ADOPT A COASTLINE

City of Joondalup

YEAR FOUR TO SEVEN TEACHERS GUIDE

BEACH ACTIVITIES

A variety of beach activities and background information for teachers to help plan their excursion.

Science

Year	Content Description	Elaborations	Teaching Points
Four	**Science Inquiry Skills/ Processing and Analysing Data and Information** Use a range of methods including tables and simple column graphs to represent data and to identify patterns and trends. **ACSIS068**	• Identifying and discussing numerical and visual patterns in data collected from students' investigations and from other sources. • Using provided graphic organisers to sort and represent information. • Discussing with teacher guidance which graphic organisers will be most useful in sorting or organising data arising from investigations.	• Column and bar graphs: · use pencil; · use ruler; and · title, axis labelled, scale intervals are equal. • Provide examples of graphic organisers. • The effect of rubbish, in particular plastic, has on the environment: · see "The Ocean is not a rubbish bin". • Accurate measurement- reading a tape measure, starting at zero (not end of tape). • Accurate and detailed observations which are factual not emotive.
	Science Inquiry Skills/ Communicating Represent and communicate ideas and findings in a variety of ways such as diagrams, physical representations and simple reports. **ACSIS071**	• Communicating with other students carrying out similar investigations to share experiences and improve investigation skills. • Using simple explanations and arguments, reports or graphical representations to communicate ideas to other students.	
	Science as a Human Endeavour/Use and Influence of Science Science knowledge helps people to understand the effect of their actions. **ACSHE062**	• Considering methods of waste management and how they can affect the environment. • Exploring how science has contributed to a discussion about an issue such as loss of habitat for living things or how human activity has changed the local environment.	

Science

Year	Content Description	Elaborations	Teaching Points
Five	**Science Inquiry Skills/ Processing and Analysing Data and Information** Construct and use a range of representations, including tables and graphs, to represent and describe observations, patterns or relationships in data using digital technologies as appropriate. **ACSIS090**	• Constructing tables, graphs and other graphic organisers to show trends in data. • Identifying patterns in data and developing explanations that fit these patterns.	• Column and bar graphs: · use pencil; · use ruler; and · title, axis labelled, scale intervals are equal. • Provide examples of graphic organisers. • The effect of rubbish, in particular plastic, has on the environment: · see "The Ocean is not a rubbish bin". • Accurate measurement- reading a tape measure, starting at zero (not end of tape). • Accurate and detailed observations which are factual not emotive. • Protocols for drawing a scientific table: · use ruler; · use pencil; · title; and · columns/rows labelled. • Protocols for drawing scientific diagrams: · use pencil; · label; and · use of a scale.
	Science Inquiry Skills/ Communicating Communicate ideas, explanations and processes in a variety of ways, including multi-modal texts. **ACSIS093**	• Discussing how models represent scientific ideas and constructing physical models to demonstrate an aspect of scientific understanding. • Constructing multi-modal texts to communicate science ideas. • Using labelled diagrams, including cross-sectional representations, to communicate ideas.	

Science

Year	Content Description	Elaborations	Teaching Points
Six	**Science Inquiry Skills/ Processing and Analysing Data and Information** Construct and use a range of representations, including tables and graphs, to represent and describe observations, patterns or relationships in data using digital technologies as appropriate. **ACSIS107**	• Using digital technologies to construct representations, including dynamic representations.	As above + • Use of excel or computer graphics to display data. • Protocols for communicating scientifically: · third person; and · objective (not subjective).
	Science Inquiry Skills/ Communicating Communicate ideas, explanations and processes in a variety of ways, including multi-modal texts. **ACSIS110**	• Discussing the best way to communicate science ideas and what should be considered when planning a text. • Using a variety of communication modes, such as reports, explanations, arguments, debates and procedural accounts, to communicate science ideas. • Using labelled diagrams, including cross-sectional representations, to communicate ideas and processes within multi-modal texts.	

Science

Year	Content Description	Elaborations	Teaching Points
Seven	**Science Inquiry Skills/ Processing and Analysing Data and Information** Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships, including using digital technologies as appropriate. **ACSIS129** **Science as a Human Endeavour/Use and Influence of Science** Science and technology contribute to finding solutions to a range of contemporary issues; these solutions may impact on other areas of society and involve ethical considerations. **ACSHE120**	• Understanding different types of graphical and physical representation and considering their advantages and disadvantages. • Describing the trends shown in collected data. • Considering how human activity in the community can have positive and negative effects on the sustainability of ecosystems.	As above + · Research the negative effects of rubbish on the ecosystem, for example it can be linked to: ▪ food chains/ webs; and ▪ bioaccumulation /magnification.

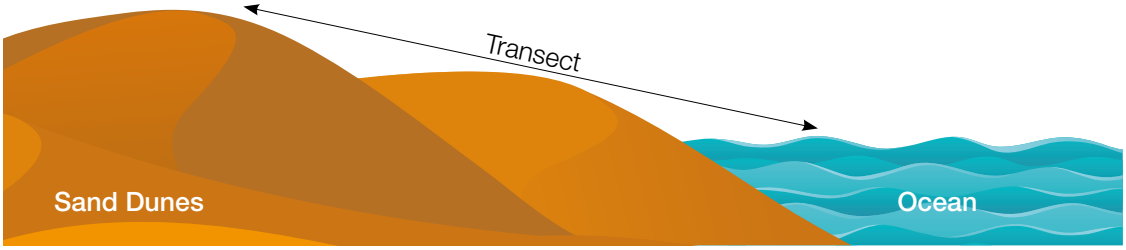
Beach Activities

- Flotsam and Jetsams
  - In small groups students can collect a small sample of debris from the beach. Sift through to see what they can find both living and non-living. White school trays are good for this as it is easy to see organisms.
    - Write a list of the various plants, animals and objects they find. If they don't know the name they could draw it. Add a tally count to their list.
    - SAFETY – use tongs or gardening gloves if looking through thick piles of weed.
    - Return all debris (except rubbish) to beach
- Debris inventory
  - Select a length of beach (5m, 10m or longer). Students walk from one end to the other making a list of all objects, plants and animals they come across.
    - Graph the data back in the classroom.
    - Older students may like to complete a more structured "Transect". A transect along the high tide line would gather good data.
- What's hiding in the High Tide Line?
  - Take a small sample (one tablespoon each group) of debris/sand from the high tide line. Store in a labelled snap lock bag.
  - At school:
    - look at samples using magnifying glasses or preferably microscopes (your local high school may be happy to loan you some). You should be able to distinguish between sand, shell, glass and plastic particles.
    - samples can be added to water to see what sinks and floats. Floating debris is usually plastic as it is light. Sand, shell and glass are heavier and sink.
- Photography
  - Take plenty of photographs which can be used back in the classroom.
- Transects
  - Construct a transect from the water line to the dunes. Be careful not to disturb any of the dune plants.
  - Observations can be recorded on graph paper (already drawn up in class) or a fabricated worksheet.
- Quadrats
  - Estimate the population of plants or the amount of plastic debris on the beach using quadrats (see information on page 4).
- She sells seashells by the seashore
  - Collect shells from along the beach. Group them according to their physical attributes
    - Students can draw Venn diagrams in the sand.
    - Line the shells up as in a bar graph to look at quantity.
    - Please DO NOT remove shells from beach- leave them as they are very important to the environment and can be used by small animals for protection or shelter. Take a photograph instead.
- Clean Up
  - Complete an Emu Stalk to collect all the rubbish from the beach. In an Emu Stalk the children line up across the beach. They then walk forwards (shoulder to shoulder) picking up rubbish as they go. This strategy helps to cover the entire area.
- In the Classroom
  - Use data and observations to draw graphs, create infographics, powerpoints or reports.

Transect Information

A transect is a straight line along which observations are made. It can be as simple as a string or rope placed in a line on the ground. The number of organisms or objects are observed and recorded at regular intervals along the transect. Transects can be up to 200m in length. Transects are usually carried out to provide information on the distribution of species in the community. This is of particular value in situations where environmental factors change over the sampled distance. This change is called an environmental gradient.

A transect is constructed by measuring out the set distance. It is suggested to cover at least 20m. A mark is made at set intervals (usually every one metre or 50cm if transect is short). Interval distance depends on the total length of the transect. At each interval the plant species are noted. This type of transect is called point sampling. Another type of transect is continuous belt transect where species found between two parallel lines (one metre apart) are noted.



Quadrat Information

A quadrat is a square or rectangular plot of land marked off for the study of plants and animals. It could also be used to estimate the different amounts of debris found on the beach. Quadrats are usually selected at random to act as samples to indicate the local distribution of plants or animals.

For example you may like to gain an estimate of the amount of plastic on the high tide line.

1. Quadrats are placed randomly along the high tide line.

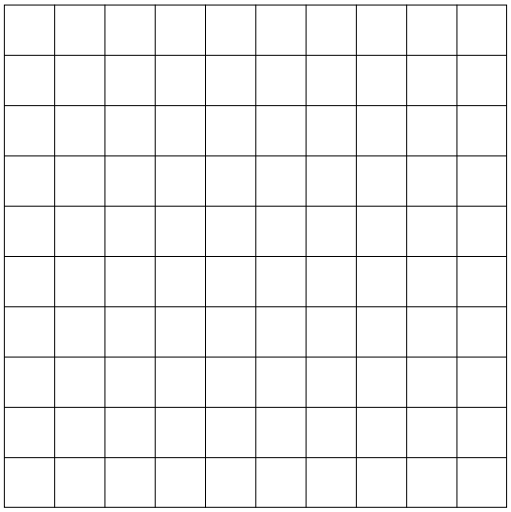
2. The amount of plastic debris is counted OR the percentage area covered estimated in each quadrat.

3. Data from each quadrat can be collated and the totals used to estimate density of the plastic.

Estimated density = total number plastic pieces OR percentage area covered by plastic

No. of quadrats x area of each quadrat

Each quadrat is 1m by 1m. They can be made out of inflexible material like wood or PVC tubing; however the simplest construction is a 4m length of rope that can be laid on the ground in a square. Your local high school may have quadrats you can loan.



References

- Coastwest and Department of Fisheries, no date, *Beachcombers Field Guide*, **http://www.fish.wa.gov.au/Documents/education/beachcombers-field-guide.pdf**
- Mudie, K. and Brotherton, J., 2009, *Heinemann Biology Preliminary*, Third Edition, Pearson Australia, Port Melbourne, Victoria.