



Engineering Virtual Learning

HS Intro to Engineering Design Lesson #17

April 28, 2020



Objective/Learning Target:

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

Bell-work:

Watch this video about college students testing Concrete Canoes

<https://www.youtube.com/watch?v=WqgTk4gZ0Lc>

How did this competition differ from what you imagine a typical college class to be?

Complete this sentence from 3:35 – 4:00 minutes “get involved if you can, because if you don’t you are going to _____ it later for missing the opportunity.”

(Other Concrete Canoe videos in Resources- Watch Missouri State University!!
You could be one of those students!!)

Learning Practice: “Cardboard Boat Activity”

Yesterday you designed a metal boat, Today you design a cardboard boat & test for buoyancy.
If a canoe made out of concrete can float, surely a boat made out of cardboard can float?

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)
- Cardboard: Cereal box is easier to cut, but not as “buoyant”
- Ruler, Scissors, Tape, Hot Glue (other construction materials from around your house)

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

Continue in the “Aluminum Boat, Will it Float?” activity page

1. Design a boat using 1 piece of cardboard. Boat should be no larger than 3” x 3” base foot print.
2. Use tape or hot glue to create water tight corners (did you use the canoe design or flat barge?)
3. Set the boat gently on the surface of the water and start placing pennies in the boat (gently)
4. Fill with pennies till the boat sinks. If pennies are too light use something a little heavier.
7. Answer the question on the next page

Check for Understanding:

Consider the following questions as you write 2 paragraphs Comparing and Contrasting between yesterdays Aluminum Foil boat and today's Cardboard boat.

- Why did the pennies sink the aluminum foil boat quicker than cardboard?
- Why is cardboard not a good boat building media?
- Does it matter if you use cardboard from cereal boxes or packing boxes?

How could you have made your cardboard boat design more buoyant?

Extend Your Learning:

Do you think Creating a Cardboard Boat and covering it with Aluminum Foil would increase the water-tightness and buoyancy?

Try It and record your results

Learning Resource Links:

Concrete Canoe: <https://www.youtube.com/watch?v=3lZpZYK1MRQ>(MO)
<https://www.youtube.com/watch?v=mpAoE7Vtyk4> (Texas)
<https://www.youtube.com/watch?v=3lZpZYK1MRQ> (So Ill)

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)