

# Food in space: (Brussels) space sprouts

## How does space work for us?



Did you know astronauts have grown red peppers, cabbages and lettuces on the International Space Station?

And that's just the start – scientists are now trying to grow plants on the Moon. Living organisms, such as red pepper plants need quite a few things to grow, like water and nutrient rich soil. However conditions on the Moon are a little different, which means we have to be more creative.



For school



For home

## Activity

Can you grow plants on the Moon?

In this activity you'll learn what plants need to survive and thrive on planet Earth, and how the conditions vary on the Moon. Your mission, should you choose to accept it, is to design a greenhouse suitable for growing plants on the Moon. Good luck!



# Guidance for teachers, parents and guardians



In this activity children will learn how space technology is revolutionising the way we produce, distribute, and consume food.

**Activity:** Design a greenhouse for the Moon.

**Approximate time:** 60 minutes.

**Target age:** 9-11 year old, KS2.

## Specific Learning Outcomes:

- I can name the conditions needed for living organisms to survive and thrive.
- I have learnt key facts about the Moon's environment.
- I can apply key learnings to solve a design problem.

## Activity Resources/ materials

- Projector and computer with internet access and sound – **to show video materials** (noted in instructions).
- Activity sheet – one printout per child.
- Pencils and coloured markers.
- Spare paper.



# Extra guidance for those in the classroom



All activities are focused on making the role of the space industry relevant to everyday life. The aim is to inspire students towards an interest in STEAM subjects and build ongoing engagement with STEAM activities.

## Curriculum subjects

- Science: Physics and Biology
- Space

This resource will help students to “develop an understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them.”

Some **crossover curricula** links include: English, Geography, Maths, Art and Design.

Children will engage in **skills** such as: designing, problem solving, working scientifically, written transcription and composition, exploring ideas, using new vocabulary, creative thinking; collecting, presenting and analysing data.

## Activity resources/materials

- Projector and computer with internet access and sound – **to show whole class videos.**
- Activity sheet – one printout per child.
- Pencils and coloured markers – **enough to go around the class.**
- Spare paper.

# Instructions

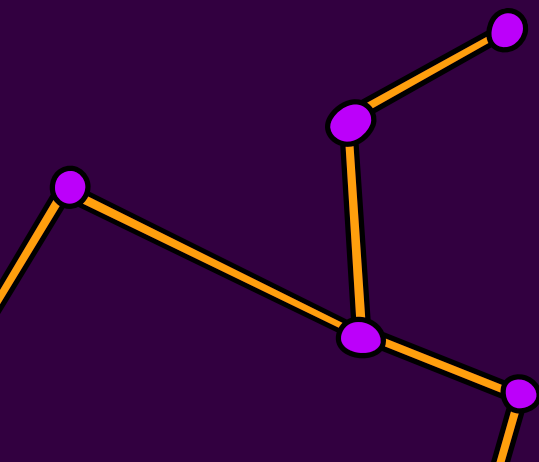


## Starter

1. Individually or as a whole group, ask the children to call out ideas and **answers to the following questions:**
  - a. Can you grow a Brussels sprout on the Moon?
  - b. Why/why not? What is different about the Moon compared to Earth?
  - c. Why do you think scientists are trying to grow plants on the Moon? Why could it be useful to us? **Some examples could be:** to feed astronauts, sustain life beyond Earth, to find new materials and resources that don't exist on our planet.
2. Play [this video](#), which explains:
  - a. Why scientists want to grow plants on the Moon.
  - b. How they are experimenting here on Earth, using tiny amounts of lunar soil collected from space missions.

## Main Lesson

1. Ask the group: **“What do plants need to grow properly? There are 5 things...”** Start by asking children to guess and write their answers down on spare pieces of paper – they have 1 minute to do so.
2. Play this video to show them [what plants need to survive](#), and what happens if some of those things are taken away.
  - a. The 5 things are: air, water, sun, soil and space.



# Instructions



3. To consolidate learning, do a verbal question and answer series with the following prompts. Model with the sentence starter “What happens to a plant if...”
  - a. There is not enough water? Or if there’s too much water?
  - b. There is not enough light, or too much light?
  - c. It has no air?
  - d. It’s too hot? Or too cold?
  - e. There are no nutrients in its soil?
  - f. There’s too many plants in one small area?

## Activity

1. Tell students they are going to look at the conditions for growing a plant on the Moon. **Hand out the activity sheet which has a 'Mini moon fact file' in Task 1**, and go through the list together, checking understanding of vocabulary and meaning.
2. Ask children to discuss with the person next to them how these conditions might make it very hard to grow plants.
  - a. Note: it’s not just a difficult environment for the plant itself; it takes time, money and lots of resources to get the materials needed to the Moon.
3. Watch this video (you may want to select English subtitles by clicking on the relevant icon in the video). to introduce **their Moon mission: how will you grow food on the Moon?** – in a greenhouse.
4. Tell children they are going to design their own Moon greenhouse in **Task 2**, so that they can grow lots of plants in space.
5. Ask them to draw their design. They will need to consider:
  - a. What plants they want to grow.
  - b. What technology they would use.
  - c. Any thing else they might need to make sure their plants grow and survive.
6. In **Task 3**, they will write down their ‘Moon mission shopping list’ using their answers above.

# Resources for teachers or parents/guardians



Here you will find all the links and background information you will need to support you, plus further resources if time/interest allows.

## Setup resources

### A tale of Moon dust at the University of Florida:

- In [this video](#) children will meet two scientists who are experimenting with lunar soil. Their mission is to find out how they can grow plants on the Moon.
- The video also gives a brief overview of why scientists want to grow plants on the moon.

### What do plants need to survive?

- This [BBC Teach video](#) is a great way to demonstrate to children the 5 things needed for plants to grow, and what can happen to them if any of those things are taken away.

### Food on the moon

- Use this [Airbus Foundation Discovery Space video](#) to set children their Moon mission; create a greenhouse on the Moon that is suitable for plants to grow in (you may want to select English subtitles by clicking on the relevant icon in the video).

### How can we grow plants on the Moon?

- This [SciShow Space video](#) is a great resource for further information on growing plants in space. It covers what scientists have already grown on the International Space Station, as well as a previous attempt to grow cotton seeds on the Moon.



# Activity sheet

## Food in space: (Brussels) space sprouts

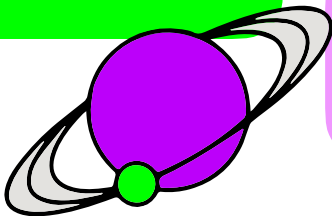
### Task 1: Mini moon fact file

Moon facts

Did you know?...

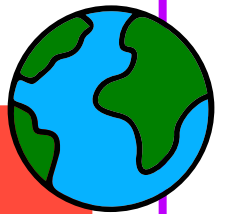
The Moon does not glow, it reflects the light from the sun.

There is no air on the Moon.



Lunar soil has no nutrients.

The Moon has gravity but it is much weaker than here on Planet Earth. It's about  $\frac{1}{6}$  of Earth's gravity.

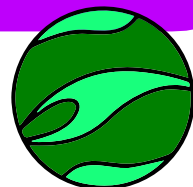


There is water on the Moon but it is in the form of ice, not liquid.

Its temperature ranges from  $-233^{\circ}\text{C}$  at night to  $+123^{\circ}\text{C}$  during the day.

There is no wind or weather on the Moon.

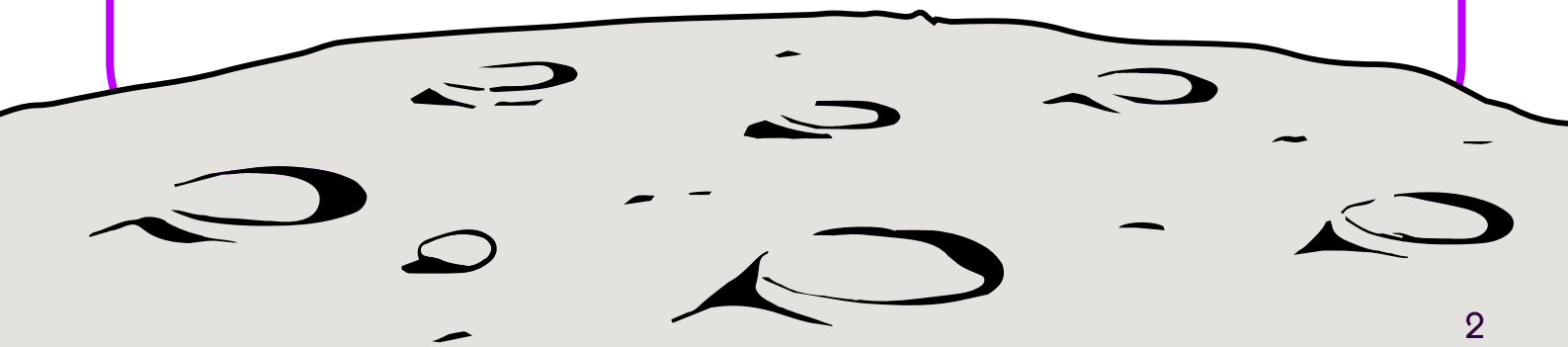
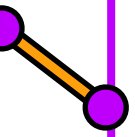
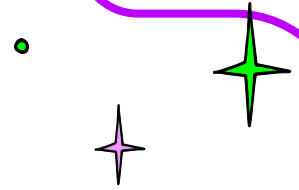
It has a thin atmosphere so there is no protection from the sun.



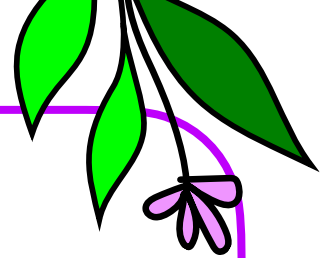
## Task 2: The greenhouse Moon mission

Growing food in space is a big challenge, luckily you're here to help the scientists out.

Design your greenhouse on the Moon below.







## Task 3: My Moon mission shopping list

What plants do you want? What technology do you need? Is there anything else you need to help your plants grow and survive on the Moon?

Write it all down!

*My shopping list:*

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