

## Launching into Space

“Launching into Space” is a lesson developed by Betsy Delaney, teacher at the John F. Kennedy Hyannis Museum. Using President Kennedy’s inspirational video about the importance of space exploration, and a *DIY Space: Stomp Rockets* lesson created by NASA, students create a model rocket, test the rocket, evaluate its performance, and improve their model.

This lesson focuses on engineering and mathematics. The lesson as designed is recommended for students in grades 4-9. We modified the lesson to meet our students in grades 2, 3, and 4.

The primary topic of the rocket building lesson is the design process. Additional topics include: data collection, analysis, and probability, earth and space science, geometry, measurement, motion and forces, number and operations, and the solar system.

The timing of the lesson as designed is 1 to 2 hours. Our “Camp Kennedy” summer class where we used the lesson was three hours and included a walk to a nearby park for launching.

### Standards

#### Massachusetts Science and Technology/Engineering Curriculum Framework

##### Grade 2:

##### PS1. Matter and Its Interactions

**2-PS1-1.** Describe and classify different kinds of materials by observable properties of color, flexibility, hardness, texture, and absorbency.

**2-PS1-2.** Test different materials and analyze the data obtained to determine which materials have the properties that are best suited for an intended purpose.

##### ETS1. Engineering Design

**2.K-2-ETS1-3.** Analyze data from tests of two objects designed to solve the same design problem to compare the strengths and weaknesses of how each object performs

##### Grade 3:

##### ETS1. Engineering Design

**3.3-5-ETS1-2.** Generate several possible solutions to a given design problem. Compare each solution based on how well each is likely to meet the criteria and constraints of the design problem

##### Grade 4:

##### ETS1. Engineering Design

**4.3-5-ETS1-3.** Plan and carry out tests of one or more design features of a given model or prototype in which variables are controlled and failure points are considered to identify which features need to be improved. Apply the results of tests to redesign a model or prototype

**3-5-ETS1-5(MA).** Evaluate relevant design features that must be considered in building a model or prototype of a solution to a given design problem.

### Introduction

Why would the John F. Kennedy Hyannis Museum host a class on rocket building? President Kennedy’s goal was for the United States to be the first country to put a person on the moon. Why? The following video shares his thoughts about the importance of space exploration:

<https://www.youtube.com/watch?v=gUNxspgFSE4>

## The Lesson

### ***NASA's DIY Space: Rocket Construction, Launching, and Performance Evaluation***

In this lesson, students will:

- Work to construct and launch paper rockets using a teacher-built PVC-pipe launcher
- Follow the flight of their rocket and calculate the altitude their rocket achieved
- Modify their rocket designs and relaunch their rockets to determine if the modifications affected the rocket's performance
- Write a post-flight mission report

Here is the link for the NASA developed activity. All the templates and specific directions are included in the lesson link:

<https://www.jpl.nasa.gov/edu/teach/activity/stomp-rockets/>

Here are the links for the PDF's that go with the lesson:

- Student Instruction Sheet: [https://www.jpl.nasa.gov/edu/pdfs/sr\\_instructions.pdf](https://www.jpl.nasa.gov/edu/pdfs/sr_instructions.pdf)
- Nose Cone Template: [https://www.jpl.nasa.gov/edu/pdfs/sr\\_templates.pdf](https://www.jpl.nasa.gov/edu/pdfs/sr_templates.pdf)
- Altitude Tracker: [https://www.jpl.nasa.gov/edu/pdfs/sr\\_tracker.pdf](https://www.jpl.nasa.gov/edu/pdfs/sr_tracker.pdf)
- Data Sheets: [https://www.jpl.nasa.gov/edu/pdfs/sr\\_worksheet\\_printout.pdf](https://www.jpl.nasa.gov/edu/pdfs/sr_worksheet_printout.pdf)

If you choose to use this lesson, we would enjoy hearing from you! Please email Emily Mezzetti, Director of Education Programming, [emily@jfkhyannismuseum.org](mailto:emily@jfkhyannismuseum.org), with your feedback.