

<b>Lesson Update and CRT Addendum</b>	
<b>Lesson/Activity Title: Rocket Staging: Balloon Staging</b>	<b>ID: 10-722</b>
<b>Product Number: EG-2003-01-108-HQ/EG-2008-09-129-MSFC</b>	<b>Grade: MS</b>
<b>URL for Lesson: <a href="https://er.jsc.nasa.gov/seh/Balloon%20Staging.pdf">https://er.jsc.nasa.gov/seh/Balloon Staging.pdf</a> or <a href="http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/LN_Rocket.html">http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/LN Rocket.html</a></b>	
<b>Subject: Position and motion, Newton’s Laws, technical design, modeling, measurement.</b>	
<b>Summary: This is a single activity within a larger lesson that lets students design a mission for lunar colonizing and work. This particular activity is a demonstration of rocket staging.</b>	
<b>Materials for Lesson: Lesson has detailed materials list for each activity.</b>	

<b>Review and Recommendations</b>	
<b>ALIGNMENT TO STANDARDS</b>	
<b>NGSS</b>	
<b>Common Core State Standards in Mathematics</b>	
<b>CULTURAL RESPONSIVE TEACHING (CRT) RECOMMENDATIONS</b>	
<b>5E Lesson/Description</b>	
<b>1. Engage</b>	Ask if students have played with balloons before, blowing them up and releasing them. What happens? How do they fly?  Show video of multi-stage rockets. Have students react and share any memories they have of seeing launches?
<b>2. Explore</b>	Exploration challenge are present in goals for the lesson in the form of concepts. Students use two questions as a guide to conduct preliminary investigation in their demonstration of rocket staging.
<b>3. Explain</b>	There is a procedure in place for the demonstration type activity. Work with students to describe a step-by-step procedure for their experiments.
<b>4. Expand/Enhance</b>	Allow students to design and test various configurations. Allow students to race each other for speed or distance.

<b>5. Evaluate</b>	Measure and record flight data. Chart/graph and compare data from various configurations. What was successful, what was not? How could scientists use this data to better put rockets into space? What are next steps/modifications you could make?

**Additional Resources:**

[http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/Lunar\\_Nautics\\_Designing\\_a\\_Mission.html](http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/Lunar_Nautics_Designing_a_Mission.html)