Air Rockets!

Name:_____ Date:_____ Period:_____

We are going to create Air Rocket out of index cards, tape, and [maybe] other classroom materials. Goal: to get your rocket to go as far as it can go and look good while doing it.

Constraints: What are the constraints that you are working within?

Variable Trial Info

Group Member(s):

Variable Being Tested:

Write down what change you made of the variable for each rocket	**Distance 1**	**Distance 2**	**Average**
Base Rocket: No change to base design			
Design 1:			
Design 2:			
Design 3:			
Design 4 (*Exemplary*)**:**			

Final Rocket Design

Describe which iteration did the best for each variable:

1. Length of Body:
2. _____:_____
3. _____:_____
4. _____:_____
5. _____:_____
6. _____:_____
7. _____:_____
8. _____:_____
9. _____:_____
10. _____:_____

Blueprints – *Insert or Attach*

Blueprint of Final Rocket (don't forget the metric measurements!):

Reflection

1. How far did your rocket fly?

2. Describe the most successful rockets:

3. Describe the most unsuccessful rockets:

4. What would you do differently next time?

Safety Concerns:

The Air Rocket Launchers are high-pressure devices. While the rocket itself is made of paper, it launches at a high velocity. Therefore:

- NEVER aim the rockets at people or animals.
- Make sure the area is clear before launching.
- Do not put your face over the rocket before launching.
- Do not overfill the pressure tank.
- Do not use either launcher if something does not seem right about it.
- Do not horseplay around the launcher.

If you are found to be doing any of these things, that could result in the exclusion from further launches and jeopardizes your grade on this project. DON'T BE UNSAFE, YOU HEAR ME?!

Engineering Objectives you will be graded on:

1. Design, construct, and test a proposed engineering solution and can identify possible design improvements.
   a. Before you build your final rocket, your team will iterate (repeatedly changing) on one variable of the basic rocket design and share the outcomes of the tests of all the variations. Your group will be testing one of the variables, with each group choosing (kind of) the variable they would like to test. Your group will then create the basic rocket and three more rockets (*four more if you aiming for Exemplary*) that change ONLY that one variable. This will help us understand what is most important about that variable. You will **write down** the results of **all trials and average** the distances.
   b. You will be presenting the results of your variable testing. To do that, you will need to record the average distance each of your iterations and choose which did the best.
   c. You must also identify the constraints that you must work within.
   d. Draw a detailed (include measurements using the Metric system) blueprint of your final rocket. This can be accomplished in one of two ways:
      i. Draw the rocket from scratch
      ii. Take a picture of your final rocket and upload it to Google Classroom: Rocket Pictures

   e. Write a reflection after the launches have been completed about what went well and what didn't.

2. The finished design is high quality in performance and/or aesthetics. Once you hear all the results from everyone's trails on their variables, it will be up to you to create the

"best" rocket, which means the one that will go the furthest. **Each person** will create his or her own 'best' rocket. Scoring will be based on the following:

a. Ms. Brown has built a basic rocket using the basic design. Whatever distance it goes will be the *base distance*.
b. Any rocket that goes further than the *base distance* will earn either an Exemplary or a Proficient for this standard.
    i. Exemplary level is both above the *base distance* and is in the top 25% of all rockets that go above *base distance*.
    ii. Proficient level is above base distance, but in the lower 75% of all those rocket distances.
c. Approaching Proficiency level is any rockets that fly at least 70% of the distance of the *base distance*.
d. Developing level is a rocket that flies any distance.
e. Any rocket can add on an additional grade level (going from AP to P, for example) if the rocket has good aesthetics. Aesthetics means an interesting, innovative or complex design; well made without a lot of tape showing; clean and clear images.

Scoring Guide	**Exemplary** (above grade level)	**Proficient** (at grade level)	**Approaching** (just below)	**Developing** (below)
1. Design, construct, and test a proposed engineering solution and can identify possible design improvements. Score:	• Nearly all constraints described • More than three designs fully tested • Well diagramed blueprint with all needed measurements in Metric • Reflection is extensively detailed	· Many constraints described · Three designs fully tested · Well diagramed blueprint with all needed measurements · Reflection is detailed	· Some constraints described · Less than three designs tested · Diagramed blueprint with some measurements · Reflection is written, but should have more details	· Few constraints described · Only one additional design tested · Diagramed blueprint · Reflection done
2. Finished design is high quality in performance and/or aesthetics. Score:	• Rocket's distance was in the top 25% of all rockets that went past the base distance. • BONUS: Rocket has nice aesthetics	· Rocket flew to, or further than, the base distance. This year, that distance was **___ meters**.	· Rocket flew within about 30% of the base distance. This year, that distance was **___meters**.	• Rocket flew any distance