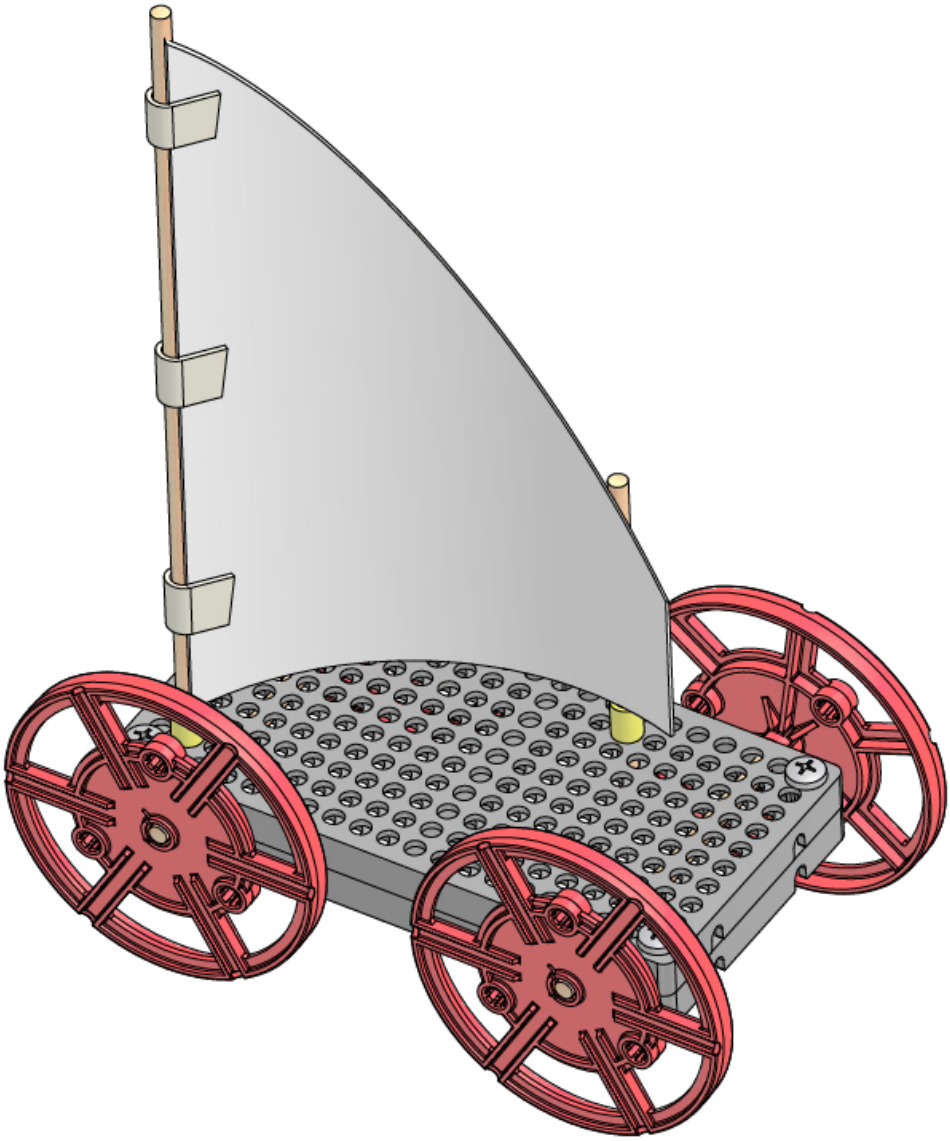
Sail Car Build Guide & Labs

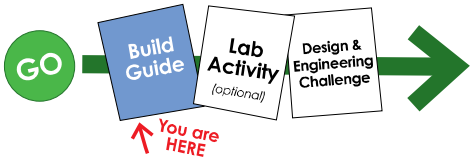
TeacherGeek LS



Harness the power of the wind to make a car go. This Build Guide and Lab activities will help you create your own Sail Car.

LEARN stuff LS

This is the LS (learn stuff) Build Guide. To do this activity "just for fun" download the JFF documents located here.



This packet includes the Build Guide and the Labs. To download the Challenge documents, click here.

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Sail Car Build Guide

TeacherGeek LS

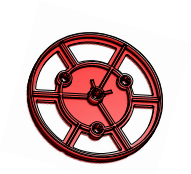
This guide will take you through the simple process of creating a Sail Car body. After the body is finished, take your car into the Labs. It will be your job to add a sail and make it go.

It is recommended that this step is done by an adult, but it is possible for children to complete this step with the adult assistance/supervision.

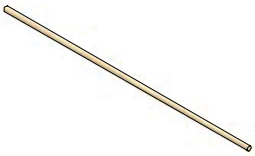
TeacherGeek Components

For One Sail Car

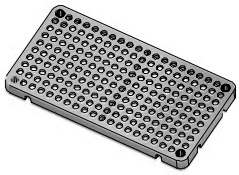
Here are the TeacherGeek components you'll need to make each Sail Car.



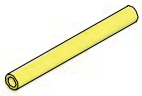
4 Wheels



3 Dowels



2 Hole Plates



Slide Stop
(enough to cut two 1cm (3/8in) sections)

4 Screws
(1in #10 Screws)

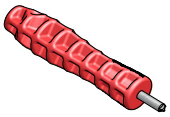
TeacherGeek Tools You'll Need

Easy to Share in Groups

These are the tools you will need for the Sail Car Body Build.
You will not need them for the Labs or Engineering Challenges. These tools are part of the TeacherGeek Maker Cart, or available here.

Multi-Cutter

Or anything else that can cut dowels & slide stop



Reamer

Phillips Screwdriver

Hammer (optional)

Caution: Tools are to be used by ages 13+, or with close adult supervision.

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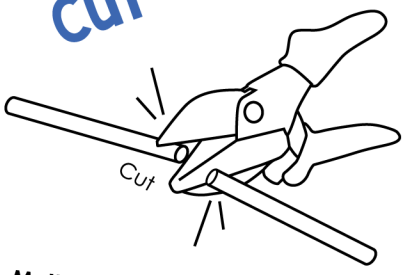
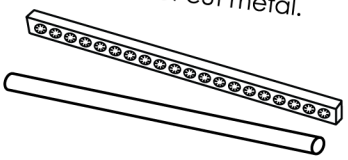
TeacherGeek Build Guide

What do you need to know
to make something out of TeacherGeek?

Cut

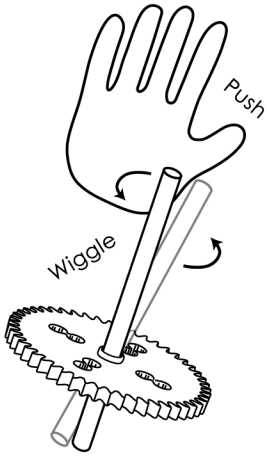


Multi-Cutters cut wood & plastic (like **dowels** and **connector strips**). They do not cut metal.

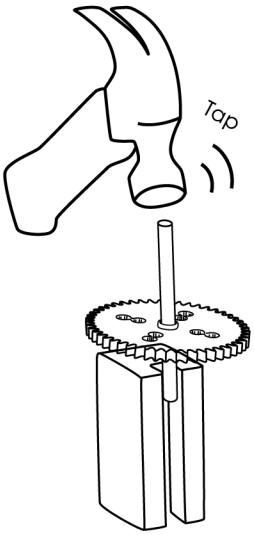


Push, Wiggle,

Push, wiggle or tap **dowels** into holes.



Tap



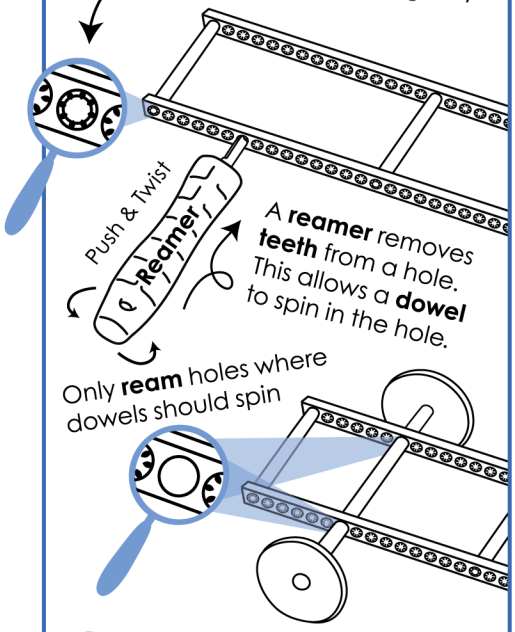
Use a **hammer** and **slider block** to tap **dowels** farther thru holes.

Quick Tip!

Use a crayon, or soap on the end of a Dowel to make building easier.

Ream

Most parts have holes with **teeth**. The **teeth** hold **dowels** (keep dowels from falling out).



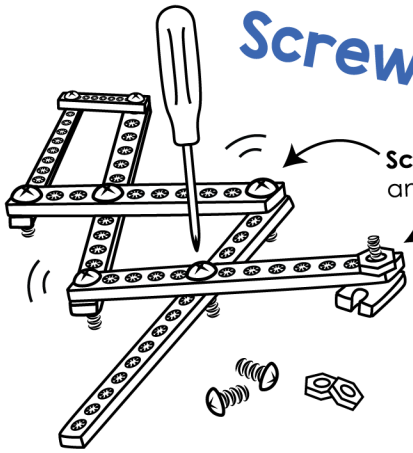
A **reamer** removes **teeth** from a hole. This allows a **dowel** to spin in the hole.

Only **ream** holes where dowels should spin

Never **ream pulleys**, **gears**, **wheels**, or any hole a **dowel** stays stuck into.

Screws & Nuts

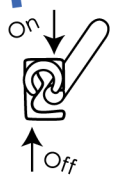
Do not **ream** holes you will put **screws** into.



Screws (without nuts) can connect parts, and allow them to rotate.

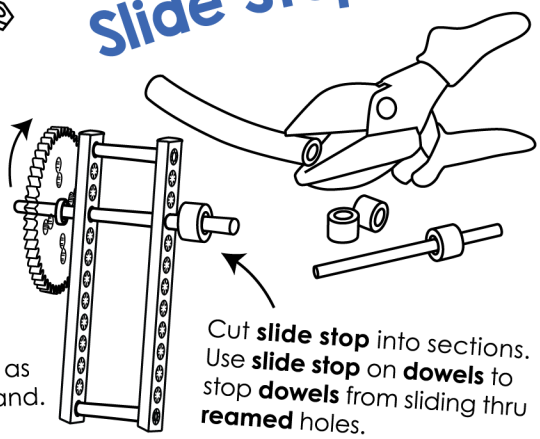
Screws (with a nut) can connect parts, and keep them from rotating.

Stop Clip



Press a **stop clip** onto a **dowel** to keep it from sliding or use it as a hook for a string / rubber band. It takes little force to get it on.

Slide Stop



Cut **slide stop** into sections. Use **slide stop** on **dowels** to stop **dowels** from sliding thru **reamed** holes.

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Sail Car Build Guide

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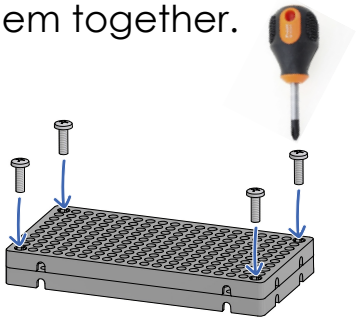
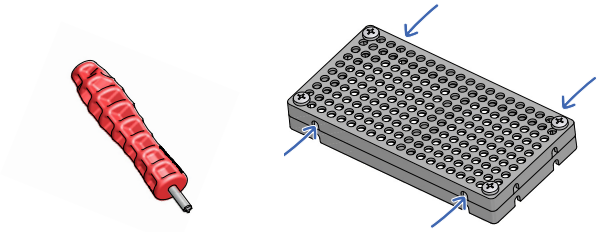
Build the Body

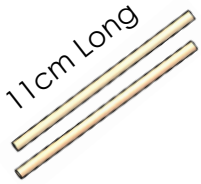
1. Stack two **hole plates** on top of each other. Use four **screws** to attach them together.



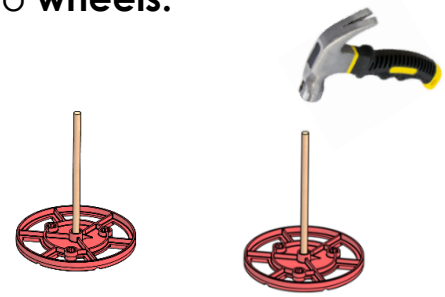
2. **Ream** the 4 holes that were created by attaching the two **hole plates**.



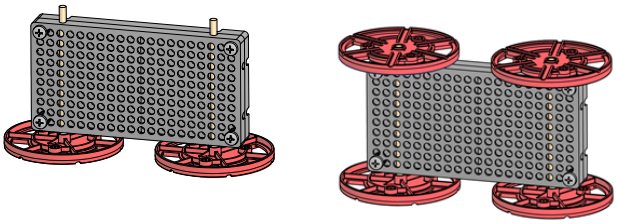
3. **Cut** two 11cm (4.25in) sections from one **dowel**. These will be your wheel axles.



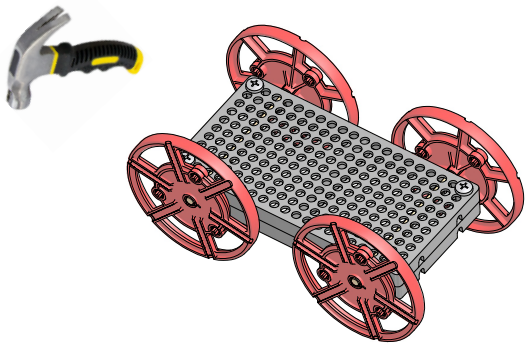
4. Push or tap the **dowels** from Step #3 into **wheels.**



5. Place the **wheels** with **dowels** from Step #4 into the reamed **hole plate** holes. Then push or tap on two more **wheels**.



6. **You're done!** Make sure the **wheels** spin easily. If not, try taking the **wheels** off and reaming the **hole plate** holes more.



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Sail Car Build Guide

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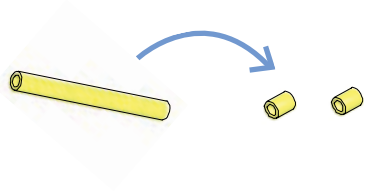
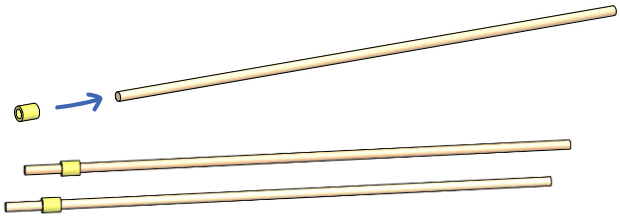
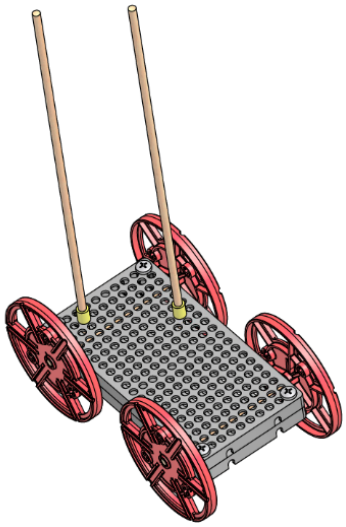
1. Cut two 1cm (3/8in) sections of **slide stop**.

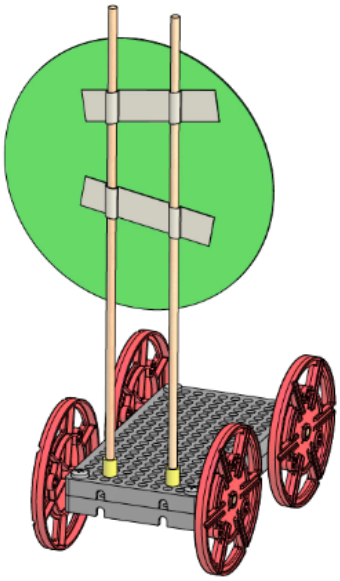


2. Place each **slide stop** section approximately 2cm (3/4in) onto an uncut **dowel**.



3. Place the masts into the Sail Car body. The masts will be used to attach the sails.



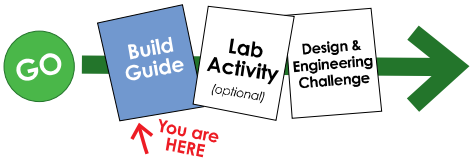


Up Next

It's time to make your Sail Car go.

Move on to the force and motion Labs on the next pages.

After you've finished, download the Design & Engineering Challenge documents located here and take your Sail Car even further.



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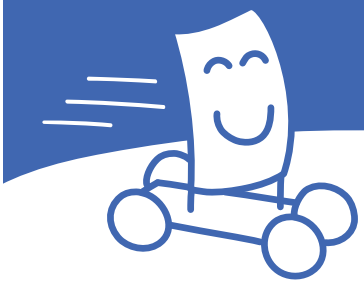

Sail Car Push-Pull Lab

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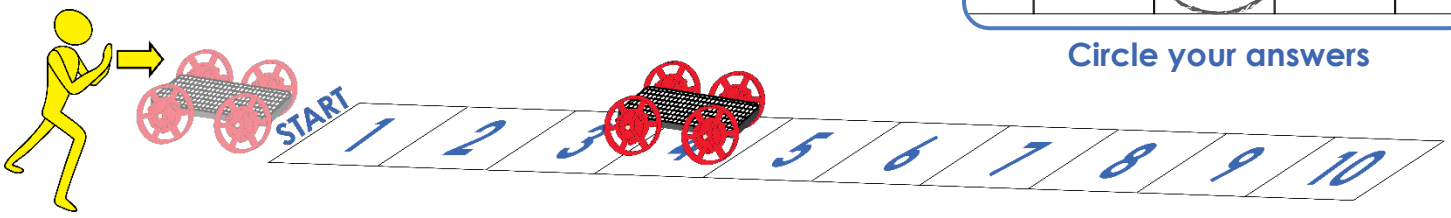
Name: _____

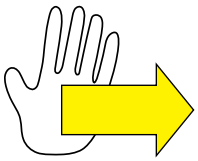
2	3	4	5	6

Circle your answers



Predict: Circle how far you *think* it will go?

1	2	3	4	5	6	7	8	9	10



Light Push

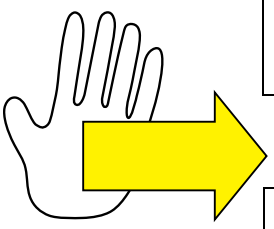
Test: Circle how far it goes?

1	2	3	4	5	6	7	8	9	10

?

Predict: Circle how far you *think* it will go?

1	2	3	4	5	6	7	8	9	10



Medium Push

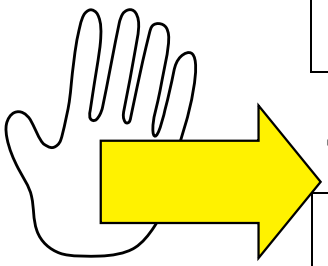
Test: How far did it go?

1	2	3	4	5	6	7	8	9	10

?

Predict: Circle how far you *think* it will go?

1	2	3	4	5	6	7	8	9	10



Strong Push

Test: How far did it go?

1	2	3	4	5	6	7	8	9	10

?

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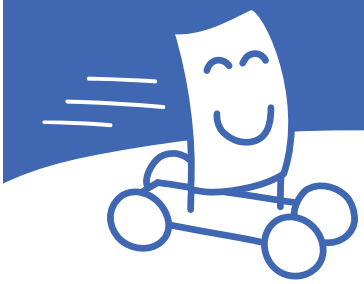
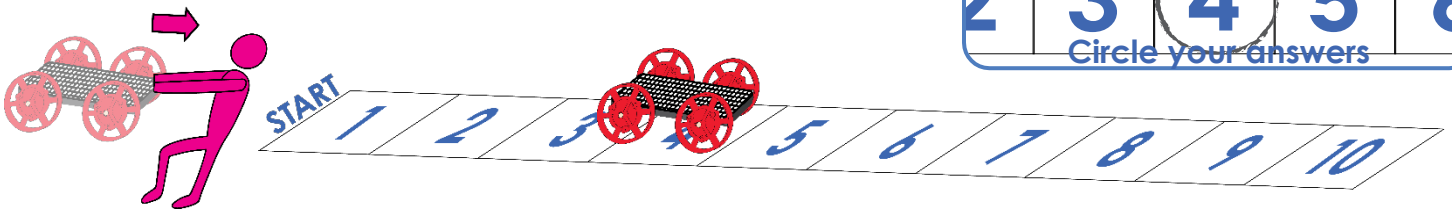


Sail Car Push-Pull Lab

Name: _____

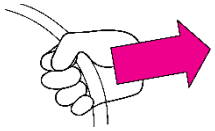
2	3	4	5	6

Circle your answers



Predict: Circle how far you *think* it will go?

1	2	3	4	5	6	7	8	9	10



Light Pull

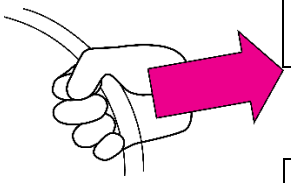
Test: Circle how far it goes?

1	2	3	4	5	6	7	8	9	10

?

Predict: Circle how far you *think* it will go?

1	2	3	4	5	6	7	8	9	10



Medium Pull

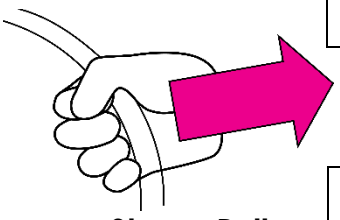
Test: How far did it go?

1	2	3	4	5	6	7	8	9	10

?

Predict: Circle how far you *think* it will go?

1	2	3	4	5	6	7	8	9	10



Strong Pull

Test: How far did it go?

1	2	3	4	5	6	7	8	9	10

?

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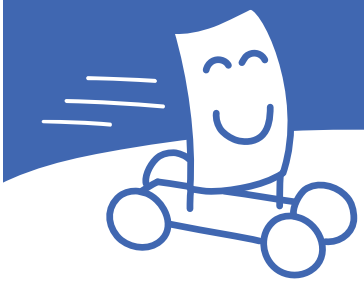

Sail Car Wind Lab

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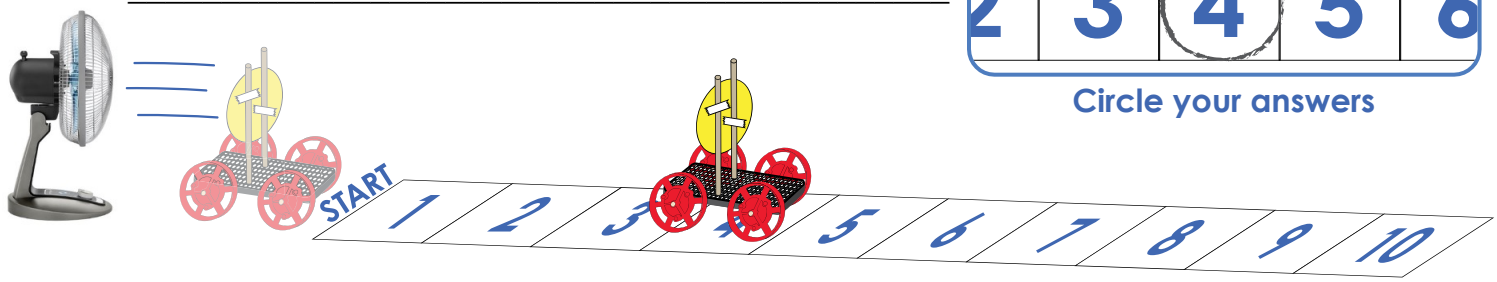
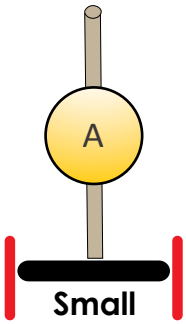
Name: _____

2	3	4	5	6

Circle your answers



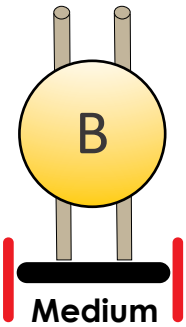


Predict: Circle how far you *think* it will go?

1	2	3	4	5	6	7	8	9	10

Test: Circle how far it goes?

1	2	3	4	5	6	7	8	9	10

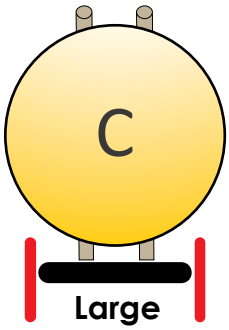


Predict: Circle how far you *think* it will go?

1	2	3	4	5	6	7	8	9	10

Test: How far did it go?

1	2	3	4	5	6	7	8	9	10



Predict: Circle how far you *think* it will go?

1	2	3	4	5	6	7	8	9	10

Test: How far did it go?

1	2	3	4	5	6	7	8	9	10

Name: _____

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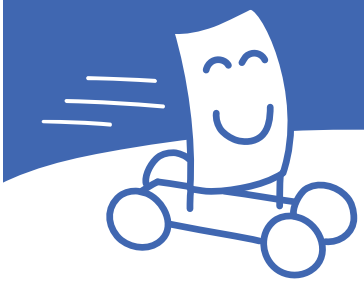
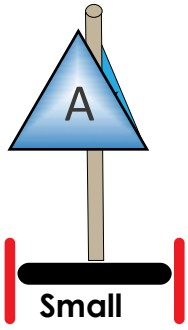


Sail Car Wind Lab

TeacherGeek

_____

Circle your answers

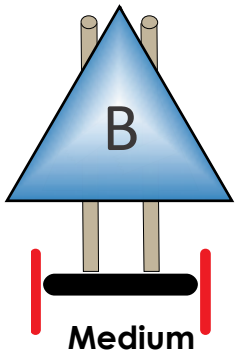


Predict: Circle how far you *think* it will go?

1	2	3	4	5	6	7	8	9	10

Test: Circle how far it goes?

1	2	3	4	5	6	7	8	9	10

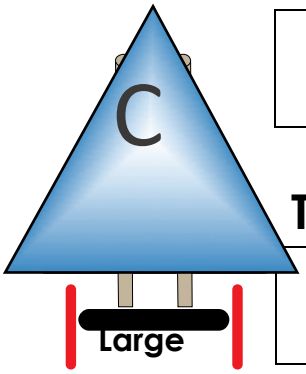


Predict: Circle how far you *think* it will go?

1	2	3	4	5	6	7	8	9	10

Test: How far did it go?

1	2	3	4	5	6	7	8	9	10



Predict: Circle how far you *think* it will go?

1	2	3	4	5	6	7	8	9	10

Test: How far did it go?

1	2	3	4	5	6	7	8	9	10

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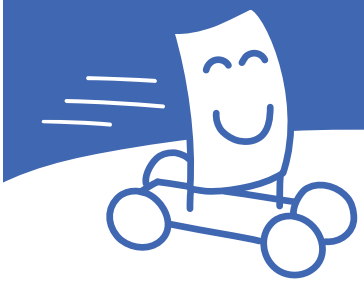
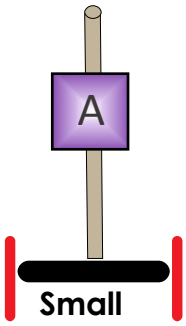


Sail Car Wind Lab

Name: _____

2	3	4	5	6

Circle your answers



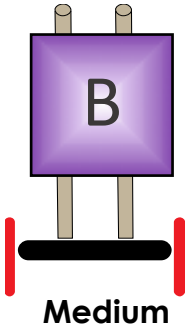
Predict: Circle how far you *think* it will go?

1	2	3	4	5	6	7	8	9	10

Test: Circle how far it goes?

1	2	3	4	5	6	7	8	9	10

?



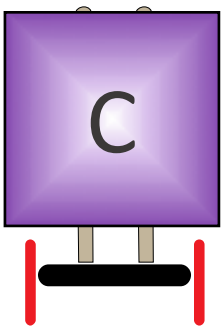
Predict: Circle how far you *think* it will go?

1	2	3	4	5	6	7	8	9	10

Test: How far did it go?

1	2	3	4	5	6	7	8	9	10

?



Predict: Circle how far you *think* it will go?

1	2	3	4	5	6	7	8	9	10

Test: How far did it go?

1	2	3	4	5	6	7	8	9	10

?

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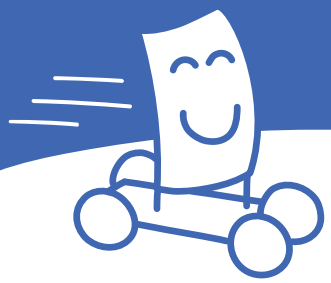
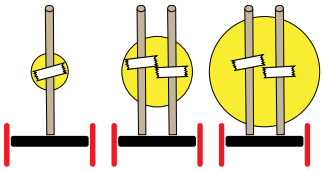


Sail Car Wind Lab

Cut the following sail shapes from cardstock, cardboard or stiff paper. The shapes can be re-used between sail car groups.



A

Small Circle Sail

B

Medium Circle Sail

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C

Large Circle Sail

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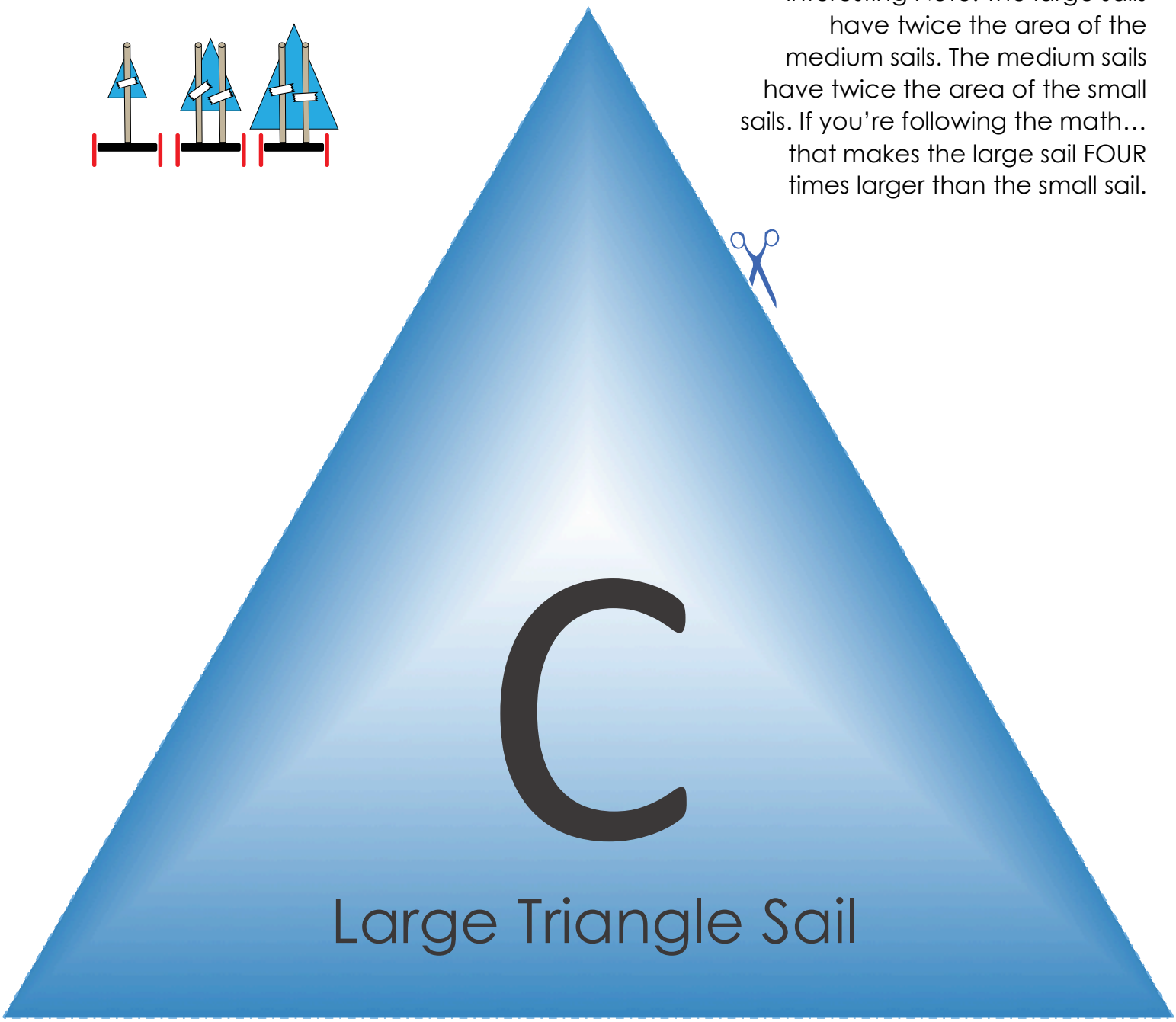
Sail Car Wind Lab

Interesting Note: The large sails have twice the area of the medium sails. The medium sails have twice the area of the small sails. If you're following the math… that makes the large sail FOUR times larger than the small sail.



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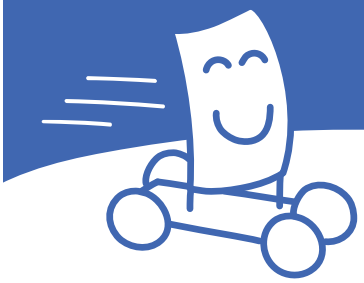
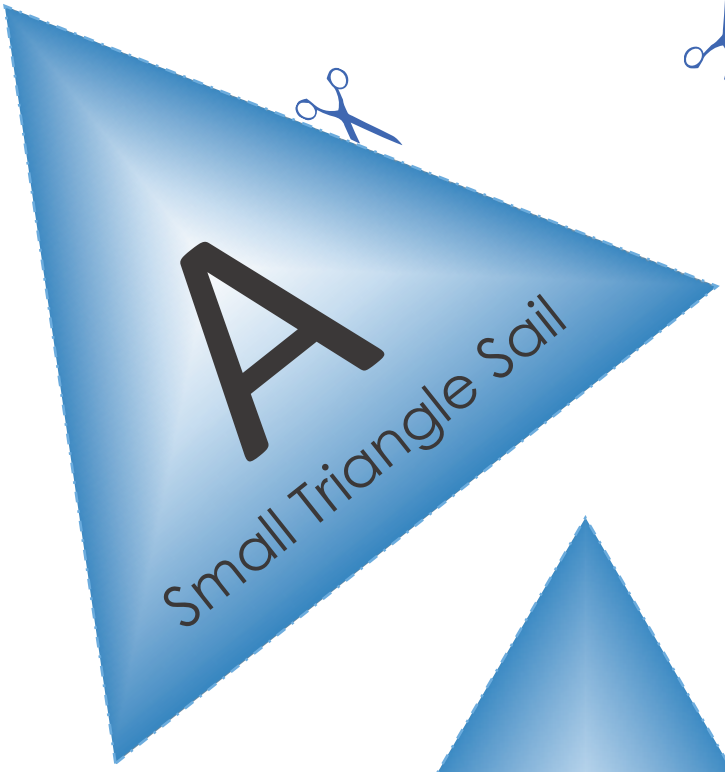
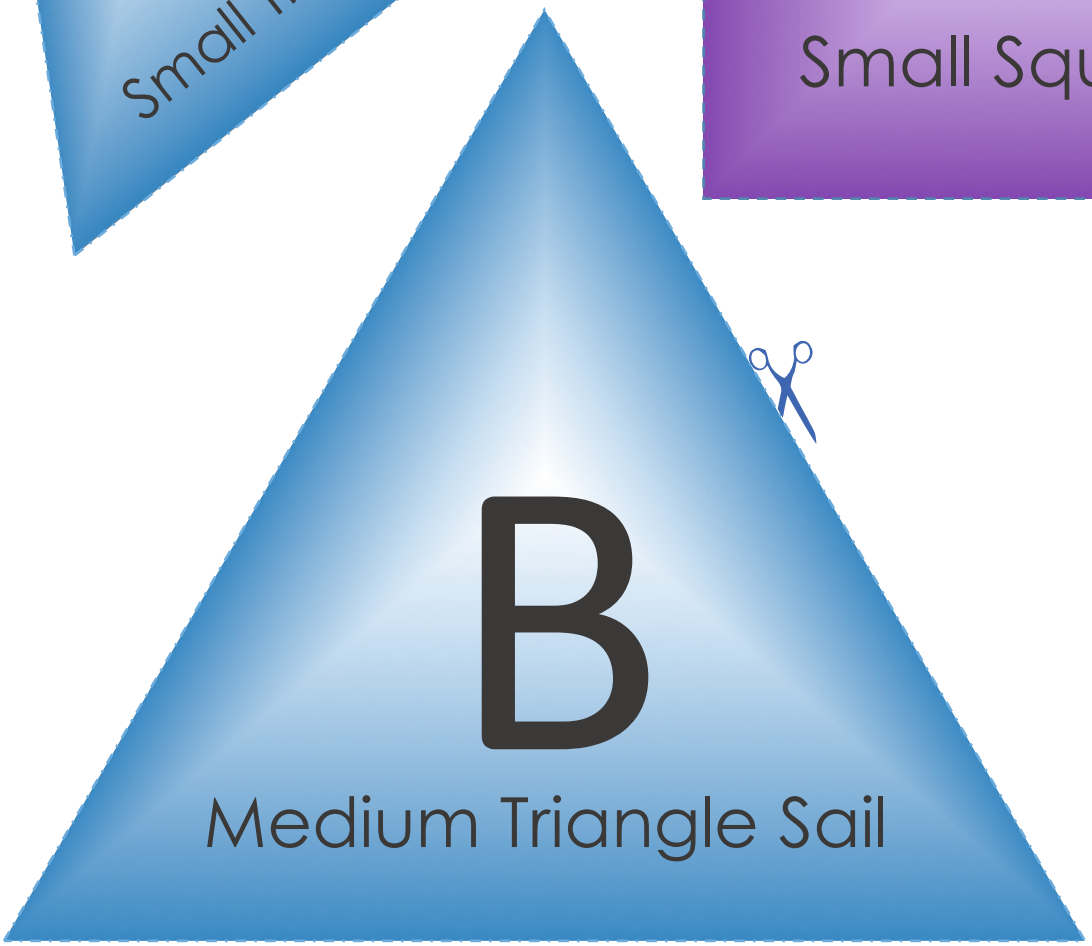


Sail Car Wind Lab





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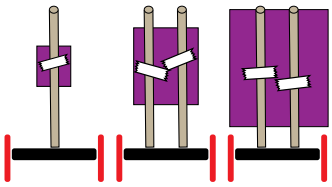

B

Medium Square Sail

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C

Large Square Sail

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