GREAT OCEAN ROAD COAST COMMITTEE

Primary Resource

DUNE SCAPE

What is a sand dune and how are they made?

Sand dunes are amazing coastal formations, created when the sea brings sand (made from crushed shells and rocks) into shore, and the wind blows this sand up to make a sand dune. This is a long process, and it can take thousands of years for a sand dune to form!

A mixture of natural and human activities also means sand dunes change shape and size every day, as more sand is added (*deposited*) or removed (*eroded*).

The following activities will help you explore how dunes are created and the impact of different natural and human impacts.

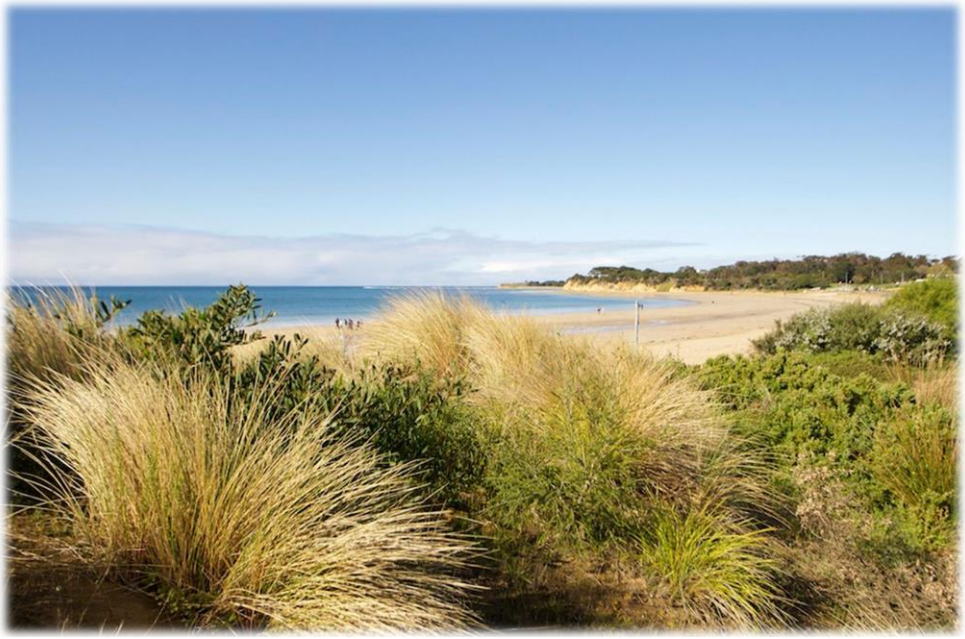
What you will need:

Activities 1 & 2

- Square or rectangular plastic tub or tray
- Dry sand (e.g. from a sandpit, hardware, or gardening store).
  Please do not take sand from the beach as this is not allowed as it is part of the habitat
- Hair dryer
- Small bucket or container with water

Extra resources for activities 3 & 4

- 10 x Plant cuttings approximately 10cm long
- 10 x Plant cuttings approximately 5cm long
- Grass cuttings-handful
- Soil or dirt from the garden
- Lego-type blocks and people
- Seashells or counter/bottle caps to represent shells



Activity 1: Windblown sand dunes

1. Place and spread sand evenly in tub.
2. Use the hairdryer to blow sand from front side of the tub to the back.
   This shows how the southerly wind in Victoria moves sand from the beach to form a dune behind the beach.
3. Blow the sand back to show how the northerly wind can push it back down onto the beach.

What does your dune look like? Draw a diagram or add a photo below.

❖ ***Dune scape fact:*** *Dunes formed by sand movement only are fairly smooth.*

Activity 2: Water washed sand dunes

1. Create a sand dune shape with the sand in the tub.
2. Using the bucket with water, splash the dune from one side.
3. Splash it again. What happens to the sand and water?

What does your dune look like? Draw a diagram or add a photo below.

Dune scape facts:

- ❖ *The water splashing from one side is like the sea waves crashing on the sand dune: this causes erosion (sand breaking down and falling away from dune).*
- ❖ *During winter, sea storms bring larger waves and cause more erosion on our beach and sand dunes. The wind naturally blows the sand back.*
- ❖ *Climate change is causing more big storms and more erosion on our dunes.*

Activity 3: Plants and sand dunes

Plants are not only an important part of the habitat for animals on the sand dunes, but important for holding the dune together, and preventing erosion. Often their roots spread right down many meters deep under the dune.

For this activity you'll make your own sand dune habitat and see how plants can help sand dunes survive natural impacts such as heavy rain and high tides.

1. Create a sand dune shape with the sand in the tub again.
2. Decorate the sand dune by sprinkling grass on the front of the dune near the pretend beach (but not on the beach as grass can't grow on the beach due to saltwater and waves).
3. Behind the grass add a line of 5cm tall plant cuttings on the dune, like bushes.
4. Behind the 'bushes' add a line of 10cm plant cuttings at the back of the dune, like trees. You have created your own sand dune habitat!
5. Draw a diagram or add a photo below in "Dune Before storm" box.

Dune Before Storm ***Dune After Storm***

Now it's time to see what happens when there's a storm surge! *Looking at how sea changes the dune so storm surge or high tides better

1. Using the bucket with water, splash your dune from one side.
2. Splash it again. What happens to the sand and water and plants?
3. Draw a diagram or add a photo above in "Dune After Storm" box.

Questions:

- Compare your dune with that in Activity 2: Which dune survived better and why?
- What animals might live naturally in a sand dune on the Surf Coast?
- What plants might naturally grow on the dunes on the Surf Coast?
- Why do plants grow at different heights at the front middle and back of dunes?
- How do you think climate change might affect habitats in the dunes?

Use the Online Resources on page 6 to help you find the answers.

Activity 4: People and sand dunes

Our coast has been a popular place for people to visit and live for a very long time. Our oldest evidence of humans using these areas are the shell middens found within the cliffs and dunes along the Surf Coast. A shell midden is made of layers of empty shells and tells us that these areas were very important resources for the Wadawurrung people who visited these places during different seasons to harvest shellfish. The oldest Wadawurrung shell midden on the Surf Coast is at least 3200 years old!

Unfortunately, today visiting and living on the coast is leaving much bigger impacts on the coast. Have you ever thought about what the landscape looked like before houses were built on the beachfront, or how people accessing the beach might impact the dunes?

This activity will help you explore the human impacts of living and visiting the coast and think about how we can do this is a more environmentally friendly way.

1. Create a sand dune shape with the sand in the tub again.
2. Add your own shell midden layer.
3. Reuse the plants to make your sand dune habitat.
4. Put some Lego houses on the “town side” of your dune.
5. Walk the Lego people down to the beach, and back again a few times.
6. Draw & label a picture or add a photo below of the human impacts on your dunes.

Questions

- How does people walking and playing in the dunes effect the plants and animals that use this habitat?
- How are historical shell middens effected by modern human activities?
- What could we do instead of walking in the dunes?
- How do you think dogs running in the dunes would affect the animal’s habitat?
- What other human impacts or activities could affect the habitat in the dunes?
- What could you do to protect the Surf Coast sand dunes?

Activity 5: Draw a real coastal sand dune

Now it's time to get creative. In the space below, draw your sand dune and the surrounding environment, making sure to include:

- Different parts of the environment *e.g. shoreline, ocean, dune, beach, large trees*
- At least *2 plants* found in dunes on Victoria's Surf Coast and label.
- At least *2 animals* that live in or near the dunes of Victoria's Surf Coast and label.
- At least *2 human impacts* in or near the dunes
- **Make sure to label all of these on your drawing.**

Don't forget to use the Online Resources on page 6 to help with your research

Online Resources

Dune Habitats and Ecosystems

Dune Ecology: Great Ocean Road Coast Committee
https://www.gorcc.com.au/education/community-education/dune-ecology/

Sandy beaches and Dunes: Victorian Fisheries Authority
https://vfa.vic.gov.au/education/featured/teachers-resource/sandy-beaches-and-dunes

Coastal dunes fact sheet: GORCC
https://www.gorcc.com.au/app/uploads/2017/07/GORCC-Fact-Sheet-Coastal-Dunes.pdf

Sand dunes: Australian National Herbarium
http://www.anbg.gov.au/photo/vegetation/sand-dunes.html

Coastal Landscapes: Breamlea Association
http://breamlea.com.au/main.asp?_=Coastal%20landscape

Coastal management: Jacaranda Geography
http://www.jaconline.com.au/essentials/downloads/JEG2_04.pdf

Dune Coastal Animals and Plants

Surf Coast Nature Search
https://scnaturesearch.com.au/

Beach Nesting Birds
https://www.birdlife.org.au/projects/beach-nesting-birds

Save the Hoodie: GORCC
https://www.gorcc.com.au/conservation/hooded-plovers/

Fauna: GORCC
https://www.gorcc.com.au/conservation/fauna/

ANGAIR Fact sheets
https://www.angair.org.au/knowledge-bank/factsheets

Shell middens

Aboriginal Victoria: Fact sheet – Aboriginal Coastal Shell Middens
https://www.aboriginalvictoria.vic.gov.au/fact-sheet-aboriginal-coastal-shell-middens

Torquay museum without walls: Wathaurong and the land
https://www.torquayhistory.com/our-collections/first-austsralians/wathaurong-and-land/

Teachers Notes & Curriculum Links

This resource has been designed to cater for Year 3/4 and Year 5/6 students. It can be completed in sections as part of a greater unit of work, as an individual activity or in class as a small group project. We hope your students enjoy and find these activities meaningful, and we would appreciate any photos, details or links to students work to inspire others. These can be sent to our Education team at education@gorcc.com.au.

VICTORIAN CURRICULUM LINKS

YEARS 3 & 4

Geography	Elaborations
Geographical Concepts and Skills: Place, space, and interconnection Identify and explain the interconnections within places and between places (VCGGC073)	• identifying the main types of natural vegetation, including forest, savannah, grassland, woodland, and desert, and explaining the relationship between climate and natural vegetation • exploring how vegetation produces the oxygen all land animals (including people) breathe, protects land from erosion by water or wind, retains rainfall, provides habitat for animals, shelters crops and livestock, provides shade for people, cools urban places, produces medicines, wood and fibre, and can make places appear more attractive • recognising that the distribution of Aboriginal and Torres Strait Islander peoples before colonisation was concentrated in more productive areas such as in the coastal and riverine areas of Australia
Geographical Knowledge: Diversity and significance of places and environments Types of natural vegetation and the significance of vegetation to the environment, the importance of environments to animals and people, and different views on how they can be protected; the use and management of natural resources and waste, and different views on how to do this sustainably (VCGGK082)	• exploring how vegetation produces the oxygen all land animals (including people) breathe, protects land from erosion by water or wind, retains rainfall, provides habitat for animals, shelters crops and livestock, provides shade for people, cools urban places, produces medicines, wood and fibre, and can make places appear more attractive • explaining how people's connections with their environment can also be aesthetic, emotional, and spiritual

YEARS 5 & 6

Geography	Elaborations
Geographical Concepts and Skills: Place, space, and interconnection Describe and explain interconnections within places and between places, and the effects of these interconnections (VCGGC087)	• exploring the extent of change in the local environment over time, through for example, vegetation clearance, fencing, urban development, drainage, irrigation, farming, forest plantations or mining
Geographical Knowledge: Factors that shape places and influence interconnections Influence of people, including the influence of Aboriginal and Torres Strait Islander peoples, on the environmental characteristics of Australian places VCGGK094	• identifying how Aboriginal and Torres Strait Islander communities altered the environment through their methods of land and resource management • exploring the extent of change in the local environment over time, through for example, vegetation clearance, fencing, urban development, drainage, irrigation, farming, forest plantations or mining