



Teacher Resource

# Space Food

## Focus Questions

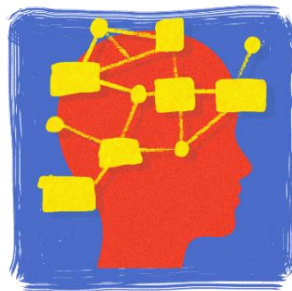
Discuss the BTN story as a class and record the main points of the discussion. Students will then respond to the following:

1. What does duckweed grow in?
  - a. Water
  - b. Soil
  - c. Air
2. Why is duckweed a good food source for astronauts?
3. Give an example of food eaten by astronauts.
4. Why is it important to grow food on long-distance space missions?
5. What questions do you have about this story?

## Activity: Class Discussion

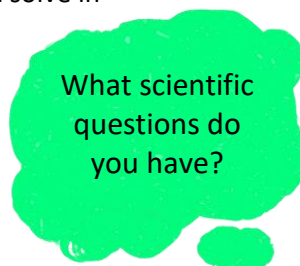
Discuss the BTN story as a class. Ask students what they learnt about growing food in space for astronauts, recording their responses on a mind map. In small groups, ask students to brainstorm responses to the following questions:

- What did you learn?
- What was surprising about the story?
- What do you wonder?
- What questions do you have about the BTN story?



## Activity: Questions and Answers

All scientific discoveries start with a question! As a class, come up with some questions you think scientists ask and solve in relation to plants and what they need to survive. As a class, make a list of questions that you would like to ask a scientist like Professor Jenny in the BTN story. Organise the questions into common themes. Use the internet to find answers to your class questions.



### EPISODE 3

21st February 2023

#### KEY LEARNING

Students will learn more about why it's important to grow food in space for long-distance space missions.

#### CURRICULUM

##### Science – Year 5

The Earth is part of a system of planets orbiting around a star (the sun).

##### Science – Years 5 & 6

Scientific knowledge is used to solve problems and inform personal and community decisions.

With guidance, pose clarifying questions and make predictions about scientific investigations.

Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena and reflects historical and cultural contributions.

##### Science – Year 6

The growth and survival of living things are affected by the physical conditions of their environment.

## Activity: Glossary

Students will brainstorm a list of key words that relate to the BTN Space Food story. Here are some words to get them started.

SPACE MISSION	MICROGRAVITY	NUTRIENTS
PHOTOSYNTHESIS	INTERNATIONAL SPACE STATION	SPACE FOOD

## Activity: Research project

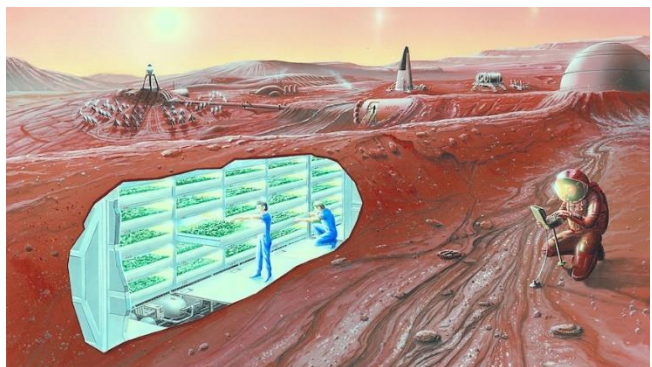
Discuss the information raised in the BTN Space Food story. What questions were raised in the discussion and what are the gaps in students' knowledge? The following KWLH organiser provides students with a framework to explore their knowledge on this topic.

What do I <u>k</u> now?	What do I <u>w</u> ant to know?	What have I <u>l</u> earnt?	<u>H</u> ow will I find out?

### Questions to research

Students will collect and record information from a wide variety of sources. Students may develop their own question for inquiry or select one of the questions below.

- Why might astronauts need to grow their food in space? Consider long-distance space missions.
- How does research into how plants grow in challenging environments help us on Earth?
- What are the benefits of growing food in space?
- How does micro gravity affect plants?
- Can photosynthesis occur in space? Why or why not?
- Can plants grow in Martian soil? What are some ways plants can be grown on Mars?
- How do plants improve air quality?
- What were the first plants to be grown in a spacecraft?
- What do plants need to grow? Consider the following needs: *Water, air, light, nutrients, somewhere to grow*. Investigate why each is important and what are the challenges in space.
- Astronauts can go through something called menu fatigue. Investigate what that is and how it can be avoided.



# Activity: Scientific Method

## What is a scientific method?

Before starting this activity, explain to students what the scientific method is and why we use it. As a class look at a diagram which illustrates the scientific method and explain the meaning of each step in the process. The method consists of a range of steps, however the order of the steps in the process can vary. The scientific method is a tool which helps us to solve problems and answer questions.

## Framework

Provide students with the opportunity to think like scientists. In pairs or small groups, students will conduct a scientific investigation about plants and what they need to survive using the scientific method. Students will design and conduct their own scientific investigation in pairs or small groups. Students will use the framework below before, during and after their investigation.



<p><b>Ask a question</b></p>	<ul style="list-style-type: none"> <li>• What questions do you have about plants and what they need to survive? For example:               <ul style="list-style-type: none"> <li>○ Do plants need photosynthesis to survive? Explain.</li> <li>○ How do plants that grow in shade differ to plants that grow in full sun?</li> <li>○ What is the best medium to grow plants in?</li> <li>○ Do plants grow faster in soil or water?</li> <li>○ Why do some plants grow better in the shade?</li> <li>○ Can plants grow upside down? If so, which way will the plant grow?</li> <li>○ Can plants grow without soil or natural light?</li> </ul> </li> <li>• Brainstorm some ideas for your science investigation based on what you have observed.</li> <li>• Identify a question that can be tested or researched. For example, “What happens when...?” or “What is the effect of...?”</li> <li>• Describe what you are going to research using your own words.</li> </ul>
<p><b>Research</b></p>	<ul style="list-style-type: none"> <li>• Research the topic to learn as much as you can.</li> <li>• Research using secondary sources of information to help you understand the observations you have made.</li> </ul>
<p><b>Hypothesis</b></p>	<ul style="list-style-type: none"> <li>• What do you already know about this scientific topic?</li> <li>• Formulate your hypothesis.</li> <li>• What do you predict to be true about the answer to your question?</li> </ul>
<p><b>Experiment</b></p>	<ul style="list-style-type: none"> <li>• Design and conduct an experiment to test your predictions.</li> <li>• How will you test your hypothesis?</li> <li>• What steps do you need to follow to investigate your prediction?</li> <li>• What equipment and materials will you need to conduct your investigation?</li> </ul>

	<ul style="list-style-type: none"> <li>• How will you gather evidence?</li> <li>• Plan how you will record and organise your data.</li> <li>• Perform your experiment, by repeating trials of tests, taking measurements, making observations, and recording data.</li> </ul>
<b>Analyse Data</b>	<ul style="list-style-type: none"> <li>• What does the data mean? Write a paragraph that summarises what happened.</li> <li>• Make calculations using the data you have collected.</li> <li>• Can you see any patterns in the data you have collected?</li> <li>• Draw a labelled diagram of your results to show what happened.</li> </ul>
<b>Conclusion</b>	<ul style="list-style-type: none"> <li>• Review your findings in relation to your hypothesis.</li> <li>• How effective was your investigation in testing your hypothesis?</li> <li>• Think of a creative way to explain/answer your science discovery (using multimedia, models, video, or animation).</li> <li>• Create your own mini science lesson about what you have learnt and teach students in another class.</li> </ul>
<b>Reflection</b>	<ul style="list-style-type: none"> <li>• Was this what I expected? Explain.</li> <li>• What problems did I experience when I was doing the investigation? How could I fix these problems?</li> </ul>

## Activity: How do astronauts live in space?

Students will learn more about what life is like on the International Space Station. These videos provide a snapshot of what living on the ISS is like.

[Everything about living in space](#)

[Life inside the ISS](#)

Students will describe a day in the life of an astronaut on the ISS, including information about sleeping, eating, personal hygiene, exercising and carrying out work on the ISS. What do astronauts do in their spare time?



As a class, watch the [Eating in Space](#) video for an in-depth look at how and what astronauts eat to stay healthy. Students will then respond to the following questions:

- What food do astronauts eat?
- Is there any food they can't eat?
- Does food need any special preparation before it can be eaten?
- Why is nutrition important for astronauts?
- If you lived in space, what foods would you miss the most? Why?

## Activity – Choose a Project

Individually or in small groups, students will choose one of the following projects to work on and then present their findings to the class.

### Duckweed Recipe

Create a recipe that features duckweed. Remember that duckweed takes on the flavours of other ingredients. Could the dish be made by astronauts in space?

### Space Gardening

Explore ways to grow plants in space. This [Kids Gardening resource](#) has some ideas about growing plants using hydroponics.

### True or False?

Create a true or false quiz about growing plants in space and test your classmates. Alternatively, create a word find or crossword.

### Lettuce look at Veggie

Find out how veggies are grown on the International Space Station. Watch [this NASA video](#) to learn more about Veggie. Write a short report explaining how it works.

## Useful Websites

- [Is life on Mars a duckweed diet away? Not quite, but it could advance the cause of space travel](#) – ABC News
- [Growing Plants in Space](#) – NASA
- [Rocket salad: growing plants in space](#) – Australian Academy of Science
- [Space Seeds](#) – BTN
- [Life in Space](#) – BTN
- [Life on Mars](#) – BTN