

6-8  
years

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**Science Content:**

Life Sciences

**Target Concepts/Skills:**

Germination of seeds, growth of seeds into plants

**Target Age group:**

6-8 years

**Duration of activity:**

1 complete lesson + 2 equivalent lesson times spread across a period of 3-4 weeks

**Summary:**

Children investigate what helps a seed grow into a plant by comparing germinating seeds and by sowing their own seeds and observing, recording, measuring and describing the growth of the seed. Different types of investigations can be carried out and depending on what aspect of conditions for plant growth students want to investigate. Templates for recording plant growth are provided.

**Objective:**

By the end of the activity children should be able to:

- Identify the different factors which influence how much and how well a plant grows;
- Design and carry out investigations to test the impact of these different factors on the rate of plant growth;
- Carry out detailed observations of the growth rate of plants across a period of time;
- Record the stage of growth of a seedling in a table and note different aspects.

**Resources:**

- A variety of seeds;
- Jars or plan pots/trays;
- Paper towels;
- Newspapers;
- Water;
- Compost;
- Labels;
- Hand lenses;
- String for measuring;
- Shoe boxes to create different light conditions

# Growth: Exploring seeds, germination and growth

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## 1. Engage (Forming hypotheses)

Decide which question to investigate (= the challenge)  
What do children already know? What are their ideas? (make the question to investigate meaningful for the children)

### Starter/ stimulus to elicit previous knowledge from the children

Have a variety of seeds that have started to germinate  
Observe and compare the seeds – What is the same? What is different?

Children are invited to consider differences in how seeds germinate and what might be needed for this. Seeds can be presented and discussed as a circle-time activity or in small groups.

**Pose the questions** - What made the difference? Why are they different? What will they become?

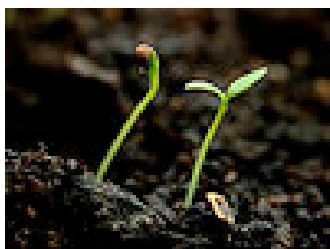
## 2. Inquiry

### Investigation - what helps a seed grow into a plant? Explore and investigate seed germination

The teacher explains to the children that they are going to do investigate in groups into what helps a seed grow into a plant:  
Children need to discuss together:

- which questions they would like to answer
- what they will do to try and answer these and in which order
- which materials they need/want to use
- how long they are going to take for each part of the investigation
- who will do what
- what they expect to see
- which findings are important to answer their question and how
- how they will record their findings
- how to present their ideas/findings to the whole class

### The teacher shows all available materials and hands out seed trays to each group.



### Possible options for questions to investigate:

- Which 'soil' do plants grow best in?
- How much water do plants need to grow?
- Which is the best 'drink' for plants?
- How much light do plants need to grow?
- Which 'colour' of light do plants grow best in?

### Planning including identifying variables, prediction

- Children discuss in groups what they want to investigate, how they will do this, what variables they should consider, and what equipment they need
- Children set up their investigation

### Observation– annotated drawings / digital camera

Recording, measure and describe - make a seed growth diary

- Children gather together as a whole class

The teacher elicits/presents ideas on how information might be recorded and described; how could you make a seed growth diary? Which information is important and how can you record it?

- Children decide (in groups) on how to record and describe – (drawings, photographs, graphs (counts), tables, paragraphs, a diary etc.)

The teacher goes round and assists/facilitates, the teacher makes sure that individual children or as a group have noted what they have done and how they intend to record their findings – books/ group diary/ as a Word document etc.

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## Explanation of findings and evaluation - this will take place several times over the next few weeks

Plenary / whole class discussion of findings

- Group leaders present their findings to the whole class, which questions they asked and answers they got; their methods, their discoveries (surprises)? Next steps for investigation

The teacher encourages groups to comment on each other's methods and findings, to compare, give feedback – come up with a synthesis of the best practice. + a top 3 of most interesting findings. The teacher also facilitates in terms of what questions could be asked, helping children note things they don't find out if their own according

## Optional extension

### Extending thinking/creativity: Do plants have feelings?

#### How does an acorn grow into a big tree?

The teacher facilitates a philosophical enquiry with the whole class – eliciting arguments and counter-arguments; syntheses of both; new questions; conclusion for now (anthropocentric/ anthropomorphic ideas about the world, plants as primary producers, dependence of all life on plants, photosynthesis)

**[This can be experimented with, i.e. the question can be asked before or after the investigation to measure the effect on the quality of the investigation and children's scientific enquiry based questions ]**

## Additional Notes

Previous knowledge requirements of pupils: seeds and plants are living things; there are different sorts of plants; many plants have roots, a stem, leaves and flowers; living things can be grouped)

### Common misconceptions:

- Seeds are dead; they only come alive when they have been planted and begin to grow (a seed is regarded as dormant however and becomes an active plant when favourable conditions are present)
- Seeds contain a baby plant
- Seeds will not germinate in the dark
- Plants make food from the sun
- Plants get food from the soil (instead, they manufacture it themselves using the process of photosynthesis)
- Plants will die if they are not kept on a window sill

### Teacher notes/advice/things to think about

- How large should the groups be? Mixed ability or not? Should roles be assigned?
- Possible health & safety hazards such as pollen allergies; children need to wash their hands well after the activity, not stick their fingers into their mouths or eyes during the activity
- How much guidance do children need with each stage of the investigation
- Other adults needed
- Discuss treating plants with care with the children and why this is important
- Have questions ready to help children along
- Structured vs. open-ended: this is something to be considered. The worksheets are provided if teachers prefer a more guided lesson. If the teacher prefers to let the children

decide about how to record their data, they can decide not to use the worksheets. Similarly, if teachers wish to focus more on the active part of the investigation than on writing, the worksheets can be skipped, or worksheets can be adapted to the age of the children or children with special needs.

### Subject knowledge background for teachers

Seeds are produced by flowering plants as the mechanism for reproduction. Seeds are produced as a result of pollination and most flowers are adapted for pollination by animals or the wind. All flowering plants have a life cycle which involves pollination, fertilization, seed production, seed dispersal, germination and growth. Seeds need water, oxygen and warm conditions to germinate. Germination and subsequent plant growth are often confused. Germination is the growth of the embryo using the food stored in the seed to develop into a seedling when conditions are right. The food store in the seed is used up to produce the seedling with its first leaves. Further growth occurs when the first leaves emerge above the soil and the young plant produces its own food through photosynthesis. The young plants need light, water, air and mineral salts for growth and maximum growth usually occurs in warm conditions. The leaves of a plant will turn towards the light (phototropism) while the roots grow towards the pull of gravity (geotropism). The developing roots absorb water and provide more water for the growing plant. Learning about plants in the classroom and the local environment is made easy because they are readily available, and the factors affecting germination and growth can be explored and observed over time with ease. Across the 3-4 weeks, lessons need to be planned to allow time for setting up the experiment, measuring the plants (perhaps at a fixed time each day), and dealing with the findings and conclusions.

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## References

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- Gillespie, H. and Gillespie, R. (2008) Science for Primary School Teachers. Buckingham, UK: Open University Press.
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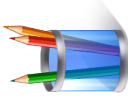







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## My seed growth diary

<p>Photograph of your plant</p> 				
<p>Drawing of your plant</p> 				
<p>What else do you see or feel?</p> 				
<p>How many leaves does it have?</p> 				
<p>What colour is it?</p> 				
<p>How high is the seedling now?</p> 				
<p>Where was your plant? How much light did it get?</p>				
<p>What 'food' or 'drink' did you give and how much?</p> 				
	<b>Week 1</b>	<b>Week 2</b>	<b>Week 3</b>	<b>Week 4</b>