

Date: \_\_\_\_\_

Name: \_\_\_\_\_

## Tin Foil Canoe Challenge

This activity was created by Katy.

Have you ever paddled a canoe? Canoes made from birch bark used to be the main source of water transportation for Indigenous peoples. Birch bark canoes were made across the continent and are still made today!

For this challenge we will combine engineering and coding to design a small-scale canoe. Instead of using birch bark, we will use tin foil as our only building material. The challenge is to use the following supplies to design, build, and test a tin foil canoe that can float under the pressure of 1500 Newtons of force. You will get this force from one of the three options below:

### MATERIALS

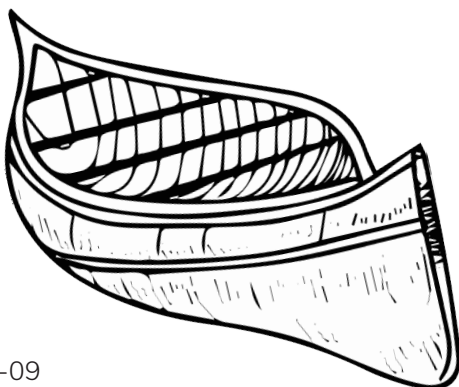
- 15x15 cm square of tin foil (one piece per canoe)
- 1 container of water

### FORCE OPTIONS

- 1 hockey puck = 1500 Newtons of force
- 3 golf balls = 1500 Newtons of force
- 30 marbles = 1500 Newtons of force

- 1 Design and construct your tin foil canoe using only a 15x15 square of tin foil. You can design your canoe on a separate sheet of paper before starting construction.
- 2 Build the canoe you have designed!
- 3 Measure your canoe, and fill in the values for the canoe variables on the next page.
- 4 Float your canoe in a container of water, and test it with a force of 1500 Newtons: add the hockey puck, golf balls, or marbles, and time the test to see whether your canoe can handle the force for at least 10 seconds without sinking.
- 5 Record your results for your first design by circling either 'Yes' or 'No' on the next page. If you answered 'Yes' for all the questions, then your design was successful! If you answered 'No' to any of the questions, repeat these steps until you create a successful design.

Note: When recording your variables, please use the largest measurement for each canoe dimension. For example, if your design is wider in the middle, measure the largest width and record that number as your variable. Record all variables in centimeters (cm).



Date: \_\_\_\_\_

Name: \_\_\_\_\_

### CANOE #1

#### RESULTS:

Did the canoe float on the water?

Yes No

Could the canoe support the 1500 Newton force?

Yes No

Was the canoe still afloat after 10 seconds?

Yes No

#### VARIABLES:

Length =

Width =

Height =

SurfaceArea  
(Length\*Width) =

Force = 1500 Newtons

### CANOE #2

#### RESULTS:

Did the canoe float on the water?

Yes No

Could the canoe support the 1500 Newton force?

Yes No

Was the canoe still afloat after 10 seconds?

Yes No

#### VARIABLES:

Length =

Width =

Height =

SurfaceArea  
(Length\*Width) =

Force = 1500 Newtons

### CANOE #3

#### RESULTS:

Did the canoe float on the water?

Yes No

Could the canoe support the 1500 Newton force?

Yes No

Was the canoe still afloat after 10 seconds?

Yes No

#### VARIABLES:

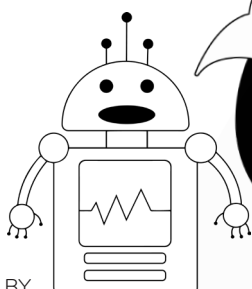
Length =

Width =

Height =

SurfaceArea  
(Length\*Width) =

Force = 1500 Newtons



Hi, I am Esiw the robot, and I know all about **variables**! A variable is something that can change. In coding, we use variables to store information. It's like a category for storing specific details about something. Like canoe dimensions! Length, Width, Height, etc. are all variables, which will have specific values depending on the canoe.