

# S.O.S. (Save Our Ship!)

5<sup>th</sup> Grade

Unit 2 – Renaissance Thinking

Literature Connections: *Science in the Renaissance* by Lisa Mullins;  
*Leonardo, Beautiful Dreamer* by Robert Byrd; *Starry Messenger* by Peter Sis

## Design Challenge Summary

**Challenge:** What will the students be required to do?

Your astronaut team is on an expedition to research a newly discovered planet outside of our solar system. Upon arrival, your ship malfunctions, and you and your team are stranded until help arrives. You can see possible food sources from your ship, but you are unable to leave the ship to retrieve them. Due to the immense gravity and unknown atmosphere, you must create a tool that can reach the food source and bring it back to the ship without leaving the ship.

*Students must create a tool that can reach the food source from a distance of 3 feet away\* and bring it back to their “ship”.* \*see Material/Equipment/ Preparation for set-up details

**Standards:** What standards are addressed?

### Science:

NS.1.4.1 Communicate observations orally, in writing, and in graphic organizers

NS.1.4.3 Conduct scientific investigations individually and in teams

NS.1.4.5 Communicate the designs, procedures, and results of scientific investigations

NS.1.4.6 Estimate and measure length, mass, temperature, capacity/volume, and elapsed time...

NS.1.4.12 Evaluate the quality and feasibility of an idea or project

NS.1.4.13 Use simple equipment, age appropriate tools, technology, and mathematics in scientific investigations

ESS.10.5.3 Compare the properties of planets in our solar system: size, shape, density, atmosphere, distance from the sun, orbital path, moons, surface, composition

ESS.10.5.5 Compare the human body’s mass to weight on Earth, the moon, and other planets in our solar system

ESS.10.5.6 Investigate careers, scientists, and historical breakthroughs related to planets

### Math:

Mathematical Practice Standards

5.MD.2 Make a line plot to display a data set of measurements in fractions of a unit. Use operations on fractions for this grade to solve problems involving information presented in line plots.

5.NF.6 Solve real world problems involving multiplication of fractions and mixed numbers

4.OA.2 Multiply or divide to solve word problems involving multiplicative comparison

### ELA:

W.5.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

W.5.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

W.5.3 Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.

W.5.4 Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience.

W.5.10 Write routinely over extended time frames and shorter time frames for a range of discipline-specific tasks, purposes, and audiences.

SL.5.1 Engage effectively in a range of collaborative discussions with diverse partners on grade 5 topics and texts, building on other’s ideas and expressing their own clearly.

SL.5.3 Summarize the points a speaker makes and explain how each claim is supported by reasons and evidence.

SL.5.4 Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace

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**Result:** What will students know, value, and be able to do as a result of the lesson? What's the big idea?

Know and apply the engineering design loop.  
Value collaboration and discussion.

**Assessment:** What evidence will be used to determine student learning?

Did they (what the challenge required)?  
Did they follow the design loop process?  
Did groups work collaboratively together?

**Prior Knowledge/Experiences:** What prior content knowledge and skills will the students need?

Experience with the Engineering Design Loop process  
Connections to the Mathematical Practices  
Investigations/Inquiry in Science  
Experiences with

**Summary/Connections:** How will this design challenge connect with new/future learning, other content areas, real world experiences, etc.?

This lesson will help students develop problem solving skills and collaboration skills that are essential in succeeding in the 21<sup>st</sup> century. It will allow students the opportunity to transfer and apply skills from various content areas within one task.

Math: plot data -how many pieces of popcorn gathered- on a line plot (5.MD.2)  
S.O.S. ECM problem (4.OA.2; 5.NF.6)

**Extensions:**

Redo the challenge, but limit the amount of resources each group is given  
Write an opinion piece on which design was the "best" design or most effective design.  
Write to explain their work through the design loop process.

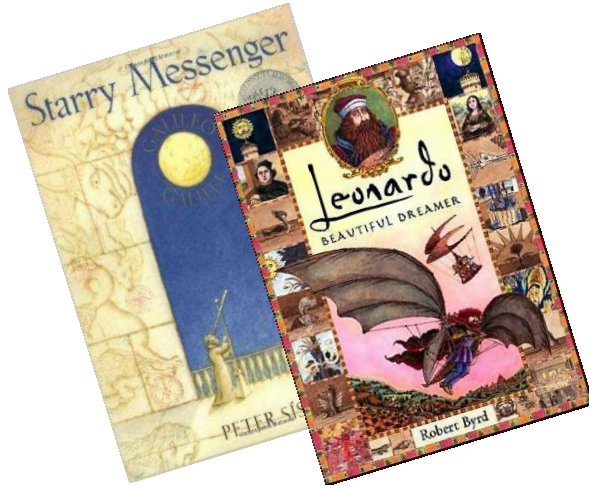
**Materials/Equipment/Preparation:** What materials and equipment will students need to successfully complete this design challenge?

**Materials:** Straws, Index cards, Paper clips, Tape (student supplies)  
Teacher Materials: large bowl, popped popcorn, masking tape, yard stick

**Set-Up:** Tape off a square "ship" large enough for 4 students to sit. Tape the bowl, filled with popcorn, to the floor 3 feet away from the "ship". Students must work together to build a tool to retrieve as many pieces of popcorn as they can in one minute.

# S.O.S

## *(Save Our Ship!)*



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### Group Supplies:

- Straws
- Index cards
- Paper clips
- Tape