



Year Two Science: Plants



Scientific enquiry types covered in this topic

	Classifying, identifying and grouping
	Comparing and Fair Testing
	Pattern Seeking
	Research
	Observing over time

Knowledge of working scientifically covered in this topic

	Making predictions	Children consider in advance what might happen or what they might find and know this is called a prediction
	Ask and answer questions	Ask questions that include scientific language, recognising they can be answered in different ways. Use secondary sources to answer questions
	Observing	Use simple equipment to observe closely including changes over time
	Measuring	Begin to measure in standard units using equipment with simple scales
	Recording data	Gather data to help answer questions including secondary sources
	Performing simple tests	Perform simple tests
	Presenting results	Communicate ideas and findings in a variety of ways
	Drawing conclusions	Explain what happened, what was found out and why

Lesson Structure

- Build on **prior learning**
- Encourage students to **recall** that prior learning
- **Make** the new **learning** in each lesson succinct, **clear** and meaningful
- **Share/model/instruct** the new knowledge to students in small manageable steps
- **Check** they are with you throughout and are grasping the knowledge
- Provide opportunity to recall and **practise** the knowledge
- Provide live **feedback** during practise
- Provide opportunity to **apply** that new knowledge in a slightly different context
- Encourage students to **deepen** their understanding with challenging tasks that requires thinking, reasoning and explaining.
- **Check** students have secured the new knowledge with a quiz





Prior learning: In Year One children learnt about the the variety of plants, the different plants to be found locally and the basic structure of plants and trees

Meet some brilliant scientists...



David Bellamy was a famous botanist and a television presenter. He also wrote many books about plants and nature.



Jane Colden was born in 1720 and was the first woman botanist in America. She discovered more about plants and she and her father wrote and illustrated a book about them. The book was so good that it won an award.

Are all seeds the same?



We will learn that there are many types of seeds which come in different shapes, colours and sizes by careful observation. We will also learn where seeds come from.



I know that: seeds come in different shapes, sizes and colours



What do plants need to grow well?



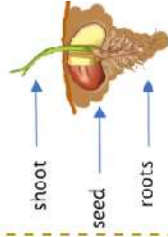
We will learn that plants need light, warmth soil and water to grow well. We will investigate growing cress seeds by carrying out a fair test, generating our own predictions and conclusions.



I know that: plants need light, water, warmth and soil to grow well



How do seeds grow into plants?



We will learn that germination is the process when a seed begins to grow into a plant. Germination needs the right temperature, oxygen and water. We will carefully observe bean plants at different stages of germination, keeping a 'bean diary' over a number of weeks to observe growth.



I know that seeds germinate into seedlings, producing roots and shoots



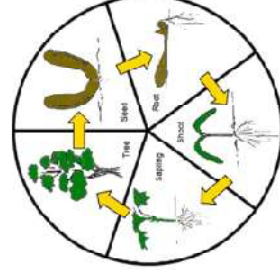
How do plants reproduce?



We will learn about how plants reproduce and learn about the life cycles of different plants, using books, leaflet and the internet.



I know that: plants produce seeds which grow into new plants

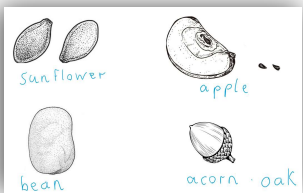


Vocabulary

observation	light	seedling	grouping
prediction	soil	root	germination
research	warmth	shoot	life cycle
fair test	water	seed	reproduce

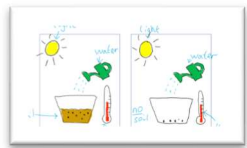
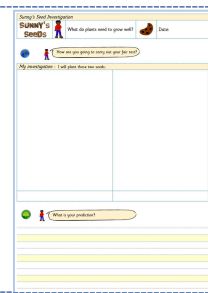
	Year Two Science: Plants	Session 1: Are all seeds the same?	
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	'Sticky' Substantive Knowledge	I know that seeds come in different shapes, sizes and colours
	'Sticky' Disciplinary Knowledge	I can observe carefully using magnifying glasses
	Scientific Enquiry Type	Classifying, identifying and grouping

Recap / Retrieval	 Introduce key botanists – David Bellamy and Jane Colden. Describe what they are famous for and add pictures to working wall. Introduce term 'botanists' as plant scientists, and explain that over the next few weeks that the children are going to be botanists and learn about plants.
Share knowledge and vocabulary	Introduce key word 'seed' (have it on flashcard (with illustration) to add to anchor chart). Explain that it is the part of the plant which can grow into a new plant. We call this 'reproduce'. Introduce key word 'reproduce' (have it on flashcard (with illustration) to add to anchor chart). Explain this is how living things make more living things e.g. by having babies or producing new plants. Explain that today we are going to be developing our scientific knowledge of careful observation, using magnifying glasses to help us carry out a classification enquiry. seed  reproduce  observation  grouping 
Model	 Model showing where seeds come from. Ideally, have some in fruit, (e.g. apple, avocado) some on trees (e.g. acorn, sycamore) and some in flowers (e.g. sunflower, poppy). You may need to have pictures of these due to seasonality. Look closely at a number of seeds – describe them (e.g. colour, size), showing them on IWB if possible (either using the webcam, or having blown up pictures taken beforehand). Sort them into groups, using criteria – e.g. small / large / rough / smooth / white / brown (use show-me board with labels). Have a variety of seeds (e.g. if possible sycamore, conker, acorn, avocado, apple, bean, peach, sunflower, pumpkin, apple, poppy, pine cone, rice, corn (popcorn seeds), orange).
Do and Check	Children to work in small groups to sort a set of seeds (different to teachers) by own criteria on whiteboards.
Including scaffolding	Once complete, children to use a 'gallery' approach to look at other children's groups. Discuss different ways children sorted. Teacher to photograph for books. 
Apply in context	Children to carefully observe and draw different seeds, using magnifying glasses (include a bean seed and 3 other seeds of their choice). (Put sticker in books with rectangles of paper for drawings.) Provide enlarged photos of seeds to scaffold children who need support with observational drawing.
Including scaffolding	
Reflect and review	 What have we learnt about seeds? Recap that plants produce seeds to reproduce and that seeds can come in many shapes, sizes and colours. In small groups, children to plant a bean seed in a sandwich bag containing soil. Tape the bags in a row on the window. Explain we are going to begin to keep a bean diary over the next four weeks. Children to photograph their first picture of the bean in soil.

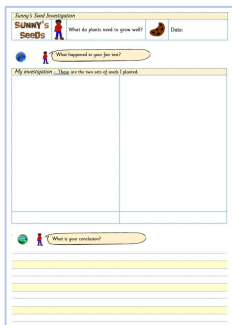
	Year Two Science: Plants	Session 2: What do plants need to grow well?	
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	'Sticky' Substantive Knowledge	I know that plants need light, water, warmth and soil to grow well.
	'Sticky' Disciplinary Knowledge	I can use my knowledge of plants to make a prediction
	Scientific Enquiry Type	Comparative and fair testing

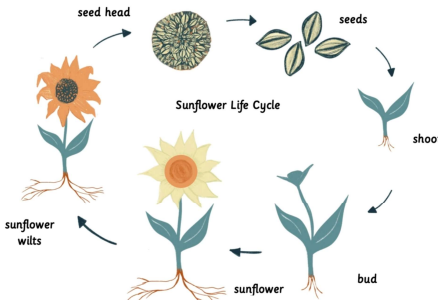
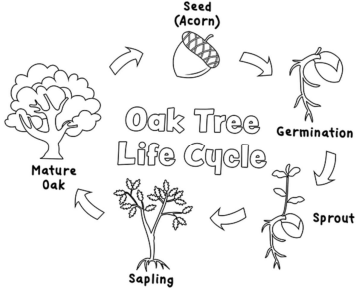
Recap / Retrieval	Recap what we learnt in the last lesson, focusing on the vocabulary 'seeds' and 'reproduce'. What did the children learn? What do seeds look like? Where do they come from? As a class complete a seed 'thought shower' on a piece of sugar paper of everything they know. Children to complete 'Quick Check' activity. Take a look at the beans. Have they started to germinate? (Introduce this, but we will come back to it in a few weeks).			
Share knowledge and vocabulary	prediction  PREDICTION: A statement made using special knowledge about something that will happen in the future. fair test 	Explain that when scientists make predictions, this is based on facts they already know, not just guesses. Show this video to highlight this: www.youtube.com/watch?v=hXQhOFopd44. Model making a prediction for example, dropping an egg. What do we know about eggs? Discuss the facts we know: They have a thin shell. Their shells are hard. Inside they have white and egg. Using what we know, model predicting what will happen if we drop the egg. Explain that today we will be making predictions when we carry out a fair test to find out what plants need to grow well. Explain a fair test is when we carry out two tests to compare something but we change just one thing (variable).		
Model	Play children the beginning of the video 'Sunny's Seeds' tinyurl.com/Sunnys-Seeds up until the point it asks 'What do you think she said?' Agree what we think mum will say, and talk through what plants need to grow well, showing vocabulary cards (MT / YT). Play the rest of the story and check if we were right. Ask why the seeds didn't grow when he just put them in water. Explain that we are going to investigate what plants need to germinate and grow well. Describe how we will do this by growing cress plants with everything they need to be healthy, but growing some others with just one of these variables missing, to compare it fairly (warmth, water, soil or light). This will make it a fair test. Model planting the two sets of seeds, one with all the requirements for growth, and one without any soil. Share with children some possible predictions about what might happen, based on our knowledge of what plants need to grow well. e.g. the plant won't grow at all / the plant will grow but much slower / the plant will grow quicker / the plant will grow really tall / the plant will just grow a little bit. Share these possibilities on the anchor chart.			 light  soil  warmth  water 
Do and Check Including scaffolding	Ask children for their predictions of what might happen to the seed grown without soil, using the vocabulary of 'my prediction...' Children to work in pairs to agree a prediction. Scaffold with stem sentence where needed 'I think... because...'. Take feedback.			
Apply in context Including scaffolding	Children to work in groups to plant cress seeds – one with all requirements for growth, one with one missing (water / warmth / light). Children to predict what will happen to the two sets of seeds. Scaffold with stem sentence where needed 'I think... because...'			 
Reflect and review		What have we learnt today? Recap what plants need to grow well. Take a look at the bean seedlings. Continue to keep bean diary – children to photograph their beans for their bean diaries.		

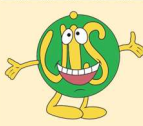
	Year Two Science: Plants	Session 3: What do plants need to grow well?	
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	'Sticky' Substantive Knowledge	I know that plants need light, water, warmth and soil to grow well.
	'Sticky' Disciplinary Knowledge	I can draw conclusions about what plants need to grow well.
	Scientific Enquiry Type	Comparative and fair testing

Recap / Retrieval	 Recap prior learning. Ask children to 'talk like an expert'. Write the key vocabulary (warmth, reproduce, seed, germination, fair test, prediction) on talk like an expert grid, and children to discuss in pairs, ticking off once they are confident they have explained it. Take feedback from each pair. Children complete 'Quick Check activity' 2.		
Share knowledge and vocabulary	Recap previous session. What have we learnt about what plants need to grow well? Recap the key vocabulary from last time. Explain that today we are going to look at what has happened to the cress plant and draw a conclusion. Introduce this word and explain that it means explaining what has happened and why. Explain that we can use our knowledge to help us explain our conclusion. When we explain why something has happened, we use the word 'because'.		conclusion  light  soil  warmth  water 
Model	Look at pictures of various plants with reasons as to why they aren't healthy. E.g. didn't ripen – not enough sun E.g. not enough rain E.g. too much rain Match conclusion This plant is healthy because it had..... This plant is not healthy because.....		
Do and Check	Children to look at pictures of plants (healthy, grown without water, grow with too much water, grown in dark) and form conclusions using sentence stems (I think.... because...), matching conclusions (it is healthy / unhealthy) and reason (it didn't have enough water / light / too much water) to pictures.		
Apply in context	Look at the two sets of seeds planted by the teacher last week. Look at the differences between the plants. Describe the differences / similarities between the plants. Model drawing the two sets of plants, carefully observing and labelling features such as colour and height. Model writing a conclusion describing what happened and why, using the word 'because'. Children to look at their cress plants to describe, draw and label. Children to draw conclusions based on what they did and the knowledge they have about what plants need to grow well. Provide scaffold with word bank and stem sentence where required.		
Reflect and review	 What have we learnt today? Share the conclusions made. Watch video https://www.bbc.co.uk/bitesize/topics/zk7h34j/articles/znpgrij6 to reinforce. Take a look at the bean seedlings. Continue to keep bean diary – children to photograph their beans for their bean diaries.		

	Year Two Science: Plants	Session 4: How do seeds grow into plants?	
	'Sticky' Substantive Knowledge	I know that seeds germinate into seedlings, producing a root and shoot	
	'Sticky' Disciplinary Knowledge	I can measure length in cms using a ruler	
	Scientific Enquiry Type	Observing over time	
Recap / Retrieval	 Recap previous learning from topic. Have a class quiz on learning so far (what plants need to grow well, germination, seeds) Children complete 'Quick Check activity' 3.		
Share knowledge and vocabulary	Introduce idea of observation over time – explain that we are going to look closely at how our bean seeds have germinated and grown over the previous weeks, using magnifying glasses to observe closely. Introduce key vocabulary. seed germination reproduce seedling shoot root		
Model	 Look at the oak tree growing time lapse footage: https://www.youtube.com/watch?v=9A3LrQ3MA-E Discuss the parts of the tree (root / shoot / seed) and germination. Explain that the seed is germinating in water, but explain that without soil it won't grow into a healthy tree. Using a still photograph of the young tree, model labelling the key parts of the plant. Measure the plant (explain it is to scale) and the length of the root and shoot to the labels.		
Do and Check	 Give children in pairs or small groups pictures of various seedlings with labels. Children to add the labels (seed / shoot / root / seedling) and to measure the root and shoot Watch seed germination to reinforce https://www.youtube.com/watch?v=TE6xptjgNRO		
Apply in context	Children to photograph the bean once more for their bean diary. Look at the 4 photographs. Discuss the difference.		
Including scaffolding	Children carefully observe and draw seedling using magnifying glasses to carefully observe. Use word bank to assist drawing. Measure the root and the shoot, adding these lengths to the diagram. Provide sticky labels of key vocabulary to add to drawings to scaffold where needed		
Reflect and review		Share how the seedling has changed over the four weeks. Recap today's sticky knowledge, including the key vocabulary.	

	Year Two Science: Plants	Session 5: How do plants reproduce?	
	'Sticky' Substantive Knowledge	I know that plants produce seeds which grow into new plants	
	'Sticky' Disciplinary Knowledge	I can use secondary sources to answer questions	
	Scientific Enquiry Type	Research	
Recap / Retrieval	Recap previous learning. Use vocabulary cards to prompt ideas from children.		
Share knowledge and vocabulary	Explain today that we are going to learn about how pants reproduce. Introduce this word. What do we know already? Introduce other key vocabulary.		seedling  life cycle  root  seed  shoot  reproduce 
Model			Ask question, 'How to plants reproduce?' How can we answer the question? Explain that we can find the answer by carrying out research – looking at the internet or using books and fact sheets. Model placing pictures form life cycle of a sunflower in a life cycle
Do and Check Including scaffolding			In groups, children to sort different pictures from life cycle of an acorn, adding labels to each picture.
Apply in context Including scaffolding	Have a range of appropriate books and fact sheets, together with laptops to research using squiggle. Model drawing a life cycle based on research, using the key words from the wood bank. Children to use internet, leaflets and books to research to draw own life cycle of a plant to show reproduction.		
Reflect and review	 Children to share life cycles they have researched and drawn to answer the question 'How do plants reproduce?'. Share key learning from today's lesson.		

	Year Two Science: Plants	Session 6: What do you know about seeds and plants?	
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	'Sticky' Substantive Knowledge	Recall of all previous substantive knowledge
	'Sticky' Disciplinary Knowledge	I can present my results to an audience, creating a booklet
	Scientific Enquiry Type	Research

Recap / Retrieval	 Have a class quiz on prior knowledge based around the three questions: What do seeds look like? What happens when seeds germinate? What do plants need to grow well?
Share knowledge and vocabulary	Revisit all prior learning. Explain that we are going to answer the key questions to provide a leaflet to explain about plants research 
Model	Model creating own book with each question as a heading to a page. Add information, photographs, diagrams from the last few weeks learning.
Do and Check	Children to create a book:
Including scaffolding	What do seeds look like? (Are they all the same?)
Apply in context	What happens when seeds germinate? (What is germination? What are the parts of a plant called?)
Including scaffolding	Where do plants need to grow well? (What do they need to grow? What happens if they don't have all these requirements?)
Reflect and review	Scaffold with key questions on labels where needed.  Children to create leaflets to distribute for family and other pupils to learn about plants. Have an end of topic quiz to recap learning.

observation



prediction



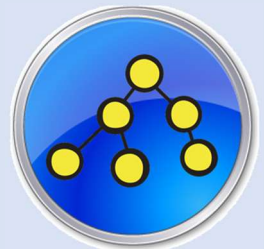
research



fair test



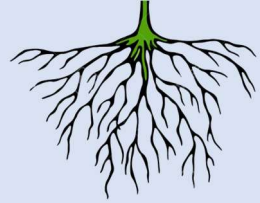
grouping



seedling



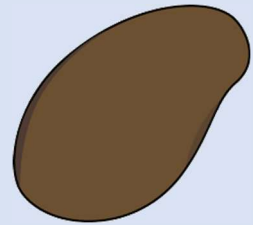
root



shoot



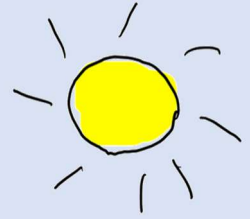
seed



germination



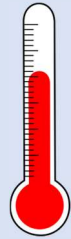
light



soil



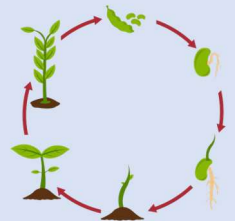
warmth



water



life cycle



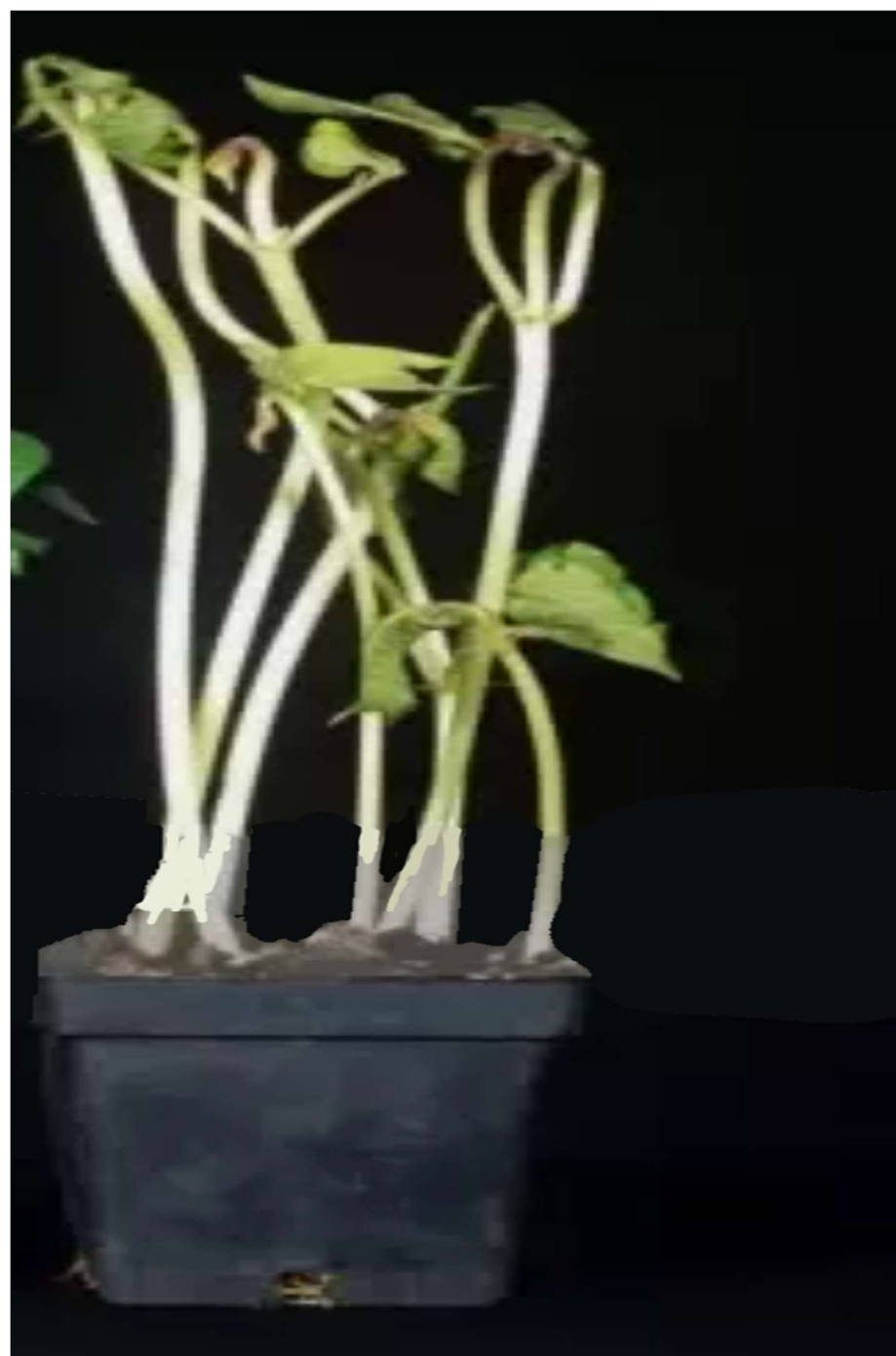
reproduce











I think	I think	I think
I think	because	because
because	because	
this plant is healthy		
this plant is unhealthy		
this plant is unhealthy		
this plant is healthy		
it has had too much water.		
it hasn't had enough water.		
it has been grown in the dark.		
It has had soil, warmth, light and water.		

Draw and label 3 seeds or bulbs.

I

II

III

1



I know that seeds come in different shapes, sizes and colours

Which of these shows a seed germinating?



Why isn't Sunny's seed germinating?

2



Sunny plants some seeds in December but they don't germinate. Why do you think that is?

I don't think Sunny's seeds germinate because



I know that seeds germinate into seedlings, producing a root and shoot

What do plants need to grow well?

3



I know what plants need to grow well

Sunny's Seed Investigation

Date:



How are you going to carry out your fair test?

My investigation - I will plant these two seeds:



What is your prediction?

SUNNY'S Seeds



Date:



What happened in your fair test?

My investigation - These are the two sets of seeds I planted:



What is your conclusion?

