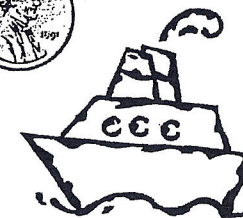


Penny Boat Challenge



The Problem:

Design a boat out of aluminum foil that will hold the most number of pennies and still stay afloat.

Rules:

- Construct your boat using **only** one piece of the heavy duty aluminum foil (30 cm x 30 cm) provided.
- Pennies are the only item you may add to your boat.
- Slowly add pennies to your boat. Once water enters the boat, or if any part of the boat touches the bottom of the container, your turn is over.
- The last penny added will not count in the total amount held.
- Predict how many pennies your boat will hold: _____
- Use your lab journal to make sketches of your boat and to keep track of your trials, errors, and successes.

After the competition:

1. My boat held _____ pennies.
2. If each penny had the mass of 2.5 grams*, my boat held _____ grams total.
3. The boat that held the most pennies belonged to _____ and held _____ pennies.
4. How did you place the pennies into your boat? Did you have a strategy?

Reflection: Write about the strategies you used to solve this problem. What worked, what didn't, and what would you change if you did this again?

*assume post-1982 pennies

SPACE CASE

Does air have volume? Find out by doing the following experiment:

1. Crumple a piece of notebook paper, and place it in the bottom of a paper or plastic-foam cup so the paper fits tightly.
2. Turn the cup upside down. (The crumpled paper should not fall out of the cup.) Lower the cup straight down into a larger beaker or bucket half-filled with water until the cup is completely underwater.
3. Lift the cup straight out of the water. Turn the cup upright, and observe the paper. Record your observations.
4. Punch a small hole in the bottom of the cup with the point of a pencil. Repeat steps 2 and 3.
5. How do these results show that air has volume? Record your explanation on the lab write-up sheet on the next page.