Aluminum Foil Boats

**Objective:** To learn about density and buoyancy by constructing a boat that will hold as many pennies as possible without sinking.

Archemedes Principle- what is it? From PowerPoint

What does it explain?

**Materials:** a piece of aluminum foil

 pennies

 this handout

 metric ruler

 maybe a calculator

**Procedure and Questions**:

 1. You must fold the aluminum foil into a boat that will float with as many pennies as possible. To calculate density you have to use a square or rectangle shape so you can measure length, width, height.

 2. To answer the questions below you have to measure the boat in cm.

 .Length= \_\_\_\_\_\_cm Height= \_\_\_\_\_\_cm Width = \_\_\_\_\_\_cm

 Volume = LxHxW so multiply the 3 numbers above and V= \_\_\_\_\_\_cm3

 3. Pennies have different masses depending on when they were made. We will

 use the mass of **2.5 grams** per penny.

 4. Density = Mass divided by Volume so take your answers from #2 and #3 and

 calculate the density of your boat with one penny.

 Show calculations here. Density = \_\_\_\_\_\_gm/cm3

 Will your boat float with one penny? Why or why not?

 5. Calculate how many pennies your boat can hold without sinking by taking the mass of \_?\_\_ pennies and dividing by the volume of your boat. The volume will always stay the same unless you build a different boat.

 Show calculations! D= M

 V

 Density with 10 pennies 15 pennies 20 pennies 30 pennies 45 pennies

Will it float? Y or N y or n y or n y or n y or n

 6. Graph the above data on a separate piece of graph paper and attach.

 Have the x axis be the number of pennies, the y axis labeled as density in gm/cm3. Then mark with an X the spot your graph hits a density of one. Your predicted number of pennies the boat will carry will be just below that spot.

 7. How many pennies do you predict your boat will hold before sinking based on your calculations and the graph?

 8. Now take your boat up to a tank and the teacher or a designated person will observe you testing it.

 -Put one penny at a time, 2 second intervals

 -Once starts sinking or leaking, no more pennies can be added

 Record number of pennies your boat carried before sinking \_\_\_\_\_\_\_\_\_\_\_\_