



Teacher Resource

Space Seeds

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. Briefly summarise the BTN story.
2. What species of seeds were sent into space?
 - a. Golden Wattle
 - b. Mulga Wattle
 - c. Silver Wattle
3. Why were the seeds sent into space?
4. Explain the seeds in space experiment.
5. What theories did the students have about their seeds in space?

Activity: What do you see, think and wonder?

After watching the BTN Space Seeds story hold a class discussion, using the following as discussion starters:

- What do you THINK about what you saw in the BTN story?
- What does this video make you WONDER?
- Think of three QUESTIONS you have about the story.
- What did you LEARN from 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 (see below for some example questions). Use the internet to find answers to your class questions.

- Why are we sending seeds to space?
- How does micro gravity affect plants?
- Can photosynthesis occur in space? Why or why not?
- Can plants grow in Martian soil?

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KEY LEARNING

Students will use the scientific method to learn about the requirements of plants.

CURRICULUM

Science – Year 4

Science knowledge helps people to understand the effect of their actions.

Science – Year 5

Scientific understandings, discoveries and inventions are used to solve problems that directly affect peoples' lives.

Science – Years 5 & 6

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

Science – Year 6

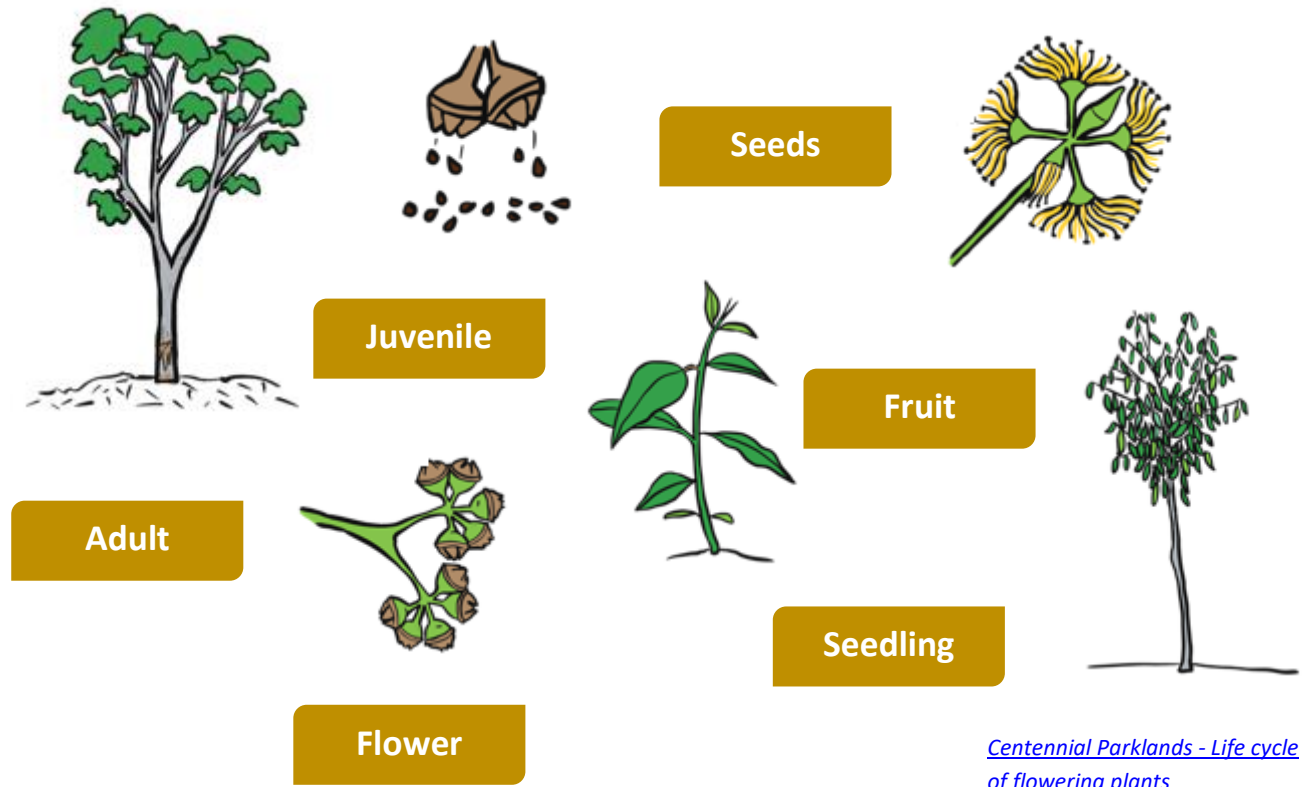
The growth and survival of living things are affected by the physical conditions of their environment.

Science – Year 7

Scientific knowledge has changed peoples' understanding of the world and is refined as new evidence becomes available.

Activity: Plant life cycle

Like all living things plants have a life cycle. Before starting this activity, students will research the six stages in the life cycle of a flowering plant. Ask students to then arrange the following images and stages (and add arrows) to create a diagram demonstrating the life cycle of an acacia plant.



Further investigation

Students will respond to one or more of the following questions to extend their learning on this topic.

- Investigate each step of the life cycle of an acacia plant, explaining the biological mechanisms behind it.
- What adaptations do acacia plants have to survive in their environment?
- What family group do acacia plants come from? Explore the classification of acacia plants.
- What are the best growing conditions for acacia plants?

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 and behave 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.



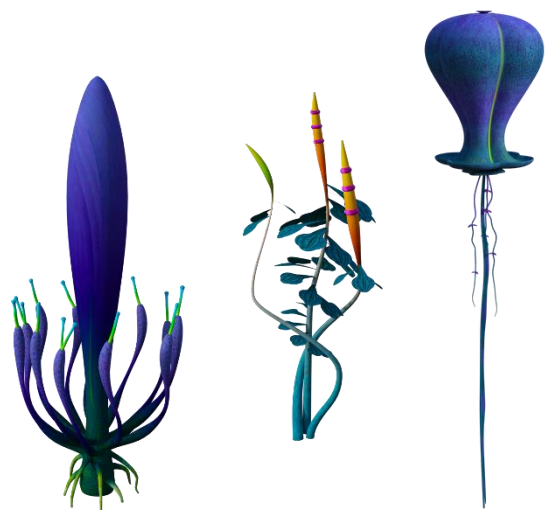
Ask a question	<ul style="list-style-type: none">• Plan a visit to a local nature reserve or your own school yard to explore and observe the plants around you. Take notes about what you see. Use speech bubbles to document your thoughts and graph paper to document what you see. Ask why or how something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

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

Activity: Create your own alien plant!

Students will use their imagination and create their own alien plant species that can survive in space. Students will imagine they have discovered a new species of plant which has never been seen before on Earth. Use the following as a guide for this activity:

- Illustrate the new plant species using only a black felt-tip pen on a piece of A4 art paper – include as much detail as you can.
- Give the plant a common and scientific name.
- Describe what the plant looks like – what are some of its physical characteristics?
- How does it survive in its environment? What are its adaptations?
- Does it have any interesting or unique features?



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.

Greenhouse design

Design your own greenhouse for plants! Challenge yourself by making a model of a greenhouse to grow plants on Mars. Do you think plants will grow in Martian soil?

Plant life cycle

Plant a native species local to your school's area. Observe and document the stages of the plant's growth: as each life stage appears.

Seed bank

Get involved in seed collecting. Collect samples of plants and remove the seeds for storing. Seeds need to be kept cool and dry in either cloth or paper (not plastic).

Scavenger Hunt

Go on a scavenger hunt in your local area and try to identify as many plants as you can. Look for plants in each of the life cycle stages. Keep a nature journal.

Useful Websites

- [What'll happen to the wattle?](#) – Seeds in Space
- [Growing Plants in Space](#) – NASA
- [Space Seeds Are Heading to Schools](#) – Space Australia
- [Endangered Seeds](#) – BTN
- [Moon Water Discovery](#) – BTN
- [Simple Hydroponics](#) – Gardening Australia