

LIFE ON THE MURRAY RIVER

Level: 7 & 8

Activity: 1

Overview

The Murray River is a rich part of the Australian landscape. It flows for more than 2,500km, through three Australian states. Throughout history, the Murray River has been a source of food, trade and life sustaining biodiversity. During this activity, students will investigate how life on the Murray has changed throughout history and make some predictions about what it might look like in the future.

Resources

- Smartboard
- Computer access for students
- Appendix A: *Murray River Today*
- Appendix B: *Looking Forward*

Activity

ENGAGE

Show students Appendix A: *Murray River Today* on the smartboard. Discuss as a group:

- Who uses the Murray River today?
- In what ways is the river used?
- How would you describe our relationship with the river?
- What hazards do we need to consider when we are working/playing/living near the river?

Instruct students to draw a Venn diagram in their workbooks titled THEN & NOW. Give them some time to make notes in the NOW section about our relationship with the river and how we use it today.

EXPLORE

Students can now explore [Murray River Aboriginals](#) and add to their THEN & NOW any information they find about the role the river played in the lives of the Aboriginal Australians pre-colonisation. Encourage them to think about whether there are any aspects of the relationship that remain relevant today (eg. Fishing, swimming etc).

EXPLAIN

Discuss as a group:

- Are there any similarities between the relationship we have with the river today and that of people in the past?
- In what ways has it changed?
- What might this relationship look like in another 200 years?

ELABORATE

Give each student a copy of Appendix C: *Looking forward*. Students need to add to the image according to what they predict the Murray River will look like in the future. They should think about the way it might be used and cared for and incorporate this into their image.

EVALUATE

In pairs, students share their images, explaining their predictions and the reasons for their choice. Each student should respond to their partner with a compliment (about something they thought was interesting) and a suggestion (about something that could be improved).

Curriculum Links

Victorian Curriculum Foundation–10

Level 7		
HISTORY	<u>Historical Concepts and Skills:</u> Chronology	Sequence significant events in chronological order to analyse the causes and effects and identify continuities and changes (VCHHC097)
	<u>Historical Concepts and Skills:</u> Chronology	Describe and explain the broad patterns of change over the period from the Ancient to the Modern World(VCHHC098)
	<u>Historical Knowledge:</u> Aboriginal and Torres Strait Islander peoples and cultures	How physical or geographical features influenced the development of Aboriginal and Torres Strait Islander peoples' communities, foundational stories and land management practices (VCHHK105)
GEOGRAPHY	<u>Geographical Knowledge:</u> Water in the world	The spiritual, economic, cultural and aesthetic value of water for people, including Aboriginal and Torres Strait Islander peoples and peoples of the Asia region, that influence the significance of places (VCGGK109)
Level 8		
HISTORY	<u>Historical Concepts and Skills:</u> Chronology	Sequence significant events in chronological order to analyse the causes and effects and identify continuities and changes (VCHHC097)
	<u>Historical Concepts and Skills:</u> Chronology	Describe and explain the broad patterns of change over the period from the Ancient to the Modern World(VCHHC098)
	<u>Historical Knowledge:</u> Aboriginal and Torres Strait Islander peoples and cultures	How physical or geographical features influenced the development of Aboriginal and Torres Strait Islander peoples' communities, foundational stories and land management practices (VCHHK105)
GEOGRAPHY	<u>Geographical Knowledge:</u> Water in the world	The spiritual, economic, cultural and aesthetic value of water for people, including Aboriginal and Torres Strait Islander peoples and peoples of the Asia region, that influence the significance of places (VCGGK109)

Sample Report Comments

{Name} can explain some of the ways in which people's relationship with the Murray River has changed over time. {He/She} used this information to make some predictions about what the river might look like and how it might be used in the future.

References

Discover Murray River, 1998-2018. *Murray River Aboriginals*, <http://www.murrayriver.com.au/about-the-murray/murray-river-aboriginals/> [viewed 06 July 2018].

Appendix A

Murray River Today



Appendix B

Looking Forward



LIFE ON THE MURRAY RIVER

Level: 7 & 8

Activity: 2

Overview

The Murray River is an amazing resource that has helped sustain life for tens of thousands of years. Today it plays an important role in Australia's lifestyle and economy. Many farms depend on it to provide water for irrigation. However, irrigation and land clearing can contribute to an increase in salinity which may impact negatively on the ecosystem and threaten the water supply for people and livestock. During this activity, students will learn about the water cycle within the Murray-Darling Basin and investigate some of the issues that threaten the health of the river. Students will analyse and interpret river data, including water levels, flow rates and salinity levels.

Resources

- Computer access for students
- Smartboard or projector

Activity

ENGAGE

Watch [The Water Cycle in the Murray-Darling Basin](#) together as a whole class.

EXPLORE

Have students complete a PMI chart in their workbooks. They will need to divide their page into three sections; *Plus*, *Minus* and *Interesting*. They can then fill in their chart with facts and ideas from the video. Share some of these as a class and collate students' ideas on a large PMI chart on the board. Look at the *Minus* section and ask students what they think are the main threats to the health of the river.

EXPLAIN

Look at the [Map of Topographic Drainage Divisions and River Regions](#) from the Bureau of Meteorology. Encourage students to make observations and draw conclusions using the information presented by asking:

- Can you locate the Murray-Darling Basin? Can you identify any of the other regions?
- Which of these regions do you think would get the most/least rain? Why?
- What role does topography play in defining these water catchment areas? For example, what significant geological feature separates the Murray-Darling Basin from the South East Coast?
Answer: The Great Dividing Range – Water runs off to the east and west into the two different catchment areas.
- Looking at the other regions, can you explain any of these drainage areas based on the geographical features of the area? For example, water drains into Lake Eyre as it is the lowest natural point in on the mainland of Australia.

ELABORATE

With a partner, students will need to access the [River Data](#) website. They need to choose one location along the river and look at the graphs showing the various measurements over time (eg. Water level, flow rates, salinity etc). By comparing these graphs, students need to make some statements about what might have happened at certain points in time. For example:

At Tocumwal on the 24th of August, 2017 the water level rose to 4.359m. Flow rates were also much higher on this day. This might have contributed to the drop in salinity that occurred over the following week.

EVALUATE

Each pair of students can now present their observations to the class. Encourage students to ask questions and discuss the observations made. Ask students to identify some times when it might not have been safe to swim in the river based on the data they have seen and explain why. Discuss the importance of checking the conditions, such as rainfall and currents, before entering the water.

Curriculum Links



Level 7		
GEOGRAPHY	<u>Geographical Knowledge:</u> Water in the World	Ways that flows of water connect places as they move through the environment and the ways this affects places (VCGGK106)
		The quantity and variability of Australia's water resources compared with those in other continents and how water balance can be used to explain these differences (VCGGK107)
	<u>Geographical Concepts and Skills:</u> Data and Information	Analyse maps and other geographical data and information using digital and spatial technologies as appropriate, to develop identifications, descriptions, explanations and conclusions that use geographical terminology (VCGGC104)
Level 8		
GEOGRAPHY	<u>Geographical Knowledge:</u> Water in the World	Ways that flows of water connect places as they move through the environment and the ways this affects places (VCGGK106)
		The quantity and variability of Australia's water resources compared with those in other continents and how water balance can be used to explain these differences (VCGGK107)
	<u>Geographical Concepts and Skills:</u> Data and Information	Analyse maps and other geographical data and information using digital and spatial technologies as appropriate, to develop identifications, descriptions, explanations and conclusions that use geographical terminology (VCGGC104)

Sample Report Comments

{Name} has learnt about the water cycle within the Murray-Darling Basin. {He/She} is beginning to explain the movement of water through the landscape in relation to topography and other geological features.

{Name} analysed and interpreted graphs showing data regarding water levels, flow rates, temperature and salinity in the river over time. {He/She} compared these graphs, identifying changes and was able to make some reasonable assertions about what might have caused these changes.

References

Bureau of Meteorology. *Australian Hydrological Geospatial Fabric (Geofabric)*, http://www.bom.gov.au/water/geofabric/documents/BOM002_Map_Poster_A3_Web.pdf [viewed 12 July 2018]

Murray-Darling Basin Authority. *River Murray Data*, <https://riverdata.mdba.gov.au/system-view> [viewed 12 July 2018]

FUSE, 2017. *The Water Cycle in the Murray-Darling Basin*. [online video] Available at: <https://fuse.education.vic.gov.au/Resource/LandingPage?ObjectId=d726e7cf-bab2-4ac8-be41-99f5cfa434c7> [Accessed 12 July 2018]

LIFE ON THE MURRAY RIVER

Levels: 7 & 8

Activity: 3

Overview

The river red gum is a type of eucalypt that can live for over 500 years. They grow along rivers and lakes. River red gums make the perfect habitat for many different animals, and older trees can have up to 300 hollows in their trunks that provide shelter for many types of animals. During this lesson, students will investigate the animals and organisms that rely on the river red gum and create a food web to show how they depend on each other for survival.

Resources

- Smartboard
- Computer access for students
- Small pieces of cardboard or Post-it notes
- Appendix A: *T-Chart*

Activity

ENGAGE

Look at the [photos of river red gums](#) on the Smartboard or projector. Tell students:

The River Red Gum is a type of Eucalypt that can live for over 500 years. They grow along rivers and lakes. River Red Gums make the perfect habitat for many different animals, and older trees can have up to 300 hollows in their trunks that provide shelter for many types of animals.

Ask students what creatures and organisms might live on or in these trees. Write each of their suggestions on a separate piece of card or Post-it note. Display these on the board or arrange them on the floor where all of the students can see them. Now ask students to think about what each of these creatures might eat and which would be at the top/bottom of the food chain. Rearrange the cards into a food chain.

EXPLORE

Students now need to do some research to find out what creatures and organisms actually do make their home in river red gums and what each of these animals eat. They need to sort the information they collect into Appendix A: *T-Chart*.

EXPLAIN

Model and explain how a food web works using the [Antarctic Food Web Game](#) on the Smartboard.

ELABORATE

Students can now create a food web using the information they have gathered in their T-Chart. This could be done on paper or using a computer application such as [Canva](#) (if students have email addresses they can start a free account), otherwise Microsoft Word or PowerPoint could be used.

EVALUATE

In pairs, students can compare their food webs. Then together as a whole group, ask students to explain any similarities/differences. Discuss the importance of the river red gum to environment.

Curriculum Links



Level 7		
SCIENCE	<u>Science Understanding:</u> Biological Sciences	Interactions between organisms can be described in terms of food chains and food webs and can be affected by human activity (VCSSU093)
Level 8		
SCIENCE	<u>Science Understanding:</u> Biological Sciences	Interactions between organisms can be described in terms of food chains and food webs and can be affected by human activity (VCSSU093)

Sample Report Comments

{Name} understands how living things within an ecosystem depend on each other and the environment for their survival. {He/she} can describe the role that *Primary Producers*, *Consumers* and *Decomposers* play within the system.

{Name} has explored the important role the river red gum plays as a habitat for many different animals and organisms. {He/She} used a food web to show the various feeding relationships within this ecosystem.

References

NSW National Parks and Wildlife Service. *River Red Gum*, <https://www.nationalparks.nsw.gov.au/plants-and-animals/river-red-gum> [viewed 16 July 2018]

PBS Learning Media. *Antarctic Food Web Game*
<https://www.pbslearningmedia.org/resource/lsp07.sci.life.eco.oceanfoodweb/antarctic-food-web-game/#.W0iWAtIzblU> [viewed 13 July 2018]

Canva. <https://www.canva.com/> [viewed 14 July 2018]

Appendix A

T-Chart

List as many creatures as you can that make their home in or on the River Red Gum, then find out what they eat to survive.

Animal	What does it eat?

LIFE ON THE MURRAY RIVER

Level: 7 & 8

Activity: 4

Overview

In 1922 a system of locks and weirs were gradually installed along the length of the Murray River. The locks store water that can be used for irrigation and water supply for townships, and they also raise the river level upstream of the weir. Raising the level of the water makes it easier for large vessels to navigate the river and it also provides pools of water that can be used for recreational activities. During this lesson, students will demonstrate their understanding of how a lock works. They will calculate a lock's capacity using its dimensions.

Resources

- Isometric Paper

Activity

ENGAGE

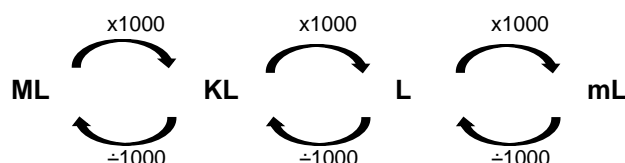
In their books, students need to draw a series of diagrams to show how a lock works. Remind them to make it as detailed as possible and to include labels. Invite some students to share their diagrams with the class.

EXPLORE

Ask students to estimate how much water they think the lock at Mildura might hold. They should write their estimate on a piece of paper and keep this for later. Now ask:

- What is this measurement called? What units of measurement would we use?

Answer: Capacity, millilitres (mL), litres (L), kilolitres (kL), megalitres (ML)



- What information will we need to calculate the capacity of the lock?

Answer: We need its dimensions (length, width and height)

EXPLAIN

Ask students:

- What is the difference between volume and capacity?

Answer: Volume is the space taken up by an object and is measured in cubic units (eg. cm^3 , m^3). Capacity is how much a container can hold and measurements depend on what it holds (eg. for liquid: L, mL etc.)

Demonstrate how to calculate capacity:

e.g. A container is 8cm long, 5cm wide and 3cm high

Step 1: Calculate its volume

$$\begin{aligned}\text{Volume} &= L \times W \times H \\ &= 8\text{cm} \times 5\text{cm} \times 3\text{cm} \\ &= 120\text{cm}^3\end{aligned}$$

Step 2: Convert to capacity

$$\begin{aligned}1\text{cm}^3 &= 1\text{mL} \\ 120\text{cm}^3 &= 120\text{mL}\end{aligned}$$

Give students the dimensions of the lock at Mildura (61.5m long, 17.1m wide and 7.6m deep) and ask them to calculate capacity (they may use a calculator). *Hint: $1\text{m}^3 = 1000\text{L}$.* Ask students to look again at their estimate and see who was closest.

ELABORATE

Explain to students that they are being asked to design a lock. The total capacity needs to be 8 megalitres. Using the isometric paper they need to draw as many different models as they can, labelling the dimensions of each.

EVALUATE

Discuss as a whole class:

- Describe the hazards around locks.
- Given how much water is flowing in and out of a lock, how could this affect conditions downstream?
- What can you do to make sure you stay safe around weirs and locks?

Curriculum Links



Level 7		
MATHEMATICS	<u>Measurement and Geometry:</u> Using units of measurement	Calculate volumes of rectangular prisms(VCMMG259)
Level 8		
MATHEMATICS	<u>Measurement and Geometry:</u> Using units of measurement	Choose appropriate units of measurement for area and volume and convert from one unit to another(VCMMG286)
		Develop the formulas for volumes of rectangular and triangular prisms and prisms in general. Use formulas to solve problems involving volume (VCMMG289)

Sample Report Comments

{Name} can describe the relationship between volume and capacity. {He/She} confidently converts between common units of capacity and volume (for example $3\text{cm}^3 = 3\text{mL}$)

{Name} can use the formula to accurately calculate the volume of a rectangular prism. {He/She} applied this knowledge to identify rectangular prisms of different dimensions for a given capacity.

References

Goulburn Murray Water. *Mildura Weir and Lock 11*, https://www.gmwwater.com.au/downloads/gmw/Storages/12-05-2015-TATDOC-3964403-v1-FACT_SHEET_MILDURA_WEIR_AND_LOCK_11_MAY_2015.pdf [viewed 15 July 2018]