



Wind Power

Wind Powered Car



Summary:

This resource supports your teaching around the topic of the **water cycle**. It contains an activity suitable for Years 5-8.

Your students will:

- **UNDERSTAND:** Renewable energy is important for sustainability. The Earth's resources, including wind, are part of what makes renewable energy possible.
- **KNOW:** Humans have been using the wind in new technologies for thousands of years, including by using sails for transportation. Sailing is a form of wind-powered transportation.
- **DO:** Build a sail-powered car.

Curriculum Links:

Learning Areas	Achievement Objectives	Levels	Years
Science			
Nature of Science: Investigating in Science	Ask questions, find evidence, explore simple models, and carry out appropriate investigations to develop simple explanations.		5-8
Physical World: Physical Inquiry and Physics concepts	Explore, describe, and represent patterns and trends for everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat.	3-4	5-8
Planet Earth and Beyond: Earth Systems	Explore and describe natural features and resources. Appreciate that water, air, rocks and soil, and life forms make up our planet and recognise that these are also Earth's resources.	1-2 3-4	5-8 5-8
Technology			
Nature of Technology: Characteristics of Technology	Understand how society and environments impact on and are influenced by technology in historical and contemporary contexts and that technological knowledge is validated by successful function.		5-8

Understand



Earth's resources, including wind (**hau**) can be harnessed to use as sources of renewable energy. While we tend to think of electricity when we hear the phrase 'renewable energy', the wind has been a source of energy for humans for thousands of years. Using a sail to power a boat or waka is one example of how humans have been using the wind for transportation, trade, and new discoveries.

Know



Sails have been used by humans for thousands of years. From the ocean voyages of Pacific, Chinese and European explorers to the modern-day America's Cup boats, sailing makes use of a renewable energy source—the wind. The technology of sails has lasted for such a long time because it is a very successful and efficient way of transporting people and cargo over long distances.

If your students have been introduced to **forces**, you may want to think about the forces acting on a sailboat. Gravity pulls the boat downwards while buoyancy keeps it afloat. The wind moving around the boat creates differences in air pressure which then create a push-and-pull effect that moves a boat forwards.

If your students have not yet started learning about forces, they can think about how strong the wind would need to be to move a smaller or larger boat.

Do

Your students will build a **sail-powered car** and race them across the classroom to demonstrate how sailing technology can be used for transportation.

Materials:

- Thin card (e.g. cereal box card)
- Ruler
- Pencil
- Tape
- Scissors
- Paper
- Small lump of blue tack
- Wooden skewer
- Large coin (to draw around)
- Straight drinking straw or other long, thin, hollow stick
- A printed copy of the Activity Instructions at the end of this resource (Optional)

Instructions before the activity:

- Start with a class discussion which brings in their prior knowledge. Has anyone seen a sailing boat, or been on one before? Is wind a renewable or non-renewable resource, and why?
- Hand out the materials and activity instructions, and give your class time to build their sail-powered cars.
- Once the cars are all made, line them up at one end of a table or smooth surface. The cars can be raced by blowing through the straw into the sail.
- Once the students have raced their cars, think about how easy or difficult it was to move the car using the students' breath alone. What happened when they had to stop and breathe in?
- Can anyone think of a more consistent source of wind, like a hairdryer or a fan?
- As an optional alternative, can your students apply what they know about sails and build a small sail-boat or waka?

Instructions:

1. Measure and cut two rectangles out of paper, 3 cm wide and 8 cm long.
2. Roll each one into a tight tube around your wooden skewer from the short end, and tape each one into place. These are your bearings
3. Draw around a coin or bottle top on your card four times.
4. Cut each circle out and make a hole in the centre of each with the point of your skewer—these are your wheels.
5. Measure and cut out a square of card with 9 cm long sides.
6. On opposite sides measure and mark at 3cm and 6cm then draw horizontal lines connecting these marks.
7. Use your scissors and ruler to score across these lines then fold across these scores to make a triangle shape. Tape together—this is the chassis or body of your wind-racer.
8. Tape the two bearings spaced apart but in line onto one of the flat faces of your prism.
9. Measure and cut two 5 cm long pieces of skewer. Feed one skewer through each bearing.
10. Place one wheel at the end of each skewer.
11. Use your leftover skewer to make the mast for your sail.
12. Measure and cut a rectangle of paper 7 cm wide and 10 cm long.
This will be the sail.
13. Poke the paper mast through the top and bottom of your paper.
14. Place your chassis wheels down on the table and use scissors to cut a small notch in the top centre.
15. Feed your mast through this notch and secure with a bit of blue tack inside the chassis to secure in place.
16. Blow into the sail to move the car!

Extension activities



Find out more about modern and ancient sailing technologies and the important part that the wind played in helping Pacific voyagers navigate te Moana Nui a Kiwa (The Pacific Ocean)

<https://maatauranga.co.nz/>

Extra resources



Extend your students' knowledge of wind power with these Schoolgen activities:

<https://www.schoolgen.co.nz/for-teachers/resources/measuring-wind-power>

<https://www.schoolgen.co.nz/for-teachers/resources/harnessing-the-power-of-the-wind>

We hope you have enjoyed this educational STEM resource.

School-gen is a Genesis community initiative to get kaiako, tamariki and whānau enthused about STEM.

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