Episode 8 (storm event): Blizzard

Episode 9 (storm event): Snowstorm

Episode 10 (storm event): Hailstorm

Episode 11 (storm event): Dust storm

Each episode **MUST** address the following;

1. *Identify* the natural hazard AND *outline* the spatial pattern of the hazard.
 - *Use a labelled map with BOLTSS to help demonstrate the spatial pattern of the hazard*

[Please note: your group can choose a natural hazard in Australia OR overseas] **[3 Marks]**
2. *Describe* the causes of the hazard AND provide examples to demonstrate the impacts of the hazard (when a hazard becomes a disaster).
 - **Impacts could include:**
 - ✓ **Environmental** (e.g. the direct or indirect death of wildlife)
 - ✓ **Economic** (e.g. destruction of crops and livestock)
 - ✓ **Social** (e.g. destruction of community-based infrastructure)

[3 Marks]
3. *Explain* the impact of climate change on your allocated natural hazard.
 - *Make specific reference to **occurrence, frequency and extent** to support your explanation*

[6 Marks]
4. *Discuss* TWO management strategies adopted by TWO stakeholders to reduce the impact of your allocated hazard.
 - *Refer to **Individuals AND/OR Groups AND/OR Governments***

[6 Marks]

Glossary of instructional verbs [write a definition as a class]

IDENTIFY	
OUTLINE	
DESCRIBE	
EXPLAIN	
DISCUSS	

STEP ONE: INVESTIGATION [1x Library lesson will be organised by your Geography teacher]

In order to produce a natural hazards documentary that is **accurate, reliable and authentic**, you will need to conduct thorough **secondary research**. In your groups, collect **AT LEAST THREE secondary sources** from **AT LEAST TWO different mediums** (e.g. a newspaper article, webpage, extract from a textbook, etc.).

The investigation MUST include the following;

- ☐ A printed copy of AT LEAST THREE secondary sources WITH key words/points highlighted and annotated to demonstrate understanding of knowledge
- ☐ A correctly formatted bibliography (please use Harvard OR APA)
- ☐ A PEEL paragraph annotation for EACH secondary source included in the bibliography- *summary; analysis and assessment; reflection*

STEP ONE DUE DATE: LAST Geography lesson of Week 7: _____

STEP ONE SUBMISSION:

At the beginning of the lesson, EACH GROUP hands in 3x highlighted/annotated sources AND a bibliography with paragraph annotations (stapled together).

Please make sure that the name of each member of your group is included on each page!

STEP TWO: PRODUCTION PROPOSAL [1x in-class lesson]

The Earth Journalism Network requires your group to compose a production proposal PRIOR TO filming your documentary. Your Geography teacher will provide your group with constructive feedback which can be implemented DURING the production of your documentary.

The production proposal MUST include the following;

- ☐ Outline the roles and responsibilities for each member in your group
- ☐ A 200 word rationale identifying the technology/software your group intends to use to produce the documentary AND the types of media, scenes and screenshots used throughout
- ☐ A written script of your documentary [Please note, the script MUST be typed]
- ☐ A storyboard outlining what your groups documentary will look like scene-by-scene [A storyboard template will be provided by your Geography teacher]

STEP TWO DUE DATE: LAST Geography lesson of Week 8: _____

STEP TWO SUBMISSION:

At the beginning of the lesson, EACH GROUP hands in the production proposal (stapled together).

Please make sure that the name of each member of your group is included on each page!

STEP THREE: FILMING [1x in-class lesson]

STEP THREE DUE DATE: Week 10

STEP THREE SUBMISSION:

At the beginning of the lesson, EACH group MUST submit their documentary on ONE USB.
Every group MUST be ready to present!

STEP FOUR: REFLECTION [5 marks]

Individually, reflect on the process of this assessment task by making FOUR meaningful statements using the PMI method;

- **PLUS:** *Comment on a benefit(s) of working in a group?*
- **MINUS:** *Comment on challenge(s) of working in a group?*
- **INTERESTING:**
 - ✱ *Set a goal that you would like to work towards in your next group work experience*
 - ✱ *Share TWO insights into what you have learnt about this topic (your specific natural hazard)*

Please note, you can submit your PMI reflection in the form of a 1 minute podcast **OR** a 300 word hand-written reflection.

STEP FOUR DUE DATE: Week 10

STEP FOUR SUBMISSION:

At the beginning of the lesson, EACH student MUST submit their PMI reflection.

Please note:

- If you have completed your reflection as a podcast please submit on a USB (save on the same USB as the documentary)
- OR
- If you have hand-written your personal reflection, hand it up to your teacher at the beginning of your lesson with your name clearly marked at the top of the page

Declaration

Tick here

I have read and understood the marking criteria for this assessment task.

☐

I have thoroughly proofread the task and corrected grammar, spelling and layout issues.

☐

My reference list is in alphabetical order and attached to the back of the task.

☐

I understand the Submission Instructions.

☐

This assessment task is the result of my own research and references are included where necessary. I have not plagiarised the work of others.

☐

Student signature (or type in name):

Date:

SUCCESS CRITERIA**INVESTIGATION**

CRITERIA	SATISFACTORY	UNSATISFACTORY
- o THREE secondary sources from TWO different mediums - o EACH source is thoroughly highlighted AND annotated - o Includes a correctly formatted bibliography - o A PEEL paragraph commenting on <i>summary; analysis and assessment; reflection</i> is written for each secondary source included in the bibliography		

PRODUCTION PROPOSAL

CRITERIA	SATISFACTORY	UNSATISFACTORY
- o Outlines the roles and responsibilities of each group member - o A 200 word rationale identifying the chosen technology/software, types of media, screens, screenshots - o A typed script of the documentary - o A storyboard outlining each scene of the documentary		

REFLECTION**[5 MARKS]**

CRITERIA	SATISFACTORY	UNSATISFACTORY	MARKS
- o Plus- <i>comment on the benefit(s) of working in a group</i> - o Minus- <i>comment on the challenge(s) of working in a group</i> - o Interesting- <i>sets a goal to work towards in a future group work task</i> - o <i>Shares TWO insights into what you have learnt about this topic (your specific natural hazard)</i> - o Adheres to a 1 minute podcast OR a 300 word hand-written reflection			

Teacher comment: _____

MARKING GUIDELINES: <i>Investigative Study</i>	MARKS
Identify the natural hazard AND outline the spatial pattern of the hazard. ➤ <i>Use a labelled map with BOLTSS and help demonstrate the spatial pattern of the hazard</i>	3
- Identifies the natural hazard and outlines the spatial pattern of the hazard - Includes a map and demonstrates the spatial pattern of the hazard on a map - Map includes BOLTSS	3
- Identifies the natural hazard and may identify the spatial pattern of the hazard - Includes a map of the hazard and may show some spatial distribution of the hazard - Map may/may not include BOLTSS	2
- May identify the natural hazard or spatial distribution of the hazard - May include a map	1
Describe the causes of the hazard AND provide examples to demonstrate the impacts of the hazard (when a hazard becomes a disaster). ➤ Impacts could include: ✓ Environmental (e.g. the direct or indirect death of wildlife) ✓ Economic (e.g. destruction of crops and livestock) ✓ Social (e.g. destruction of community based infrastructure)	3
- Provides characteristics and features of the causes of the hazard - Clearly provides examples to demonstrate the impacts of the hazard - Shows an understanding of the environmental OR economic OR social impacts of the hazard	3
- Sketches in general terms the causes of the hazard - May provide examples to demonstrate the impacts of the hazard - Sketches in general terms the environmental OR economic OR social impacts of the hazard	2
Recognises and names the causes of the hazard and/or makes reference to the environmental OR economic OR social impact of the hazard	1
Explain the impact of climate change on your allocated natural hazard. ➤ <i>Make specific reference to occurrence, frequency and extent to support your explanation.</i>	6
- Thoroughly demonstrates how and/or why climate change has impacted on the natural hazard - Makes specific reference to the occurrence, frequency and extent of the hazard to support your explanation	5-6
- Demonstrates how and/or why climate change has impacted on the natural hazard - Provides reference to either the occurrence AND/OR frequency AND/OR extent of the hazard	3-4
- Sketches in general terms the impact of climate change on the natural hazard - May refer to either the occurrence OR frequency OR extent of the hazard	1-2
Discuss TWO management strategies adopted by TWO stakeholders to reduce the impact of your allocated hazard. ➤ <i>Refer to Individuals AND/OR Groups AND/OR Governments</i>	6
- Clearly identifies issues and provides points for and/or against TWO management strategies adopted by TWO stakeholders to reduce the impact of the hazard - Refer to Individuals AND/OR Groups AND/OR Governments	5-6
- Identifies issues and may provide points for and/or against ONE or TWO management strategies adopted by ONE or TWO stakeholders to reduce the impact of the hazard - May refer to Individuals AND/OR Groups AND/OR Governments	3-4
- Sketches in general terms a management strategy and may refer to a stakeholder - May refer to an Individual or Group or Government	1-2
Documentary	2
- Documentary adheres to the time limit of 4-5 minutes - Documentary effectively uses technology/software to engage the target audience	2
- Documentary does not adhere to the time limit of 4-5 minutes - Documentary attempts to use technology/software	1
TOTAL: _____ / 20	

EPISODE ALLOCATIONS

Episode 1 (weather event): Floods	Episode 2 (weather event): Heatwave
Episode 3 (storm event): Tropical cyclone	Episode 4 (storm event): Hurricane
Episode 5 (storm event): Typhoon	Episode 6: (storm event): Tornado
Episode 7 (storm event): Thunderstorm	Episode 8 (storm event): Blizzard
Episode 9 (storm event): Snowstorm	Episode 10 (storm event): Hailstorm
Episode 11 (storm event): Dust storm	

RECORD OF GROUPS - *Natural Hazard documentary*

EPISODE	GROUP MEMBER NAMES
Episode 1 (weather event): Floods	
Episode 2 (weather event): Heatwave	
Episode 3 (storm event): Tropical cyclone	
Episode 4 (storm event): Hurricane	
Episode 5 (storm event): Typhoon	
Episode 6: (storm event): Tornado	
Episode 7 (storm event): Thunderstorm	
Episode 8 (storm event): Blizzard	
Episode 9 (storm event): Snowstorm	
Episode 10 (storm event): Hailstorm	
Episode 11 (storm event): Dust storm	

ANNOTATING A SECONDARY SOURCE

Some words to help you get started include...

distinguishes; analyses; defends; compares; suggests; concludes; recognises; examines; identifies; demonstrates; claims; assumes; investigates; criticises; proposes

REFERENCE:	
SUMMARY A summary of a source condenses the author's message describing the main points of an argument, major methods of investigation, and its main conclusions- but omitting detail. In general, a summary does not contain critical analysis of the arguments or your opinion of the source.	
ANALYSIS AND ASSESSMENT Your annotation should include an evaluation of each source. This evaluation may include answering questions such as; ➤ <i>Is the author's argument valid and reliable and how do you know this?</i> ➤ <i>Is there evidence of bias, subjectivity, objectivity and how do you know this?</i>	
REFLECTION Reflect on its usefulness to your research and your topic. In particular, consider; ➤ <i>How relevant is the content to your research?</i> ➤ <i>Has the argument impacted on your previously held views? How?</i> ➤ <i>What specifically does it add to your knowledge?</i> ➤ <i>How will you be using this source in your own work?</i>	

EPIISODE __ (__ EVENT): **STORYBOARD**

PRODUCTION PROPOSAL

ROLES AND RESPONSIBILITIES OF GROUP MEMBERS:

NAME OF GROUP MEMBER	OUTLINE INDIVIDUAL ROLES AND RESPONSIBILITIES

TECHNOLOGY AND SOFTWARE RATIONALE:

In 200 words...

- Identify the technology/software that your group intends to use
- Comment on the types of media, scenes and screenshots your group intends to use

TYPE HERE...

DOCUMENTARY SCRIPT:

STAGE 4: WATER IN THE WORLD

CANADA 5: The Bow River Investigation

OPTION 1: INDEPENDENT INQUIRY

To complete the following activities students will need the GTANSW & ACT Bulletin Article titled "*CANADA 5: The Bow River*" (Edition 52, Volume 2, 2020).

Inquiry focus question

Why do the water resources of the Bow River catchment need careful management to reduce water scarcity in the future?

Activities

1. Develop a set of "I need to know" questions (contributing questions) to learn about water resources, their use and management in the Bow River Catchment such as: What are the main sources of water?

I NEED TO KNOW

2. Interpret and analyse SOURCES A – N and use the weblinks to develop your knowledge and understanding and to answer your contributing questions.
3. List some key findings to incorporate into your response

4. Communicate your answer to the inquiry focus question in a digital presentation.
You are encouraged to use spatial technologies as part of your presentation OR create an digital infographic that could be printed as an A3 poster for classroom walls.
Spatial technologies could take the form of integrating an elevation profile for the Bow River between Bow Lake and Calgary constructed using Google Earth (see Weblinks); creating a digital tour of the Bow River catchment using Google Tour Builder or Tour creator; creating an ESRI StoryMap or a Scribble Map.

STAGE 4: WATER IN THE WORLD

CANADA 5: The Bow River Investigation

OPTION 2: GUIDED INQUIRY

To complete the following activities students will need the GTANSW & ACT Bulletin Article titled "CANADA 5: *The Bow River*" (Edition 52, Volume 2, 2020).

Inquiry focus question

Why do the water resources of the Bow River catchment need careful management to reduce water scarcity in the future?

Activities

1. Refer to SOURCES A – N to answer the designated questions under each syllabus heading
2. In groups discuss the answers, collaboratively mind map key ideas and contribute to a class discussion.
3. Teacher models writing an explanation that includes evidence and visual materials.
4. Students answer the inquiry focus question

Water resources

AIM: Investigate the water resources in the Bow River catchment by identifying different forms of water used as resources and examining the spatial distribution of the water resources.

Refer to SOURCES A – C, SOURCE G

1. Describe the location and dimensions of the Bow River and its catchment using mapping concepts such as latitude, longitude, direction, area and distance.

2. Identify the types of water resources found in the Bow River catchment

3. Provide evidence that the amount of water in the Bow River varies over time

4. List the Google earth satellite image and sources A and B from the largest to the smallest scale. Why is it important for a study of the Bow River catchment to study maps at different scales?

STAGE 4: WATER IN THE WORLD

The Water Cycle

AIM: Investigate how the water cycle connects places in the Bow River Catchment by explaining how water flows within the catchment. Examine factors that influence water flows and water availability.

Refer to SOURCES C, D and Google Earth

5. Use Google Earth tools to *create* an elevation profile for the Bow River between Bow Lake and Calgary (see Weblinks). Identify different landforms along your elevation profile.

Watch the Bow River animation at <https://www.youtube.com/watch?v=5e00c1IJHL8>

Refer to SOURCES D – F

6. Bow River water flows from the mountains to the sea. Explain what this means by tracking the path of the river from its source to its mouth.

7. Suggest factors that would influence the movement of water in the catchment.

8. Discuss factors that might influence the availability of water in Calgary city in one year.

The value of water

AIM: Investigate the economic, cultural, spiritual and aesthetic values of water for people in the Bow River catchment by describing ways water is used by people.

Refer to SOURCE H, the photographs and video clips below.

9. Identify and rank the main uses of water in the Bow River catchment

Irrigation and Food – <https://www.youtube.com/watch?v=t0J28uJkyTQ>

Eastern irrigation district – <https://www.youtube.com/watch?v=GcR2xJlhPik>

Bow River irrigation district – <https://www.youtube.com/watch?v=4vKWXAiNNdU>

Western irrigation district – <https://www.youtube.com/watch?v=lr7p-XM-2Uk>

10. List examples of economic, cultural, spiritual and aesthetic values of water for people living in the catchment. Explain two of these values.

STAGE 4: WATER IN THE WORLD

Water scarcity and water management

AIM: Investigate the nature of water scarcity and ways of overcoming it in the Bow River catchment. Examine the strategies used by governments, individuals and communities to overcome water scarcity and manage water sustainably.

Judge if they are successful.

Propose actions individuals can take to contribute to water management

Refer to **SOURCES J – L**

11. As a class discuss the concept of water scarcity and the general causes of water scarcity. Create a mind map to summarise key ideas.

12. Describe THREE potential causes of water scarcity in the Bow River Catchment

Refer to SOURCES M and N.

13. Form a small group. Discuss how the actions of either an individual, a community OR the government of Alberta can cause water scarcity but also contribute to the better management of water resources.

Conclusion

Contribute to a class debate on the following questions. Record your ideas here in preparation for the debate.

- a. Which actions would contribute most to future water scarcity?

- b. Whose actions (individual, community or government) would have the greatest impact on the sustainable use of water resources to reduce water scarcity in the future?

STAGE 4: WATER IN THE WORLD

CANADA 5: The Bow River Investigation

OPTION 3: CLASS INQUIRY

To complete the following activities students will need the GTANSW & ACT Bulletin Article titled “CANADA 5: The Bow River” (Edition 52, Volume 2, 2020).

Complete introductory activities to locate the Bow River catchment and discuss the flow of water. Complete the following activities as a class, in small groups or individually.

Introduction

1. Complete the following activities as a class using Google Earth and Sources C, D and E
 - Use Google Earth to locate Canada, the city of Calgary, Lake Louise and Banff.
 - Compare the location of Canada and Australia
 - Observe and describe the landscapes around Calgary that can be seen in the satellite image e.g. Mountains, valley and plains
 - Discuss whether water flows from Lake Louise to Calgary or from Calgary to Lake Louise
 - Study the diagram of the Bow River and its catchment Source E.
 - Explain a catchment and discuss where water from the Bow River catchment ends up.
 - Examine the climate graphs in Source C. Discuss the link between precipitation and amount of water in the Bow River at each place.)
- a. Watch the Bow River animation at <https://www.youtube.com/watch?v=5e00c1IJHL8>
- b. Write **five** important facts about the Bow River and catchment

Water availability

AIM: Investigate sources of water in the Bow River catchment and examine the water cycle. Discuss water is a renewable resource and study the availability of water in different places.

Refer to SOURCE F

2. Use the illustration to discuss the movement of water in the water cycle through different locations. What did you notice?

STAGE 4: WATER IN THE WORLD

3. Draw a simple diagram to show the movement of water and name water cycle processes

4. Identify some uses of water in SOURCE F.

Water for human use

AIM: Investigate the importance of water in sustaining life and ways in which water is used eg at home, for recreation or in farming. Identify sources of fresh water for human use.

Refer to SOURCE I

5. List three ways water from the Bow River is used by people.

6. Refer to the graph in Source H. Rank the main uses of water from highest to lowest

Factors affecting access to water

AIM: Explore how people's activities and actions affect access to fresh water eg water storage and pollution and ways natural hazards affect access to fresh water eg drought.

Refer to SOURCE J.

7. Identify THREE ways that people make it easier to get water for farming, industry and towns.

STAGE 4: WATER IN THE WORLD

8. Explain what happens to the water after it is used by human activities.

9. List problems that could be caused by people's use of water in the Bow River catchment.
Could these problems affect future water supplies?

10. Discuss how droughts and floods affect access to water.

Water as a valuable resource

11. List different values of water explained by your teacher.

Identify examples of values using the photographs and selected sources

Water management

AIM: Understand why water needs to be preserved and strategies used to manage water.

Refer to SOURCES M and N

Watch the Bow River animation – <https://www.youtube.com/watch?v=cpL11ROPoPE>

Create a poster that encourages people to use water wisely to avoid problems in the future.

STAGE 4: SKILLS

To complete the following activities students will need the GTANSW & ACT “*Stage 4 Skills Stimulus*” (Edition 52, Volume 2, 2020).

SOURCE A: How the world could look

What is Pangaea Proxima?

In a projected future supercontinent:

- North America will join
- South America will join
- Australia will join
- The Atlantic Ocean will

SOURCE B: Earth’s volatile boundaries

For the following earthquakes:

- CIRCLE the type of plate boundary involved.
- explain how the plate movement here resulted in an earthquake.

a. Chile (5)

- Plate boundary (circle): Convergent Divergent Strike fault (transform)
- How an earthquake occurs here

b. California (2)

- Plate boundary (circle): Convergent Divergent Strike fault (transform)
- How an earthquake occurs here

c. Turkey (8)

- Plate boundary (circle): Convergent Divergent Strike fault (transform)
- How an earthquake occurs here

d. Calculate

- The % of yearly earthquakes that can be felt. _____
- The % of yearly earthquakes that are over 7.0 magnitude _____

STAGE 4: SKILLS

Refer to:

SOURCE C: Uluru – satellite image and elevation profile

SOURCE D: Uluru visitor map

SOURCE E: Uluru in the rain

- a. The steepest gradient on this elevation profile is on the _____ (direction) side
- b. The highest altitude of Uluru on this profile is _____
- c. The altitude of the surrounding landscape is _____
- d. The elevation of Uluru above the surrounding plain is _____
- e. The visible lines on the rock are evidence of _____

- f. The photograph is an example of an (circle)
 - i. Satellite photograph
 - ii. Vertical aerial photograph
 - iii. Oblique aerial photograph
- g. What values are protected by the designated “No filming, photography or painting” zone on the map?

- h. Use the map scale to determine the distance across the elevation profile.

- i. State the direction a photographer at the Sunset viewing areas would be facing to take a photo of Uluru at sunset. _____
- j. Calculate the length of the walking trail from and back to the Mala Carpark. _____
- k. Comment on the role of water in the formation and transformation of Uluru over time

- l. Use your knowledge and understanding and / or research to summarise explanations for the formation of Uluru. Refer to tectonic forces, weathering, erosion, deposition and Aboriginal Cultural Knowledge in your answer. Include at least ONE diagram in your answer.

STAGE 4: SKILLS

SOURCE F: Topographic map Warragamba Dam and photographs

- a. Name the lake created by the Warragamba Dam. _____
- b. Name the river that was dammed _____
- c. State the direction that this river flows _____
- d. Study the landforms and environment surrounding Warragamba dam. State THREE features that make this area ideal for a dam. Explain the benefit of each feature.
 - i. _____
 - ii. _____
 - iii. _____
- e. State the elevation at the following grid references:
 - i. GR 757462. _____
 - ii. GR 777484. _____
- f. Name the feature at 787489 _____
Suggest the purpose of this infrastructure:

- g. Give a Grid reference for the following features:
 - i. RFS building. _____
 - ii. Warragamba TRIG station. _____
- h. Calculate the length of the Warragamba Dam wall _____
- i. State THREE uses of the water in the dam:

- j. Use the map legend and photographs to explain the presence of fire trails and a rural fire station in the area.

Refer to SOURCE G: Enlarged Topographic map Warragamba Dam

- k. Determine the height of the Warragamba Dam wall _____
- l. Locate AR7748 on both maps. Use the scale of the map in SOURCE F to calculate the area covered by one grid square.

- m. Calculate the building density in AR 7748 _____
- n. Construct a photo sketch (line drawing) of the bottom photograph

STAGE 4: SKILLS

Label landform, water and human features

CHALLENGE / EXTENSION ACTIVITY

Warragamba Dam is in the **Hawkesbury Nepean Catchment**. Flooding is a major issue.

Watch the video clip "*Why Hawkesbury-Nepean floods are so dangerous*" at <https://www.youtube.com/watch?v=28SN9KixO2I>

- a. Explain the BATHTUB EFFECT

- b. Investigate the Hawkesbury Nepean Catchment and the threat of flood using the Water in the World resource at <https://www.ses.nsw.gov.au/for-schools/secondary/water-in-the-world/>
- c. Identify strategies proposed to reduce future flooding in this catchment, including a proposal to change the height of Warragamba Dam.

- d. Suggest the strengths and weaknesses of TWO strategies to reduce flooding in this catchment.

Strategy _____

Strategy _____

Strengths	Weaknesses	Strengths	Weaknesses

STAGE 4: SKILLS

SOURCE H: Access to water

- a. Describe the global distribution of countries with the least access to water (% of the population and total numbers). Refer to continents or regions in your answer.

- b. Calculate the total number of people without access to safe water in the **ten** countries listed.

- c. Define the following concepts:

• 'access' _____

• 'safe water' _____

• 'water scarcity' _____

- d. Why is access to safe water so important?

SOURCE I: Water scarcity

- a. Why is groundwater an important water source in India (provide evidence)

- b. How is the declining availability of groundwater measured?

(Hint: What do the numbers on the map refer to?)

- c. Describe the spatial pattern of 'extreme' groundwater decline in India.

STAGE 4: SKILLS

- d. If groundwater is not replenished, what will be the impact on farmers and communities in the worst affected Indian states?

- e. Suggest how groundwater supplies are replenished naturally and artificially

SOURCE J: Global water stress

- a. Use the map to explain the concept of 'water stress'

- b. Describe the spatial pattern of water stress on a global scale

- c. Suggest explanations for the following countries facing high levels of water stress

i. Australia _____

ii. China and India _____

iii. USA _____

SOURCE K: Water stress by country

Use an Atlas or Google Earth to locate each of the following countries on SOURCE J.

Calculate and describe projected changes in water stress between 2010 and 2040 for these countries.

- a. Botswana (Continent _____)

- b. Chile (Continent _____)

- c. Estonia (Continent _____)

STAGE 5: SUSTAINABLE BIOMES

Snapshot: Biomes and biome productivity

To complete the following activities students will need the GTANSW & ACT Bulletin Article titled *"SNAPSHOT: Biomes and biome productivity"* (Edition 52, Volume 2, 2020).

1. **Use the 'Speak geography' template on page 50 to create a word / concept bank**
2. Compare features of tropical rainforest and desert biomes SOURCE E.

Use the SOURCE A and the Climate Map Index at the following link – <https://www.climate-charts.com/World-Climate-Index-Map.html>

3. Select one place to represents a rainforest biome and one place to represent a desert biome.
Complete a climate graph for each place. See page 21
Use the Geospace 'Describing Climate' tables to describe the climate of each location. See page 22

Rainforest

Desert

4. Explain how differences in climate explain the features of the two biomes described in Question 2.

STAGE 5: SUSTAINABLE BIOMES

Refer to SOURCES A and B

5. What is a 'low latitude' location?

6. What is a 'high altitude' location?

7. Why is tundra found in high latitudes and high altitudes?

Refer to SOURCE C

8. Why is primary biomass (primary producers) the most important level in a food pyramid?

9. It is generally accepted that the most productive biomes also produce the most food.
Provide one reason for this link.

Complete:

- **Risk and reward class activity on page 54**

** This activity could be undertaken by students working individually, in pairs or small groups*

- **Test your recall: Stop the bus activity on page 55**

** This activity could be undertaken by students working individually, in pairs or small groups*

STAGE 5: SUSTAINABLE BIOMES

SPEAK  GEOGRAPHY	A	B	C	D	E
SUSTAINABLE BIOMES and Biome productivity	F	G	H	I	J
Instructions <i>As you learn:</i> Record geographical concepts and terms used throughout the topic as you learn.	K	L	M	N	O
On completion: *Put an asterisk beside the terms you can define right now without looking them up.	P	Q	R	S	T
<u>Underline</u> terms you do not know or understand.	U	V	W	XY	Z



STAGE 5: SUSTAINABLE BIOMES

Pollinators, bees and food

To complete the following activities students will need the GTANSW & ACT Bulletin Article titled *"Pollinators, bees and food"* (Edition 52, Volume 2, 2020). A PPT resource can be used for online learning.

1. What is the link between pollinators such as bees and food security?

2. Listen to the FAO podcast 'The power of pollinators' at <http://www.fao.org/news/podcast/tzh-06-the-power-of-pollinators-why-more-bees-means-better-food/en/>

Outline one key message from the podcast.

3. Provide reasons for the global loss of pollinators.

4. What are commercial bee services?

5. Why are bee services increasingly important?

6. Outline the CSIRO 'bees in backpacks' research.

Complete:

- **Challenges to food production – Pieces of the pie. Instruction page 55, activity page 57**
- **Challenges to food production – Consequence and flow charts. Instruction page 55, activity page 58**

STAGE 5: SUSTAINABLE BIOMES

Mongolia's grassland biome

To complete the following activities students will need the GTANSW & ACT Bulletin Article titled "*Mongolia's grassland biome*" (Edition 52, Volume 2, 2020).

1. Provide three statements that summarise the distribution of grassland biomes.

2. What names are used for grasslands across the world.

3. What factors influence the productivity of grassland biomes?

4. Why are grasslands able to support food and fibre production?

5. How important are grasslands for global food production?

Refer to SOURCE B

- 6a. List the different biomes in Mongolia

- b. What is the dominant biome? _____

Refer to SOURCE C

- 7a. Calculate the average annual precipitation _____

- b. What is the average maximum temperature? _____

- c. Why are Mongolia's grasslands described as 'temperate' grasslands?

STAGE 5: SUSTAINABLE BIOMES

Refer to the photographs throughout

8. Describe the grassland environment and agricultural landuse in Mongolia.

9. Why are the nomadic herders of Mongolia considered to be sustainable farmers?

10. Mind map threats and challenges to grasslands, nomadic herders and food production in Mongolia

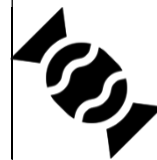
11. Select ONE government environmental strategy. Explain how this strategy will help protect the grasslands and also help achieve sustainable food production.

RISK and REWARD: BIOMES and their PRODUCTIVITY REVISION

BRONZE	SILVER	GOLD
How are biomes linked to climate?	How does altitude influence the location of different biomes?	How are biomes in low latitudes different from biomes in high latitudes?
Name two continents with tropical rainforest biomes.	Name two continents with tundra biomes	Name four biomes found in Australia
Define primary biomass	Define primary productivity	Why is the primary productivity of biomes important?
Where are the most productive biomes found?	Name one highly productive biome and one biome with low primary productivity	Where is the primary productivity of a biome shown on a food pyramid?
State one way that biomes are used to produce food.	State two ways biomes are used to produce food.	How are biomes altered to produce food?
Why do productive biomes have more biodiversity (living things) than less productive biomes?	What is the difference in biodiversity between highly productive biomes and those with low primary productivity?	Explain why productive biomes have higher biodiversity and more complex food webs.
State one impact of climate change on biomes	State two impacts of climate change on biomes	State three impacts of climate change on biomes
State one way that climate change can affect food production	Explain why irrigation might be needed to produce food in places experiencing climate change	Explain why some places experiencing climate change will have less capacity to produce food.
What is a cartogram?	How are cartograms different to conventional maps?	Why are cartograms a useful tool for studying geographical phenomenon such as biomes?
State one way that satellite images are used to monitor biomes	Explain how satellite images show different vegetation types.	How does the productivity of biomes in Australia change with the seasons?

Risk and reward

- You will be randomly selected to pick a question to answer, if the class they cannot improve your answer – you get the reward.
- If you improve someone's answer, you get a reward.
- Today's rewards will be:



SUSTAINABLE BIOMES

1: Test your recall - STOP THE BUS



You will need a copy of the article “*Biomes and their productivity*” to complete this activity.

Organisation

- Each student (or small group) completes the worksheet until a STOP THE BUS is called.
- Teacher is the umpire if there is disagreement.
- Share ideas for each question with the class and add depth to your responses

Instructions

- The aim of this activity is to provide 4 facts or ideas in response to each question.
- Bonus marks are given for correct information not given by other students
- Bonus marks are given for attempting the bonus question indicated by **
- The first person (small group) to fill in 4 relevant responses to each question calls “STOP THE BUS” and all students STOP WRITING.

Scoring

- 3 marks for bonus questions
- 2 marks for an answer no one else has
- 1 mark for a correct answer
- 0 marks for an incorrect answer.

2: Challenges to food production - PIECES OF PIE

This activity is based on the article “*Pollinators, bees and food*”

- You will need a copy of the article to complete this activity.
- Complete the pieces of pie by answering each question.



3: Challenges to food production - CONSEQUENCE and FLOW CHARTS



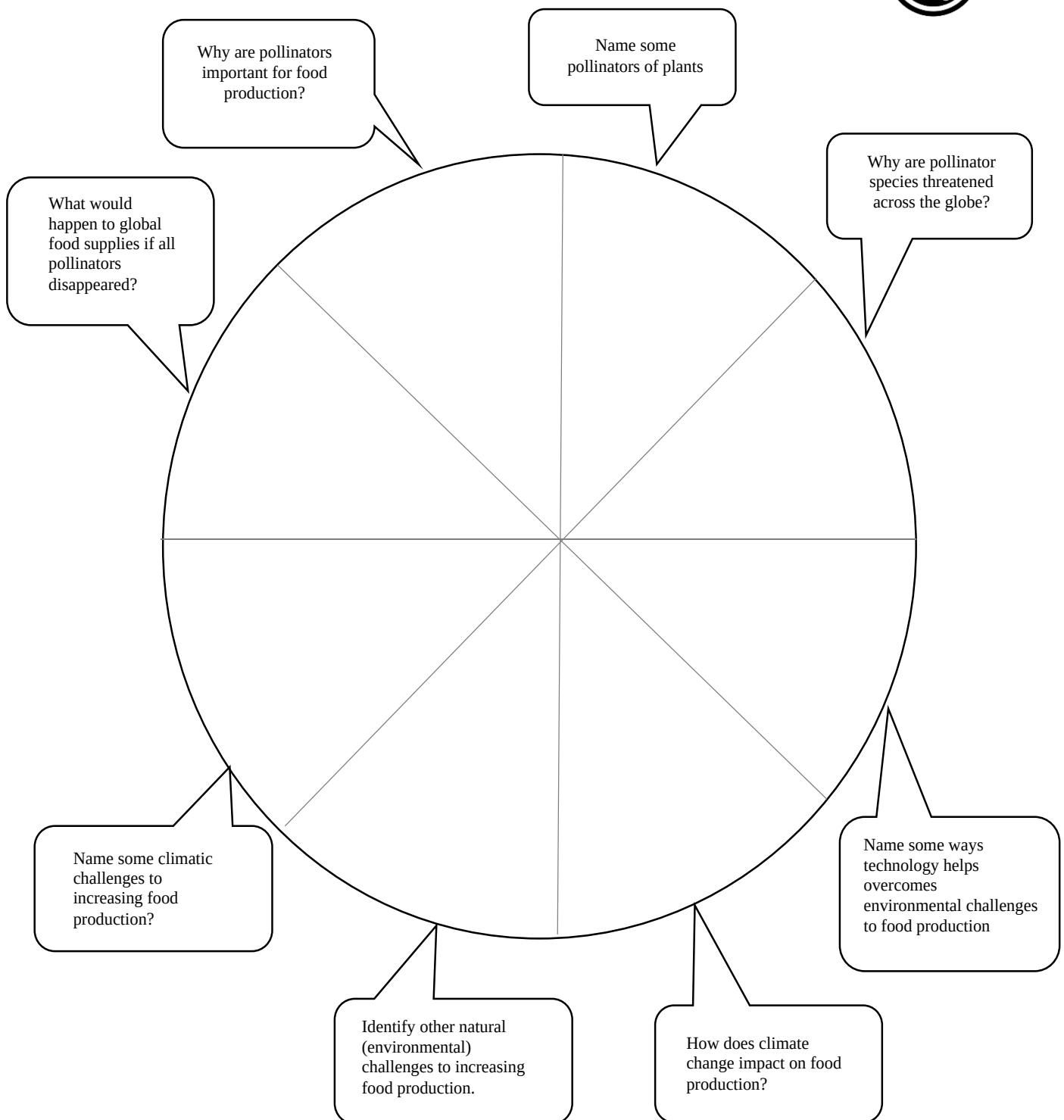
- Students will need a copy of the article “*Pollinators, bees and food*” to complete this activity.
- Use the article, listen to the podcast and study the infographic at the following weblink to:
 - Summarise consequences of a global loss of pollinators on the Consequence Chart
 - Create a Flow Diagram to show how ONE strategy to protect bees can have a positive impact on food production and food security

NOTE: Full page charts can be printed from the Global Education website for this activity if required https://www.globaleducation.edu.au/verve/_resources/flow_chart.pdf
https://www.globaleducation.edu.au/verve/_resources/consequences_chart.pdf

1: TEST YOUR RECALL - STOP THE BUS

Question	1.	2.	3.	4.	Score
What makes the world's biomes different to each other?					
What does the primary productivity of a biome mean?					
How does primary productivity vary between biomes?					
Why are some biomes able to produce higher yields from agriculture than others?					
How do people use and alter biomes for agricultural production?					
What are the consequences of altering biomes to grow agricultural products? **					

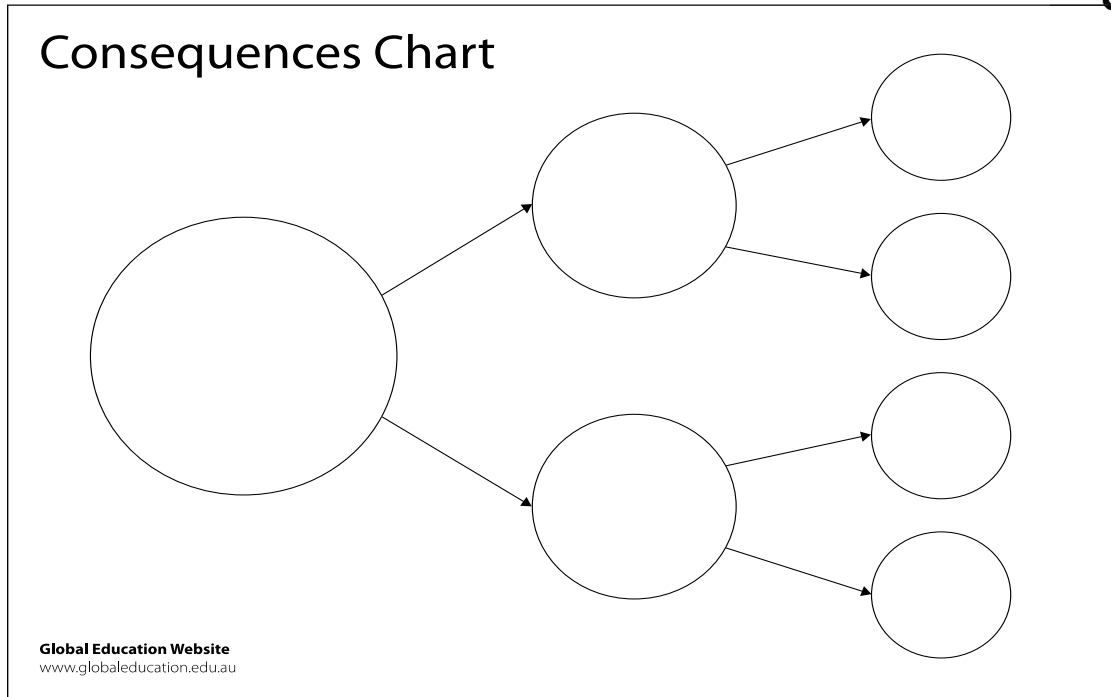
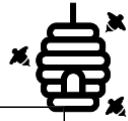
2. CHALLENGES TO FOOD PRODUCTION - PIECES OF THE PIE



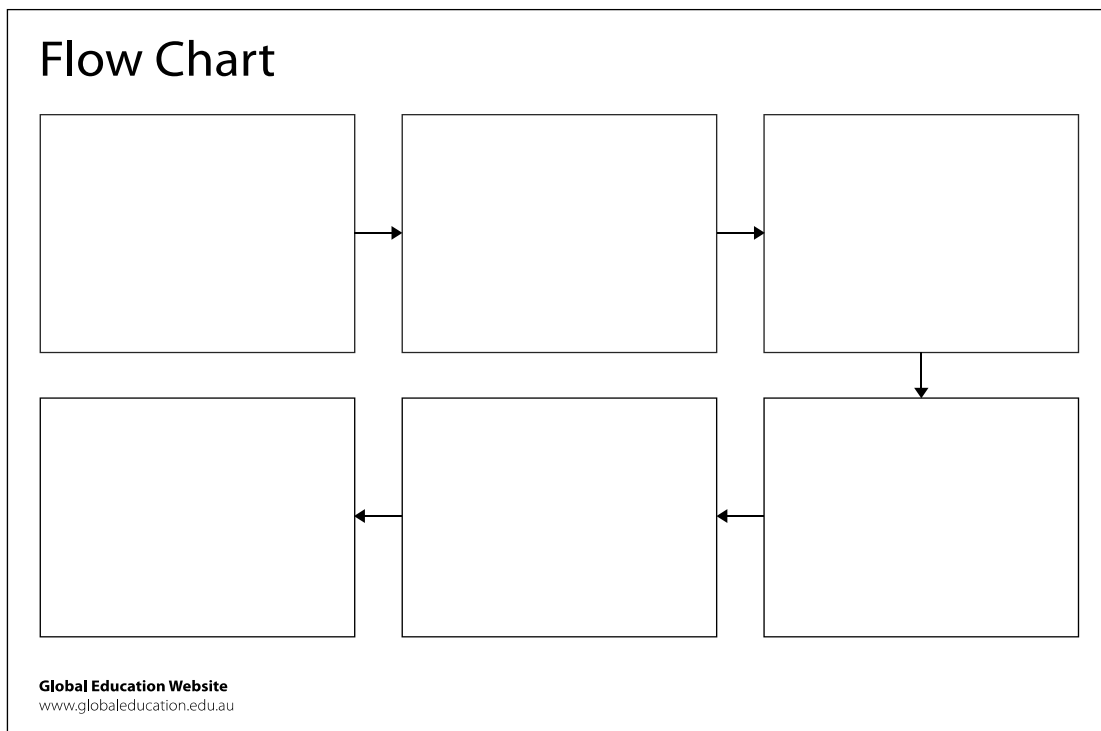
Created and revised by L Chaffer for GTANSW & ACT for Bulletin 2, 2020 **Template ideas from various twitter posts*

3. CHALLENGES TO FOOD PRODUCTION - CONSEQUENCE & FLOW CHARTS

Summarise TWO consequences of a global loss of bees and two flow on effects of each consequence



Propose ONE strategy to protect bees and show how that strategy will have a positive impact on food production in a flow chart.



STAGE 5: ENVIRONMENTAL CHANGE

INVESTIGATIVE STUDY: Tundra

To complete the following activities students will need the GTANSW & ACT Bulletin Article titled *"Investigative study: Tundra"* (Edition 52, Volume 2, 2020).

1. Summarise: Use the scaffold to create a brief summary

	McDonald Island and Heard Islands Reserve and World Heritage Area, AUSTRALIA	Churchill Wildlife Management Area, CANADA
Biophysical processes		
Describe the biophysical processes that occur in tundra environments.		
Explain how the biophysical processes enable tundra environments to function.		
Causes, extent & consequences of change		
Examine the causes and extent of change to tundra environments.		
Analyse the short and long-term consequences of environmental change.		

STAGE 5: ENVIRONMENTAL CHANGE

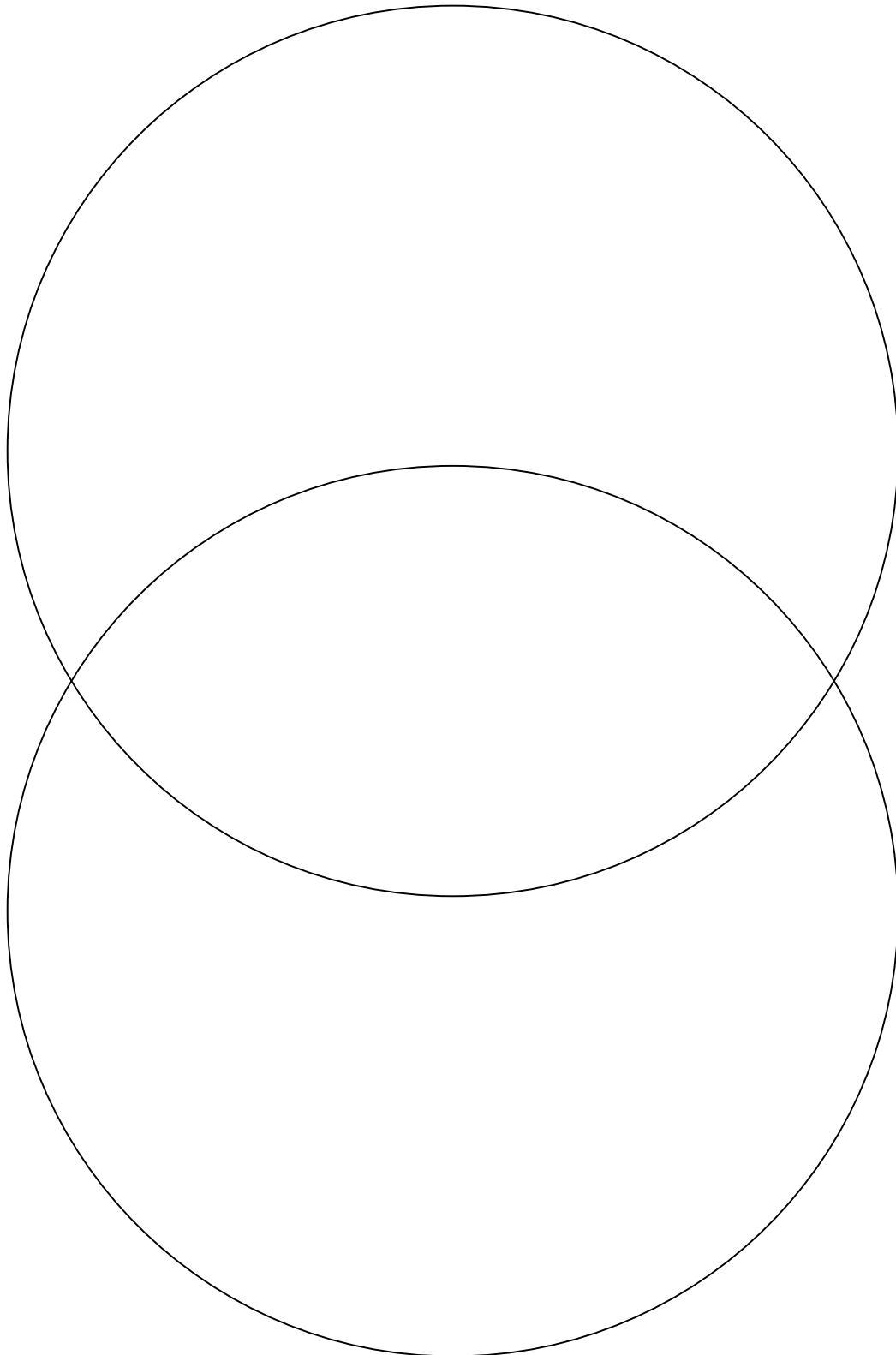
2. Identify causes and consequences of environmental change in tundra environments.

Causes of change	➡	Impact on the lithosphere
	➡	Impact on the atmosphere
	➡	Impact on the biosphere
	➡	Impact on the hydrosphere

STAGE 5: ENVIRONMENTAL CHANGE

3. Comparing places

Use the VENN DIAGRAM below to show major similarities and differences between McDonald Island and Heard Islands Reserve and World Heritage Area, Australia AND Churchill Wildlife Management Area, CANADA.



STAGE 5: ENVIRONMENTAL CHANGE

4. Writing task - **EXTENDED RESPONSE**

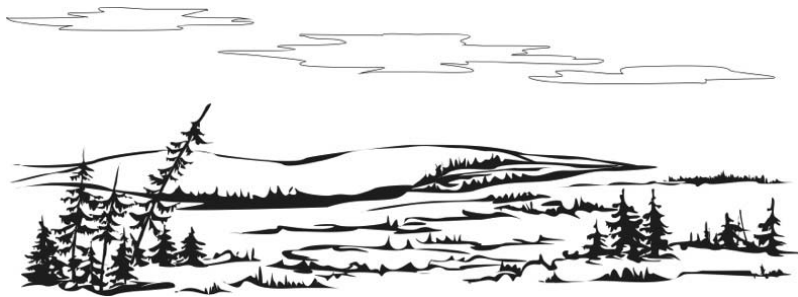
Examine the short, and longer-term consequences of environmental change in tundra environments. Refer to both Churchill, Canada and McDonald and Heard Islands, Australia in your response. Use this planning scaffold for your answer.

Introduction	
Short term consequences – overview	
Short term consequences – Churchill	
Short term consequences – Heard and McDonald Islands	
Long term consequences – overview	
Long term consequences – Churchill	
Long term consequences – Heard and McDonald Islands	
Conclusion	

STAGE 5: ENVIRONMENTAL CHANGE

5. Test your memory: 15 MINUTES ON TUNDRA

Annotate the image with features of the tundra environment at Churchill, Canada



Location: Churchill, Canada

Environmental processes important for the functioning of the Churchill's tundra environment

-
-
-
-
-

Write a 100-word response to this question:

How have human activities changed the functioning of this tundra environment?

STAGE 5: ENVIRONMENTAL CHANGE

Sydney Harbour

To complete the following activities students will need the GTANSW & ACT Bulletin Article titled “*Sydney Harbour*” (Edition 52, Volume 2, 2020).

1. THINK: What does a healthy aquatic environment look like?

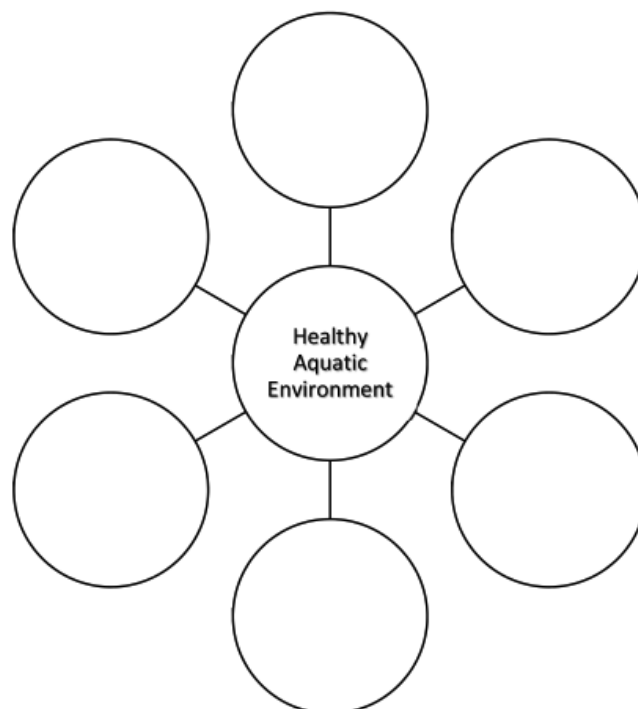
- a. Distinguish between aquatic and terrestrial environments

- b. Identify some aquatic environments you know

- c. Do you think Sydney Harbour is a healthy aquatic environment? YES NO
Justify your answer

2. COLLABORATE: See Saw

Work in pairs to add features of a healthy aquatic environment to the following mind map.
Join a class discussion and modify the mind map you created with any new ideas.



STAGE 5: ENVIRONMENTAL CHANGE

3. TEST YOURSELF: How well do you know Sydney Harbour? Try this quiz.

1. How old is Sydney Harbour on which it was built?
 - a. 25 Million Years
 - b. 10 Million Years
 - c. 100 000 years
 - d. 10 000 years
2. Tidal ranges vary hugely around Australia from less than 1m at Portland, Vic, to 10 m at Derby, WA. Sydney Harbour is subject to tidal changes. What is the maximum difference between the high and low tide in Sydney Harbour?
 - a. 0.5m
 - b. 2.1m
 - c. 5.3m
3. Seagrass beds provide important nursery grounds for baby fish. How many species of seagrass occur in Sydney Harbour?
 - a. 3
 - b. 15
 - c. 30
4. The Eastern blue groper lives in the Harbour. They can grow up to 120 cm, but how long can they live?
 - a. 5 years
 - b. 10 years
 - c. > 30 years
5. The East Australian Current flows southward from the Great Barrier Reef along the coast of NSW. In the film 'Finding Nemo' Nemo's dad Marlin travelled southward in the EAC from the GBR to Sydney. Is this realistic? Do we find tropical fish in Sydney Harbour?
 - a. Yes
 - b. No
6. If you answered yes, how many days do you think it takes for a fish to arrive in Sydney Harbour if it came from Heron Island (approximately 1500km north of Sydney), assuming the EAC flows at 1 m/s?
 - a. 17 days
 - b. Two months
 - c. Half a year
7. Sydney Harbour can be a busy waterway! Approximately how many boats were registered in Sydney Harbour in 2014?
 - a. 5000
 - b. 9 000
 - c. 20 000
 - d. 50 000

STAGE 5: ENVIRONMENTAL CHANGE

8. One Sydharb is an official Australian unit of measurement used to measure volume. A Sydharb of water equals?
- 250 gegalitres
 - 500 gegalitres
 - 750 gegalitres
 - 1000 gegalitres
9. How many fish species are in Sydney Harbour?
- Fewer than 380
 - 480
 - 580
 - Over 580
10. How much of the 322km long Sydney Harbour shoreline is reclaimed land?
- 25%
 - 30%
 - 40%
 - Over 50%

Answers are at the back of the Bulletin 52, No 1, 2020 Supplement.

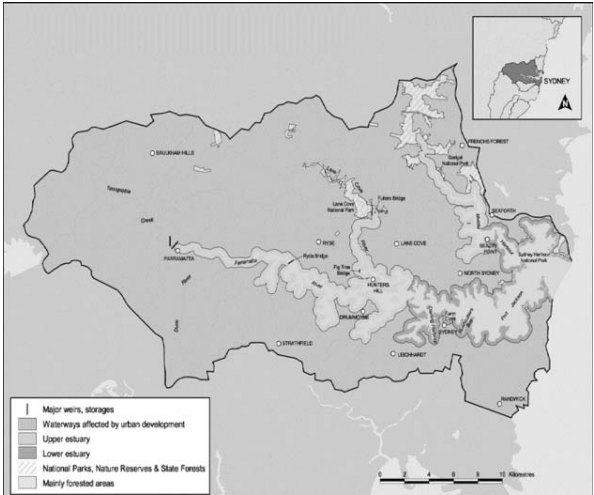
What else do you know about the environment of Sydney Harbour?

Outline FIVE features of the Sydney Harbour environment you currently know.

NOW: Read the information on Sydney Harbour to complete questions 4, 5 and 6.

STAGE 5: ENVIRONMENTAL CHANGE

4. Sydney Harbour What is? Where? Why there? Why care?

What type of environment is Sydney Harbour? Where is Sydney Harbour? Why is it there? Outline important processes for the healthy functioning of the Sydney Harbour environment Hydrosphere Lithosphere Atmosphere Biosphere	List ways the harbor environment has been changed over time by human activities. 
What are the consequences of past environmental change in Sydney Harbour? Why should we care about what is happening to the Sydney Harbour environment?	
Suggest ways Sydney Harbour could be managed to reduce and repair environmental damage?	

STAGE 5: ENVIRONMENTAL CHANGE

5. TEN plus TEN

At the completion of your study of environmental functioning and change in Sydney Harbour:

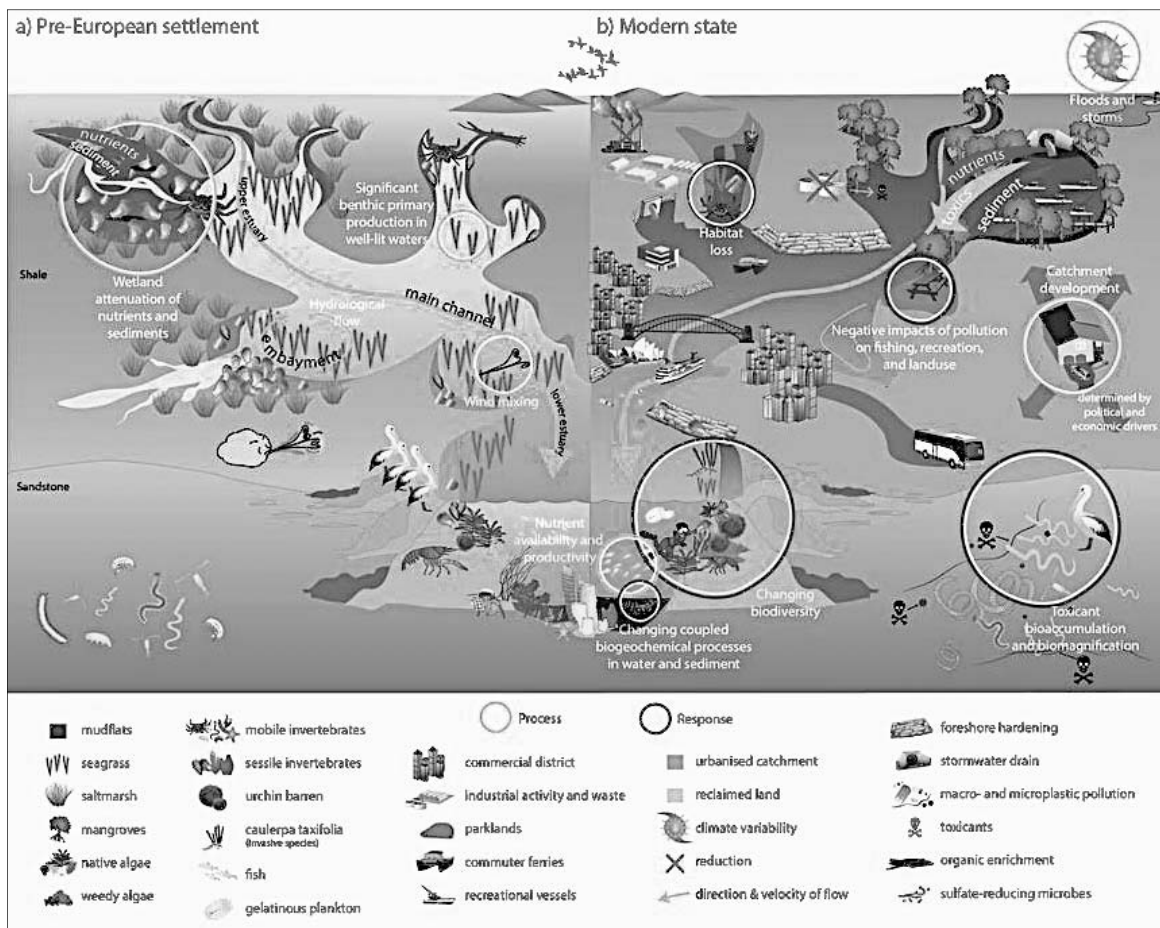
- Create a glossary of ten geographical terms with a definition for each
- Write a statement about Sydney Harbour using the term

Term x 10	Meaning / definition	Sydney Harbour
<i>Example Bathymetry</i>	<i>The depth of the ocean floor (Bottom of the harbour)</i>	<i>The bathymetry of Sydney Harbour varies with an average depth of 13 metres and depths up to 45 metres in shipping channels.</i>

STAGE 5: ENVIRONMENTAL CHANGE

6. Identifying environmental processes

Conceptual diagrams use symbols to summarise a wide range of scientific / geographical information about environments and environmental processes



Sydney Harbour Estuary Processes Study. Source: www.researchgate.net

Use your knowledge PLUS this conceptual diagram to identify dominant environmental processes affecting Sydney Harbour prior to European settlement and in 2020.

Pre-European settlement	2020

STAGE 5: SKILLS

To complete the following activities students will need the GTANSW & ACT “Stage 5 Skills Stimulus” (Edition 52, Volume 2, 2020).

Challenges to food production and natural environments

SOURCE A: Pollinators

1. How many species of bees and other insects are pollinators of earth’s most important (leading) food crops? _____
2. True or false. A loss of pollinators would cause:
 - a. 45 % of harvests would experience losses up to 45% of production. _____
 - b. 40% of harvests would experience losses of over 45% of production. _____
 - c. 50% of crops depend on some form of animal pollination _____
3. Which areas of the world will suffer the greatest agricultural losses (over 12.5%) if pollinators are lost? Name countries you know.

SOURCE B: Locusts

1. Explain why locusts are a challenge to food production

2. What is a locust? (research if you do not know)

3. Describe the spread of locust swarms from Pakistan to the middle East and East Africa in 2019. Refer to countries and distances.

4. Investigate the damage caused by this locust plague in one country on this map. Summarise your findings in ONE paragraph. Refer to crop losses and food security in your response.

STAGE 5: SKILLS

SOURCE C: Climate and topography

1. Identify THREE natural challenges to food production in SOURCE C.

2. Explain how the Netherlands, Vietnam and Egypt have overcome these challenges?
Use geographical terms in your answer.

3. Define the terms “*under glass*” and “*under sky*” that are often used to describe differences in agricultural production.

SOURCES D and E: Amazon Basin land cover and landuse

1. What is unique about the changes occurring in the Amazon?

2. What is the link between events in the Amazon and food production?

3. Explain why deforestation is a global environmental issue

4. What is a false colour satellite image? Suggest why false colours are used instead of original images?

5. Describe the location of areas that have been cleared for pasture in Brazil.

STAGE 5: SKILLS

SOURCE F: Water Cycle

Use the diagram to explain how the water cycle is changed when forests are replaced by grasslands.

SOURCE F: Biodiversity loss

1. Briefly list THREE reasons why reindeer populations are in decline in the Arctic.

2. What is the common link between all of the changes listed in Q1?

3. Summarise the data for the most affected locations in Canada and Russia where numbers of animals are monitored.

Calculate the % change in reindeer populations for each location.

Location	Country	Current Numbers '000,000	Maximum Population '000,000	% change
16				
13				
12				
9				
1				

SOURCE G: Thawing soils

1. What is "permafrost"?

2. Describe the geographical location of 'continuous' permafrost.

STAGE 5: SKILLS

3. What happens as continuous permafrost become discontinuous and more fragmented

4. Why is thawing permafrost an issue for settlements and infrastructure?
Give examples of what would happen as the ground thaws.

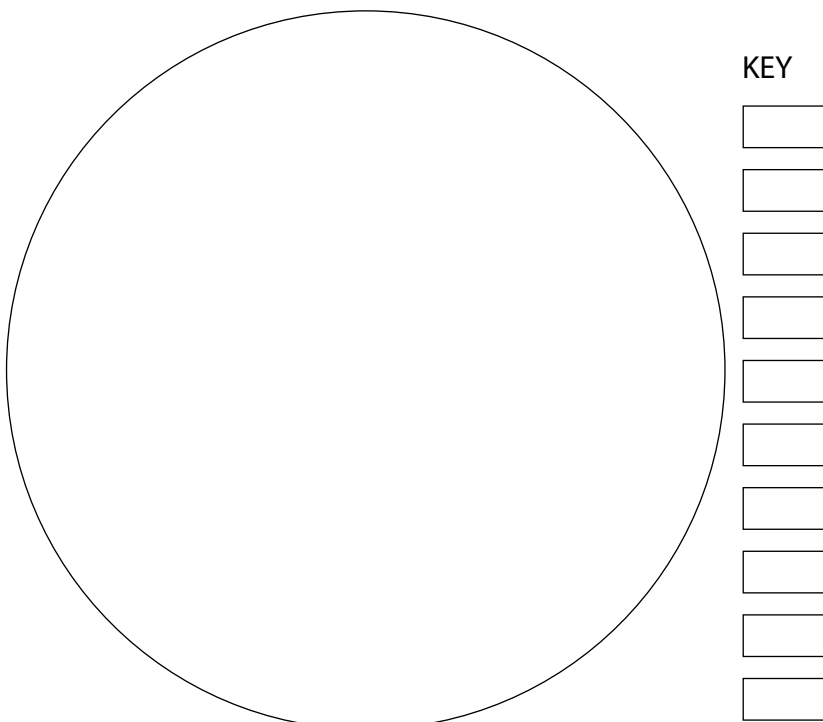
5. Explain two links between changing climate and thawing permafrost.

SOURCE H: Human use of Earth's biomes and environments

Analyse the illustration.

a. Represent the information in a pie graph:

- Create a key
- Convert % to degrees – every 1% will be 3.6 degrees.
- Begin your graph at north with the largest segment and construct moving clockwise (to the right from largest to smallest segments).



STAGE 5: SKILLS

- b. Write a paragraph to describe the extent of human use of the Earth's land surface. Use some statistics in your answer.

SOURCE I: Land and climate change

- a. Identify the key message in this illustration.

- b. What strategies are suggested to address the issue?

SOURCE J: Sustainable land management

- a. Work in pairs or small groups to define or explain each of the challenges to achieving sustainable land management in TABLE A.
- b. Complete sections of TABLE B allocated to your group.
Briefly explain the strategy and identify the challenges it will address.
- c. Contribute to a class discussion and complete your table using the ideas raised.

TABLE A

Challenge	Definition
1.Climate mitigation	
2.Climate adaptation	
3.Land degradation Desertification	
4.Biodiversity conservation	
5.Food security	

STAGE 5: SKILLS

TABLE B

Strategy	What this means	Challenge addressed
Zero deforestation and conversion		
Integrated water management		
Reduced food loss and waste		
Sustainable forest and grassland management		
Better livestock management		
Diet shift		
Agroforestry		
Better cropland management		
Better urban planning		
Forest and ecosystem restoration		
Zero grassland conversion		
Agricultural diversification		
Coastal wetlands restoration		
Increased soil carbon		

STAGE 5: ENVIRONMENTAL CHANGE

Canada Introduction

True or False answers

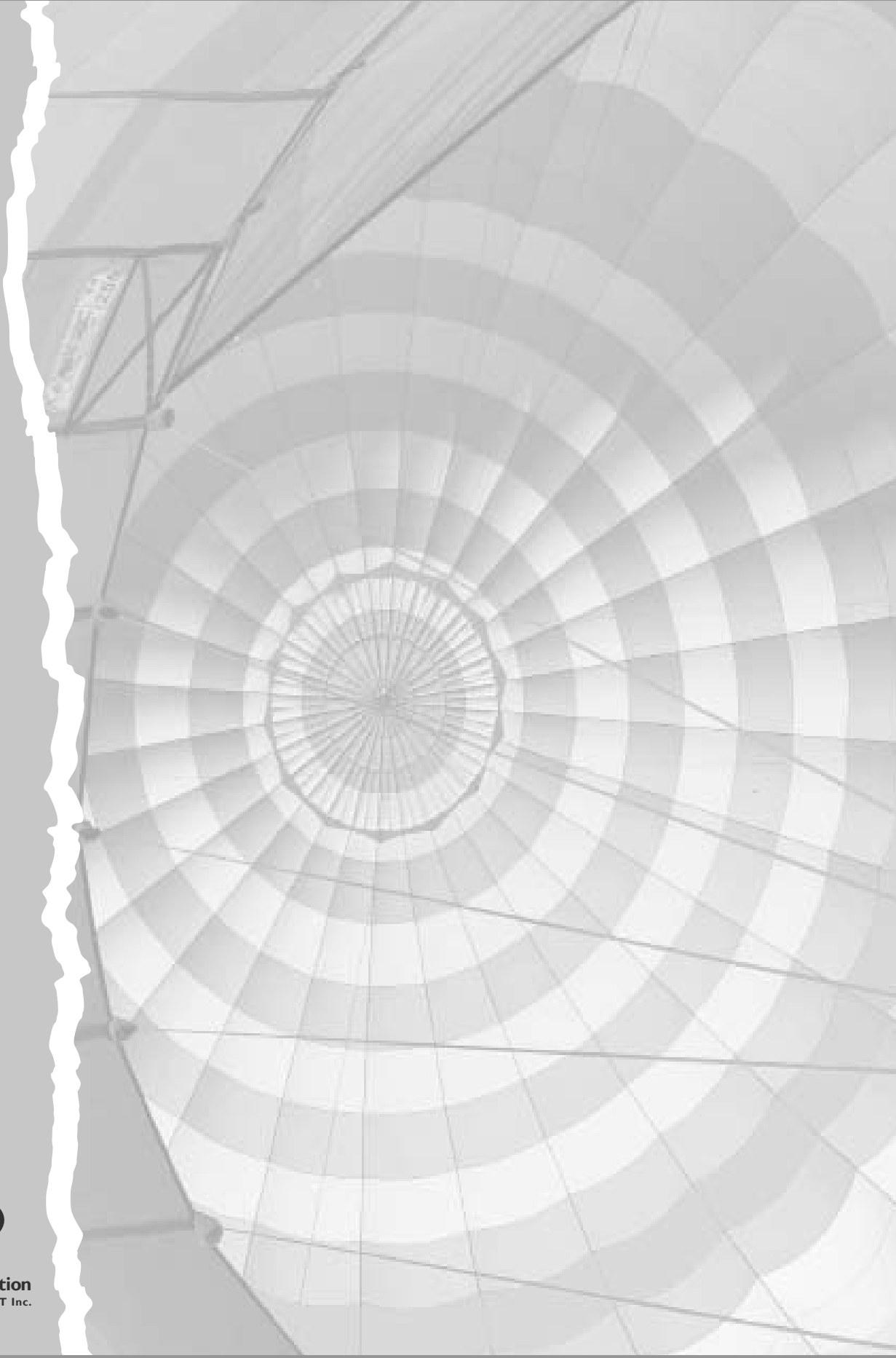
1 F, 2 F, 3 F, 4 T, 5 F, 6 F, 7 F, 8 T, 9 T, 10 T, 11 T, 12 T, 13 F, 14 T, 15 F

How well do you know Sydney Harbour?

Quiz answers

- 1d.** Sydney Harbour was formed just over 10 000 years ago. As the sea level rose, the ocean flooded into a valley hilly river system. Sydney Harbour is known as a ria (drowned river valley).
- 2b.** Sydney is known as 'micro-tidal' and experiences a maximum 'tidal range' just over 2.1 m. The Harbour is a tide dominated estuary. The tides determine water level, salinity, current strength and direction and aquatic species throughout the whole harbour. Estuarine environments are among the most species rich on Earth.
- 3a** Several species of seagrass have been recorded but seagrass beds are dominated by 3 taxa. Sea grasses are habitat forming and important for biodiversity.
- 4c.** Blue gropers can live in excess of 35 years!
- 5a.** Yes ... on the increase!
- 6a.**
- 7c.** As of 2009 there were 20,000 boats registered in Sydney Harbour. Most of these were between 4–6 meters in size.
- 8b.** 500 gigalitres (1 Gigalitre is 1,000,000,000 litres)
- 9c.** Over 586 species of fish are found in Sydney Harbour... rich estuarine biodiversity. There are over 3000 marine species in the harbour.
- 10a.** 77km of the shoreline is reclaimed land (about 25%) – but 50% is armoured by seawalls for reclamation as well as protection of property. Sydney Harbour is one of the world's most modified harbours.





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