Pendulum Lab

Research: Be able to describe what a “pendulum” is.

Materials:

- Pendulum bobs of different sizes and mass
- String
- Chopstick
- Protractor
- Timer (phone)

Experiment 1 Question: How does the length of string affect how fast a pendulum swings?

Independent variable: _________________________________________________________________

Dependent variable: _________________________________________________________________

Controlled variables: _______________________________________________________________

Hypothesis: (If, then, because format)

________________________________________________________________________________________
Procedure:

1. Ready the timer for 30 seconds.
2. Pull the pendulum bob/string to 15° on the protractor and release.
3. Count the number of times the pendulum makes one complete trip back and forth (a period) in 30 seconds.
4. Record results in data table for 50 cm.
5. Repeat for 2 more trials.
6. Calculate averages.
7. Wrap the string around chopstick until the string is 40 cm and secure with the clothespin. Repeat steps 1-6.
8. Repeat steps 1-5 at lengths 30 cm and 20 cm.

Data

<table>
<thead>
<tr>
<th>How many periods in 30 seconds?</th>
<th>Length of Pendulum String</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50 cm</td>
</tr>
<tr>
<td>Trial 1</td>
<td></td>
</tr>
<tr>
<td>Trial 2</td>
<td></td>
</tr>
<tr>
<td>Trial 3</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td></td>
</tr>
</tbody>
</table>

Graph: Construct an appropriate graph to represent your data.
**Experiment 2 Question:** How does the mass of a pendulum affect how fast a pendulum swings?

**Independent variable:** _________________________________________________________________

**Dependent variable:** _________________________________________________________________

**Controlled variables:** _________________________________________________________________

**Hypothesis:** (If, then, because format)

___________________________________________________________________________________________
___________________________________________________________________________________________
___________________________________________________________________________________________

**Procedure:**

1. Ready the timer for 15 seconds.
2. Pull the large pendulum bob/string to 15° on the protractor and release.
3. Count the number of times the pendulum makes one complete trip back and forth (a period) in 15 seconds.
4. Record results in data table for large pendulum.
5. Repeat for 2 more trials.
6. Calculate averages.
7. Repeat steps 1-6 at for the small pendulum.

**Data**

<table>
<thead>
<tr>
<th>How many periods in 15 seconds?</th>
<th>Size of Pendulum Bobs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Large Pendulum 45.5 g</td>
</tr>
<tr>
<td>Trial 1</td>
<td></td>
</tr>
<tr>
<td>Trial 2</td>
<td></td>
</tr>
<tr>
<td>Trial 3</td>
<td></td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td></td>
</tr>
</tbody>
</table>
**Graph**: Construct an appropriate graph to represent your data.

**Analysis**:

**Experiment 1**: What is the relationship between length and speed?

**Experiment 2**: What is the relationship between mass and speed?

**Conclusion**:

___________________________________________________________________________________________
___________________________________________________________________________________________
___________________________________________________________________________________________
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___________________________________________________________________________________________
___________________________________________________________________________________________