

ROCKET DESIGN REPORT

Each student will write an individual report, including individual drawings and/or photos.

Reports will be typed, double spaced, with one inch margins. Acceptable fonts are Times New Roman or Cambria. Any report submitted in Comic Sans will be given an automatic zero.

You will email an anonymous copy of your final report to Mr. D when you are done if you are willing.

Pay special attention to the 'Lab Report Rubric' and 'Engineering Design Rubric' when you write and rewrite your report. Your grade will be determined by how well you adhere to these guidelines. Students who pass this report typically rewrite/revise their report three or four times.

Cover page

Title, rocket name, date submitted, partner's name, maximum launch distance.

Each of the following sections will have its own 'cover page', in bold, horizontally and vertically centered on a single sheet paper: **Purpose, Literature Review, Testing and Development, Rocket Day Conclusion, and Launch Team.**

Purpose

State this question in your own words in a paragraph: How do you design a water rocket out of a 2-liter soda bottle to fly a maximum distance?

Literature Review

In this section, you will summarize the things you learn from reading past-year's students design reports and resources online.

Using your best judgment, in five separate paragraphs, describe the pros and cons of different fin shapes, nose cones, how pieces were secured to the bottle, an ideal mass, and general lessons learned in rocket building. Be concise, but spare no details. If you are going to pursue a two

tank design, add a sixth paragraph outlining ways to splice two (or more) bottles together.

Testing and Development

This section will be broken up into different missions each with its own date, with each mission representing a different launch day. In your report, start each section with the following title at the top of the page, in bold: **Mission #: Year - Month, Day.**

In your report, each mission will have three subsections each with its own heading in italics, using Mission 1 as an example: *Mission #1: Preparation, Mission #1: Results, Mission #1: Recommendations.*

Mission preparation will explain to the reader what specific design elements you are testing on that mission day. Include all details a reader would need to recreate your design on that day.

Mission results will explain what happened on that mission day – rocket distances, wind and weather, unforeseen environmental factors and launch issues, launch pressure – everything you can think of that influenced your launch. Use data tables to show distances and organize data as you see fit. Make notes in your lab notebook that you will need to write this section.

Mission recommendations will explain the general lessons learned from that mission that will inform the design changes you will make for the next mission date. Describe any damage your rocket suffered, how design elements (fins, weight, nose cone, etc) performed. Talk about what you learned because these elements either worked well, or performed poorly. Using the performance data from each launch day, talk about any additional research you need to do to solve any problems that cropped up. Talk about your plan to fix these problems, or improve your design overall. Once this research is done, talk about how you are going to redesign your rocket specifically, including diagrams, measurements, list of materials, how to put it together, etc.

Repeat this pattern for every day that you launched. Be sure to include citations for design ideas that were not original thoughts of your own. Include descriptions of everything – fins, nosecone, how it was all secured together – everything.

Rocket Day Conclusion

Summarize the most important lessons you learned during testing and development. Describe how these lessons led you to your final design.

Take the reader through the final design by describing – in detail, including measurements, materials used, photos / diagrams – how to build your final rocket design.

Include any advice you would give to someone embarking on this project. What do you wish someone would have told you before you started?

Launch Team

What your role is as part of the launch team and a detailed description of your responsibilities.

The role of your lab notebook

You will use your lab notebook extensively to outline your designs, make launch notes, and write down anything you need to go in your final report. You should have it and a pen with you at all times to write down anything that's possibly useful for your final report.

Nuts and bolts on writing formal lab reports (what you need to know for college)

You don't get credit for a new discovery until other scientists can reproduce your results based on your report. After reading your report, someone from your class should be able to read your report, understand it, and reproduce your results.

Data tables must also be typed, and numbers in data tables must be center justified and in bold font following the font guidelines below.

Data tables and charts must be labeled with the following format in bold '**Figure #: Title**' below

each table in the report. Figure numbers must be sequential with all other figures in the report. For the entire report, pictures, tables, and charts should be labeled 'Figure.' If the first piece of graphical information is a graph, label it 'Figure 1.' If the second piece of graphical information is a table, name it 'Figure 2' not 'Table 1.'

Formula and equations must be typed, center justified, and in bold.

References used throughout the report should be footnoted. At the end of the report in a reference section, list the footnotes in alphabetical order by the first letter of the author's last name. Use the name of the organization presenting the information if there is no author.

Be direct and concise. Don't use bold words, all caps, colloquialisms, hyperbole, or be overly verbose. Big words are okay, but not at the expense of clarity. As an example, it would be okay to say, "The sample was levigated, then dissolved in water," because levigated means to grind into a fine powder and is appropriate in this context. But it would not be okay to say, "There was visible vapors having their provenance in ignited carbonaceous materials," because it's verbose, confusing, and sounds like you are showing off. In this case just say, "Smoke rose from the sample."

Use the past tense as the experiments are complete by the time you begin writing. Use the passive voice, do not use 'I.' "The experiment was completed," is acceptable, while "I did the experiment," is unacceptable.

In discussing what went wrong in an experiment, know that it's ok to get 'bad' results providing you were not careless. You must also suggest ways to improve on the experiment if you could do it over again.