LAW OF CONSERVATION OF ENERGY LAB ACTIVITY – BOTTLE ROCKETS

Purpose: To determine the launch speed of a bottle rocket, using the Law of Conservation of Energy.

Materials:

* 100 mL vinegar
* Up to 100 mL water
* 3 scoops of baking soda
* Water bottle
* Test tube stopper
* Measuring tape
* Coffee filter
* Electronic balance

Procedure:

1. Find a test tube stopper that fits your water bottle. Determine the mass, in kg.
2. Measure the height of the stopper in the water bottle, in m, and record this in the ‘Launch’ column.
3. Measure 100 mL of vinegar into your water bottle, and add up to 100 mL of water.
4. Measure up to 3 scoops of baking soda onto the coffee filter. Roll the coffee filter up, as was demonstrated in the Bill Nye ‘Energy’ episode.
5. Wearing safety goggles, place the rolled up coffee filter in the water bottle, and seal it with the test tube stopper.
6. Record the maximum height of the test tube stopper in the ‘Maximum Height’ column.
7. Determine the launch speed of the test tube stopper.

Observations / Calculations:

Mass: \_\_\_\_\_\_\_\_\_\_ kg

|  |  |  |
| --- | --- | --- |
|  | Launch | Maximum Height |
| h (m) | \_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_ |
| Eg (J) |  |  |
| v (m/s) |  |  |
| Ek (J) |  |  |
| ET (J) |  |  |

Error Analysis:

1. What are some errors that occurred during this experiment?
2. How would you improve this experiment?

Conclusion:

Discussion:

1. Write the energy transformation equation for this experiment.
2. State the Law of Conservation of Energy.
3. Some energy may have been lost in this experiment; in what form(s) would it be?