# Aluminum Foil Boats

Exercise your engineering muscles while designing boats to carry the most cargo.

## Materials

- Aluminum foil
- Tape
- Approx. 50 pennies
- Container of water big enough to float you boat

## Introduction/The science

We know from experience that if you drop a metal ball into a bucket it will sink to the bottom. We also know that giant boats are made of metal and can float. How is that possible?

The shape of the boat is what's most important. A boat floats because it is full of air. As cargo is added the boat becomes heavier. If too much cargo or weight is added, the boat becomes too heavy and starts to sink. The solution is to throw cargo overboard or abandon ship.

## The Activity: Design and build a boat

**Step 1: Build the boats**

Use the aluminum foil and tape to construct at least 3 different boat hulls. Try different sizes, different shapes, and different amounts of aluminum foil.

Make sure the boats are not too large for your water container.

Finishing touches:

- Make sure there are no leaks
- Make sure your boats can hold their shape
- Flatten the bottoms of the boats
- Try to make each boat's sides the same height all the way around, you don't want a low point.

**Step 2: Test the boats**

Before you start adding pennies, you are going to make an estimate (educated guess) on how many pennies your boats can carry. Label each boat with a letter, number, or any way you want then write them on a piece of paper. Write your guesses down for each boat.
Now start adding pennies one at a time in your first boat, make sure to keep count. How many did you add before it sank? Take note of it, was it close to your estimate? Now do the same with your other boats.

**Step 3: Evaluate and redesign**

Think about what boat carried the most pennies, why was it successful? Is there anything you can do to help your boat carry even more cargo? Try it out!

## Wrap up

- What went really well in your design?
- What was the hardest part of the design process?
- What surprised you about your designs?