

Build-A-Boat Challenge

Introduction

People have been building [boats](#) for a VERY long time. It's believed that boats were even used in prehistoric times. In fact, the oldest boat that has ever been found, the [Pesse canoe](#), is believed to be about 10,000 years old.

Boats have been built out of many different materials with some of the oldest being [dug out logs](#). Other materials include [reeds](#), planks of wood, animal skins, resin, fiberglass, aluminum and steel. The challenge with building boats is always to get the strongest structure that will float on water with the least weight possible. Your challenge will be simpler. Build a boat out of a piece of aluminum foil

Materials/ Preparations

- Gather about 1 to 1.5 cups of small heavy objects. Look for things like: coins, nuts, bolts, washers, small stones, marbles, broken cement pieces, or anything dense that won't be hurt by water.
- Get a bucket, basin, or large bowl that is at least 10 inches in [diameter](#) (the distance across).
** You may also use a sink with the drain plugged.*
- Tear off a few (3 to 5) sheets of aluminum foil and cut each sheet into an 8-inch by 8-inch square.
- Fill the bucket (or other water container) with 3 to 4 inches of water.

The Challenge

STEP ONE: Inventing

- Think about different ways you can use the aluminum foil to make something that will float and hold the heavy objects.
- Write notes and sketch out things you think of, so you don't forget any of your ideas.
- Try to decide which idea is easiest to build and which idea is most likely to work.
- See if you can come up with a solution that uses the best features of all of your best ideas.
** Do research on boat design and aluminum foil projects to see if you can learn things that will help!*

STEP TWO: Making

A.) Start folding! Using ONLY ONE SHEET of aluminum foil, make your boat.

- You may fold the foil into any shape you want.
- You may cut the foil into smaller pieces if you'd like.
- Your goal is to make your boat float with as many of the small objects as you can without sinking.

B.) Once you have a boat, Test it!

- Place your boat into the water.
- Add small objects carefully.
- Keep adding objects until it sinks!

Build-A-Boat Challenge

C.) Pull your boat out and try again.

- See if you can get more in your boat by changing the way you add the objects.
- Think of ways you can improve your design then make a new boat. Go back and test it as in STEP TWO.
- Think of ways you could improve the design if you could use other materials in addition to the 1 sheet of foil. Try out your ideas and make notes of the results.

STEP THREE: Storytelling

If you have access to a digital camera, take pictures of your models.

- Take a picture of your best success using only aluminum foil with it holding its heaviest load.
- Take a picture of any improved versions you made using additional materials.

**Another option: If you are able, record a video of your boat floating with it's heaviest load.*

- Talk about your earliest ideas, what worked and what didn't.
- Talk about what inspired your current design.
- Talk about what you would like to try if you continued this challenge in the future.

Send your pictures and/or videos to your teacher along with the answer to the following questions:

1. What things did you try during this challenge that worked?
2. What things did you try that did not work?
3. How would you improve your design if you could build the boat out anything you wanted, and why?

Lessons Learned

It's fun to try to build things and see how well they work, but there's a lot more to the Build-A-Boat Challenge than just having fun with aluminum foil. Students are introduced to a challenge and must think critically about how to solve it. They use their creativity and their problem solving skills to brainstorm ideas and build models. Students are then instructed to test their ideas and make notes of the results. Again, they must think critically about their observations and what those observations mean for their designs.

By repeatedly testing and improving their models, students are taught the value of learning from failure. By observing how their boats eventually sink, students learn about principles of physics and engineering. Finally, by recording their experiences and answering questions about them, students get valuable practice communicating their observations, experiences, thoughts, and ideas.