

Paper Rocket Project

Physical Science

Mr. Pickett

Name _____

Date _____

Hour _____

Goals:

You will be constructing a rocket made entirely of paper. The rocket will be launched using air pressure to provide the necessary force. Your goal is to launch the rocket as far as possible from the launcher. Preliminary launches will be performed to test the effect of different rocket lengths, nose cone diameters, rocket masses, launch angles, and different launcher pressures.

Constraints:

- Use the materials provided in the classroom.
- You may alter the length, number of fins, fin shape, and mass of the rocket.
- You may change the launch angle and pressure used for the launch.
- Work with one partner or by yourself.
- Record data for the preliminary launches and your own rocket's launches.
- You will be allowed two launches.

Required Tasks:

- Observe the preliminary launches, own launches and classmates' launches
- Record data for the preliminary launches and your own rocket's launches.
- Answer discussion questions using complete sentences.
- Complete calculations related to the motion of the rocket.
- Determine question and variables for each preliminary test
- If time allows, use the Rocket Modeler II software program to predict the height of your rocket flight

Grading:

The assignment is a project grade worth 20 points.

Answer all items on the following summary using complete sentences.

Foam Mega Rockets

Work with a group of three to attempt to come the closest to a target set 20 meters away. Record the distances from the target for each group on a data table created on your own paper.

1. List the names of the group members who came closest to the target

2. Describe the forces acting on the rocket before, during and after the flight.

3. What factors or variables could be changed to increase or decrease the distance that the rocket would fly. (Name at least two)

Rocket Motion Discussion Questions

1. List the names of the designers of the top three rockets and the distance from the target for each. (closest to the target)

2. Draw a diagram showing an overhead view of the rocket launch. Include labels on the launcher and the target in the sketch. Represent the best flight of your rocket as a vector. Label the distance between the target and the rocket in meters.



3. Provide a description of the unbalanced forces acting on the rocket that cause it to leave the launcher.

4. Sketch the flight path of the rocket as a parabola. Sketch and label the vertical and horizontal vectors at one specific point in the flight as it ascends or move upward, at the top of the trajectory, and as it descends or falls towards the ground.

5. Compare the force of air resistance and the force of gravity acting on the rocket as it fell.

6. In the preliminary tests the rocket with a nose cone with greater diameter did not travel as far. Explain why.

Rocket Motion Calculations

Calculate average speed

1. If your rocket traveled 20 meters in 4 seconds, what was its average speed?

Write the equation you will use to determine this.

Write the equation with the given values substituted

2. If your rocket traveled at an average speed of 25.6 m/s for 5 seconds, how far did it travel?

Calculate velocity

3. If the rocket launched from the launcher was moving at 17 m/s after 5 seconds, what was its acceleration?

4. If the rocket launched from the launcher was moving at 15 m/s after 5 seconds, what was its acceleration?