

STEM Projects

Students of our pilot educational establishments are invited to research, develop and submit STEM based projects to the Lunar Mission One pilot education programme.

These could include investigations and proposals that cover:

- The technology required to build the digital archive
- The spacecraft robotics and drilling technology
- LM1 launch and precision landing systems
- The science and challenges presented by Solar System exploration

STEM Project Ideas

Introduction

The following STEM project ideas are designed to provide you with a mental trigger from which you can develop your own lessons. The ideas are purposely brief in order to avoid becoming prescriptive.

Each idea can be modified to suit local cultures and curriculum requirements. The list is not exhaustive, hence teachers, leaders and groups should feel free to develop their own STEM based projects. If you are unsure about the suitability of your own idea, please contact your local LM1 Education Ambassador or, alternatively; schools@lunarmissionone.com for further guidance.

For a larger list of STEM project ideas and lesson plans, please visit our list of recommended STEM websites.

Design and Technology

Subject Area	Topic Label	Age Group
Design and Technology	STEM Engineering	4 to 7 years
Use video and books to explore the use of rockets to launch people and equipment into space. Highlight the need for an aerodynamic shape (to ease passage through the atmosphere) and a rocket engine to provide thrust. Allow the students to junk model their own space rocket. Record the results of their ideas and model constructions.		

Subject Area	Topic Label	Age Group
Design and Technology	STEM Engineering	7 to 11 years
Use video and books to explore the soft landing techniques that have been employed on previous planetary space missions. Working in small groups, students design an enclosure to protect the LM1 scientific payload from impact damage at touch-down. Students junk model their enclosure and prove its ability to protect an egg, when dropped from a set height.		

Subject Area	Topic Label	Age Group
Design and Technology	STEM Engineering	7 to 11 years
Use video and books to explore the need for thermal protection on spacecraft. Using a heat source (desk-lamp), range of materials (paper, cotton, silver-foil etc.) and thermometer, test the thermal insulation properties of a range of materials. Write a scientific report to explain your experiment and that recommends the best material to protect the Lunar Mission One lander.		

Subject Area	Topic Label	Age Group
Design and Technology	STEM Design	14 years and above
Use sensors, actuators and microcontrollers to control the position of a lunar lander's radio antenna. Design and build a working prototype. Record and present the results of your research.		

Subject Area	Topic Label	Age Group
Design and Technology	STEM Design	18 years and above
Students review the storage capacity and longevity requirements of the Lunar Mission One public and private digital archives. The students then investigate the capability of currently available and proposed data storage hardware. Students present their research papers for consideration by the LM1 Science and Technology teams and for storage in the LM1 digital archive.		

Computing

Subject Area	Topic Label	Age Group
Computing	STEM Technology	4 to 7 years
Layout a simple 10 x 10 grid box pattern on a school hall floor or playground. Place obstacles in some of the grid cells. Working in pairs (one student as the robot), read out and record programme instructions (Left/Right/Forward/Back) to allow the robot to walk through the obstacle course. Record each pair's robot programme steps and add images of the exercise.		

Subject Area	Topic Label	Age Group
Computing	STEM Technology	7 to 11 years
Design, build and add data to a simple database. Select an interesting 'Life on Earth' topic area for your research and database design (E.g. a database to record the favourite sports that the students in your school play, or the most popular snacks in your school).		

Subject Area	Topic Label	Age Group
Computing	STEM Design	11 years and above
Design and build a computer game based on Lunar Mission One's mission to the Moon. The game should educate as well as entertain. Players should learn about the mission itself, and/or Lunar and Planetary Science.		

Mathematics Projects

Subject Area	Topic Label	Age Group
Mathematics	STEM Mathematics	7 years and above
<p>Discuss the data required to calculate how long it will take Lunar Mission One to travel to the Moon (trans-lunar velocity and distance to the Moon). Use books and online resources to find these two values. Calculate the travel time to the Moon and present your results in an explanatory report. Extend the exercise to include the time for radio broadcasts to reach the Lunar Mission One lander.</p>		

Subject Area	Topic Label	Age Group
Mathematics	STEM Mathematics	11 years and above
<p>Introduce the Astronomical Unit (AU) as a measurement of distance. Research its value. Find out and record the distance in AU, of each planet from the Sun. Find out and record, the orbital period of each planet. Using this information, calculate the orbital speed of each planet. Explain any patterns that you see emerge. Present your results in report form.</p>		

Subject Area	Topic Label	Age Group
Mathematics	STEM Mathematics	14 years and above
<p>Research one or more of Kepler's Laws of Planetary Motion. Record the results of your research. Prove the mathematical validity of one or more of Kepler's laws, using measured Solar System planetary data. Include your mathematical treatment/s in your report.</p>		

Science Projects

Subject Area	Topic Label	Age Group
Science	STEM Science	7 to 11 years
<p>Study and explore the effects of magnetism. Design an experiment to test the magnetic properties of a range of materials. Record your results and write a scientific report to explain how to carry out your experiment and what you have discovered. Expand your project to research and build an electromagnet. Make a proposal about how the Lunar Mission One lander could make use of an electromagnet.</p>		

Subject Area	Topic Label	Age Group
Science	STEM Science	11 years and above
<p>Explore the use of Sun-dials to measure time. Build and test your own Sundial. Use still images of your Sun-dial and a wristwatch to prove that the Sun-dial works. Now consider the rotational period of our Moon. Design a sun-dial for Lunar Mission One that can be used to measure time during the period of a Lunar Day.</p>		

Subject Area	Topic Label	Age Group
Science	STEM Science	14 years and above
<p>Water ice is thought to exist near the Lunar Mission One landing site. Research the current data on this possibility and record your findings. Consider the different states of matter and the atmospheric pressure near the Lunar South Pole. Explain the challenges that will occur if a future Lunar Colony wishes to recover the water in its liquid state.</p>		

Subject Area	Topic Label	Age Group
Science	STEM Science	17 years and above
Using currently available material science data, research the properties of a range of materials, with a particular focus on longevity. Select a suitable material for the construction of the Lunar Mission One digital archive capsule. Report your findings and the reason for your choice of material.		

STEM General

(Topics directly related to the LM1 mission, rather than the Life on Earth digital archive)

Subject Area	Topic Label	Age Group
Economics, Law and Politics	STEM General	16 years and above
College students, studying Economics, Law and / or Politics, research and study historical and current space treaties and laws. They focus their attention on the laws and treaties concerning the usage of the Earth's moon. Students develop papers and a presentation to explain the potential impacts of space law on Lunar Mission One.		