



Engineering Virtual Learning

HS Intro to Engineering Design Lesson #16

April 27, 2020



Objective/Learning Target:

Students will design and create a boat out of aluminum foil and test it for bounciness.
(project day 1 of 2)

Bell-Work:

Suppose you are doing the dishes and you drop a small pan in the sink.
Do you think it will sink or float?

If metal sinks, then how can ships made of metal like aircraft carriers
and cruise ships float and hold tons of weight?

Sketch some of these boat designs in your engineers notebook:
Canoe, River Barge, Aircraft Carrier, Fishing Boat

Which one do you think you could fashion out of Aluminum Foil?
Draw a “plan” for your design.

Learning Practice: “Aluminum Boat Activity”

Materials and Supplies:

- Small bucket, large bowl, or sink. Fill to about 4 inches from the top with water (do not overflow)
- 40 coins of the same weight (pennies work best)
- Scissors
- Aluminum foil. Cut into four 6-inch squares.
- Ruler

Procedure: Record in your engineers notebook as you conduct this experiment.

Title the page “Aluminum Boat, Will it Float?”

1. Measure with the ruler and cut out four 6-inch aluminum foil squares.
2. Wrap one of the squares around 10 coins and squeeze the foil tight into a ball.
3. Place the foil ball (wrapped coins) gently on the surface of the water and let go.

Did you expect this foil penny ball to float? (record your answer in your engineers notebook)

4. Take the second foil square and fold the four edges up to make a small boat (your design)

Make sure you seal each corner tightly so water cannot leak into the sides or corners.

5. Set the boat gently on the surface of the water and start placing pennies in the boat (gently)
6. Fill with pennies till the boat sinks. Record how many pennies fit into the boat.
7. Answer the questions on the next page

Parent Resource:(go here to watch this activity in action) <https://www.youtube.com/watch?v=q7R7JYAdYIY>

Check for Understanding:

After watching these videos: <https://www.youtube.com/watch?v=nMIXU97E-uQ> ,
<https://www.youtube.com/watch?v=bIALCGm1cLU>

Consider the following questions as you write 2 paragraphs Comparing and Contrasting between the foil ball and the foil boat.

- Why did the 10 penny ball sink immediately?
- How can your light boat hold so much weight?
- What happens when it springs a leak?
- What does the word displacement mean?
- What does the word buoyancy mean?
- Does the size of the boat matter?

How could you have made your design more buoyant?

Test your answer with the 2 remaining pieces of aluminum foil.

Learning Resource Links:

Aluminum Foil Boat Design–

<https://www.youtube.com/watch?v=pK-iPwtW4W8> (boat design)

<https://www.youtube.com/watch?v=DsFiup7MT4w> (boat design)

<https://www.youtube.com/watch?v=q7R7JYAdYIY> (parent resource)