

Grade Level: 4 - 5

Curriculum: Explorations, ADST

Title of Lesson: What Floats your Boat?

Learning Goals/Objectives:

- Designs can be improved with prototyping and testing.
- The choice of technology and tools depends on the task.

Materials Needed:

- Cardboard
- Pencil and paper
- Hot Glue Gun, Tape, or other adhesive
- Aluminum Foil
- Heavy objects for weights
- Tub of water, or similar
- Scissors
- Ruler

Activity Instructions: (Step by Step)

- Watch this video: https://www.youtube.com/watch?v=H_scnWnN1Fg
- What kind of boats have you seen before? Name as many kinds of boats as you can. What does each one do?
 - The job that each boat is designed to do changes how they look! A canoe does not look the same as a barge!
 - Look closely at this picture at the boats you were able to think of and carefully look at how big they are, and what shape they are:
 - <https://www.alansfactoryoutlet.com/hubfs/53-types-of-boats-ships-illustrated-to-scale-3.jpg>
- Your challenge is to create a boat that will carry the most weight, for as long as possible.
 - Begin by making some observations about the boats you have seen before, and ones you saw in the picture. What do you think your boat should look like to be successful at your task?
 - Draw a few ideas for how your boat might look. Remember, try to make each idea different from the last! The more ideas you have, the more chances you have to succeed!
 - Once you have drawn a few ideas, pick one to try to make. Use aluminum foil to shape the hull, or bottom of the boat
 - Test your design by filling your sink, tub, bucket or container with enough water for the boat to float without touching the bottom. Carefully put your boat into the water and watch what happens. Make some

observations; Does your boat float or sink? Does it lean to one side or the other? Does it sit low or high in the water?

- Once you have written down your observations, slowly add some weight to it. Make observations about how the boat acts when you add weight to it!
 - Continue to add weight until the boat sinks. Does the boat tip over? Did it bend, or fold in half?
 - Think about your boat's design. What would you do differently if you were to make your boat again? Could you use another idea, or maybe use your observations to improve your design?
 - Try out some of your ideas on a new boat. Does your new boat hold more, or less weight?
- Once you are happy with your prototype boat, try making it from cardboard.
 - Cardboard will begin to lose its strength if it gets wet. Can you think of any ways to make it more waterproof? (ie colour it with waxy crayons, put scotch or packing tape on it, paint it, wrap with waxed paper, etc)
 - How much weight did your boat hold? How long did it float for?