Build-A-Boat Challenge

A Boat Full of Hope

You are with Jesse, Walt, and Mike in the Inventionland forest when you come across a rare kind of metal. Walt wants to take all of it home to use for an invention. As you're walking home, much to Walt's dismay, you get lost! You find a river in the middle of the forest when Mike, the geography wiz, remembers that the river current floats in the direction of the town. Build a boat for the boys so that they can make it home! Make sure the boat can carry as much of Walt's metal as possible!

Introduction

Boats have been built out of lots of different materials. Some are as simple as being dug out logs. Many others have been made of reeds, planks of wood, or steel. Your challenge is to build a boat out of a piece of aluminum foil, then see how much your boat can carry.

Materials/ Preparations

**** Make sure to get a parent or guardian's permission before you start!***

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

The Challenge

STEP ONE: Inventing

- Sketch out ideas on how to make a boat that can float and hold your heavy objects.
- Come up with as many ideas as you can and try the simplest idea first.
  ** Do research on boat design and aluminum foil projects to see if you can learn things that will help!*

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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.
- Your goal is to make a boat that floats with as many objects in it as possible without sinking.

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

- Place your boat into the water.
- Add small objects carefully. **(Only add one at a time!)**
- Keep adding objects until it sinks!

C.) Pull your boat out and try again.

- See if you can get more in your boat by changing how you add the objects.
- Think of ways you can improve your design then make a new boat.
- Go back and test it as you did in STEP TWO.

STEP THREE: Storytelling

Option A: Take pictures of your models.

- Take a picture of your best boat floating while holding its heaviest load.
- Take pictures of other boats you tried along the way.

Option B: If you are able to, record a video of your boat floating with it's heaviest load.

- Talk about your earliest ideas. What worked? What didn't?
- Was there anything that inspired you? (Other things you've seen that gave you ideas) Talk about it.

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.