# Fierce Earth - Waves and Tides

**ABC ME screening details:** 26 May, 2020 – 12:45pm

This episode can also be viewed on [ABC iView](https://iview.abc.net.au/show/fierce-earth) after the scheduled screening time.

**Key learning areas:** science

**Level:** secondary

**About: its wet-suits on for the Fierce Earth team as they hit the surf to unlock the secrets of king-sized waves and fast rising tides.**

## Before the episode

1. What are waves? What are some examples of waves that you are familiar with?
2. How are waves formed?
3. What is an energy transfer?
4. Why do sandcastles that you build at the beach breakdown?

## During the episode

1. Where does the energy carried in waves come from?
2. How do waves start?
3. Explain why waves “break” close to the shoreline
4. How many high tides and low tides are usually experienced each day?
5. What is gravity? How does the gravity of the moon cause high and low tides on earth? Draw a diagram to support your answer.
6. What is a tidal range? Explain why the Seven Estuary experiences such a large tidal range.

## After the episode

1. What is a rip current?
2. If a person is out swimming at the beach and suddenly becomes caught in a rip current, what should they do?

**Follow-up activity:** Imagine you have been given access to the following materials: hand held fan with 3 speed settings, ruler, fish tank with no water, water, marker pen.

* 1. Explain how you could model the formation of waves using these materials. Include a labelled diagram of your model.
  2. Construct a hypothesis on the effect of increasing wind speed on wave height.
  3. Write a method to test your hypothesis, on a small scale, using the model you described in part b.
  4. Identify the independent variable, dependent variable and 3 controlled variables for the experiment you wrote in part c.

# NSW teacher notes

This is an optional standalone resource that could supplement student learning. The activities align with syllabus outcomes across stages and can be modified to meet the needs of your students. Students can complete the activities while learning at home and in the classroom. All activities can be completed without access to the internet or a device. Teachers could collect student work to offer feedback and as evidence of learning.

## Learning intentions

* To explain predictable phenomena on the Earth, including waves and tides.
* To use models to explain common phenomena, like waves, involving energy transfers.
* To investigate factors that affect waves as carriers of energy.

## NSW Science 7-10 Syllabus outcomes

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| Outcome | Stage 4 | Stage 5 |
| Working Scientifically | SC4-4WS - identifies questions and problems that can be tested or researched and makes predictions based on scientific knowledge  SC4-5WS - collaboratively and individually produces a plan to investigate questions and problems  SC4-8WS - selects and uses appropriate strategies, understanding and skills to produce creative and plausible solutions to identified problems  SC4-9WS - presents science ideas, findings and information to a given audience using appropriate scientific language, text types and representations | SC5-4WS - develops questions or hypotheses to be investigated scientifically  SC5-5WS - produces a plan to investigate identified questions, hypotheses or problems, individually and collaboratively  SC5-8WS - applies scientific understanding and critical thinking skills to suggest possible solutions to identified problems  SC5-9WS - presents science ideas and evidence for a particular purpose and to a specific audience, using appropriate scientific language, conventions and representations |
| Knowledge and understanding | ES2 (a) - explain that predictable phenomena on the Earth, including day and night, seasons and eclipses are caused by the relative positions of the sun, the Earth and the moon  **Additional ES -** describe the effect of the forces of the sun and moon on the hydrosphere  PW2 (e) identify that the Earth's gravity pulls objects towards the centre of the Earth  PW3 (e) investigate some everyday energy transformations that cause change within systems, including motion, electricity, heat, sound and light | PW1 (b),identify situations where waves transfer energy  (c) describe, using the wave model, the features of waves including wavelength, frequency and speed |

[NSW Science 7-10 Syllabus](https://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/learning-areas/science/science-7-10-2018) © NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales 2018. See the [NESA website](https://educationstandards.nsw.edu.au/wps/portal/nesa/mini-footer/copyright) for additional copyright information.