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4. Mangrove reproduction
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8. Life in estuarine habitats
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5. Copepods
6. Diatoms, dinoflagellates and the photic zone
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9. Coral feeding and reproduction
10. Coral bleaching
11. Artemia
12. Mollusc biology
13. Mollusc ID
14. Echinoderm ID
15. Where some marine organisms live
16. Some whale facts
17. Some turtle facts
18. Sea bird significance
19. Shark externals

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1. Tree of marine life
2. Rays
3. Naming system
3. Definition of species
4. Key to marine life
5. Phylum Protozoa
6. Phylum Porifera
7. Phylum Cnidaria
8. Phylum Ctenophora
9. Phylum Annelida
10. Phylum Mollusca
11. Phylum Arthropoda
12. Phylum Chordata
13. Class Ascidiacea
14. Class Chondrichthyes
15. Class Osteichthyes
16. Class Reptilia
17. Class Aves
18. Class Mammalia

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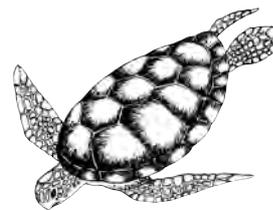
1. Studying the biotic and abiotic environment
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4. Physiological adaptations
5. Intertidal zone survival and reproduction
6. Behavioural adaptations
7. Shark navigation and prey location
8. Rocky shore food web
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10. Energy pyramids and food chains
11. Three types of symbiotic relationship
12. Ecosystems and a communities
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1. External features of a bony fish
2. A sea mullet dissection
3. External features of a crayfish
4. Plankton
5. Beach or rocky shore profile
6. Complete a transect

Teacher's guide notes

- All information to answer the questions is contained in the textbook - *Marine Science for Australian Students 2005, 2007 and 2009 Editions*.
- Students use the marine biology exercises to obtain basic facts before they complete their field work. (The models in A6 and B3 identify basic habitats)
- The appended overhead transparency masters support the exercise book and provide additional illustrations that could be turned into worksheets.
- The answers are suggestions.
- The questions were designed to help the student practise answering different levels of literacy question (see page 591 of your textbook).
 - For example the harder questions have more challenging verbs such as interpret, distinguish between and decide, whereas easier questions will have verbs such as name, state, label, list or complete.
 - Each State has its own literacy guidelines on this so please consult these first.
 - The verbs have been underlined in Exercise A1.
- The lectures were designed for TAFE classes for Marine Biology guides.



Please drop me an email at bmoffatt@wetpaper.com.au if you have any comments as they would be most welcome.

A handwritten signature in black ink that reads "Bob Moffatt". The signature is stylized and cursive, written over a dotted line.

Bob Moffatt
Wet Paper Publications

Part A: Mangroves and seagrasses

A1. What do mangroves look like?

Aims

- To identify and describe common mangrove features.
- To describe some mangrove adaptations.
- To explain mangrove distribution in terms of latitude.

What to do

- Read pages 259 - 261 of your textbook - *Marine Science for Australian Students* and answer the questions below.

Questions

Q1. Label the following external features in Figures 5.1 and 5.2:

Pneumatophores, trunk, leaves, fruit.

Q2. Distinguish between the different ways the term *mangrove* can be used.

(1) *a trees*

(2) *as a forest and*

(3) *as a habitat or ecosystem*

Q3. Describe where mangroves are found.

Mangroves are found growing in the intertidal areas of sheltered shores, estuaries and bays.

They are also found in the lee of large islands, river entrances and creeks where mud has been deposited.

Q4. Complete the missing words -

Mangroves are the temporary (*habitats*) for fish populations and are in the top of the *most productive ecosystems on Earth.*

Q5. Draw a graph in the space below to distinguish between the numbers of mangrove species found at different latitudes. Explain why more mangroves are found in the tropics compared to temperate latitudes.

Tropics - higher rainfall, greater biodiversity, protected coastline

Temperate - lower rainfall, colder, unprotected coastline - high wave action, shorter creeks and rivers

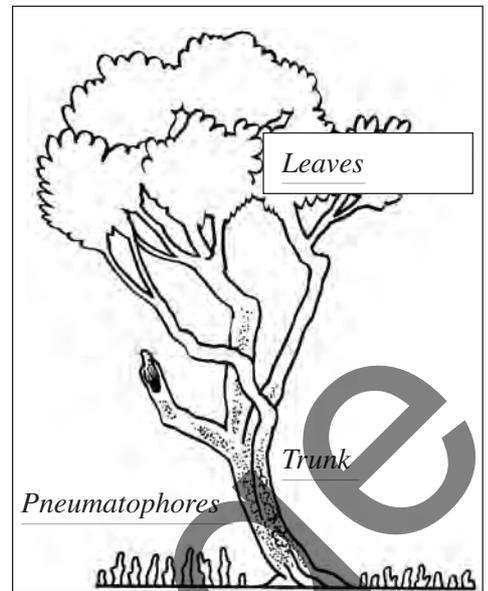


Figure 5.1 Mangrove

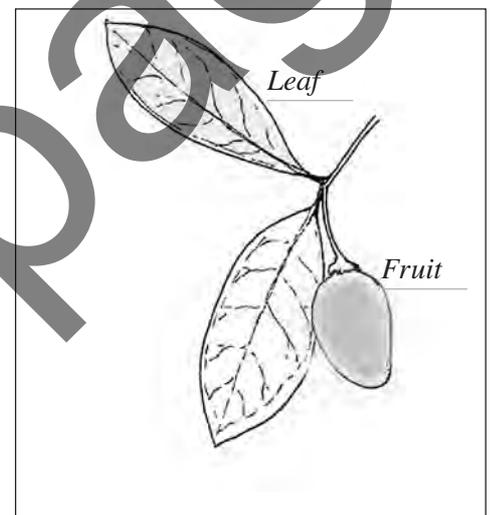


Figure 5.2 Mangrove leaf

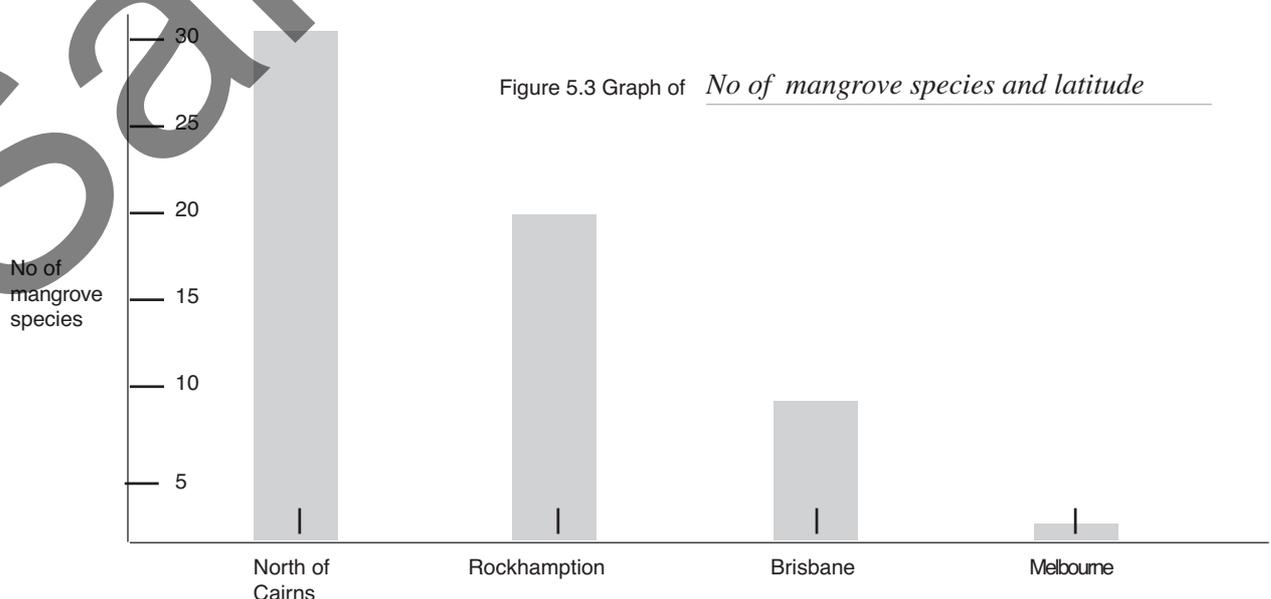


Figure 5.3 Graph of *No of mangrove species and latitude*

- Q6. Describe two water characteristics required for mangroves to grow.
Mangroves grow in an environment where the water is very salty and the oxygen levels are low.
- Q7. Name the root system that stops mangroves from being washed away with tides.
A system of laterally spreading cable roots
- Q8. Identify the root systems of mangroves A - E in Figure 6.1.
 A - *Stilt roots*
 B - *Knee roots*
 C - *Pneumatophore*
 D - *Aerial roots, Stilt roots*
 E - *Buttress roots*
- Q9. Describe how mangrove roots help overcome the problem of very low concentrations of oxygen.
The roots are above high tide and therefore allow the plant to breathe in carbon dioxide which is necessary for photosynthesis
- Q10. Explain why mangroves growing above high tide levels possess a less specialized root system.
Because they can take air in at high tide.
- Q11. List and explain three ways mangroves get rid of salt to help them photosynthesise.
 1. *Exclusion - air is filtered through the leaves*
 2. *Excretion - salt glands excrete the salt*
 3. *Accumulation - leaves build up the salt and then fall off*
- Q 12. Decide where mangroves A - E shown in Figures 6.1 could be found. Draw these in Figure 6.2 below.
Those with well developed root systems would be found in the swampy areas
Those with tree like trunks found above high tide

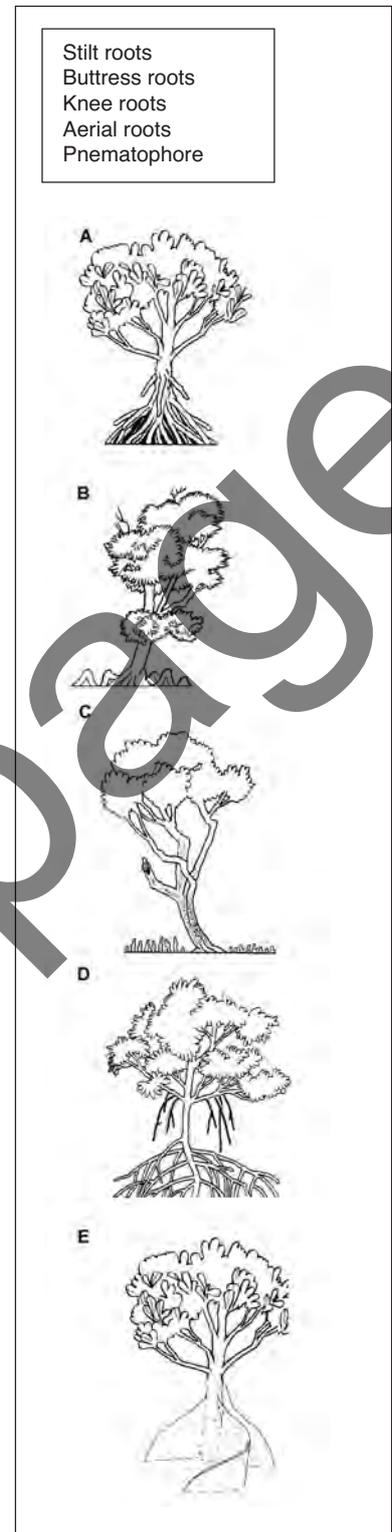


Figure 6.1 Mangrove root systems

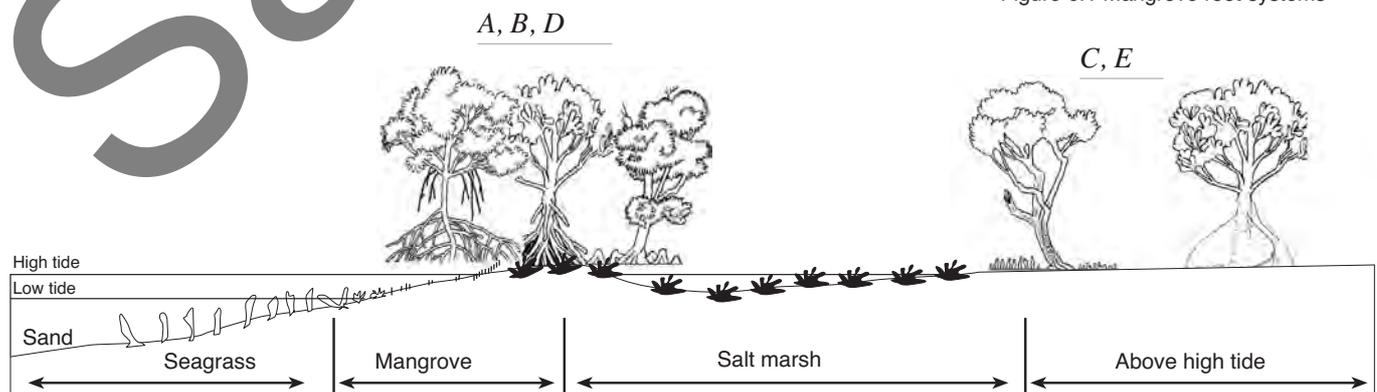


Figure 6.2 Mangrove distribution

A2. Which animals use mangroves for shelter?

Aim

- To explain how animals use mangroves for shelter.

What to do

- Read page 264 of your textbook and answer the questions below.

Questions

- Q1. Label the animals in Figure 7.1.
- Q2. Identify in Figure 7.2, where the following animals would be found.

Shells, spiders, pelicans, egrets, mudcrabs, whiting, phytoplankton

- Q3. List three examples of how mangroves provide shelter for these animals.

- Leaves provide hiding places for terrestrial animals.
- Roots provide hiding places for aquatic animals at high tide.
- Mud and exposed roots at low tide allows shells to feed in protected areas.

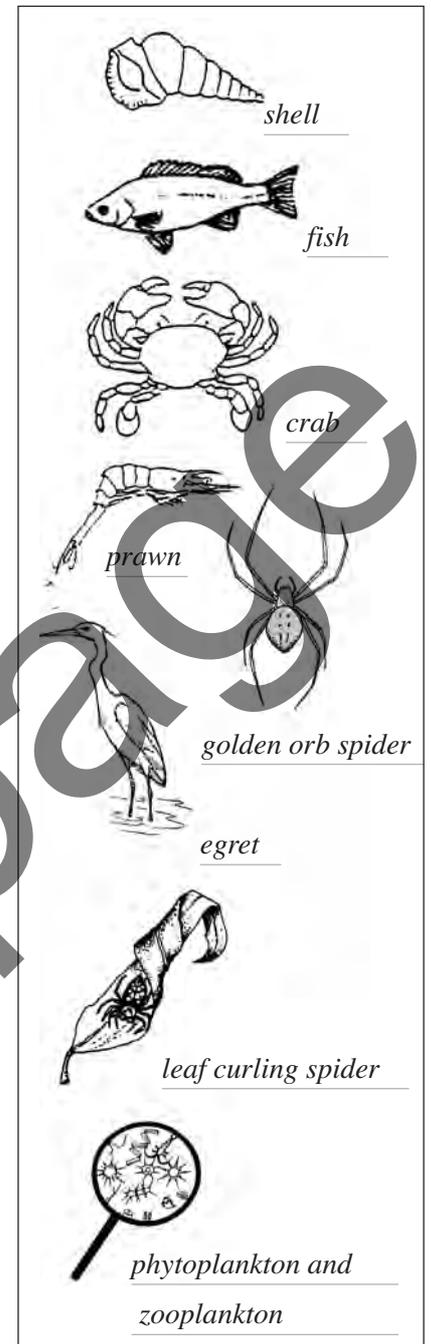


Figure 7.1 Organisms associated with mangroves

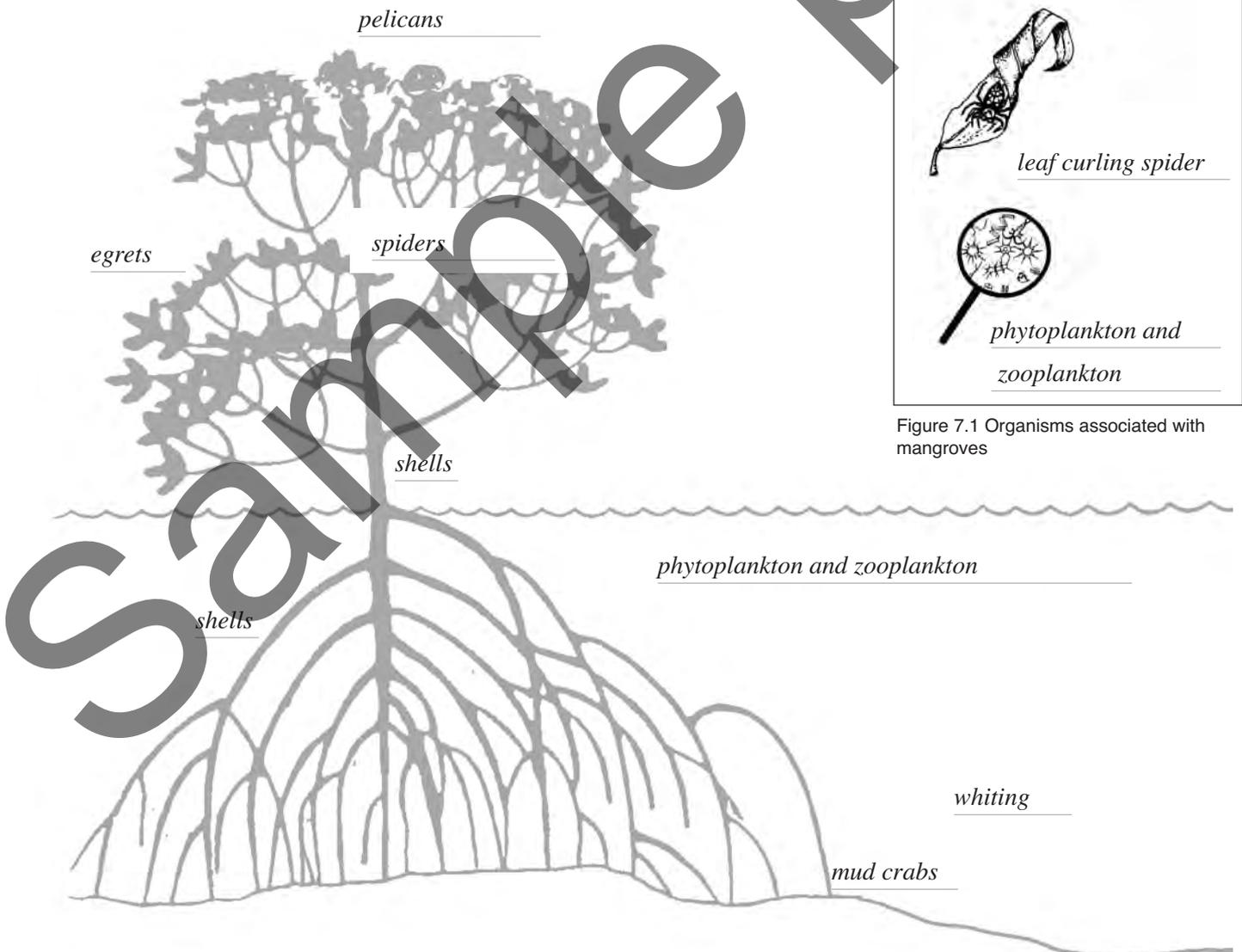
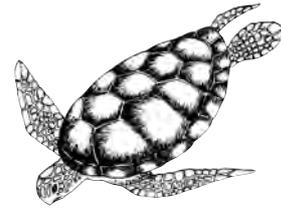


Figure 7.2 Animals and plants found in mangroves

Appendix 2 Marine biology lecture handouts

Second edition 2009

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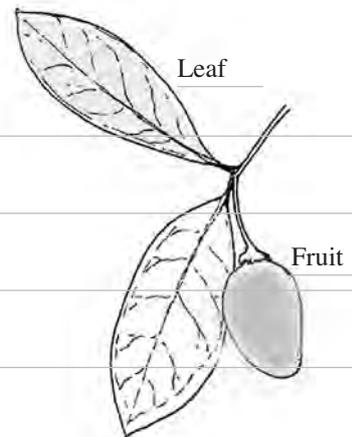
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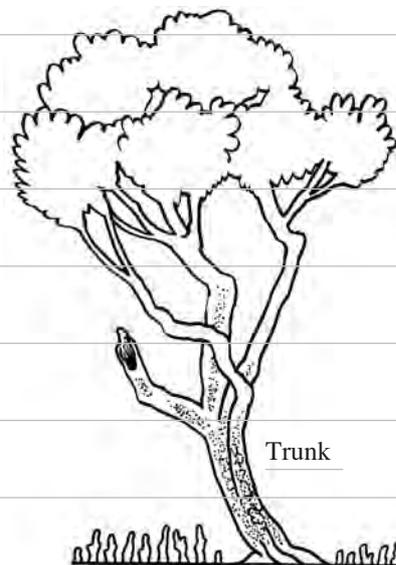
1. Where mangroves live



Notes



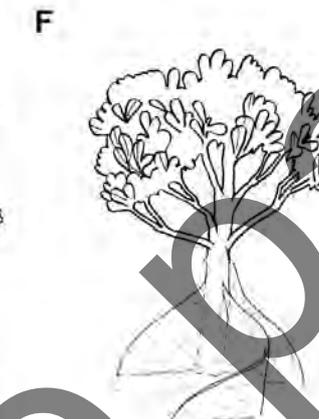
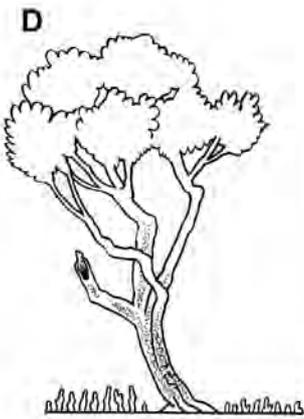
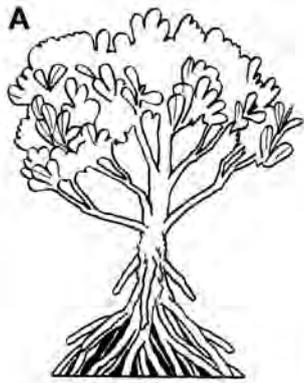
Leaves



Trunk

Pneumatophores

Mangroves root systems



Notes

A, B, D

C, E

