



Willow Tree Academy

Science progression document

National Curriculum Content:

EYFS	KS1	Y3/4	Y5/6
<p style="text-align: center;"><u>Understanding of the World: The World</u></p> <p>Birth to three years:</p> <ul style="list-style-type: none"> . Repeat actions that have an effect . Explore natural materials, indoors and outdoors. . Explore and respond to different natural phenomena. . Make connections between features and their family and other families. . Notice differences between people . <p>30 - 50 months</p> <ul style="list-style-type: none"> ● Use senses to explore ● Explore collections of materials ● Talk about what they see using a wide vocabulary. ● Begin to make sense of their own story and family history. ● Show interest in different occupations ● Explore how things work ● Plant seeds and care for growing plants. ● Talk about different forces ● Knows that there are different countries and discuss experiences. <p>40-60 months</p> <ul style="list-style-type: none"> ● Looks closely at similarities, differences, patterns and change. ● Name and describe people in the family ● Compare and contrast , characters from stories ● Draw information from a simple map. ● Explore the natural world . ● Recognise some similarities and differences ● Understand the effect of changing seasons <p>Early Learning Goal</p> <p>Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur, and talk about changes.</p>	<ul style="list-style-type: none"> ● Ask questions about what they notice ● Develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions ● Observe changes over a period of time ● Notice patterns, grouping and classifying things ● Carry out simple comparative tests ● Find things out using secondary sources of information. ● Begin to use simple scientific language ● Talk about what they have found out ● Communicate their ideas to a range of audiences in a variety of ways. ● Science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos. 	<ul style="list-style-type: none"> ● Explore by talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments ● Begin to develop their ideas about functions, relationships and interactions ● Ask their own questions about what they observe ● Make some decisions about which types of scientific enquiry is likely to be the best way ● Observe changes over time ● Notice patterns ● Begin to group and classify things, ● Carry out simple comparative and fair tests ● Find things out using secondary sources of information ● Draw simple conclusions and use some scientific language to write about what they have found out. 	<ul style="list-style-type: none"> ● Develop a deeper understanding of a wide range of scientific ideas ● Explore by talking about their ideas ● Ask their own questions about scientific phenomena ● Analysing functions, relationships and interactions more systematically ● Encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates ● Begin to recognise that scientific ideas change and develop over time ● Select the most appropriate ways to answer science questions using different types of scientific enquiry ● Observe changes over different periods of time ● Notice patterns ● Begin to group and classify things, ● Carry out simple comparative and fair tests ● Find things out using secondary sources of information ● Draw conclusions based on their data and observations ● Use evidence to justify their ideas ● Use their scientific knowledge and understanding to explain their findings.

Year group coverage

Substantive knowledge

	Plants	Rocks	Animals inc humans	Forces and magnets	Materials and their properties	States of matter	Seasonal changes	Electricity	Light	Earth and space	Living things and their habitat	Evolution and inheritance	Sound
EYS													
Y1													
Y2													
Y3													
Y4													
Y5													
Y6													

Disciplinary knowledge



Comparative/fair testing	Research	Observation over time	Pattern-seeking	Identifying, grouping and classifying
<p>Changing one variable to see its effect on another, whilst keeping all the other the same.</p> <p>Link for support: https://www.ogdentrust.com/assets/general/WS-fair-tests_February-2020.pdf</p>	<p>Using secondary sources of information to answer scientific questions.</p> <p>Link for support: https://www.ogdentrust.com/assets/general/WS-research.pdf</p>	<p>Observing changes that occur a period of time ranging from minutes to months.</p> <p>Link for support: https://www.ogdentrust.com/assets/general/WS-observing-over-time.pdf</p>	<p>Identifying patterns and looking for relationships in enquiries where variables are difficult to control.</p> <p>Link for support: https://www.ogdentrust.com/assets/general/WS-pattern-seeking.pdf</p>	<p>Making observations to name, sort and organise items.</p> <p>Link for support: https://www.ogdentrust.com/assets/general/WS-identifying-and-classifying.pdf</p>

Knowledge Progression

EYFS - Y6

Supporting documentation

https://docs.google.com/presentation/d/1bfRwOttgzHY5jFn_Er6_3ODk7gUW_klddY1CtCkcl-s/edit#slide=id.g1626bf6edb9_0_70

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<p>Understanding of the World: The World Birth to three years:</p> <ul style="list-style-type: none"> Repeat actions that have an effect Explore natural materials, indoors and outdoors. Explore and respond to different natural phenomena. <p>Make connections between features and their family and other families.</p> <ul style="list-style-type: none"> Notice differences between people . <p>30 - 50 months</p> <ul style="list-style-type: none"> Use senses to explore Explore collections of materials Talk about what they see using a wide vocabulary. Begin to make sense of their own story and family history. Show interest in different occupations Explore how things work Plant seeds and care for growing plants. Talk about different forces Knows that there are different countries and discuss experiences. <p>40-60 months</p> <ul style="list-style-type: none"> Looks closely at similarities, differences, patterns and change. Name and describe people in the family Compare and contrast , characters from stories Draw information from a simple map. Explore the natural world . Recognise some similarities and differences Understand the effect of changing seasons <p>Early Learning Goal Children know about similarities and differences in relation to and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals ts and explain why some things occur, and talk about changes.</p>	<ul style="list-style-type: none"> identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals identify and name a variety of common animals that are carnivores, herbivores and omnivores describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense 	<ul style="list-style-type: none"> notice that animals, including humans, have offspring which grow into adults find out about and describe the basic needs of animals, including humans, for survival (water, food and air) describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. 	<ul style="list-style-type: none"> identify that animals, including humans, need the right types and amount of nutrition Identify that they cannot make their own food; they get nutrition from what they eat. identify that humans and some other animals have skeletons and muscles for support, protection and movement. 	<ul style="list-style-type: none"> describe the simple functions of the basic parts of the digestive system in humans identify the different types of teeth in humans and their simple functions construct and interpret a variety of food chains, identifying producers, predators and prey. 	<ul style="list-style-type: none"> describe the changes as humans develop to old age. 	<ul style="list-style-type: none"> identify and name the main parts of the human circulatory system Describe the functions of the heart, blood vessels and blood Describe the ways in which nutrients and water are transported within animals, including humans. Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function

Scientists

Carl Linnaeus (Animal classification)

Gregor Mendel

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<p><u>30 - 50 months</u></p> <ul style="list-style-type: none"> Comments and asks questions about aspects of their familiar world or the natural world. Can talk about some of the things they have observed such as plants, animals, natural and found objects. Developing an understanding of growth, decay and changes over time. Shows care and concern for living things and the environment. <p><u>Early Learning Goal</u></p> <p>Children know about similarities and differences in relation living things.</p> <p>They talk about the features of their own immediate environment and how environments might vary.</p> <p>They make observations of animals and plants and explain why some things occur, and talk about changes.</p>		<p>Explore and compare the differences between things that are living, dead, and things that have never been alive</p> <p>identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other</p> <p>identify and name a variety of plants and animals in their habitats, including micro-habitats</p> <p>Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.</p>		<p>Recognise that living things can be grouped in a variety of ways</p> <p>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment</p> <p>Recognise that environments can change and that this can sometimes pose dangers to living things.</p>	<p>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird</p> <p>Describe the life process of reproduction in some plants and animals.</p>	<p>Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals</p> <p>Give reasons for classifying plants and animals based on specific characteristics.</p>

Scientists

David Attenborough (Naturalist and Nature Documentary Broadcaster)
 Jan Ingenhousz (Photosynthesis)
 Carl Linnaeus (Botanist & Classification)

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<p><u>30 - 50 months</u></p> <ul style="list-style-type: none"> Comments and asks questions about aspects of their familiar world such as the place where they live or the natural world. Can talk about some of the things they have observed such as plants, animals, natural and found objects. Developing an understanding of growth, decay and changes over time. Shows care and concern for living things and the environment. <p><u>Early Learning Goal</u></p> <p>Children know about similarities and differences in relation living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur, and talk about changes.</p>	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> observe and describe how seeds and bulbs grow into mature plants find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. 	<ul style="list-style-type: none"> identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers 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 investigate the way in which water is transported within plants explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. 	<p>See living things and their habitats.</p>	<p>See living things and their habitats.</p>	<p>See living things and their habitats.</p>

Scientists

Beatrix Potter (Author and Scientist)
Agnes Arber (Botanist)
Jan Ingenhousz (Photosynthesis)
Joseph Banks (Botanist)

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<p><u>Understanding of the World: The World</u></p> <p>30 - 50 months</p> <ul style="list-style-type: none"> Can talk about some of the things they have observed in natural and found objects. Talks about why things happen and how things work. Developing an understanding of changes over time. <p>40-60 months</p> <ul style="list-style-type: none"> Looks closely at similarities, differences, patterns and change. <p>Early Learning Goal</p> <p>Children know about similarities and differences in relation to objects and materials.</p>	<ul style="list-style-type: none"> distinguish between an object and the material from which it is made identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock describe the simple physical properties of a variety of everyday materials compare and group together a variety of everyday materials on the basis of their simple physical properties 	<ul style="list-style-type: none"> identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> compare and group materials together, according to whether they are solids, liquids or gases observe that some materials change state when they are heated or cooled, and <i>measure or research the temperature at which this happens in degrees Celsius (°C)</i> identify the part played by evaporation and condensation in the water cycle and <i>associate the rate of evaporation with temperature.</i> 	<ul style="list-style-type: none"> compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic demonstrate that dissolving, mixing and changes of state are reversible changes explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda. 	

Scientists

John Horner (Paleontologist)
 Friedrich Mohs (Scientist)
 Leonardo Da Vinci (Scientist/ geologist/ artist)

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			<p>Recognise that they need light in order to see things and that dark is the absence of light</p> <p>Notice that light is reflected from surfaces</p> <p>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes</p> <p>Recognise that shadows are formed when the light from a light source is blocked by an opaque object</p> <p>Find patterns in the way that the size of shadows change.</p>	<p>identify how sounds are made, associating some of them with something vibrating</p> <p>Recognise that vibrations from sounds travel through a medium to the ear</p> <p>Find patterns between the pitch of a sound and features of the object that produced it</p> <p>Find patterns between the volume of a sound and the strength of the vibrations that produced it</p> <p>Recognise that sounds get fainter as the distance from the sound source increases.</p>	<p>use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. (taken from space unit)</p>	<p>Recognise that light appears to travel in straight lines</p> <p>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</p> <p>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</p> <p>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</p>

Scientists

Gailileo Galilei
(Frequency and Pitch of Sound Waves)

James Clerk Maxwell(Visible and Invisible Waves of Light) (Y3)

Aristotle (Sound Waves)

Alexander Graham Bell (Invented the Telephone)

Thomas Young (Wave Theory of Light)

Ibn al-Haytham (Alhazen) (Light and our Eyes)

Percy Shaw(The Cats Eye)

Forces and magnets

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			<p>Compare how things move on different surfaces</p> <p>Notice that some forces need contact between two objects, but magnetic forces can act at a distance</p> <p>Observe how magnets attract or repel each other and attract some materials and not others.</p> <p>Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials</p> <p>Describe magnets as having two poles</p> <p>Predict whether two magnets will attract or repel each other, depending on which poles are facing.</p>		<p>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</p> <p>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces</p> <p>Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.</p>	

Scientists

The Wright Brothers (Airplanes)

William Gilbert (Theories of Magnetism)

Archimedes of Syracuse (Levers)

Isaac Newton (Gravity)

Electricity

EYFS

Year 1

Year 2

Year 3

Year 4

Year 5

Year 6

- Identify common appliances that run on electricity.
- Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.
- Identify whether a lamp will light in a simple series circuit, based on whether the lamp is part of a complete loop with a battery.
- Recognise that a switch opens and closes the circuit and associate this with whether a lamp lights in a simple series circuit.
- Recognise some common conductors and insulators, and associate metals with being good conductors.
- Know the difference between a conductor and an insulator, giving examples of each.
- Safety when using electricity

- Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.
- Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches.
- Use recognised symbols when representing a simple circuit in a diagram.

Scientists

Benjamin Franklin (scientist_

Thomas Edison (electric power -lightbulb)

Alexander Graham Bell (scientist)

Nikola Tesla (inventor)

EYFS

Year 1

Year 2

Year 3

Year 4

Year 5

Year 6

Seasonal change

- observe changes across the four seasons
- observe and describe weather associated with the seasons and how day length varies.

Space

- 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.

Evolution and Inheritance

- recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
- recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
- identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

Scientists

Galileo Galilei
Sir Isaac Newton
Katherine Johnson
Edwin Hubble
Stephen Hawking

Charles Darwin
Mary Anning
Alfred Wallace

Science and ICT

To Support Teaching and Learning

Science and ICT

Animals including humans/plants

Digital microscopes

Human body app - animated images inside the body

Materials

Living things and their habitats

Data loggers (testing temperature of habitats)

Weather station

Forces and magnets

Data loggers (using speed probe)

Electricity/Light

Data loggers - measuring light travelling through materials.

Earth and Space

Star walk 2 app- Star gazing

NASA Education app -models,videos and images.

Useful Websites:

Animals including humans

<https://www.hamilton-trust.org.uk/science/year-3-science/animals-including-humans-keeping-healthy/>

<https://www.stem.org.uk/resources/community/collection/13293/year-5-animals-including-humans>

<https://hands-on-science.co.uk/curriculum-topic/animals-including-humans/>

<https://www.bbc.co.uk/bitesize/topics/zn22pv4>

<https://www.bbc.co.uk/bitesize/topics/zcyucdm>

<https://www.bbc.co.uk/bitesize/topics/z6wwxnb>

<https://www.bbc.co.uk/bitesize/topics/zbnnb9q>

<https://www.discoveryeducation.co.uk/login/eha/?service=espresso>

<https://www.childrensuniversity.manchester.ac.uk/learning-activities/science/>

Living things and their habitats

<https://www.bbc.co.uk/bitesize/topics/zpxnyrd/articles/z2vdjxs>

<https://www.bbc.co.uk/bitesize/topics/zx882hv>

<https://explorify.wellcome.ac.uk/en/activities?filtered> (Explorify)

<https://www.dkfindout.com/uk/animals-and-nature/habitats-and-ecosystems/coral-reef/>

<https://www.dkfindout.com/uk/animals-and-nature/plants/how-seeds-are-spread/>

<https://www.discoveryeducation.co.uk/login/eha/?service=espresso>

<http://flash.topmarks.co.uk/4016>

<https://www.bbc.co.uk/games/embed/earth-squad-go>

Plants

<https://www.dkfindout.com/uk/animals-and-nature/plants/what-is-plant/>

<https://www.dkfindout.com/uk/animals-and-nature/plants/>

<https://www.dkfindout.com/uk/animals-and-nature/plants/deciduous-trees/>

<https://www.discoveryeducation.co.uk/login/eha/?service=espresso>

Useful Websites:

Materials

<https://www.bbc.co.uk/bitesize/topics/zryycdm>

<http://flash.topmarks.co.uk/4055>

<https://www.dkfindout.com/uk/science/electricity/circuits/>

<http://resources.hwb.wales.gov.uk/VTC/rocks/eng/Introduction/default.htm>

<http://sciencenetlinks.com/collections/material-marvels-series/>

Light/Sound

<http://flash.topmarks.co.uk/4056>

<https://www.bbc.co.uk/bitesize/topics/zbssgk7>

Forces and magnets

<https://www.bbc.co.uk/bitesize/topics/zyttyrd>

<https://www.bbc.co.uk/bitesize/topics/zvpp34j/articles/zywcrdm>

<https://www.dkfindout.com/uk/science/forces-and-motion/laws-motion/>

<http://flash.topmarks.co.uk/4060>

<http://flash.topmarks.co.uk/4058>

<https://www.bbc.co.uk/bitesize/topics/zsxxsbk>

Useful Websites:

Earth and space

<https://www.nasa.gov/kidsclub/index.html>

<https://www.childrensuniversity.manchester.ac.uk/learning-activities/science/the-earth-and-beyond/introduction/>

https://www.nasa.gov/multimedia/nasatv/iss_ustream.html

Watch the ISS Live - be aware turn sound off live feed and astronauts sometimes swear!

<https://www.dkfindout.com/uk/search/space/>

Evolution and Inheritance

<https://www.bbc.co.uk/bitesize/topics/zvhhvcw>

<https://www.stem.org.uk/resources/collection/4354/primary-evolution>

<https://www.stem.org.uk/resources/collection/3439/arkive-darwin-collection>

<https://www.hamilton-trust.org.uk/science/year-6-science/game-survival/>

Staff CPD:

- Reach Out CPD <https://www.reachoutcpd.com/>
- Explorify <https://explorify.wellcome.ac.uk/>
- The Association For Science Education (ASE) <https://www.ase.org.uk/resources/search/ages/14-16-16/topic/chemical-analysis-22>
- Science Sparks <https://www.science-sparks.com/>
- STEM Learning <https://www.stem.org.uk/>
- DK Find out <https://www.dkfindout.com/uk/>

