

**AVON-HEATHCOTE ESTUARY/IHUTAI**

# **EDUCATION RESOURCE**

## **for teachers**



We trust that the enclosed teaching resources will assist you in making your study an educational as well as an enjoyable experience.

**THIS RESOURCE INCLUDES:**

- Map of the Estuary
- Estuary Fieldtrip Organisation Guideline for teachers
- Estuary Care Code
- History of the Estuary
- Activity ideas, before, during and after a visit to the estuary
- Estuary Detective Games
- and much more.....

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**Notes:** The teacher information pages are numbered, all other pages are “handouts” for photocopying.

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# INTRODUCTION

This resource was first produced by The Friends of the Avon-Heathcote Estuary. The group's aims and objectives were to raise awareness of the ecological, cultural, natural and social environmental values and issues relating to this area.

The Friends of the Estuary disbanded in January 2003 as the majority of it's committee joined the then formed "Avon-Heathcote Estuary Ihutai Trust" in 2002.

**This resource is produced for teachers aiming to:**

- Further raise the awareness of the values of the Avon-Heathcote Estuary
- To instil a sense of pride for our local environment, thereby inspiring the next generation to take a personal responsibility for and become actively involved in caring for this unique natural environment.

The Avon-Heathcote Estuary Education Resource was produced by Tanya Jenkins - Environmental Education Consultant in 2003 and updated in 2019.

All resource material has been first trialled and then used during Estuary field trips with Christchurch schools by the producer of this Resource.





# SECTION 1:

# PLANNING YOUR VISIT TO THE ESTUARY



# TEACHER NOTES

- The Estuary provides an ideal outdoor classroom with its easily accessible location and the guaranteed animal and plant species to be viewed.
- It is not intended that this Resource takes the place of a visit to this area. It aims to provide a variety of useful resources in preparation for a visit.

## USEFUL WEBSITES FOR ADDITIONAL INFORMATION

In addition to resource material provided in this Estuary Resource you can search the internet.

[www.ecan.govt.nz](http://www.ecan.govt.nz)

[www.ccc.govt.nz](http://www.ccc.govt.nz)

[www.environment.org.nz](http://www.environment.org.nz)

[www.doc.govt.nz](http://www.doc.govt.nz)

[www.estuary.org.nz](http://www.estuary.org.nz)



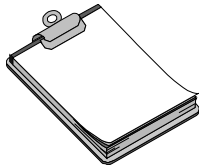
# CURRICULUM LINKS

Environmental education lends itself to a multidisciplinary approach. The following are suggestions on how it can be tied into the essential learning areas within the curriculum.



## HEALTH & PHYSICAL WELL BEING

- EXERCISE
- DIET
- POLLUTION
- WATER QUALITY



## TECHNOLOGY

- MAPPING
- USE OF EQUIPMENT
- PROBLEM SOLVING
- INVESTIGATING SOLUTIONS

## THE ARTS

- POSTERS
- PHOTOGRAPHY
- DRAWING
- CRAFT
- MUSIC

## SCIENCE

- EXPERIMENTS
- RESEARCH
- PROBLEM SOLVING

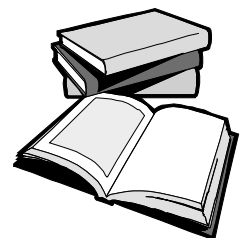
# ESTUARY EDUCATION

## LANGUAGE

- DRAMA
- POETRY
- READING
- DEBATE

## SOCIAL SCIENCES

- SURVEYS
- PROBLEM SOLVING
- HUMAN IMPACT
- RESOURCE MANAGEMENT



## MATHEMATICS

- COMPUTERS
- GRAPHS
- DATA ANALYSIS
- STATISTICS

## OUTDOOR EDUCATION

- ACTIVITIES
- EXPLORING
- EXPERIENCING
- FIELD TRIPS: BEACH LITTER SURVEYS, MUSEUM, ESTUARY, SEWAGE TREATMENT PLANT





# FIELD TRIP ORGANISATION GUIDELINES

## CHOOSE A SITE, DATE AND TIME:

- A visit at outgoing or low tide is recommended as this is the best time to observe feeding birds, crabs and snails. Tide table can be obtained from [www.linz.govt.nz/sea/tides/tide-predictions](http://www.linz.govt.nz/sea/tides/tide-predictions)
- Plan for a visit during the warmer terms of the year (first or fourth term).
- Pre-visit the chosen site to check out car parking, toilet facilities, play grounds, and suitable areas for students to gather. Have morning breaks or conduct activities.
- Is there someone you can invite as a guest speaker previous to, or on the day? Check the list provided titled "Organisations That Can Help with Estuary Field Trips".

## ADVANCE ORGANISATION:

- Letter to parents requesting "adult helpers"
- Transport availability e.g. school bus (needs booking?), private car pooling (teachers/parents).
- Does the school have a first aid kit to take on the day?
- Availability of a mobile telephone for quick communication in case of an emergency.
- Notify students they will need a sunhat and a warm jacket (weather can change quickly).
- Students MUST wear sensible footwear. Sharp shells stick and litter such as broken glass are often found on the mudflats. Mudflats can also be extremely slippery.
- Students will need to take a drink and something to eat.
- Ask students if they can borrow a pair of binoculars for bird observation (from home).
- Arrange for sunscreen lotion, pens and copies of the Estuary Detective Game.
- Arrange for toilet paper and soap in case the public toilets do not have these.
- Choose activities from this Resource to complete prior to your visit to the Estuary.
- Choose activities from this Resource to conduct while at the Estuary.
- Discuss the "Estuary Care Code" with your students (enclosed in this Resource).

## On the day;

- Listen to the weather forecast and decide if it is a suitable day to go ahead as planned.
- Check that all students wear appropriate clothing.
- Bring mobile telephone, First Aid Kit and suntan lotion.
- Bring toilet paper and soap.
- Bring pens, photocopied activity sheets.
- Set clear limits to the students' movements and behaviour for the day Perhaps read out the Estuary Care Code again.
- Explain that everyone must wash their hands before consuming food.
- Explain dangers of separation from the group. Perhaps a signal to recall students can be arranged.



# ESTUARY CARE CODE GUIDELINES

## In preparation to your visit to the Estuary

To further ensure the safety and well being of your students as well as that of the “residents” of the Estuary we ask you to discuss the Estuary Care Code below with your students and your adult helpers. It is important that students are not just provided with rules but also with a reason why these rules are required. DISCUSS the rules with your students and see if they can think of the reason for this rule. Reasons are provided for your information.

## ESTUARY CARE CODE

### STUDENTS:

**Rule:** No running - only walking. No yelling - just talking voice levels.

**Reason:** To avoid disturbing resting, nesting or feeding birds.

**Rule:** Take home only memories and photos NOT plants or animals such as crabs or snails.

**Reason:** Crabs or plants will not survive long in a pocket, backpack or bedroom.

**Rule:** Leave only footprints NOT LITTER.

**Reason:** Apart from looking unsightly, it can be harmful to animal wildlife.

**Rule:** Where possible keep to the path when walking along the Estuary edge.

**Reason:** To avoid damaging bird nests and vegetation. To enforce good practice; e.g. when tramping in forest it is easy to get lost.

**Rule:** When turning over a rock or stone, return it to the same position as you found it.

**Reason:** Crabs and insects made their homes underneath these rocks, not returning their “home” means that they have to find another “home”.

**Rule:** Sensible behaviour.

**Reason:** Throwing object to birds or mudflat dwellers is cruel and not acceptable. We are the visitors to their home environment, behave as you expect visitors to behave.

### TEACHERS AND ADULT HELPERS

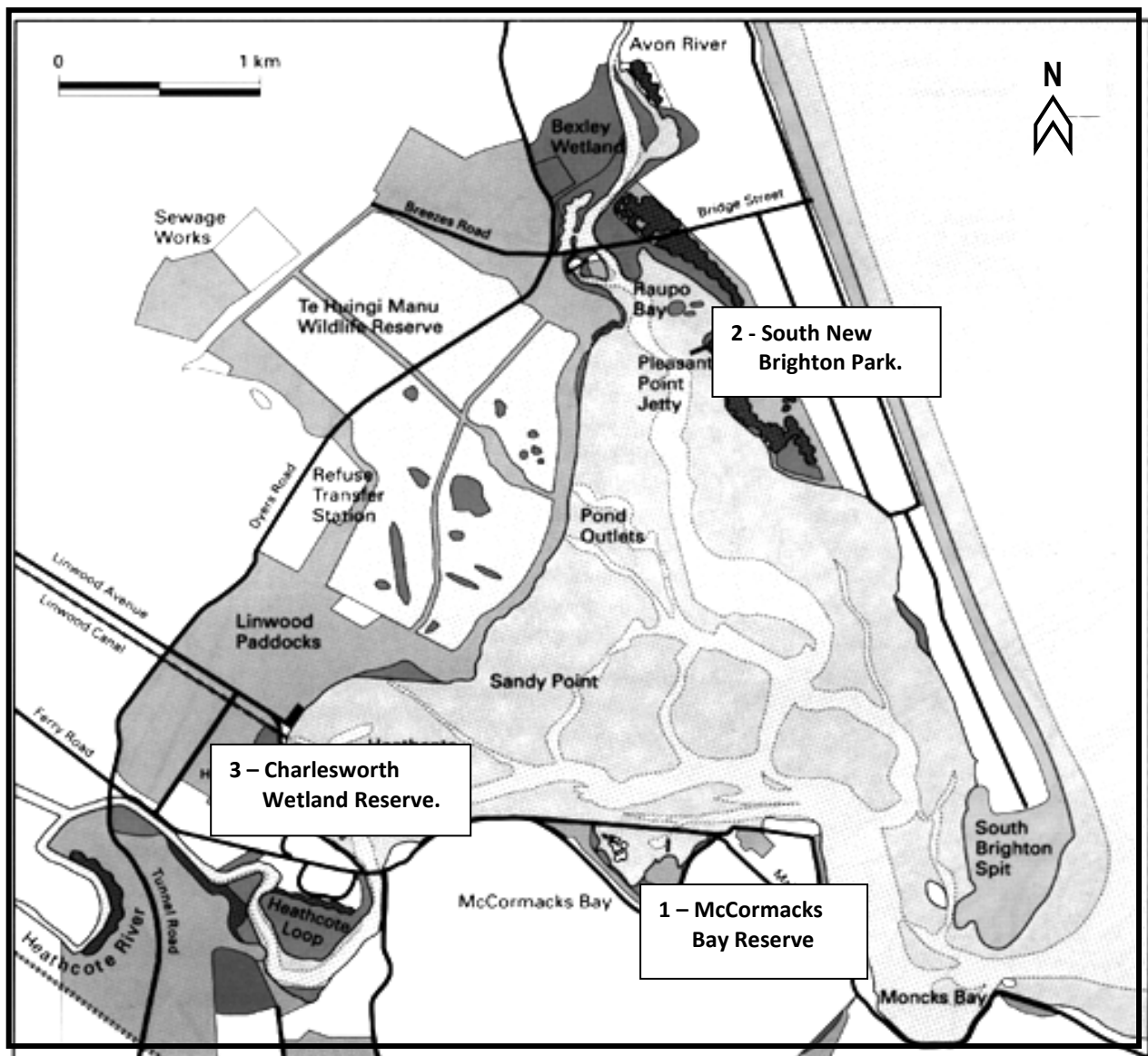
- Please do not allow your students to use toilet facilities unsupervised.
- Please always ensure your students (adult/student ratio as per school policy) stay close together. Ensure that no students “run up ahead” or become “stragglers left behind”. Appoint adult helpers as a “leader” and a “tail end Charlie”
- If you or your students see an injured bird, tell the teacher in charge who in turn will contact the Department of Conservation for assistance.



## ESTUARY MAP & AREA INFORMATION

The Avon-Heathcote estuarine area comprises 880ha of intertidal mudflats, 100ha Linwood paddocks and 240ha oxidation ponds.

In New Zealand, 91% of wetlands have been drained for development and it is only now that we realise that these areas are extremely valuable to a variety of animal and plant species. In Canterbury only 1.7% of our wetlands remain, making the Avon-Heathcote estuary one of the few examples left.



1. McCormacks Bay Reserve – McCormacks Bay Road - MtPleasant
2. South New Brighton Park – Beatty Street
3. Charlesworth Wetland Reserve – Charlesworth Street



# RECOMMENDED AREAS FOR A CLASSROOM VISIT

## **1 - McCORMACKS BAY**

Coming from the City turn right off Main Road into McCormacks Bay Road, plenty of car parking available along the roadside.

## **2 – SOUTH NEW BRIGHTON PARK**

Turn right off Estuary Road into Beatty Street, follow the road to the Estuary water edge and jetty. Ample parking for buses.

## **3– CHARLESWORTH WETLAND RESERVE**

Turn left off Ferry Road into Charlesworth Street. On the right side you will see a large carparking area.

Or a combination of 2 sites, one in the morning and one in the afternoon works well.

### **SITES PROVIDE:**

- Easy parking for bus and/or cars
- Walking tracks
- Playground areas
- Observation/Information Boards
- Excellent views of bird species
- Good examples of plants
- At low tide they provide the opportunity to observe mud crabs, snails etc.

**SITES 1 and 2** provide Public toilet facilities, site 3 does not.





**SECTION 2:**

**PRE VISIT  
IDEAS**

# PRE - VISIT ACTIVITY IDEAS

## BEFORE A VISIT TO THE ESTUARY:

- Ask students to draw a picture of the Estuary as they know it. Repeat the exercise after the field trip and compare both pictures. You will be amazed to realise how much they have seen and learned.
- Discuss how people use the Estuary e.g. sunbathing, windsurfing, walking etc. Let them tell you their personal experiences.
- Discuss how and why we have to be careful at the Estuary and/or beach, e.g. do not swim alone, beware of currents and sharp objects such as broken glass and shells etc.
- Build their vocabulary by brainstorming the meaning of words like:  
Wetland, estuary, saline water, catchment, native birds, introduced birds, recreation, oxidation ponds, stormwater, sewerage (in relation to the Estuary).
- Choose suitable background material and work through material provided in this Resource explaining the history of the Estuary.
- Discuss the Estuary Care Code enclosed in this Resource.
  - Do the students think the guidelines are fair?
  - Can students think of additional Care Code guidelines?



# WETLANDS & ESTUARIES

To some people thought of as muddy, insect ridden and smelly areas of little or no use. To others, wetlands are areas of high value, an important habitat, and feeding and breeding grounds for plants, birds, insects and fish.

## WHERE ARE OUR WETLANDS?

In New Zealand more than 90% of wetland areas have been drained for farmland, roads or towns. In Canterbury only 1.7% of wetland areas remain. In the pioneering days draining may have been justified, but today people understand the importance of maintaining and even restoring these areas of great value and biodiversity (variety of life). "Wetlands are the most endangered habitat in the world." (Quote from Prof. David Bellamy).

## WHAT IS A WETLAND?

A wetland is an area where plant and animal life adapts to living in wet conditions. There are several types of wetlands. Some are temporarily wet, (dry only between tides). Some are only wet after rain or floods. Others are permanently wet. Wetlands can be divided into three categories:

- 1 Coastal wetlands: estuaries, river mouths, mangrove, lagoons and harbours.
- 2 Swamp, bogs, river margins, high country swamp.
- 3 Man made wetlands such as ditches, hydro lakes and water races.

## WHAT IS AN ESTUARY?

Estuaries (ngutuawa), are closed or semi enclosed bodies of water where fresh water from a river or rivers (awa) meet the saline water of the ocean. Usually sand and mud flats are dry at low tide, and covered at high tide. Daily tidal flooding provides an area where different types of animals and plant life can survive depending on their saline tolerance (capability to cope with different amounts of salt in each part of the estuary). Animals and plants have to cope with wind, waves, tides, heat and lots of predators.

Food is plentiful in an estuary and easily accessible during low tide. A continuous flow of nutrients from the rivers, organic matter from the land and tides bring in large quantities of plankton (microscopic plant and animal life). Dead and rotting plant and organic matter full of bacteria make up a layer of detritus. This is stored in sediments (sand shifted by wind and water from land, river and sea). It settles on the higher reaches of the estuary, creating mudflats. Detritus and bacteria provide food for microscopic plants like algae, diatoms and flagellates. These form the basis of the estuarine food chain. You often see a layer of shiny, brownish/greenish algae covering the mudflats at low tide. These provide the food source for microscopic and small animals like amphipods and copepods and also for snails, crabs and molluscs. These crabs, snails and mollusc in turn provide the major food source for the many different bird species found on the estuary.

## EXAMPLES OF AN ESTUARY FOOD CHAIN:

- Plant plankton (diatoms) ⇒ crab ⇒ kingfisher
- Plankton (diatoms) ⇒ mud snail ⇒ flounder ⇒ gulls
- Seagrass ⇒ detritus ⇒ lugworm ⇒ Siberian godwit
- Detritus and bacteria in sediments ⇒ algae ⇒ filter feeder e.g. cockle or worm ⇒ pied oystercatcher
- Plant plankton (diatoms) ⇒ insects ⇒ fish ⇒ eel





## AVON-HEATHCOTE ESTUARY/Ihutai FACTS



The Avon-Heathcote Estuary is one of the few surviving areas resulting from the gradual infilling of the sea between the Southern Alps and what is now Banks Peninsula.

It comprises 880ha of intertidal mudflats, 100ha Linwood paddocks and 240ha oxidation ponds. The Estuary is divided from the ocean by a long sandbar (New Brighton Spit) creating a sheltered environment.

Fresh water from the Avon/Ōtākaro and Heathcote/ Ōpāwaho rivers meet and mix through tidal movements with the saline water from the ocean, creating a unique area providing breeding, nesting, feeding and resting areas for a wide variety of salt and fresh water plants, fish, insects, crustacea and bird species.

On average 20,000 and during mid summer up to 32,000 birds have been counted in the Estuary. 114 different bird and 28 fish species have been identified. Many different types of plant, crustacea and insect species are also found here. The Estuary is a flounder nursery and a vital link to the rivers for whitebait, eel and yellow eyed mullet.

Because of this area's bio-diversity (variety of life), it is an ideal area for educational studies. Being within a short travelling distance from the Christchurch schools, it provides a unique opportunity for conservation, geography, botanic and ecological studies. Many different types of scientific studies have been and are still being conducted e.g. the monitoring of bird behaviour, migration and breeding habits.

The Oxidation Ponds are part of the sewerage system put in place by the Christchurch City Council in the early sixties. The 16 islands and edge vegetation now play an important part by providing an ideal habitat for many birds. As some birds enjoy the large amounts of insects found near the ponds, the majority of birds utilise the ponds as safe and quiet areas to shelter from the weather, to nest or to 'hide' during their moulting period, when they are most vulnerable to predators

Our Estuary is not just a place where our sewage ends up, and rivers meet the oceans. It is much more than that. We are very lucky to have such a valuable wildlife area right on our doorstep. It provides an opportunity to prove that people and nature can live in harmony.

Organisations responsible for the welfare of our Estuary are:

Department of Conservation ..... Wildlife  
Environment Canterbury ..... Activities on the water  
Christchurch City Council ..... Estuary shoreline

### REFERENCES:

Seashore Birds Of New Zealand:

An identification guide by Gordon Ell the BUSH PRESS

Birdlife Of The Avon-Heathcote Estuary And Rivers, And Their Margins:

By Andrew Crossland 1993

Exploring an Estuary. A field guide to the Avon-Heathcote Estuary/Ihutai Christchurch, Second edition 2016



# ACTIVITIES & THREATS AT THE ESTUARY

There are many activities we can do at the Estuary. There are also many threats to the survival of an Estuary.

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## RECREATIONAL ACTIVITIES

- Fishing is fun.
  - Learning to surf is great.
  - There is so much to see while walking around a wetland.
  - Bird watching to see how many birds you can identify.
  - Swimming. But be careful! Not all areas in an estuary are safe or healthy. Look for signs.
  - When visiting a wetland or estuary, look for signs that suggest how to look after ourselves and the wildlife.
- 

## THREATS

Even a slight change can be of major importance to the survival of the life in an estuary. The mudflats that trap nutrients from rivers and tides can also trap pollution turning mudflats into toxic dumps. Many people still seem to think that estuaries are ideal places to dump unwanted rubbish.

- Fertiliser can run off from farmland.
  - Farm stock trampling the plant life along the water's edge can destroy bird breeding or roosting sites and fish spawning area.
  - Rubbish dumping in nearby landfills can cause toxic leachate to enter into the water or seep into the mud, killing molluscs.
  - Litter from people coming downstream can get stuck amongst plants, looking unsightly but worse, trapping, entangling wildlife or being eaten by wildlife.
  - Wastewater from industry containing chemicals and dirty stormwater can poison the mud which in turn poisons the mudflat dwellers.
  - Dogs not on the leash can chase birds away from their nests, leaving eggs to cool off, or disturb birds that are resting or feeding.
  - Jet boats and jet skis cause waves that flood nests and their noise can scare birds away.
  - Accidental and carelessly dumped rubbish, oil or fuel spills from ships out at sea can cause major damage to the estuarine food web.
  - Wetland reclamation - part of the wetlands drained for housing, roading, farm or industrial areas threaten many Canterbury wetlands.
- 



# PEOPLE AT THE ESTUARY: A TEACHERS GUIDE

## Example Answers

### WHO GOES TO AN ESTUARY AND WHAT DO THEY DO?

| WHERE           | PEOPLE SEEN       | WHAT DO THEY DO?                    |
|-----------------|-------------------|-------------------------------------|
| Walkway         | Runners           | Exercising                          |
|                 | Adults            | Walking their dog                   |
|                 | Families          | Walking                             |
|                 | Families          | Watching the sunset                 |
|                 | Class of children | Are on a Field Trip                 |
| Reserve         | Families          | Having a picnic or BBQ              |
|                 | Friends           | Throwing frisbees                   |
|                 | Children          | Playing in the playground           |
|                 | Children          | Flying a kite                       |
|                 | Adult             | Park maintenance (e.g. mowing lawn) |
| Water's Edge    | Adults            | Bird watching                       |
|                 | Adults            | Taking photos                       |
|                 | Family            | Collecting cockles at low tide      |
|                 | Family            | Fishing                             |
|                 | Scientists        | Water testing                       |
|                 | Children          | Playing on the jetty                |
|                 | Children          | Looking for crabs                   |
| In/on the water | Family            | Sailing Optimist yachts             |
|                 | Family            | Windsurfing                         |
|                 | Family            | Jet skiing                          |
|                 | Family            | Swimming                            |
|                 | Family            | Canoeing (Training?)                |







**SECTION 3:**

**ACTIVITIES  
WHILE AT  
THE  
ESTUARY**

# ACTIVITIES AT THE ESTUARY

- For a quiet time at the edge of the mudflats, sit all children down along the water edge. Tell them to quietly look around and draw on paper what they can see i.e. birds, trees, water, mud, clouds.
- To orientate themselves, ask students to point in the direction of the Avon/Ōtākaro and Heathcote/ Ōpāwaho rivers, the ocean, the mouth of the estuary and the city centre. (You will be amazed the different directions students will point to.)
- Ask students to list the sources of water entering the estuary. (Answer: Avon/Ōtākaro and Heathcote/ Ōpāwaho rivers, the ocean, stormwater, rain water, road runoff).
- Ask children to close their eyes for a few minutes and listen to the sounds of the estuary. Then list the different sounds just heard e.g. birds, wind, traffic.
- Observe and discuss animal behaviour - movements on the estuary. e.g. how do crabs move? - Sideways. (See enclosed information titled “CRABS and SNAILS”.)
- Have children collect litter from the area visited. Discuss how these items could harm birds and/or how these items could be re-cycled, e.g. Six-pack rings, cans, packing straps, plastic bags - Entanglement, swallowing litter. Make sure hands are washed afterwards.
- If everyone is prepared to sit quietly for three full minutes on the edge of McCormacks Bay you will have the opportunity to see hundreds of tunnelling mudcrabs come to the surface. It is worth a try!!
- Discuss with students the reasons why Maori settled along the estuary e.g. ample food supply such as fish, birds and cockles, plants used for weaving, roofing and clothing, shelter from wind and waves, easy access to fresh water and easy access to the ocean and rivers for transport.
- Conduct any of the other activities enclosed in this resource.
- Just before returning to school sit in a circle and discuss with the children what they have observed. Suggested discussion points:
  - Which creature did you find most interesting and why?
  - Did you find the estuary more interesting than you thought before you got here?
  - Did you see any litter? What was it and how did you think it got there?
  - Did you see any signs? (i.e. Do not litter, no dogs allowed). Why do you think they were put there?
  - What are tides? How can we find out about today’s tides? (Newspapers)
  - Name two plants we saw today.
  - How many different bird species did we see today?
  - How many legs does a mud crab have?
  - How does the mudcrab move across the sand?



# CRABS AND SNAILS

## POINTS OF INTEREST TO SHARE WITH YOUR STUDENTS WHILE INVESTIGATING MUDFLATS

### CRABS:

77 species can be found in New Zealand of which 10 are found in and around the Avon-Heathcote estuary.

### TUNNELING MUD FLAT AND STALK-EYED CRABS:

- Females carry 2,000-16,000 eggs between their tail and underbelly. Crabs produce eggs twice per season and carry them for between 60 and 90 days.
- The Tunnelling mud crab actively defends its permanent burrow. They have larger pinchers
- The Stalk-eyed mud crabs dig a new burrow every 5 to 7 days.
- You will find little mud pellets outside the burrows on outgoing tides indicating the occupancy of the burrow from crabs sifting algae from mud.
- Students love picking up crabs. Please be careful not to hurt crabs and do not let students take crabs home. They will not survive.
- To pick up a crab, hold firmly between thumb and forefinger.
- Turn the crab over and check if the crab has a small narrow tail tucked up to its belly. If it does, it is a male. If it has a wide beehive shape tail tucked up against its belly, it is a female. Check for eggs oozing out from its tail. They are orangy/red.

Question to ask students: Why do crabs have eyes on stalks?

Answer: To look out for birds before coming out of their burrow.

### SNAILS:

- Mud flat snails are unique to New Zealand.
- They use a lung-like oxygen system. They can obtain oxygen from air when the tide is out and from water at high tide when covered with water.
- They eat bacteria and algae left behind by each high tide. They sift through 58 kg of mud per year leaving behind squiggly mud trails whilst eating (point out these trails).
- Snails lay eggs in a nest of "cement" called a "nidus" (look for horseshoe shaped mud nests).
- Nidus is produced by mixing saliva with mud to anchor the nest firmly to the mud to prevent it being washed away by high tides.
- Each nidus may contain 7,000 – 10,000 eggs.
- Snails can produce one nidus every week between November and March.
- Snails are "hermaphrodites" i.e. they are male and female and do not need to "mate".
- As many as 350 snails per square metre can be found at several points at the estuary and are a major food supply for many bird species.

### SUGGESTION:

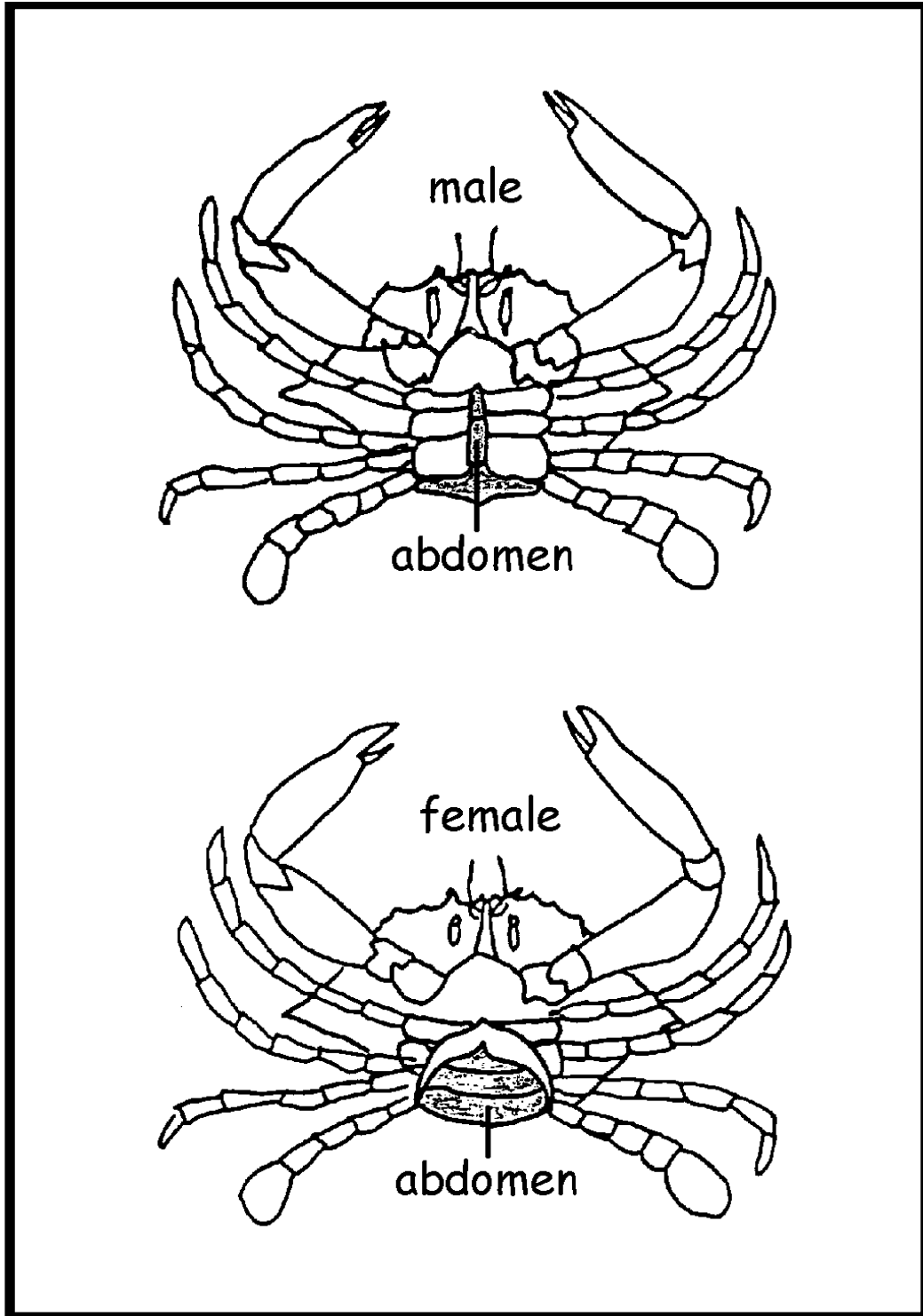
To avoid major impacts to the Estuary, teachers could collect a crab (use a spade) or snail and place in an icecream container for the students to view. Be sure to return collected animals to the mud flat.

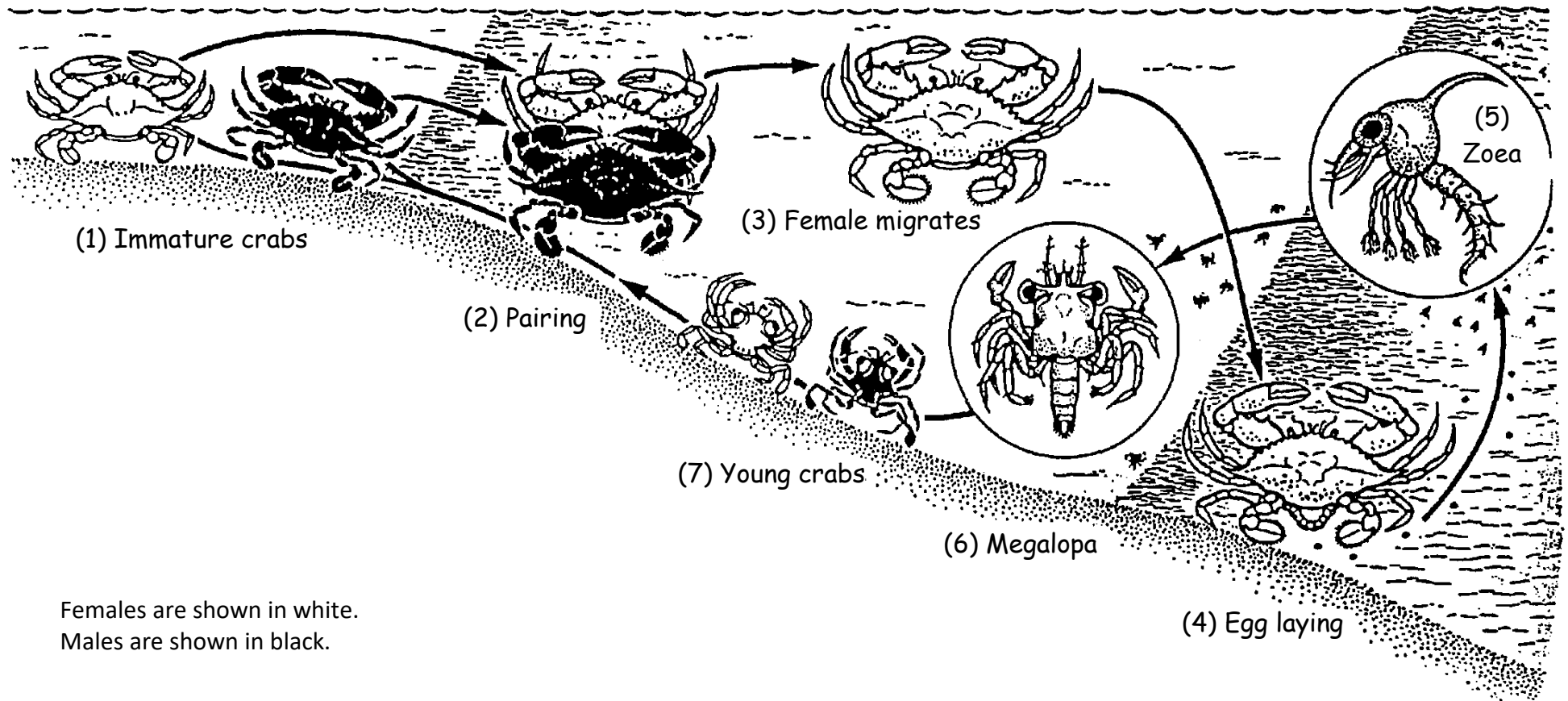




# CRABS: MALE OR FEMALE?

To find out whether a crab is a male or a female, simply tip it upside down and look at the abdomen (tail flap). A male has a narrow lighthouse-shaped abdomen whereas the female's is much wider enabling her to carry eggs.





Females are shown in white.  
Males are shown in black.

# CRAWL LIFE CYCLE

# THE ESTUARY DETECTIVE

## WELCOME DETECTIVE!

Let's see what interesting things you can find at the estuary today.

Something you think is beautiful: \_\_\_\_\_

Something that is impossible to count: \_\_\_\_\_

Something that is hard to the touch: \_\_\_\_\_

Something that feels soft to touch: \_\_\_\_\_

Something that you think looks ugly: \_\_\_\_\_

Something that moves: \_\_\_\_\_

Something that does not move: \_\_\_\_\_

Something that does not belong in the estuary: \_\_\_\_\_

The most interesting bird you saw today: \_\_\_\_\_

## THE BEST AND THE WORST PLACES IN THE ESTUARY

Select an area that you liked best. Describe why you liked it. On the back of this sheet make a drawing of this area. \_\_\_\_\_

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Select an area you liked the least. Describe why. On the back of this sheet make a drawing of this area. How do you think this area could be improved so that you would like it? \_\_\_\_\_

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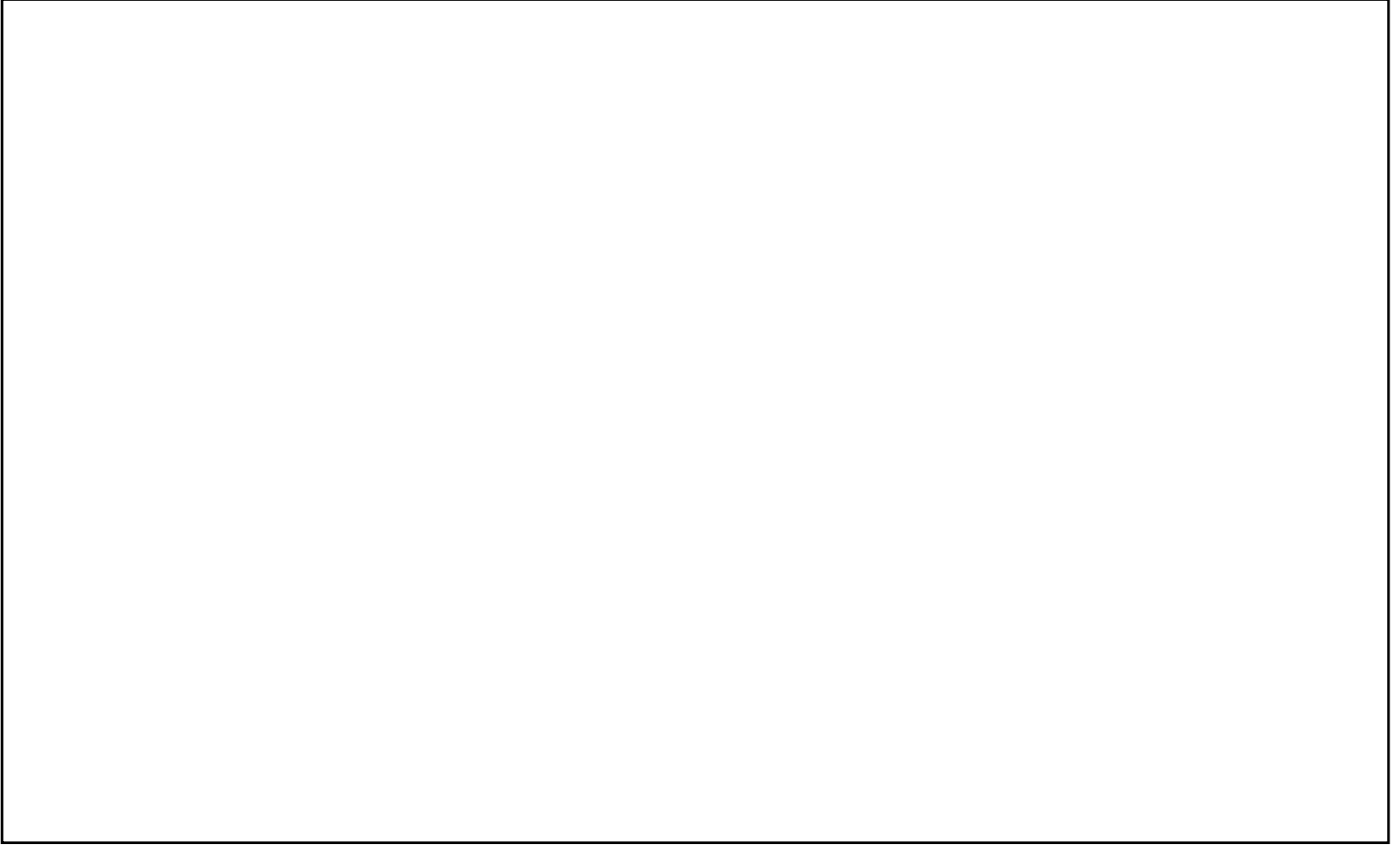
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Think of and list five words that you think would describe the Estuary.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_

DISCUSS ALL THE ANSWERS AFTERWARDS WITH OTHERS IN YOUR GROUP.

**DRAW THE AREA YOU LIKED THE MOST**

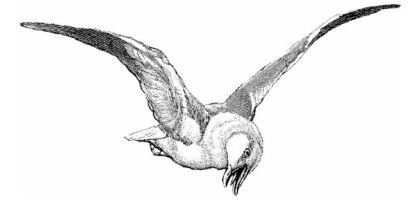


**DRAW THE AREA YOU LIKE THE LEAST**





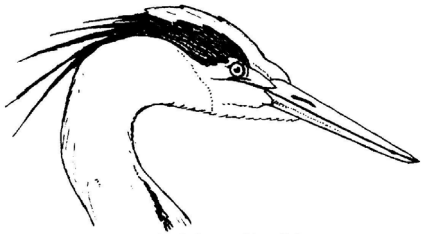
# BIRD LIFE



FILL IN THE QUESTIONS BELOW FOR AT LEAST **FIVE** DIFFERENT BIRDS SEEN TODAY

|   |  |  |  |  |  |
|---|--|--|--|--|--|
| NAME OF BIRD  |  |  |  |  |  |
| WAS IT ON ITS OWN<br>OR WITH OTHER<br>BIRDS?                          |  |  |  |  |  |
| WHAT DO YOU THINK<br>IT EATS?   |  |  |  |  |  |
| DESCRIBE IT'S:<br><br>BEAK<br>COLOUR<br>LEGS e.g. long, short<br>FEET |  |  |  |  |  |
| DRAW THE SHAPE OF<br>ITS BEAK   |  |  |  |  |  |

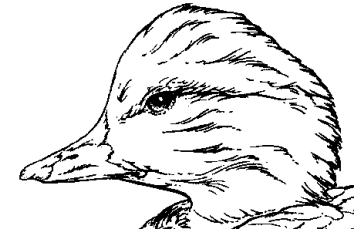
# THE DIFFERENT BILLS AND FEET OF BIRDS



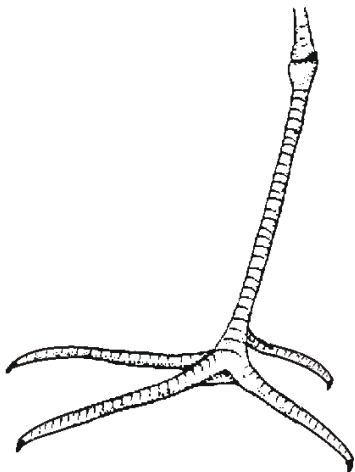
1. SPEARING



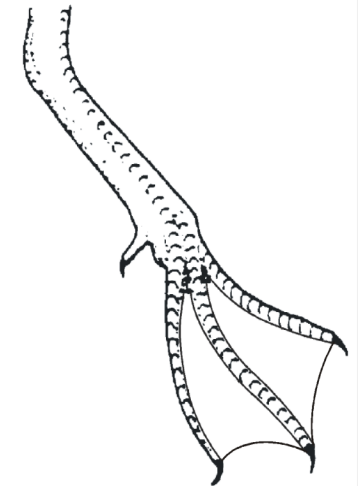
2. CUTTING



3. AQUATIC  
INSECT/GRAIN



4. WADING



5. THREE WEBBED  
TOES  
FOR SWIMMING

CAN YOU NAME FIVE BIRDS FROM THE ESTUARY THAT HAVE THE SAME TYPE OF BILLS AND FEET AS IN THE PICTURES?

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

CAN YOU THINK OF ANY OTHERS?

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_



**SECTION 4:**

**ACTIVITIES**

**BACK AT**

**SCHOOL**



# FACT FILE HOW MUCH DO YOU REMEMBER?

LIST 8 ANIMALS YOU SAW AT THE ESTUARY. WRITE 1 FACT FOR EACH ANIMAL THAT YOU LEARNED DURING YOUR VISIT TO ESTUARY.

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

4 \_\_\_\_\_

5 \_\_\_\_\_

6 \_\_\_\_\_

7 \_\_\_\_\_

8 \_\_\_\_\_

# FACT FILE

CAN YOU DRAW THE ANIMALS YOU'VE LISTED?

1

2

3

4

5

6

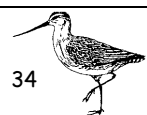
7

8

# ESTUARY - SURVIVAL AND ADAPTATION

## Post Visit Activity - Teacher Copy/Sample

| PLANTS   |           |       |      |              |  | ANIMALS      |                |        |        |          |          |                     |
|--|-----------|-------|------|--------------|--|--------------|----------------|--------|--------|----------|----------|---------------------|
| Sea Lettuce  | Glasswort | Ngaio | Flax | Cabbage Tree |  | Mud Snail    | Oyster Catcher | Pukeko | Cockle | Mud Crab | Flounder |                     |
| <b>HAVE:</b>   |           |       |      |              |  | <b>HAVE:</b> |                |        |        |          |          |                     |
| Hairy Leaves   |           |       |      |              |  |              |                |        |        |          |          | Shell               |
| Thick Leaves   |           |       |      |              |  |              |                |        |        |          |          | Feelers             |
| Shiny Leaves   |           |       |      |              |  |              |                |        |        |          |          | Mouth               |
| No Leaves  |           |       |      |              |  |              |                |        |        |          |          | Beak                |
| Thin Leaves  |           |       |      |              |  |              |                |        |        |          |          | Siphon              |
| Hooks  |           |       |      |              |  |              |                |        |        |          |          | Eyes                |
| Spines   |           |       |      |              |  |              |                |        |        |          |          | Nippers             |
| Juicy leaves   |           |       |      |              |  |              |                |        |        |          |          | Soft Bodies         |
| Trunk  |           |       |      |              |  |              |                |        |        |          |          | Hard Bodies         |
| Flowers  |           |       |      |              |  |              |                |        |        |          |          | Camouflage          |
| Seeds  |           |       |      |              |  |              |                |        |        |          |          | Gills               |
| Soft Lettuce Like Leaves   |           |       |      |              |  |              |                |        |        |          |          |                     |
| Long Leaves  |           |       |      |              |  |              |                |        |        |          |          |                     |
|  |           |       |      |              |  |              |                |        |        |          |          |                     |
|  |           |       |      |              |  |              |                |        |        |          |          | <b>LIVE:</b>        |
| <b>LIVE:</b>   |           |       |      |              |  |              |                |        |        |          |          | On Water            |
| In Water   |           |       |      |              |  |              |                |        |        |          |          | Under Water         |
| Beside Water   |           |       |      |              |  |              |                |        |        |          |          | Out Of Water        |
| Above High Tides   |           |       |      |              |  |              |                |        |        |          |          | High Tide Zone      |
| On Flat Near Water   |           |       |      |              |  |              |                |        |        |          |          | Low Tide Zone       |
| Up Bank  |           |       |      |              |  |              |                |        |        |          |          | Sand                |
| Under Bushes   |           |       |      |              |  |              |                |        |        |          |          | Mud                 |
|  |           |       |      |              |  |              |                |        |        |          |          |                     |
|  |           |       |      |              |  |              |                |        |        |          |          | <b>EAT:</b>         |
| <b>DO:</b>   |           |       |      |              |  |              |                |        |        |          |          | Plankton            |
| Climb  |           |       |      |              |  |              |                |        |        |          |          | Plants              |
| Spread Out   |           |       |      |              |  |              |                |        |        |          |          | Animals             |
| Grow Tall  |           |       |      |              |  |              |                |        |        |          |          | Dead Plants/Animals |
| Grows In Clumps  |           |       |      |              |  |              |                |        |        |          |          | Shellfish           |
|  |           |       |      |              |  |              |                |        |        |          |          |                     |
|  |           |       |      |              |  |              |                |        |        |          |          |                     |
| Science L3.2, L4.2 Survival  |           |       |      |              |  |              |                |        |        |          |          | <b>DO:</b>          |
| The relative number of ticks indicates the adaptive features and behaviours that enable species to survive. You or your students may decide to more descriptors to go down each side e.g. "dart" for flounder or "stays still". Birds would need "long legs", "webbed feet" etc. |           |       |      |              |  |              |                |        |        |          |          | Dig                 |
| It may be necessary to look up information on what some species are.   |           |       |      |              |  |              |                |        |        |          |          | Attack              |
| (Adapted from Dept. of Conservation Hawkes Bay Resource 2001)  |           |       |      |              |  |              |                |        |        |          |          | Slide               |
|  |           |       |      |              |  |              |                |        |        |          |          | Swim                |
|  |           |       |      |              |  |              |                |        |        |          |          | Walk                |
|  |           |       |      |              |  |              |                |        |        |          |          | Wade                |





## ACTIVITIES BACK AT SCHOOL

- For classroom display, students produce drawings of what they have seen while at the estuary. Large A3 size posters using paint or crayons brighten up the classroom (or library, school reception area etc).
- Discuss how littered items can harm and even kill birds e.g. six-pack rings, empty cans, broken glass, plastic bags. Discuss why people litter.
- Children could write out a questionnaire on littering to conduct at home. Results can be compared and discussed in the classroom.
- Design a poster promoting the recreational and natural values of the estuary.
- Discuss influence of people on the estuary e.g. jetboats create waves which could flood a bird's nest, dogs running around uncontrolled scaring birds off their nest.
- Discuss the meaning of an estuary food chain e.g. phytoplankton is eaten by tiny animals (zoo plankton). These in turn are eaten by crustaceans and/or small fish which provide food for larger fish and/or birds. Discuss what would happen if we removed one link in this food chain.
- Bird migration map; Draw a map depicting all continents based on the information given with the slides. Draw lines to indicate origin of the migratory birds on the estuary.

### **Many related environmental studies could be conducted as a follow up to this visit:**

- A visit to the “Living Earth” Processing Plant in Bromley (Christchurch City Council)
- A visit to your local Marae
- A visit to Ferrymead Heritage Park
- A visit to “Trees for Canterbury” native tree nursery in Woolston
- Discuss water conservation
- Discuss water pollution issues
- Conduct a litter clean up at the beach or river



## MORE "BACK AT SCHOOL" ACTIVITY OPTIONS

### TEACHER NOTE:

All activities are suggestions only. You can of course adapt activities to suit the age of your students. Activities are kept fairly simple as they should be easy to complete in a minimum of time to ensure that they stay "Fun Activities".

1. Create a word find listing at least five names of birds seen at the Estuary. (Maybe for publication in the next school newsletter?)
2. Choose a native animal or plant species that can be found in the Estuary. On a piece of paper list 5 clues on your choice e.g. what it eats, how big or small it is, what colour it is, how it moves or eats. Everyone could present the clues to the rest of the class for others to "Guess the species".
3. Find out the role of the Department of Conservation.
4. Write a poem or limerick on the Estuary or one of the animal species seen there.
5. Nature Alphabet: On a sheet of paper write from top to bottom all the letters of the alphabet. Beside each letter think of and write a word starting with that letter. The word has to relate to the natural environment.
6. List five recreational sports people enjoy in and around the Estuary. For each one list one positive and one negative impact this may have on the estuarine environment. State how we could reduce the negative impact.
7. Book review: Choose a book from the school library on a New Zealand nature topic. In front of the class tell others why you chose the book you've read.
8. Write a letter to someone who has never seen a mud crab. Describe what it looks like, where it lives and what it eats.
9. Design a logo stating why we should protect the Avon-Heathcote Estuary.
10. Write a short story of your favourite estuary bird. Describing an adventure it had e.g. "a crab describing how it escaped being eaten by a kingfisher" or "A snail being picked up by a school student, looked at through a magnifying glass and putting it back". Help students use their imagination with example stories.
11. Brainstorm on what makes animals endangered, and what we can do to prevent animals from becoming endangered.
12. Invent a New Zealand "EXTINCT" bird species. Draw a picture of it, give it a name and produce a fact sheet including descriptions of its features like its beak, feathers, legs, tail. Fact sheet should include the invented 'animal's' habitat, its food requirements plus a list of its predators.



## AVON-HEATHCOTE ESTUARY CARE PLEDGE

Because we want to help ensure that this unique wetland environment is a healthy place for all people, animals and plants that live in and around it, not just for us, but also for future generations, all of us from

Room No. \_\_\_\_\_ at \_\_\_\_\_ School  
agree to abide by the Estuary Care Rules listed.

### ESTUARY CARE RULES:

1. We are considerate to birdlife by not feeding birds and being careful not to disturb birds when they are resting or nesting.
2. We never leave any litter behind when visiting the estuary.
3. We know to call the Department of Conservation when we find an injured, stranded or dead penguin, seal or dolphin when visiting the estuary or beach.
4. We pass on what we have learned to our families, so that they know how to care for the estuary too.
5. We know how harmful beach litter is to wildlife, and make sure that we and our families pick up dangerous items from the beach or estuary when visiting.
6. We stay on the walking tracks provided so as not to damage plant life.
7. We understand and recognise the historical and natural value of the estuary.
8. We never take home a live animal or plant from the estuary.
9. We think that graffiti is pathetic, childish and stupid and will never lower ourselves to do anything like that.
10. We respect the importance of the estuary to all fish, plants, birds, crustacea, mud, and even algae and will always be careful not to cause any damage when visiting the estuary.

We visited and learned about the Estuary. We know how important it is to have a clean and healthy estuary environment and because we care for the welfare of the animals, plants and all the things they need to survive we call ourselves: **Friends of the Avon-Heathcote Estuary.**

Here are all our signatures (including the teachers):



# ACTIVITY IDEAS TO INCLUDE THE WHOLE SCHOOL

## 1. LIBRARY DISPLAY:

Students collect materials and set up an **ESTUARY DISPLAY** in the library for at least two weeks.

### Suggestions:

- **Pictures** collected by students e.g. postcards, magazine and newspaper clippings, posters, or their own drawings depicting some of our unique Estuary and its inhabitants.
- **Art** e.g. posters depicting crabs/snail/birds, origami, ceramic bird tiles, fantasy bird species made from plastic bottles, yoghurt containers etc.
- **Books** e.g. each student chooses their favourite conservation or nature theme book for the display.
- **Issues board:** Students collect Estuary related newspaper clippings over three weeks for show on a large display board. Under teacher guidance, most prominent issues are discussed as a class.

**Extension idea:** Students read stories on New Zealand wetland animal species to younger students using library books or school journals.

**Optional idea:** If the suggested library display is not suitable or appropriate at your school, set up the display in your classroom, inviting other classes to view the display.

## 2. SCHOOL GROUND LITTER ACTION ACTIVITY:

Class litter collection for five minutes straight after lunchtime. To make this educational and fun you could extend this activity using following ideas:

- Students bring supermarket bags to school (encouraging recycling) for collecting litter.
- Students work in groups of five or six in a designated area of the school ground (map use and familiarisation of school grounds). Groups rotate working in designated areas.
- Decorate the school rubbish bin, making them obvious and fun to look at. This could be designed and painted by groups of students.
- Littered items could be surveyed, grouped into categories of e.g. chip packets, confectionery wrappers etc.
- Graph or survey could be displayed, noting changes over a week, month or term.
- Investigation/discussion on why students discard litter on the grounds rather than in the bins provided.
- Investigation/discussion of solutions to the litter problem e.g. need more bins, “nerdy” image if you pick up litter needs changing.
- Investigate/discuss effect of littered items on beach or riverbank on animal species (e.g. entanglement).





- Investigate recycling option of litter: cans, paper waste or bottles for art projects.
- Invite other classes to join the project, perhaps you could schedule litter collection days.
- Invite students themselves to think of ideas to extend the litter project to encourage students to take personal responsibility for a tidy and healthier environment.

### 3. ESTABLISH A SCHOOL ENVIRONMENTAL CONCERN GROUP:

Such a group could consist of one student from each class, form or syndicate (voted by class or appointed by a teacher) and would need teacher guidance (teacher presence at meeting, minute taking, encouragement). Once a group has been established members need to decide on:

- A. A name which sounds fun and is easy to remember for others.
- B. How often you will meet each year.
- C. A motto for the group plus a mission statement (the aim of the group).
- D. Brainstorm and select a few easy, realistic projects to undertake for the term or school year.

#### Hints from schools who have established a school environment group:

**Involve the whole school** in your projects e.g. through reports in schools' newsletters, assembly reports.

**Invite ideas and feedback** from all teachers, parents and all students, e.g. through school newsletters, an ideas box at reception, asking teachers for ideas at staff meetings or asking each class to brainstorm and provide a list of five project ideas for selection by environment group members

**Motivate and encourage participation** in your selected projects e.g. through awards/certificates presented at assembly, badges ('Conservation Student' of the week) or providing free time/ privileges.

#### Proven successful projects in other schools:

- Establish a native tree section in the school ground with help from caretaker.
- Establish a vegetable garden in the school ground with help from caretaker/parent/helper/local dairy or garden centre (providing seeds and seedlings).
- Create (design and paint) a mural depicting native animals and plants.
- Reward system, allowing pupil(s) to assist caretaker/gardener for a set time.\*\*\*
- Reward system, allowing pupil(s) to collect littered items for a set time.\*\*\*
- Reward system, allowing pupil(s) to just be outside during school hours for a set time.\*\*\*

\*\*\* Allowing time out of class, to get fresh air has proven to be very rewarding exercise for several schools who have trialled this. Use the motto and concept of "collecting litter or gardening as a "reward/privilege and honour" rather than a punishment.



# ESTUARY POETRY

Choose a topic related to what you have seen whilst visiting the Avon-Heathcote estuary. Write a poem or Haiku.

Examples of students work produced in the past

## THE AVON-HEATHCOTE ESTUARY

|             |             |
|-------------|-------------|
| Spoonbills  | resting     |
| water       | dazzling    |
| crabs       | scrambling  |
| rocks       | still       |
| sounds      | interesting |
| the estuary | beautiful   |
| scenery     | magnificent |

*by Erin aged 9 Burwood Primary School in 1999*

## WETLANDS

The wetlands are a place  
Where animals hide and live  
Such as the eel. He slithers  
Through the estuaries and feeds on all sorts of fish.

The wetlands are a place for birds, plants,  
Fish and insects too.  
The birds flutter and mutter above or on the wetlands.

The plants provide hiding places for birds.  
The fish swam amongst each other.  
The insects hide in the mud and under rocks.

*by Michelle French – Chisnallwood Int School in 1999*



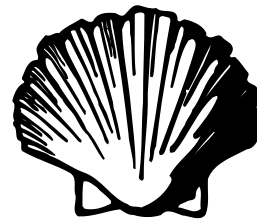
# CLAY DOUGH CREATURES

Children can model clay dough into animal shapes. Use food colouring to make various colours of clay.

## CLAY DOUGH



1 Cup Flour  
½ Cup Salt  
Water  
Food Colouring



1. Mix the salt and flour together in a bowl.
2. Add water till the dough is fairly stiff like pie dough. Squeeze the dough with your hands until it is smooth

Store your dough in a plastic bag in the fridge until it is ready to use.

### **TWO WAYS TO COLOUR YOUR DOUGH:**

1. Add food colouring to the water before mixing it with flour.
2. Divide the dough into smaller balls and add food colouring directly to the dough.

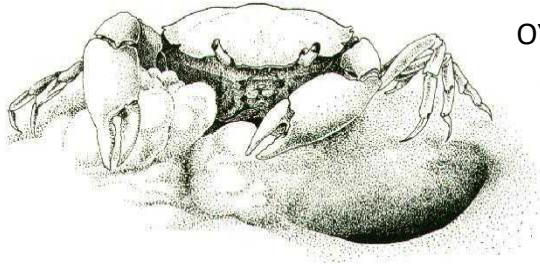
Make your animals small so they dry easily.

Decorate with markers and glitter

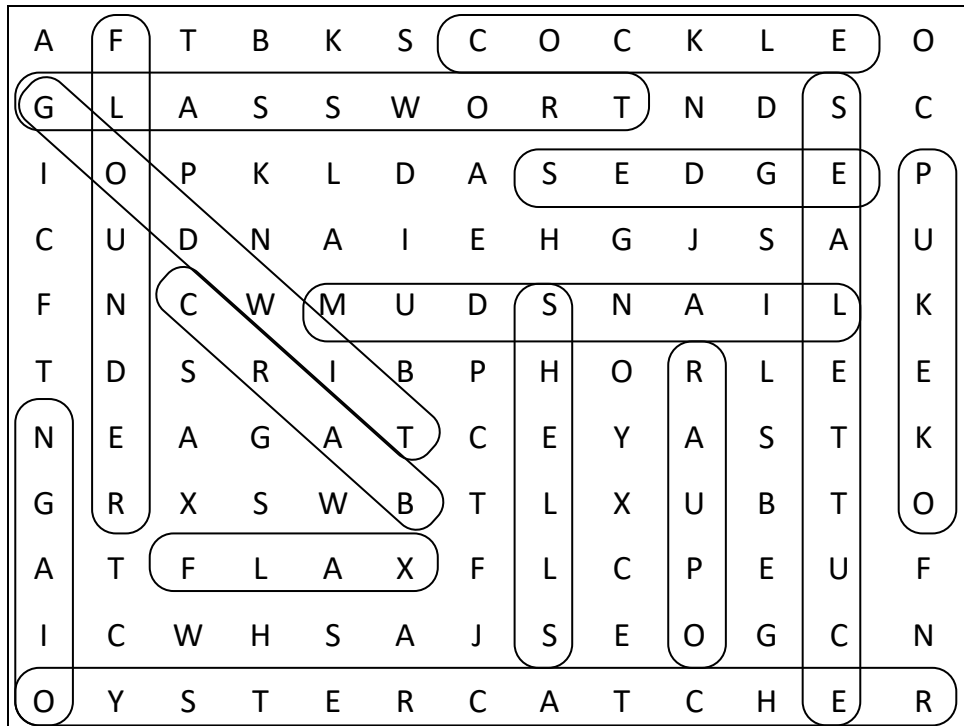
# ESTUARY ACTIVITIES - TEACHERS ANSWERS

## WORDFIND

COCKLE  
CRAB  
FLAX  
FLOUNDER  
GLASSWORT  
GODWIT  
MUD SNAIL



NGAIO  
OYSTER CATCHER  
PUKEKO  
RAUPO  
SEA LETTUCE  
SHELLS  
SEDGE



## FILL THE GAPS

KAYAKING  
JOGGING  
SAILING  
WALKS

WINDSURFING  
BIRD WATCHING  
NATURE STUDIES  
PICNICS

## HOW MANY ESTUARY ANIMALS AND PLANTS DO YOU KNOW?

Some answers are in the wordfind. Encourage the children to think of others.

## WORD SCRAMBLE

BIRDS  
CRABS  
SEAWEED  
PEOPLE

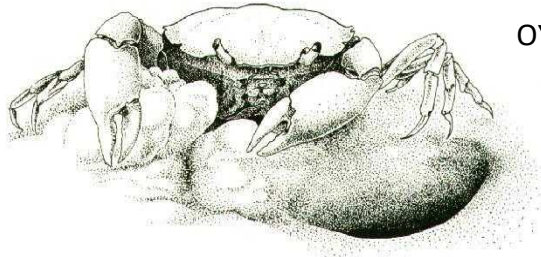
SHELLS  
PLANTS  
WATER  
INSECTS



# ESTUARY ACTIVITIES

## WORDFIND

COCKLE  
CRAB  
FLAX  
FLOUNDER  
GLASSWORT  
GODWIT  
MUD SNAIL



NGAIO  
OYSTER CATCHER  
PUKEKO  
RAUPO  
SEA LETTUCE  
SHELLS  
SEDGE

|   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | F | T | B | K | S | C | O | C | K | L | E | O |
| G | L | A | S | S | W | O | R | T | N | D | S | C |
| I | O | P | K | L | D | A | S | E | D | G | E | P |
| C | U | D | N | A | I | E | H | G | J | S | A | U |
| F | N | C | W | M | U | D | S | N | A | I | L | K |
| T | D | S | R | I | B | P | H | O | R | L | E | E |
| N | E | A | G | A | T | C | E | Y | A | S | T | K |
| G | R | X | S | W | B | T | L | X | U | B | T | O |
| A | T | F | L | A | X | F | L | C | P | E | U | F |
| I | C | W | H | S | A | J | S | E | O | G | C | N |
| O | Y | S | T | E | R | C | A | T | C | H | E | R |

## FILL THE GAPS

Fill in the missing letters in the words that are the names of things we can enjoy at the Estuary.

K \_ Y \_ K \_ \_ G

WIN \_ SU \_ \_ \_ NG

J \_ G \_ ING

B \_ \_ D WA \_ \_ H \_ \_ G

SAI \_ \_ NG

N \_ T \_ RE STU \_ IES

W \_ \_ KS

PI \_ N \_ \_ S

## HOW MANY ESTUARY ANIMALS AND PLANTS DO YOU KNOW?

We share our Estuary with many plant and animal species.

Can you name:

Five animal species:

Five plant species:

- |        |        |
|--------|--------|
| 1..... | 1..... |
| 2..... | 2..... |
| 3..... | 3..... |
| 4..... | 4..... |

