

A5. What is climate change and how does it affect the ocean?

Aim

- To interpret climate change graphs and explain how the oceans are becoming more acidic.

What to do

- Read page 446 of your textbook and the page opposite to answer the questions below.

Questions

Q1. Write a definition for the enhanced greenhouse effect.

Q2. State which human actions increase greenhouse gases.

Q3. Recall the major reason for sea level rise.

Q4. Define the term climate change in terms of average weather.

Q5. Recall the statement that says “warming of the climate system is unequivocal” and three justifications for it.

Q6. Interpret the graph on Earth’s temperature 1000 - 2100 on the next page.

Q7. Interpret the graph of future scenarios for sea level rise on the next page.

Q8. Describe the effect of increased carbon dioxide on ocean acidity.

Q9. Recall the change in pH units over the past 200 years.

Q10. Summarise possible effects of ocean acidification and global warming on marine organisms and Earth ecosystems.

A6. How do ocean currents form?

Aim

- To describe how the Sun and Earth's rotation causes currents.

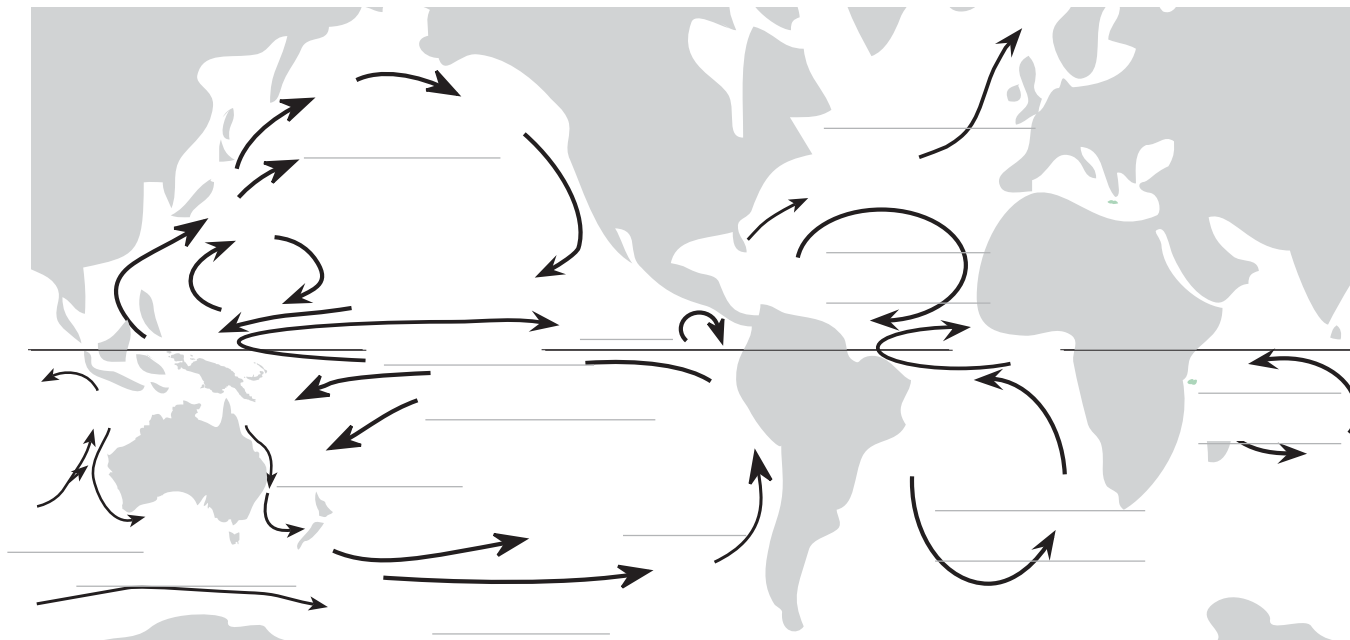
What to do

- Read pages 59 - 62 of your textbook and the page opposite to answer the questions below.

Questions

Q1. Explain the two effects the sun has on ocean currents.

Q2. Complete the map of the world below marking in the Pacific, Atlantic and Indian Oceans and identifying the following currents - *North Pacific, El Niño, Leeuwin, Antarctica, West wind drift, Humbolt, East Australian, Gulf Stream, Equatorial, North Equatorial, South Equatorial, South Atlantic.*



Q3. Explain how thermohaline circulation occurs, state what it controls and explain what it is responsible for.

Q4. Define the term geostrophic current and explain their significance for Australia.

Q5. Describe how the Earth's rotation can cause currents to move.

Q6. Define the term Coriolis force.

A9. What is so special about the EAC?

Aim

- To describe features of the East Australian Current.

What to do

- Read pages 64 - 65 of your textbook, and answer the questions below.

Questions

- Q1. Name the person who discovered the East Australian current and explain how it was discovered.

- Q2. Explain what instruments were used by the CSIRO Marine Division to discover that the current does not flow in one direction.

- Q3. Name and describe the circulating bodies of water off the East Australian coast.

- Q4. Explain why the Coral Sea is almost a metre higher than Bass Strait.

- Q5. State where upwellings occur in the EAC and how they help the fishing industry.

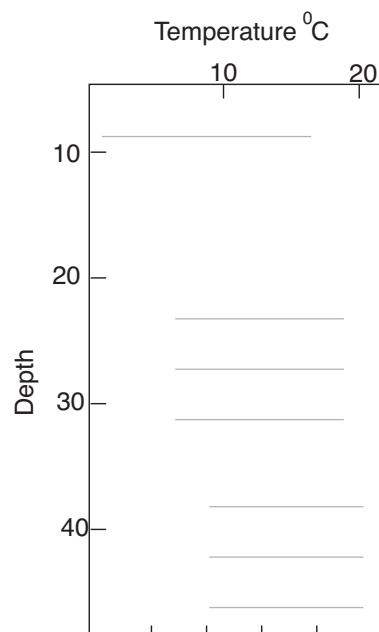
- Q6. State temperature and colour differences in these upwelling areas.

Extension

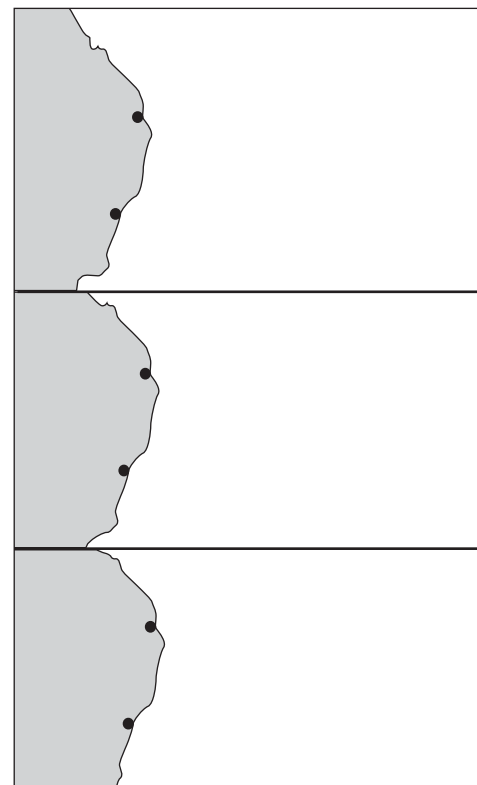
In the film - *Finding Nemo*, Marlin took three weeks to get to Sydney in the EAC. Calculate the average speed of the current based on this information.

- Q7. Use the following definition to complete the illustration below.

A thermocline is a layer within a body of water or air where the temperature changes rapidly with depth.



- Q8. Complete the following diagram to show how and where an eddy forms in the EAC.



B8. How does sand get onto a beach?

Aim

- To explain how sand gets onto a beach.

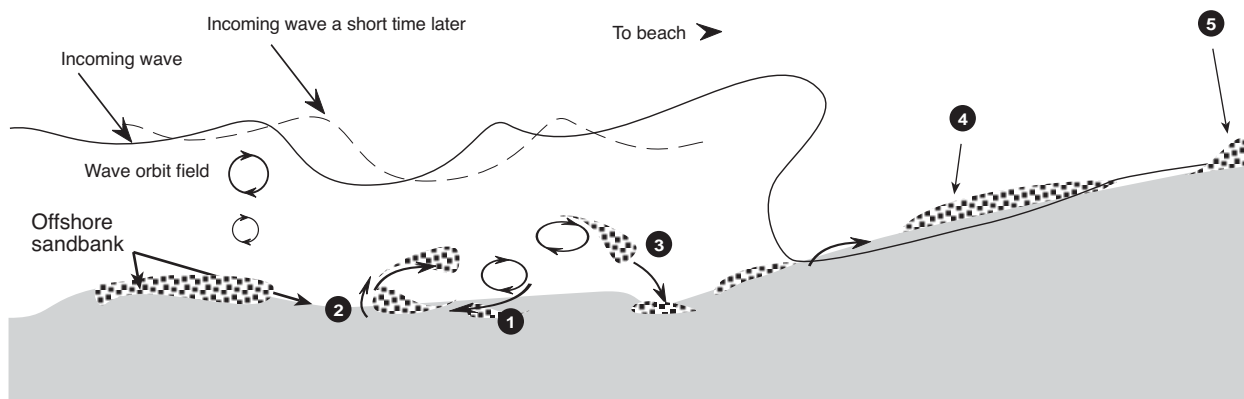
What to do

- Read page 95 - 96 of your textbook and answer the questions below.

Questions

Q1. Define the term wave bore.

Q2. Define the term microridge.



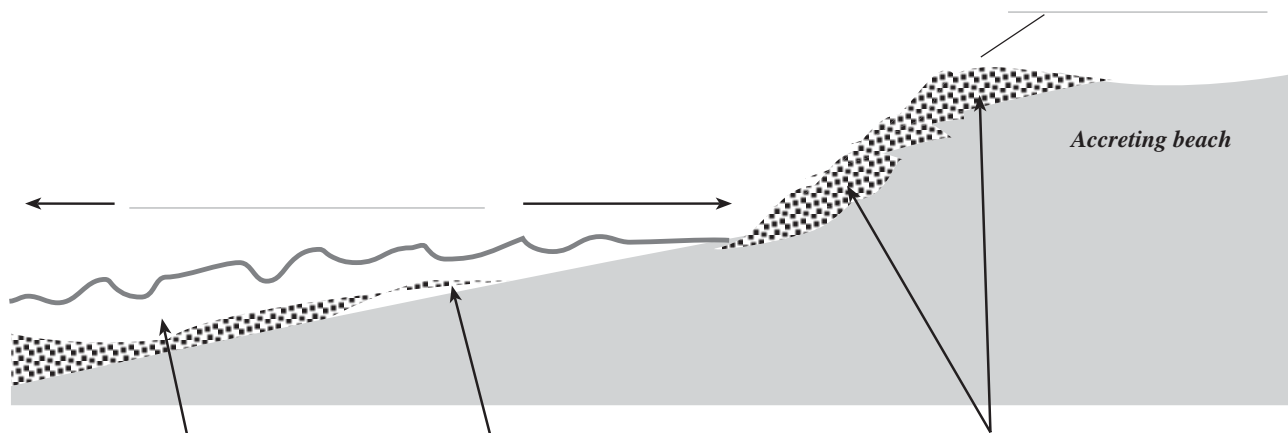
Q3. Describe what is happening in the diagram above by writing a sentence after each number.

1. _____
2. _____
3. _____
4. _____
5. _____

Q4. Define the term beach berm.

Q5. Define the term accreting beach.

Q6. Complete the diagram below to illustrate your answers to Questions 4 and 5 above.



B9. What are sand dunes and how are they made?

***Note:**
If you are using the 2003 or 2005 editions of *Marine Science*, you will have to google an answer for Q5.

Aim

- To describe how sand dunes are formed.

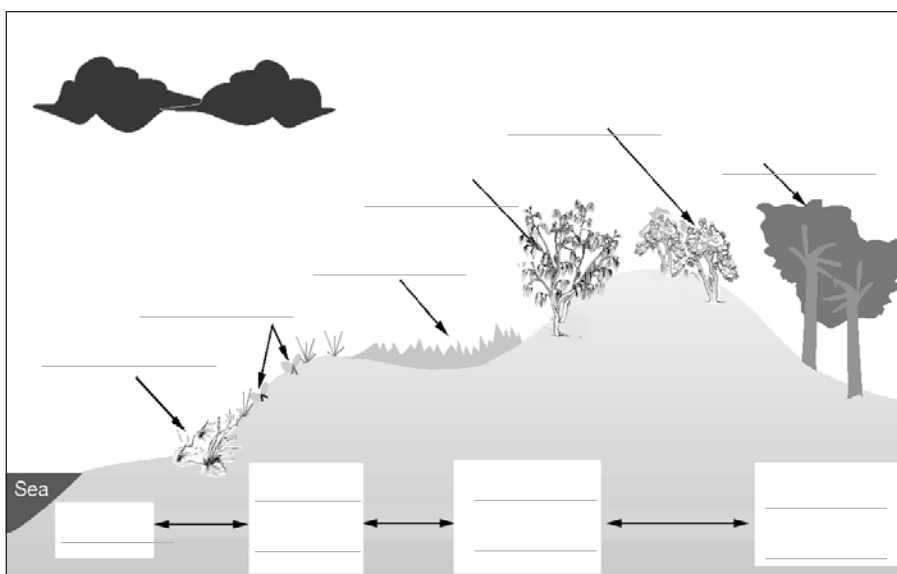
What to do

- Read* pages 92, 94 and 95 of your textbook and answer the questions below.

Questions

- Q1. Use Figure 96.4 in your textbook to label the figure opposite.
- Q2. Name the type of waves that deposit sand on the beach.

- Q3. Locate the missing words in the sentences below from your textbook.



Where beach sand is moving onshore an _____ beach is said to occur.

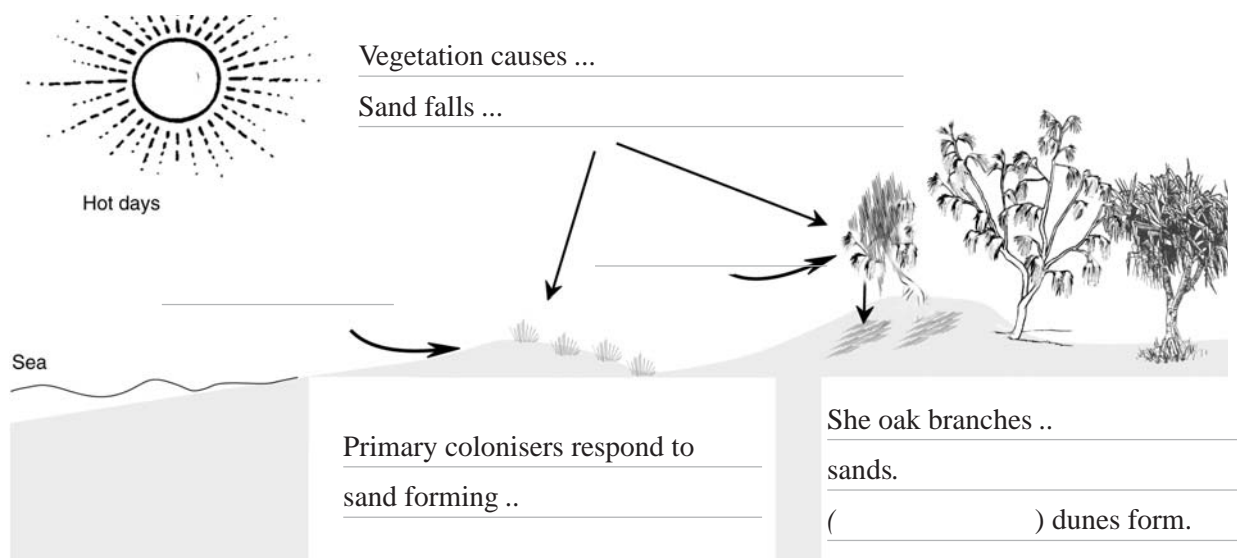
On hot, sunny, windy onshore days the sand in the berm is quickly blown up the beach.

Spindle-like plants called _____ slow the wind carrying the sand which deposits at the base of the dune plant.

This forms the structure called a _____ dune .

If the wind is strong enough, the sand continues over the primary dune where it _____ under the branches of vegetation a second set of dunes called a _____ dune.

- Q4. Summarise your understanding of sand dune formation by completing the figure below.



- Q5. Explain the terms ecological succession and climax community used to describe a dune system.

C3. Can we make and establish a test for seawater?

Aim

To make a series of seawater samples and determine a test for salinity.

What to do

Part A

- Read pages 136 - 137 of your textbook and answer the questions below.

Questions

Q1. Define the terms PPM and g/L.

Q2. Suppose your group is required to make up 200 mLs of salt solution containing 35 g/L. Calculate how much salt you should weigh out.

Q3. Complete the table above for the entire task.

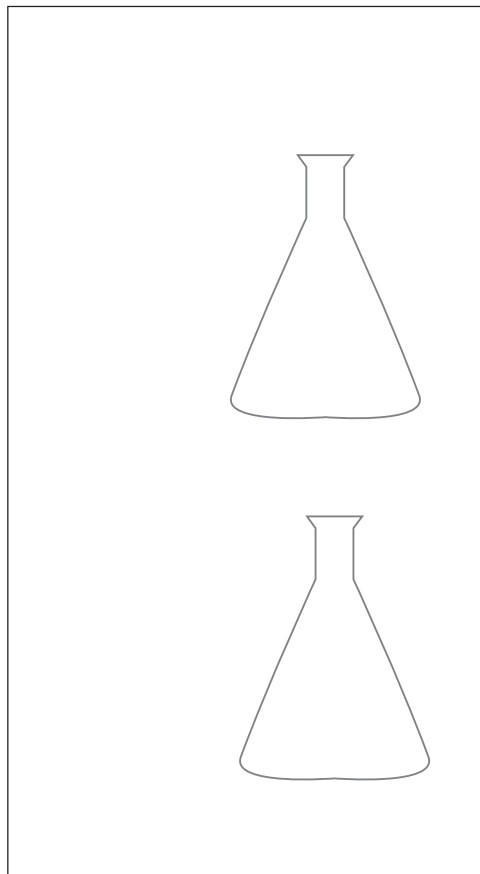
Q4. Define the term titration.

Q5. Describe what happens at the end point.

Q6. Name the solutions used in this experiment.

Q7. Describe how they will be used to determine end point. Copy the illustrations from page 135 of your textbook to illustrate your answer.

Sample	Weight of salt (g/L)	Weight of salt (g/200mL)	Concentration
1	5		5 000 ppm
2	10		
3	15		15 000 ppm
4	20		20 000 ppm
5			25 000 ppm
6	30		
7	35		35 000 ppm
8			40 000 ppm



C7. What are some of our seas contaminated with?

Based on an original exercise by Tim Ryan, Maryborough State High School. Acknowledgement is given to the Australian Fisheries Management Authority for permission to reproduce the article from Australian Fisheries.

Aim

To describe some effects of heavy metal pollution.

What to do

- Read the information on the page opposite and answer the questions below.

Article update

Check out the annual report on Australia's heavy metal pollution at <http://www.environment.gov.au>

Questions

Q1. Suggest eight sources of contamination in St Vincent Gulf.

Q2. To determine an estimate of the trace elements in St Vincent Gulf by water analysis was labour intensive and time consuming. Give a reason why and how the levels of contamination were determined.

Q3. Name the types of organisms that were examined in this study.

Q4. Recall which metal trace elements were investigated.

Q5. Recall what the letters NHMRC stand for.

Q6. In which tissue of the fish were the highest levels of zinc found? Suggest an explanation for the results.

Q7. Tabulate the NHMRC recommended levels of lead in fish, zinc in molluscs and copper in crustaceans.

Q8. Decide if any of the levels of trace elements found in the examples exceed the maximum recommended concentrations of the NHMRC and give an example.

Q9. Calculate the weight of copper found in a sample of 3 kg (dry weight) of fish muscle.

Q10. Calculate the expected range of weight of zinc found in 10 kg of living mollusc muscle.

Q11. Compare the trace metal value found in St Vincent Gulf with Cockburn Sound (WA). Determine if any of the levels at Cockburn Sound (WA) are above NHMRC recommended levels.

Q12. Would you expect trace metal levels to increase in organisms as you go up the food chain? Explain your answer. Did this occur at St. Vincent Gulf in all cases? If not, suggest a possible reason for this observation.

