Breaking Point - Tensile Strength Lab

**Scenario:** You and a partner are engineers tasked with testing material that will be used to develop a lightweight safety rope for use in construction worker safety harnesses while they build high-rise buildings. You will model a construction worker hanging from the rope using strands of several different materials. You will design and conduct an experiment to determine which material can hold the most weight before it snaps.

A possible set up could be:

![Image of experiment setup]

**The materials you will have available are (use only what you need):**
3 types of thread (Nylon, Kevlar, Cotton)
1 5-gallon bucket
1 metal hook
Safety Goggles
Washers x many shared by class
Water Bottles x many shared by class
Ruler

**1. What is your independent variable (IV):**

**2. What is your dependent variable (DV):**

**3. What are four variables that should be controlled? (CVs):**
   a. 
   b. 
   c. 
   d. 


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4. Sketch of YOUR setup:

5. Procedure (What did you do?)

1. __________________________________________________________

2. __________________________________________________________

3. __________________________________________________________

4. __________________________________________________________

5. __________________________________________________________

6. __________________________________________________________

7. __________________________________________________________

8. __________________________________________________________

9. __________________________________________________________

10. __________________________________________________________

11. __________________________________________________________

12. __________________________________________________________

13. __________________________________________________________

14. __________________________________________________________

15. __________________________________________________________
6. Data:

<table>
<thead>
<tr>
<th>Material</th>
<th>Trial 1</th>
<th>Trial 2</th>
<th>Trial 3</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nylon</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kevlar</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cotton</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

7. Graph:

Title: ______________

8. What is a valid conclusion you can make from your data and graph?

____________________________________________________________________________________

____________________________________________________________________________________

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____________________________________________________________________________________
9. How do you know your experiment was reliable and valid?
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________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________

10. How could you improve your experiment next time?
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________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
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11. What is another experiment you could design to further test the material?
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________________________________________________________________________________________
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