Wind power makes racing a breeze!

This guide will help you create your own wind powered sail car!

Choose how you would like to complete this activity.
Download documents & videos at teachergeek.com/sailcar

You Are Here
- Go Guide
- Optional Labs
  - Balanced Forces
  - Forces & Motion
  - Inertia
- Optional Challenges
  - Crosswind
  - Headwind

Check out our build video and immersive challenge videos by scanning the QR Code or going to teachergeek.com/sailcar
In 2009, Richard Jenkins set the world record of 126.2 mph (202.9 km/h) for a wind-powered land vehicle. His sail car went over twice as fast as the speed of the wind, which was fluctuating between 30 and 50 mph (50 – 80 km/h).
1. Stack two hole plates, then attach them with 25mm (1 in.) screws.

2. Ream the holes between the hole plates.

3. Cut two 11cm (4 in.) dowels to use as axles.

4. Wiggle one side of each axle into a wheel.

5. Put the axles into the reamed holes.

6. Wiggle on two more wheels.

7. Cut two 1cm (3/8 in.) pieces of slide stop.

8. Slide each 2cm (3/4 in.) onto an uncut dowel.

9. Insert dowels into hole plate (slide stop side down).

10. Tape on your sail design.

11. It’s time to design your own racer! This basic frame is good for labs, but you can make much better ones for the challenge! See p. 5 for inspiration.
How far can your sail car go?

Your sail car must go the farthest!
The fan must remain 60cm (2ft.) behind the start line and must be the only power source for your car.

Use a piece of tape to mark your farthest distance!

CONSTRANTS
(rules and limits for your design)

Dimensions: The maximum size your racer can be.

Components: The maximum number of TeacherGeek components that can be used on your racer.

- 4 Wheels
- 2 Hole Plates
- 4 Dowels
- 8cm (3 in) Slide Stop
- 4 Screws

There is no limit on recycling materials.
GO GUIDE

SAIL CAR

VARIABLES

Experiment with your car

Frame
The location of the sail has big effects on the stability and tracking of your racer.

Stability
Does it stay up?

Tracking
Does it go straight?

Inertia
More mass means your racer needs more wind force to move, but also more air resistance to slow down.

Friction
Friction can be your friend (traction) or your enemy (axle sticking). Rubber bands, wax (crayons), and graphite (pencil “lead”) can be used to change friction.

Experiment with your sail

Sail Size
Bigger sails will harness more energy from the fan/wind, but they also create more air resistance.

Sail Angle
Changing the sail angle also allows you to adapt to different wind directions.

Sail Shape
Different shapes interact with the wind in different ways. Each shape has its own strengths and weaknesses.

TIP
When redesigning and testing, change only one variable at a time so you can determine the effect of each change.

The Design Process never ends! There is no perfect design.
**HISTORICAL VESSELS**

**Dhows** have been used for thousands of years as trading vessels along the coasts of Arabia, East Africa, and India, where they are believed to have originated.

**Brigs** were popular among Europeans in the 18th & 19th centuries due to their speed and maneuverability. They were often used by pirates, merchants, and navies.

**Outrigger Canoes** are fast and maneuverable. Developed in the islands of South East Asia, Pacific Islanders used them to settle the islands of Oceana as far as Hawaii.

**The Zephyr Venus Landsailer** was designed by NASA to explore Venus. Its main source of propulsion is its sail, which is covered in solar panels to power the steering systems and scientific equipment. The vessel folds into a protective shell for landing.

SAIL INTO THE FUTURE