Name ____
Date ____________________________ Per. ______

Straw Rocket Lab

Question: What is the relationship between the elastic potential energy of a rubber band rocket launcher and the gravitational potential energy of a straw rocket?

Hypothesis: If the amount of stretch (related to elastic potential energy) in a rubber band launcher increases, then the average height of a straw rocket (related to the gravitational potential energy) will increase, decrease, or stay the same.

Materials:
Rocket
Rocket Launcher
Masking Tape
Ruler

Procedure:

1. Build a "rocket" and "launcher" according to your teacher's directions.
2. Find the mass of the "rocket" using the electronic balance and record it here:
   ____
3. What is the independent variable in this lab? __________________________________
4. What are the three dependent variables in this lab?
   ____
   ____
   ____
5. Find a starting brick on the wall and place a piece of masking tape on the bottom of the brick. This mark will be zero.
6. Line the top of your rocket launcher up with the zero mark.
7. Launch your rocket straight up with 1 cm of stretch. Measure how high the top of the rocket goes. Repeat 1 cm of stretch two more times. Record each trial on the data table. If the top of the rocket goes too high to measure with a ruler, count the bricks. Each brick is 10 cm.
8. Continue launching your rocket with a 2, 3, 4, and 5 cm of stretch – 3 trials each.

Amount of Stretch (cm) Elastic Potential Energy	Height Trial 1 (cm)	Height Trial 2 (cm)	Height Trial 3 (cm)	Average Height (cm)	Calculated Gravitational Potential Energy (mJ)	Inferred Kinetic Energy (mJ)
1						
2						
3						
4						
5						

9. Find the average height for each amount of stretch. Round the average height to the nearest whole number.

   The unit for potential energy is the Joule. Since we are using grams instead of kg, our measurement will be in millijoules (mJ).

   The Universal Gravitational Constant (G) is 9.8. It is the force between two bodies. For example: the moon is held in place orbiting around the earth because of gravity.

10. Calculate the Potential Energy for each amount of stretch using the following formula:

    Potential Energy = Mass X 9.8 X Average Height

11. Just after take-off, the rocket has kinetic energy only. The elastic potential energy and the gravitational potential energy are zero. What is the inferred kinetic energy that the rocket will have immediately after the launch? Remember, energy cannot be created or destroyed, instead it is always conserved! Record inferred kinetic energy on your data table.

12. Analysis: Make a line graph of your results. Amount of stretch will be on the X axis and Gravitational Potential Energy will be on the Y axis.

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Conclusion:

1. What kind of energy does the rocket have just before you release it?

____

2. What kind of energy does the rocket have just after you released it?

____

3. Look at the shape of your graph. What conclusion can you make about the relationship between the elastic potential energy of a rubber band rocket launcher and the gravitational potential energy of a straw rocket? (restate your hypothesis correctly)

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4. Using quantitative data from your data table, describe the relationship between the amount of stretch in the rubber band (elastic potential energy) and the gravitational potential energy of a straw rocket.

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