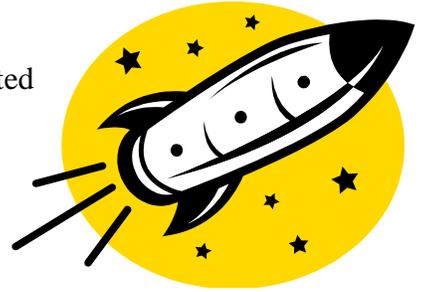


Fly Me to the Moon Worksheet

Part I: Basic Design Test



1. Although we are interested in the rocket's height, we are also interested in the time it takes for the rocket to go up. Measure the time your rocket flies from liftoff to when it begins to fall back down to the ground. Discuss the following questions with your group, and write down your thoughts.

a) Why do you think we are measuring time instead of height?

b) Why might a rocket engineer want to collect data on the original design before trying to improve it?

2. Record each group's rocket name and how many seconds it took to reach its maximum height (total time up before the rocket began to fall back down).

Rocket Name	Total Time Up (s)
Average Time Up	

3. Now find the **Average Time Up** for all of the rockets. Show your work in the space below.

Part II: Improving the Rocket Design

1. With your group, brainstorm a list of things that you could change about the way you designed the rocket and launched it. Engineers call such changeable features “parameters.” **Write down as many parameters as you can think of until your teacher stops you to bring the class back together.**
2. What parameters of the rocket will you modify? Pick one and describe how you will change it in a systematic, measurable way. Get approval from your teacher before you move on to building and testing your design.



Teacher Approval Yes No

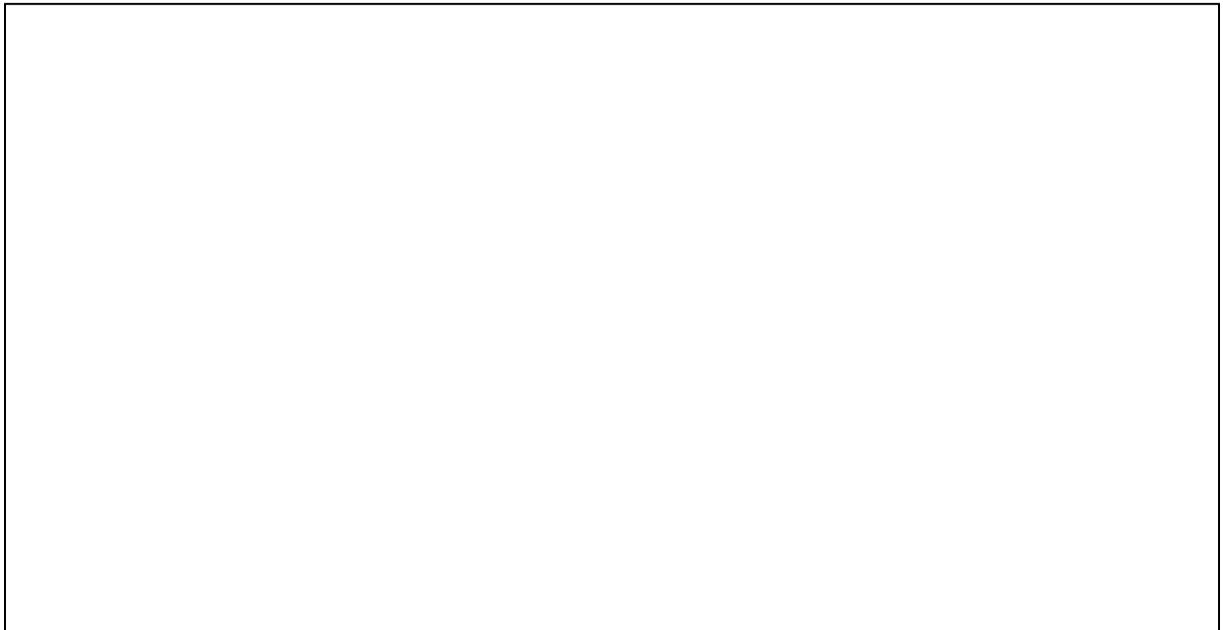
3. Once you have built several rockets for your next trial, you are ready to test (with your teacher’s approval). Record the results of your test in the table below. The column on the left should indicate the parameter that you tested.

Data for Your Group	
	Total Time Up(s)

Name: _____ Date: _____

Observations about Other Groups	
Group: _____ Parameter tested: What you noticed:	Group: _____ Parameter tested: What you noticed:
Group: _____ Parameter tested: What you noticed:	Group: _____ Parameter tested: What you noticed:
Group: _____ Parameter tested: What you noticed:	Group: _____ Parameter tested: What you noticed:

4. Make a bar graph or scatter plot in the space below to display your results.



5. As you changed your chosen parameter, did it seem to have an effect on the height of the rocket? If so, what was the relationship? Describe your findings below. Be ready to share these results with the class.

6. Why were some rockets able to fly longer than others? What were some similarities and differences between the longest and shortest flying rockets?

Part III. Choosing the Best Design

1. Using what you have learned from the results of your experiments, plan your final rocket design with your group. Sketch the design in the space below.



Stop

Teacher Approval Yes No

2. Once approved by your teacher, you can begin to build your new rocket design. You will also create a poster to “sell” your idea. Pretend that your group is an aerospace engineering team that is trying to market your rocket design through your poster. It should include:
- Your group’s name. Be creative!
 - A brief explanation (1-2 sentences) of what makes the rocket fly upwards. Use physics concepts to support your explanation.
 - A diagram of your rocket, with dimensions clearly labeled.
 - Some way of highlighting the design features that you think make this an excellent, high-flying rocket.