EYFS - Medium Term Planning - Science - Spring 2
Growing and Changing

Essential Knowledge & End Points	Key Vocabulary
In this unit children will explore : • seasons, • growing plants, • how animals grow and change, • food and farming and how we grow and change. Knowledge from this unit will help children to meet the Early Learning Goal Understanding the World: The Natural World and will also contribute understanding of People, Cultures and Communities and Past and Present.	Change Grow Crops Harvest

	Knowledge	As scientists, we will...
Session 1:	• We have four seasons on earth; spring, summer, autumn and winter. • People and places change over time	Recognise there are different seasons, name them and will be able to describe things we do in the different seasons. When asked, we will be able to describe how the seasons change over a year. We will be able to describe how they have changed over time (linking back to previous units and how children have considered chronology). Look closely at leaves and discuss the shapes or patterns they notice
Session 2:	• Plants need water and light to grow • Living things, such as plants, grow and change throughout the year.	Know some trees keep their leaves whilst others lose them during autumn. We will think about the order of events in a story and what a seed needs to grow.
Session 3:	• Animals grow and change • Caterpillars change into Butterflies. (Change as appropriate)	Recognise the adult and child stages of various animals and their corresponding names e.g. cow (calf) etc. We will understand that animals are living things that grow and change over time. We will recognise that a caterpillar changes into a butterfly. (Change as appropriate)
Session 4:	• We can grow food to eat. • Farmers harvest crops for us to eat	Understand that farmers can grow food for us to eat. Children know some crops that grow nearby (if locally relevant). We will experience planting seeds and observing plant growth.
Session 5:	• We grow and change throughout our lives. • When we become adults there are many different things we can do.	Describe some of the phases of the human life cycle. We will know we have changed since they were born and can describe some of the things we can do now that we couldn't before. We will think about things they'd like to do in the future; travel, talents, interests, jobs, etc. We will think about a wide range of careers we may aspire to do in the future.

Year 1 - Medium Term Planning - Science - Spring 2
Plants

Prior Learning Links

Build on from the knowledge learnt in EYFS - plants need light and water to grow

Essential Knowledge & End Points

Year 1NC:

Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.
Identify and describe the basic structure of a variety of common flowering plants, including trees.

End Points:

- Plants need the right temperature, light and water to grow
- Most plants grow from seeds
- If seeds do not get the right conditions, they may not grow into healthy plants
- The roots of a plant act as an anchor, fixing the plant into the ground. They also absorb water from the soil.
- The stem of a plant grows above the ground. The leaves and flowers grow from it.
- A plant's leaves absorb sunlight and turn it into energy that the plant uses to grow.
- Plants spread their seeds in order to make new plants
- When plants make seeds to make new plants, we call this reproducing
- Evergreen trees keep their leaves all year round
- Deciduous trees drop their leaves during autumn time and grow fresh leaves in spring
- We eat different parts of plants including roots, stem, leaves and sometimes the flowers
- Some plants are dangerous to eat and could make us ill
- We need a variety of fruit and vegetables in our diet

Key Vocabulary

Plant	Seed
Root	Deciduous
Stem	Evergreen
Leaves	

Key Scientist

Session 2

Maria Sibylla Merian (German artist, scientific illustrator and naturalist).

	Knowledge	As scientists, we will...	
Session 1:	To know what plants need in order to grow: • Plants need the right temperature, light and water to grow. • Most plants grow from seeds. • If seeds do not have the right temperature, light and water, they may not grow into healthy plants.	Investigate what plants need to grow by putting cress seeds in different conditions. For example, some seeds on a damp paper towel in the window, and some in a dark cupboard, some in the window with no water at all, some in a pot of water, some in a fridge. Check every few days and observe and compare changes. Children can record their observations. (Working Scientifically - identifying and classifying/observing closely/using their observations to suggest answers/gathering and recording data/performing simple tests)	
Session 2:	To name and describe the parts of a plant: • The roots of a plant act as an anchor, fixing the plant into the ground. • They also absorb water from the soil. The stem of a plant grows above the ground. • The leaves and flowers grow from it. • A plant's leaves absorb sunlight and turn it into energy that the plant uses to grow.	Draw and label the parts of a plant. Encourage pupils to physically draw the plant, not add labels to a pre-printed plant. It will help them to think carefully about each part. Accuracy of drawing is not important here - it is more about understanding the role each part of the plant plays. (Working Scientifically - identifying and classifying)	
Session 3:	To understand that plants spread their seeds to make new plants: • Plants spread their seeds in order to make new plants. • When plants make seeds to make new plants, we call this reproducing. • Plants must spread their seeds to help them grow into new plants.	Draw a chosen plant (this could be the apple tree from the taught part of the lesson, or a plant you have within the school grounds) and draw the seeds. Write a sentence to describe how the plant seeds disperse. (Working Scientifically - identifying and classifying)	
Session 4:	To understand that some trees are evergreen, and some are deciduous: • Evergreen trees keep their leaves all year around. • Deciduous trees drop their leaves during autumn time and grow fresh leaves in spring time. • Oak trees are deciduous and fir trees are evergreen.	Draw an oak (deciduous) tree and a fir (evergreen) tree during the season of autumn. Write a sentence to explain the difference between the trees. (Working Scientifically - identifying and classifying)	

Session 5:	To recognise which parts of plants we eat: • We eat different parts of plants including the roots, stem, leaves and sometimes the flowers. • Some plants are dangerous to eat and would make us ill. • We need a variety of fruit and vegetables in our diet.	Complete a table recording the parts of a plant we eat. Provide table for children to fill in with information. E.g. stem in one box and in the box next to it, the children write the different plants we eat the stem of (e.g. celery, asparagus). You may decide to use photos to support children in attempting the task. (Working Scientifically - gathering and recording data)	
Session 6:	To describe some common plants, including trees • To name and describe the purpose of parts of a plant, and what they need in order to grow. • To understand that plants spread their seeds to reproduce. • To understand that some trees are evergreen, and some are deciduous. • To understand that plants are grown for food and to recognise which parts of plants we eat.	Create a report about plants. Include information about the different parts of plants, how seeds disperse, some plants we find in our local area, deciduous and evergreen trees and plants we eat. (scaffold as appropriate). (Working scientifically - identifying and classifying/gathering and recording data)	**Assessment opportunity:** MCQ

Year 2 - Medium Term Planning - Science - Spring 2
Plants

Prior Learning Links

Build on from the knowledge learnt in Year 1:
What plants need to grow and basic anatomy of a plant

Essential Knowledge & End Points

Year 2 NC:

• Observe and describe how seeds and bulbs grow to mature plants
• Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy

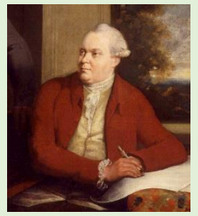
End Points

• Know there are many different types of plants
• Seeds and bulbs grow into mature plants
• A seed can grow into a flowering plant
• When a seed germinates, it changes from a seed to a seedling
• Some plants create bulbs that live underground, and their leaves grow up through the soil
• Plants need light and water to grow
• Plants often grow well in the Spring when the temperatures get warmer and there is often rain
• Some plants (crops) are grown for food
• Crops are harvested, packaged and transported for people to buy and eat

Key Vocabulary

Plant	Seedling
Root	Bulb
Stem	Germinate
Leaves	crops
Seed	

Key Scientist



Session 1
Daniel Solander (botanist who worked with Joseph Banks on Captain Cook's voyage around the World)

Session 1
Joseph Banks (naturalist on Captain Cook's voyage around the World).

	Knowledge	As scientists, we will...	
Session 1:	To know there are many different kinds of plants • There are many different kinds of plants. • Around my school I can find plants such as: dandelion, forget-me-not, daffodil, dog rose. • Around my school I can find trees such as: (oak, beech, sycamore)	Show children some botanical sketches and explain that scientists draw and label living things so they can study them. Children to draw and label some plants/leaves. (Working Scientifically - identifying and classifying)	
Session 2:	Seeds and bulbs grow into mature plants • A seed can grow into a flowering plant. • When a seed germinates, it changes from a seed into a seedling. • Some plants create bulbs that live underground, and their leaves grow up through the soil.	Draw and label a diagram of a seed and seedling, and a bulb and a sprouting bulb. (Working Scientifically - observing closely, identifying & classifying).	
Session 3:	**Working Scientifically:** Observe closely, using simple equipment Healthy plants need light and water to grow: • When a plant has no water, it cannot grow well.	**Focussed Assessment:** What do plants need to help them grow? Over two or more lessons, plan, undertake and evaluate a **comparative test.** Include diagrams and written explanations throughout the comparative test.	**Assessment opportunity**

Session 4:	• When a plant has no light, it cannot grow well. • Plants often grow well in the Spring as the temperatures get warmer and there is often rain.	(Working Scientifically - asking simple questions/observing closely/performing simple tests/gathering and recording data to help in answering questions)	
Session 5:	To understand that plants are grown for food: • Some plants are grown for food. • Farmers grow crops for food. Crops are harvested, packaged and transported for people to buy and eat.	Where does our food come from? This task could be completed as a cartoon strip. You could choose one vegetable to focus on, such as 'The Journey of a Potato'. The main idea is that children understand plants need water, sunlight and an appropriate temperature to grow properly, and that farmers grow and harvest crops for us to eat. (Working Scientifically - asking simple questions)	
Session 6:	Describe how seeds and bulbs grow into mature plants Scientific Understanding: • To be able to observe and describe how seeds and bulbs grow into mature plants • To find out and describe how plants need water, light and a suitable temperature to stay healthy	How do bulbs and seeds work? Structure strips could be used to help children organize their writing. Suggested structure: 1. What is a seed? What is a bulb? 2. What do bulbs and seeds need to grow? What happens if they don't have these things? 3. What can bulbs and seeds grow into? 4. Which plants can we eat? (Working Scientifically - using their observations and ideas to suggest answers to questions)	**Assessment opportunity** MCQ

Year 3 - Medium Term Planning - Science - Spring 2
Rocks

Prior Learning Links

- Link their knowledge from History of the Stone Age and how rocks were used as tools by early humans.

Essential Knowledge & End Points

Year 3 NC:

- Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
- Describe in simple terms how fossils are formed when things that have lived are trapped within rock
- Recognise that soils are made from rocks and organic matter (Yr3 NC)

End Points

- Rocks have different names and can be sorted into groups according to their properties
- There are three main groups of rock called sedimentary, igneous and metamorphic
- Sedimentary rocks are formed by layers of sediment under the sea
- Metamorphic rocks are formed under immense heat and pressure
- Igneous rocks are formed by volcanoes
- Rocks can have small air spaces in them allowing water to pass through them
- If a rock allows water to pass through, it is called permeable rock
- If a rock doesn't allow water to pass through, it is called impermeable rock
- Fossils are formed when rock forms around things that once lived
- Fossils are rare and take thousands of years to form
- Scientists who study fossils are called palaeontologists
- Soil is made from rocks and organic matter
- Organic matter is made from the decaying remains of living things

Key Vocabulary

Geology
Permeable
Impermeable
Fossils
Fossilised
Palaeontologist
Soil
Sediment
Metamorphic
Pressure
Earth's crust
Igneous
Volcano
Magma
Lava

Key Scientist

Session 4
Mary Anning

	Knowledge	As scientists, we will...
Session 1:	To know there are many different types of rocks: • There are many different types of rocks. • Rocks have different names and can be sorted into groups according to their properties.	Sort rock samples according to their properties. Ensure children know the names of the rocks. Record some rocks and a description of each in a table. Misconception: all rocks are hard. (Working Scientifically - making systematic and careful observations/identifying differences, similarities/recording findings/gathering data/setting up simple practical enquiries)
Session 2:	To know that geologists sort rocks into three main groups: • To know that the three main groups of rock are called sedimentary, igneous and metamorphic • To know that sedimentary rocks are formed by layers of sediment under the sea • To know that metamorphic rocks are formed under immense heat and pressure and igneous rocks are formed by volcanoes	Draw a diagram and write a short explanation to show how each rock type forms. (Working Scientifically - identifying differences, similarities and changes related to processes/reporting on findings from enquiries including written explanations)
Session 3:	To understand that some rocks allow water to pass through, but others do not: • Rocks can have small air spaces in them allowing water to pass through them. • If a rock type allows water to pass through it, is called permeable rock. • If a rock type doesn't allow water to pass through it, is called impermeable rock.	Use magnifying glasses look closely at different rocks. Which rocks will be permeable and which will be impermeable? Using your rock samples, place different types of rock in a beaker of water. Record which rock released bubbles and which did not. Sort the rocks into a table of two columns: permeable and impermeable. (Working Scientifically - setting up simple practical enquiries, comparative tests/making systematic and careful observations/gathering and recording data/using results to draw simple conclusions/using straightforward scientific evidence to support their findings)

Session 4:	To know that some rocks contain fossils which can tell us about life millions of years ago: • Fossils are formed when rock forms around things that once lived. • Fossils are rare and take thousands of years to form. • Scientists who study fossils are called palaeontologists.	Option A - Draw and label a diagram to show how fossils could form in sedimentary rock. Option B - Who was Mary Anning? (Working Scientifically - reporting findings including written explanations)	
Session 5:	To recognise that soils are made from rocks and organic matter: • Soil is made from rocks and organic matter. • Organic matter is made from the decaying remains of living things.	Are all soils the same? If possible, provide soil samples from two or more locations e.g. soil from a flower bed, soil from a wooded area, soil containing many rocks. Use a sieve, and water and tweezers. Use magnifying glasses, make these available to children. Once children have looked closely at the soils, they can record by drawing and labelling a diagram of the soil samples, explaining what they noticed. (Working Scientifically - setting up simple practical enquiries, comparative tests/making systematic and careful observations/recording findings using diagrams)	
Session 6:	**Review:** Reporting on findings from enquiries: • Group rocks based on properties • Talk about / draw a diagram / write about findings • Draw conclusions about the least / most wearing rock	**Focussed Assessment:** *Today we are geologists.* Provide a purpose for the investigation e.g. to find the best material for a new paved area in school. Suggest that you would like to find out which rock would last the longest/be the least wearing/the strongest. Decide whether to do a rub test and/or a scratch test etc. Ask children to order the rocks and justify their selection of strongest rock. How will you report your findings (to persuade), e.g. draw, write, present?	**Assessment opportunity**
Session 7:	To explain rocks and what they can tell us about our planet: • Rocks are classified by how they are formed: sedimentary, igneous and metamorphic. • Rocks can also be classified by their properties such as whether they are hard or whether they are permeable • Fossils are formed over a long period of time from the remains of plants and animals that have died. • Soil is a mixture of small pieces of rock with dead organic matter.	What can rocks tell a geologist about our planet? Writing – information board Suggested structure: • Introduction (what is a geologist, what are rocks) • Igneous and Metamorphic rocks (how they are made, their properties) • Sedimentary rocks and fossils (their properties, how fossils can tell us about life long ago) • Soil (different types and why it is important) • Conclusion (rocks can tell us about life long ago, how rocks are formed, what lives in an area, what geographical features there are, e.g. volcanoes and scientists are always learning more about rocks and the secrets they hold). You may want to use structure strips as a scaffold. Working Scientifically - identifying differences, similarities or changes related to simple scientific ideas and processes/reporting on findings from enquiries.	**Assessment opportunity** MCQ

Year 4 - Medium Term Planning - Science - Spring 2
Sound

Prior Learning Links

This unit builds on knowledge from Year 3 Light, particularly around how the eye sees as they focus on how the ear hears in this unit.

Essential Knowledge & End Points

Year 4 NC:

- identify how sounds are made, associating some of them with something vibrating
- recognise that vibrations from sounds travel through a medium to the ear
- find patterns between the pitch of a sound and features of the object that produced it
- find patterns between the volume of a sound and the strength of the vibrations that produced it
- recognise that sounds get fainter as the distance from the sound source increases

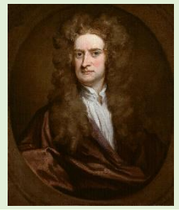
End Points:

- Sound is caused by a back and forth movement called vibration
- Sound waves move out from a vibrating object
- Sound can travel through different types of matter (solid, liquid, gas)
- Sound is fainter the further from the source it is
- Pitch is how high or low a sound is and relates to the speed of vibrations
- Volume is how loud or quite a sound is and relates to the strength of the vibrations
- Louder sounds are made by bigger vibrations
- Quieter sounds are made by smaller vibrations
- Faster vibrations make higher-pitched sounds
- Slower vibrations make lower-pitched sounds
- We hear through soundwaves entering the ear, travelling through it and the messages sent to the brain

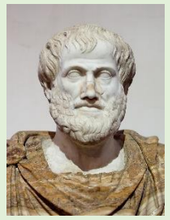
Key Vocabulary

vibration
pitch
larynx
sound waves
volume
ear drum
sound barrier
supersonic

Key Scientist



Session 2
Isaac Newton



Session 2
Aristotle

	Knowledge	As scientists, we will...
Session 1:	To understand how sound is produced and how it travels: • Sound is caused by a back and forth movement called vibration. • Sound waves move out from a vibrating object. • Sound can travel through different types of matter. • Sound is fainter the further from the source it is.	Outside, children investigate what happens to volume of a drumbeat as the distance from sound source increases. Use a decibel app on a data logger to measure volume of sound. Complete a table with recorded data and explanation in books. Explain why sounds are fainter further away. Children can use results to explain how to make it a fairer test in the future. Working Scientifically - setting up simple practical enquiries/taking accurate measurements using a range of equipment/gathering and recording data/reporting on findings from enquiries/using results to draw simple conclusions.
Session 2:	To know sound travels through the air: • In warm air, sound travels at about 340 metres per second. • The speed of sound in water is about four times faster than in air. • There are airplanes that can travel as fast as sound.	Measuring the speed of sound - If possible, if there is a large enough space, go outside and measure. Children should record the time it takes and predict what the time will be if the sound comes from further back or closer. Write an explanation about the speed of sound: - How fast does speed travel? Does sound travel slower or faster than light? - How do you know? Working Scientifically - setting up simple practical enquiries/taking accurate measurements using a range of scientific equipment/making careful observations/gathering and recording data/make predictions for new values/reporting on findings from enquiries.

Session 3:	To know the difference between pitch and volume: • Loud sounds are made by big vibrations. • More energy is needed to make louder sounds. • Quiet sounds are made by small vibrations. • More vibrations every second makes higher pitched sounds.	How do you change the sounds made by different musical instruments? 1. Groups move around a circus of stations to explore the sounds made by different musical instruments. 2. Record observations as labelled scientific diagrams identifying how the sound is produced as well as how the volume and pitch of the sound is changed. 3. Use the data logger to measure the sound made. Working Scientifically - setting up simple practical enquiries/recording data/reporting on findings from enquiries.	
Session 4:	To understand how the human voice makes different sounds and vibrations in sound waves travel through the different parts of the ear: • When you sing a high note, your vocal cords vibrate very fast. • When you sing a low note, your vocal cords vibrate more slowly. • The larynx is in the throat and the muscles vibrate the vocal cords. • Vibrations in sound waves travel through the different parts of the ear. • We hear sounds when sound waves enter our ear, travel through it and messages are sent to our brain. • The structure of the ear includes ear drum, bones called the hammer, anvil, and stirrup, cochlea. • Hairs inside the cochlea are connected to nerves that carry the signals to the brain.	Explain how humans hear. Draw a diagram and label. Scaffold this task as appropriate using images of the different parts of the ear to help children order the process. (Working Scientifically - recording findings using simple scientific language, labelled diagrams)	
Session 5:	Review: Identify differences, similarities or changes related to simple scientific ideas and processes. • explain how to make the best possible string telephone • suggest reasons for improvements	**Focussed Assessment:** Explore how to use a string telephone. In groups, ask children to investigate what makes the best string telephone. Give time for the children to reflect and test their designs so that they can be modified and improved. After the investigation, children demonstrate their telephones to the class and explain why their telephone is/is not good. Discuss how their research has informed their design – detailing improvements they have made and reasons for making those improvements. Working Scientifically – using results to draw simple conclusions, suggest improvements and raise further questions.	**Assessment opportunity**
Session 6:	To show my knowledge and understanding of sound Scientific Understanding: • Sound is caused by a back and forth movement called vibration. • Sound waves move out from a vibrating object in all directions. • In warm air, sound travels at about 770 miles per hour (340 metres per second). •Sound becomes quieter further from the source. • Loud sounds have larger vibrations. • Quiet sounds have smaller vibrations. • High pitched sounds have faster vibrations. • Low pitched sounds have slower vibrations. • The larynx is in the throat and the muscles vibrate the vocal cords	Independent writing task: Describe what sound is, how sound is made and how it travels. Include an explanation of volume and pitch. Working Scientifically - reporting on findings from enquiries including written explanations/using straightforward scientific evidence to answer questions/asking relevant questions and using different types of scientific enquiries to answer them	**Assessment opportunity** MCQ

Year 5 - Medium Term Planning - Science - Spring 2
Space

Prior Learning Links

Essential Knowledge & End Points

Year 5 NC:

- Describe the movement of the Earth and other planets relative to the sun in the solar system
- Describe the movement of the Moon relative to the Earth
- Describe the Sun, Earth and Moon as approximately spherical bodies
- Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky

End Points:

- Astronomers believe the universe started with the Big Bang 14 billion years ago and that the universe is still expanding today
- Galaxies are groups of stars held together by gravity
- Our galaxy is the Milky Way and our nearest neighbour is Andromeda galaxy
- Gravity is the force which pulls all objects towards each other
- Although all objects attract all others by the force, gravity, it is too weak to notice unless one object (like the Earth) is huge
- The Earth's gravity holds us to the Earth's surface; the Sun's gravity holds the Earth in orbit around it
- The Sun is at the centre of our solar system
- Our solar system contains 8 planets, 4 terrestrial planets and 4 Jovian planets
- There are trillions of smaller rocks called asteroids, as well as dwarf planets like Pluto and Ceres
- The moon is the Earth's natural satellite
- The moon is a planet, it does not make its own light
- Depending on the position of the Sun, we see all, part or none of the Moon; these are known as the phases of the Moon
- Neil Armstrong and Buzz Aldrin were the first humans to land on the moon
- Our home supercluster is called Laniakea and contains over 100,000 galaxies

Key Vocabulary

Astronomy	Orbit
Astronomer	Light year
Universe	Big Bang theory
Galaxy	Gravity
Star	Satellite
Solar system	The Milky Way

Key Scientist

Session 5
Sir Bernard Lovell

	Knowledge	As scientists, we will...	
Session 1:	To know that astronomers believe the universe began with the Big Bang, and that it is still expanding today: • Galaxies are groups of stars held together by gravity. • Our galaxy is the Milky Way and our nearest neighbour is Andromeda galaxy. • Astronomers believe the universe started 14 billion years ago with a Big Bang.	Mark dots on a balloon in felt tip. What will happen when I inflate this balloon? Discuss how the dots move away from each other. This is what is happening to galaxies in space. Children explain what happened at the Big Bang and draw a diagram of galaxies moving apart. They may want to use the image of the balloon. Working Scientifically - identifying scientific evidence that has been used to support ideas/recording data of increasing complexity using scientific diagrams and labels.	
Session 2:	To understand that gravity is a force that holds objects together: • Gravity is the force which pulls all objects towards each other. • Although all objects attract all others by the force, gravity, it is too weak to notice unless one object (like the Earth) is huge. • The Earth's gravity holds us to the Earth's surface; the Sun's gravity holds the Earth in orbit around it.	**Focussed Assessment:** Gather and record data using tables and graphs. Investigate the formation of "craters" by dropping meteors (e.g. marbles/ balls) into a tray of sand and observing the craters produced. Consider what could be changed and measured and allocate different variables to different groups (height of drop, size of meteor, type of sand). Discuss how they can make results more reliable (repeating drops, finding an average). Groups to make measurements and record in a table and graph of their own design.	**Assessment opportunity**
Session 3:	To know the planets of our solar system: • The Sun is at the centre of our solar system. • Our solar system contains 8 planets, 4 terrestrial planets and 4 Jovian planets. • There are also trillions of smaller rocks called asteroids, as well as dwarf planets like Pluto and Ceres.	Draw and label a diagram of the solar system with the planets in the correct order. Add some features of each planet to the diagram. Working Scientifically - recording data using scientific diagrams and labels.	

Session 4:	To understand the Moon's phases The moon is the Earth's natural satellite: • The moon does not make its own light. • Depending on the position of the Sun, we see all, part or none of the Moon; these are known as the phases of the Moon. • Neil Armstrong and Buzz Aldrin were the first humans to land on the Moon.	Draw and label the eight distinct stages of the moon known as the lunar phases. Working Scientifically - recording data of increasing complexity using scientific diagrams and labels.	
Session 5:	To understand that the solar system is just a small part of our universe: • The universe is immensely vast. Our solar system is a tiny part of The Milky Way galaxy. • The Milky Way's closest neighbour is Andromeda, 2.5 million light years away. • Our home supercluster is called Laniakea and contains over 100,000 galaxies.	Create a diagram of the different scales of the universe. From stars, to galaxies, to galaxy clusters, to superclusters. Write a definition for each one. Working Scientifically - recording data of increasing complexity using scientific diagrams and labels.	
Session 6:	• To know the order of scale: planet, sun, solar system, galaxy, and universe • To know that astronomers believe the universe started 14 billion years ago in a big bang and that it is still expanding. • To know that gravity is a force between all objects, and the force is bigger if the object it bigger. We can only 'feel' gravity between us and the Earth. • To know the planets of the solar system • To understand the reason that we see the phases of the moon • To understand that our solar system is just a small part of the universe	Design a creature that could survive on Mars. Draw your creature. Label it to identify its unique features that help it to survive on Mars (skin/fur, colour, hot/cold blooded, feet, how many legs, eyes, ears, nose, mouth, what it eats, what it drinks, what it breathes etc.) Write a few sentences convincing me that your creature would be able to survive on Mars.	**Assessment opportunity** MCQ

Year 6 - Medium Term Planning - Science - Spring 2
Light

Prior Learning Links

This unit builds on from **Year 3** Light:

- Light enables us to see things
- Darkness it the absence of light
- The sun is an important source of light for life on earth
- Light travels in straight lines
- Transparent material allows light to pass through it
- Opaque material blocks light from passing through it
- Mirrors reflect light
- Mirrors of different shapes reflect light differently
- A shadow is created when an object blocks the path of light
- The sun appears to move across the sky as our planet revolves on its axis
- Shadows change in size and shape throughout the day

Essential Knowledge & End Points

Year 6 NC:

- Recognise that light appears to travel in straight lines
- Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye
- Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes
- use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them

End Points:

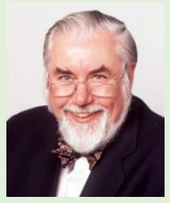
- Light enables us to see by entering our eyes
- Light travels in straight lines
- Some light sources are natural, and some are artificial
- The iris helps the pupil to open and close
- Inside the retina, light rays become electrical signals which are sent to the brain
- Shadows are always the same shape as the object that made them
- The size of shadows can change but the outline shape stays the same as the object
- Light from the sun is made up of the colours of the rainbow
- When light travels through a prism, the glass slows it down and changes its course
- Different colours are slowed down different amounts when going through a prism
- A periscope uses reflects an image out of sight using light and mirrors

Key Vocabulary

Light	Shade
Speed of light	Reflection
Mirror	Prism

Key Scientist

Session 1
Alhazen



Session 6
Professor Colin Webb

	Knowledge	As scientists, we will...	
Session 1:	To know that light is a source of illumination that allows us to see: • Light illuminates allowing us to see. • Some light sources are natural and some are artificial. • Light travels in straight lines.	How does light travel? Include a diagram of a light source showing how light travels to our eyes. Working Scientifically - identifying scientific evidence that has been used to support or refute ideas or arguments.	
Session 2:	To know that light enters our eyes, enabling us to see: • The cornea is a transparent covering on the outside of your eye. • The iris is the coloured part of the eye which helps the pupil to 'open and close'. • Inside the retina, the light rays become electrical signals which travel along the optic nerve to the brain.	Draw and label an eye; write an explanation for how we see. Must include key vocabulary: cornea, iris, pupil, lens, retina, optic nerve. Working Scientifically - identifying scientific evidence that has been used to support or refute ideas or arguments.	
Session 3:	**Plan:** Identify different types of scientific enquiries to answer their own questions • raise a range of questions about light? • identify ways to answer a range of questions?	**Focussed Assessment:** *Today we are going to be physicists.* Provide a discussion-starting stimulus e.g. pictures of light in different contexts: shining through clouds, shadow puppets, headlights, eye. Explore children's ideas around light.	**Assessment opportunity**

		Challenge small groups to raise questions about light e.g. 20. Then ask them to sort these into groups for how they could be answered e.g. research, direct observation, testing, we may never know... Share questions from different groups, supporting children to turn some into a form which could be investigated. Select questions which could be: answered now by research; answered in a later lesson by observation or investigation; placed on the class 'Wonder Wall' to consider at the end of term.	
Session 4:	To test the hypothesis that shadows are always the same shape as the object that made them: • Light travels in straight lines. • Shadows are always the same shape as the object that made them. • The size of shadows can change, but the outline shape is always the same as the original object.	Hypothesis: shadows are always the same shape as the object that made them. Use torches and objects from the classroom to test this hypothesis. Ask children to record their findings, but allow them to decide how best to do this. Children can write an explanation including diagrams to show what they found out and to make predictions about further testing. Working Scientifically - planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary/using test results to make predictions to set up further tests/reporting and presenting findings from enquiries, including conclusions, causal relationships in written forms/recording data.	
Session 5:	To understand what light is made of and how a prism works: • Scientists call the light that comes from the sun 'white light'. • The light from the sun is made up of all the colours of the rainbow. • When light travels through a prism, the glass slows it down, and changes its course. • Different colours are slowed down different amounts.	Allow time to look at prisms. Draw and label diagrams of a prism and describe what is happening to the light as it travels through. Working Scientifically - identifying scientific evidence that has been used to support or refute ideas or arguments/reporting and presenting findings from enquiries including causal relationships.	
Session 6:	To understand that a periscope uses mirrors to reflect an image of something out of sight: • A periscope helps you to see something that is out of sight. • A periscope reflects an image using light and mirrors. • Submarines use periscopes to see above the surface of the water whilst still submerged.	Make a periscope. Whilst the pupils are making their periscope, ask them about what is happening to the light, how does the image travel down the device? Pupils can write a description of how they made their periscope. They can draw and annotate a diagram to show how the light travels within the periscope. Working Scientifically - identifying scientific evidence that has been used to support or refute ideas or arguments.	
Session 7:	To understand how light behaves Scientific Understanding: • Light travels in straight lines • Shadows are always the same shape as the objects that made them • The size of shadows can change, but the outline shape is always the same as the original object • Light can reflect from a surface and change the duration of travel	'It is important to understand how light behaves.' Explain why a scientist might say this. This task can draw on knowledge from other units in the science curriculum such as plants and astronomy. Working Scientifically - identifying scientific evidence that has been used to support or refute ideas or arguments/reporting and presenting findings from enquiries.	**Assessment opportunity** MCQ