KS4 Biology – Plants

Subject curriculum intent:	To develop in our students: • An enjoyment of Science by providing relevant, interesting and challenging experiences and activities. • Observational skills, by looking for patterns and contrasts. • An inquiring mind and a logical approach to problem solving. • The ability to draw conclusions from simple experiments and, where appropriate, to devise suitable experiments for further investigations. • Communication skills in speaking and listening, written, diagrammatic and symbolic forms. • Co-operation and a respect for others by being able to work as part of a team – the development of appropriate social skills. • Confidence in their own abilities. • A respect for the environment and a careful use of resources. • An interest in the world about them and a greater understanding of it.

End of KS3 intent/outcome	End of KS4 intent/outcome	End of KS5 intent/outcome
Students will build on their knowledge of science through the different areas – biology chemistry and physics. Students will 'work scientifically' to achieve the goals of each topic area they encounter.	Students will continue to develop their scientific knowledge through the different areas – biology, chemistry and physics. Students will 'work scientifically' to achieve the goals of each topic area they encounter. Students will be able to relate their scientific experiences to everyday life and have an understanding that science is all around them.	N/A

Intent for this topic:	Students will be able to identify, name and classify different plants. Students will learn the parts of a plant and the parts of a flower, they will be able to label and explain their function. Students will explore the life cycle of a plant and explain what happens at each stage. Students will investigate what a plant needs to grow and have the opportunity to grow their own plants to observe and understand how they germinate. Students will 'work scientifically' to achieve these goals, learning the key features of scientific enquiry; observing over time, pattern seeking, identifying, classifying, investigating (fair tests) and researching.
Core vocabulary needed for this subject/topic:	**Subject:** Biology, Chemistry, Physics Observe, pattern, identifying, classifying, investigating, fair test, researching

	Topic: Leaf, stem, flower, root, seed, grow, water, light, rain, sun, plant, petal, stigma, style, ovary, ovule, anther, filament, stamen, pollination, photosynthesis, carbon dioxide
Vocabulary pupils will have accessed in other topics or subject areas:	Leaf, stem, flower, root, seed, grow, water, light, rain, sun, plant, petal
Key vocabulary taught within this topic:	Leaf, stem, flower, root, seed, grow, water, light, rain, sun, plant, petal, stigma, style, ovary, ovule, anther, filament, stamen, pollination, photosynthesis, carbon dioxide

Prior knowledge: what pupils may already have studied

Key stage	Subject	Topic title	Term/year taught	Content/What might pupils already know?
KS3	Science	Why are plants important?	Autumn 1/Year 2	Pupils may have been introduced to the different parts of plants and flowers. They may also have had opportunities to grow and look after their own plants.
KS3	Grow it		Every year	Pupils will have had opportunities to learn about different plants and how to look after them.

Links to other subjects: Grow it, Maths

	OU Progression Steps 5-6	OU Progression Steps 7-8	OU Step 1	OU Step 2	OU Step 3
Subject specific knowledge	Knows that plants and trees change during the year. Knows that plants have different parts. Knows that plants grow from a seed. Knows the difference between plants and flowers.	Knows that plants and trees change during the year. Can name the parts of a plant (stem, flower, leaf, root.) Knows the different stages of a plant's life cycle.	Can name the parts of a plant (stem, flower, leaf, root) and knows that each part has a different function. e.g. roots take in water. Knows that a flower has different parts. Knows the different stages of a plant's life cycle.	Knows that a flower has different parts. Knows that a plant needs pollen from another plant to make seeds. Knows that pollen can be spread by insects and the wind.	Knows that a flower has different parts. Knows that a plant needs pollen from another plant to make seeds is called pollination. Knows that pollination is the process of getting pollen to the stigma.

	Knows that leaves can be different shapes. Knows that plants need water to stay alive and grow.	Knows plants/flowers have different names. Knows that plants need different things to grow.	Knows plants/flowers have different names and features. Knows that a plant needs light, water, warmth and nutrition (food) to grow.	Knows that plants make their own food. Knows the different stages of a plant's life cycle. Knows the different stages of a seeds life cycle. Knows that plants make food from sunlight.	Knows that pollen can be spread by insects and the wind. Knows that seeds can be dispersed in different ways (wind, animal, explosions, drop and roll). Knows that plants make food from sunlight and this is called photosynthesis. Knows the key components of photosynthesis (e.g. sunlight, chlorophyll, water and carbon dioxide).
Subject specific skills	Is able to identify 1 change in plants and trees during the year through observation. Is able to point to or match different parts of a plant when given the name. Is able to explores properties of seeds e.g. texture, size, dry/moist, hard/soft.	Is able to independently describe a leaf or flower. Is able to label the parts of a plant (leaf, flower, stem, root) Is able to find named parts of plants e.g. leaf, flower, stem, root Is able to sequence the life cycle of a plant.	Is able to label the parts of a plant (leaf, flower, stem, root) and explain their functions. Is able to verbally name the parts of a flower using a diagram. Is able to classify plants using simple keys. Is able to sequence the life cycle of a plant.	Is able to label the parts of a flower. Is able to dissect a flower with support. Is able to identify that plants make their own food using sunlight, water and air (carbon dioxide) Is able to explain the different stages of a seeds life cycle using	Is able to dissect and label the parts of a flower. Is able to explain the functions of each part of the flower. Is able to investigate how seeds are dispersed. Is able to explain the process of photosynthesis.

	Is able to help to plant a seed. Is able to sort plants and flowers. Is able to water a plant. Follow a set of demonstrations to carry out a simple investigation.	Is able to independently plant a seed after a 1:1 modelling. Is able to name some plants e.g. sunflower, tree, dandelion. Is able to demonstrate how and when to water a plant or seed. Is able to make a prediction from a choice of 3 using symbols. Is able to follow a picture method to carry out a simple investigation. Is able to identify one thing that has changed when completing a fair test. Identifies the correct result in a table.	Is able to explain that a plant needs light, water, warmth and nutrition (food) to grow. Is able to successfully grow a plant from seed. Is able to select an appropriate prediction from a given choice. Is able to follow a word and picture method to carry out a simple investigation. Is able to suggest what to change when completing a fair test. Is able to record results in a simple table. Analyses results in the form of tables, simple bar graphs and a brief descriptions using key words or sentence blanks.	key scientific vocabulary e.g. germination. Is able to successfully grow a plant from a seed. Is able to record growing a plant from seed using a photographic diary. Is able to make a prediction linked to their investigation. Is able to follow a written set of instructions to carry out a simple investigation. Is able to explain why their investigation included a fair test. Is able to record results in a suitable table. Is able to record results in the form of a simple bar graph. Analyses results in the form of tables, simple	Is able to make predictions. Is able to follow a written set of instructions to carry out a simple investigation. Is able to design an experiment to include a fair test. Is able to record results in a suitable table. Analyses results in the form of tables, simple bar graphs and a brief description. Is able to draw conclusions from their results.

				bar graphs and a brief description.	
Personal development	**Problem solving** Investigations and matching exercises **Communication skills** Working as pairs in investigations, asking and answering questions **Self-belief** Learning new skills, practising them and demonstrating them. **Self-management** Working with new equipment **Teamwork** Working as groups to solve problems or find out new information				
Suggested activities	• Experience plants or plant parts using the senses – touch, smell, taste, look, hear e.g. dry corn stalks. • Explore different kinds of leaves brought into class – for shape, prickly/not prickly, hairy, shiny, thickness, colour etc. • Find different kinds of leaves in local environment. • Find leaves in local environment to match to given leaves. • Compare fresh leaves with same types of leaf collected a week ago. • Leaf rubbings – to look at shapes, textures, veins etc. • Repeat all the above for flowers, stems, roots. • "Make the Plant" game – assemble parts (root, stem, leaf, flower of more than one type of plant) named by adult to complete plant e.g. on Velcro board or Bingo game. • Labelling the parts of a plant (root, stem, leaf, flower). • Labelling the parts of a flower (petal, pollen, anther, stigma, style, filament, ovary, ovule, sepal, stem). • Compare real plant with real animal, e.g. different body parts - plants don't have eyes, feet etc; different needs – food, water. • Explore different seeds e.g. coconuts, conkers, poppy seeds, wheat. • Make collection of plants/plant parts that humans eat. • Visit farm or garden to see food plants growing. • Grow food plants in school. • Grow new plants from cuttings of parent plant. • Germinate readily visible seeds, e.g. bean sprouts. • Grow pips and seeds of edible plants. • What do seeds need to germinate? dry/wet light/dark (both samples need to be moist), warm/cold (put one sample in fridge, one in dark, warm cupboard) • What do plants need to grow? Water/no water. • Does the depth of planting a seed affect its growth rate?				

	• Observe germination and growth of seedlings in soil in clear Perspex observation chamber. • Observe and record a plant as it grows using a digital camera to record growth and help pupils compare different stages.
Possible Investigations	• What do seeds need to germinate? dry/wet light/dark (both samples need to be moist), warm/cold (put one sample in fridge, one in dark, warm cupboard) • What do plants need to grow? Water/no water. • Does the depth of planting a seed affect its growth rate? • Observe germination and growth of seedlings in soil in clear Perspex observation chamber. • Observe and record a plant as it grows using a digital camera to record growth and help pupils compare different stages. • Which is the best place in school to grow plants? • Does the colour of light affect growth? Use film canisters but cellotape coloured acetate over two opposite holes. Resources: seedlings in pots, film canisters, cellotape, coloured filter acetate
Online resources Twinkl CLEAPPS for risk assessments BBC bitesize for video resources. Youtube	
Evidencing Work All work / evidence sheets need to be printed off, annotated by staff, self-assessed by pupils and stored in student folders.	

RRS Articles:
This unit of work is linked to Articles of the UN Convention on the Rights of the Child.
Article 13 (freedom of expression)
Article 29 (goals of education)