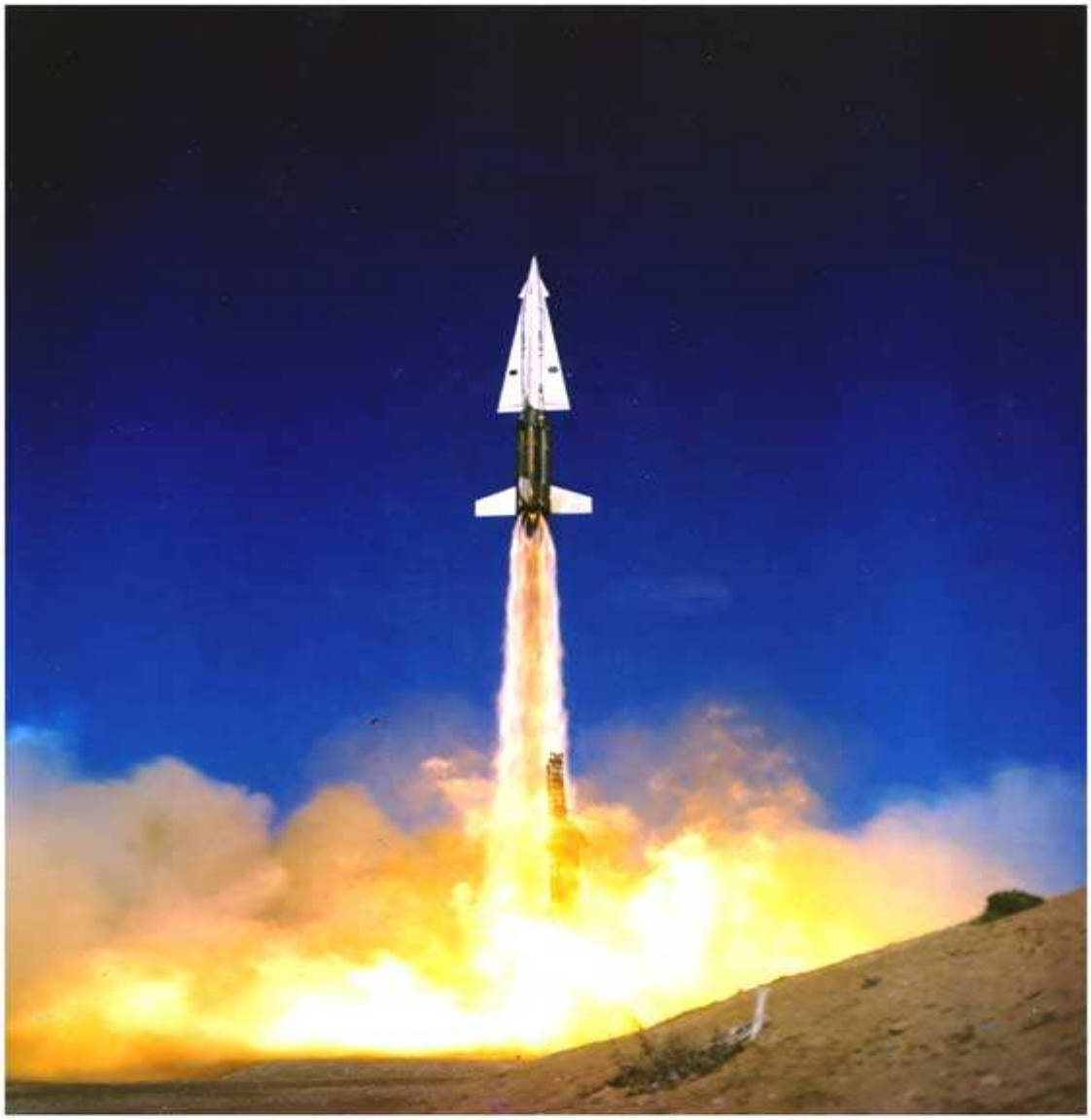
"HOUSTON WE HAVE A PROBLEM"



Your challenge is to build a rocket that will fly the furthest possible distance.

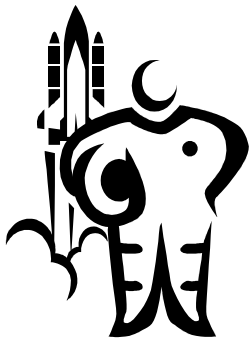
NAME_____

NAME_____

DATE: _____ SECTION:_____

Your first task is to perform a "web quest" to help you understand how rockets fly. Using the Internet answer the following "Quest"ions:

State and explain in your own words Newton's laws of motion.



How do rockets lift off the ground? (A common misconception is that the fire coming out of a rocket "pushes" against the launch pad). What happens far above the launch pad, then?

Why do rockets have to be so large to get into space?

Once in space, a rocket's engines no longer have to fire to keep it going. Why?

Why do rockets have "fins" on the side?

Time to design your rocket:

You will be provided with the following resources:

- 1 clear 35mm film container;
- some "rocket fuel";
- some material to create a rocket body;
- some sticky tape;

Step one:	Using the information you learned on your "web quest" use the grid paper to draw four possible designs for your rocket
Step two:	Using the design matrix, select your best design solution
Step three:	Build it!
Step four:	Test it **twice**!
Step five:	Record your results on the feedback page
Step six:	Read the following questions and continue testing while implementing variations to answer the questions (make sure to record your results each time)

Fuel instructions:

If using Alka Seltzer:

Hold the rocket upside down and add water to the film canister to 1/4 full. Add 1/4 of the Alka Seltzer tablet to the water in the film canister and quickly snap on the lid. Stand back and wait for a reaction. Keep track of all Alka Seltzer, you are only issued 2 tablets.

While testing, answer the following questions:

- Try making the water a little warmer or a little colder. How does the temperature affect the result?

- How does the amount of fuel placed in the cylinder affect how far the rocket will fly?

- How does the weight of the rocket affect how far the rocket will fly?

Explain how your rocket flies. What is happening with the fuel mixture?

How do Newton's laws apply to your rocket?

Bonus: Would it be possible to create a two stage rocket? How?

Complete the **Design Matrix** to determine the best solution / idea to solve the problem.

4 – meets perfectly 3 – meets well 2 – meets somewhat 1 – meets minimally 0 – does not meet	Solution 1	Solution 2	Solution 3	Solution 4
Totals:				

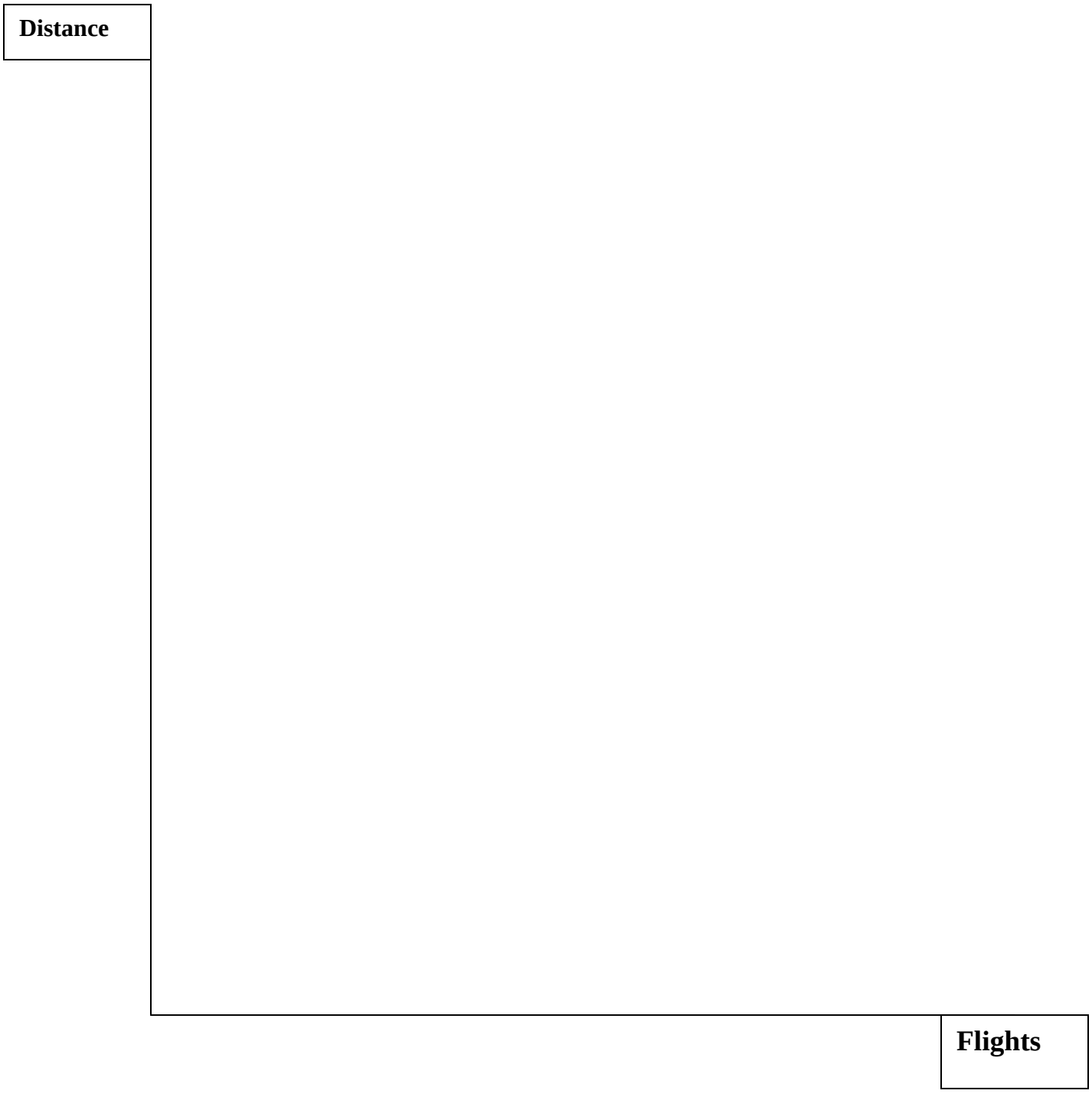
Alka-Seltzer Rockets

Observations and feedback – Record the distance and the change you made to the rocket at each test. You must do a minimum of 4 tests:

	Amount H2O	Temp H2O (warm, medium, cold)	Amount Fuel	Distance Results	Design Changes (if any)
Sample Test	*¼ full*	*Medium*	*¼ tablet*	*12 feet*	*n/a*
Test 1:					
Test 2:					
Test 3:					
Test 4:					
Test 5:					
Test 6:					
Test 7:					
Test 8:					

Graph Your Results: Use the results from your tests to create a *visual* representation of the data.

# of flights:	
Total distance flown (all flights):	
Furthest flight:	
Shortest flight:	
Average flight distance:	



GRADING RUBRIC

Please grade yourself on the process. How do you think you did? (Worth 2 points)

	Points	Student	Instructor
Statement of Newton's Laws	5 pts	_____	_____
Rocket lift and flight information	5 pts	_____	_____
Possible Designs (4)	8 pts	_____	_____
Complete Design Matrix	5 pts	_____	_____
Rocket Flight Explanation	10 pts	_____	_____
Rocket observations / feedback	15 pts	_____	_____
Student grading	2 pts	_____	_____
Total Points	50 pts	_____	_____