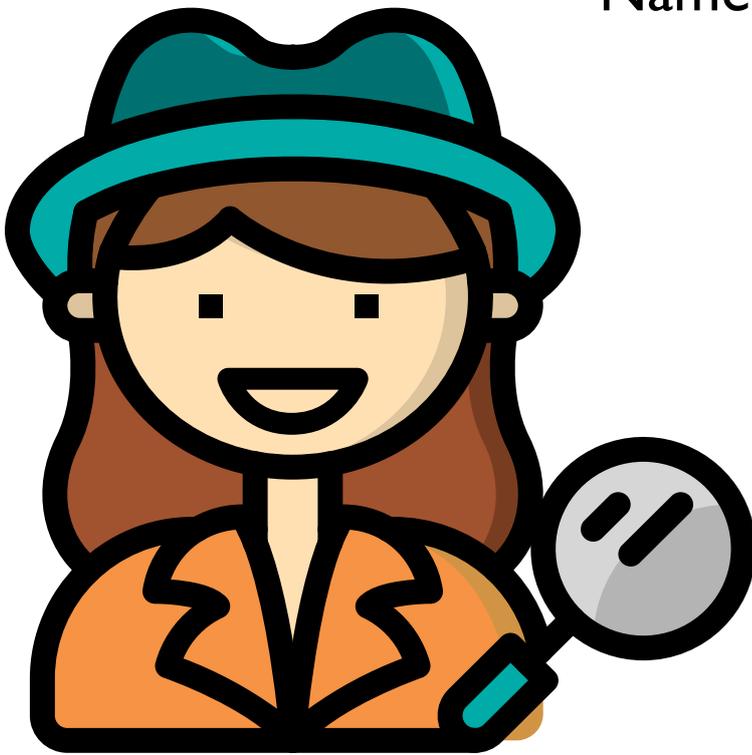


Name: _____



Fishcare Victoria

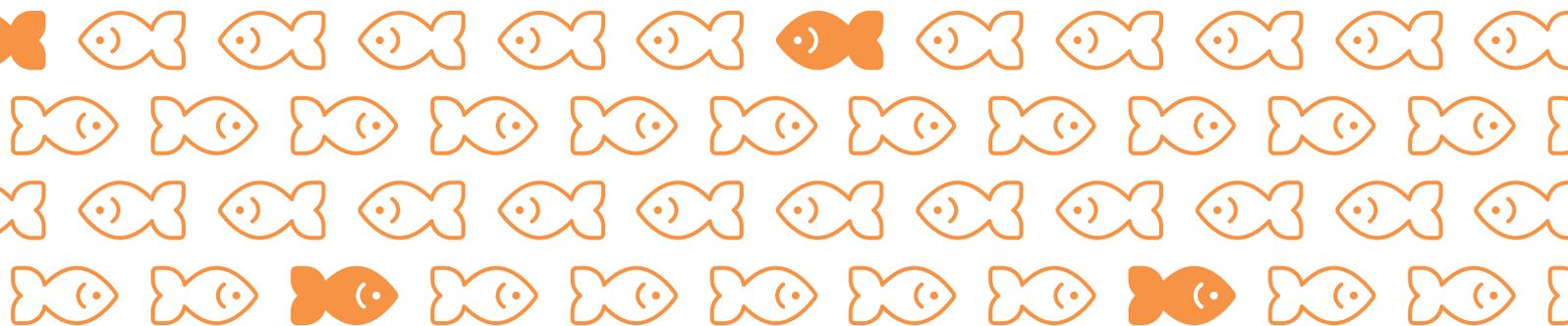
INVADING THE BAY!

Workbook

DIGITAL EDITION - Adobe Acrobat Reader recommended to complete digitally

Available from get.adobe.com/reader/

Uncheck all boxes and click 'Download Acrobat Reader'.



Purpose of the book

Fishcare Victoria Mission Statement

Shaping the Sustainable future of recreational fishing in Victoria through education, hands-on experiences, communication and community participation.

We are a community operated not-for-profit with the motto 'We Fish, We Care'. Our work promotes responsible fishing practices and increased stewardship of Victoria's aquatic environments and is funded through the Recreational Fishing License Trust fund.

This workbook is aligned to the F-10 Victorian Curriculum, specifically Science and Sustainability and linked to the following codes.

Level 3 and 4:

Living things can be grouped on the basis of observable features and can be distinguished from non-living things (VCSSU057).

Different living things have different life cycles and depend on each other and the environment to survive (VCSSU058).

Level 5 and 6:

Living things have structural features and adaptations that help them to survive in their environment (VCSSU074).

The growth and survival of living things are affected by the physical conditions of their environment (VCSSU075).

Level 7 and 8

There are differences within and between groups of organisms; classification helps organise this diversity (VCSSU091).

Interactions between organisms can be described in terms of food chains and food webs and can be affected by human activity (VCSSU093).

Level 9 and 10

The theory of evolution by natural selection explains the diversity of living things and is supported by a range of scientific evidence (VCSSU120).

Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these system (VCSSU121).

For more information and student resources please visit our website www.fishcare.org.au



Meet the locals

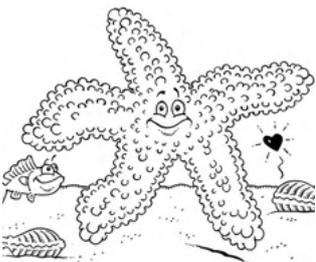
Objective

For students to gain an understanding of the local flora and fauna that live within Port Phillip Bay, and the changes that have occurred since European settlement. By the end of the lesson students should be able to understand the difference between a native and an introduced species and how each have adapted to live in Port Phillip Bay.

Lesson plan

Port Phillip Bay is Victoria's largest marine embayment and supports several natural ecosystems. An ecosystem is a community of living organisms that interact with their physical environment. Species native to Port Phillip Bay have evolved over many thousands of years to suit their habitat and are known as native species. Approximately 85% of plants and animals in Port Phillip Bay are endemic to Victorian water.

Native species



Zig zag sea star

The Zig zag sea star is a native species of sea star found living within Port Phillip Bay. It is a small 5-armed sea star with a diameter of up

to 25cm with an orange-yellow colour. The tip of each arm is blunt and not upturned and the spines are rounded and knob-like.



Common kelp

The Common kelp is a native species of seaweed found within Port Phillip Bay. It has a long smooth stalk that branches into tan or

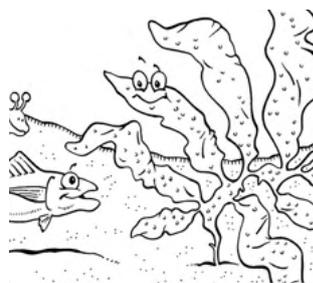
brown coloured leathery blades and grows up to 2m tall. It forms an underwater forest within the rocky reef habitat which it lives, providing shelter and shade to the area, whilst using sunlight as a form of energy.



Red shore crab

The Red shore crab is a native species of crab found within Port Phillip Bay. It is a dark red brown colour that grows to 7cm wide and

capable of dodging waves and climbing under crevices on the rockpools and coastal shores where it lives.



Red seaweed

The Red seaweed is a native species of seaweed found living within Port Phillip Bay. It has a slender stalk that branches into dark

red or red purple blades and can grow up to 40cm in length. Found attached to rocky reefs and create a low-lying turf habitat in subtidal areas.



What special features (size, shape, colour) have each of our local species adapted to help them live and survive in Port Phillip Bay? List a special feature and how it contributes to survival?

Zig zag sea star

Common kelp

Red shore crab

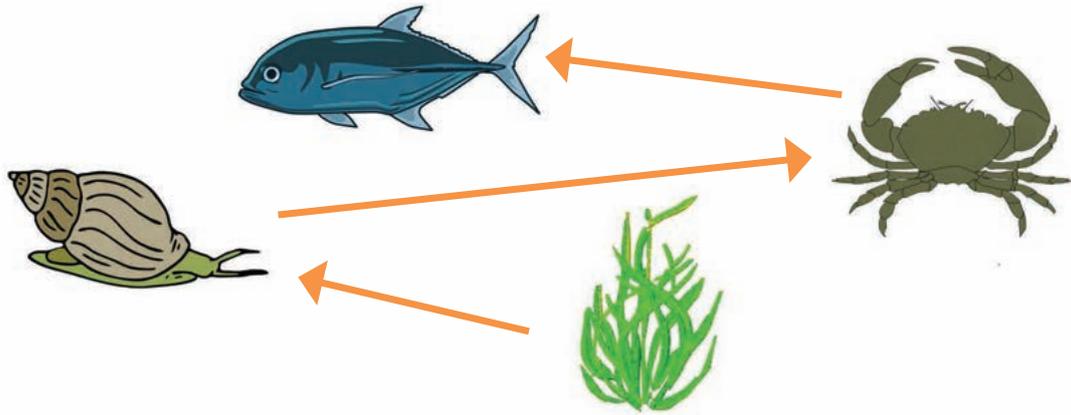
Red seaweed



What is evolution by natural selection?



Ecosystems



Every ecosystem has a food web which consists of multiple food chains and shows what-eats-what in an ecological community. Arrows show the direction which energy and matter flows through the system.

DIGITAL EDITION - Lines, arrows and circles can be accessed in acrobat via the comments menu using the shape tool. (Looks like overlapping square, triangle and circle)

Draw arrows on the ecosystem below to create a food web.



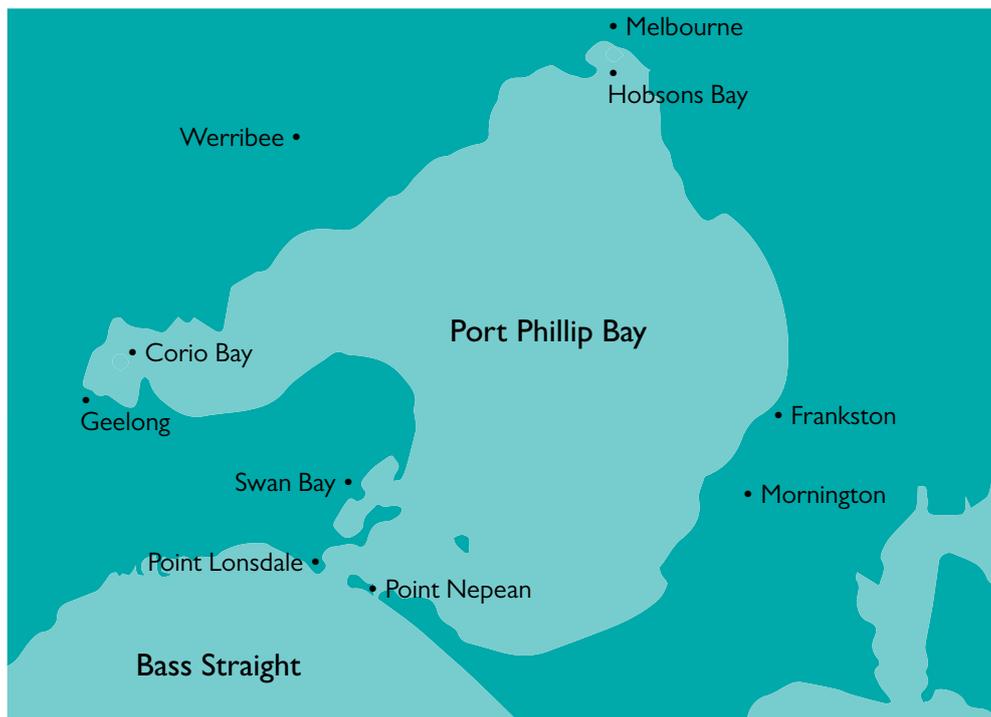
The people invasion

In 1802 European settlers entered the bay by boat and began to settle along the coastline of Port Phillip Bay. Here, they cleared trees away near riverbanks for houses and farms and brought with them species from their country, some on purpose but others by accident. Port Phillip Bay today is one of Australia's busiest commercial ports used to transport cargo from all around the world and in 2017-2018 alone Port Phillip Bay saw 3,795 ship visits (Victorian Ports Corporation). Some of the largest cargo ships to enter the bay are 300m long carrying with them ballast water from our common traders; China, Japan, Europe and Africa.

Hull hitchhikers

Ballast water is the water used to help a cargo ship stay balanced during its voyage overseas without cargo. Generally, water from outside the ship is pumped into the hull before leaving Port and pumped back out upon arrival; bringing with it hull hitchhikers from all over the world! These hitchhikers are known as introduced species because they do not naturally occur in the area which it is found and in some cases begin to disrupt the local ecosystem by outcompeting native species for food, shelter and habitat because they have no natural predators and are very resilient.

On the map below highlight the shipping routes used by Port Phillip Bay

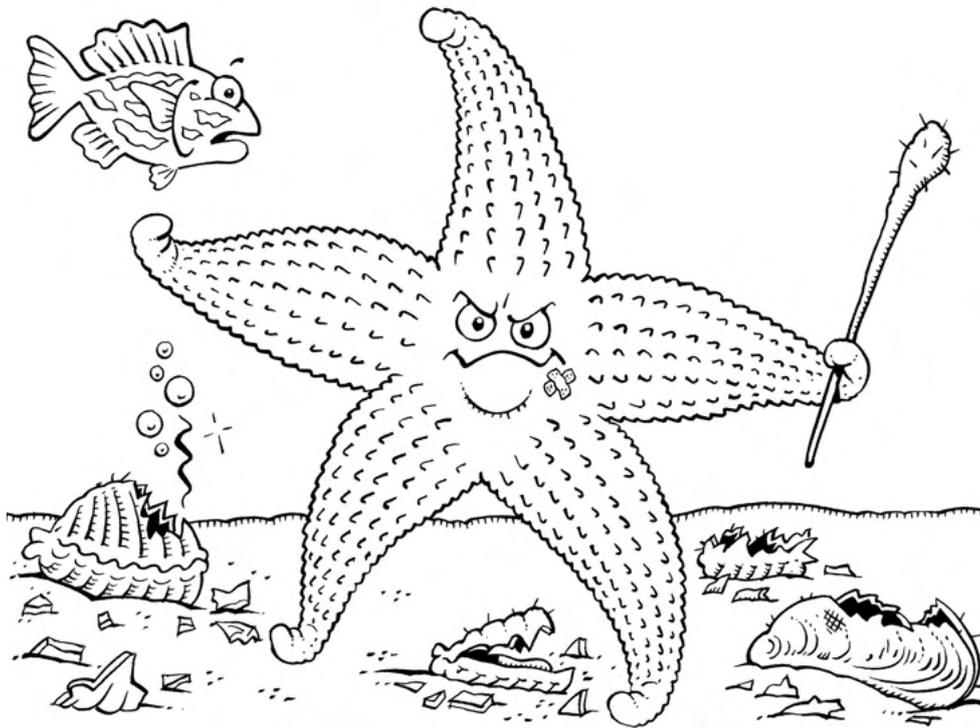


Explain how human activity can affect food webs and food chains?



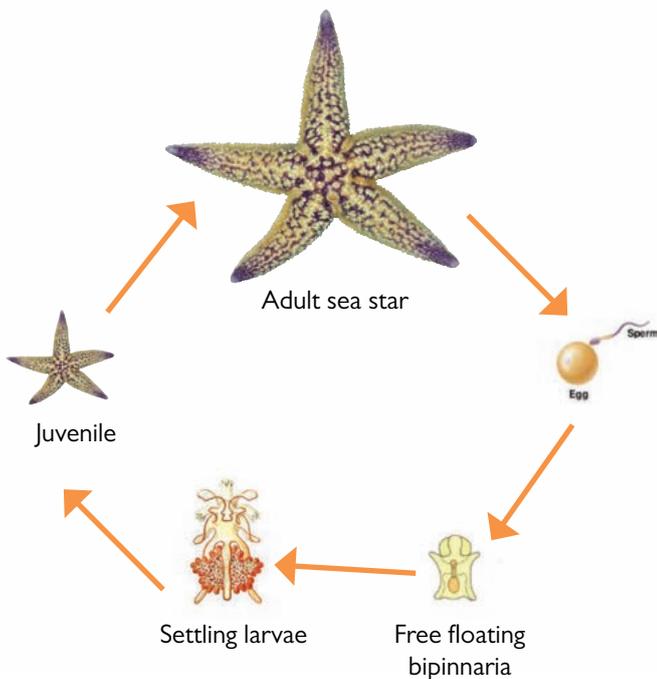
Pesky pests

Northern Pacific sea star



Did you know?

Sea stars start life as microscopic free-swimming larvae which can be carried by ocean currents in the hulls of ships, surviving thousands of miles!



The Northern Pacific sea star is a 5-armed sea star mostly yellow in colour with purple tips. It is introduced from China, Japan, Korea and Russia in the ballast water of commercial ships. It is commonly mistaken for the native 11-armed sea star. If seen call 136 186.

The Northern Pacific sea star is introduced from _____, _____, _____ and _____ and is commonly mistaken for the native _____.

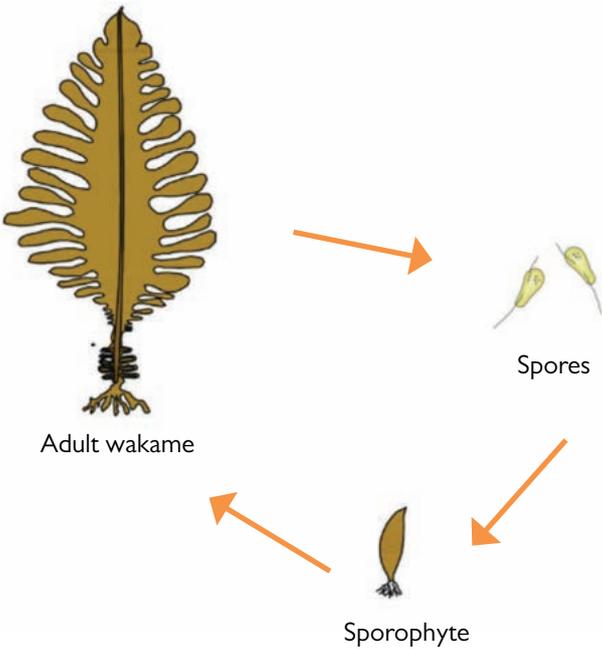
If seen call _____.



Japanese kelp



Discuss how seaweed use the abiotic components of their environment to reproduce?

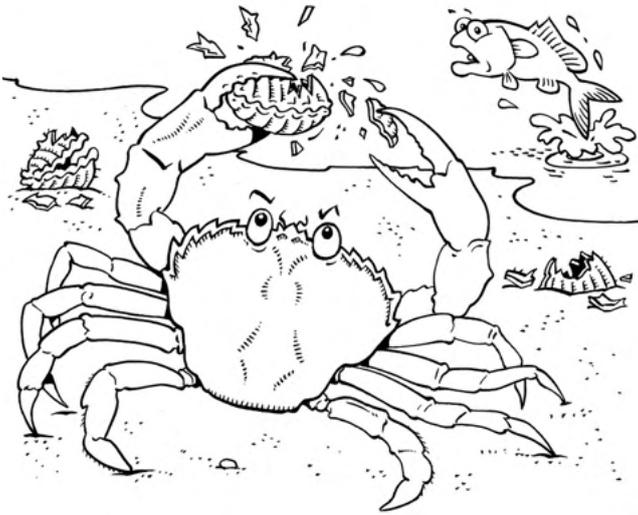


Japanese kelp is a golden-brown seaweed introduced from Japan. It flourishes on seabeds and in sheltered temperate waters is commonly mistaken for the native common kelp. If seen call 136 186.

Japanese kelp is introduced from _____ and is commonly mistaken for the _____. If seen call _____.



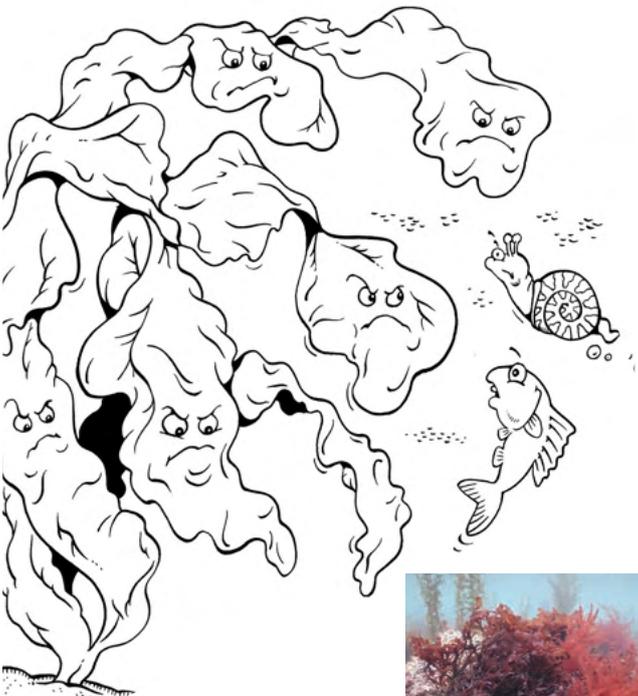
European green shore crab



The European green shore crab has a mottled green coloured triangular shell with flattened legs, no swimming paddles, 5 spines next to each eye and commonly mistaken for the native red shore crab. Introduced from Europe and North Africa by boat and found living in the intertidal zone where it preys upon native species and is the largest cause of death to native crabs and molluscs. If seen call 136 186.

European green shore crab is introduced from _____ and _____ and is commonly mistaken for the native _____. If seen call _____.

Red algae

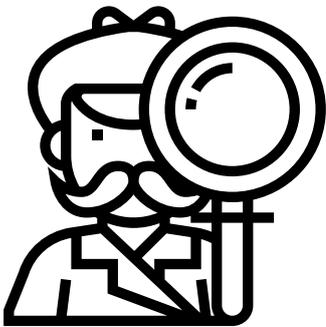
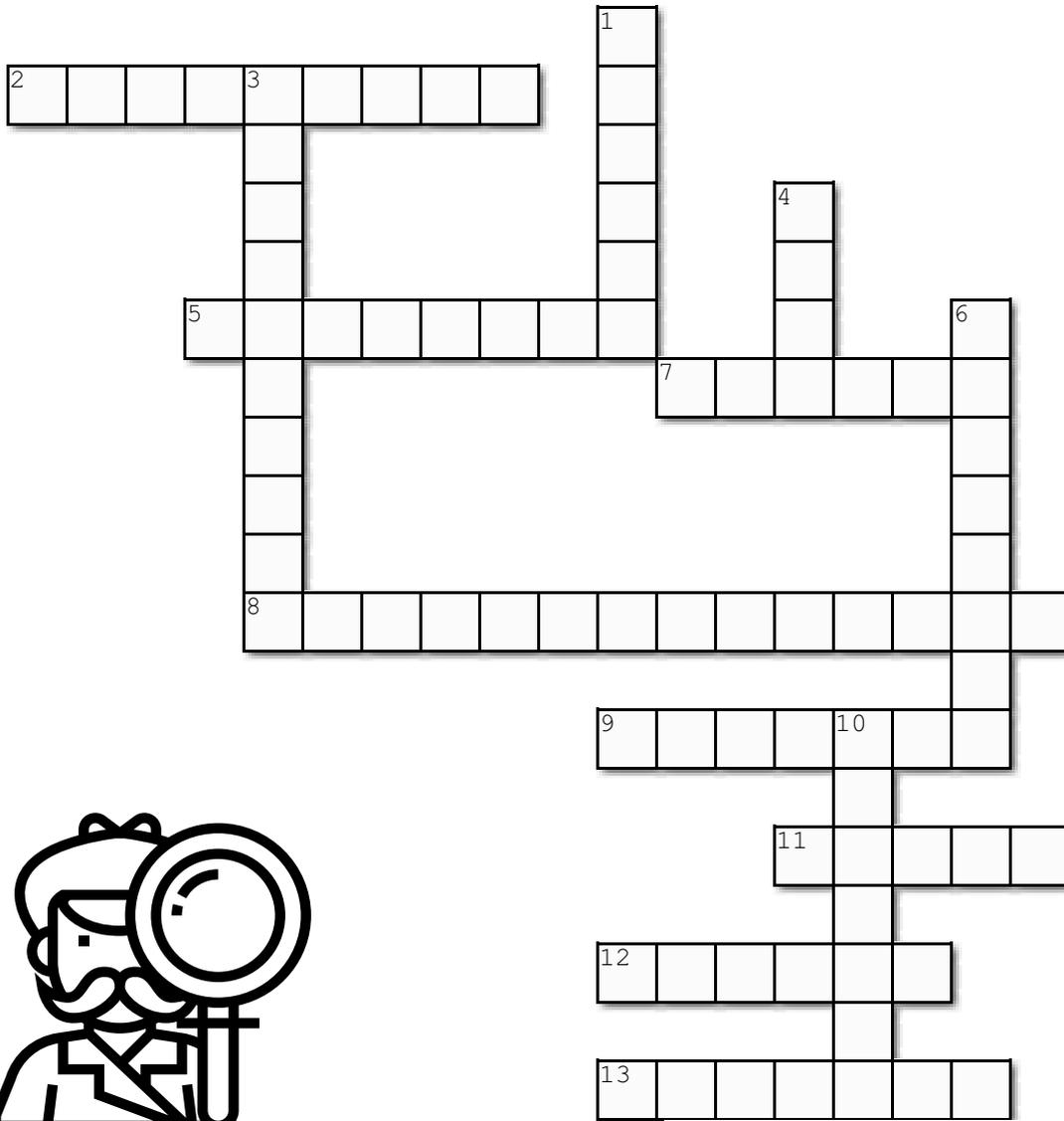


Red algae is a large red-brown seaweed that can grow up to three metres in length and can have between one and six blades. Introduced from Japan and Korea by ship and found living in sheltered areas where it grows rapidly and disrupts the growth of native seaweed species and impacts food availability of snails. It is commonly mistaken for the native red seaweed and sometimes called “devils tongue” weed. If seen call 136 186.

Red algae is introduced from _____ and _____ and is commonly mistaken for the native _____. If seen call _____.



European green shore crab activity



Across

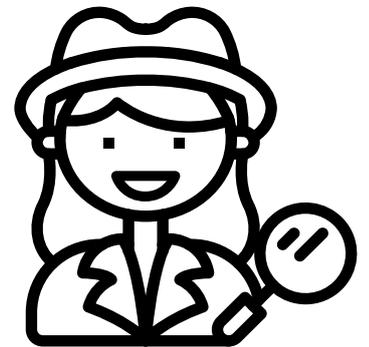
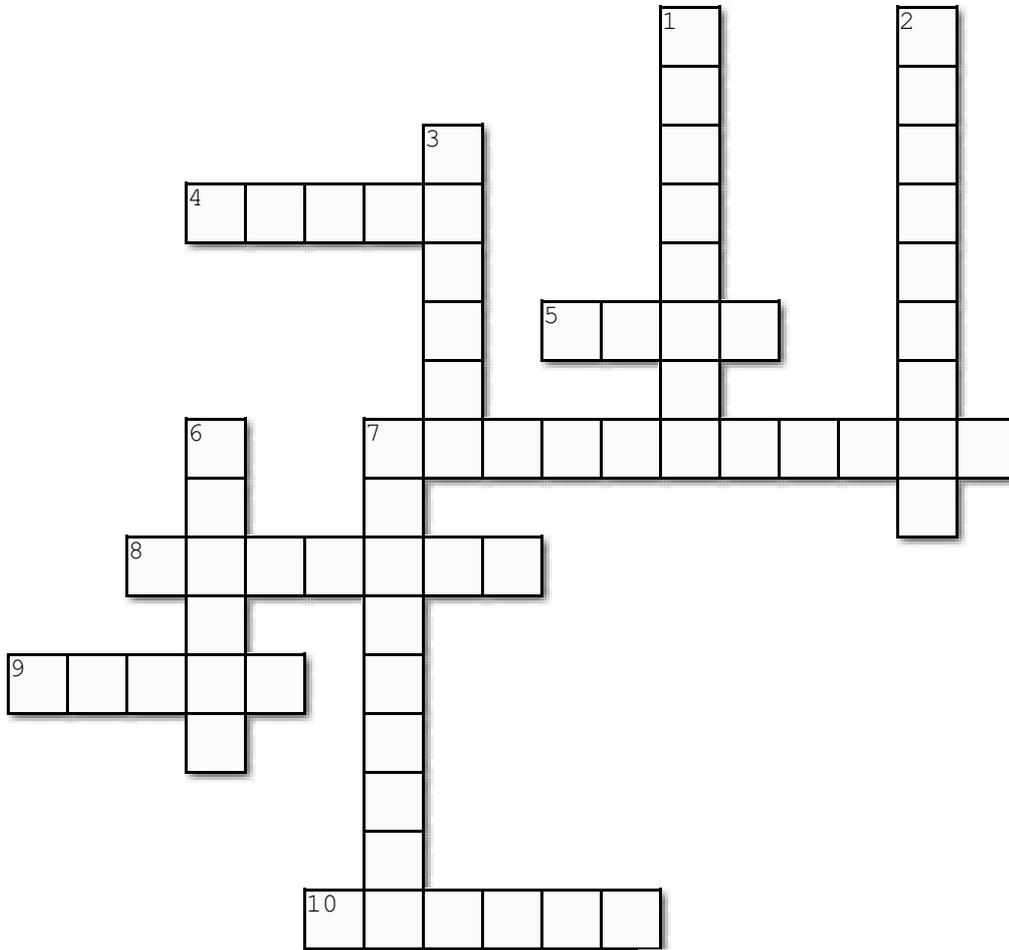
2. my legs are... ?
5. I am an... species?
7. I prey upon species?
8. I am commonly mistaken for?
9. I have no swimming...?
11. what colour am I?
12. There is 5 of these next my eyes
13. I out- compete the native species for food and...?

Down

1. I am native to North Africa and...?
3. what shape is my shell?
4. How did I get to Port Phillip Bay?
6. I inhabit rocky reefs, sand flats and...?
10. I am the ... cause of death to native crabs and molluscs?



Red algae activity



Across

4. I am native to Japan and ...?
5. How did I get to Port Phillip Bay?
7. I am commonly mistaken for native...?
8. I can grow...
9. How many meters long can a grow?
10. I impact food availability for?

Down

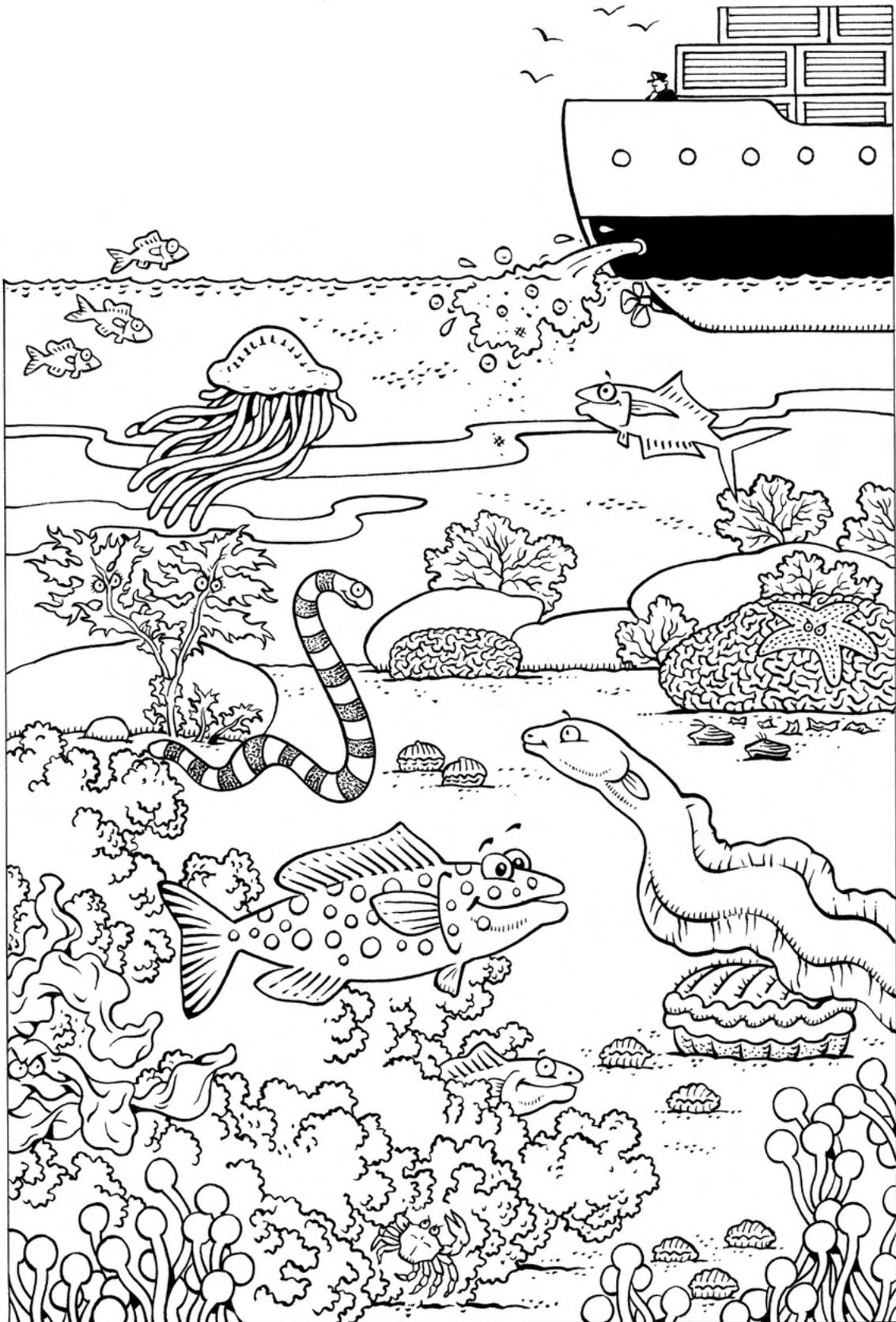
1. I am classified as an ... species
2. I am found in ... areas?
3. I disrupt the growth of ... seaweed species
6. I have between 1 and 6...?
7. what colour am I?



Become a detective!

Spot the invasive

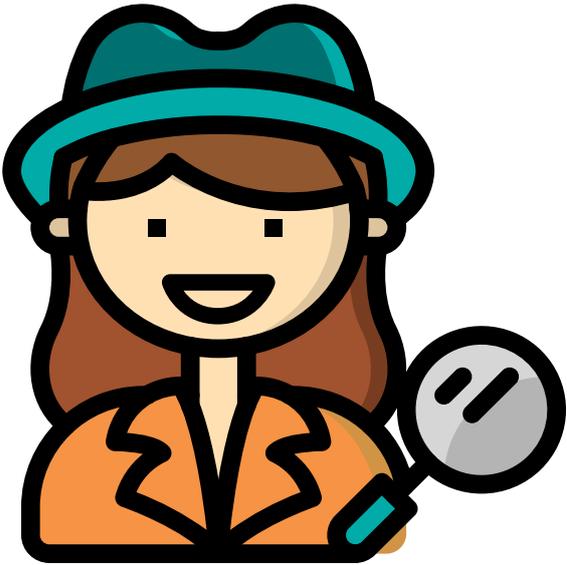
Circle the introduced species in the image below.



My goals for a healthy Port Phillip Bay

Immediate Goal:

Short Term Goal:



Long Term Goal:



Answers

Page 4

Special features:

Zig zag sea star

- Tough spiny skin to protect from predators.
- Orange yellow colour to camouflage from predators.

Common kelp

- Tan or brown in colour to camouflage from predators.
- Grows up to 2m tall to access more sunlight for energy from photosynthesis.

Red shore crab

- Dark red and brown in colour to camouflage from predators.
- Fast moving which helps it dodge waves and escape predators.

Red seaweed

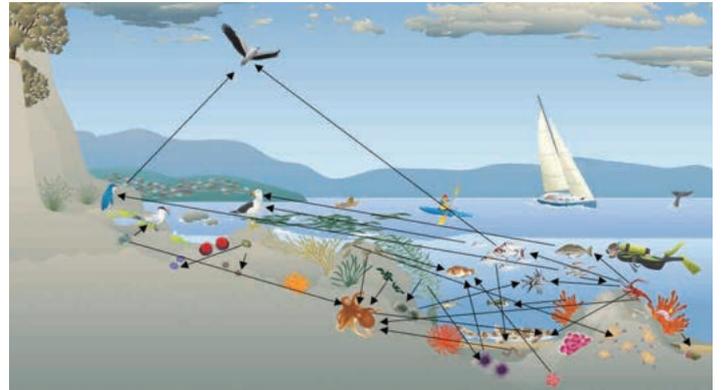
- Dark red or purple in colour to camouflage from predators.
- Attaches to rocks to avoid being swept away by waves.

Natural selection:

The theory of evolution by natural selection explains the diversity of living things and is supported by a range of scientific evidence.

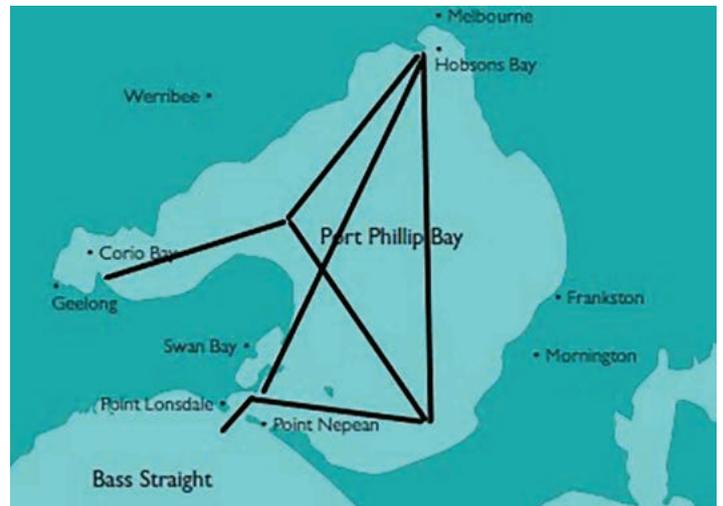
Page 5

Ecosystem diagram:



Page 6

Shipping diagram:



Explain:

Cargo ships and marine vessels used by humans have introduced species which disrupt native food webs and food chains by altering the interactions that occur between organisms in an environment.

Page 7

Northern Pacific sea star:

The Northern Pacific sea star is introduced from JAPAN, KOREA and RUSSIA and is commonly mistaken for the ZIG ZAG SEA STAR. If seen call 136 186.



Page 8

Japanese kelp:

Japanese kelp is introduced from J A P A N and is commonly mistaken for the native COMMON KELP. If seen call 136 186.

Page 9

European green shore crab:

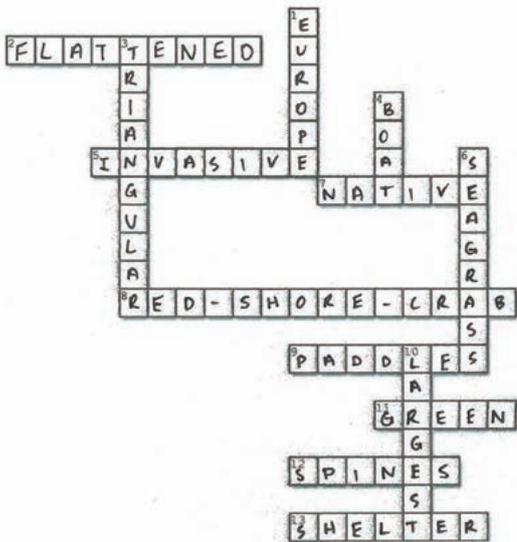
European green shore crab in introduced from EUROPE and NORTHERN AFRICA and is commonly mistaken for the native the RED SHORE CRAB. If seen call 136 186.

Red algae:

Red algae is introduced from J A P A N and K O R E A and is commonly mistaken for the native RED SEA W E E D. If seen call 136 186.

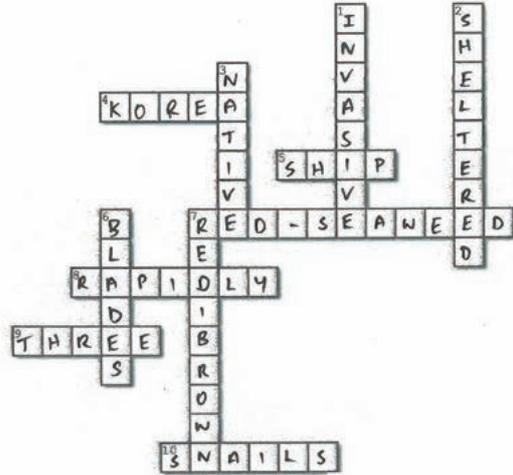
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Green shore crab activity:



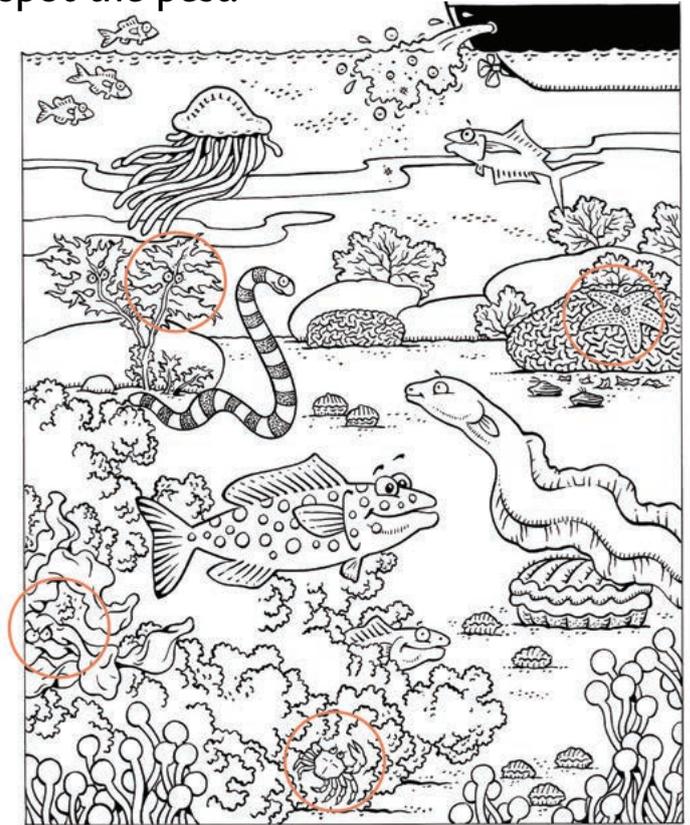
Page 11

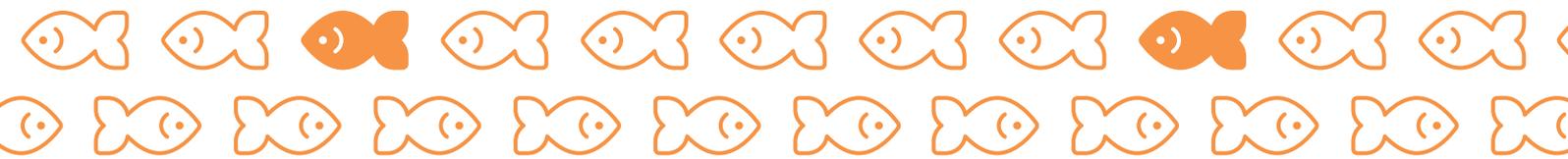
Red algae activity:



Page 12

Spot the pest:





Created by: Jacinta Early and Elysia Gustafson from Fishcare Victoria.

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Black & white cartoons by Paul Lennon

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