Building Raft Project - 24 points
DUE: Friday, May 20, 2016

**BUILDING RAFTS PROJECT**

**Project Steps**
Step 1: Build 5 rafts using Popsicle sticks, a plastic cup and glue (Day 1)
Step 2: Complete the Day 1 Reflection questions (Day 1)
Step 3: Collect data by sinking your rafts (Day 2)
Step 4: Graph your data (Day 2)
Step 5: Complete the Day 2 Reflection questions to find and explain the line of best fit (Day 2)
* Participation Points = 2 per day for being on-task and helping your group

**Step 1: Build the Rafts** (2 points)
1. Place two Popsicle sticks flat and parallel to each other. These two Popsicle sticks are going to be called the **supports** of the raft. These supports will be the same for each of the rafts, so be sure to be consistent with your definition and measurements.
2. Glue two Popsicle sticks to these supports so they are perpendicular to the supports. These Popsicle sticks will be called the **planks** of the raft. They are to be glued in the center of the two supports and next to each other.
3. Glue one plastic cup to the center of the planks.

To build the other 4 rafts, repeat this process. However, when you get to step 2, increase the number of planks by two for each raft. This means that your second raft will have 4 planks, the third will have 6, the fourth will have 8, and the fifth will have 10.

**Step 2: Day 1 Reflection Questions** (1 point each)
*Answer the following questions before collecting any data for this project.* Be sure to stay consistent with these decisions for the remainder of the experiment. This will ensure that the data collected is correct.

(A) What is your group’s definition of "sunk"?

(B) How does your group think the pennies should be **PLACED** within the plastic cup?

(C) How many pennies do you predict each of your rafts will hold before sinking?
Step 3: Collect Data by Sinking Your Rafts (2 points)
1. Place one raft at a time in the water.
2. Place one penny at a time into the plastic cup to see how many pennies the raft can hold until it sinks. Remember to use your definition of sunk from your Day 1 Reflection Questions answers. Also be sure to place your pennies in the cup according to your Day 1 Reflection Question answers as well.
3. Record how many pennies it takes to sink each raft in the table below.

<table>
<thead>
<tr>
<th>Number of Popsicle Sticks (Planks Only)</th>
<th>Number of Pennies</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
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<tr>
<td>10</td>
<td></td>
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</tbody>
</table>

Step 4: Graph the Data (2 points)
Graph the data on the scatterplot below. Let $x =$ the number of Popsicle sticks and $y =$ the number of pennies. Be sure to label the axes with a constant scale!
Step 5: Day 2 Reflection Questions. (1 point each)
(A) Draw a line of best fit on your scatterplot.

(B) Determine the slope of your line.

(C) Explain what the slope tells you about the number of pennies and the number of planks in the raft.

(D) Determine the y-intercept of your line.

(E) Explain what the y-intercept means in terms of the number of pennies and the number of planks.

(F) Write the equation for the line of best fit in the form \( y = mx + b \).

(G) Use your equation to predict how many pennies it would take to sink a 12 Popsicle stick raft. How about a 20, 25, 40, or 50 Popsicle stick raft? Complete the table below with the predictions from your equation. **SHOW ALL OF YOUR WORK!!** (1 point each)

<table>
<thead>
<tr>
<th>Number of Popsicle Sticks (Planks Only)</th>
<th>Number of Pennies</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td></td>
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<td>40</td>
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