

ACTIVITY 3: ENGINEER A SAIL CART

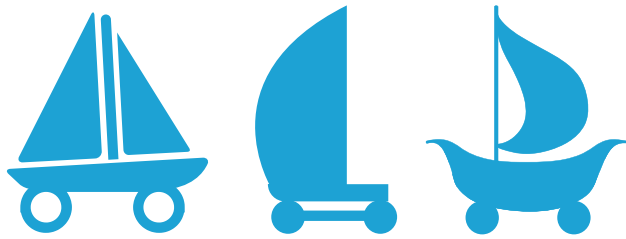


Image Credit: Gary Abud, Jr.

The purpose of this experiment is for students to build a wind-powered cart that utilizes a sail so that it can be moved by the air.

Context:

This is an engineering challenge that can be done outside of class individually by students or with one partner. Alternatively, you can provide time during class—and supply the necessary materials or have students bring in their own—to design and build the carts. A variety of household materials can be used or students can research and select the materials they use.

Guidelines: All sail carts* must have at least:

1. a body
2. at least 1 sail
3. 2 axles
4. 4 round wheels

Suggested Materials: Possible materials to consider might include, but aren't limited to:

- DVDs, bottle caps, jar lids, cardboard circles
 - for wheels
- Wooden dowels, straws, chopsticks, pencils, masking tape, or rubber bands
 - for axles
- Cardboard, construction paper, paper towel or toilet paper tubes
 - for the body of the sail cart
- Aluminum foil, paper plate, notebook paper, paper towel, felt, or facial tissue
 - for the sail

**Sail carts may have additional features as students determine that the design calls for. They may be decorated in any fashion.*

Testing and Racing Notes:

You will need to provide a source of wind, e.g., a box fan, that students can use to test their sail carts. Allow them time to test their sail carts individually and make improvements to their design before holding the sail cart race.

Project Steps:

First, communicate the project, with its guidelines** and your given timeline, to students. Emphasize that the objective is not as much to create the best looking sail cart but one that is fully functional.

Then, allow students time to research materials in, or outside of, class and design the sail carts.

Next, have students test their designs and make adjustments or improvements.

Last, hold a sail cart race*** where heats of 2-3 sail carts at a time line up next to one another in front of the wind source (e.g., box fan) and you see which sail cart travels the farthest before stopping after the fan is turned on. Students should measure and record the distance their sail cart travels.

***Note: teachers can evaluate these sail cart projects and their functionality according to a criteria that best suits the format of their learning setting.*

****You can allow students to race in a single heat or compete in tournament style according to a bracket where the winner moves on to race other winners in subsequent rounds until one champion is determined.*



Image Credit: Great Lakes Now