

Ocean Waves

Objective: To learn about alternative technologies while studying mechanical waves

Introduction: Watching the ocean, especially on a windy day, is very suggestive of its power. Typically humans have harnessed this power for recreation or sea travel but wave power is currently being investigated as a source of electrical power generation. The aim of this lesson is help students understand ocean waves and introduce them to the potential and challenges of harnessing wave energy.

Curriculum Connections:

Unit B - 1.1 sts

Unit C - 2.3sts

Unit D – 2.1-2.4k, 2.1sts

Supplies / Materials:

- Projector and computer
- Computer access for students
- Tub of water
- Print outs of charts and **resources** provided
- Chart paper and markers

Hook: Watch a bit of the following video:

<https://www.youtube.com/watch?v=gSKFqm4pIEI>



SCIENCE FOCUS

Lesson Subject

Physics 20

Topic

Mechanical Waves

Location

Classroom

Length

50-80 minutes (dependent on work time allotted)



Intro Activity: Ask for student observations from the video provided above – you are looking for answers such as “a wave is powerful and rhythmic.”

Main Activity:

1. Explain that the class will be investigating waves as a renewable energy source.
2. Explore the movements of particles in a wave – if possible watch the animation in **Resource 1**, it might be helpful to have the video preloaded for your class.
3. Discuss transverse and longitudinal movements of particles; provide an example of previously record information in either a table or chart.
4. Have students discuss methods in which the energy of waves may be captured – it may be helpful to have a model tub of water and some supplies so students can experiment with wave movement and energy. Make sure to put some time aside to set up, run and tear down the tub models. You can also get a student to help with this! Give students time to jot down notes of thoughts, ideas and discoveries that came up during this experiment.
5. Have students brainstorm some of the challenges to harnessing wave power. Some of the topics could include changes in wave intensity and frequency, international politics, set-up and repair of stations, transport of energy and viability in the North. Note that the students should focus on the viability of wave power in the North, and this could lead into the next lesson.

Independent Student Work: Have students research wave technology and determine whether it would be valuable for Northern Canadians to invest in. Resource 2 is a good starting place. Try to use both local **resources** from your community and or territory, and look nationally as well.

Conclusion / Review: Have students share some of their findings, and write down some of the ideas that came up during one of the brainstorming sessions from the previous main activities. Your students can either write their thoughts down or present this information pictorially or orally to the teacher or to the class.

Homework: Finish independent student work in the form of a KWL chart, a Brain Map or a short reflection piece.

Resources:

1. Mechanical energy of waves:
<http://www.acs.psu.edu/drussell/Demos/waves/wavemotion.html>
2. Wave technology: <https://hub.globalccsinstitute.com/publications/renewable-electricity-futures-study-volume-2-renewable-electricity-generation-and-storage-technologies/95-technology-characterization>