Battle Hill Primary School Science Substantive Knowledge - Progression Overview

National Curriculum statements in red are from other linked topics.

	EYFS	У1	¥2	У3	¥4	У5	У6
Animals, including humans	To discern between plants and animals; naming some examples and suggesting differences. To know that all living things produce smaller versions of themselves and name some (eg: cat & kitten). To understand that living things grow and will die. To know that living things and their environment need care. To know the importance of good health. To understand about healthy eating and exercise. To know about personal hygiene: teeth cleaning, toileting, dressing and knowing about washing hands.	To identify and name a variety of common animals found in the conservation area, To identify and classify fish, amphibians, reptiles, birds and mammals. To know what a carnivore/herbivore is and identify examples. To describe the bodies of different animal classes (incl. pets). To label basic parts of the human body and their function in relation to the senses.	To know that animals need water, nutrition, shelter and oxygen to survive. To know about how humans (and other animals) have offspring that grow to adults ad to describe the journey. To know the importance of exercise, healthy diets and hygiene for humans. 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. (Y2 - Living things and their habitats).	To know that animals cannot make their own food: they must find it themselves. To begin to understand the structure and role of skeletons and muscles.	 To describe the function and structure of the human digestive system. To identify different types of teeth in humans and their function. To look at the dentiition of other animals to deduce their diets (carnivore / herbivore). Identify producers, predators and prey in a variety of food chains. 	To describe the processes of ageing in humans from infant to adult to old age. Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. (Y5 - Living things and their habitats). Describe the life process of reproduction in some plants and animals. (Y5 - Living things and their habitats).	To describe the structures and function of the human circulatory system, including: heart, arteries, veins, blood vessels and blood. To recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. To describe the way that nutrients and water are transported within animals (including humans). 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. (Y6 - Living things and their habitats). Give reasons for classifying plants and animals based on specific characteristics. (Y6 - Living things and their habitats).

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Living things		To explore, classify and			
and their	Identify and name a variety of	compare the differences	Explore the part that	To classify living things from	To descr
	common wild and garden plants,	between things that are	flowers play in the life	the conservation area in	mammal,
habitats	including deciduous and evergreen	living, dead, and things that	cycle of flowering	different ways.	bird.
	trees. (Y1 - Plants).	have never been alive.	plants, including	To make allocation have for	Tashaw
	Identify and describe the basic	Te been he bin a thing	pollination, seed	To make classification keys for living things in the conservation	To show creature
	structure of a variety of common	To know why living things live in their particular	formation and seed	area, as well as examples given	creature
	flowering plants, including trees.	habitats they are suited to	dispersal. (Y3 - Plants).	from the wider world.	To descr
	(Y1 - Plants).	and require.			trees for
		ana roquiro.		To understand describe changes	grounds,
	Identify and name a variety of	To understand that animals		to environments that can harm or	animal.
	common animals including fish,	and plants in a habitat		pose dangers to living things	
	amphibians, reptiles, birds and	depend on each other in		(Geography links with water	
	mammals. (Y1 - Animals including humans).	different ways.		conservation).	
	Tdoutify and none available of	To identify and name a		Construct and interpret a	
	Identify and name a variety of common animals that are	some plants and animals in		variety of food chains,	
	carnivores, herbivores and	their habitats, including		identifying producers,	
	omnivores. (Y1 - Animals including	micro-habitats.		predators and prey. (Y4 -	
	humans).	To understand and describe		Animals, including humans).	
		food relationships and 4-			
	Describe and compare the	step food chains.			
	structure of a variety of common				
	animals (fish, amphibians,	Notice that animals,			
	reptiles, birds and mammals,	including humans, have			
	including pets). (Y1 - Animals, including humans).	offspring which grow			
	including numans).	into adults. (Y2 - Animals			
	Observe changes across the four	including humans).			-
	seasons. (Y1 - Seasonal change).		\sim		
				1 - 22	
Plants	To identify common plants in the nature				
	area.	To know about how and to	To know and describe the	Recognise that living things can	Desc
		observe plants growing from	functions of roots,	be grouped in a variety of ways.	proc
	To know the names and function of the	seeds and bulbs into mature	stems/trunks, leaves and	(Y4 - Living things and their	repr
	structures of flowering plants (stem,	plants.	flowers.	habitats).	plant
	petal, stamen, anther, pollen, trunk,	To explore the need for	To test the requirements of		- Liv
	roots, fruit, leaves).	plants to have water,	plants to have soil, light, water,	Explore and use classification	their
		sunlight and suitable	and room to grow.	keys to help group, identify and	
		temperature to grow.		name a variety of living things in	
			To know about and test how	their local and wider	
		To begin to know about	water is transported in plants.	environment. (Y4 - Living things	
	No.	seed dispersal.		and their habitats).	
	8		To know about the lifecycle of	Descention that any important	
	C A	To know about	plant in our conservation area:	Recognise that environments can change and that this can	
		photosynthesis	observe the ash trees.	sometimes pose dangers to	
		Transferred	To understand the set of	living things. (Y4 - Living things	
		Identify and name a variety of plants and	To understand the role of flowers, pollen, seeds and the	and their habitats)	
		animals in their habitats,	processes they are involved in	10	
		including microhabitats.	(pollination, germination, seed	00-	
		(Y2 - Living things and	alspersal).		
		(Y2 - Living things and their habitats)	dispersal).		

escribe the life cycles of a mal, amphibian, insect and a

how the life cycle of tures.

escribe reproduction in the s found in the school nds, humans, and another al. Understand about taxonomic classification of plants and animals in terms of observable characteristics and give reasons living things are grouped in that way.

Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. (Y6 -Evolution and inheritance).

Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. (Y6 - Evolution and inheritance).

Describe the life process of peproduction in some plants and animals. (Y5 Living things and pheir 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. (Y6 - Living things and their habitats).

Give reasons for classifying plants and animals based on specific characteristics. (Y6 -Living things and their habitats).

Materials	To identify some simple materials in their environment. To discuss some physical properties/qualities of those materials. To know that some materials can be changed, describing the action and the change produced.	To distinguish between an object and the material from which it is made. To compare and group a variety of everyday materials based their simple physical properties. To describe some physical properties of a variety of everyday materials. To identify and compare the uses of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.	To investigate the suitability of materials to perform a task, eg: paper for an umbrella. To explore how shapes of solid objects can be changed by quashing, twisting and bending.	Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. (Y3 - Rocks). Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Y3 - Rocks). 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. (Y3 -	To classify and compare a range of everyday materials based on the properties of: conductivity (thermal and electrical), transparency, solubility and hardness. To describe the process of dissolving and how to recover a dissolved substance. To understand the terms solution, soluble, dissolve, residue, evaporation, emulsion, mixture. To use knowledge of the states of matter to explain how mixture of different materials may be separated. To demonstrate that dissolving and mixing are reversible changes. To know that some changes in materials form new materials and that is usually
Forces and magnets		I Reach	Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 - Uses of everyday materials).	Forces and magnets). To compare how different surfaces affect the movement of objects across them. To know that magnets don't need to touch to demonstrate their force. To observe the properties and behaviour of magnet: repelling, attracting, magnetic/non-magnetic surfaces. To know about magnetic polarity.	irreversible: burning, acid+bicarb. To describe gravity as an invisible force that attracts mass towards the centre of the Earth. To identify the effects of friction, air resistance and water resistance on travelling objects. To know the relationship between surface area and the size of the friction, air/water resistance force. To know and demonstrate that lever and pulley systems can amplify or reduce a force

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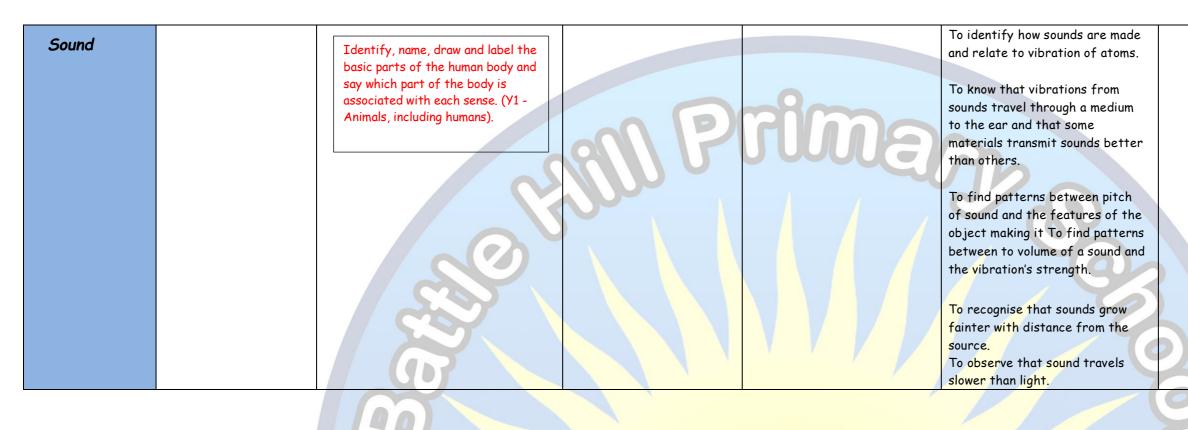
Light	Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 - Animals, including humans). Describe the simple physical properties of a variety of everyday materials. (Y1 - Materials).	To know that light is visible energy. To know about light sources (fire, electricity, the sun). To know that light is reflected of surfaces. To understand how shadows are formed and how they change through the day. To know about the dangers of light sources: the sun, lasers etc.		str To of and To of the To ligh sho the	o know that light travels in raight lines. o understand the mechanics how we see, including the atomy of the human eye. know that visible light reflects surfaces, allowing us to see em. use their understanding of how adow have the same shape as e opaque object that uses them.
Electricity			To identify common appliances that run on electricity.To construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.To identify whether or not a circuit with missing parts will work and explain why.To recognise and demonstrate that a switch opens and closes a circuit.To recognise some common conductors and insulators, and associate metals with being good conductors.To know about and to understand issues of safety around electricity: in the home/school, railways, sub-stations etc.	Vol inc To foi cou fui To wh	 know that an increase in Itage or number of cells will crease a bulb's brightness. compare and give reasons r variation in how mponent in a circuit nction. use recognised symbols nen drawing circuit agrams.

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Earth and space	Observe changes across the four seasons. (V1 - Seasonal changes). Observe and describe weather associated with the seasons and how day length varies. (V1- Seasonal changes).	To know the structure and basic mechanics of the Solar System To know that the Sun and planets are roughly spherical. To know the planets in order To know the relative sizes of Earth, Moon and Sun and the relative distances between them and other planets. To describe the movement of the Earth, Sun and Moon relative to each other. To describe day / night and spin and axial tilt. latitude and relative position with the Sun to explain climate zones on Earth (GEOGRAPHY)	
Evolution and inheritance	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, neach other. (Y2 - Living things and their habitats).Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Y3 - Rocks).Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4 - Living things and their habitats).Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals, including humans).Notice that animals, including humans).Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4 - Living things and their habitats).	Describe the life process of reproduction in some plants and animals. (Living things and their habitats - Y5).	To recognise that living things have changed over long periods of time and that fossils provide evidence about living things of the past. To recognise that living things produce offspring of the same kind, but re individually different from their parents. To recognise, identify and describe how animals and plants in the local environment and globally are suited to their environment. To understand that adaptation leads to evolution over millions of years.
Seasonal changes	To know the four seasons and their order. To know the characteristics of the four seasons in the local environment. To observe and record the changes over the year.	Use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky. (Y5 - Earth and space).	

Rocks	Distinguish between an object and the material from which it is made. (Y1 - Everyday materials). Identify and compare the suitability of a variety of everyday materials, including wood, materials, including materials, including wood, materials, including materials, including wood, materials, including wood, materials, including materials, including wood, materials, including materials, including wood, materials, including materials, including ma	Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. (Y6 - Evolution and inheritance).
States of matter	To know about and identify solids, liquids and gasses. To understand the basic mechanics and physics of the To observe that some materials can change their state after heating / cooling and know the terms: melt, freeze, exaporate, condense. To relate condensation and evaporation to the Water Cycle and link the rates to temperature (geography links).	

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Battle Hill Primary School Working Scientifically - Disciplinary Knowledge Progression Overview

In the EYFS, the characteristics of effective learning from the <u>Statutory Framework for the Early Years Foundation Stage</u> are the foundations on which the working scientifically skills build in Key Stage 1. While children are playing and exploring, teachers will be modelling, encouraging and supporting them to do the following:

- show curiosity and ask questions
- make observations using their senses and simple equipment
- make direct comparisons
- use equipment to measure
- record their observations by drawing, taking photographs, using sorting rings or boxes and, in Reception, on simple tick sheets
- use their observations to help them to answer their questions
- talk about what they are doing and have found out
- identify, sort and group.

Asking questions and recognising that they can be answered in different ways			
Years 1 and 2	Years 3 and 4		
Asking simple questions and recognising that they can be answered in different ways	Asking relevant questions and using different types of scientific enquiries to answer them	Planning different types of including recognising and c	
 While exploring the world, the children develop their ability to ask questions (such as what something is, how things are similar and different, the ways things work, which alternative is better, how things change and how they happen). Where appropriate, they answer these questions. The children answer questions developed with the teacher often through a scenario. The children are involved in planning how to use resources provided to answer the questions using different types of enquiry, helping them to recognise that there are different ways in which questions can be answered. 	 The children consider their prior knowledge when asking questions. Theyindependently use a range of question stems. Where appropriate, they answer these questions posed by the teacher. Given a range of resources, the children decide for themselves how to gather evidence to answer the question. They recognise when secondary sources can be used to answer questions that cannot be answered through practical work. They identify the type of enquiry that they have chosen to answer their question. 	 Children independently by a scientific experient their developedunderst Given a wide range of reto gather evidence to a enquiry tocarry out and secondary sources can answered through pract 	

Years 5 and 6

of scientific enquiries to answer questions, controlling variables where necessary

ly ask scientific questions. This may be stimulated ence or involve asking further questions based on standing following an enquiry.

resources the children decide for themselves how answer a scientific question. They choose a type of nd justify their choice. They recognise how n be used to answer questions that cannot be actical work.

Years 1 and 2	Years 3 and 4	
 Observing closely, using simple equipment Children explore the world around them. They make careful observations to support identification, comparison and noticing change. They use appropriate senses, aided by equipment such as magnifying glasses or digital microscopes, to make their observations. They begin to take measurements, initiallyby comparisons, then using non-standard units. 	 Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers The children make systematic and careful observations. They use a range of equipment for measuring length, time, temperature and capacity. They use standard units for their measurements. 	 Taking measurements, with increasing accurate when appropriate The children select results e.g. ruler, ta a suitable scale. During an enquiry, the to: take repeat react increase the sample period and frequencies and frequencies to the transmission of the tran
	Engaging in practical enquiry to answer question	าร
Years 1 and 2	Years 3 and 4	
 Performing simple tests The children use practical resources provided to gather evidence to answer questions generated by themselves or theteacher. They carry out: tests to classify; comparative tests; pattern seeking enquiries; and make observations over time. Identifying and classifying Children use their observations and testingto compare objects, materials and living things. They sort and group these things, identifying their own criteria for sorting. They use simple secondary sources (suchas identification sheets) to name living things. They describe the characteristics they used to identify a living thing. 	 Setting up simple practical enquiries, comparative and fair tests The children select from a range of practical resources to gather evidence toanswer questions generated by themselves or the teacher. They follow their plan to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and patternseeking. Explanatory note A comparative test is performed by changing a variable that is qualitative e.g. the type of material, shape of theparachute. This leads to a ranked outcome. A fair test is performed by changing avariable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship. 	 Planning different types of including recognising and a The children select frevidence to answer the and controlling variable measurements to make patterns and relations
	rning to hav	n9

Years 5 and 6

s, using a range of scientific equipment, racy and precision, taking repeat readings

t measuring equipment to give the most precise tape measure or trundle wheel, force meter with

- they make decisions e.g. whether they need adings (fair testing);
- le size (pattern seeking); adjust the observation quency (observing over time); or check further rces (researching); in order to get accurate data true value).

Years 5 and 6

s of scientific enquiries to answer questions, d controlling variables where necessary

from a range of practical resources to gather their questions. They carry out fairtests, recognising ables. They decide what observations or ake over time and for how long. They look for onships using a suitable sample.

 Gathering and recording data to help in answering questions The children record their observations e.g.using photographs, videos, drawings, labelled diagrams or in writing. They record their measurements e.g. using prepared tables, pictograms, tallycharts and block graphs. They classify using simple prepared tablesand sorting rings. 	 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 The children sometimes decide how to record and present evidence. They record their observation e.g. using photographs, videos, pictures, labelled diagrams or writing. They record their measurements e.g. using tables, tally charts and bar charts (given templates, if required, to which they can add headings). They record classifications e.g. using tables, Venn diagrams, Carroll diagrams. Children are supported to present the same data in different ways in order to help with answering the question. 	 Recording data and result diagrams and labels, class line graphs The children decide hor observations e.g. using observational drawings, record measurements e graphs and scatter graphs and scatter graphs. Carroll Children present the scanswering the question.
	Answering questions and concluding	
Years 1 and 2	Years 3 and 4	9
 Using their observations and ideas to suggest answers to questions Children use their experiences of the worldaround them to suggest appropriate answers to questions. They are supported to relate these to their evidence e.g. observations they have made, measurements they have taken or information they have gained from secondary sources. 	observations theyhave made, measurements they havetaken or information they have gainedfrom secondary sources. The answers	 Identifying scientific evid refute ideas or arguments Children answer their of they have made, measur gained from secondary other evidence e.g. from scientific understanding They talk about how the that they have gathered They talk about how new
 Using their observations and ideas tosuggest answers to questions The children recognise 'biggest and smallest', 'best and worst' etc. from theirdata. 	Identifying differences, similarities or changes related to simple scientific ideas and processes • Children interpret their data to generate simple comparative statements based on their evidence. They begin to identify naturally occurring patterns and causal relationships. Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • They draw conclusions based on their evidence and current subject knowledge.	 Reporting and presenting causal relationships and exin oral and written forms In their conclusions, clin the natural world frithe overall pattern; an knowledge.

ults of increasing complexity using scientific assification keys, tables, scatter graphs, bar and

how to record and present evidence. They record ng annotated photographs, videos, labelled diagrams, gs, labelled scientific diagrams or writing. They s e.g. using tables, tally charts, bar charts, line raphs. They record classifications e.g. using tables, oll diagrams and classification keys.

same data in different ways in order to help with on.

Years 5 and 6

vidence that has been used to support or ts

own and others' questions based on observations surements they have taken or information they have by sources. When doing this, they discuss whether from other groups, secondary sources and their ing, supports or refutes their answer.

their scientific ideaschange due to new evidence red.

new discoverieschange scientific understanding.

g findings from enquiries, including conclusions, explanations of and degree of trust in results, ns such as displays and other presentations

children: identify causal relationships and patterns from their evidence; identifyresults that do not fit and explain their findings using their subject

Years 1 and 2	Years 3 and 4	
	 Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions They identify ways in which they adapted their method as they progressed or how they would do it differently if they repeated the enquiry. 	 Reporting and presenting to causal relationships and exin oral and written forms They evaluate, for example, the precision of secondary sources us They identify any limital
	 Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions Children use their evidence to suggest values for different items tested using the same method e.g. the distance travelled by a car on an additional surface. Following a scientific experience, the children ask further questions which canbe answered by extending the same enquiry. 	Using test results to mal and fair tests • Children use the scient predictions they can in
	Communicating their findings	
Years 1 and 2	Years 3 and 4	
	 Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions They communicate their findings to an audience both orally and in writing, usingappropriate scientific vocabulary. 	Reporting and presenting causal relationships and e in oral and written forms • They communicate the language and illustration
	Rearning together and hav	ngfun

Years 5 and 6

g findings from enquiries, including conclusions, explanations of and degree of trust in results, ns such as displays and other presentations

cample, the choice of method used, the control of in and accuracy of measurements and the credibility used.

itations that reducethe trust they have in their data.

nake predictions to set up further comparative entific knowledgegained from enquiry work to make investigate usingcomparative and fair tests.

Years 5 and 6

ing findings from enquiries, including conclusions, d explanations of and degree of trust in results, rms such as displays and other presentations

heir findings to anaudience using relevant scientific tions.

