Year 2 Autumn 1: Plant Growth (Biology)

Year 2: Autumn 1

Biology: Plant Growth

	Required prior knowledge	Knowledge to be explicitly taught	How knowledge will be built upon
Substantive	• Plants need water and light to grow (N3-4 Spr2) • The basic parts of a plant are leaves, flowers, roots, stem/trunk/branch (Y1 Aut) • **Plants** are classed as **living things** because they **grow**, **move**, **reproduce**, and need **nutrition** (food) (Y1 Aut)	• A seed is **living.** • A seed is the **embryonic** stage of the plant life cycle. • A seed consists of three parts: the **seed coat**, the **endosperm** and the **embryo.** • **Germination** is the development of a plant from a **seed**. During germination, **roots** and **shoots** emerge and grow. • To **germinate,** a seed needs water and a certain temperature. • **Temperature** is a measure of how hot or cold something is. • Some plants grow from **bulbs**. A bulb is a resting stage for certain plants. They have a large underground food store, short **stems** and fleshy leaves. • When a plant grows it gets bigger. • Plants need **water**, **light** and a suitable **temperature** to grow. • Many plants make **fruits** or **vegetables**; some of these grow below ground.	• The four main stages of the plant's life cycle include germination, pollination, fertilisation and seed dispersal (Y3 Spr). • Pollination and fertilisation usually takes place in flowers. Dispersal is important to make sure there is enough space for seeds to germinate and plants to grow (Y3 Spr). • Seeds can be dispersed in a variety of ways (Y3 Spr). • Plants need air (oxygen and carbon dioxide), water, light, nutrients from the soil, space, and a suitable temperature to grow (Y3 Spr). • Requirements for life vary from plant to plant and they adapt to their environment (e.g. some plants need less space, a lower temperature, fewer nutrients etc.) (Y3 Spr). • Roots absorb nutrients from the soil and help anchor the plant (Y3 Spr). • The stem/trunk supports the plant and transports water up the plant. The xylem transports water and nutrients from the roots, and the phloem transports food from the leaves to the all parts of the plant (Y3 Spr). • Leaves use sunlight, carbon dioxide from the air and water to make their own food (Y3 Spr).
Disciplinary	• **Maths**: Use words to describe lengths and heights (Y1) • A&P: Ask questions and make predictions about what will happen when something is tried (N3-4, Aut2) • M&O: Measure/observe using senses (N3-4, Aut2) • R&P: Record numerical or descriptive observations in a table (Y1 Aut) • A&E: Make simple statements about the results of an enquiry (Y1 Spr)	***Investigate the conditions required for germination*** • A&P: Make a prediction based on substantive knowledge. • A&P: It is important that we keep as much as we can the same, apart from the thing we measure and the one thing we change. ***Investigate how light affects the growth of plants*** • M&O: Make systematic observations of an object.	• Explain findings using scientific knowledge (Y3). • The thing that we measure is called the dependent variable; the thing we change is the independent variable (Y3).
VCs	• 5A: Some plants grow in soil (Y1). • 7: Plants are organised with roots, stem, leaves and flowers (Y1).		

Year 2 Autumn 2: Needs of Animals (Biology)

Year 2: Autumn 2

Biology: Needs of Animals

	Required prior knowledge	Knowledge to be explicitly taught	How knowledge will be built upon
Substantive	• Talk about how they have changed from being a baby (N3-4 Aut1). • Habitats are the places that living things live and different animals live in different habitats (N3-4 Aut1). • Parents and their young look similar and different to each other (N3-4 Spr2). • Names of animals and their young (e.g. calves and cow, lamb and sheep) (N3-4). • Animals can be grouped into fish, amphibians, reptiles, birds and mammals (name common examples) (Y1 Sum). • Animals can be placed into different groups: carnivores, herbivores and omnivores) (Y1 Sum). • Temperature is a measure of how hot or cold something is (Y2 Aut). • Plants need water, light and a suitable temperature to grow (Y2 Aut). • Plants are classed as living things because they grow, move, reproduce, and need nutrition (food) (Y1 Aut).	• A **natural resource** is a material or substance that is produced by the **environment** (not man made) and may be used to support life. • Food and water are natural resources. • Animals, including humans, need **food** to survive. • Humans need to eat a healthy and **balanced diet**. This should include all the **nutrients** that we need, should be high in fruits and vegetables and low in fats, salt and sugars. • Animals, including humans, need **water** and **oxygen** to survive. • Animals, including humans, the **right temperature** to survive. • Animals, including humans, **reproduce**. This means they have **offspring** that grow into adults. • As animals **grow,** they get bigger. • Some animals change **form** as they get older (e.g. tadpole to frog). • Humans need **exercise** to stay healthy. • Humans need to practise **hygiene** to stay healthy.	• Life cycles of hedgehogs, peregrine falcons, frog and ladybird, including metamorphosis (Y5 Spr1). • Living things grow, need air and nutrients, react to their surroundings, move, get rid of their waste, reproduce (Y2 Spr). • Living things are adapted to their environment. This means they may not be able to survive in other habitats (Y2 Spr). • The main food groups are carbohydrates (starch and sugars), proteins, fats, dairy, fruit and vegetables (Y3 Spr). • Humans need a balanced diet which is made of main food groups (Y3 Spr). • Vitamins, minerals and fibre are needed and being deficient in these causes diseases (Y3 Spr).
Disciplinary	• A&P: Scientists conduct secondary research to learn from what other scientists have already learned (Y1 Sum). • A&P: Scientists group objects or living things based on their properties (Y1 Spr). • M&O: Gather information from text/books/images (Y1). • R&P: Use a Carroll diagram to classify items based on properties (Y1 Spr).	***Gather information from images and/or text and group animals into those that change form as they grow and those that do not.***	• Using and drawing a classification key to classify organisms (Y4).
VCs	• 8: Living things, including humans, react to their surroundings with their senses (Y1). • 9: Young animals grow into adult animals. The young look similar, but not the same, as the adults (EYFS). • 11: Humans need to practise good hygiene, like brushing teeth and washing hands (EYFS).	• 5B: The air is all around us on Earth. Air has oxygen in it. • 8: All living things need food, oxygen, water and certain temperature conditions. • 9: Plants and animals reproduce (have offspring). • 11: Humans need to exercise, practise good hygiene and eat a healthy and balanced diet to stay healthy. Their diet should be high in fruits and vegetables and low in fats, sugar and salt.	• 5B: The air has (oxygen and) carbon dioxide in it (Y3). • 8: Organisms move, reproduce, are sensitive to their surroundings, grow, need oxygen, get rid of their waste, and need nutrition (MRS GOWN) (Y2). • 9: Sexual/asexual reproduction (Y5). • 11: A balanced diet includes the right proportions of carbohydrates, proteins, fats, fibre, vitamins and minerals (Y3).

Year 2 : Spring 1 - Uses of everyday materials (Chemistry)

Year 2: Spring 1

Chemistry: Uses of Everyday Materials

	Required prior knowledge	Knowledge to be explicitly taught	How knowledge will be built upon
Substantive	• An object is a 'thing' that can be seen and touched (Y1 Spr). • Objects have a name and often have a purpose for example a cup is the object and its purpose is for drinking from (Y1 Spr). • The material is what an object is made of, for example a cup can be made of paper or plastic. Common materials include wood, paper, metal, glass, water, rock (Y1 Spr). • Materials have different physical properties, some materials are hard whilst others are soft, some can be described as rough whilst others are smooth, some are dull whereas others are shiny. (Y1 Spr). • Materials can be grouped in a number of ways based on their physical properties (Y1 Spr). • The material that we choose to make an object from depends on its purpose (e.g. no chocolate kettle) (Y1).	• **Matter** is all the 'stuff' that we experience in everyday life, including air, water, tables and us! • Materials have different **physical properties** such as **malleable**, **waterproof**, **heatproof**, **windproof** and **absorbent**. • These physical properties make the materials more suitable for certain uses. • Everyday materials such as **wood**, **metal**, **plastic**, **brick**, **rock**, **paper** and **cardboard** have these physical properties but to different extents. • Different combinations of materials can be used to create different objects, for example a saucepan or a mop. • The shape of some solid objects made from some materials can be changed by **squashing**, **bending**, **twisting** or **stretching** the material. • **Sustainability** means meeting the needs of the people today, whilst meeting the needs of people of the future. • One way to use materials more sustainably is to **reduce**, **reuse** and **recycle** wherever possible.	• There are three states of matter: solid, liquid and gas (Y2 Sum). • Physical properties include being malleable, windproof, hard/soft, opaque/transparent, magnetic, electrical conductivity, thermal conductivity, and boiling and melting points (Y5 Sum). • Chemical properties are properties that scientists need specialist equipment to measure (Y5 Sum).
Disciplinary	• A&P: It is important that we keep as much as we can the same, apart from the thing we measure and the one thing we change (Y1 Spr). • M&O: Make systematic observations of an object (Y2 Aut) • R&P: Use a Carroll diagram to classify items based on properties (Y1 Spr). • A&E: Make simple statements about the results of an enquiry (Y1 Spr).	***Classify materials based on the extent of its properties by using a pair of axes*** • R&P: Use a pair of axes to classify items based on the extent to which it displays two properties. ***Investigate the best material to use to make an umbrella that is waterproof and windproof*** • A&P: There are four main stages of enquiry (A&P, M&O, R&P, A&E). • A&P: Scientists identify potential hazards in their experiments and plan ways to reduce them. • A&E: Ask further questions that could be explored to extend findings.	
VCs	• 1: Objects have a purpose and are made of different materials. (Y1) • 2: We can push and pull objects to make them move (EYFS).	• 1: All the 'stuff' encountered in everyday life, including air, water and different kinds of solid substances, is called matter. Different materials are recognisable by their properties. Materials have different properties, which make them suitable for specific purposes. • 2: We can move or change the shape of objects by pushing and pulling: by squashing, bending, twisting or stretching the materials.	• 1: Matter can exist in three different states: as solids, liquids and gases (Y2). Properties of materials can be physical (such as hardness) or chemical (such as toxicity). (Y4) • 2: Forces act in pairs. Forces acting against each other are opposing. Unbalanced forces will change the shape or movement of an object (Y3).

Year 2: Spring 2 - Living Things & Their Habitats (Biology)

Year 2: Spring 2

Biology: Living Things & Their Habitats

	Required prior knowledge	Knowledge to be explicitly taught	How knowledge will be built upon
Substantive	• Animals can be placed into groups (carnivores, herbivores and omnivores) based on the foods they eat (Y1 Sum). • Geography: Deserts are places where there is very little precipitation (Y2 Spr). • Geography: Hot deserts have a very hot and dry climate (Y2 Spr). • Geography: Cold deserts have a very cold and dry climate (Y2 Spr). • Temperature is a measure of how hot or cold something is (Y2 Aut). • Plants need water, light and a suitable temperature to grow (Y2 Aut). • Animals, including humans, need **food, water, oxygen** and the **right temperature** to survive (Y2 Aut).	• Everything in the world can be categorised as either **alive**, used to be alive or has never been alive. • Living things are called **organisms.** • Organisms **m**ove, reproduce, are **s**ensitive to their **s**urroundings, **g**row, need **o**xygen, get rid of their **w**aste, and need **n**utrition (MRS GOWN). • Animals move from place to place, while plants move on the spot. • **Habitats** are the places that living things live. A very small habitat is called a **micro-habitat**, and these can be found within larger habitats. • **Flora** describes plant life; **fauna** describes animal life. • A **species** is a group of living things that are the same type. • **Biodiversity** is a word we use to describe all of the living things in an area. • Animals and plants in a habitat depend on each other, e.g. for food or shelter. • Animals get their food from plants and other animals. This food provides the **energy** animals need. • Most plants produce their own food and are called **producers**. • In a **food chain**, the arrows show where the **energy** is being transferred from and to. • Living things are **adapted** to their **environment**. This means they may not be able to survive in other habitats. • Some animals and plants are adapted to life in a **hot desert**: **camels** and **cacti.** Some animals and plants are adapted to life in a **cold desert**: **Arctic fox, polar bear, penguin** and **shrubs.**	• The main food groups are carbohydrates (starch and sugars), proteins, fats, dairy, fruit and vegetables. Humans need a balanced diet of these (Y3 Spr). Vitamins, minerals and fibre are needed and being deficient in these causes diseases (Y3 Spr). • Different animals have different nutritional needs (Y3 Spr). • A food chain starts with a producer (usually a plant) who can produce its own food. Organisms that eat producers are called consumers (Y4 Aut). • A predator hunts prey to eat (Y4 Aut). • A food web shows the transfer of energy between different organisms. Animals and plants need to digest food to transfer energy from it (Y4 Aut). • An ecosystem is made up of all organisms living in an area and the non-living features of the environment (Y4 Aut). • In a food chain, an amount of energy from the Sun (a chemical store) is transferred to the plant by light. The energy is then transferred along the food chain as the different organisms are eaten (Y5 Aut). • Living things move, reproduce, are sensitive to their surroundings, grow, respire, excrete, and need nutrition (MRS GREN).
Disciplinary	• A&P: There are four main stages of enquiry (A&P, M&O, R&P, A&E) (Y2). • A&P: Scientists look for patterns in the world around them (Y1 Spr). • A&E: Make simple statements about the results of an enquiry (Y1 Spr).	***Examine microhabitats using a magnifying glass and counting the number and type of organisms found in an area*** • M&O: Observe using a magnifying glass safely.	• A&P: Scientists look for patterns in data to try to identify correlations (Y5).
VCs	• 8: All living things need food, oxygen, water and certain temperature conditions (Y2). • 9: There are lots of different kinds of animals and plants in the world today (EYFS). • 10: There are many different kinds of plants and animals in the world today (EYFS).	• 4: All living things need food to give them energy. All food chains start with a producer (a living thing that makes its own food). The arrows in a food chain show where energy is being transferred from and to. • 8: Most plants make their own food. Animals' food comes from eating plants (herbivores) or by eating animals (carnivores), which have eaten plants or other animals. These relationships can be represented in a food chain. Plants and animals are often dependent on each other. Organisms are adapted to their environment. If conditions in a habitat change, organisms may not be able to survive. Organisms move, reproduce, are sensitive to surroundings, grow, need oxygen, get rid of waste, and need nutrition (MRS GOWN). • 9: A species is a group of living things of the same type. • 10: Biodiversity describes all the different living things in an area. Living things are adapted to their environments. If the environment changes, the organisms may no longer be adapted and may struggle to survive.	• 4: In most plants, sunlight, carbon dioxide and water are used to make food in the leaves (Y3). • 8: Feeding relationships can be shown in food webs (Y4). Living things move, reproduce, are sensitive to their surroundings, grow, respire, excrete, and need nutrition (MRS GREN) (Y6). • 9: A species is a group of one type of organism. Individuals in this group can breed with each other to produce offspring that can go on to reproduce (Y4). • 10: Living things are found in certain environments because they have the features that enable them to survive there. This happens because of natural selection (Y6).

Year 2: Summer

Chemistry: Solids, Liquids and Gases

	Required prior knowledge	Knowledge to be explicitly taught	How knowledge will be built upon
Substantive	• Melting and freezing can be observed in the world around us (N3-4 Aut2). • An object is a 'thing' that can be seen and touched (Y1 Spr). • Objects have a name and often have a purpose for example a cup is the object and its purpose is for drinking from (Y1 Spr). • Matter is all the 'stuff' that we experience in everyday life, including air, water, tables and us! (Y2 Spr1). • The shape of some solid objects made from some materials can be changed by squashing, bending, twisting or stretching the material (Y2 Spr1).	• All **materials** are made of a single **substance** or a **mixture** of **substances.** • **Matter** is what all 'stuff' is made from. • There are three **states of matter**: **solids**, **liquids** and **gases.** • Substances can exist as solids, liquids and gases. • The three states of matter have different properties. • Liquids take the shape of the container they are in, when you move the liquid into a different container the shape will change. • Solids keep their shape unless a force is put on it. They will change their shape if you cut them or squash them. • Gases have no fixed shape or volume, they spread out to fill a container. If they are not in a container, they will keep spreading out. • We can decide if a substance is in its solid, liquid or gaseous state by looking at its properties. • One substance can exist in the different states, when the substance is in a different state it is still the same substance. • The Earth is getting warmer. We call this **global warming**. Global warming will cause solid ice to melt and become liquid water.	• The different substances in their different forms (solids, liquids and gases) are all made of particles (Y4 Spr). • The particles in the different states of matter are arranged differently (Y4 Spr). • Substances can change from one state of matter to another. Solids can change to become a liquid (melting), liquids can change to become a gas (evaporating), gases can change to become liquids (condensing) and liquids can change to become a solid (freezing) (Y4 Spr). • Materials change state at different temperatures, i.e. they have different melting and boiling points (Y4 Spr). • The water cycle relies on evaporation and condensation. Water is collected in the oceans from rivers; it evaporates and then condenses to form clouds; it then precipitates and the cycle begins again (Y4 Spr).
Disciplinary	• A&P: Scientists group objects or living things based on their properties (Y1 Spr).	***Classify different substances as solids, liquids or gases.***	
VCs	• 1: All the 'stuff' encountered in everyday life, including air, water and different kinds of solid substances, is called matter. (Y2) • 5B: Geography – Weather is short term; climate is long-term weather patterns (Y2).	• 1: Matter can exist in three different states: as solids, liquids and gases. The amount and type of substance does not change when the matter changes state. • 5B: Global warming describes the increase in Earth's average temperatures.	• 1: If a material could be divided into smaller and smaller pieces, it would be found to be made of particles, which smaller than can be seen even with a microscope. These particles are not in a material; they are the material. The particles of a substance are arranged differently when it is solid, liquid or gas. (Y4) • 5B: Geography – The greenhouse effect keeps the Earth warm; the enhanced greenhouse effect causes global warming (Y5).