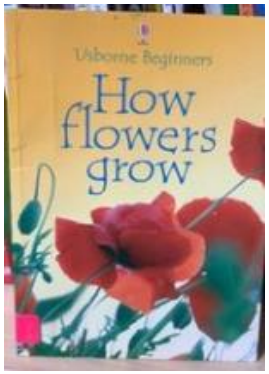
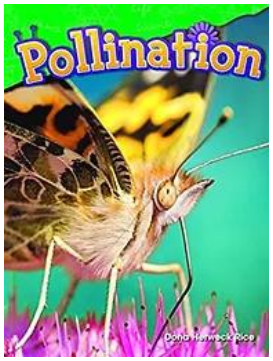
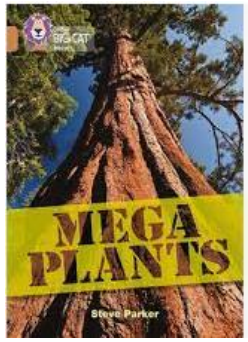
BILSTON CHURCH OF ENGLAND PRIMARY

MEDIUM TERM PLANNING

Subject	Topic/Key Question	Year Group	Term	Time Allocation
Science	How does your garden grow?	3	Summer 1	24 hours
 Reading scheme	 Library	 Library	 Library	 Reading scheme
End of lower Key stage 2 Outcomes	Asking relevant questions and using different types of scientific enquiries to answer them. Setting up simple practical enquiries, comparative and fair tests. Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.			

	Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Identifying differences, similarities or changes related to simple scientific ideas and processes. Using straightforward scientific evidence to answer questions or to support their findings.
End of Unit Outcomes	I can identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. I can 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. I can investigate the way in which water is transported within plants. I can explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.
Vocabulary	**Structure** – flowering plants, roots, stem, trunk, leaves, flowers. **Function –** nutrition, support, reproduction, makes its own food. **Requirements for life & growth –** air, light, soil, water, nutrients from soil, room to grow, Flowers, pollination, seed formation, seed dispersal.

Lessons highlighted must not be missed

Lesson Sequence	Time Allocation	Key Question/WALT	Teaching Activities	Resources

Lesson 1 What do we know about Plants?	2 hour	WALT: understand plants. **Success Criteria** • I can identify the parts of a plant. • I can describe some of the functions of those parts. • I can ask scientific questions about plants.	Working Scientifically Link. Asking relevant questions and using different types of scientific enquiries to answer them. Show the children a potted plant with roots, stem, leaves and flowers and talk about the different parts. Show slides 1 and 2 of Slideshow 1, which each show images of six different flowering plants. Ask children to discuss the images in pairs. Ask children: What do all the plants have in common? What differences are there between them? What do the plants need in order to grow and stay healthy? Collect key words that they use and write them on the board. Tell the children that they will be carrying out a challenge to demonstrate what they already know about the different parts of flowering plants. The challenges are differentiated by outcome, with Challenge 2 requiring greater detail than Challenge 1. Explain that they are drawing a diagram to show what they know about plants. They do not need to include colour, background and so on. Challenge 3 requires children who know about the function of some of the main parts of a plant to apply their understanding to the whole organism. They do this by completing a whole-parts relationship graphic organiser. They will need copies individually or to share Resource sheet 1. A graphic organiser is a visual framework that helps children to identify functional	Snap Science: Resource sheet 1 Slideshow 1 Challenge slides A flowering plant in a pot, such as a geranium, sticky notes or index cards.

			relationships within a system, in this case a flowering plant. Tell the children that they will need to think about what plants need to grow in order to help them work out what the different parts do. The challenges are presented on the Challenge slides to be displayed on the board, or printed out and placed in the centre of the table.	
Lesson 2 What do we know about leaves?	2 hour	WALT: understand plants. **Success Criteria** • I can make observations about leaves. • I can describe similarities and differences in leaves. • I can describe the function of a leaf.	Working Scientifically Link. Identifying differences, similarities or changes related to simple scientific ideas and processes. Give each child a mini-whiteboard. Distribute the class set of leaves (one each or one between two if they are large leaves) and the magnifying glasses. If possible display the leaf using a visualiser. Ask children to make a list on their whiteboards of all the things they notice about the leaf including colour, shape, texture, size and smell. Ask children to work in pairs to write a definition of a leaf on their mini-whiteboards, and then share this with another pair. Collect common words and ideas on a flip chart or large whiteboard. Show slide 1 of Slideshow 1, which shows images of six very different leaves. Confirm that they are all leaves. Ask: What do you notice? Do you want to change your definition? Why? Organise children into groups and tell them that their challenge is to make close observations of some more leaves, and to notice how they are the same and how	Snap Science: Slideshow 1 Challenge slides Mini-whiteboards, pens, fl ip chart or large whiteboard, sets of leaves (different sizes, colours, textures and shapes with 10–12 per set), a class set of one type of leaf, such as oak, sycamore, beech or birch, magnifying glasses (one per child), digital camera(s), the KWL grid.

			they are different. The challenges are differentiated by the level of observation and knowledge required, with Challenge 2 requiring a broader vocabulary than Challenge 1. Challenge 3 requires children to identify features common to all leaves and to begin to relate these to function. The challenges are presented on the Challenge slides to be displayed on the board, or printed out and placed in the centre of the table. Provide each group with a set of leaves and magnifying glasses. Children doing Challenge 1 will need two identical sets of leaves. The real leaves can be supplemented with pictures but fi rst-hand experience is essential.	
Lesson 3 What would happen if a plant lost its leaves?	2 hour	WALT: investigate living things. **Success Criteria** • I can help to plan an investigation to answer the question: What happens if a plant loses its leaves? • I can decide what to observe or measure to collect my results. • I can recognise when a test is fair.	Working Scientifically Link. Setting up simple practical enquiries, comparative and fair tests (Lesson 3); gathering, recording, classifying and presenting data in a variety of ways to help in answering questions (by end of Lesson 11). Look at the KWL grid and recap the information and questions about leaves from the last lesson. Ask: What features do leaves have? What do leaves do? Show children the plants that will be used for the investigation. Ensure there are two types of plant and that the children know the plants are growing. Ask: What do you think would happen to a plant if it lost all of its leaves? What if it lost some of its leaves? Capture children's ideas on the whiteboard.	Snap Science: Resource sheet 1 Resource sheet 2 Resource sheet 3 KWL display, plants, e.g. busy lizzie, geranium or primula (two plants for Challenge 1; three plants for Challenge 2 and four for Challenge 3).

			Ask: How could we find out? Tell the children that in their groups they will be carrying out a challenge to plan a fair test to answer the question: What happens to a plant if it loses its leaves? The challenges are differentiated by complexity and the number of variables to manage and record. Tell them that every group will use the Generic fair test planner to turn their ideas into an investigation plan. Show them all how to do this by creating an example plan by selecting responses to the following questions: 1. What will you change about the plants? It is important that they recognise that it must be the number of leaves. 2. What changes do you think might happen to the plant that you could observe or measure? Using children's ideas from the Explore discussion, identify and note some possible measurements or observations that could be made, such as the appearance of the plant (colour, wilting), whether the plant grows taller, whether it grows new leaves. If the plants are in flower then children can also make observations of what happens to the flowers. 3. How often will you make your observation or measurement? Every other day or twice a week should be sufficient – it may depend on the type of plant. 4. What will you do with your plants during the investigation to make sure that it is a fair test?	

			What else will the plants need to keep them alive? What would happen if you didn't water them? (They would all die whether they had leaves or not.) Would it be fair if we put the plant with no leaves on the windowsill and the plant with all its leaves in the cupboard?	
Lesson 4 Are all roots the same?	2 hour	WALT: understand plants. **Success Criteria** • I can make detailed observations about the roots of a plant. • I can record observations and information in drawings and writing. • I can describe similarities and differences in roots. • I can describe the function of a root.	Working Scientifically Link. Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables. Show the plant, in its pot, to the children. Ask: Does the plant look healthy? What do you think might have caused it to look like this? What might it need? Note suggestions from children on the board. You can use targeted questioning to assess whether children who were not sure about what plants need in Lesson 1 are now more secure in their knowledge. Confirm that the plant appears to be lacking in water but that the soil is damp so there must be some other problem. Remove the plant from its pot. Ask: What parts can you see and what is missing? What does this tell you about the function of the roots? What difference has the removal of the roots made to the plant? Confirm that the plant is lacking in water because it is unable to absorb water due to the lack of roots. Provide children with seedlings and magnifying glasses and encourage them to observe the roots of each seedling in turn.	Snap Science: Resource sheet 1 Slideshow 1 Challenge slides Animation 1 A plant, in a pot, which has had its roots removed, a range of seedlings, such as peas, broad or runner beans (one set per group with a minimum of one seedling between two pupils), magnifiers (one per child), other examples of plant roots, a pot-bound plant, KWL display

			Ask: What can you see? What else do you notice? Draw their attention to the root hairs and the branching of the roots on more mature seedlings. Use a visualiser or microscope to draw attention to the important details or use slide 1 of Slideshow 1. Ask: How do you think the root hairs and branching help the plant to absorb water? If some of the seedlings are in pots, ensure that the children observe how the roots anchor the plant as they remove it from the pot. They will also have noticed how easily the plant without roots could be separated from the soil. Tell the children that they are going to complete a challenge to observe and draw the different features of roots and through this observation learn what the different features are for and what roots do. Refer to any relevant statements or questions on the KWL display. The challenges are differentiated by the level of understanding and detail required to relate feature to function. The challenges are presented on the Challenge slides to be displayed on the board, or printed out and placed in the centre of the table. Provide other examples of roots, such as vegetables, weeds or grasses for children to observe and handle, supplemented as necessary by the images on slide 2 of Slideshow 1. Ask: How are they similar and different? How can you tell they are roots? Encourage children to think beyond ‘they grow under the ground’ by reminding them of	

			other plant structures they are familiar with from KS1, such as bulbs that are also found under the soil. Show Animation 1 which shows how a root anchors a plant in the ground and takes in water and nutrients. Talk about these functions, relating them to the features they have observed. Draw on any experiences they may have had of plants being anchored in the ground, such as digging up root vegetables or pulling up cabbages or weeds, and of how they water plants, e.g., the soil rather than the leaves	
Lesson 5 Where does the water go?	2 hour	WALT: understand plants. **Success Criteria** • I can make scientific observations about water transport in plants.. • I can describe what happens to water in a plant. • I can make predictions based on what I have observed.	Working Scientifically Link. Using results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests. Show the children one of the coloured carnations and one that is still white. If children were not involved in the preparation of the carnation: Ask: What do you think happened to the coloured one? Distribute the prepared carnations and tell the children to look closely at the petals, leaves and stem. Ask: What do you notice? Show the time-lapse video (Video 1) of the carnation in coloured water. Explain that the video shows what has been done to the carnations. If children were involved in the preparation of the carnations, this will act as reinforcement of the process. Be sure to note that this experiment shows how water travels up the stem of a flower, but that coloured carnations are not normally so	Snap Science: Challenge slides Video 1 Prepared carnations and celery, one white carnation, magnifying glasses (one per child), red and blue food colouring, containers, celery with leaves, carnations (one carnation and one stalk of celery both with the stem divided per group)

			because of the water they take up - there could be some confusion here! Ask: What does this tell you about what the stem does? Distribute the prepared celery. Ensure that each pair has both a piece that has been cut lengthways and a cross section. Tell children to look closely at the celery. Ask: What can you see? What are the coloured dots on the slices and at the ends? What are the coloured strands in the pieces cut lengthways? Pull one out. What does this tell you about the transport of water in plants? If necessary use a visualiser or microscope to draw attention to the details. Show slide 1 of the Challenge slides, which features the following statement: Water goes up the left of the stem to the left-hand side of the plant, and the right of the stem to the right-hand side of the plant. Ask: Do you think the statement is true or false? Why? If they all agree, challenge children by disagreeing with the statement. Encourage children to refer to their observations of the carnation and the celery to support their decision. Ask: How could we find out? If necessary prompt children by showing a carnation with a split stem. Tell the children that their challenge is to work in small groups (ideally in fours) to set up an observation-over-time investigation to fi nd out if the statement is true or false. Groups completing Challenge 1 or 2 need a carnation and a stick of celery, each with the stem	

			divided, four containers and food colouring (red and blue). There will be a better result if the carnations are left in a warm, sunny spot. Those completing Challenge 3 need a second stick of celery instead of the carnation. The challenges are differentiated by the level of detail and explanation required.	
Lesson 6 Why do plants need stems?	2 hour	WALT: investigate living things. **Success Criteria** • I can describe the results of my investigations. • I can explain what these show about the way in which water is transported in plants. • I can present my findings, from secondary sources and investigations, about how water is transported in plants.	Working Scientifically Link. Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Remind children about the statement they are investigating: Water goes up the left of the stem to the left-hand side of the plant, and the right of the stem to the right-hand side of the plant. Ask them to look closely at their celery and carnations. Ask: What has happened? Was your prediction correct? When children have observed the whole carnation and celery, cut slices of the celery above and below the split so that they can see where the different colours are. Ask children to compare what they can see with the diagrams they made in Lesson 5. Ask: What is the same? What is different? The carnations and celery could be photographed to become part of the presentation of findings. Show carnations from children in Challenge groups 1 and 2 to the children who completed Challenge 3.	Snap Science: Challenge slides Animation 1 Celery, carnations and challenge diagrams from Lesson 5, magnifiers, sharp knife (teacher use only), large paper, pens, pencils, scissors, glue, camera KWL display; access to computers would be helpful

			Share the additional statement for Challenge group 3: The leaves help plants to take up water. Discuss the findings from this group about how quickly the water was taken up. Observe that the coloured water has been drawn into the leaves. Show Animation 1 which explains the different functions of a stem, to transport water from the roots to the leaves and flowers and to hold them up to the air and sun. Ask: How does the animation help to explain what you have observed in the carnations and celery about the way water is transported in plants? How does it help to explain the observations of celery with and without leaves? What else does the stem do? Tell the children that their challenge is to present their findings about plants, their stems and water transport. The challenges are differentiated by the method of presentation. For all challenges there should be an emphasis on children demonstrating how they have learned about stems as well as what they have learned. Ask: How do you know this? What did you do to find this out? What do your findings show? Allow children to choose which challenge to complete, then group them (mixed ability). Show the Challenge slides. Discuss the different ways the information could be presented	
Lesson 7	2 hour	WALT: understand plants.	Working Scientifically Link.	Snap Science:

Where do new plants come from?		**Success Criteria** • I can name the main stages in the life cycle of a flowering plant. • I can put the stages in order. • I can present them in a sequenced diagram.	Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables. Read the poem 'Growing Apples' by Michael Rosen (Slideshow 1). Pause before the girl is about to answer and ask children what they think she is going to say. Show the children an apple. Ask: Where did it come from? How can I get more apples from it? Cut the apple open to show the seeds. Establish that the seeds will grow into an apple tree that will produce more apples. Use slide 3 (Slideshow 1) to remind children about familiar animal life cycles. Use slide 4 to record what children already know about the life cycle of an apple tree. Brainstorm together what words they will need to label the diagram. Discuss what happens when a seed germinates (revision from KS1). Ask: Why does the root grow first? Why does the plant not need leaves straight away? (The seed provides food for the germinating plant.) What does the seed need in order to germinate? Watch Video 1. Focus on the vocabulary or the life cycle stages that the children were least confident about in the introductory activity. Explain to the children that their challenge is to present the life cycle of a plant in a diagram. The first two challenges are differentiated by the support provided. In	Resource sheet 1 Resource sheet 2 Resource sheet 3 Slideshow 1 Video 1 Apple, sharp knife (teacher use only), scissors, glue.

			the third challenge children apply what they have learned about apple trees to a different flowering plant.	
Lesson 8 What do flowers have in common?	2 hour	WALT: understand plants. **Success Criteria** • I can make careful observations of parts of a flower. • I can label the parts of a flower. • I can describe the functions of the different parts. • I can compare different flowers.	Working Scientifically Link. Identifying differences, similarities or changes related to simple scientific ideas and processes. Children work in groups of six. Provide three different types of flower for each group, preferably two of each kind. Children look closely, comparing the different flowers. Ask: What is similar about them? Do they all have the same parts? Can you name any of the parts? What differences can you see? You can approach this section of the lesson in a variety of ways. Either show the Video 1 or show slide 1 of Slideshow 1 and explain the functions of the different parts of the flower; or use a visualiser/microscope to show a real flower while explaining the functions of the parts. Encourage children to look for those parts in their flowers. Ask: What is the same about all the stems/petals/stamens/carpels? How does that feature help them to do their job? Why might there be differences? Explain to the children that you are going to show them a video of a flower dissection and that they should watch carefully as next they are going to dissect a flower themselves in order to look closely at its parts. Show Video 2.	Snap Science: Resource sheet 1 Resource sheet 2 Slideshow 1 Challenge slides Video 1 Video 2 Three different types of flowers (such as snowdrop, peony, wallflower, sweet pea, lily, foxglove, two of each type per group of six pupils), magnifiers, 'sticky cards' (see preparation notes), tweezers, if available **Preparation notes:** Prepare a sticky square using several strips of

			Each child dissects a flower, placing each part onto their pre-prepared sticky card and then sticking it into their book or onto a sheet of paper. As children dissect each part, ask them to consider these key questions each time: What is this part? What is its function? They then complete either Challenge 1, 2 or 3. Display slide 2 of Slideshow 1 so that children have access to the key vocabulary. The challenges are presented on the Challenge slides to be printed out and placed in the centre of the table.	double-sided sticky tape.
Lesson 9 What do bees do?	2 hour	WALT: investigate living things. **Success Criteria** • I can describe how pollen is transferred between flowers. • I can explain what the different parts of the flower do. • I can explain why bees and pollination are important.	Working Scientifically Link. Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Watch the video clip of bees pollinating flowers (Video 1). Ask: What do you think the bees are doing? Why do they visit the flowers? Why are the petals brightly coloured? Why do they need to attract insects? Encourage children to think about how the answers to these questions link with what they saw when they looked closely at the flower parts in Lesson 8. Show the animation of insect pollination (Animation 1) and discuss. Ask: What does the bee do? Why does the bee visit the flowers? Where is the pollen produced? What happens to it? What happens after the pollen is transferred to	Snap Science: Resource sheet 1 Resource sheet 2 Resource sheet 3 Video 1 Animation 1 Props for pollination role play: cut out petal, sepal and antennae card shapes attached to cardboard headbands, containers for the pollen grains, such as a plastic bottles

			another flower? What would happen if no pollen was transferred? Tell the children that their challenge is to model the process of insect pollination through role play. Organise children into different roles: at least three children per flower to be either petals or sepals and at least three to act as stamens, holding the containers of 'pollen grain'. For each flower, there will need to be one child acting as the stigma. The rest of the children can be the bees wearing the antennae headbands. The children arrange themselves into flowers and the children representing bees fly from flower to flower. When they land on a flower some of the pollen is transferred to their legs and body (via the Velcro dots). When they visit the next flower some of this pollen sticks to the stigma. The flower has been pollinated. Through questioning, ensure that the children direct the role play as far as possible. Ask: How will you represent the flower? Where will you need to stand? Do the petals go inside or outside the sepals? Where is the pollen produced? Which part of the flower collects the pollen? What will happen when the pollen has been transferred to the stigma/carpel? Why are bees so important? Children may wish to add to the role play, e.g. by finding a way to represent the nectar. If possible, video the role play. This can be used later or played back to support any groups that need a reminder during the challenge activity.	or yoghurt pots for the stamen, small circular objects or spheres to act as pollen grains, such as ping pong balls, Styrofoam balls, Velcro dots, milk bottle lids, woolly hats for the stigma, video camera (optional)

			Following the role play, children then work individually or in pairs to write a voiceover to help someone watching the role play to understand what it shows. These challenges are differentiated by the amount of support and guidance given to the children.	
Lesson 10 How are seeds dispersed?	2 hour	WALT: work scientifically. **Success Criteria** • I can make careful observations of seeds. • I can describe different methods of seed dispersal. • I can match features of seeds to their method of dispersal. • I can explain why seed dispersal is important.	Working Scientifically Link. Identifying differences, similarities or changes related to simple scientific ideas and processes. Ask: What would happen if all the seeds from a plant stayed in the space around the parent plant? Model, with children acting as the seeds around you. As they grow they are crowded and compete with each other and the parent plant for water, light and space. Establish that seeds need to be dispersed away from the parent plant to reduce competition. Discuss with children how seeds can be carried away from the parent plant. What examples do children already know? If a school collection of fruits and seeds is available, identify seeds that the children mention and look at them closely. Use children's observations of the seeds to prompt other ideas about how they may be dispersed. Watch the video Seed dispersal (Video 1) showing methods of seed dispersal and then use the interactive (Interactive 1), supported by real examples if available, to match the seeds to their method of dispersal. Tell the children they are naturalists discovering the seeds of unknown plants. Their challenge is to draw and	Snap Science: Challenge slides Video 1 Interactive 1 Collection of seeds, range of reclaimed and modelling materials which may include small boxes, yoghurt pots and other containers, tubes, a range of papers and card, components for technology projects such as wheels, gears, cotton reels, polystyrene balls, fabric, feathers and other trimmings, pipe-cleaners,

			then make a model of the seed from a new type of plant. Their fellow naturalists will have to decide how they think the seed is dispersed. Children could work individually or in pairs. The challenges are presented on the Challenge slides to be displayed on the board, or printed out and placed in the centre of the table.	hooks, Velcro, balloons, plastic bags, bubble wrap, tape, glue, string, scissors and other tools as required
Lesson 11 Can plants survive without leaves?	2 hour	WALT: work scientifically. **Success Criteria** • I can use my observations to decide which statements about the function of a leaf are true. • I can write a conclusion that: – describes what my observations show – uses my observations to answer my question – uses what I know to explain my observations – uses	Working Scientifically Link. Using results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests. Review what children know about the functions of a leaf. Use pair-share questioning depending on how secure the children's knowledge is and refer to the What we know section of the KWL display. Look at the plants and records of observations for each challenge from Lesson 3. Ask: What has happened to the plants? Show the statements on slide 1 of Can a plant survive without leaves? (Slideshow 1). Ask: Which of the statements are most likely to be correct? What evidence from your investigations supports this judgement? Discuss the evidence shown on slide 2 as well as highlighting children's own investigations. Show slide 3. Use pair-share discussion to establish what the slide shows. Explain that drawing a conclusion actually involves writing. Use the success criteria to remind children that a conclusion should describe what	Snap Science: Slideshow 1 Challenge slides Coloured pens/ pencils/highlighters (two colours per pair), the plants from the investigations set up in Lesson 3, What would happen if a plant lost its leaves? Children's logs of observations, KWL display

		what other people know about this question.	happened, what the observations show, answer the investigation question and explain why they think it happened. Provide each pair with a copy of the two conclusions. Pair the children so that less confident readers are supported by partners who can read more fluently. Ask children to decide which is the better conclusion and use coloured pens, pencils or highlighters to identify good points and where improvements are needed. Using slide 4, or children's work on a visualiser, identify why the second conclusion is better than the first. Explain to the children that their challenge is to write a conclusion to their investigation into what would happen to a plant if it lost its leaves. The challenges are presented on the Challenge slides to be displayed on the board, or printed out and placed in the centre of the table.	
Lesson 12 Am I the Perfect plant?	2 hour	WALT: understand plants. **Success Criteria** • I can design a flowering plant. • I can label its parts, features and functions.	Working Scientifically Link. Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Before the lesson, encourage children to look at the KWL display. Reflect on what has been learned. What did they know at the start of the module? Have they changed their mind about anything they thought they knew? What have they learned? Which of their questions do they now know the answers to? Draw attention in particular to information about the key features plants need in order to survive and reproduce.	KWL display, large piece of paper, coloured pens and pencils, sticky notes, collage materials (optional).

			If there are questions that have not been answered, decide whether they can be used for enrichment lessons, covered in the ongoing 'Our Changing World' module, researched outside school or be answered during modules in later year groups. Explain that for this challenge, children should draw on what they have learned to design a plant. Using the seed they designed in Lesson 10 as a starting point, challenge them to imagine and draw the plant that it would grow into. They will name it, if they did not choose a name when they designed the seed, and present it as a picture or collage with labels and annotations. Through pair-share or group discussion, draw up success criteria against which the designs will be evaluated. These would be based around the results of the challenges.	