



Wrecks, Reefs and the *Mermaid* Education resource kit

Divers and the *Mermaid* anchor
Xanthe Rivett photographer 2009

AUSTRALIAN NATIONAL MARITIME MUSEUM TRAVELLING EXHIBITION


AUSTRALIAN
NATIONAL MARITIME
MUSEUM



The Exhibition

In 2009 the Australian National Maritime Museum organised two archaeological expeditions to remote coral reefs off the coast of Queensland.

The aim of these expeditions, sponsored by the **Silentworld Foundation**, were to locate the site of His Majesty's Colonial Schooner *Mermaid*, wrecked in 1829 on the Great Barrier Reef, and to survey the sites of His Majesty's Ship *Porpoise* and the merchant ship *Cato*, both lost more than 400 kilometres offshore from present day Gladstone on the Wreck Reefs in 1803.



The expeditions would also provide marine scientists the opportunity to investigate the physical condition of the various reefs encountered during the work and to seek possible evidence of the impact of climate change on these reefs.

Wrecks, Reefs and the Mermaid is an exhibition of photographs by Xanthe Rivett illustrating the museum's work on these coral reefs.

The Resource Kit

This resource can be used either for pre- or post visits to the exhibition, or as stand-alone resources. They have been written for the following areas:

Stages 1 and 2 Science and Technology, specifically related to story writing constructed from the use of photographs taken on the *Mermaid* and Wreck Reefs dives, marine habitats and comparison with dry habitats. There is also a Mathematical component.

Stage 4 History, Stage 6 Ancient History and Stage 6 Marine studies specifically related to introductory archaeology.

Level 2 VELS English, Mathematics and Science and Level 5 VELS History learning focus.

Curriculum Links – NSW

Stage 1 Science and Technology

Picture It

Outcomes

- There are different ways of communicating with others
- Interpret data and explain their observations
- Sequence using images

Stage 2 Science and Technology

Mini Worlds

Outcomes

- Plants and animals live in environments that supply their needs
- Investigation can take many forms
- The results of investigation can lead to more questions
- Work co-operatively in a group

Our Australia

Outcomes

- Living things depend on other living things to survive
- Investigation can take many forms
- Make accurate observations and describe these observations, or record them as diagrams, tables of data and graphs
- Be curious about and appreciate the natural and made environment

Stage 2 Mathematics

Number Outcomes

- NS2.1 Counts, orders, reads and records numbers up to four digits
- NS1.3 Uses a range of mental strategies and concrete materials for multiplication and division

Stage 4 History

Inquiry questions

- What is History?
- How do historians investigate the past?
- Why is conserving our heritage important?

Outcomes

- 4.4 identifies major periods of historical time and sequences people and events within specific periods of time
- 4.5 identifies the meaning, purpose and context of historical sources
- 4.6 draws conclusions about the usefulness of sources as evidence in an inquiry
- 4.10 selects and uses appropriate oral, written and other forms, including ICT, to communicate effectively about the past

Suggested Site Studies include:

- a museum visit
- a heritage site
- a local history site
- a virtual history site
- an archaeological site

Stage 6 Ancient History - Preliminary

The resource for Stage 4 could be used as an introduction to the unit of work: Investigating the Past: History, Archaeology and Science

Stage 6 Marine Studies

Investigate

- What is archaeology?
- How is marine archaeology different to terrestrial archaeology?
- What methods are used by marine archaeologists?
- How are sites preserved?

Curriculum Links – VELS

Level 2 English

Standards

- Study different text types
- Create and interpret texts
- Write short sequenced texts
- Select content, form and vocabulary depending on the purpose for writing

Level 2 Mathematics

Standards

- Order numbers and count to 1000
- Form patterns and sets of numbers
- Describe simple fractions
- Use commutative and associative properties of addition and multiplication

Level 2 Science Learning Focus

Standards

- Stimulate, respond to and nourish curiosity, wonder and questioning
- Understand the environment
- Observe and describe phenomena
- Collect data and recognise simple patterns in data
-

Level 5 History Learning Focus

Standards

- Evaluate sources, eg. artefacts
- Engage in critical enquiry

Icons

Icons are used next to activities to indicate skills being addressed.



Think carefully about the question and what you want to say in reply.



Discuss something with a friend, within a group or with your teacher.



Write a response in the space provided. This could be following discussion.



Perform mathematical calculations.



Read some information.



Look at some visual material.



Research an issue.



This is an interactive activity.



Make something.

Stages 1 and 2 Science and Technology

Level 2 VELS English, Mathematics and Science



Look at the series of images of marine life at a remote coral reef off the coast of Queensland. Also read the captions.



Photo 1 Clownfish – Xanthe Rivett photographer
Clownfish are small reef dwellers.



Photo 2 Painted lobster – Xanthe Rivett photographer
Painted lobsters normally come out at night to feed.



Photo 3 Parrotfish – Xanthe Rivett photographer
Parrotfish have large teeth plates to eat algae off the coral.



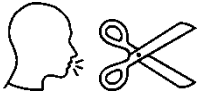
Photo 4 Whitetip shark – Xanthe Rivett photographer
White tip sharks, with their white tipped dorsal fin, are rarely aggressive.



Photo 5 Whip corals – Xanthe Rivett photographer
Whip corals are soft and are so called because of their long swaying whip.



Photo 6 The edge of the reef – Xanthe Rivett photographer
About 50 metres from the edge of the reef the water becomes a darker blue where the depth of water increases.



Stage 1/Level 2 Student Activities

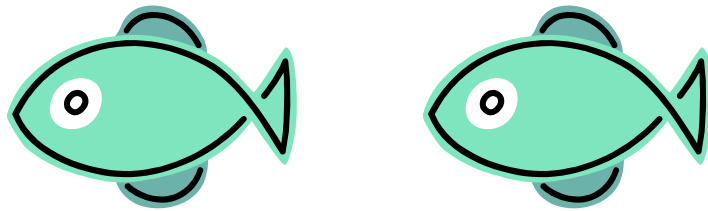
Working in groups complete the following:

- 1 List all the colours you can see in the photos on pages 7 and 8.
- 2 Reproduce your colours onto a colour wheel starting with the cool colours at the top and working around the wheel to the warm colours.
- 3 Name the fish shown in the photos.
- 4 List words to describe the movement of the fish and other marine life.
- 5 For each photo (numbered 1-6) identify what is happening/present in the photo
- 6 Cut out the pictures and re-group them to tell a story. Underneath the photo write a sentence or two about what is happening in the photo to create the story.
- 7 Reorganise the photos and write a different sentence or two for each photo to create a different story.
- 8 Choose your better story, mount the pictures and add your text below. Display on the wall of your classroom.

Working on your own, complete the following:

- 1 Count the number of fish in photos 1 and 3.
- 2 Which photo has the most fish in it?
- 3 Complete the following table using the number of fish you counted in photo 3:

Divide the fish into two even groups. Write the number in each group.



How many do you have left over?

Divide the fish into four even groups. Write the number in each group.



How many do you have left over?



Stage 2 Student Activities

Working in groups complete the following:

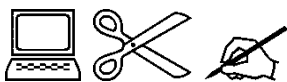
- 1 For each photo (numbered 1-6) discuss what is happening/ present in the photo.
- 2 List all features of the environment you can see in the photos.
- 3 What characteristics are unique to an ocean environment?
- 4 By looking at the pictures and using the internet, list the characteristics of the flora and fauna on this reef.
- 5 Research the habitat of whipcorals and one fish mentioned in the pictures.

6 Choices:

- Make a papier maché model of one of the fish and its environment.
OR
- Write and draw a one page tourist pamphlet based on your research and the characteristics of the reef and its inhabitants (items 4 and 5 above). Make it colourful, attention grabbing and informative.
OR
- Record a radio advertisement for the reef based on your research and the characteristics of the reef and its inhabitants (items 4 and 5 above).
OR
- Complete the table on the following page which looks at characteristics of fish seen in the photos.

Name of fish	Colour	Special characteristics	Size	Preferred habitat	Interesting information

7 Extension Activity



Choose a dry desert habitat in Australia and research some of its flora and fauna. Construct a comparative table like the one above and compare the characteristics of desert flora and fauna with the reef flora and fauna you have been studying.

Stage 4 History, Stage 6 Ancient History, Stage 6 Marine Studies

Level 5 VELS History

Where was the *Mermaid* going?



- 1 Mark Sydney on the map.
- 2 Research the location of Flora Reef, Queensland and mark it on the map.
- 3 The *Mermaid* was sailing for Port Raffles in the Northern Territory. Mark Port Raffles on the map.
- 4 Estimate how much of the *Mermaid's* voyage had been accomplished before she was abandoned.

How is archaeology linked to other areas of study?

Archaeology is the study of past societies through recovery and analysis of objects left behind which relate to their lives. Archaeology relies on cross-disciplinary research. Below is a mind-map showing some of the other disciplines with whom archaeologists work. Under each heading write why you think there is a link between archaeology and that discipline.



Anthropology

Biology



History

Chemistry

Geography

Geology

Linguistics



Pulley sheath – Xanthe Rivett photographer



Archaeology

Archaeology is the study of past societies through recovery and analysis of objects left behind which relate to their lives. These objects are called artefacts and may have a cultural interest.

Look at the artefact above.

As the archaeologists slowly plotted the artefacts lying on the seabed two rather unusual small copper alloy wheels were located near a pile of anchor chain. On closer inspection the wheels were identified as being the remains of two small pulley sheaths. One of the sheaths carried what is known as a 'Broad Arrow' a mark used to denote government ownership.

Focus Questions:

- 1 How can you tell that this item was found under the water? Give two reasons.
- 2 What would help us, looking at this photo, to understand how big the pulley is?
- 3 What conclusions can we draw about the extent of technological knowledge of the builders of the vessel on which this pulley would have been found?
- 4 What equipment would archaeologists need for marine exploration?

Be a maritime archaeologist

Create your own maritime archaeological dig to give students an idea of how the process works and what issues arise. Then ask students to draw conclusions about their 'dig'.

Materials required:

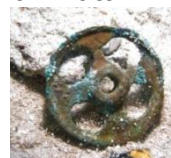


- Big container filled with a sand base and then water
- Markers - Blue Linckia Sea Stars* (*Linckia laevigata*)
These were actually used as markers by archaeologists investigating the *Mermaid*.
- Small piece of lead sheathing – any piece of flat lead will do
- Coral and pebbles
- Some broken pieces of pottery
- A tin or enamel plate
- Some jewellery (men's only)
- A piece of sailcloth
- A piece of rope
- Two pulley sheaths**
- More sand to cover the artefacts on the seabed
- Tape for creating a grid
- Latex gloves, brushes, paper

*Blue Linckia Sea Stars
Make six copies of this and laminate.

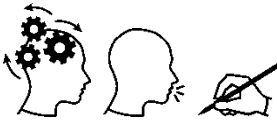


**Two pulley sheaths
Make two copies of this and laminate.



Process:

- Set up the dig, ensuring that all the artefacts are well covered and that some are caught up together, eg. the rope inside a rolled up piece of sail
- Outline to students the reasons for wearing gloves.
- Discuss the importance of being slow and methodical with the dig, and how to use the brush effectively to uncover the artefacts.
- Lay out a grid and markers over the seabed and label; copy the grid to paper for recording purposes.
- Have another tub with water close by for students to transfer their objects to.
- Give all students an opportunity 'to dig'.
- Lay out all objects in the second tub so that all can be clearly seen.

**Focus Questions:**

- 1 Identify what you have recovered.
- 2 Of what material is each item made?
- 3 What does this tell you about the technology of the time?
- 4 What did this vessel carry? For example was it a cargo ship?
- 5 How was this vessel propelled? Justify your answer.
- 6 In what type of ocean area did this vessel sink? Justify your answer.
- 7 Why did you need markers and a grid as part of your 'dig'?
- 8 Why is the location of the artefacts recovered reproduced on a paper grid?
- 9 What were some of the difficulties you encountered working in water?
- 10 Why do archaeologists have to be so very slow and methodical with their work?

**Extension Activity:**

Choose a land archaeological site and a maritime archaeological site, both in Australia. Complete the comparative table on the next page and compare the characteristics of the two sites.

Site name and location	Type of dig	Objects found	Equipment used	Specific difficulties encountered	Interesting information

Additional Archaeological Information for the Teacher

In 1829 HMCS *Mermaid* left Sydney carrying dispatches and stores for the isolated settlement at Port Raffles (Northern Territory). The captain ignored sailing instructions and went further offshore where the vessel struck an uncharted reef south of Cairns. The ship was abandoned and its location lost.

Using archival information which indicated the *Mermaid* may be on Flora Reef, part of the Great Barrier Reef Marine Park, the 2009 expedition team used metal detectors and magnetometers to aid in the identification of surface artefacts and to locate and plot any deposits which may have lain buried under the sand and coral. The reef investigated is protected for its conservation values, and therefore the seabed was not excavated.

Once a site was located the surface features were marked by using pin flags or small weighted floats and then mapped by the volunteer divers and archaeologists. Survey lanes were established on the seabed, the surface material was plotted and a series of linked photographs of the site produced.

As the reef top platform of Flora Reef was quite flat and featureless in places the snorkellers and divers searching for the remains of the *Mermaid* used Blue Linckia Sea Stars (*Linckia laevigata*) as visual identifiers and landmarks. Thanks to the clarity of the water these brilliant blue sea stars could be seen up to 20 metres away slowly moving across the reef platform grazing on the algae and small sponges growing on the coral rock.

On the first day of the expedition team members located a scattering of shipwreck material on the eastern side of Flora Reef. On closer examination some of the items were identified as parts of a late 19th century compass and a bilge pump that had been made by Esbe an early 20th century pump manufacturer. These observations confirmed that although the wreck of a small wooden ship had been found it was far too late to be the *Mermaid* which had been built in 1817.

The expedition team then located a second wreck site which was littered with iron lumps, copper fastenings, hull sheathing and assorted fittings from a small timber ship including the lower section of a bilge pump. Over time the copper alloy of these artefacts had been abraded by the actions of the sand and the sea and reacted with the seawater to form a green coloured concretion.

As the archaeologists slowly plotted the artefacts lying on the seabed two rather unusual small copper alloy wheels were located near a pile of anchor chain. On closer inspection the wheels were identified as being the remains of two small pulley sheaths. One of the sheaths's carried what is known as a 'Broad Arrow' a mark used to denote government ownership.

When the *Mermaid* was stranded on the reef in 1829 an anchor and hemp cable were used in an attempt to pull the vessel off the reef. The attempt failed and the anchor was left behind when the

vessel was abandoned. The team searched the wreck for anchors and located a small iron anchor in seven to eight metres of water 120 metres south east of the wreck site.

The discovery of the right-sized anchor, along with the wreck's position, the presence of government markings on the ship's fastenings, the occurrence of lead and iron shot on the wreck and the size of the wreck all pointed to the site being that of HMCS *Mermaid*.

Other References

The following resources are available on-line through the ANMM website: www.anmm.gov.au

Signals article

Science Matters article

Associated images