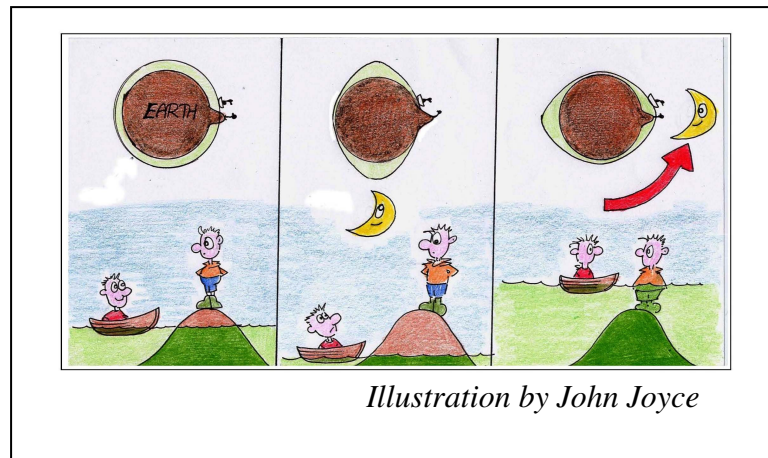


Lesson Plan: Tides – Where Does all the Water Go?

Strand: Natural Environment



TITLE: TIDES – WHERE DOES ALL THE WATER GO?

Aim / Description:

Students are to complete a project investigating and researching tides. Each student should seek to:

- Develop an understanding of what causes tides and why sea levels change between high and low tide
- Recognise and identify common features of tides
- Investigate how tides affect the lives of plants, animals and people.

Materials:

- Tidal Vocabulary
- Photos of a shore line (local to the school) during the day showing the level of tides at different times during the day.
- Illustration of what causes tides
- Interesting facts about tides
- Access to the internet

Activity:

(Prior to giving the lesson about tides, it is recommended that students have an understanding of the earth and its place in relation to the sun and the moon (i.e. the tilt of the planet earth relative to the sun and the moon; how the earth moves around the sun; how the moon moves around the earth etc).



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VOCABULARY:

Step1. Go through the tidal vocabulary and define the following words:

- **Tides: are** the rise and fall of the surface of the ocean that occurs approximately every twelve and a half hours. This is due to the gravitational pull of the moon and the sun on the water mass of the sea.
- **High tide:** is the highest point to which water rises on the seashore at each tide. At any one time, high tides occur simultaneously on the side of the Earth when it **is** directly below the moon, and again on the opposite side of the Earth.
- **Low tide:** is the lowest point to which water descends on the seashore at each tide. At any one time, low tides will occur when the Earth **is not** directly beneath the Moon, nor on the opposite side of the globe from the Moon.
- **Neap tides:** are the weakest tides (i.e. with relatively *low* “High Tides” and relatively *high* “Low Tides”). They occur when the moon and the sun are at *right angles* with the Earth and are weak because the gravitational force of the sun and the moon cancel each other out.
- **Spring tides:** are the highest and lowest tides of the month. Spring tides occur when the moon and the sun are *lined up* with the Earth, so that their gravitational forces combine, causing the strongest pull on the Earth and the waters that cover it.



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RESEARCH / INVESTIGATION:

Step 2. Students (or the teacher) should identify a tidal area and if possible take photos or complete drawings of the location showing the different levels of tides during the day.

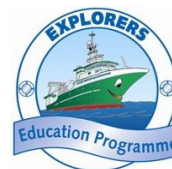
A). Ask the students to identify the features of the tide (where are the high and low tide marks; where are the high and low tide marks during neap tides; where are the high and low tide marks during spring tides; how often does the tide come in and out over 24 hours. *(Also, refer to lesson plan: Tidal Treats and Retreats for activities learning about tides).*

B). Identify how animals and humans can be affected by the tides. (e.g. how animals and plants on the shoreline are affected by exposure to sunshine and wind as the tides goes in and out and how the types of predators change from birds and land animals to fish, crabs and other marine predators; how the movement of boats in a harbour may be affected by the different water levels at high and low tides; how people fishing will be affected as the water levels change etc.).

Step 3. As part of the research project, students should answer the questions below and develop drawings to demonstrate their understanding.

- What causes tides?
Tides are caused by the gravitational pull of the sun and the moon on the Earth. The pull causes the ocean that surrounds the Earth to bulge or lift in the direction of the sun or moon. A high tide occurs near the bulge, causing a low tide between the two bulges.
- How often do tides occur?
In most places around the world, high tides alternate with low tides approximately every six and a quarter hours. This gives a high tide every 12 ½ hours and a low tide every 12 ½ hours.
- What has a stronger influence over tides, the Sun or the Moon and why?
The Moon has a stronger influence over tides because, even though it is much smaller than the Sun, it is much, much closer to the Earth.
- What is a low tide?
A low tide is the lowest point to which the sea falls on the seashore during any one tide.
- What is a high tide?
A high tide is the highest point to which sea rises on the seashore during any one tide.

Explorer Education Programme



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- What is a spring tide?
A spring tide that occurs when the Moon and the Sun are lined up with the Earth, causing the strongest pull on the Earth and thus the highest and lowest tides.
- What is a neap tide?
A neap tide occurs when the Moon and the Sun are at right angles with the Earth; these are the weakest tides.
- How often do the highest and lowest tides occur?
Highest and lowest tides occur approximately every two weeks.
- Are high tides the same from day to day?
No, tidal heights change on a daily basis because of the changing positions of the Earth and the Moon as they orbit around the Sun.

Step 4. Students should also be encouraged to find out some interesting facts about tides around the world.

- Where are the largest tides in the world?
The Bay of Fundy, in Nova Scotia
- What other natural event can affect water level?
Hurricanes can force tides even higher.

Outcome / Objective:

Students should have developed skills in:

- Investigation
- Research
- Communication