Science at Spire Junior School

Science Overview

Science at Spire aims to inspire and excite the children about the world around them. We want the children to develop curiosity about the wonders of the world and develop an understanding and knowledge of how science has changed and shaped our everyday lives. Science at Spire Juniors provides children with practical learning opportunities. Through using a range of different ideas and concepts, children are engaged through first-hand experiences. Our science curriculum encourages children to become enquiry-based learners, through questioning, researching, investigating and evaluating experiences. All aspects of 'working scientifically' from the National Curriculum are intertwined throughout science at Spire to ensure that children gain an understanding of what it means to be a successful scientist. The school's approach to science considers the school's context and ensures that the children have access to expert opportunities. Cross-curricular experiences are identified, mapped and planned to ensure links are made between subjects. The children's love of science is developed by yearly events such as 'science week' and workshop days provided by the Royal Institution of Science. We believe these experiences are extremely valuable to our children.

Science long term overview

	Year 3/4	Year 5/6
Cycle A	Living things and their habitats States of matter Sound Electricity	Living things and their habitats Animas including humans Evolution and inheritance Electricity Light
Cycle B	Plants Animals including humans Rocks Light Forces and magnets	Living things and their habitats Animals including humans Properties and changes of materials Earth and Space Forces

Opportunities for links with Maths

Recording measurements from observations.

Creating graphs that show the data they have collected from investigations, enquiries or observations.

Within each topic there is a short explanation about how you can use Maths in your lessons.

Opportunities for links with English

What I know, what to know and know now grids.

Writing hypothesis and predictions.

Oral/ written evaluations of experiments

Recording information in books

There are example sheets to use when conducting an observation. These can be printed to A3 so staff can create a class version before the children write on their own sheet. This will be useful the first few times the children see these sheets.

Our aim is to get the children to know the process of these sheets well enough for them to create their own graphs, tables, plans and predictions etc.

Including cross-curricular links is essential in Science and it is important that any investigations/observations are recorded in the children's books. After an 'activity lesson' we should be asking the children a question about what they have learnt so they can make predictions using the knowledge they have gained from that lesson.

When children are recording their findings, they should be doing so using their mathematical knowledge to record and present their data in tables, graphs and charts.

Marking should be light touch with Reasoning questions after 'activity lessons', these can be printed for ease.

Working Scientifically

Asking relevant questions and using different types of scientific enquiries to answer them

Setting up simple practical enquiries, comparative and fair tests

Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers

Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions

Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables

•Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions

Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

•Identifying differences, similarities or changes related to simple scientific ideas and processes

•Using straightforward scientific evidence to answer questions or to support their findings.

Cycle A

Year 3/4

Living things and their habitats

- Recognise that living things can be grouped in a variety of ways
- Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
- Recognise that environments can change and that this can sometimes pose dangers to living things.

Equipment needed
Camera/ iPad
Printed photos
Different classification grids

Useful websites
Hamilton Trust
Terrific Scientific
BBC Science KS2
STEM KS2 science
Wikipedia for teacher's knowledge
Videos of Our Planet (Attenborough)

Working Scientifically objective	How we can work scientifically
• Identifying differences, similarities or changes related to simple scientific ideas and processes • Using straightforward scientific evidence to answer questions or to support their findings.	Group photos of different living things and explain their reasoning building upon their previous scientific knowledge. Look at using a classification grid to support their reasoning.
• Making systematic and careful observations • Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions	Go into the woods and photograph things that we have seen that are living things. Next lesson, look at using a classification grid to sort the things we found into categories.
• Using straightforward scientific evidence to answer questions or to support their findings.	Look at the different types of environments and the dangers and benefits of environments changing.

Animals including humans

- 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.

Equipment needed
Ingredients for Digestive experiment-
See activity card.
Human and Animal teeth pictures.
Food chain sheets
Classification grid for teeth
Activity sheets for digestive system
Evaluation and experiment sheets
What I know, what to know, have learnt sheet

Useful websites
Hamilton Trust
Terrific Scientific
BBC Science KS2
STEM KS2 science
Wikipedia for teacher's knowledge
Videos of Our Planet (Attenborough)

Working Scientifically objective	How we can work scientifically
• Setting up simple practical enquiries • Recording findings using simple scientific language, drawings, labelled diagrams • Using straightforward scientific evidence to answer questions or to support their findings.	Conduct an experiment about how food travels through the body thinking about the names of the different parts that are involved in the digestive process looking to answer the question ' What happens to food once we have eaten it?'
• Classifying and presenting data in a variety of ways to help in answering questions • Using straightforward scientific evidence to answer questions or to support their findings.	Compare pictures of teeth and sort into animals and humans, Giving explanation as to their reasoning based on the question ' How do you know these teeth belong to an animal/human?' Looking to answer Why do we have different teeth.
• Classifying and presenting data in a variety of ways to help in answering questions	Constructing a food chain and identifying the predators, producers and prey.

States of matter

- 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 measure or research the temperature at which this happens in degrees Celsius (°C)
- Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

Equipment needed
Equipment for sorting solids, liquids and gasses
Equipment to make rice crispy cakes
Data loggers
Thermometers
Rulers
Plastic seal bags
Sheets for investigations and experiments

Useful websites
Hamilton Trust
Terrific Scientific
BBC Science KS2
STEM KS2 science
Wikipedia for teacher's knowledge

Working Scientifically objective	How we can work scientifically
• Making systematic and careful observations • classifying and presenting data in a variety of ways to help in answering questions • Recording findings using simple scientific language and tables • Identifying differences, similarities or changes related to simple scientific ideas and processes	Look at a mixture of real-life materials and group them into solids, liquids and gases. Work as a group- record into their books in a table.
• Using straightforward scientific evidence to answer questions or to support their findings. Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers	Observe the state of something when it is heated or cooled. Children will work in small groups to make rice crispy cakes- chocolate is melted from a solid to a liquid- watching the temperature for this.
• Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. • Setting up simple practical enquiries, comparative and fair tests	Conduct evaporation experiment in plastic sealed bag- Place each Groups in a different place so that we can discover the link between ttemperature and evaporation.
• Asking relevant questions and using different types of scientific enquiries to answer them	Conduct the 'puddle experiment' using the knowledge they have learnt so far, what do you think will happen to the puddle over the course of a hot day. Measuring the change and making predictions about what they expect to see.

Sound

- 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

Equipment needed

Noise dosimeter

Sound walk sheet (Server)

Silent PowerPoint

Drum and beater
Bowl of water and tuning fork (1 set per table)
Paper or plastic cups (with a small hole punched in the bottom)
Long lengths of string

Useful websites

https://www.bbc.com/bitesize/articles/zstr2nb

Section 1 – soundproofing investigation from http://resources.hwb.wales.gov.uk

Working Scientifically objective	How we can work scientifically
• Ask relevant questions and use different types of scientific enquiries to answer them. • Use straightforward scientific evidence to answer questions or to support their findings.	Go on a 'sound walk' through the school and begin to think about how sound is made. Consider which areas of the school will be quiet, which will be loud and which will have no sound at all. Walk around the school listening for different sounds. Begin to consider sound and how sounds are made. Understand the term 'noise pollution'.
• Ask relevant questions and use different types of scientific enquiries to answer them. • Set up simple practical enquiries and comparative and fair tests. • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.	Explain that sounds are made when an object vibrates and begin to understand that we hear sounds when the vibrations travel from a source through a medium to our ears. Get chn to hit a tuning fork and put it into some water to see the vibrations. Chn will then make paper cup phones.
• Ask relevant questions and using different types of scientific enquiries to answer them. • Set up simple practical enquiries and comparative and fair tests. • Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. • Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables	Investigate sound-proofing materials by planning and conducting a fair test, considering all the variables and how to record the results. Consider reasons needed to reduce sounds and reasons for not reducing sounds. Work in a group to plan an investigation that will find out which material will best reduce sound. With help, consider the different variables of their test and plan how to ensure their investigation is fair. Record the results of the investigation and use the results to draw a conclusion.

• Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. • Use results to draw simple conclusions, make predictions for • new values, suggest improvements and raise further questions. • Use straightforward scientific evidence to answer questions or to support findings.	
• Ask relevant questions and use different types of scientific enquiries to answer them. • Set up simple practical enquiries and comparative and fair tests. • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.	Measure how loud a sound is the further away we get. Using trundle wheels and a noise dosimeter to record what happens as the 'listener' gets further away from the point of sound. Discuss a fair test and how we will create the noise, ensure we are recording fairly etc. Create a graph to show our findings.

Electricity

- 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 or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery
- Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuits
- Recognise some common conductors and insulators, and associate metals with being good conductors.

Equipment needed
Batteries
Light bulbs
Wires
Different materials to test conductibility

Useful websites
Terrific scientific
Hamilton
BBC Science KS2
STEM KS2 science
Wikipedia for teacher's knowledge

Working Scientifically objective	How we can work scientifically
• Asking relevant questions and using different types of scientific enquiries to answer them	Identify that things run off electricity and how we use it safely.
• Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further question • Reporting on findings from enquiries, including oral and written explanations, • Using straightforward scientific evidence to answer questions or to support their findings.	Let children experiment with making a light bulb light up -Get them to write the questions they ask each other as they try to make the light bulb work. Talk about why the circuit only works when it is in a full loop, why do you think that is as a reasoning question for the plenary.
• Setting up simple practical enquiries, comparative and fair tests • Asking relevant questions and using different types of scientific enquiries to answer them • Setting up simple practical enquiries, comparative and fair tests • Reporting on findings from enquiries, including oral and written explanations	Find out what a conductor is and which materials are conductors and which materials are not.
• Using straightforward scientific evidence to answer questions or to support their findings.	Use electricity to create simple circuits with cells, lights, buzzers and motors.
• Using straightforward scientific evidence to answer questions or to support their findings. • Gathering, recording, classifying and presenting data in a variety • of ways to help in answering questions	Understand how a switch works. Use paperclips to show the physical movement of opening and closing a circuit. Children to make their own circuit with a switch and discuss why a circuit doesn't work unless it is a full loop.

Cycle B

Year 3/4

Plants

- 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.

Equipment needed
A few trays of seedlings
Green photocopy paper & different shades of green tissue paper
A calendar & sticky labels
Compost & 18 medium flowerpots
Observation sheet (from server in general sheets)
Celery
Food colouring
Plastic cups

Useful websites
A short compilation clip of plants growing from www.bbc.co.uk
Zinnia's first message from www.YouTube.com
Color changing flowers and celery experiment Grace's Science Place from www.youtube.com

Working Scientifically objective	How we can work scientifically
• Ask relevant questions and using different types of scientific enquiries to answer them. • Set up simple practical enquiries and comparative and fair tests. • Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers	Begin the topic saying that an alien Zinnia want you to provide her with the best information to help them grow plants. Make a list of what we know and what we want to find out. Plant some beans in transparent jars and place them in different conditions to begin some observations. Use data loggers and other equipment to record light levels, water etc. Begin to take measurements of height and make notes on observations. From this - discuss and decide all the requirements we think plants need to grow strong and healthy. Set up a plant growth investigation to test our theories. Continually check on all the seedlings including the ones that are growing without something - light, air, water, soil, warmth and space and begin to think about the differences they are showing and why. set up data loggers to record temperature and light over a 24 hour period. Children should create a report on these findings towards the end of the term.
• Make systematic and careful observations and, where appropriate, take accurate measurements using standard units. • Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.	It's time to check up on your investigation and see which seedlings are growing strong and healthy and which are not. Further broaden your plant knowledge by observing whole plants closely and making detailed, labelled drawings of real life plants they can dissect and label together. There is also a game they can play to support knowledge of the plants.

• Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. • Identify differences, similarities or changes related to • simple scientific ideas and processes.	Investigate how water is transported in plants using celery and food colouring. Get each group to choose their colour for the water. Put the celery into the water and the following few hours they should notice the water being transported through the bottom of the plant through to the top. Get the children to take pictures of this. Stick them into their books and get the children to make accurate guesses as to why the plant was changing colour from the bottom to the top.
• Set up simple practical enquiries and comparative and fair tests • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. • Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.	Begin to understand why fruits are so varied – to help with the dispersal of their seeds. Make your own paper seed and investigate wind dispersal by testing different versions to find the best flier. Find the sheets on the server for the paper copters and the investigation sheets.

Animals including humans

- Identify that animals, including humans, need the right types and amount of nutrition, and 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

Equipment needed
A full water bottle for every child (their usual class drinking bottle will be fine)
Skeleton to cut
Marker pens
A flip chart marked with 2 axes
Pens, pencils and rulers
A drum

Useful websites
A brief BBC film clip introducing some of the 5 different food groups from www.bbc.co.uk
Film on human skeleton with other animals from www.bbc.co.uk
Film clip on invertebrate with exoskeletons from www.bbc.co.uk
Film clip showing how muscles work in pairs from www.bbc.co.uk

Working Scientifically objective	How we can work scientifically
Gather, record, classify and present data in a variety of ways to help in answering questions. Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.	Use knowledge of food groups and a balanced diet to design healthy meals by creating lifelike models of food on paper plates.
Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions	Look at skeletons- compare vertebrates and invertebrates use a classification grid- discuss why we as humans need a skeleton to move. Create their own skeleton and get them to think about joints.
Gather, record, classify and present data in a variety of ways to help in answering questions. Use straightforward scientific evidence to answer questions or to support findings - pattern seeking enquiry.	Learn how muscles work in pairs and investigate the question 'Do people have stronger muscles because they use them more?' Make predictions, gather data, discuss, display and interpret findings. Investigate how muscles work in pairs (biceps and triceps) using a bottle of water as a weight. Investigate the question -*Do some people have stronger muscles because they use them more?* With guidance, decide what data to collect, how to tabulate it and how to share out the work in the group. With guidance display data as a scatter gram and use it to look for a pattern in the data.

Rocks

- 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.

Equipment needed
A selection of seashells with distinctive shapes, e.g. cockles
Poster paint in shades of brown/ grey/ ochre
Plaster of Paris (or alternative)
Thick card & paper clips
Flat boards or trays
A quantity of Plasticine & small rolling pins
Soil samples – see Teacher's Notes
Lidded tubs to store soil for the Soil Detective activity (one per group)
3 finely calibrated measuring cylinders 3 plastic funnels & 3 plastic beakers 3 balls of cotton wool
One per child of: plastic spoon, sheet of A4 paper, plastic gloves & a magnifying lens

Useful websites
Child friendly summary of Mary's life from www.bbc.co.uk
Illustrated child friendly account of how fossils are made from www.oum.ox.ac.uk
Short animation explaining how fossils are formed from www.planet-science.com
A very short clip which shows different types of soil from www.bbc.co.uk

Working Scientifically objective	How we can work scientifically
• Set up simple practical enquiries and comparative and fair tests. • Make systematic and careful observations. • Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.	Use the classification grid with the children to deduce which rocks are which based on their appearance and simple physical properties . Once the children have done that they will need to rank the different rocks based on their permeability. - The classification grid and rock hardiness sheet are on the server.
• Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.	Meet the great fossil hunter Mary Anning, ask questions and discover fascinating facts about her life and work. Learn how fossils are made and make your own one from plaster of Paris.
• Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment. • Gather, record, classify and present data in a variety of ways to help answer questions. • Identify differences, similarities or changes related • to simple scientific ideas and processes. • Use straightforward scientific evidence to answer questions or to support findings.	Investigate different soils, asking questions and seeking answers through a variety of scientific enquiries (exploring/ classifying and identifying /fair testing)

Light

- Recognise that they need light in order to see things and that dark is the absence of light
- Notice that light is reflected from surfaces
- Recognise that light from the sun can be dangerous and that there are ways to protect their eyes
- Recognise that shadows are formed when the light from a light source is blocked by an opaque object
- Find patterns in the way that the size of shadows change.

Equipment needed
Strong cardboard boxes (1 between 3 pupils) prepared ahead (see Teachers' Notes)
Random objects from the classroom
Torches
Some large blackout curtains/a quantity of blackout material
Strong duct tape and scissors
Small squares of card in different colours, plus black, white, fluorescent colours and a large number of tiny (sample) squares Objects: a mirror, reflector, high visibility strip or item, black and white clothing

Useful websites
Clip on light sources and reflectors from www.bbc.co.uk
Clip on reflective gear for roads from www.bbc.co.uk

Working Scientifically objective	How we can work scientifically
• Ask relevant questions and use different types of scientific enquiries to answer them. • Make systematic and careful observations. • Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.	• Investigate what we need in order to see objects in a dark place and discover how light travels. Children will need a box, and will work in groups of 3 put holes in the box (one at a time) and try to notice how the light falls (In a straight line) once they have made a few small holes they can shine a light on one of the top holes while looking through the side of the box to notice that the holes are lighting the box in straight lines. Fill in their investigation sheets.
• Gather, record, classify and present data in a variety of ways to help answer questions. • Record findings using simple scientific language, • drawings and labelled diagrams.	• What's it like to see in a very dark place? Go into a dark "cave" and observe which colours show up best and which do not. Shine a torch to reveal reflectors and high visibility items and discover why they gleam! Predict and then investigate how well different colours and materials reflect light in a simulated dark cave. Use results to sort and classify the samples.
• Identify differences, similarities or changes related to simple scientific ideas and processes. • Use straightforward scientific evidence to answer questions or to support their findings.	• Discover how shadows are made and investigate first hand how changing the orientation of an object or the material it is made from can affect the nature and shape of the shadow. Record which type of object makes the darkest shadow. Record the different sizes of the shadows and how they made them longer or shorter (e.g by standing closer/further away to the object of light)

Working Scientifically objective	How we can work scientifically
• Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. • Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions	• As a whole class sit in a circle and start with a torch. Get different children to hold mirrors and try to aim the torch at a mirror. The child with the mirror needs to make the light hit the target sheet. Children to create a write up about how this worked and they need to understand that light reflects off objects.

Forces and Magnets

- Compare how things move on different surfaces
- Notice that some forces need contact between two objects, but magnetic forces can act at a distance
- Observe how magnets attract or repel each other and attract some materials and not others
- 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
- Describe magnets as having two poles
- Predict whether two magnets will attract or repel each other, depending on which poles are facing.

Equipment needed
Different types of magnets
Different surfaces – carpet, gravel, concrete, laminate, wood
Toy cars
Rulers
Balloons barely blown up

Useful websites
https://www.bbc.com/bitesize/clips/z k9rkqt
https://www.hamilton- trust.org.uk/science/year-3-science/forces-and-magnets-amazing- magnets/

Working Scientifically objective	How we can work scientifically
• Set up simple practical enquiries and comparative and fair tests. • Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment.	• Introduce the idea of measuring force. Use a balloon and a ruler to push the toy car across different surfaces. Talk about using the same amount of force each time to make it a fair test. Chn will record which surface the car travels best on.
• Ask relevant questions and use different types of scientific enquiries to answer them. • Set up simple practical enquiries and comparative and fair tests. • Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.	• Discover that gravity is a force that doesn't need contact - but is it the only one? No: magnetism can also pull objects from a distance. Drop different things such as plastic bags, balls etc with different weights and talk about how quickly they will fall. Look at magnetism and conduct an experiment to find out what things a magnet can pick up (give them things that are metal and things that are not) Get the children to sort pictures of the items into a Venn diagram of 'magnetic' and 'not magnetic.' Notice that magnets can work at a distance.
• Use straightforward scientific evidence to answer questions or to support findings.	• Explore how magnets behave towards each other in a variety of different exciting challenges. Discover that magnets have 2 poles and that same poles repel whilst opposite poles attract. Learn that the world itself is a giant magnet.- look at the power point for magnet games.

Cycle A

Year 5/6

Living things and their Habitats

- Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals
- Give reasons for classifying plants and animals based on specific characteristics.

Equipment needed
Bags
Cameras
Magnifying glasses
World map
Internet access

Useful websites
https://ed.ted.com/on/90xRVJZ6
http://www.bbc.co.uk/bitesize/ks2/science/living_things/variation/play/pop_pup.shtml
http://listverse.com/2016/02/12/10-recently-discovered-animals-with-amazing-features/
https://www.zooniverse.org/projects/zooniverse/snapshot-serengeti

Working Scientifically objective	How we can work scientifically
• Record data and results of increasing complexity using classification keys. • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. • Identify scientific evidence that has been used to support or refute ideas or arguments.	• Identify similarities and differences between living things in order to determine their classification. • Use classification keys to sort living things according to observable • characteristics. • Children will then go out into the EYFS woods and collect, record, classify and name some of the leaves they find. They will then Sketch a tree and its corresponding leaf in the style of a botanical illustration.
• Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. • Identify scientific evidence that has been used to support or refute ideas or arguments.	• Write scientific descriptions of unusual living things from around the world. Classify unusual living things using their descriptions and online research.
• Record data and results of increasing complexity using scientific • diagrams and labels, and classification keys. • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. • Identify scientific evidence that has been used to support or refute ideas or arguments.	• Design, describe and name a new creature that characteristically • sits within the Animalia classification. • Sort 'new' creatures within the Animalia taxonomy. • Sketch a detailed creature based on known characteristics and imagination.

Animals including humans

- Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood
- Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function
- Describe the ways in which nutrients and water are transported within animals, including humans.

Equipment needed
Clay and sculpting tools
Stopwatches
Jars or glasses
Elastic bands
Food colouring
Paper towels

Useful websites
https://www.bbc.com/bitesize/articles/zqv4cwx
https://www.bbc.com/teach/class-clips-video/art-and-design-ks1-ks2-using-different-painting-techniques-for-effect/z7h76v4
https://kitchenpantryscientist.com/diffusion-and-osmosis-experiments/
http://www.bbc.co.uk/programmes/articles/1yV5MBkc2Y6pQSWyMgR21y2/what-should-i-be-eating-drinking
https://www.youtube.com/watch?v=dyvfSmB0YOQ

Working Scientifically objective	How we can work scientifically
• Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. • Report and present findings from enquiries, including conclusions, causal relationships and explanations of results. • Identify scientific evidence that has been used to support or refute ideas or arguments.	• Explore the structure and function of the human heart. Create anatomically correct sculptures of a heart. • Investigate and recreate heartrates for varying levels of exertion, giving • explanations for observations and recording the heartbeats.
• Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. • Identify scientific evidence that has been used to support or refute ideas or arguments.	• Know that nutrients and water are transported around the body in the blood. • Know that diffusion and osmosis are processes that move nutrients and water in the body. • Complete the experiment with a jar with water and secure a paper towel in the jar's mouth (with a rubber band) so that it hangs down into the water, making a water-filled chamber that you can add food colouring to. Put a few drops of food colouring into the chamber and see what happens

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.

Equipment needed
Jelly - order through the office
Glasses
Small objects
Mr. Men and Little Miss lesson (on server)

Useful websites
https://www.pbslearningmedia.org/resource/tdc02.sci.life.evo.dar/evolving-ideas-who-was-charles-darwin/
http://www.sciencemadesimple.co.uk/curriculum-blogs/biology-blogs/animal-adaptations
https://www.bbc.com/bitesize/topics/zvhhvcw
http://www.planet-science.com/categories/under-11s/games/2010/09/mission-adaptation.aspx

• Working Scientifically objective	• How we can work scientifically
• Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. • Identify scientific evidence that has been used to support or refute ideas or arguments.	• Introduce Charles Darwin – Explain his ideas on Evolution. Investigate variation across specific animals and plants. • Identify subtle adaptations to environments in the animal and plant world looking at the images of foxes from around the world. • Identify advantages and disadvantages of certain characteristics – e.g a polar bear having thick fur and living in the artic. • Give the children different pictures of foxes and get them to explain where they think the fox is from and why.

• Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations • Identifying scientific evidence that has been used to support or refute ideas or arguments.	• Introduce a trilobite. Explain that it lived 250 Million years ago. How do we know what it looked like? How do we know how old it is? Tell the children they are going to explore those two questions. • Prepare a jelly mixture and pour into a large, clear container to make the first layer. Place small items in the jelly. Once the first layer has set, pour in a different colour jelly into the same container. This acts as the next rock layer and is younger than the previous layer and will have younger things in it. Repeat the process until you have several different colours of layers and 'fossils' within! Then get the children, to be • palaeontologists and search for the fossils in the jelly and place them in order from oldest to newest. Talk to them about Mary Anning and palaeontology. • Deeper learning Questions could be - How are fossils useful? • How can you tell how old the fossil is?
• Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	• Using Mr. Men and Little Miss to combine them and see what their children would look like - sticking them in their books and explaining why they have common traits. Sheet and PowerPoint in resources folder.
• Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations • Identifying scientific evidence that has been used to support or refute ideas or arguments.	• Mission planet game on the laptops - A game where children take 'photos' of animals in the wild and • Document their adaptation. (link is on previous page.)

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.

Equipment needed
Light bulbs
Batteries
Wires
Buzzers
Motors
Switches

Useful websites
https://www.bbc.co.uk/bitesize/topics/zj44jxs

Working Scientifically objective	How we can work scientifically
• Identifying scientific evidence that has been used to support or refute ideas or arguments. • Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	• Get the children to experiment with the electrical equipment and draw how they made their circuit work. Get them to explain why it worked when everything was linked together with wires, and why it didn't work when there was a break in the circuit.
• Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • Taking measurements, using a range of scientific equipment, with increasing accuracy and • Precision, taking repeat readings when appropriate • Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • Using test results to make predictions to set up further comparative and fair tests • Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations	• Look at how to make a basic circuit. Is there a relation to the strength of a battery and the strength of a lightbulb? Get the children to design their own experiment to see if the stronger the voltage the brighter the light bulb. Get them to think about how they can record this and what variables they will use. • Get the children to draw their experiment using the recognized symbols.

• Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • Using test results to make predictions to set up further comparative and fair tests • Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations	• Get the children to conduct a similar experiment with buzzers. Ask them to make predictions based on the last experiment. Get the children to design their own experiment to see if the stronger the voltage the brighter the louder the noise. Get them to think about how they can record this and what variables they will use. • Get the children to draw their experiment using the recognized symbols.

Light

- 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.

Equipment needed
CCTV based diagram including measurements
Maths needed to solve the problem
Shiny metal
Mirrors
Torches
Sticky-notes
Rulers
Light meter
Retro reflectors (all flat)
Shiny coloured Perspex

Useful websites
https://www.bbc.com/bitesize/clips/zyntsbk
https://www.bbc.com/bitesize/clips/zf9c87h
http://www.makingyourown.co.uk/make-your-own-periscope-kaleidoscope.html
https://www.bbc.com/bitesize/articles/zqdxb82
https://www.bbc.com/bitesize/clips/ztcg9j6

• Working Scientifically objective	• How we can work scientifically
• Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.	• A thief was spotted on CCTV 'casing' the school, using a torch. Can you demonstrate that light travels in straight lines and calculate plausible heights of the suspect based on their torch beam? • Demonstrate that light travels in straight lines • Understand why a light source is needed to see • Suggest viable angles based on sight • Convert feet and inches to cm
• Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • Use test results to make predictions to set up further comparative and fair tests. • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.	• We know that the thief could see round corners, and likely used a periscope. All suspects have one, but are they using materials that reflect well enough to see? Can you investigate and eliminate another suspect? • Children need to work in groups or partners to create the different periscopes using the different materials and see which one is the best – record this in their books using the graphs/tables.

Working Scientifically objective	How we can work scientifically
• Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	• Children will need the sheet on the server to draw their findings. They will need a book, a piece of paper, a torch and a ruler. The will shine the torch on the book and cast a shadow on the piece of paper. Can they change the shape and size of the shadow? • Then, they need to follow the steps on their sheet to create shadows based on a room design.
• Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • Using test results to make predictions to set up further comparative and fair tests	• Ask the children to think of situations / times when they cannot see anything • (when it's dark and when we close our eyes) • Ask the children why they think we cannot see in these situations i.e. what is missing? • Whole class investigation – Explain how light is reflected into our eyes and that's how we see. Use a pictures of an eye around the classroom and turn the lights off. Get the children to take it in turns reflecting the light of a torch into the eye pictures. • Children given the steps in the process of how we see things in a jumbled up order; they need to cut them out and stick them in the correct order

• taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	• Get the children to create their own shadow puppets. Look at the shadows that they can create with them. Talk about why shadows have the same shape as the object that creates them. Then, get the children to record and measure using a scatter graph to show a correlation to how much light is blocked by the puppet and the size of the shadow. • Reasoning question to stick in books should be linked to this such as "Why was the shadow bigger when the object was closer to the light source?"

Cycle B

Year 5/6

Living things and their habitats

- Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
- Describe the life process of reproduction in some plants and animals.

Equipment needed
Art books
Tadpoles- let the Science co-ordinator know the half-term before so they can be ordered

Useful websites
https://www.bbc.com/teach/class-clips-video/the-life-cycles-of-diffe organisms/zvh8qp3
https://www.bbc.com/bitesize/clips/zcwk39q
https://www.bbc.com/teach/class-clips-video/life-cycle-of-an-ant/zf
https://www.bbc.com/teach/class-clips-video/the-life-cycle-of-a-fro spring-and-a-sunflower-in-summer/z4k4jhv

Working Scientifically objective	How we can work scientifically
• Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. • Identify scientific evidence that has been used to support or refute ideas or arguments.	• Watch some online footage of insect and amphibian lifecycles to help create your own life cycle illustrations for display. • Set up an in-school habitat for your choice of insect and amphibian so that you can observe them over time (tadpoles are easiest!) • There's a reading comprehension in the plants folder to support the teaching
• Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays	• Learn about Naturalist Scientists such as David Attenborough and Jane Goodall • How they use recordings and observations to learn • Keep recording details of the tadpoles. • How they use recordings and observations to learn about animals.

Animals including humans

- Describe the changes as humans develop to old age.

Equipment needed
3D model of skeleton

Useful website
https://www.bbc.com/bitesize/topics/zgssgk7
https://www.dkfindout.com/uk/human-body/life-cycle/

Working Scientifically objective	How we can work scientifically
• Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other Presentations. • Identifying scientific evidence that has been used to support or refute ideas or arguments.	• Bring in a photo of yourself, or your TA. Get the children to order and try • and label the ages that you were at those times. Have a class discussion • about the changes humans go through. Show children pictures of elderly • people too and get them to discuss how else humans can change. Can the • children draw you as an elderly person?

• Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations • Identifying scientific evidence that has been used to support or refute ideas or arguments.	• Get the children to bring in pictures of themselves at different ages. They • can create a poster about the changes they have made e.g height, speech, • intelligence. Get them to explain how the human body changes as we get • older.

Properties and changes of materials

- 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

Equipment needed
Metal cup/ coffee
Range of containers
Video recording devices
Items for initial set up (salty water, pencil, metal spoon, metallic looking plastic, metallic card)
Bread and cake ingredients, jelly, eggs and access to cooking Facilities
Old rusty tray (or images)
Range of liquids and nail types
Apples, lemon juice, salt, sugar, Vitamin C tablets
Access to the internet/ photographic equipment

Useful websites
http://www.sciencekids.co.nz/gamesactivities/circuitsconductors.html
https://www.bbc.co.uk/programmes/p0118114
https://www.bbc.co.uk/programmes/p0119tj2
https://www.bbc.co.uk/programmes/p0119lz9

Working Scientifically objective	How we can work scientifically
• Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. • Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. • Record data and results of increasing complexity using scientific diagrams and labels, and line graphs. • Use test results to make predictions to set up further comparative and fair tests. • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays & presentations.	• Children will need to design one cup to keep ice cream cold and one cup to keep coffee hot. • They will need to try out different materials and make an advert for their cup explaining why their materials keep the item cold/hot.
• Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. • Record data and results of increasing complexity using scientific diagrams and labels, tables and line graphs. • Use test results to make predictions to set up further comparative and fair tests. • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in written form.	• See the kitchen science pack for loads of great experiments that show dissolving. • Get the children to 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. • Get children to experiment with soluble solutions and test different things (see server sheet for details)

Working Scientifically objective	How we can work scientifically
• Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. • Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • Report and present findings from enquiries, including • conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.	• Plan and group together different materials based on their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets
• Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. • Record results of increasing complexity using scientific diagrams and labels. • Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. • Use test results to make predictions to set up further comparative and fair tests. • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in written forms.	• Cook and bake noting the irreversible changes that occur. • Plan and carry out investigations into the impact of certain ingredients on an end product.

• Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. • Record data and results of increasing complexity using scientific diagrams and labels, and tables. • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.	• Some changes in materials can't be reversed and they can produce new materials in the process. Immerse yourself in the world of oxidisation and observe how rust is formed and how apples spoil when cut open - can you prolong your apple's shelf life or is it all looking brown?

Earth and 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.

Equipment needed
Various sized fruit
Toilet paper
Rounders posts and stand
Torch
Lego figures
Globes
Measuring equipment and compass
Class sheets (on server)
Small flags

Useful websites
https://www.youtube.com/watch?v=5xldz4EuV2U
https://www.bbc.co.uk/programmes/p00n6zgy
https://nrich.maths.org/7753
https://www.bbc.com/bitesize/clips/z6shfg8
https://www.bbc.com/bitesize/clips/zvks4wx
https://www.stem.org.uk/resources/community/collection/12347/ earth-and-space https://apod.nasa.gov/cgi-bin/apod/apod_sear http://www.beyondthechalkboard.org/activity/comes-sun-tracing shadows/

Working Scientifically objective	How we can work scientifically
• Record data of increasing complexity using tables, scatter graphs, bar and line graphs • Identify scientific evidence that has been used to support or refute ideas or arguments.	• Use fruit to create a model of the solar system. • Calculate scales and ratios for a model of the solar system. • Research, collate and create graphs for data about the planets. • Paint the planets from known images and the nature of the planets.
• Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms. Identify scientific evidence that has been used to support or refute ideas or arguments.	• Can you build your own orrery to demonstrate how the solar system works? Children will Know the difference between geo and heliocentric solar system and how views have evolved. • Build an orrery of our solar system. • Create episode one of Stargazing which explains how the solar system works and what is in it.- use iPads. • (To show this- you could take stills from their videos and get them to write a speech bubble to explain what they were presenting)

• Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	• Get the chn to put a flag in the UK and a flag in Australia. • Turn the lights off in the classroom and shine a torch on the globe. Talk to the children about when it is day time in the UK where is night-time? Children will then record what happens to the globe as they spin it on its axis, keeping the sun (torch) in the same place. Get them to fill in the 'explore' sheet whilst they conduct their investigation into night time and day time.
Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.	Tracing shadows.
Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	Follow up lesson- children to use the 'interpret' the data and what we can learn about the sun from this.
Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Using test results to make predictions to set up further comparative and fair tests	Discussing their shape and size, and then making predictions as to whether these shadows will change over the course of the day, and if so, how. Use the class recording sheet and take it in turns for small groups to go outside and observe how an

	object's shadow has changed. Talk about the validity of the experiment and how to keep the test fair.

Forces

- Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
- Identify the effects of air resistance, water resistance and friction, that act between moving surfaces
- Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

Equipment needed
Parachute equipment
Video recording equipment
Force meter
Relative 'heavy' cars/ vehicles for testing
Plasticine
Equipment for boat investigations
Tin foil
Hair dryers/ fans
Half a drain pipe full of water

Useful websites
https://www.bbc.com/bitesize/clips/zsjd7ty
https://www.creativeeducation.co.uk/video/1399
https://www.bbc.com.bitesize/clips/tqw2hv
https://www.bbc.co.uk/programmes/p019bh9c

Working Scientifically objective	How we can work scientifically
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• Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. • Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. • Record data and results of increasing complexity using scientific diagrams and labels and tables. • Use test results to make predictions to set up further comparative and fair tests. • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in written forms.	Investigate how levers work and how the position of the fulcrum impacts on its effectiveness. Scale weights and lengths. Investigate how pulleys work and note the correlation between effort required and the number of pulleys. Set out instructions for forces on the ground to help them implement findings from investigations.

Working Scientifically objective	How we can work scientifically
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• Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. • Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. • Record data and results of increasing complexity using scientific diagrams and labels, tables, scatter graphs, bar and line graphs. • Use test results to make predictions to set up further	• Investigate and identify which shape of boat is best to beat the water resistance of a river, offering an explanation. • Make recommendations for the best boat shape and waterway to get the meteorite across, based on scientific evidence.

comparative and fair tests. • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.	

SEND in my subject: Science

Cognition and Learning		Communication and Interaction	
Subject Challenges for SEND	Provision for SEND	Subject Challenges for SEND	Provision for SEND
High level vocabulary used in all lessons. Gaps in children's knowledge. Struggle to access content due to literacy skills. Children may struggle to remember information/facts they have previously learnt.	Differentiated 6 in 6 to support retrieval skills. Key words given to the children to support scaffolded activities. Modelled support from teacher or TA where appropriate. Support with practical experiments. Forward and backward chaining.	Children may struggle to communicate and express their opinions or predictions in Science. Those who have language or processing barriers may struggle when there is a lot of written or spoken language in Science lessons.	Visual cues such as Widgit. Kagan activities to support peer discussion. Provide children the opportunity to share their answers in different ways. Eg) drawing, recording on iPad. Chunking down if instructions given step by step. Appropriate modelling and examples provided.
Physical and Sensory		**Social, Emotional and Mental Health**	
Subject Challenges for SEND	Provision for SEND	Subject Challenges for SEND	Provision for SEND
Children with visual impairments may find it difficult to see images and text shown during the science lessons. Recording of information might be challenging when completing scientific experiments or investigations. Children with fine motor challenges may find it difficult to use certain Science equipment during Science investigations.	Ensure all images are enlarged and accessible. Ensure children with visual impairments are close to the whiteboard screen. Allow for additional ways of recording information such as drawing diagrams, taking photos, recording on iPads. Use a wider range of tools such as larger pencil grips. Use technology to aid access and support where needed.	If work is challenging, children may become more frustrated and withdraw from the task. Children's mental health and wellbeing may impact on their ability to access their learning.	If children need a break from their learning, provide a calm corner where the children can access a safe space if needed. Ensure children have the opportunity to access brain breaks during their learning activities. Use of a now/next approach so that learners are aware of what is coming up in advance.

Assessment in Science

Assessing Knowledge of a subject.

The easiest part of our summative assessment would be the "What I know, questions I have and what I've learnt" grid. Children will fill in the things they have learnt at the end of a half-term. However, this isn't going to be enough information to build a picture of a whole unit of work's progression. Which is why we use the deeper learning questions after an 'active lesson' to ask questions that make the children explain their thinking and their knowledge. Teachers should use a broad range of assessment approaches, for example:

- Effective questioning
- KWL grids
- Teacher observation
- Peer and self-assessment
- Deeper learning questions.

At the end of the year teachers will moderate 2 HA, 2 MA and 2 LA children's books to check their assessment of the children is similar.

The Circulatory System

K	W	L
What I know already	What I would like to know	What I have learned

KWL grid used at the start of each topic in Science across the school.

Assessing Working Scientifically (WS)

With the new scheme all children will be taking part in different experiments, investigations and observations. These are designed to meet the Working Scientifically objectives throughout the year, as well as providing the children with a range of experiences in the science curriculum.

Within each practical lesson there is a lesson objective as well as at least one objective in Working Scientifically. The children will have a sheet at the front of their science books that they can record how often they fulfil a WS objective. At the end of the year teachers can easily identify how well the children have met the WS objectives.

In children's books

The children will be directed to colour in a lab bottle each time they have worked scientifically in a lesson.