
Rocky Investigations

Level

Between 2 and 5

Key questions

What can you find out about rock pools and the life in them?

How do we feel about the rock pools?

Key outcomes

Observe features of rock pools and rock platforms.

To write creatively about some of the observations.

Adapted from 1991, *Coastal Marine Environment*, (coastal activities written by 64 contributors), Hooper Education Centre, Brisbane North Region, Queensland Department of Education.

Hazard warning!

Primary children need to be warned about slippery rocks, and the risk of waves suddenly washing over rocks. If blue-ringed octopuses are likely to be in the pools, then additional warnings should be given about handling any marine life. Despite these hazards, young students should still be able to have lots of fun and make numerous observations on rocky shores.

Activities for primary students on a rocky shore or platform

What you need

Pencil, paper for each student

Tongs, rubber gloves, plastic containers, thermometers, measuring stick in centimetres for each groups

What you do

Wave Wash-up

Observe the wave run-up on the rocky area. What do you notice about the paths the water follows? Does the water always chose the same way?

Watch sand movement with wave run-up. Does the sand or the water appear to pound any life?

Pet rocks

Look at the rocks in any three areas along the shoreline or platform.

For each, consider the following:

- What shape is the rock?
- How does it feel?
- What colour is it?
- Are there any unusual features?
- What?

Rub your finger across the rock and lick your finger.

- What is the taste?

Draw one of the rocks which appeals to you.

- Name your pet rock.
- Write a short story or poem about your rock and its own feelings about being in its present location.

If there are lots of small rocks in the area, you may be able to take one back to school as your pet.

- What sort of bed would you make for it?

Rocky Investigations

Rock investigation

Examine the location of the rocks and record whether they are always bare, covered by the tide, or always submerged.

- Are there any shelves or pools?
- What do you see in the pools?

Your teacher may help you lift out some of the plants and animals which live in the pool. You can use tongs and store things in the plastic container to examine more closely.

- How do these smell?
- Feel?

You may be able to draw some of the things you see. You may also be able to name some.

- Is the seaweed long and wavy or stuck closely onto the rock sides?
- How does it feel?
- What eats it?

How do the animals affect each other?

- What will the crabs eat?
- What will the little fish?
- The anemones?
- The shell fish?

Will this rock pool be here next year?

- How could it change?
- What are three words you could use to describe the pool to your friend?

Features of rock pools

Using the thermometer, measuring stick and a recording sheet, each group of students can record the water temperature and depth in a selection of different sized pools. You can also record other variables: surface area (measure), shape (draw), and note if it is shaded by other rocks or trees. Observations about the life in the pool should be recorded as a list.

Later, either back in class or on the beach, make inferences about the temperature of the water and the life found in the pool.

- Is the temperature of the water higher in small pools?
- In shallow pools?
- Is more sea life found in deeper, larger pools?
- Are unshaded pools always hotter than shaded ones?

Graphs can be drawn to show some of the results.

Rocky Investigations



Figure 1. An illustration of a cunjevoi

Cunjevoi behaviour

Your teacher will show you what a cunjevoi looks like (Figure 1). Watch a colony of cunjevoi.

- What do they look like?
- Are they different when the water covers them?
- Where are they more numerous on the rocks?
- Why? What do they feel like?
- What happens when you touch them lightly?
- Observe their behaviour when waves flow over them.
- What are they doing?

Creative writing about pools

Small groups of students should choose a rock pool to study. If there are numerous pools, each student may be able to choose one each.

Look carefully into the pool, its surroundings, the rock, at the bottom of the pool, and at the life in the pool. Make a list of your discoveries.

Write a few lines, using phrases to describe the food available in the pool.

What are descriptive words for:

- the life
- the rock
- the water
- the bottom of the pool
- the surface
- the seaweed and shells.

Imagine you are one of the living organisms in or around the pool. Relate a day in your life.

Rocky Investigations

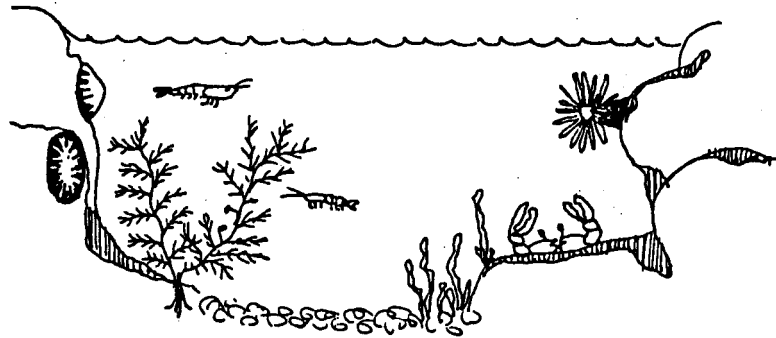


Figure 2. An illustration of the variety of life in a rock pool

Abundance in rock pools (Level 5)

Choose a variety of sizes of pools as they are exposed by the receding tide.

Measure the temperature of each pool at fifteen minute intervals, recording your measurements.

Calculate the approximate surface area (use measuring tape and take several measurements around and across the pool. Transfer these to graph paper. Choose a suitable scale and count the number of squares to reach the total area).

Compare the temperature of the water with the surface area.

Look at the number of life forms, animal and vegetable in each pool (Figure 2).

Compare the maximum temperature reached with life abundance.

- What do you notice?
- Can you discover any relationship between the temperature rise in exposed rock pools and life existing in them?

Designs

Sketch some of the patterns seen in the pools (e.g. cunjevoi, seaweed, fish, tumbled pebbles, sponge, shells).

Record the colours.

Take your sketch back to school and reproduce part or all of it in colour.

You may be able to combine all the sketches of the students and make a big collage to show your day on the rocky shore.

Rocky Shore Organisms

Level

4-8+

Key question

How do organisms adapt to life on the rocky shore?

Key outcome

Describe differences in characteristics of rocky shore organisms, and relate these to the conditions in which they live.

Adapted from field work led by Mark Rodrigue, Marine Discovery Centre, Queenscliff, Victoria.

Two types of adaptations are common to species on a rock platform:

- Mechanisms to resist dislodgment: permanent attachment, suction, shape and shelter.
- Mechanisms to prevent desiccation (drying out) when not covered by the sea: hard coverings, shells, opercula, tubes of worms, retention of moisture, use of shade.

What you need

Clipboard, paper, pencil

What you do

This field activity is designed to allow you the opportunity to observe rock platforms and examine the animals on it in relation to these adaptations.

On a suitable rock platform:

- List as many animals as possible that have the adaptations listed in the accompanying data sheet (see data sheet 1).

Then consider:

- Are these adaptations related to where the organism lives on the rocky shore platform.

Extension

Are there any animals not showing these adaptations?

Why are these adaptations necessary if the animal is to live on the rock platform?

Using the adaptations listed, design an 'ideal' animal to live on this rock platform.

Compare your results with others: are they similar?

Why?

Undertake the rocky shore field work described in the units 'Field Methods' or 'Rock Platforms'.

Rocky Shore Organisms

Adaptation	Animal and number
Strong adhered foot	
Specialised breathing organs	
Bluntly conical or rounded shell	
Cement-like substance for attachment	
Filter feeding device	
Ability to withstand high temperature	
Flexible shell or overlapping plates	
File like tooth ribbons (radula)	
Flat jointed exoskeleton	
Holdfast for attachment	
Stinging cells	
Closed off shell with an operculum	
Rows of tube feet	
Larvae spending part of life as plankton	

Rock Platforms: a Different Approach

Level

4-8+

Key questions

How do I prepare an interpretation plan for a rock platform?

Can I use a field guide to identify specimens observed?

What is the connection between this rocky platform and the surrounding coastal area?

Key outcome

Encourages you to look at interpreting a rock platform in the context of how it relates to and is part of adjacent terrestrial and marine ecosystems.

by Sue Feary, Bruce Gray and Chris Heming, NSW National Parks and Wildlife Service, Nowra, NSW.

Rock platforms have always held a fascination for beach goers. The pools and crevices support a diversity of plant and animal life adapted to a precarious existence in the zone where the land meets the sea. Understanding how a rock platform is related to the terrestrial ecosystem and the wholly submerged marine ecosystem as part of a continuum is critical to the integrated approach to management of terrestrial and marine national parks, such as is planned for Jervis Bay.

This field study and associated questions encourages you to look at interpreting a rock platform in the context of how it relates to, and is part of, adjacent terrestrial and marine ecosystems. Instead of examining a rock platform in isolation, an alternative approach is to examine a transect that commences at the top of a catchment and continues across the rock platform down to the sea bed. The different components of the transect can be interpreted for the public by a range of techniques, including signs drawing attention to certain features. But keep in mind the possible high cost of maintenance of such signs!

Though this field study was applied to Jervis Bay, any appropriate site with a small catchment and a rocky shore can be utilised for the field work and discussion.

What you need

Clipboard, paper, pencil

Species lists of marine and terrestrial fauna and flora

Magnifying glass, bucket or plastic bowl to act as a temporary holding area for identification of species

Maps of the walking track systems (see accompanying sheet)

Brief background notes on the natural and cultural values of the area

What you do

1. Select a rough pathway to form a transect that commences at the top of a beach (or, if circumstances allow, a catchment of a creek running onto the beach), and continues across the rock platform down to the sea bed.
2. Note the major features of your transect as you walk down it. Identify plants and animals using a field guide, or merely note the variety (e.g. scrub, low plants and reeds, grass tussocks, burrows, bare rock on slope, boulder field, rock platform with numerous molluscs and invertebrates, steep drop off into sea).

Rock Platforms: a Different Approach

When you have completed the transect:

- Prepare your own plan for a field study to examine a rock platform.
- Construct a list of plants/animals found during your examination of the rock platform.
- Compare the species found between the different zones you cross.
- Use a map of the walking tracks.
 - How do these tracks take advantage of the natural features of the area.
 - Do they allow protection of the special features.
- Imagine you are the ranger in this area.
 - How would you provide an interpretation service for your transect?
 - Would you put up information signs?
 - How would you label features?
 - How would you provide a self guiding walk?
 - Provide a brochure identifying the major species.
- Compare your methods with others and, working in a small group, develop a plan which could be submitted to the National Parks and Wildlife Service in the region.

Extension

Refer to the unit 'Field Methods' for detailed instructions on field work on rock platforms, and to the introductory unit 'National and Marine Parks in Jervis Bay' for species lists and further information about this area.

Rock Platforms: a Different Approach

Interpretation at an Aboriginal midden

The headland above a rock platform may contain an Aboriginal midden, demonstrating indigenous exploitation of rock platform molluscs in prehistoric times. Such middens often are around 3 000 years old.

A glance at the species occurring in a midden can tell us much about how Aboriginal people gathered the resources of the rocky shore platform. Shellfish gathering was carried out mostly by women, while the men concentrated on spear fishing. Some of the species favoured by Kooris were the large, solitary gastropods of the lower littoral zone. These could only be collected at low tide and would have required a greater effort than other more gregarious species of the mid and upper littoral zones. However, the return for effort in terms of the amount of shell fish meat that could be extracted from the large gastropods and bivalves probably was worth the effort.

It is also interesting to note the sizes of the shellfish gathered 3 000 years ago and those on the rock platform today. In some cases there has been a marked reduction in size over time, perhaps indicating modern day over-exploitation. A similar result is obtained by comparing the sizes of the skeletons of fish in midden deposits with those caught today.

Shellfish remains are the most common component of middens, but they also contain much other evidence of hunting and gathering activities, which usually cannot be seen unless the site is excavated. Stone artifacts, the bones of fish, birds and mammals, bone and shell implements, and human burials are often present, preserved as a result of the high calcium carbonate content of the deposits.

Extension

You need a special permit to examine a midden in detail. If you do, you could compare the size of the shells in the midden with those found on the beach or rock platform today.

Consider including the traditional Aboriginal use of the area in your interpretation.

You also could do a 'bush tucker' demonstration.