



# Climate change activity

## Beach erosion experiment

### Main learning points



- Coastal/beach erosion is caused by the weather and the sea – wind and waves.
- Climate change can speed up erosion as severe weather events like storms increase.

### Resources required



- **The effects of coastal erosion** (p2)
- Large but shallow tray
- Small rocks or pebbles
- Water
- Blue food colouring
- Small plastic bottle

### Introduction:



#### What is erosion?

Explain that **erosion** is the geological process in which earth's materials are worn away and transported by natural forces such as wind or water.

#### What is beach erosion?

Explain that **beach erosion** is caused by the loss of sand which is moved by wind and waves into deeper water and can, over time, change the position and shape of the coastline and affect historic places.

### Activity:



- Provide the group(s) with the resources required and **learner activity instructions** (p3). The beach model can be set up by the group or be provided ready for use, but will need to be reassembled as required.
- Learners will:
  - set up the beach model in the tray
  - replicate the action of wind and waves using the plastic bottle
  - comment on their findings.
- After the experiment, give out the **learner activity explanation** (p4).

**Please note:** If running this activity as a round-robin style with other themed activities, it generally takes less time.

# Activity resource: The effects of coastal erosion

Erosion warning at St Andrews Castle



Damaged burial chamber, Lopness, Orkney



## Activity instructions

# Beach erosion experiment

### Resources required



- Large but shallow tray
- Small rocks or pebbles
- Water
- Blue food colouring
- Small plastic bottle



### What to do

- 1 Add around 600 grams (5 cups) of sand to one side of the tray, arrange into a sloping mound and add in some small rocks and pebbles.
- 2 Fill the small bottle with water, add some drops of food colouring and shake gently with the lid on until mixed.
- 3 Fill the empty side of the tray with the water from the bottle and repeat twice.
- 4 Now move the empty bottle up and down in the water to produce waves.

### Questions

- ? What happens to the sand and rocks when you move the bottle up and down in the water?
- ? What happens if the waves you create are faster or slower?
- ? Can you think of anything which will reduce or stop the action of the 'waves' on the model beach?

Photos: ES Learning and Inclusion Team

## Activity explanation

# Beach and coastal erosion

### What is coastal and beach erosion?

Coastal and beach erosion is the loss of sand which is removed by waves and affected by the wind. The sand is carried back into deeper water just as in the tray experiment, so over time, beaches can become thinner in width and lower because the covering of sand is washed away.

Severe beach erosion can happen after a storm. As climate change is thought to produce more storms and extreme weather, the rate of coastal and beach erosion seems to be increasing in some places.

### What's the impact of coastal and beach erosion?

Historic sites and monuments on the coast can be affected by coastal erosion. Some were not even originally built on the coast, but the coastline has moved further inland because the land has been eroded and sites are now threatened.



**Left:** Tantallon Castle, perched on a steep rocky cliff overlooking the Firth of Forth

**Right:** Skara Brae is under threat of coastal erosion from rising sea levels and extreme weather events

### How can we slow down or stop coastal erosion?

- **Reduce building along coastal areas** so that the land is not altered e.g. removal or damage to sand dunes. Dunes are mounds of sand that separate the beach from land further inland. The roots of dune grasses help keep the sand in place and the dunes can act as a natural barrier, stopping the waves from reaching further up the beach and eroding it.
- **Build long walls which reach out into the sea called jetties**, which stop waves reaching the shore or reduce their force. Jetties can slow down the movement of sand or direct the waves in a particular direction.
- **Build sea walls as a barrier** to separate the land from the sea, which can also help to reduce coastal erosion.

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