Wind power makes racing a breeze!
This guide will help you create your own wind powered sail car!
TEACHERGEEK PARTS

The list includes extra parts so you can experiment and create your own designs.

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<th>NAME</th>
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<td>Wheels SKU 1821-30</td>
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<tr>
<td>Hole Plates SKU 1821-32</td>
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MATERIALS YOU SUPPLY

- Fan
- Tape
- Paper (sail material)
- Recycling Bin Materials

CAN YOU BEAT THE RECORD?

In 2009, Richard Jenkins set the world record of 126.2 mph (202.9 km/h) for a wind-powered land vehicle.

Do you have fewer parts? You may have ordered the basic kit. Download the Basic Go Guide at teachergeek.com/sailcar
GO GUIDE

BUILD A SAIL CAR

1. Stack two hole plates, then attach them with 25mm (1in.) screws.

2. Ream the holes between the hole plates.

3. Cut two 11cm (4in.) 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 (3/8in.) pieces of slide stop.

8. Slide each 2cm (3/4in.) 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!

CONSTRAINTS
(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 Strips
- 9 Dowels
- 8 cm (3 in) Slide Stop
- 5 Blocks
- 4 Screws
- 4 Tire Rubber Bands

There is no limit on recycling materials.
Experiment with your sail

Frame
The dimensions of your frame and the location of the sail have big effects on the stability and tracking of your racer.

Stability
Does it stay up?

Tracking
Does it go straight?

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

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

F = ma

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

Can’t sail into the wind

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.

Tire rubber bands can be added to wheels to give more traction.

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

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

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.

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