FLIPPING ALUMINUM BALLS

Part 1. How high can you flip?

Describe the flipper system that resulted in the highest flip. Discuss all of the variables.

Part 2. How far can you flip?

Describe the flipper system that resulted in the longest flip. Discuss all of the variables.
### Experiment 1: Spacers (pennies)

<table>
<thead>
<tr>
<th>Number of spacers</th>
<th>Trial number</th>
<th>Average height</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
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<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
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</tbody>
</table>

### Experiment 2: Flip stick length

<table>
<thead>
<tr>
<th>Length of flip stick</th>
<th>Trial number</th>
<th>Average height</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 cm</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>1 cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 cm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 cm</td>
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<td></td>
</tr>
</tbody>
</table>

### Experiment 3: Angle

<table>
<thead>
<tr>
<th>Angle of launch</th>
<th>Trial number</th>
<th>Average distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>0°</td>
<td>1 2 3 4</td>
<td></td>
</tr>
<tr>
<td>10°</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20°</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30°</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40°</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4. A stone was launched using the catapult shown above. The stone did not go over the wall. List all the things you might change so that a stone would go over the wall.
Directions: Answer the following questions.

1. Billy forgot to eat his ice cream while he was watching television, and it melted. He thought the ice cream melted because it was in the light. Billy decided to do an experiment to find out. Here's what he did.

As soon as it got dark, Billy put into each of two identical bowls one scoop of chocolate chip ice cream. He took one bowl outside where it was dark, and the other he put in the kitchen where a light would shine all night. Billy got up at dawn and discovered that the ice cream outside was still solid but the ice cream in the kitchen had melted. "Aha," said Billy, "light makes ice cream melt."

- If you think Billy did a good experiment, put a check in the box.
- If you think Billy did not design his experiment very well, explain what was wrong and how the experiment could be done better.

2. A grandfather clock uses a pendulum to keep it running on time. Lisa's grandfather clock was running too slowly all the time. What could she do to the pendulum in her clock so that her clock would keep accurate time?

3. Explain what it means to conduct a controlled experiment.

4. Explain what the word variable means.
**FOSS Variables Pictorial Assessment**  
**Student Sheet**

**Directions:** Look at the picture, then answer the questions.

A class of students made pendulums out of string. Each string was a different length. The same amount of weight was attached to each string. The pendulums were tested to see how many swings each would make in 10 seconds. When finished, the pendulums were hung on a number line like this.

<table>
<thead>
<tr>
<th>Number of swings in 10 seconds</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 4 5 6 7 8 9 10 11 12 13 14 15 16</td>
</tr>
</tbody>
</table>

3a. Draw a circle around the pendulum that you think should be tested again.

3b. If that pendulum was tested again, predict how many swings it would make in 10 seconds.

3c. Explain the relationship between the length of the strings and the number of swings a pendulum makes in 10 seconds.