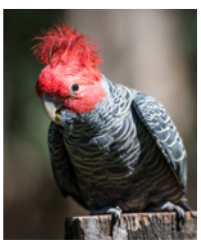
Jane Goodall's roots&shoots

The Rivers and Wetlands of the Murray-Darling Basin

Teacher Resources



Jane Goodall Institute Australia

Petaurus EDUCATION GROUP

Jane Goodall's roots & Shoots





All images from The Rivers and Wetlands of the Murray-Darling Basin. See image credits page 174 for details.

Contents

The Jane Goodall Institute Australia and Petaurus Education Group acknowledge with deep respect the First Nations of this land we now call Australia.

We recognise their continuing connection to Country, and acknowledge that they never ceded sovereignty. We thank them for caring for our living landscapes since time immemorial.

We acknowledge and respect the continuation of cultural, spiritual and educational practices. We pay our respects to Elders past and present and emerging, and extend that respect to all First Nations people reading this resource.

About The Roots & Shoots Program

Congratulations for being a Roots & Shoots school!

Roots & Shoots is a global community action program founded by Dr. Jane Goodall in 1991. The program aims to inspire, empower and encourage young people all over the world.

It shows them how to follow their passions, take actions together and become the change our world needs. That way, we can all ensure a better future for people, animals and the environment.

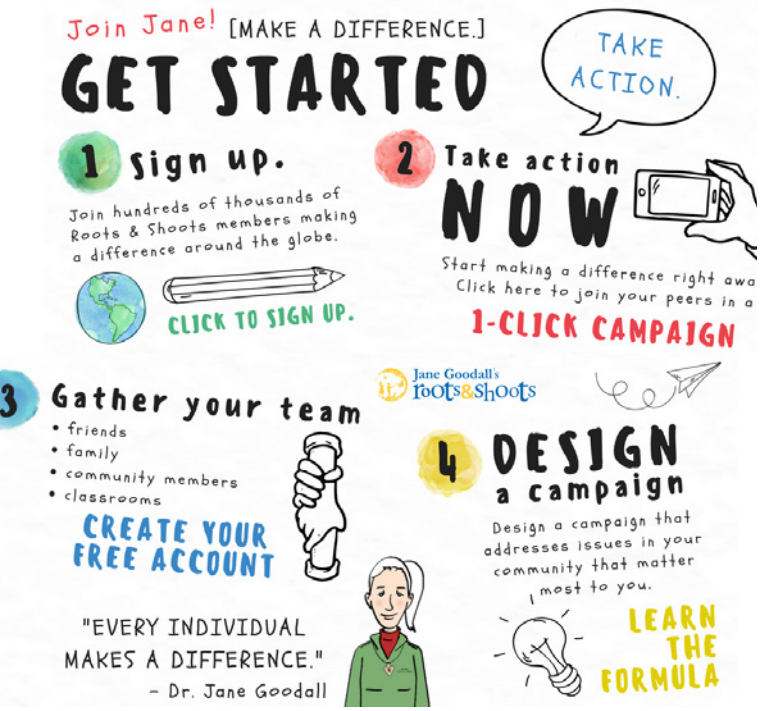
About the Resource Box

The Roots & Shoots Resource Box is designed for teachers and students in primary schools, or by homeschoolers. As well as the four stunning books within, the Box offers several exciting learning opportunities and competitions to further foster optimism for our future.

R&S are excited to be partnering with WOODiWILD to increase biodiversity. Woodiwild enables schools to join a national tree planting program – creating habitat and carbon storage - while also raising funds for their own school needs! To learn more about this fantastic initiative visit woodiwild.org

rootsandshoots.org.au

WOODiWiLD



This Teacher Resource

This resource aims to more deeply engage teachers and students with the amazing and inspiring content of the 2022 Roots & Shoots Resource Box. Moving beyond simply reading and viewing the beautiful pages of these books, through these learning sequences it is hoped all can feel more purposefully connected to nature and inspired to take action towards a better future.

The Rivers and Wetlands of the Murray-Darling Basin book is authored by experts and is an important teacher professional learning resource. It supports teachers towards achieving **Australian Professional Standards for Teachers Standard 2: Know the content and how to teach it**.

Teachers can choose to undertake part, or all, of these learning sequences, however it is recommended to follow the complete sequence in order to achieve the best outcomes. Completing the activities in these Learning Sequences will enable students:

- to achieve outcomes in upper primary Geography and Science courses – see Pg.6 for details. Specific links are listed for each lesson
- to engage with the content of the Rivers and Wetlands of the Murray-Darling Basin book
- to think creatively and engage with alternative perspectives about their environment.

These learning sequences are not prescriptive lesson plans, but rather offer activities and experiences to support teachers to implement flexible, hands-on programs tailored for their students.

These learning sequences loosely apply the 5 E's instructional model and the 8 Ways of Learning – see below for a more complete summary of these pedagogical approaches.

A digital edition of
Rivers and Wetlands of the Murray-Darling Basin
can be accessed here:
janegoodall.org.au/australian-programs/resourcebox

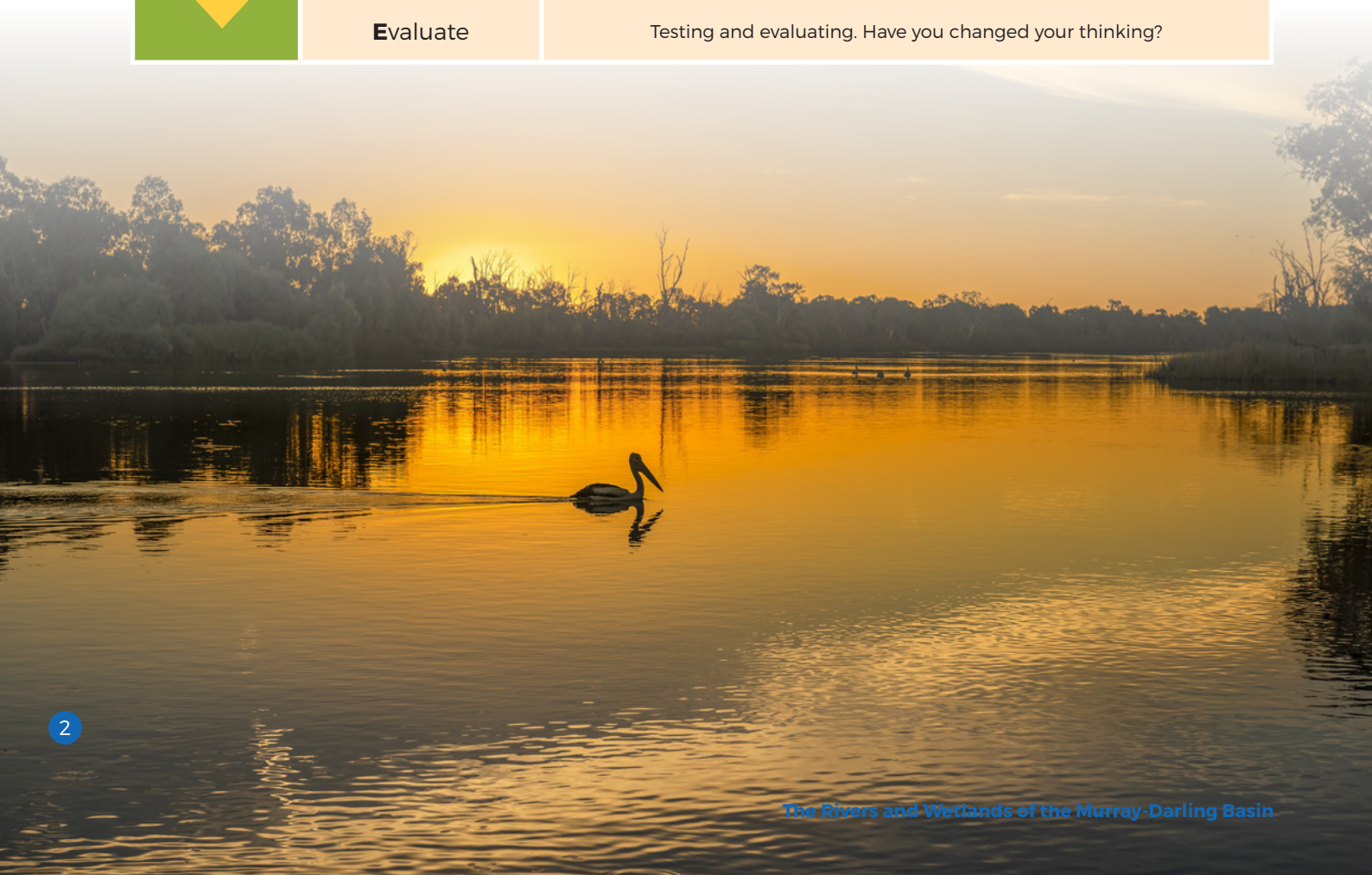
TEACHER NOTE

This symbol indicates where teachers can take opportunities to differentiate and tailor learning to their students . This is also a chance to adapt content up and down learning years and stages.

Pedagogical approaches applied in these resources

These learning sequences loosely follow inquiry-based learning into a modified 5Es instructional model (Bybee, 1997), with the five phases: Engage, Explore, Explain, Elaborate and Evaluate.

5E's	Main ideas / skills
Engage	Identifying and defining Connect past with present Create interest
Explore	Researching and planning Encourage creative thinking Give common set of experiences Challenge own ideas
Explain	Apply new vocabulary
Elaborate	Producing and implementing Apply to new experiences
Evaluate	Testing and evaluating. Have you changed your thinking?

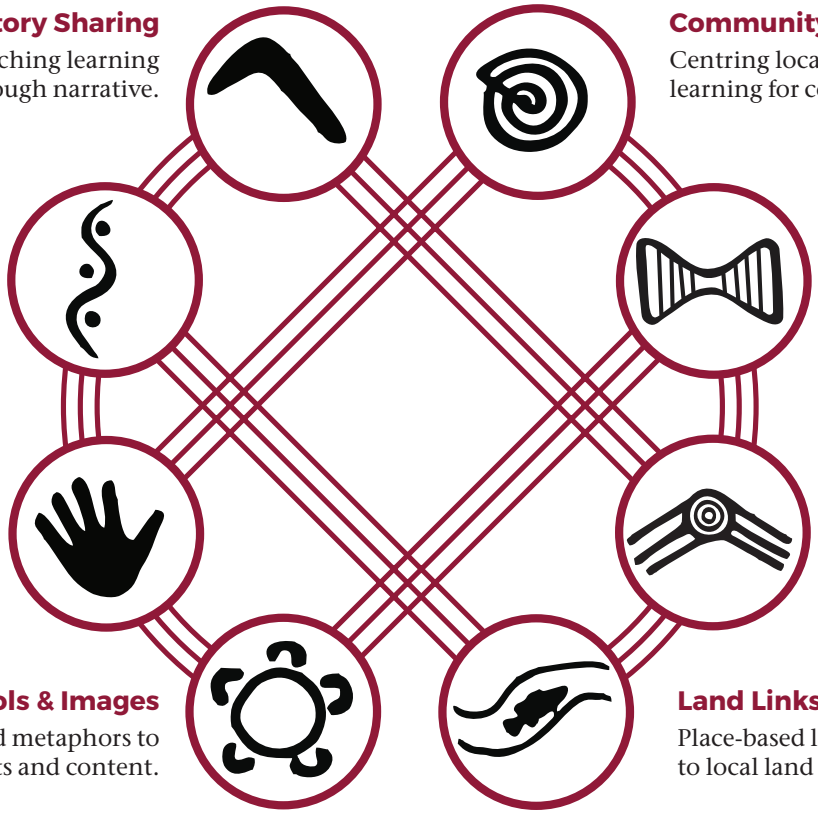


8 Ways of Learning Aboriginal Pedagogy Approach

We acknowledge the Traditional Owners of western New South Wales, where this pedagogy was developed.

For the best understanding of this pedagogy, and its value in applying it here and in your teaching, head to **www.8ways.online**. The following summary is from that website.

Throughout this resource you will see the symbols in this picture below. These indicate where these practises are incorporated into the learning sequences.



Story Sharing
Approaching learning through narrative.

Community Links
Centring local viewpoints, applying learning for community benefit.

Learning Maps
Explicitly mapping/ visualising processes.

Deconstruct/ Reconstruct
Modelling and scaffolding, working from wholes to parts (watch then do).

Non-verbal
Applying intra-personal and kinaesthetic skills to thinking and learning.

Non-linear
Producing innovations and understanding by thinking laterally or combining systems.

Symbols & Images
Using images and metaphors to understand concepts and content.

Land Links
Place-based learning, linking content to local land and place.

This is a pedagogy framework that allows teachers to include Aboriginal perspectives by using Aboriginal learning techniques.

This Aboriginal pedagogy framework is expressed as eight interconnected pedagogies involving narrative-driven learning, visualised learning processes, hands-on/ reflective techniques, use of symbols/metaphors, land-based learning, indirect/synergistic logic, modelled/ scaffolded genre mastery, and connectedness to community.

Throughout this resource, you will see the following symbols. These indicate where these practices are incorporated into the learning sequences.

The meaning of each symbol is summarised simply above – for a more complete understanding, head to the **8ways** website.

About Petaurus Education Group

This Teacher Resource is written by Petaurus Education Group.

Petaurus Education Group Inc. is a not-for-profit organisation based in Albury (on Wiradjuri Country) in southern NSW. Initiated by the local community, Petaurus is named after the threatened squirrel glider (*Petaurus norfolcensis*) that lives around Albury.

Established in late-2014, Petaurus aims to connect communities, schools and individuals with natural resource management topics such as land, water, biodiversity, productive and sustainable farming, and cultural awareness.

Petaurus creates on-ground, hands-on and local nature-based opportunities for schools to engage with their communities to promote and instil a sense of local pride and ownership in young people. Innovation and creativity are encouraged, as well as linking students to real-life community issues and challenges.

With hubs in Albury, Hay and Gol Gol, Petaurus staff and board members bring a range of experiences including teaching, science, community development, media and the arts, with the goal of developing and delivering quality engagement, education and communication that promotes positive change.

Petaurus works with a range of government and non-government groups and has an extensive network of contacts across the Murray-Darling Basin. Where possible, Petaurus aligns its teaching and learning activities to relevant state and national curriculum outcomes.

Petaurus works across the Basin, engaging and collaborating with communities to create balanced, productive and resilient regional landscapes and communities.

Learn more about our work and to download resources from our extensive library: www.petaurus.org.au

Petaurus
EDUCATION GROUP

Introduction to Rivers and Wetlands of the Murray-Darling Basin

For the past 30 years, the authors of this book Owen Dunlop and Adrian Wells, have travelled extensively across the Murray-Darling Basin, engaging with school students and communities about this vital water catchment. They have explored the rivers, landscapes, wildlife, wetlands, and an ancient culture that is still strong. They have even eaten carp, the Basin's most despised fish!

This book brings together many of the experiences and knowledge gained over that time. This book will take you across the Basin and along its three longest rivers. You will meet amazing animals, riverboats, zombie fish, the brave goanna women, and the rivers' kidneys. You will discover poetry and Aboriginal art and a wombat as big as a rhinoceros.

You will learn how water in our hard-working rivers is used to keep the environment healthy, grow food, strengthen Aboriginal cultural heritage, and provide water for homes and industry.

Our discussions, workshops and tours with schools and community groups have always been based on the need to find a balance in using the Basin's water so it can be shared fairly.

This is not easy.

But the book explains how people, communities, businesses and governments are working together to find that balance.

And you will discover that working with others is the best approach.

Above all, you will discover what a beautiful and interesting place this Basin and its rivers and wetlands are. It is well worth visiting.

We hope this book interests, amazes and inspires you.

Contents include:

- The Murray-Darling Basin
- The Three Rivers
- A Journey Down the Mighty Murray
- A Journey Down Darling Baaka River
- A Journey Down Bila Murrambidya
- Who Uses the Water From The Three Rivers?
- What's in a Basin?
- Wetlands
- Need a Helping Hand?

Useful Links and Professional Learning

Roots & Shoots

If you've an idea to benefit animals, people and environment – no matter how big or small – we want to help you. Across Australia, our Roots & Shoots local leaders are ready to guide our members in planning, creating and realising your activity. Whether you're an individual, youth group or school we provide the skills, tools and mentoring to make your activity a success.

Australian Curriculum

These Learning Sequences are designed to be used by teachers and students across Australia and are therefore linked to Australian Curriculum outcomes. For latest developments and additional resources to support the teaching of Australian Curriculum, head to that website.

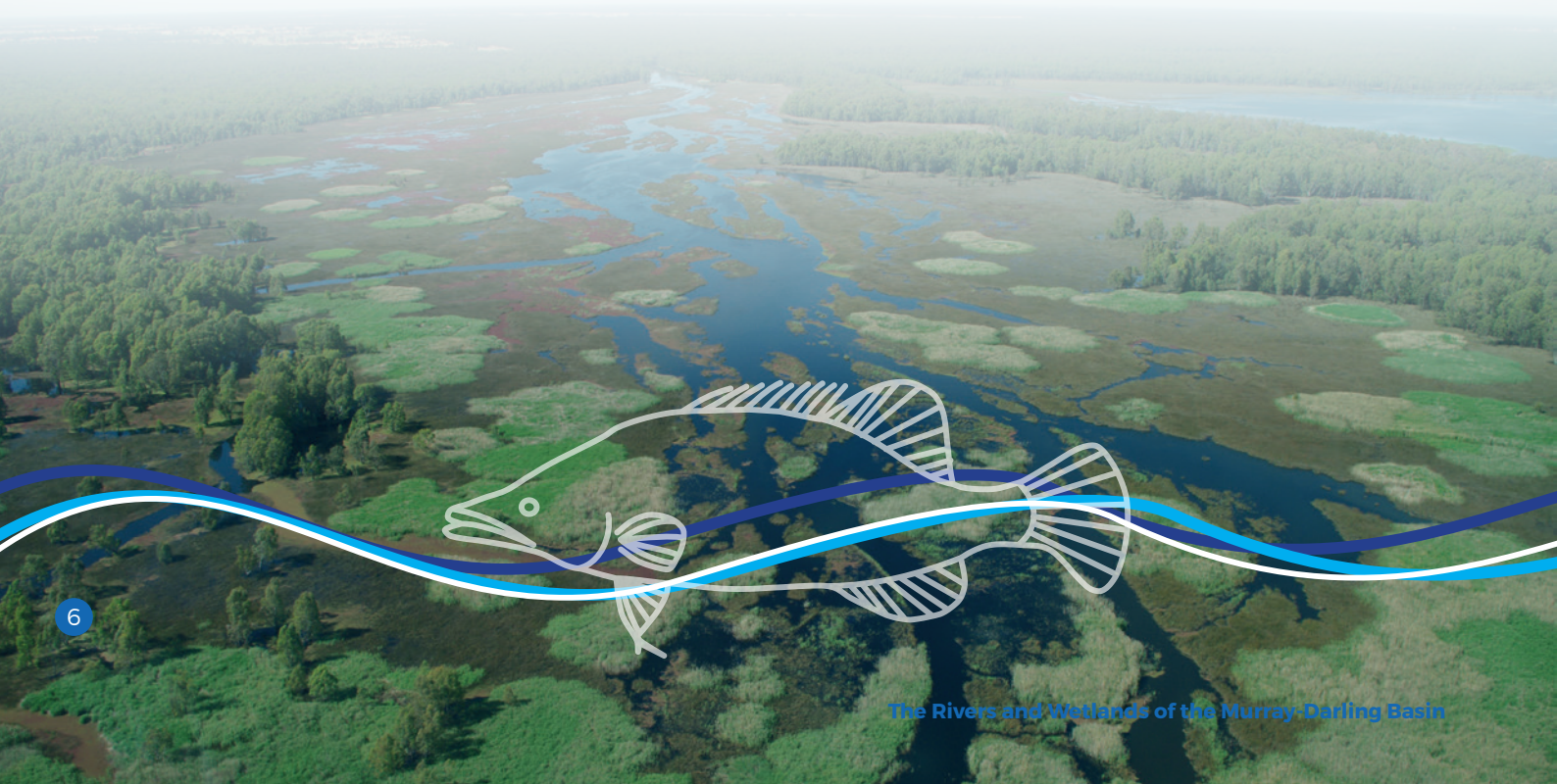
Australian Association of Environmental Educators (AAEE)

Australia's peak professional body for environmental educators.

- Advocate for Environmental Education and promote best practice.
- Provide a network for cross-sector environmental educators.
- Promote the effective use of education to help people to live more sustainably.
- Support members via professional development.
- Build strong local networks that facilitate collaboration and skill sharing.

Petaurus Education Group online resource library

This not-for-profit education group has been working across the Murray-Darling Basin since 2014. Specialising in creating resources with kids, for kids, on a variety of topics related to living in the Murray-Darling Basin. Access their amazing, easy-to-use on-line library that includes interactive presentations, films and books that will excite and support your learners.



Summary of Learning Sequences

Learning Sequence	Learning intentions	Main ACARA V9 curriculum links	Main learning experiences	Page
Discovering A River Estimated 7 lessons*	Describe features of rivers, including natural and constructed features and how they change over time Collect information about a river from maps, images and texts Describe how important features of a river are cared for Communicate a river story in a chosen format	**Year 1 HASS:** How places change and how they can be cared for by different groups including First Nations Australians (AC9HS1K04) **Year 1 HASS:** The natural, managed and constructed features of local places, and their location (AC9HS1K03) **Year 1 Science:** Describe daily and seasonal changes in the environment and explore how these changes affect everyday life (AC9S1U02) **Year 2 HASS Skills - Questioning and Researching:** Collect, sort and record information and data from observations and from provided sources, including unscaled timelines and labelled maps or models (AC9HS2S02) **Year 2 HASS History - Knowledge and Understanding:** A local individual, group, place or building and the reasons for their importance, including social, cultural or spiritual significance (AC9HS2K01) **Year 2 English Literacy - Texts in Context:** Identify how similar topics and information are presented in different types of texts (AC9E2LY01)	Film and image analysis Explore a river using historical photos, satellite images, different types of maps and fieldwork (optional) Creating labelled photographs Interviews Create your river story as a model, artwork or play	8

Learning Sequence:
Discovering a River

Overarching Inquiry Question:

What makes up a river?

Learning Intentions:

Identify natural, managed and constructed features of a river

Sort and record information from a variety of provided sources about the river

Describe how these features change across time (seasons and weather events) and space (along the course of a river)

Success Criteria:

I can identify some natural, managed and constructed features of rivers using multiple sources such as different maps, images, explaining the significance of one.

I can identify multiple natural, managed and constructed features along the course of a river and across time (seasons and weather events) using multiple sources.

I can model how living and non-living things change along the course of a river and through time (seasons and weather events).

Main Outcomes

Year 1: **HASS:** How places change and how they can be cared for by different groups including First Nations Australians (AC9HS1K04)

Year 1: **HASS:** The natural, managed and constructed features of local places, and their location (AC9HS1K03)

Year 2: **HASS:** Collect, sort and record information and data from observations and from provided sources, including unscaled timelines and labelled maps or models (AC9HS2S02)

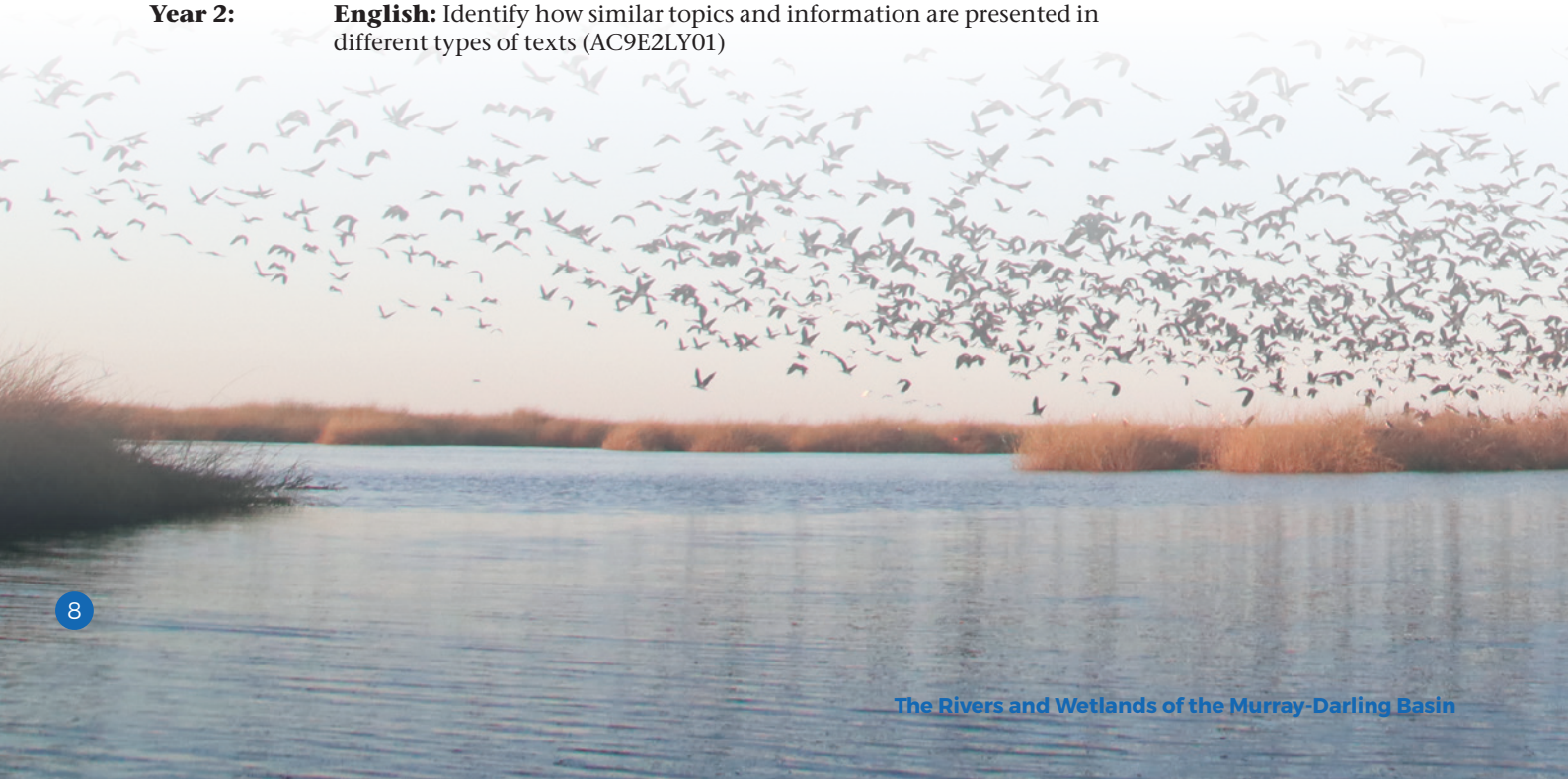
Year 2: **HASS:** A local individual, group, place or building and the reasons for their importance, including social, cultural or spiritual significance (AC9HS2K01)

Year 1: **Science:** Describe daily and seasonal changes in the environment and explore how these changes affect everyday life (AC9S1U02)

Year 2: **English:** Identify how similar topics and information are presented in different types of texts (AC9E2LY01)

KEY VOCABULARY

Caption
Catchment
Drought
Fauna
Flood
Flora
Map
River
Satellite image
Species
Water level



TEACHER NOTES

Before you start, invest time in building a library of resources related to your local river or a river your class is connected to - historical photos, a variety of different maps, Google earth imagery, artworks, poems, quotes from important river people. Sources showing the river with high and low water levels are important. Community libraries and any river-keeper/Landcare groups are a great place to start. Note the variety of images used in The Rivers and Wetlands of the Murray-Darling Basin book as a guide.

Familiarise yourself with the fascinating world of Australia's largest river catchment on page 12-16 in the book.

Invite students to bring in historical photos, old maps, artwork, and stories (grandparents are a great place to start) about their rivers.

Use higher level vocabulary like "species", "flora and fauna" and "catchment" from the start of this learning sequence. Other key vocabulary will be explored throughout the sequence.

Living Landscapes Volume 1, part of the 2022 Roots & Shoots Resources Box for schools, includes chapters by Martuwarra Fitzroy River Council and Darug Custodian Aboriginal Corporation who share their perspectives on why their local river is so important and how it is cared for.

These learning sequences are not prescriptive lesson plans, but rather offer activities and experiences to support teachers to implement flexible, hands-on programs tailored for their students. Feel free to dive in and use one, or all, of these activities!

SPECIAL NOTES

Icons like this:

- indicate opportunity for differentiation, including up and down learning stages
- indicate how this relates to the 8 ways of learning pedagogy
- 01 indicate a page number in the Living Landscapes book

Learning Sequence: Discovering a River
Lesson 1

Content		Teaching learning and assessment	Resources
ENGAGE		**What is a basin?** Get students to think about water in our environment and get them to brainstorm all the different types of water that occurs in nature. E.g., rain, creeks, river, sea, dams, wetlands etc. Get students to think about their kitchen sink or any sink they have at home. Ask them how the sink works. Make sure to point out the key features: • Water comes from the tap • The basin itself can hold the water in it • The water can be released through the plug hole Make sure to point out that the plug hole is at the lowest part of a sink. Explain to students that water in our environment is exactly like our kitchen basin. Draw a diagram on the board to help explain to students how this works. Ask students what they think the tap or water source part of our basin is. The answer is rain or when snow melts. This is where our water comes from. Then ask students what happens to water when it rains or the snow melts. Make sure to direct students to think about what occurs naturally rather than collected in water tanks etc. The water ends up in our rivers, creeks, wetlands, lakes or dams. Explain that this is like the sink of our basins at homes. Rivers, creeks, lakes etc hold our water. Ask students what they think the drain section is. Then explain to students the water leaves our rivers, lakes, creeks etc by flowing through to the sea. It meets the sea at a certain point which is called the "mouth". Now look closely at the Murray-Darling Basin. Explain this is a very big basin that is in Australia. Look at a map of it and point out some of its features. Explain the rain and snow melt and end up in our rivers, creeks, wetlands etc. Point out the three main rivers in the Murray-Darling Basin (Murray, Darling and Murrumbidgee). If your school is in the Murray-Darling Basin, you could point out some of the different bodies of water near you. Then point out the mouth of the Murray-Darling basin which is where the river meets the sea.  Think, pair, share about what you learnt today. If students have any questions about what a basin is or about the Murray-Darling Basin get them to record them on "Murray-Darling Basin research wall" that could be explored later.	**Teacher Resources:** Find each image in the book for context **Resources Required:** Physical and map such as google earth

Learning Sequence: Discovering a River
Lesson 2

Content		Teaching learning and assessment	Resources
EXPLORE		**What is a wetland?** Give students five minutes to draw or list what they think a wetland is and everything they think lives in a wetland.  As a class draw what a wetland* is. Talk about the different layers of a wetland and what is involved in them. Explain to the students that a wetland is an area of land that is covered with water for at least part of the year. Wetlands can be found in different parts of the world and play an important role in supporting many different species of plants and animals. Explain to the students that the Murray-Darling Basin has many wetlands that are important for many species that live there. *make sure to explain to students that wetlands are not always wet  Case Study: Choose one wetland in the Murray-Darling Basin and research the important features it has, some of the animals that may live in it, and any other interesting facts. Chapter 8 of The Rivers and Wetlands of the Murray-Darling Basin Book is all about wetlands and a good resource for students to explore. Students share their findings about a certain wetland in the Murray-Darling Basin. Think, pair, share about what you learnt today. Connect the discussion about a wetland with the *Amazing Ecosystems* learning sequence and book, this can continue from the food web activity in the learning sequence.	**Resources Required:** Look at the Murray-Darling Wetlands Working Group website for more information.

Learning Sequence: Discovering a River
Lesson 3

Content		Teaching learning and assessment	Resources
EXPLORE		**Rivers in the Murray-Darling Basin** Over the next few lessons students will be creating a resource library about a certain area in the Murray-Darling Basin. Get students to use the same location over the next few lessons to build a profile. Choose a town along one of the rivers in the Murray-Darling Basin – individual, groups or whole class – and compile a river library of resources. Ensure you include any significant places or features such as monuments, places of high visitation, scar trees, old trees. Using the three rivers in the book as examples (deconstruct-reconstruct) Find maps – old, new, topographic, themed Google Earth – follow rivers Find photos, including historical photos, of the river showing: Changes – drought and flood; Seasons – cold and hot weather, windy weather Natural Features – Animals and plants that call the river home – fish, trees, crustaceans, reeds, birds. Find local First Nations language names. Constructed Features – Locate towns along the river and find images of the river there; weirs, bridges, dams. Research what First Nation groups are along the river (use AITSIS map page 20 of *Living Landscapes Vol 2*) - what do they call the river? Find a poem, narrative or informative text about your river and discuss what is learnt – match lines of the poem or story to word lists Consider a field trip to a river. Whilst there, add to your river resource library by completing a nature diary entry with field sketches, rubbings, photographs. Allow time to complete a Response to Country activity (page 78 to 81 of *Living Landscapes Vol 2* book in your Roots & Shoots Resource Box).	**Resources Required:** Physical and digital map such as Google Earth

Learning Sequence: Discovering a River
Lesson 4

Content		Teaching learning and assessment	Resources
EXPLORE		**Animals in the Murray-Darling Basin** Choose a native animal that lives in the town you picked from the previous lesson – individual, groups or whole class – and compile an Animal Library of resources. Research the animal and create an animal profile. Make sure to include: • Where the animal is located • What are the features of the animals habitat • Why the animal is an important part of the Murray-Darling basin • Its diet • The animals structural and behavioural features	

Learning Sequence: Discovering a River
Lesson 5

Content		Teaching learning and assessment	Resources
EXPLAIN	 	**Community in the Murray-Darling Basin** Choose a person or group located in the Murray-Darling Basin to interview or research – Landcare groups, First Nations groups, fishing people, farmers or others who live along the river. Show them your river resource library. What do you think are some important NATURAL features of the Murray-Darling Basin? • What do you think are some important CONSTRUCTED features of the Murray-Darling Basin? • How do you notice the Murray-Darling Basin changes? • What special places or features of the Murray-Darling Basin do you care for? Invite students to ask parents and grandparents about the Murray-Darling Basin and bring in short writing or photos. This lesson connects in with the *Living Landscapes Vol 2* learning sequence, look there for extension activities.	

Learning Sequence: Discovering a River
Lesson 6

Content		Teaching learning and assessment	Resources
EXPLAIN		**Recreation in the Murray-Darling Basin** Ask students if they have ever visited the Murray-Darling Basin or any other rivers or lakes. Ask them what recreational activities they can do in these places. Show them pictures of people enjoying different recreational activities such as swimming, fishing, boating, and camping. Ask them to discuss the benefits of participating in these activities.	**Resources Required:** Poster equipment, glue, markers
		Students choose a location on the Murray-Darling Basin and create a flyer or brochure to showcase the amazing recreational activities that can occur at that location. Students can discuss: How participating in these activities can have positive benefits for physical health, mental wellbeing, and social connections. What would happen if we didn't care for our Basin: Would people want to swim in a polluted river, or walk on a bush track covered in litter?	
		Extension: have students create a poster or a digital presentation on the impact of recreational activities on the Murray-Darling Basin. The poster or presentation should include at least three examples of how recreational activities can impact the environment and what can be done to mitigate those impacts. The presentation can be shared with the class or displayed in the classroom.	

Learning Sequence: Discovering a River
Lessons 6-7

Content		Teaching learning and assessment	Resources
EVALUATE		**How can my river model tell an even better story?** Have students create a poster or a digital presentation explaining the importance of Rivers and Wetlands in the Murray-Darling Basin. The poster should include at least three examples of wetland species, both plants and animals, found in the Murray-Darling Basin, as well as the benefits that wetlands provide to the environment and humans. The presentation can be shared with the class or displayed in the classroom. **How has my thinking changed?** Complete the See, Think, Wonder activity from the ENGAGE section. Can you see more? Has your thinking deepened? Have you answered any of your questions?	**Resources Required:** Images from the ENGAGE activity Digital presentation software, computers

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