

Title

Space Engineering

Topic

Create a solution for human space travel

Grade Level

6th

Subject

Science

Established GoalsDerived from [Next Generation Science](#)

MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

Essential Questions

Why is human space travel difficult? How can you solve those problems? What can you learn from people you don't usually work with? How can you communicate with new team members?

Understandings

<i>Students will understand that...</i> Most jobs require you to work with a diverse team of people.	<i>Students will know that...</i> Space travel is dangerous and requires a lot of planning and engineering to be safe and successful	<i>Students will be able to...</i> Work with their team to persuade "investors" to support their engineering solution.
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[NETS \(Students\):](#)

Simply reference the number and letter (e.g., "2c")

Creativity & Innovation	1a, 1c
Communication & Collaboration	2a 2b, 2d
Research & Information Fluency	3b
Critical Thinking, Problem Solving & Decision Making	4a, 4b, 4c, 4d
Digital Citizenship	5b
Technology Operations	6b

NETS (Teachers):

Simply reference the number and letter (e.g., "2c")

Facilitate & Inspire Student Learning & Creativity	1a, 1b, 1d
Design & Develop Digital Age Learning Experiences & Assessments	2a, 2b
Model Digital Age Work & Learning	3b, 3c
Promote & Model Digital Age Citizenship & Responsibility	4c
Engage in Professional Growth and Leadership	5b

Assessment Evidence

Performance Tasks:
Students completed Space Engineering Assignment

Students complete self-reflection on their work

Students complete reflection on their group's ability to constructively communicate

Learning Plan

Inquiry Hook:
Culmination of study on space

Activity Procedure:
Instruction page for students: <https://goo.gl/qc613Y>

Students worked through the 8 steps of the engineering design process to come up with and present their solution.

Students had to work in a group with other students they had not ever worked with before. Students could not work alone. The first activity involved a team-building scenario where they had to talk and negotiate with their team members and find ways to reach a compromise. <https://goo.gl/RgKVml> I talked with each group at the start to ensure they could demonstrate constructive collaboration and had methods of communicating with their group members outside of class as needed.

At the very end of the project, students reflected on their group work as well as on their communication throughout the process.

Reflection Methods:
Daily reflection journal on progress and accomplishments
Feedback survey to other groups <http://goo.gl/VglyXn>
Reflection survey on final project <https://goo.gl/3Pbp8G>
Reflection write-up on their communication throughout the project <https://goo.gl/6AsJdR>

Materials

Facilities: STEM Lab	Equipment (non-tech): Anything required for the creation of their space prototype	Equipment (tech): Chromebooks Google Apps for Education
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Student Sample

Insert link to, or image(s) of, student samples below.

Document containing sample student responses to communication paragraph: <https://goo.gl/6BR6Qn>

I found it very interesting that these students who are digital natives and who have a Chromebook every day in class still overwhelmingly preferred to talk with their group in person rather than digitally. This may also be a factor of my class environment, which allows for them to move and talk with their classmates as needed every day.

Sample photos of presentation day, with students providing feedback to groups during presentations.

