

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
- Nose Cone Template: https://www.jpl.nasa.gov/edu/pdfs/sr_templates.pdf
- Altitude Tracker: https://www.jpl.nasa.gov/edu/pdfs/sr_tracker.pdf
- Data Sheets: 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, with your feedback.