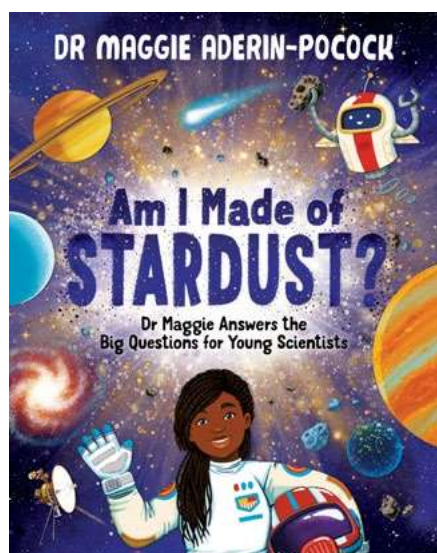


AM I MADE OF STARDUST?

Pupil activity sheet

This is one of a series of six activity sheets to use alongside the books which have been shortlisted for the Royal Society Young People's Book Prize 2023.



“The universe is EVERYTHING... all of space and everything in it, from galaxies and nebulae to black holes and stars. Our Earth is just a teeny, tiny part of this immense cosmic system.”

Am I Made of Stardust?

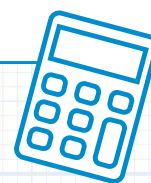


Find out fascinating facts about space and think about how humans could live on other planets in *Am I made of Stardust?* by Maggie Aderin-Pocock.

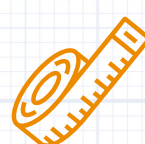
Mathematics challenge

Collecting data

Have you considered how you are going to measure light levels and temperature while you carry out all your investigations into plant growth? A useful way to do this is to use a data logger which can be used to record both temperature and light levels continuously and to make graphs. Ask your teacher if there are any in school that you could use. If there aren't any available, find out about apps that can be downloaded onto tablets or phones.

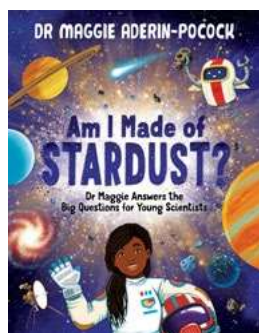


Once you have experimented with the technology you will have to plan how best to use it. Although it might be interesting to see daily changes in temperature and light levels, will this be useful if you only measure growth at fixed times (for example daily or weekly)?



Yet another problem to think about is how to measure plant growth. For example, you might decide to measure height and then notice that the tallest plants don't look very healthy. Other things that you could measure are the weight of the harvest (if you have very sensitive scales) or the colour of the leaves.

These are all important discussions to have before you start your investigations. During the investigation, you should also ask yourself: 'Is this the best way to collect evidence?', 'Could there be a better way to show our findings?' It might be worth different groups measuring and recording in different ways so that you can compare your results with each other and see if you reach the same conclusions.



AM I MADE OF STARDUST?

Pupil activity sheet (continued)



Landing on Mars

Once scientists have worked out what humans will need to survive on Mars, other scientists and engineers need to work out how to get everything there safely. Because Mars has a different atmosphere to Earth, parachutes do not work as well. This means that we are going to have to work hard to develop the best parachutes possible and think of other ways to protect precious cargos landing on the surface of the planet.

Your challenge is to experiment with ways of landing a fragile cargo here on Earth. For example, you might use a raw egg (in which case a small zip lock bag will stop it getting too messy if it breaks). How are you going to SLOW the fall of your egg from a height? How are you going to cushion the fall? Why don't you get into teams and see who devises the best method to protect their precious cargo?



Scientist profile

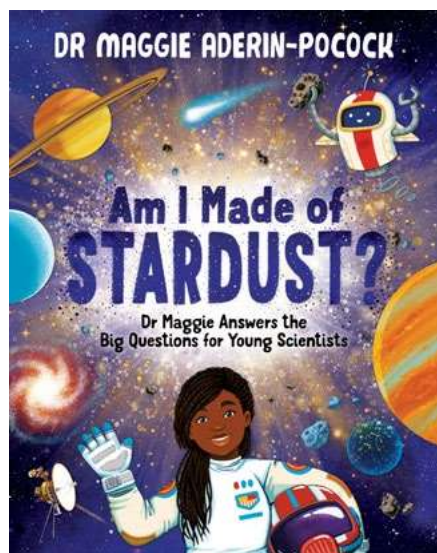
Watch Maggie Aderin-Pocock talk about her exciting job as a space scientist, and how she became interested at a young age. She is also a science communicator helping people to understand new and exciting facts about space and often appears on TV. But did you know that she originally wanted to be an astronaut? If you find something that interests you and work hard to find out more you too will be ready to take up amazing opportunities when the time comes, even though they might not be what you originally planned. Just like Maggie.



AM I MADE OF STARDUST?

Teacher activity sheet

This is one of a series of six activity sheets to use alongside the books which have been shortlisted for the Royal Society Young People's Book Prize 2023.



Each activity sheet contains ideas for experiments to do with your pupils, provides information relating to careers, and has a maths focus to help pupils understand the importance of mathematics education across the curriculum.

These investigations can be done as standalone activities or carried out as an in-depth sequence to develop pupils' disciplinary and substantive knowledge. The pupils' deeper learning and their science capital development would be more memorable if they were able to collaborate with a scientist such as a botanist or horticultural scientist. If you work with a scientist in this way you could also consider applying for a [Royal Society Partnership Grant](https://royalsociety.org/partnership) of up to £3,000. For more information and to apply, visit: royalsociety.org/partnership



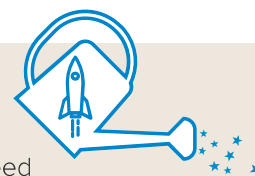
Growing food in space

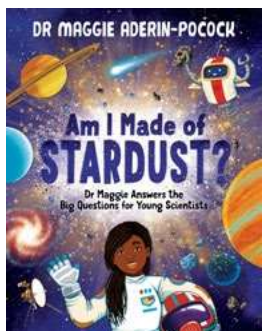
The challenges of growing crops on mars

Find out what pupils already know about what plants need to grow. After using secondary research to find out what the temperature and light levels are like on Mars, invite pupils to discuss whether these are ideal conditions for growing crops for people colonising Mars. Challenge them to set up an investigation growing 'micro-greens' (salads such as mustard and lettuce which are harvested as baby leaves). Ask them to compare the impact of different temperatures and different light levels on the amount of the crop and the health of the plants.

Overcoming the challenges

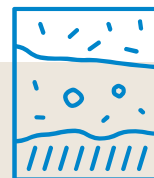
Challenge pupils to think about how they could overcome some of the problems of growing food crops in the harsh conditions on Mars. Could they design a structure that would protect plants and maximise the warmth and the light? If working with a horticultural scientist, they could find out from them what humans already do to help plants grow in harsh climates or they could use secondary sources of information.





AM I MADE OF STARDUST?

Teacher activity sheet (continued)



Martian soil

Soil on earth is made of minerals and lots of 'organic matter'. Organic matter is made up of decomposed plants and animals, whereas Martian soil is comprised only of minerals and no organic matter. Challenge pupils to investigate how well plants would grow without organic matter. They could compare builders' sand with potting compost and investigate the impact of different ratios of the two different growing media. Mustard or radish grow quickly so would give quick results. However, it would be interesting to try other seeds too.

For more ideas about how pupils could explore the properties of Martian soil scan the QR code to access the free resource [Is There Anyone Out There?](#)



Images: © iStock.com / Andrée_Ney



Irradiated plants

Away from Earth's protective magnetic field, people and plants in space are subject to much higher levels of radiation from the sun. Scientists need to investigate how this affects everything that is sent into space. For example, do seeds that have been subjected to radiation still germinate? Microwave ovens produce radiation. Put fast germinating seeds, such as radish, in a microwave on a low setting for 5 seconds. Compare with non-microwaved seeds to see if it makes a difference to germination. What do pupils notice? What happens if the seeds are microwaved for longer? What happens if the plants are microwaved after germination? A similar investigation could be planned by freezing seeds for a week to see if that affects germination.



Career links

Exploration of space and space travel needs collaboration between many different science and engineering disciplines. Consequently, there are a wide variety of related career opportunities.



• Astro-botanist

A lot of the work described in this activity sheet would be conducted by Astro-botanists.

• Material scientists and engineers

Scientists investigate the properties of materials in the extreme conditions of space and engineers apply their findings to make equipment for use by astronauts as well as during unmanned missions.

• Astronaut

Many scientists working in the field dreamt of being astronauts which led them into a wide range of space related careers. Page 107 has some ideas about what experiences and qualifications young people would need to be considered for astronaut training.

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