

# Rocky Shore

## TEACHERS

This unit of work has been designed to support your class visit for the 'Rocky Shore' programme at the National Aquarium of New Zealand. Students will participate in a range of level specific interactive activities.

The primary focus of this programme is the Living World Strand of the Science Curriculum, however when planning your unit of work links can be made to other essential learning areas. Similarly, different essential skills can be emphasised depending on the needs of your students.

## PROGRAMME OVERVIEW

The Rocky Shore programme teaches students about the different aquatic animals that inhabit the inter-tidal zones and aquatic environments in the Rocky Shore.

Students will examine the inter-tidal zones and the challenges that aquatic animals face living there. They will discover what special features the animals have to successfully live in this environment and why each animal has adapted to live in its environment.

**ESSENTIAL LEARNING AREA:** Science

**STRAND:** Living World

**ACHIEVEMENT AIM 2 AND 4:** Investigate and understand relationships between structure and function in living organisms. Investigate local ecosystems and understand the interdependence of living organisms, including humans, and their relationship with their physical environment.

Level	Essential Learning Area	Strand	Achievement Aim	Achievement Objective
1	Science	Living World	Structure and Function Interdependence of living organisms	Observe and identify parts of common animals.
2	Science	Living World	Structure and Function Interdependence of living organisms	Investigate the responses of animals, including people, to environmental changes in their habitats.
3	Science	Living World	Structure and Function Interdependence of living organisms	Investigate special features of common animals and describe how these help them to stay alive.
4	Science	Living World	Structure and Function Interdependence of living organisms	Use simple food chains to explain the feeding relationships of familiar animals and plants, and investigate effect of human intervention on these relationships.

## **SCIENTIFIC SKILLS AND ATTITUDES**

- Focusing and Planning
- Information Gathering
- Processing and Interpreting
- Reporting

The 'Rocky Shore' programme at the National Aquarium of New Zealand lays the foundations for developing the above investigative skills and attitudes.

## **SPECIFIC LEARNING OUTCOMES**

- To understand why a particular type of animal lives in certain habitats.
- To understand, describe and identify examples of structural, functional and behavioural adaptations which help animals survive into the next generation.
- To become aware of the environmental factors affecting aquatic organisms and discuss how certain factors affect their survival.

## **MAJOR TOPICS COVERED BY THIS BOOKLET:**

- 1) The challenges of the marine environment
- 2) Life cycles
- 3) Food webs – the marine food web and us
- 4) You and the environment

# Rocky Shore Post-Visit Activities

## Post - visit activities:

### Games

A few fun games may reinforce the ideas, names and concepts learned.

- 1) Pin a picture or name of a marine creature on the back of each student (see at the back of the booklet for pictures and facts about selected animals). They have to find out who they are by asking others questions that require a yes or no answer.
- 2) Marine charades. Use the names and terms which relate to the seashore habitat. Have the students form teams and try and act out this new vocabulary.
- 3) Role-Play. Highlight a seashore issue and have the class have a mock town meeting to discuss the issues. Give the students characters to research and present their view of their character. Examples of issues to discuss may be: building houses near the seashore, pollution from storm water drains or rubbish left on the coastline.

### Tall Tales

Create your own tall tale to explain how something comes to be, such as an animal 'the starfish that fell from the sky', or anything that your imagination suggests.

### Story by Committee

Everyone sits in a circle facing each other. Have one person begin a story. After one minute, he or she has to stop in the middle of a sentence and the next person must finish the sentence and continue the story. Make sure everyone gets a chance to talk. Record the story as you tell it on a tape recorder and then play it back. Here are some rocky shore theme starters:

#### **Henry the hermit crab.....**

**A seagull was flying above a rock pool when.....**

**The tide is slowly going out, so Cecil the barnacle....**

**"Boy it is getting hot and stuffy in here" said Billy the cockabully.....**

Factors affecting the lives of rocky shore animals are? The environmental challenge...

Ask the children to fill out this question sheet as post – visit activity or use questions as prompts for class discussion. Model answers can be found at the back of the booklet.

**SALINITY** – Seawater changes greatly on the rocky shore. Marine animals need saltwater. What would cause the water to become...

Less salty? .....

More salty? .....

Marine animals need water. **DEHYDRATION** becomes a problem when animals are exposed to the air. How would these animals overcome this? .....

.....  
.....

Strong **WAVE ACTION** on the shore may damage soft animals, or dislodge and wash away attached animals. How would these animals protect themselves? .....

.....  
.....

An animal's survival is also affected by other animals. **PREDATORS** try to ..... them. **COMPETITORS** fight for resources such as ..... and .....

### Use your imagination

Imagine you are a nature photographer along the rocky coast of NZ. Watch your step! The rock is slippery and the tide is coming in. The algae and shelled animals pictured here live in special regions where they get just the right amount of water. Fill in the sentences. The picture of the marine environment can be found at the back of the booklet along with the model answers.

1. The picture shows that the water is still at \_\_\_\_\_ tide.
2. The \_\_\_\_\_ live closest to the top of the rock, where they only get splashed with water.
3. Nearby, a \_\_\_\_\_ scurries up the rock.
4. Barnacles, periwinkles and mussels are covered with a hard \_\_\_\_\_. This covering keeps them from drying out in the \_\_\_\_\_. As the tide comes in, the barnacles, periwinkles and mussels become covered with \_\_\_\_\_ and can filter feed.
5. The animals of the \_\_\_\_\_ zone have to be adapted to both wet and dry conditions.
6. Under the water, a sea urchin grazes on a long ribbon of \_\_\_\_\_.
7. Suppose you want to take a picture of a \_\_\_\_\_ eating a sea urchin. You'll have to look in the \_\_\_\_\_ zone.
8. A \_\_\_\_\_ in the \_\_\_\_\_ zone eats plants, animals, and even dead things – anything it can get with its big claws.

### Another trip to the rocky shore...

Going to the rocky shore.

Now that you know a little more about the creatures found on the rocky shore. Here is your chance to show how much you have learnt.

Take the class to the rocky shore. Observe a rock pool quietly for 5-6 minutes before disturbing anything. Give them an activity sheet (see back of booklet) and ask them to identify three to four animals that they have observed in the rock pool or rock platform. The children have to mark on the rocky shore diagram where they found them and list in the text boxes what characteristics the creature has to allow it to survive in that environment (e.g. a shell, behaviour – hides under rocks, pulls it's tentacles into its body to conserve water).

## **Some useful references:**

Collins guide to the New Zealand seashore. By Dave Gunson (1983). Collins, Auckland.

Collins guide to the sea fishes of New Zealand. By Tony Ayling and Geoffrey J.Cox (1982), Collins, Auckland.

Whats on the beach, a guide to coastal marine life. By Glenys Stace (1997). Penguin Books, Auckland.

The Mobil New Zealand Nature Series: seashore life. By R.K. Dell and E.Heath (1981). Reed Ltd, Wellington.

The Mobil New Zealand Nature Series: common shells. By J.R. Penniket and L. Kirby (1982). Reed Ltd, Wellington.

Common seaweeds of New Zealand. By Nancy Adams (1994). Canterbury University Press, Christchurch.

The living reef. The ecology of New Zealand's rocky reefs. Edited by N. Andrew and M. Francis. Craig Potton Publishing, Nelson.

Deep sea New Zealand, blue water, black abyss. By Peter Batson (2003). Canterbury University Press, Christchurch.

The National Aquarium Secondary Schools resource booklet.

Te Angiangi Marine Reserve education resource. By Amelia McQueen for Department of Conservation (2003).

Web site keywords:

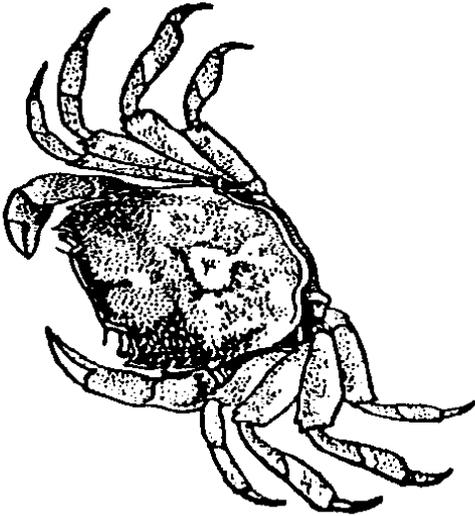
Department of Conservation  
Ministry of Fisheries  
Experiencing Marine Reserves

**Activity sheets and model answers**

**see below**

## Games:

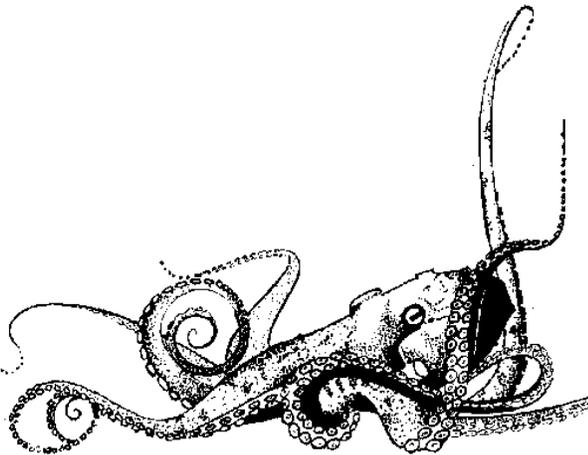
*Pin a picture or name of a marine creature to the back of a child. Cut out the pictures and facts. Paste the facts onto the back of the picture. The children can read out the facts once they have guessed what the creature is.*



I eat pretty much anything - dead or alive.

My claws can be used to defend myself or bring food to my mouth.

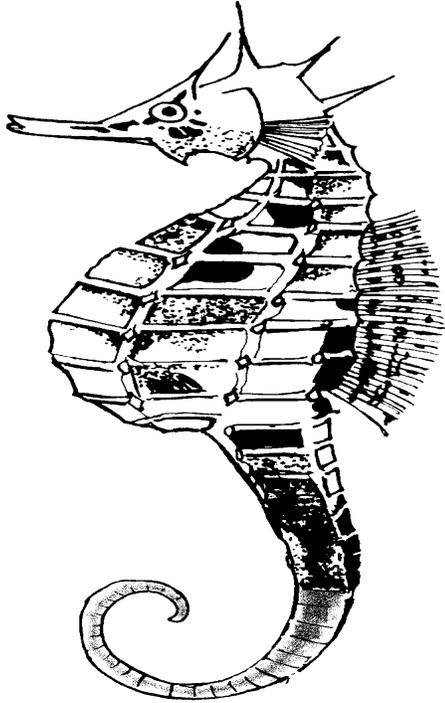
If I grow too big for my shell I shed it and grow another.



I have long tentacles with suckers.

I am an intelligent creature and I change colour depending on my mood.

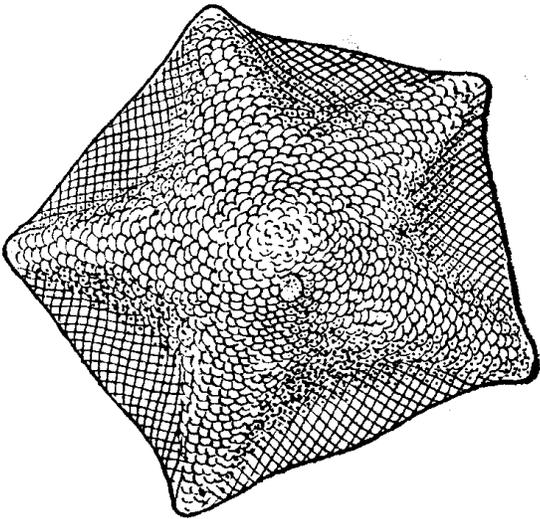
I can ambush my prey, a bit like a cat stalking a bird!



I' m a strange looking fish!

I love eating small  
microscopic plants and  
animals ...sucking them in  
with my straw-like mouth.

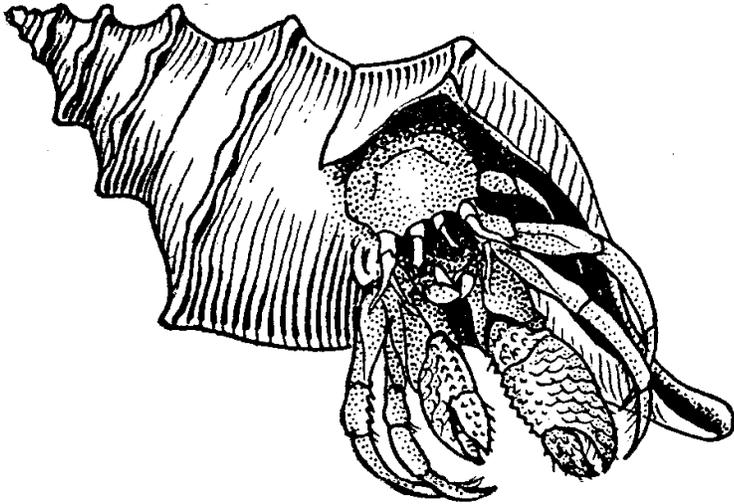
Only the males of our kind  
give birth!



I' m a relative of sea  
urchins (kina) and sea  
cucumbers!

When feeding I push my  
stomach outside my mouth  
(yuck!).

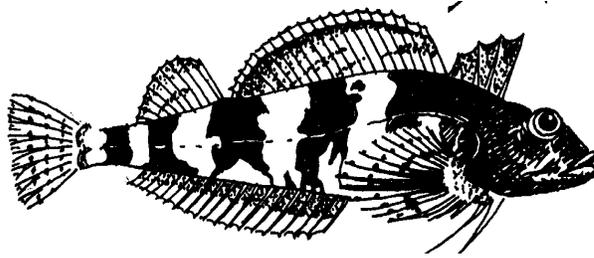
If I lose a leg I can grow  
another one back.



I don't have a hard shell like other crabs so I live in a seashell!

When I grow too big for my shell I have to look for a bigger home!

I eat all sorts of things - dead or alive.



I am one of many fishes found in rock pools.

When frightened I hide in small bunches of seaweed or under rock ledges.

I like my space in rock pools, so if any other fish comes into my space... look out!

**THE ROCKY SHORE....** *Can you identify 3-4 marine creatures? Mark where you found them on the picture below. What characteristics does the marine creature have that allows it to survive in the rocky shore environment?*

**FACTORS AFFECTING THE LIVES OF ROCKY SHORE ANIMALS ARE:**

*The environmental challenge... MODEL ANSWERS*

**SALINITY** – Seawater changes greatly on the rocky shore. Marine animals need saltwater. What would cause the water to become...

Less salty? **RAIN/HIGH TIDE (DILUTION OF SALT)** .....

More salty? **SUN/WIND (WATER EVAPORATION)** .....

Marine animals need water. **DEHYDRATION** becomes a problem when animals are exposed to the air. How would these animals overcome this? .....

**BEHAVIOURAL RESPONSES – HIDING UNDER ROCKS**.....

**MORPHOLOGICAL FEATURES – ‘SHELLS WHICH CAN CLOSE’** .....

Strong **WAVE ACTION** on the shore may damage soft animals, or dislodge and wash away attached animals. How would these animals protect themselves? **KELP- STRONG FLEXIBLE**

**WITH HOLDFAST (‘ROOT- LIKE STRUCTURE’)** .....

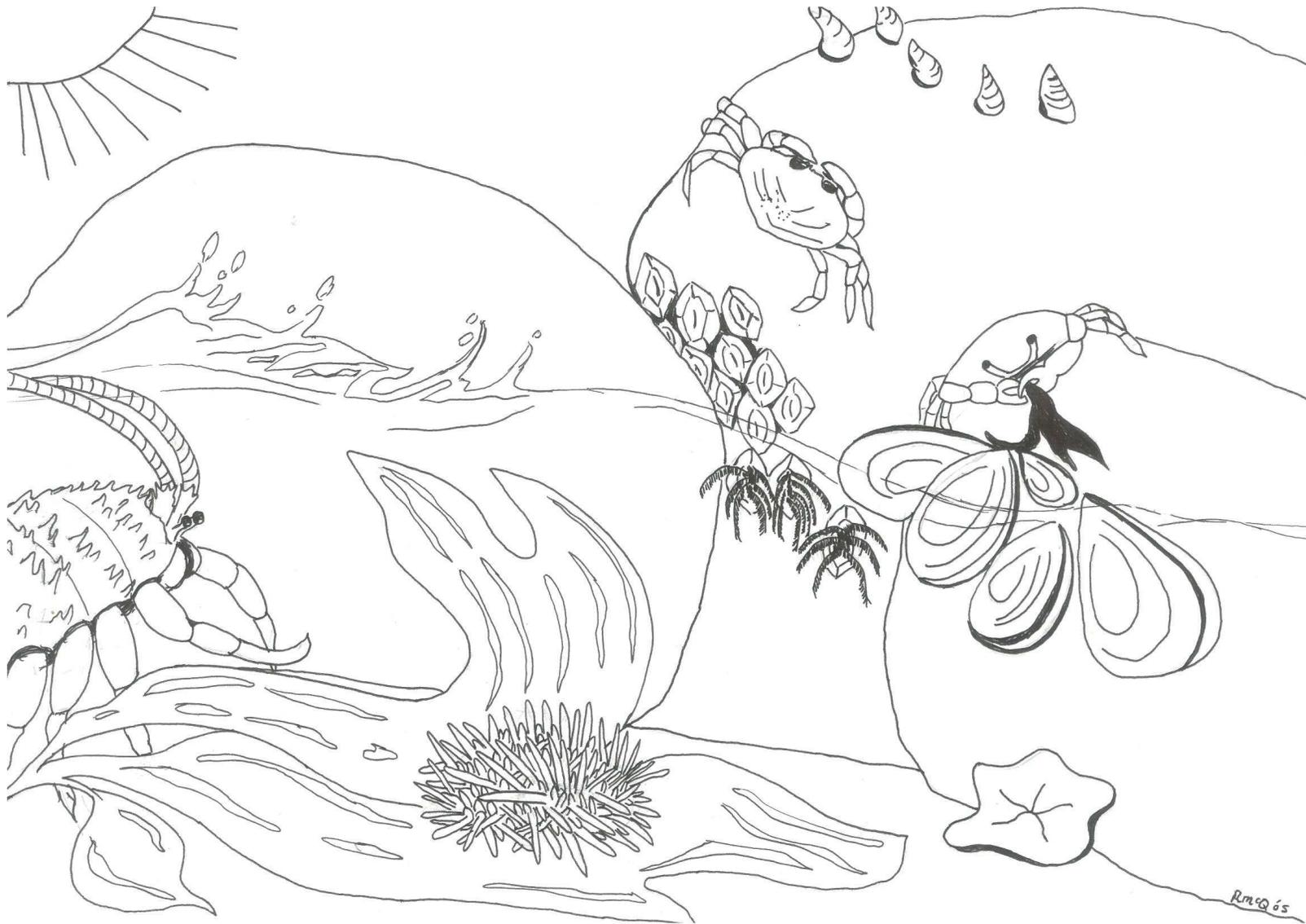
**SHELLFISH HARD SHELLS FOR PROTECTION, BLACK ‘FOOT’ ALLOWS PAUA THE ATTACH STRONGLY TO ROCKS** .....

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An animal’s survival is also affected by other animals. **PREDATORS** try to **EAT** .....

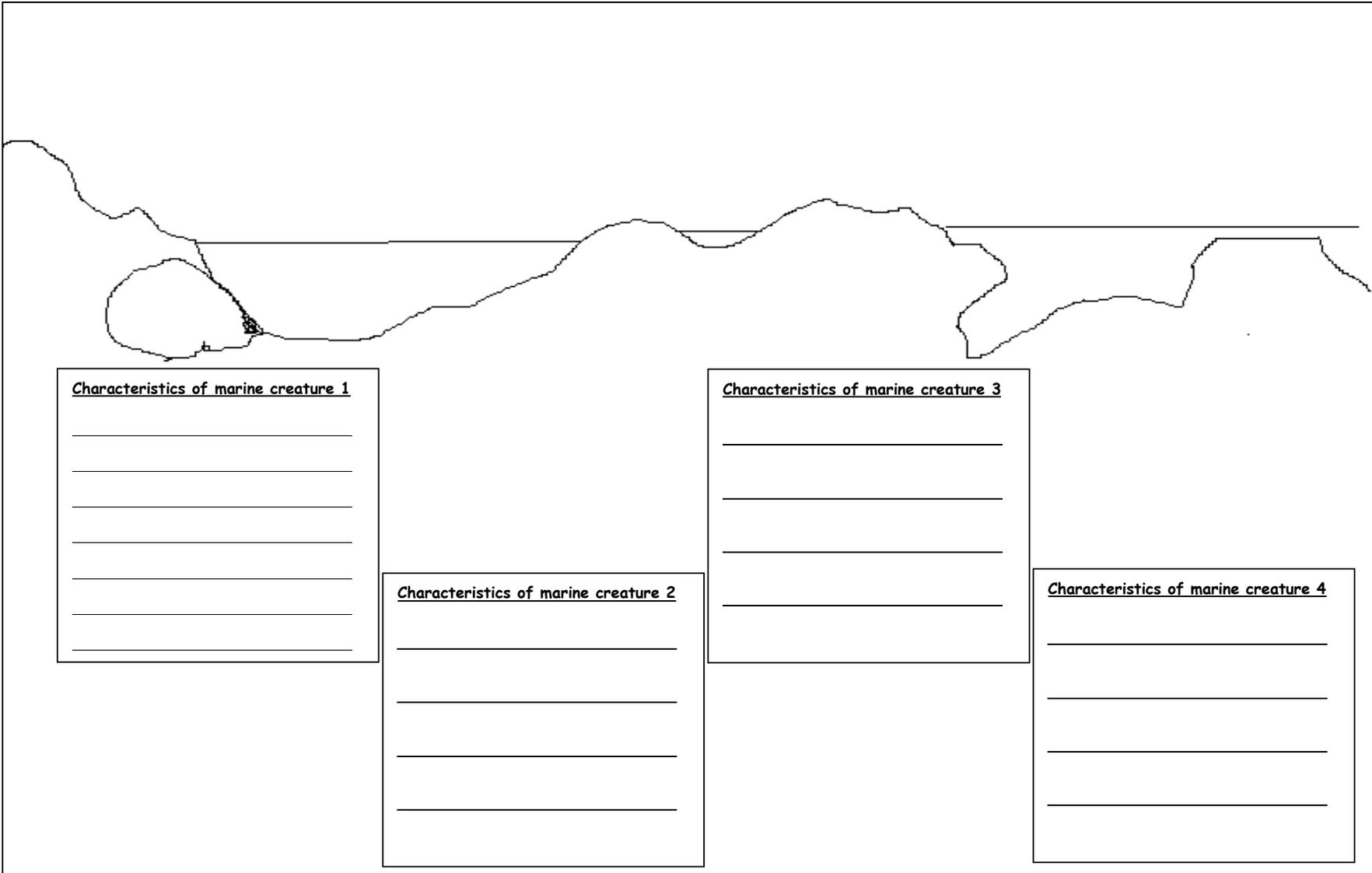
them. **COMPETITORS** fight for resources such as **FOOD** and **LIGHT**.....

Use your imagination



Use your imagination

9. The picture shows that the water is still at **\_HIGH\_** tide.
10. The **\_PERIWINKLES\_** live closest to the top of the rock, where they only get splashed with water.
11. Nearby, a **\_CRAB\_** scurries up the rock.
12. Barnacles, periwinkles and mussels are covered with a hard **\_SHELL\_**. This covering keeps them from drying out in the **\_SUN\_**. As the tide comes in, the barnacles, periwinkles and mussels become covered with **\_WATER\_** and can filter feed.
13. The animals of the **\_MID-TIDE\_** zone have to be adapted to both wet and dry conditions.
14. Under the water, a sea urchin grazes on a long ribbon of **\_SEAWEED/KELP\_**.
15. Suppose you want to take a picture of a **\_CRAYFISH\_** eating a sea urchin. You'll have to look in the **\_LOW-TIDE\_** zone.
16. A **\_CRAB\_** in the **\_TIDAL\_** zone eats plants, animals, and even dead things – anything it can get with its big claws.



Characteristics of marine creature 1

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Characteristics of marine creature 3

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Characteristics of marine creature 2

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Characteristics of marine creature 4

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