

Let's Move to the Moon – Notes for DM Ambassadors

Many thanks for volunteering to deliver the 'Let's Move to the Moon' project which is funded by the UK Space Agency and supported by then Henry Royce Institute.

It is coordinated by Dr Leah-Nani Alconcel (PI and Associate Professor at University of Birmingham), Dr Chris Hamlett (Discover Materials National Outreach Officer, based at University of Birmingham) and the local Discover Materials Working Group Members located at each Discover Materials partner institution (see graphic at the end of this document).

Overview

The project consists of a suitcase containing all of the equipment that the students need to complete eight missions concerning materials properties that need to be considered when planning to build a moon base.

The schools with whom you will be working will have already been booked in via Discover Materials (either by Chris Hamlett or by your local Discover Materials Ambassador) and you will be needed to deliver one or two sessions, the date of which will be finalised by communications between the school, Discover Materials and yourself.

Your role

In the Mission Suitcase there will be everything needed for the missions to be carried out by a group of school ages students under the guidance of a teachers / session leader.

Your role is to deliver the suitcase to its recipient(s) and, if requested, deliver an outreach session to the group of students. You (or a fellow DM Ambassador at your institution) will then collect the suitcase and run Mission 7 with the group.

You can offer support to the session leader during loan period of the suitcase but this is not expected of you as they will already have the contact details of either Chris, Leah or the local Discover Materials Working Group member whom they can contact if they have any questions.

Introductory session (Mission 0)

At this session you will introduce Materials Science and Engineering (MSE) to the students, careers paths in MSE and introduce them to the project.*

You will then introduce the box, hand out the students' mission booklets (which will contain information about all of the missions and QR codes to videos that will support each mission).

You (or the session leader) will then play the first video and let the group commence with Mission 0, you can stay to help the student crack the code to open the box if you like.

**Chris Hamlett can provide slides for an introductory session if you like*

Final session (Mission 7) – two or more ambassadors would be great for this

The final session involves the following:

- 1) Play the Mission 7 video which invites the students to design a poster on what materials to take to the moon to build a moon based on the materials requirements explored throughout the missions (see 'Mission Descriptions at the end of this document).
- 2) Help the students design their poster, discuss their findings, and make sure they upload a photo of their poster to our Padlet page (or you do it for them if they do not have their phones with them) – **it is very important to make sure the photos of the posters are uploaded as these will be used for feedback to the UKSA.**
- 3) Launch a 3D printed rocket using a bike pump.

**Chris Hamlett can provide slides for an this session.*

Safety

There is little risk with Mission 0 but you **must** have read the risk assessment for Mission 7 (Launching the rocket) because this involves pressurisation and pressure release (to launch the rocket) and so there is a risk of injury.

Feedback

We would like the teachers and students to upload photos of their posters as part of the reporting process for this project so, if needed, please assist them in doing so.

We would also appreciate your feedback so please fill in the DM Ambassador Feedback form after the session (this also helps us keep track of your volunteering hours) which will be sent to you via email after the school visit.

Mission Descriptions

Here is an overview of the missions in the booklet (it is anticipated that each mission can be completed within an hour).

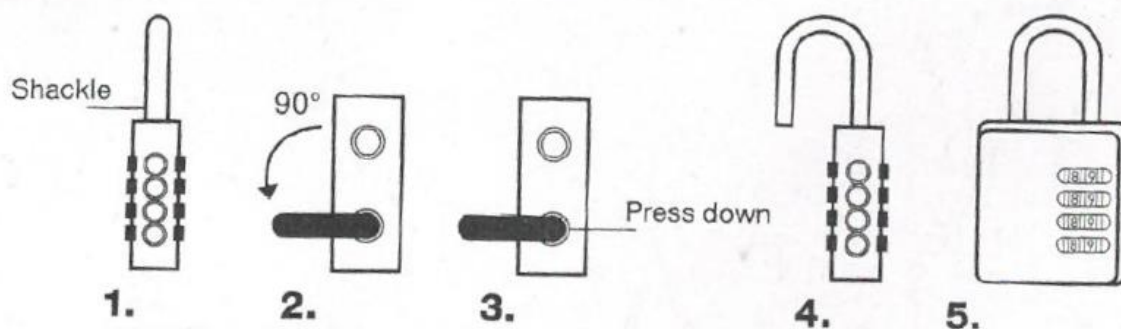
Mission 0 – Ida Noddack Challenge

The students have to work out the code to the padlock in order to open the suitcase. The clues will be in the Mission Booklet. If you need the code for the padlock it is 7517. If you need to reset the padlock, the instructions are below.

To reset the combination:

1. Turn the dials and align the numbers to 0-0-0-0 so they are clearly visible in the windows.
2. Pull up the shackle and turn it 90° counter clockwise to align the lug on the shackle with the notch on the lock body.
3. Press and hold the shackle down firmly.
4. Now turn the dials to set your chosen combination.
5. Return the shackle back to the original position. Your personal combination is now ready to use.

Please keep these instructions for future reference.



Mission 1 – Cecilia Payne Gaposhkin Challenge

The students will use the callipers, ruler and mass balance provided to calculate the density of bars of different materials.

Mission 2 – Stephanie Kwolek Challenge

The students will be provided with a metal and plastic ruler and try bending them in order to learn a bit more about the mechanical properties of materials and discuss the requirements of the materials they may want to take to the Moon.

Mission 3 – Joycelyn Bell-Burnell Challenge

The students will use an instant cool pack, cubes of different materials and an infrared thermometer to study how good different materials are at conducting heat by measuring the temperature of the cool pack and the temperature of the top surface of the material.

Mission 4 – Marie Curie Challenge

Using UV colour changing beads, a long wavelength UV torch and sheets of different materials the students will investigate how good different materials are at absorbing UV light. This ability will be based on the colour changes of the UV beads after exposure to UV light through the different materials.

Mission 5 – Helen Sharman Challenge

Using a vacuum jar and a hand pump the students will investigate the effect of a vacuum on a marshmallow, a balloon and a ping pong ball.

Mission 6 – Zaha Hadid Challenge

Using a 35mm film cannister, an effervescent vitamin C tablet and some water the students will learn about propulsion by launching their cannisters into the air and experimenting with the water : tablet ratio to see how high they can get their rocket.

Mission 7 – Benedetta Cappa Challenge

This mission involves a Discover Materials Ambassador visiting the school and they will bring along a 3D printed rocket which they will launch using a foot pump. They will also discuss the project with the students and help them finish their posters.

Any questions?

If you have any questions regarding any aspect of the project then please do not hesitate to get in touch with us by emailing Chris Hamlett (c.a.hamlett@bham.ac.uk).

Many thanks for helping to deliver this project.

FAQs

Who is my local Discover Materials Working Group Member?

There are between one and three members of staff at the partner universities who sit on the Discover Materials Working Group. Please see the graphic below of who your local representative is.

