Activity Sheet 1
Variable Data Sheet (Catapult)

Objectives:
1. To design and build a basic catapult (*follow the construction sheet*).
2. To test how the pull distance affects the distance the marshmallow travels.
3. To test your own variable on the catapult.
4. To compete against your classmates in a catapult contest.

Variable:
Does the distance the catapult is pulled back/down affect how far the marshmallow travels? Test and record your data below:

<table>
<thead>
<tr>
<th>Trial</th>
<th>Pull Distance (cm)</th>
<th>Distance Travelled (cm)</th>
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</thead>
<tbody>
<tr>
<td>1</td>
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<td>2</td>
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<td>5</td>
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</tbody>
</table>

Conclusion (*State what your test results show about this relationship)*:

________________________________________________________________
________________________________________________________________
________________________________________________________________
1) List three other variables that you could adjust on your catapult.

_________________   ___________________  ___________________

2) Circle the variable above that you want to test. This is your independent variable.

3) You will write an Aim for this experiment. This is a cause/affect statement.

For example: To find out how the size of a ball affects the height it bounces.

Underline the independent variable in the example. Circle the dependent variable in the example.

Aim: ______________________________________________________________

________________________________________________________________

4) Make a hypothesis for your experiment. This is an If, Then, Because statement.

For example: If the ball is larger, then it will bounce less because it has more mass to be pulled down by the gravitational force.

Hypothesis: _______________________________________________________

________________________________________________________________

________________________________________________________________
5) Change your independent variable three times and test each one twice. Find the average for each test. Be sure to fill in the table headings and record your data.

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Dependent Variable</th>
<th>Average</th>
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<tbody>
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6) Look at your results. What is the answer to your aim? Circle two numbers in your results table that support this answer. Write a conclusion that includes the answer and your supporting evidence.

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________________________________________________________________
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Activity Sheet 2
Appendix B

Definition of Terms

**Lever**
One of the six simple machines. Makes work easier by increasing the force on the load.

**Energy**
The ability to do work.

**Potential Energy**
The kind of energy that a body has by virtue of its position. When a body is raised to a higher level, it is able to do a certain amount of work in falling back again, and hence it was given a certain amount of potential energy in raising it.

**Kinetic Energy**
The energy that a body has by virtue of its motion.

**Work**
When a force is applied to move an object. This requires energy.

**Range**
Distance for which a projectile can be thrown.

**Variable**
Any factor that can change.

**Independent Variable**
The factor that is changed by the scientist. A good experiment will only have one of these.

**Dependent Variable**
The factor that is measured to see the effect of the independent variable.
Activity Sheet 3
Catapult Science Challenge Questions

1. Describe and explain how the energy changes during the launch of the catapult. Where does the catapult get the energy to begin? What happens to the energy?

2. Draw a diagram of the marshmallow after it is launched in the air, showing with arrows the forces that are pushing or pulling on it. What eventually happens to the marshmallow? Why?
3. What class of lever was your catapult? Support your answer by drawing and explaining where the fulcrum, load, and effort were.