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11. Phylum Arthropoda
12. Phylum Chordata
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14. Class Chondrichthyes
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16. Class Reptilia
17. Class Aves
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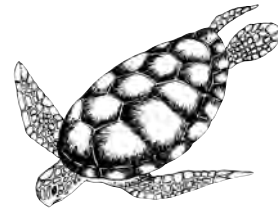
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1. External features of a bony fish
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## Teacher's guide notes

- 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](mailto: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.

.....  
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

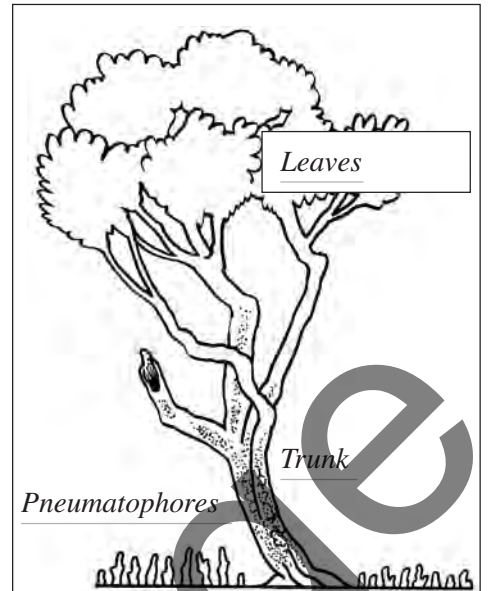


Figure 5.1 Mangrove

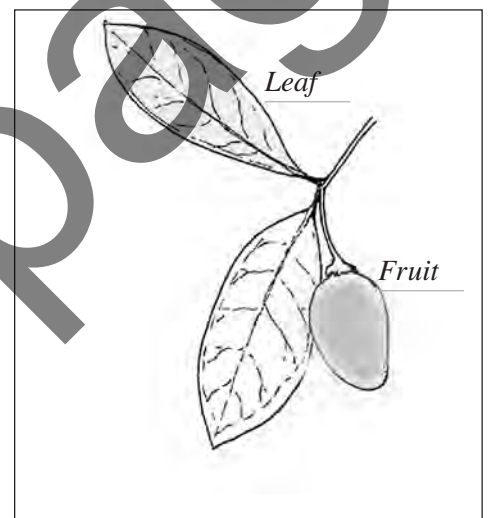


Figure 5.2 Mangrove leaf

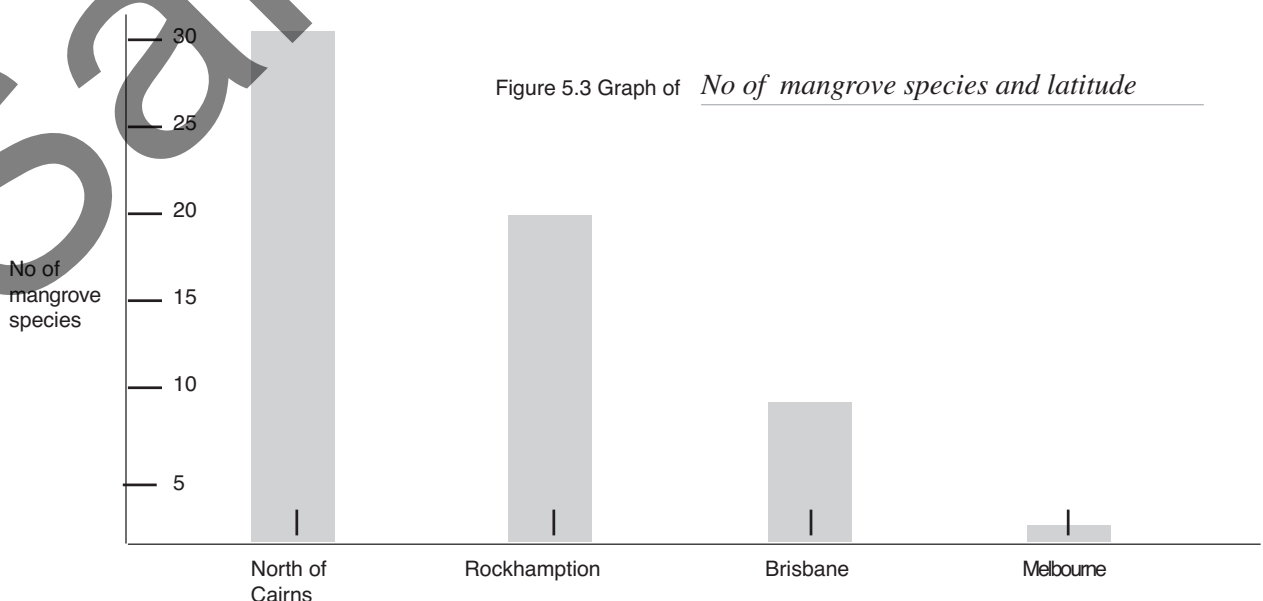


Figure 5.3 Graph of *No of mangrove species and latitude*

- 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*

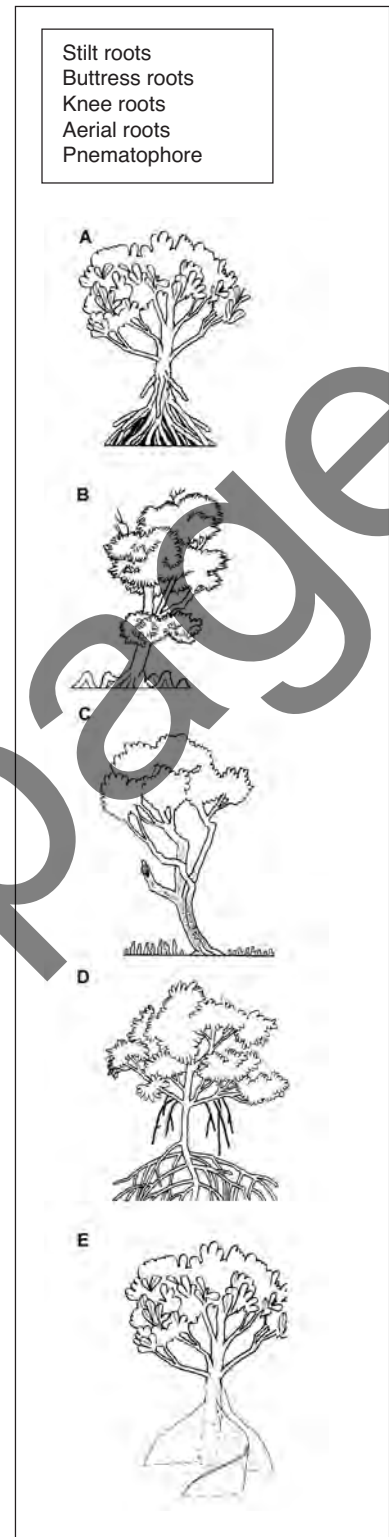


Figure 6.1 Mangrove root systems

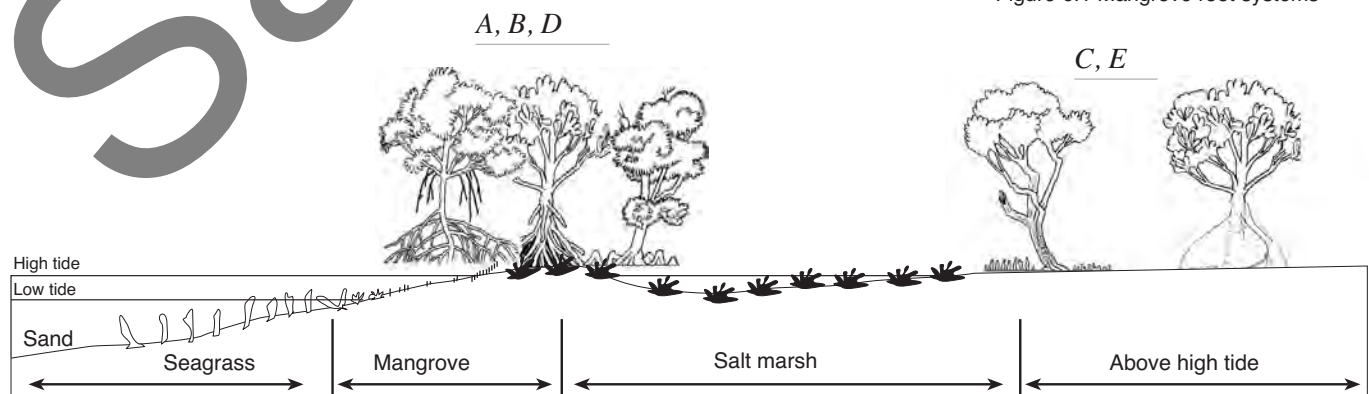


Figure 6.2 Mangrove distribution



## 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.

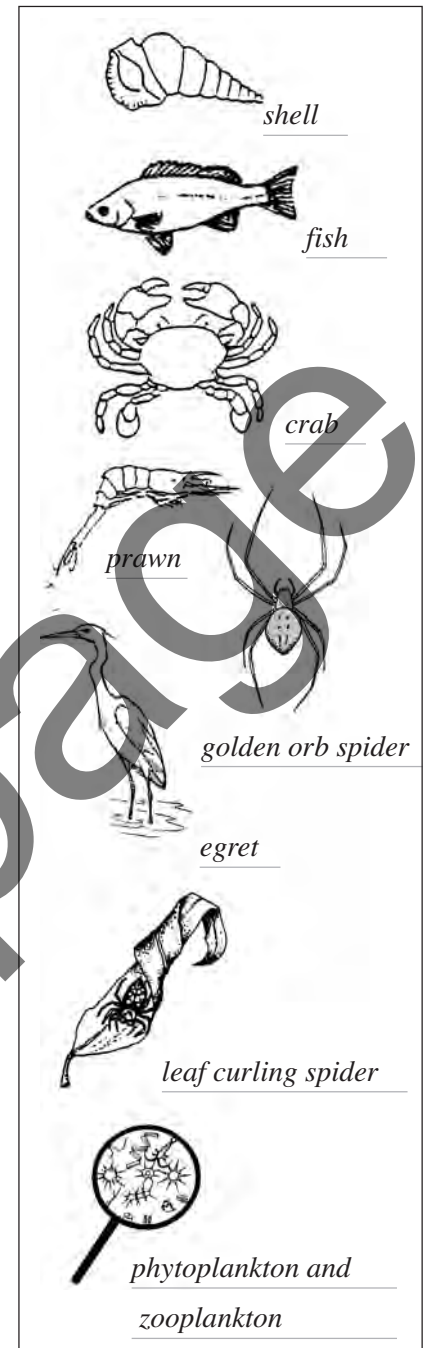


Figure 7.1 Organisms associated with mangroves

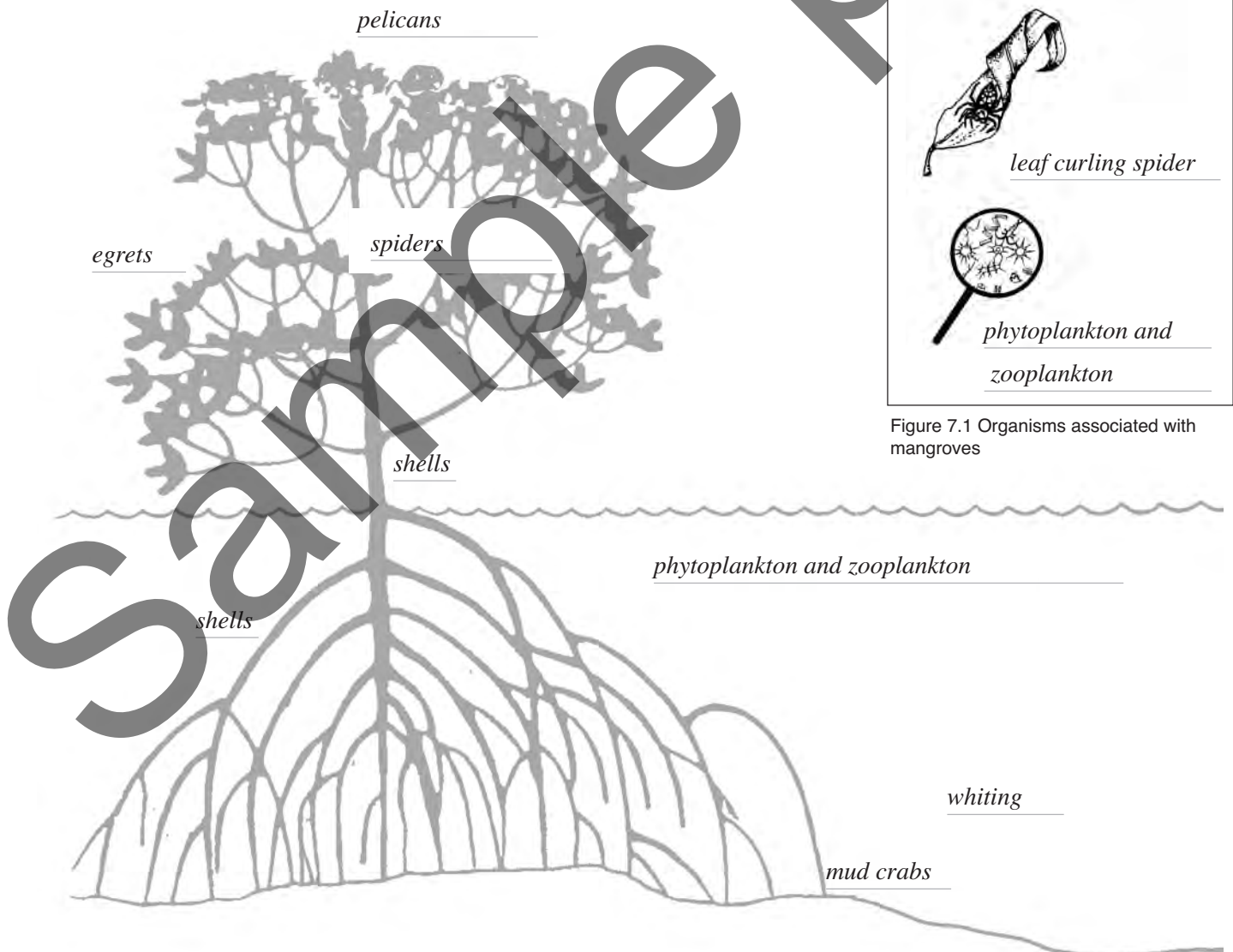
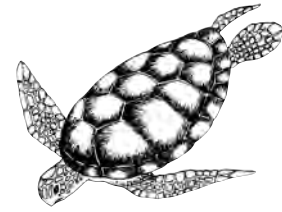


Figure 7.2 Animals and plants found in mangroves

# Appendix 2 Marine biology lecture handouts

Second edition 2009

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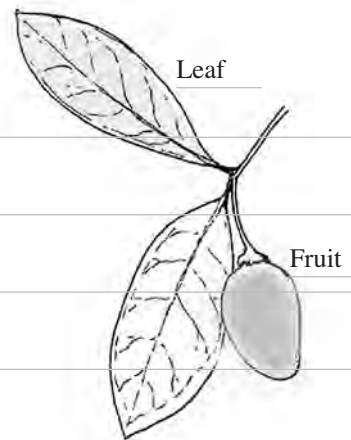
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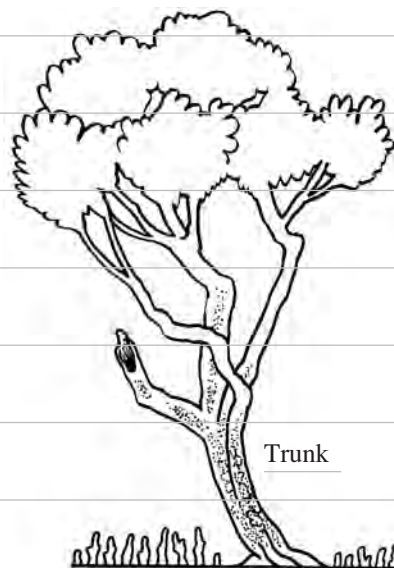
# 1. Where mangroves live



Notes



Leaves



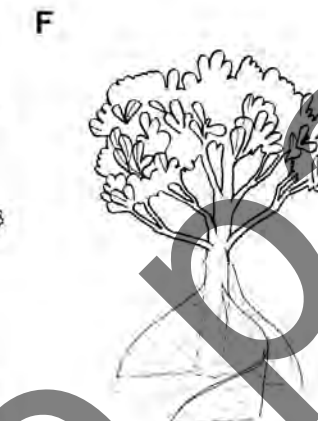
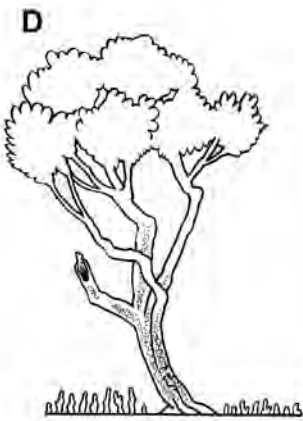
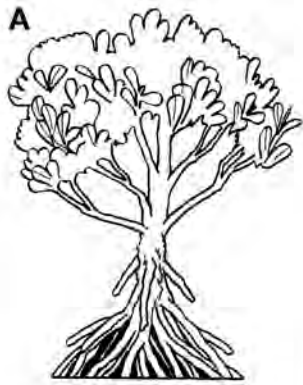
Trunk



Pneumatophores



# Mangroves root systems



## Notes

A, B, D

C, E

