Britannica School

Middle Level

Energy from Waves & Tides

A Lesson Plan Featuring **Britannica School**

Lesson Overview

Subject	Energy from Waves and Tides
Level	Middle
Duration	5-6 Class Periods of 45 minutes
Description/Aim	Students investigate how the ocean is a source of renewable energy.
Materials	• Internet Connection • Access to **'Ocean Waves & Tides' Resource Pack in Britannica School ↗** • Scientific Equipment (see Procedures) • Various Worksheets (included)

Lesson Objectives

- Gain a better understanding of global issues
- Identify current key issues that exist within the climate change problem
- Find new meaning through the information they discover
- Share their learning with their local community and the wider world

*This lesson refers to content taken from **Britannica School,** the go-to site for learning more about any subject.*

Don't already have access? ***Request a free trial here!***

Lesson Background

Energy from Waves & Tides

In 2015, world leaders agreed to 17 goals for a better world by 2030. **The United Nations Sustainable Development Goals,** as they are known, address global challenges like poverty, inequality and climate change and serve as a blueprint to a more sustainable future.

As a global education leader, working to support students in becoming lifelong learners and citizens of the world, Britannica educators have partnered with the United Nations Global Goals to call upon schools, educators and students to amplify, reflect and act on these challenges that affect every one of us.

The following lesson will teach students about the responsible stewardship of our oceans by investigating how waves and tides can be harnessed to provide a renewable source of energy.

It will lead students towards deeper connections, understanding and ultimately action.

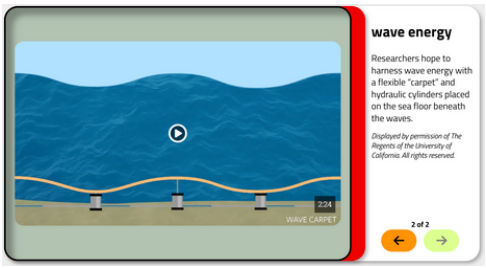
As the call for sustainable change grows around the world, ensure that your students are informed, engaged and prepared to tackle one of the most important issues facing their generation.

This lesson supports UN Sustainable Development Goal 14: Life Below Water, which aims to conserve and sustainably use the oceans, seas and marine resources for sustainable development.

A pioneering project in Northern Ireland used the rise and fall of the tides to create power. *Marine Current Turbines - a Siemens business.* **Image Credit: Britannica School.**

Step-by-Step Procedures

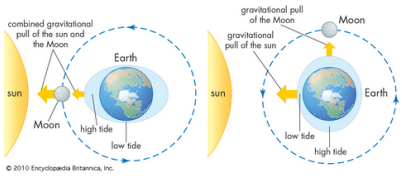
1. Types of Ocean Energy



Wave energy and tidal energy form Ocean Energy. Watch the **'Wave Energy' video↗** and read the **'Water Power' article↗** found in the **'Ocean Waves & Tides' Resource Pack↗**.

Use the information to complete a Main Idea and Detail table for each type of energy.

Main Idea and Detail worksheet [PDF]



2. Tides

Watch the **'Tide' video↗**, examine the **'Tide' image↗** and read the **'Tide' article↗**, all found in the **'Ocean Waves & Tides' Resource Pack.**

Explain how high and low tides are formed using the Cause and Effect worksheet.

Cause and Effect worksheet [PDF]

Practical Activity: Making Waves

First read the **'Wave' article↗** from the **'Ocean Waves & Tides'↗** Resource Pack. Then follow the steps below to complete a wave-making investigation.

Equipment:

- Baking tray
- Sand
- Handful of stones
- Water
- Flat board of wood/plastic

Steps:

1. In small groups, fill the baking tray with 6cm of water.
2. Place the board at an angle in one end of the tray and move it back and forth to create a wave.
3. Count how many times the wave moves back and forth across the tray before it disappears.
4. Place a handful of stones at one of the tray, ensure the stone pile is higher than the top of the water and there is a seaward slope in the stones. See Diagram 1.

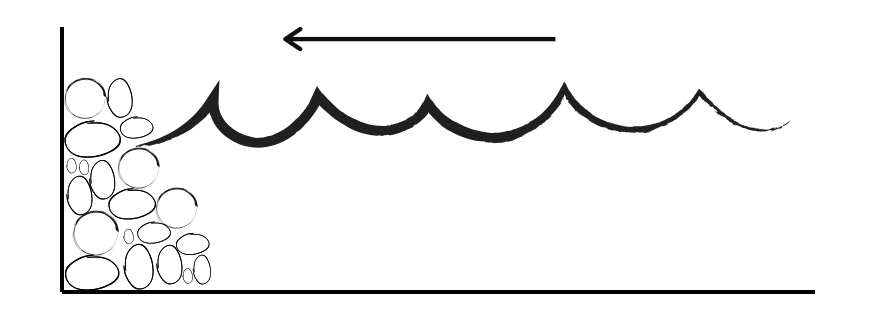


Diagram 1

5. Create a wave using the board that reflects off the stones. Count how many times the wave moves back and forth across the tray before it disappears.
6. Replace the stones with sand, ensure the sand is higher than the top of the water and there is a seaward slope. See Diagram 2.

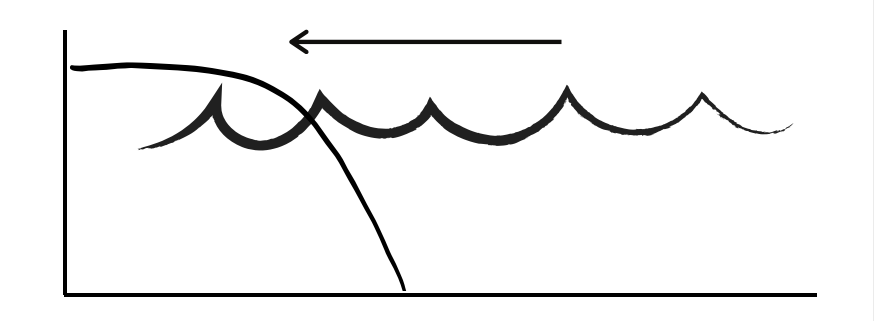


Diagram 2

7. Create a wave using the board that reflects off the sand. Count how many times the wave moves back and forth across the tray before it disappears.

Wrap Up:

- Were the differences in the waves without stones/sand and with stones and sand? Explain
- Predict what would happen if there was island in the centre of the tray?

Adapted from MESA, "Wave Experiments", Marine Education Society of Australasia http://www.mesa.edu.au/cams/pdf/waves.pdf, last accessed 08 July 2020

Assessment

- Various annotated work samples such as Cause and Effect chart or the Wave Investigation task.
- Observation of the students participating in the lesson and their contribution to group discussions.

Britannica School

Inspire curiosity and the joy of learning.

Britannica School is the most trusted, comprehensive digital research resource built to empower K-12 students.

As the go-to site for research - the core of any inquiry learning model - Britannica School offers thousands of curriculum-aligned articles, images, videos, audio clips, primary sources, maps and recommended websites across three differentiated levels to meet every child's learning needs.

Trusted by millions of students and teachers worldwide

150M+
Students & Teachers

83
Countries

elearn.eb.com/britannica-school

Britannica EDUCATION

To learn more about Britannica's resources and how we can support you, please email **contact@britannica.com.au** or visit **elearn.eb.com**