

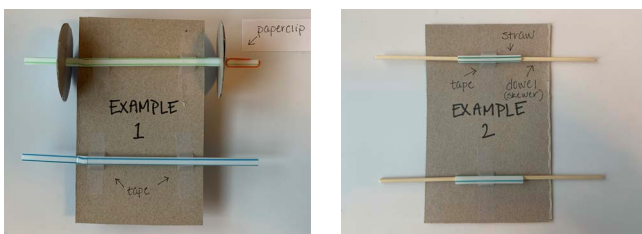


# Everyday Engineering

## Sail Mobiles

### What you need:

- Piece of thin cardboard, about the size of an index card – 4" x 6". (Recycled cereal boxes work well for this.)
- Axles (drinking straws, coffee stirrers, small dowels, lollipop sticks)
- Wheels (spools, bottle caps, cardboard circles, old Lego wheels)
- Tape
- Paper clips
- Scissors
- Sail materials (plastic bag, newspaper, tissue paper)
- Small electric fan



### Things to try:

- With a partner (or alone), make two SailMobiles with different sail designs and race them. Which sail design works the best? Or, use the same sail design, but try different designs for the body of your car. Does the size of your wheels effect how your SailMobile travels? What changes can you make to your design?

### What you do:

1. Clear a workspace on a flat surface like a dining room table or floor.
2. On another flat surface, create a test track by setting up the fan and a finish line about 2 - 3 feet from the fan.
3. Build a car body using the cardboard as the base. The materials you use will determine how you secure your wheels and axles, but tape and paper clips are two materials that work well. Test your car body to make sure it rolls smoothly.

*Hint: Figuring out how to attach your wheels and axles will be an engineering challenge too! In Example 1, the axles are taped directly to the base. In this case, the wheels should be secure enough on the axles that they don't wobble or fall off, but still spin freely. If your wheels fit so snugly on your axles that they don't spin freely, try Example 2 where the axles are able to spin.*

4. Now, design a sail for your car! The sail will harness wind from the fan to power your car. Take a few minutes to plan a design for your sail. How will your sail "collect" the wind? What material will make the best sail? How will you attach your sail to your boat? Hint: leftover axle materials make good masts.
5. Once you have planned your design, build your sail.
6. Try your new SailMobile on the test track. Turn on the fan and watch it go! Did your SailMobile make it to the finish line? If not, keep brainstorming, designing and testing new sails!