Beach in a Tray

Coast | Film: Buoy Ahoy! Coast | Game: What's in the Sand?



Our question

How do waves move sand, and can adding sand help protect a beach?

You need: A shallow tray or tub, sand, water, a jug, a ruler, a few small stones (optional)

What to do

1. Pile sand at one end of the tray to make a sloping beach. Pour water into the other end until it is about 2 cm deep.
2. Measure how far the dry beach reaches from the end wall. This is the beach width.
3. Make 20 gentle waves by dipping a ruler up and down at the water end. Measure the beach width again.
4. Rebuild the plain beach, then make 20 strong storm waves. Measure again. Look for where the sand ended up.
5. Rebuild the beach with extra sand (like the dredge did), then with a row of stones. Each time, make the same 20 storm waves, measure and compare.

Fair test: Change one thing at a time. First compare gentle and storm waves on a plain beach. Then change the protection (none, extra sand or stones) and use the same storm waves each time. Keep the tray, the sand, the water depth and the number of waves the same.

Safety: Mop up spills straight away.

Our results

Beach and waves	Width before (cm)	Width after 20 waves (cm)	Change (cm)
Plain, gentle waves			
Plain, storm waves			
Extra sand, storm waves			
Stones, storm waves			

Think about it

- Which waves moved more sand? Where did it go?
- How is your tray like Port Beach in a winter storm?
- Which protection worked best? Would it work on a real beach?

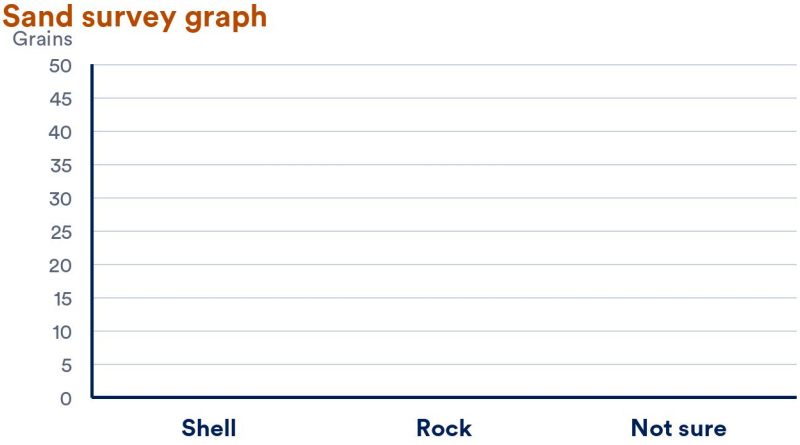
Curriculum link: Year 4: weathering, erosion, transportation and deposition.

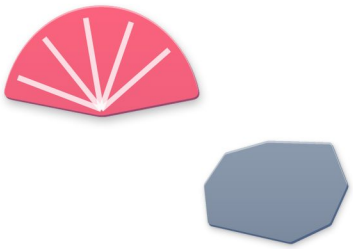
Port Beach by the Numbers

From the film

- In 2019, a report named Port Beach one of the two WA beaches most at risk.
- The State Government gave $3.25 million to help.
- The plan was to bring up to 150,000 cubic metres of sand. That is enough to fill about 60 Olympic swimming pools.

Sand survey graph





Your turn

1. If 150,000 cubic metres of sand fills about 60 pools, about how much sand fills one pool?

2. Sand survey: count 50 grains from a sand sample. How many are shell and how many are rock? Write each as a fraction and a percentage.

3. Draw a bar graph of your sand survey on the grid.

4. The City of Fremantle, Fremantle Ports and the Department of Transport worked together. Why might a port and a council both want this to work?

5. Winter storms carry sand away and summer waves often push some back. Predict what Port Beach might look like in July and in January.