**Balloon Rocket Design**

Develop your own controlled experiment to see how a variable (e.g., fin size, fin shape, cone size, cone shape, body tube length, etc.) affects the way a balloon rocket flies (e.g., distance, speed, vertical height, etc.)

1. Develop a **question**:

The question describes the focus of the investigation. The question should ask how the independent variable would affect the dependent variable. The question should be written so that someone unfamiliar with your experiment can easily understand it.

Sample format: “How will (the independent variable) affect (the dependent variable)?”

2. Develop a **hypothesis:**

A hypothesis is an educated prediction. It should explain the effect that changing the independent variable will have on the dependent variable in the investigation.

The hypothesis should state why you think this will happen (“because. . . ”).

You must have a reference (evidence from an outside source) to support why you think something is going to happen.

Sample format: “I think (independent variable) will cause (dependent variable to

. . . ), and I expect this to happen because (describe the scientific reasons of why you expect this relationship between the variables). Include cited scientific concepts that relate to this prediction.

3. Develop an **investigation design:**

Using the five components below, describe the design of the investigation:

1. Independent variable: the variable that is changed on purpose

2. Dependent variable: the variable that is measured as a result of changes purposely made in the independent variable

3. Constant variables (also called “constants”): the variable(s) in an investigation that are kept the same and not allowed to change or vary

4. Number of repeated trials: the number of times that a level of the independent variable is tested in an investigation, or the number of objects or organisms tested at each level of the independent variable

4. **Build** your rocket and perform the **experiment**

Build the rocket and perform the trials. All data should be recorded in a data table.

The actual rocket used needs to be turned in along with the written components of this assignment.

5. **Analysis**

Write an analysis of the experiment. In other words, answer the question developed in part 1. Discuss how the independent variable affected the dependent variable. Analyze the data and discuss any inconsistencies. Provide an overview of what you might have done differently to improve the performance of the rocket.