



Aim

To introduce the challenges facing space engineers by engaging in an open-ended design task to create a sturdy and stable habitat but from lightweight materials and using simple construction methods

Introduction

Plans are now in place for the first human mission to Mars sometime after 2030, but first, space engineers need to trial their deep-space systems in a Moon mission called Artemis. This will put humans on the lunar surface as early as 2024, with plans for a longer-term presence on the Moon, called the Artemis base camp, that would sustain as many as four astronauts.

The materials launched from Earth and used to build this base camp need to be lightweight to escape Earth's gravity and be easy to assemble by astronauts once they arrive. Space engineers are currently developing and testing their designs as part of this Artemis lunar mission.



Useful links

- What is Artemis? <https://tinyurl.com/1vxdku47>
- Meet the Artemis Team <https://tinyurl.com/1eytmfqk>
- What's an airlock? <https://tinyurl.com/3ff6uhvu>



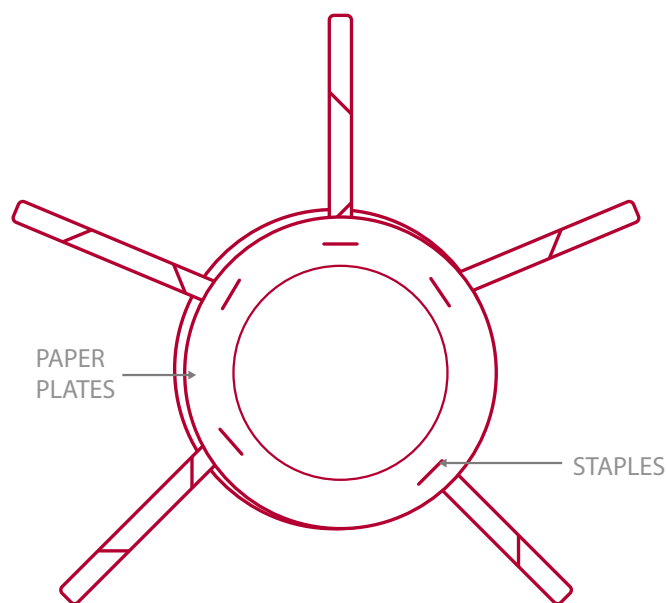
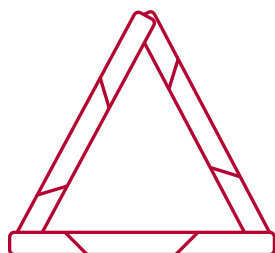
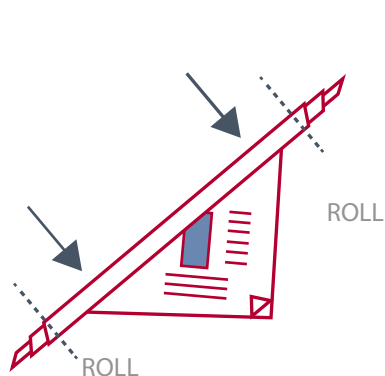
In association with

Equipment

- Pencil
- Scissors
- Tape measure
- Sticky tape
- Newspapers
- Paper plates
- Stapler
- Tissue paper
- Dowel / broom handle

Instructions to design and build a Moon Base Camp using a framework of paper tubes

- 1 In your teams, research and then sketch two or more possible designs for your base camp. Remember that engineers will research existing structural designs - strong ones are often built from a number of triangles joined together. Also, consider the benefits of an airlock
- 2 Once your initial designs are complete, total up the number of paper tubes needed
- 3 Constructing your paper tubes
 - Lay three sheets of newspaper out flat, one on top of the other
 - Roll the sheets diagonally, starting at one corner, around the dowel to form a tube
 - Once rolled use tape to stop the tubes unravelling
 - Trim each end to make all tubes an equal length
- 4 Start to construct the framework of your base camp, jointing the tubes together by flattening the ends, positioning appropriately and, under supervision, stapling the ends together
- 5 Your structure can be made even more secure by placing paper plates each side of the joints and stapling together
- 6 Once your base camp is constructed, add walls by taping tissue paper, or more newspapers, across the overall structure



Next steps

- Invite other teams to inspect your base camp, give them a tour and explain your 'designer thinking'
- Take photos of your design and create a presentation that highlights the parts of the task that were most challenging and how you would like to modify and extend your design next time
- Conduct your own independent research of Artemis Base Camp and present your findings as a poster