What causes tides?

Materials

- Tide tables
- Map of an area related to tide times
- Paper
- Thin cardboard
- Some clear plastic
- Scissors
- Paper Fastener

ACTIVITY 1 Following the tide cycle

Instructions

1. Find a chart of the high and low tide times and tide heights for a particular month. Find out which days there is a new and a full moon.

2. Pick four consecutive days. Write down the daily tide times for those days.

3. Draw a graph of the tide height against time for the high and low tides in the day (there may be 3 or 4).

Question

What is the period of time between each high tide?

Extension activity

Instructions

Repeat what you have just done but for different days two weeks later.

Questions

1. Are the tides the same height?

2. Do the high and low tides occur at the same time?

Next step

1. If you can get a map of an island, pick a particular day.

2. Find all the places you have tide information for.

3. Mark off the high tide times over a full day (24 hours).

Questions

1. Do you notice anything about the pattern?

2. Could you say that the pattern of the high tide times shows up like a wave that travels around the island?

3. How would knowing this affect your planning of a fishing trip?

ACTIVITY 2 Modelling the tides

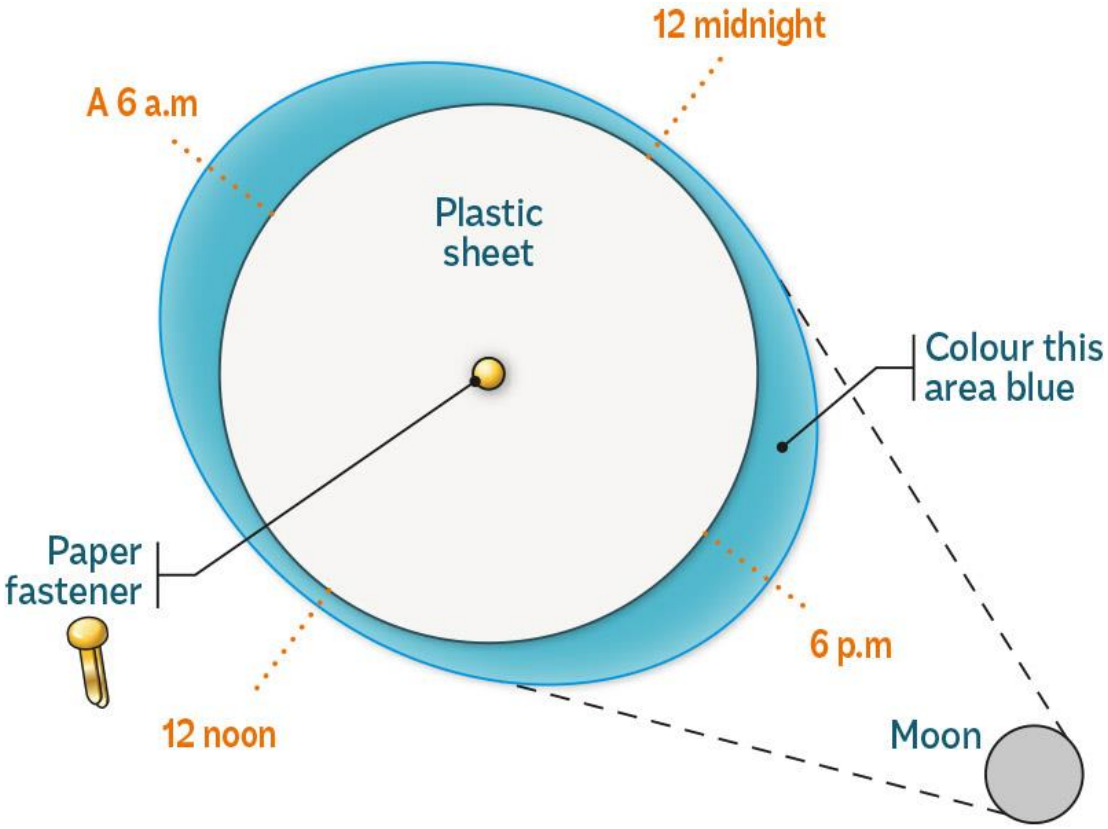
Instructions

Step 1.

1. On a piece of clear plastic sheet (overhead transparencies are good), copy out the template below.

2. Cut out the shape and colour in the ocean blue.

3. Make sure you mark the points A, B, C, and D and the times.

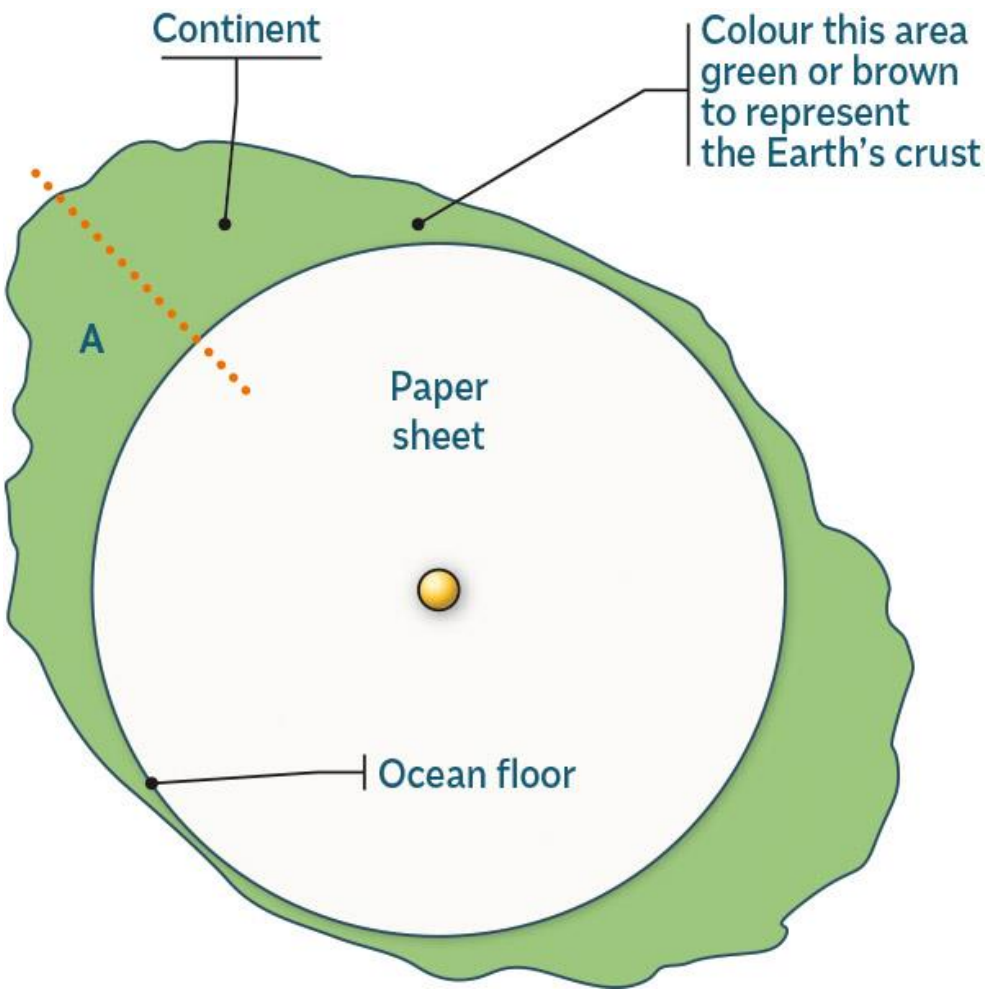


Step 2.

1. On a piece of paper, copy out the template below.

2. Colour in the land a different colour.

3. Paste this onto a piece of cardboard.



Step 3.

1. Carefully push a paper fastner through the centre of the top plastic piece and then through the bottom piece of card. Make sure that the top clear plastic template can turn on top of the bottom piece.

2. Line up the A on the top piece with the one on the bottom piece. Is this a high tide or low tide at A?

3. Now rotate the piece of plastic so it is 12 noon at A. Is this high tide or low tide?

4. Continue on to 6 pm and 12 midnight at A. This is like the moon orbiting around the Earth.

Questions

1. How many high and low tides are there in one day?

2. What does the ocean appear to be doing as the moon orbits around the Earth?

3. Name the force that attracts the water towards the moon.

Something to think about

1. Why is there a bulge of water at the opposite end? (Hint: This has to something to do a special force called centrifugal force. Here is an example, what happens when you swing a bucket of water over your head?)

2. Do you think the gravitational force of the sun will have any effect on the tides?

3. What is going to happen if the sea levels start to rise? Can you show this on the template model you have made?

Something to find out about

1. The tide heights are not exactly the same over the 24 hour period. Why does this happen?

2. The tides do not exactly go through a 24 hour period. In fact it is slightly longer. Can you find out why?

ACTIVITY 3 Spring and neap tides

Prediction

When do you think the tides will be at their highest?

Materials

A tide chart for a month. The dates for the new and full moon.

Instructions

1. Draw a graph of the tides for the month. Height is on the y axis. Date is on the *x* axis.

2. Mark on the graph, the highest and lowest tide for each day.

3. Mark on the graph, the day on which there is a full moon and the day there is a new moon.

Observation

What do you notice about the tide heights on these days?

Explanation

Can you use the four diagrams below to explain why there are changes in the high tide heights? (The diagrams show the moon's position in relation to the earth and sun as it orbits the earth.)