Tides & waves

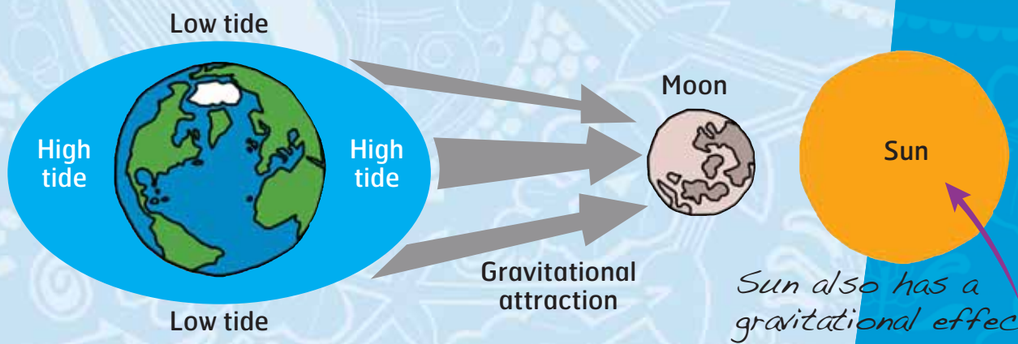
"Hi I'm Marvin Moon.
Did you know I act like a big magnet? Using the force of gravity, I pull the oceans towards me as the earth spins. You see this as movement of water up and down a beach or in and out of an estuary. These are called tides."

Tides

When you've been at the beach, have you noticed that the water level changes?

Sometimes it changes so much you may need to move your deck chairs further up the beach as the tide comes in! This is all because of the invisible attraction acting between the moon and the earth, called gravity.

As the Moon moves and spins around the Earth, gravity pulls – like a magnet - on the earth's seas that are closest to it. This causes water to bulge towards the moon (see diagram below) and a balancing bulge occurs on the opposite side of the earth. Of course, the continents get in the way, and the bulges of water can't move smoothly around the earth as it rotates. If you stay in one place you will normally see water levels go up and down, making high and low tides, twice a day and just over six hours apart.



Things to do:

How tides are made

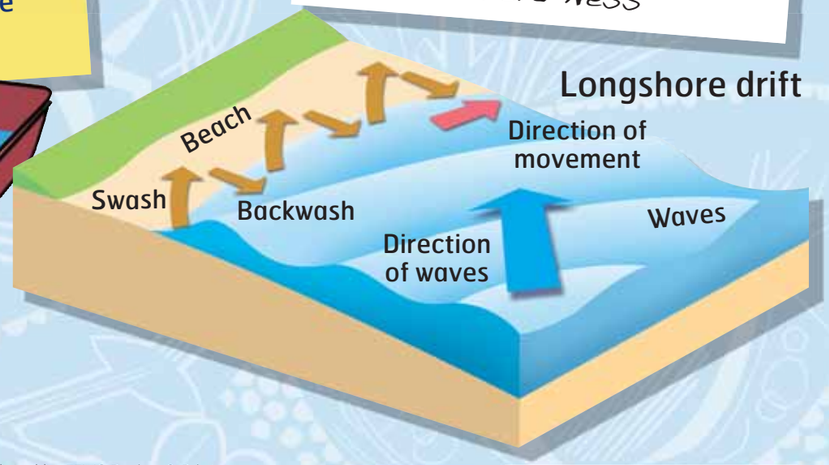
You need 7 people and 7 balloons. 1 green balloon is the earth, 1 white balloon is the moon, 1 yellow balloon is the sun and 4 blue balloons are the sea. The sun and earth stay in the same place and spin whilst the moon moves around the earth attracting the sea. Have fun!

Longshore drift

Waves also transport sand and shingle along the shore, a process known as longshore drift. Waves often hit the shore at an angle, depending on the direction of the wind. Longshore drift has created features like Orford Ness and Landguard Point. Sometimes man tries to slow down longshore drift by building defences called groynes.

"Longshore drift moves sand sideways along the beach in a zig-zag pattern – this can sometimes cause sand to pile up on one side of the beach! Look out for this next time you go to the beach".

The amazing effect of Longshore drift can be seen at Orford Ness



Things to do:

See how currents move sand

1 Using the same tray and water add a drop of ink or paint and blow and watch how the ink moves.

1

See how groynes work

2 Using a clean tray and water this time put a ruler half way across the tray and blow the paint towards the ruler. See what happens!

2

Produced by EFMS Design & Print
The Coastal Knowledge Fact Sheets have been produced by the Suffolk Coast and Heaths AONB with co-funding from our partners.
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Cartoons: Marvin Moon © Simon Reid.
Illustrations: Rolando Ugolini

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"Did you know that the wind makes waves on the sea?"

Waves

As wind passes over the sea, it forces the water surface to ripple, and eventually to form into waves. As waves approach the beach, they touch against the sea bottom, which makes them become higher and steeper until they finally break, creating the white water that rushes up the beach.

The size of a wave is affected by the speed of the wind, and how long it blows for, how deep the water is, and how great is the fetch – the distance the wind has travelled across open water.

We can recognise the difference between constructive and destructive waves.

Constructive waves

These are small waves below one metre in height that are low in energy. As the wave breaks gently on the beach it carries sand and pebbles with it, which are then left behind as the tide goes out. This type of wave helps to put sand back on the beaches.

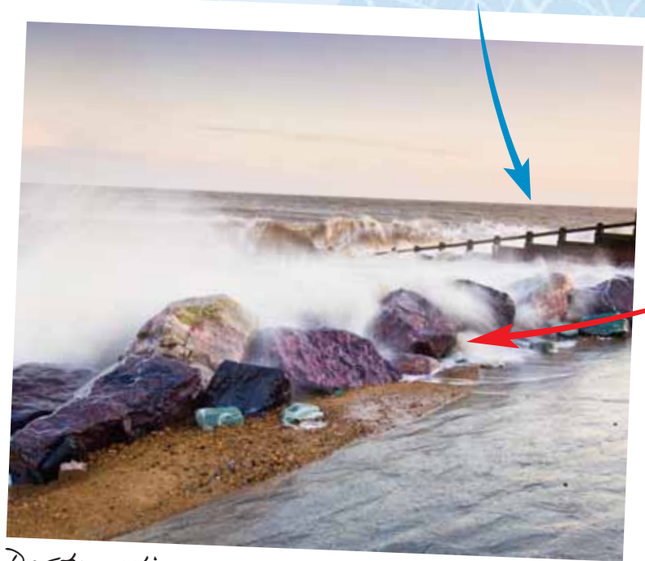
Shingle pushed up by small waves

Constructive waves leaving shingle behind at Hollesley Bay

Destructive waves

These are tall, steep waves that carry a lot of energy. These waves hit the beach hard and fast, with lots of water and energy, and can destroy the beach by washing beach material – sand and pebbles – away.

Large waves hitting the beach



Destructive waves at Slaughden taking shingle away

Rocks protecting the beach

Large wave with lots of energy

Strong backwash

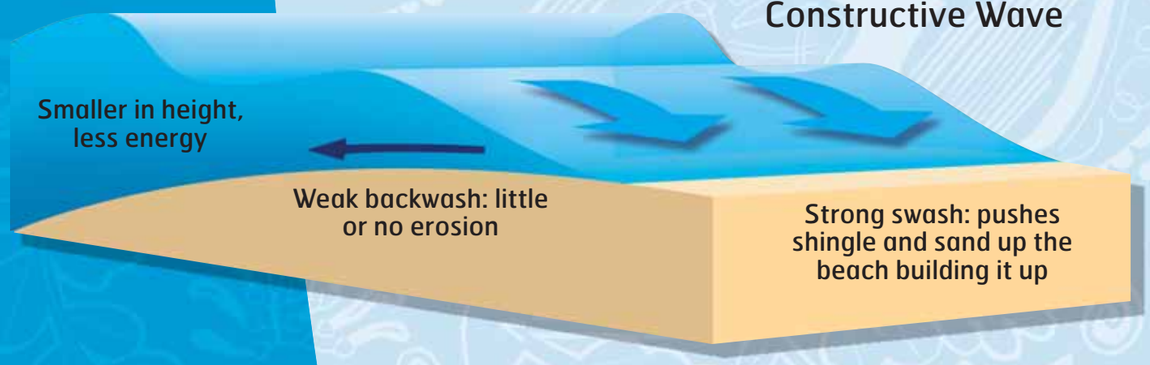
Waves at Felixstowe

Things to do:

Making waves

Get a tray and pour in water to cover the bottom then blow! See what happens?

Constructive Wave



Destructive Wave