



## Stage 5: Investigating the requirements of plants for life and growth

### Learning Objectives:

- To design and conduct a fair investigation
- To explore the requirements of plants for life and growth

### Stage Overview:

In this stage, the children will design and carry out their own fair tests to understand first-hand what is required for their plants to grow. Using the extra bean plants that were grown earlier in the project, the children will work in groups to investigate and observe what happens to a plant when one element is removed from its environment. This will help them to draw conclusions about the function of different parts of the plants and the requirements they have for growth and life.

### Materials needed:

- 10 bean plants (grown in stage 1)
- Question cards
- Envelopes x 5
- Investigation planning grid

### Presentation notes:

Slide 2: Prediction envelope carousel

- Assign children to mixed ability groups and give each group one question to investigate:
  1. What will happen to a plant without leaves?
  2. What will happen to a plant without roots?
  3. What will happen to a plant without water?
  4. What will happen to a plant without light?
  5. What will happen to a plant without nutrients?
- Ask the children to think carefully and write an answer to their group's question on a post-it note. Encourage them to use the word **BECAUSE** to extend their reasoning.
- Collect all the prediction post-its in an envelope (one for each group) and then ask them to discuss their predictions with their group.

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|---------------------------------------|---|
| Slide 3: Fair testing                 | <ul style="list-style-type: none"> <li>- Use the power point to discuss the meaning of a fair test and why it is important.</li> <li>- A fair test is a controlled investigation that compares two things. In order for a test to be fair or well controlled, we have to make sure that only one thing (this is called a variable) is changed and everything else is kept the same.</li> <li>- A variable is anything that can affect the results we are observing or measuring.</li> <li>- In our investigation, we will use two bean plants that are the same age. We will change one variable (something in the plant's environment) for one plant but not the other. Then we will treat both of our plants exactly the same and observe what happens. By only changing one thing on one of plants, we can see if that one thing makes a difference to how the plant grows by comparing it with the plant that we have not changed (the control plant).</li> </ul> |
| Slide 4: Investigation design         | <ul style="list-style-type: none"> <li>- In groups, ask the children to think about how they will conduct an investigation to answer their group's question. What will they change for one plant? How will they check if it is making a difference?</li> <li>- In groups, ask the children to think about all the things (variables) that they will have to keep the same for both of their bean plants.</li> </ul>   |
| Slide 5: Investigation planning       | <ul style="list-style-type: none"> <li>- Using the investigation planning grid, ask the children to write up their investigation plan. Challenge them to use the correct scientific vocabulary and explain why they are changing their variables or keeping them constant.</li> </ul>   |
| Slide 6: Practical investigation      | <ul style="list-style-type: none"> <li>- The children should set up the investigation that they planned. Remind them to label their plants as either the 'control' or the 'experimental' plant at this stage.</li> </ul>  |
| Slide 7: Keeping observation journals | <ul style="list-style-type: none"> <li>- Ask groups to observe their plants at regular intervals, recording their observations with diagrams each time.</li> </ul>  |
| Slide 8: Drawing conclusions          | <ul style="list-style-type: none"> <li>- Once a difference has been observed, ask the children to think about their results and write a conclusion to explain why they think this has happened.</li> <li>- Re-open the prediction envelopes to see if they were correct.</li> </ul>   |
| Slide 9-12: Understanding our results | <ul style="list-style-type: none"> <li>- Share the power point to teach the children about the different parts of the plant and their functions.</li> </ul>   |
| Slide 13: Presenting findings         | <ul style="list-style-type: none"> <li>- Give the children the opportunity to prepare a short presentation to explain their results and explain why they occurred using what they have learnt from the power point.</li> <li>- Address any misconceptions that they may still have.</li> </ul>  |



**Links to the National Curriculum:**

| Subject | Topic                  | Objective   |
|---------|------------------------|---|
| Science | Plants                 | <ul style="list-style-type: none"><li>- Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</li><li>- Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant</li></ul>   |
|         | Working scientifically | <ul style="list-style-type: none"><li>- Asking relevant questions and using different types of scientific enquiries to answer them</li><li>- Setting up simple practical enquiries, comparative and fair tests</li><li>- Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment</li></ul> |