Progression of Knowledge for each Science topic

Year 1-6

Year 1-Plants

National Curriculum C	bjectives		Sticky knowledge	25%	Vocabulary	K	ey Scientists
 Identify and name and garden plants evergreen trees. Identify and descr variety of common Identify and name and leaves of trees 	e a variety of common wild s, including deciduous and ibe the basic structure of a r flowering plants. e the roots, truck, branches s		 Plants grow from seeds/bulbs Plants need light and water to grow and survive Plants are important We can eat lots of plants 		Evergreen, deciduous, garden, Wild, stem, Flower, Bulb, Seed, Root, Branch, Trunk, leaves	Beatr	ix Potter
Prior L	earning	Key Questions (s):			Year 2 Learning (Next Stage of Study)		
In EYFS children should:		How do plants grow?			In Year 2 children will:		
 Carry out observations of plants Know some names of plants, trees, and flowers May be able to name and describe different plants, trees, and flowers Show some care for their world around them 		 What do plants need to grow? Do all plants need water? Are all plants green? Why do seeds look different? Can plants grow as big in the shade? What is the biggest/smallest (ect) tree/flower/plant on the planet? 			 Observe that describe how seeds that balls grow into mature plants. Find out and describe how plants need water, light, and warmth to grow and stay healthy. 		
		1	Teaching Ideas (Working Scientifi	cally)			
Comparative tests	Identify & classify		Observation over time	Pattern	Seeking		Research
What type of compostHow can we sort the leaves thatgrows the tallestwe collected on our walk?sunflower?		hat	How does a daffodil blub change over the year? How does my sunflower change each week?	Do trees v their leave	vith bigger leaves s first in autumn? nattern in where y	es lose What are the most common n? British plants and where can we find them?	
Which tree has the biggest leaves?		week? Is there a p How does the oak tree change over the year? grounds?		find moss growing in the school grounds?		How did Beatrix Potter help our understanding of mushrooms and toadstools?	

National Curriculum O	bjectives	Sticky knowledge	15	Vocabulary	Key Scientists	
 Observe and descr grow into mature Find out and descr light and warmth 	be how seeds and bulbs; plants. ibe how plants need water, to grow and stay, healthy.	 Plants grow from seeds/bulbs Plants need light, water and warmth to grow and survive Plants are important We need plants to survive (to clean of We can eat different parts of the plan (leaves, stems, roots, seeds, fruit) 	uir, to eat) nts	Sunlight, trunk, Branch, root, Seed, Bulb, flower, stem, wild, garden, grow, deciduous, evergreen, o compare, record, temp predict, measure, diagram, germinate, warmth, lea	Agnes Arber Allan Tichmarsh observe, perature,	
Prior L	earning I	Key Questions (s):		Year 3 Learnir	ng (Next Stage of Study)	
 Prior Learning K In Year 1 children should: Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. Identify and describe the basic structure of a variety of common flowering plants. Identify and name the roots, truck, branches and leaves of trees 		 Do cress produce seeds, how could we find out? Do all plants produce flowers and seeds? What is different between freshly cut and planted flowers? Do plants flower all year round? What are flowers for? What happens to a plant after it has produced seeds? 		 Identify and describe the functions of different parts of the flowering plant: roots, stem/trunk/leaves and flowers Explore the part flowers play in a flowering plant's life cycle, including pollination, seed formation and seed dispersal Explain the requirements of plants for life and growth (air, light, water, nutrients from soil, room to grow) and how they vary between plants Know the way in which water is transported between plants 		
		Teaching Ideas (Working Scientifi	cally)		1	
Comparative tests	Identify & classify	Observation over time	Pattern S	Seeking	Research	
Do cress seeds grow How can we identify the trees quicker outside or inside? that we observed on our tree hunt?		28 What happens to my bean after I Do bigger s have planted it? bigger plan		seeds grow in to rts?	How does a cactus survive in a desert with no water?	

Year 2-Plants

National Curriculum Objectives		Sticky knowledge	Vocab	ulary	Key Scientists	
 Identify and describe the functions of different parts of the flowering plant: roots, stem/trunk/leaves and flowers Explore the part flowers play in a flowering plant's life cycle, including pollination, seed formation and seed dispersal Explain the requirements of plants for life and growth (air, light, water, nutrients from soil, room to grow) and how they vary between plants Know the way in which water is transported between plants 		 Plants are producers, they make their own food Their leaves absorb sunlight and carbon dioxide Plants have roots, which provide support a water from the soil Flowering plants have specific adaptations help it to carry out pollination, fertilisation production Seed dispersal improves a plants changes a successful reproduction Seeds/bulbs require the right conditions to and grow Seeds contain enough food for the plant's i growth 	chlorophyll, photosynthe oxygen, Dioxide, Carbon, Seedling, growth, energy transportation, dispersal, reproduction, anchor, sup water, light, air	oxygen, Dioxide, Carbon, Seedling, growth, energy, flower, transportation, dispersal, pollination, reproduction, anchor, support, soil, nutrients, water, light, air		
Prior Learni	ng	Key Questions (s):	Year 6 Lo	Year 6 Learning (Next Stage of Study)		
Prior Learning. In Year 2 children should: • Observe and describe how seeds and bulbs; grow into mature plants. • Find out and describe how plants need water, light and warmth to grow and stay healthy.		 How do plants reproduce? Do all flowers look the same? How do insects know which flowers to poll Why do flowers smell? What do seeds do? Can a plant live without its leaves? Do grass/trees make flowers? What conditions are perfect for a seed to gut where do weeds come from? Who does the space between seeds affect h they grow? Does seed size match plant size? Do plants take in water through their roots? How does light affect plant growth? How does a plant get carbon dioxide? 	In Year 6 children will: Recognise that provide inform Recognise that normally offsp Identify how a environments i evolution. Now well	 In Year 6 children will: Recognise that living things have changed over time and that fossils. provide information about living things 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 environments in different ways, and that adaption can lead to evolution. 		
		Teaching Ideas (Working Scientific	ally)			
Comparative tests	Identify & classify	Ubservation over time	Pattern Seeking	Kesearch		
How does the length of the carnation stem affect how long it takes for the food colouring to dye the petals?	How many ways can you group o seed collection?	ur What happens to celery when it is left in a glass of coloured water?	What colour flowers do pollinating insects prefer?	How do flowers reproduc	ce?	

Year 3-Plants

National Curriculum C Identify and name animals including birds and mamma Identify and name animals that are a omnivores •	bjectives e a variety of common fish, amphibians, reptiles, ils. e a variety of common carnivores, herbivores and	 Sticky knowledge There are many different animals with different characteristics. Animals have senses to help individu survive. When animals sense things able to respond. Animals need food to survive. Animals need a variety of food to he grow, repair their bodies, be active a healthy. 	ials they are Ip them ind stay	Vocabulary Elbow, teeth, toes, Knee, nose, eye, thumb, foot, leg, fingers, hand, shoulder, Mouth, ear, neck, head, smell, taste, touch, hearing, sight, omnivore, herbivore, carnivores, reptiles, Mammals, fish, birds, Amphibians	Key Scientists Chris Packham (animal conservationist)	
Prior L	earning Ke	y Questions (s):		Year 2 Learning (Next Stage of Study)		
 In EYFS children should: Have knowledge of identifying different parts of their body. Have some understanding of healthy food and the need for variety in their diets. Show care and concern for living things. Know the effects exercise has on their bodies. Have some understanding of growth and change. Can talk about things they have observed 		 What do animals eat? Do all animals eat the same food? Which of our senses is the most accuidentifying food? Do all animals hunt? Why are animals different colours an patterns? 	urate at nd	In Year 2 children will Know that au offspring wh Know the ba animals inclu Find out and animals inclu food and air) Describe the exercise, eati types of food	: nimals including humans have ich grow into adults sic stages in a life cycle for iding humans. describe the basic needs of iding humans for survival (water, importance for humans of ng the right amounts of different , and hygiene.	
		Teaching Ideas (Working Scientifi	cally)	· · · · · · · · · · · · · · · · · · ·		
Comparative tests	Identify & classify	Observation over time	Pattern S	Seeking	Research	
Is our sense of smell better when we cannot see?		How does my height change over the year?	Do you get better at smelling as you get older?			

Year 1-Animals, including Humans

 National Curriculum Objectives Know that animals including humans have offspring which grow into adults Know the basic stages in a life cycle for animals including humans. Find out and describe the basic needs of animals including humans for survival (water, food and air). Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. 		 Sticky knowledge Animals move in order to survive. Different animals move in different ways to help them survive. Exercise keeps animal's bodies in go condition and increases survival cho All animals eventually die. Animals reproduce new animals wh reach maturity. Animals grow until maturity and th grow any larger. 	ood ances. ren they ren do not	Vocabulary Living, dead, Never, alive Habitats micro-Habitats, Food Food Chain, Leaf Litter, Shelter Seashore, Woodland, Ocean Rainforest, conditions Desert Damp Shade	Key Scientists Steve Irwin (crocodile hunter)
Prior Learning	K	ey Questions (s):		Year 3 Learning (Next Stag	ge of Study)
Prior Learning In Year 1 children should: I dentify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. I dentify and name a variety of common animals that are carnivores, herbivores and omnivores •		 How long should my pets live for? Do all animals grow and live the same way? Do bigger animals live longer? Why are we all different heights? How and why do we grow and change? 		 In Year 3 children will: Identify that animals including humans need the right types and amount of nutrition and they cannot make their own food; they get their nutrition from what they eat. Know how nutrients, water and oxygen are transported within animals and humans. Know about the importance of a nutritious, balanced diet. Identify that humans and some other animals have skeletons and muscles for support, partection and movement. 	
	Teachi	ing Ideas (Working Scientifically)	_		
Comparative tests	Identify & classify	Observation over time	Pattern S	seeking	Research
Do amphibians have more in common with reptiles or fish? Do bananas make us run faster?	Which offspring belongs to which animal? How would you group things to show which are living dead or have never been alive?	How does a tadpole change over time? How much food and drink do I have over a week?	Which age the most in	group of children wash their hands i a day?	What food do you need in a healthy diet and why? What do you need to do to look after a pet dog/cat/lizard and keep it healthy?

Year 2-Animals, including Humans

National Curriculum Objectives		Sticky knowledge	S.	Vocabulary	Key
 Identify that animals including humans need the right types and amount of nutrition and they cannot make their own food; they get their nutrition from what they eat. Know how nutrients, water and oxygen are transported within animals and humans. Know about the importance of a nutritious, balanced diet. Identify that humans and some other animals have skeletons and muscles for support, protection and movement. 		 Different animals are adapted to eat different foods. Many animals have skeletons to support their bodies and protect vital organs. Muscles are connected to bones and move them when they contract. Movable joints connect bones 		utrients, Nutrition carbohydrates rotein, Fats, Vitamins unerals, Water, Fibre, Skeleton ones, Joints, Endoskeleton xoskeleton, Hydrostatic Skeleton ertebrates, Invertebrates uuscles contract elax	Scientists Adelle Davis Marie Curie
Prior Learning	k	(ey Questions (s):		Year 4 Learning (Next Stag	je of Study)
 Prior Learning In Year 2 children should: Know that animals including humans have offspring which grow into adults Know the basic stages in a life cycle for animals including humans. Find out and describe the basic needs of animals including humans for survival (water, food and air). Describe the importance for humans of exercise, eating the right amounts of different types of food and hygiene. 		 Why do we need a skeleton? What types of skeleton are there? Are all skeletons the same? Can something survive without a ske What happens if we break a bone? How do we move? Are bones that are bigger, stronger? Why do we need joints? Why do muscles get tired? Can we 'break' muscles? 	In eleton?	 In Year 4 children will: 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. 	
	Teach	ung Ideas (Working Scientifically)	T		-
Comparative tests	Identify & classify	Observation over time	Pattern See	king	Research
How does the angle that your elbow/knee is bent affect the circumference of your upper arm/thigh?	How do the skeletons of different animals compare?	nt How does our skeleton change over time?	Do male hum female humar	ans have larger skulls than ns?	Why do different types of vitamins keep us healthy and which foods can we find them in?

Year 3-Animals, including Humans

National Curriculum Objectives			Sticky knowledge	55	Vocabulary	Key Scientists
 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 		 Animals have teeth to help them eat. Different types of teeth do different jobs. Food is broken down by the teeth and further in the stomach and intestines where nutrients go into the blood. The blood takes nutrients around the body. Nutrients produced by plants move to primary consumers through food chains. 		Herbivore, carnivore Digestive System, Tongue mouth, Teeth, Oesophagus Stomach, Gall Bladder Small Intestine, Pancreas Large Intestine, Liver Tooth, Canine, Incisor molar, Premolar, Producer consumer	Ivan Pavlov (digestive system mechanisms)	
Prior Learning		Key	Questions (s):		Year 5 Learning (Next Stage of Study)	
 In Year 3 children should: Identify that animals including humans need the right types and amount of nutrition and they cannot make their own food; they get their nutrition from what they eat. Know how nutrients, water and oxygen are transported within animals and humans. Know about the importance of a nutritious, balanced diet. Identify that humans and some other animals have skeletons and 		 What different types of food are there? Why do we need a variety of different foods? Do all organisms eat the same things? Why do some people need different diets? Why are teeth important? What happens to our food? What is our digestive system? How does our food turn into poo and wee? 		 In Year 5 children will: Know the life cycle of different living things. Know the difference between different life cycles. Know the process of reproduction in plants. Know the process of reproduction in animals. 		
	Tead	chinç	y Ideas (Working Scientifically)	-		
Comparative tests	Identify & classify		Observation over time	Pattern S	Seeking	Research
In our class, are omnivores taller than vegetarians?	What are the names for all th organs involved in the digesti system? How can we organise teeth ir groups?	re ive rto	How does an eggshell change when it is left in cola?	Are foods high in su	that are high in energy always gar?	How do dentists fix broken teeth?

Year 4-Animals, including Humans

National Curriculum Objec	tives		Sticky knowledge	-5	Vocabulary	Key Scientists
• Describe the changes a	s humans develop to old age.		 Different animals mature at different rates and live to different ages. Puberty is something we all go throup process which prepares our bodies for adults and reproduction Hormones control these changes wh physical and/or emotional. 	ugh, a or being, ich can be	Foetus, Embryo, Womb Gestation Baby, Toddler Teenager, Elderly, Growth Development, Puberty, Hormone, Physical Emotional	Dr Steve Jones (Geneticist)
Pr	ior Learning	Key	Questions (s):		Year 6 Learning (Nex	t Stage of Study)
 In Year 4 children should: 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. 		 What do humans look like? Do all animal embryos look the same? How do humans change? Why do humans change? What causes puberty? What changes do we go through during puberty? What changes do we go through during puberty? Are there any patterns between vertebrate animals and their acetation parieds? 		 In Year 6 children will: 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. 		
	Tea	chinç	Ideas (Working Scientifically)			
Comparative tests	Identify & classify		Observation over time	Pattern S	Seeking	Research
How does age affect a human's reaction time?	Can you identify all the stages in the human life cycle?	ı	How do different animal embryos change?	Is there a mammal's	relationship between a size and its gestation period?	Why do people get grey/white hair when they get older?

Year 5-Animals, including Humans

 National Curriculum Objectives Identify and name the main parts of the h describe the functions of the heart/blood v Recognise the impact of diet/exercise/drug their bodies function. Describe the ways in which nutrients and v animals including humans. 	uman circulatory system and essels and blood. s and lifestyle on the way. • vater are transported within	Sticky knowledge The heart pumps blood around the body. Oxygen is breathed into the lungs where it is absorbed by the blood. Muscles need oxygen to release energy from work.	food to do	Vocabulary Oxygenated deoxygenated Valve, exercise respiration circulatory system heart, lungs blood, vessels blood, artery, vein, pulmonary alveoli, capillary digestive, transport, gas exchange, villi, nutrients water, oxygen	Key Scientists Justus von Liebig (Theories of nutrition/metabolism)
Prior Learning	Key G	Questions (s):		drugs, tobacco Learning in KS3 (New	t Stage of Study)
In Year 5 children should: Describe the changes as humans develop t	σ old age.	Why do we need oxygen? How do we breathe? Do fish and plants breathe? Do all living things need oxygen? How does the size of a person's lungs affect capacity? Are there ways to increase/decrease our lun Is lung capacity fixed? Why do we have blood? How does our heart work? How does our heart work? How does size of muscle affect our pulse rat How does exercise effect our pulse rate? How might the circulatory system of an elep hummingbird or a polar bear differ? Is the air you breathe out the same as that in?	, their lung g capacity? :e? shant/a you breathe	 In KS3 children will: the hierarchical organists organisms: from cells to systems to organisms. the tissues and organs or system including adapte the digestive system dig calculations of energy re daily diet the consequences of imb obesity/starvation and of the structure and function system in humans inclu the effects of recreationed and life processes. 	ition of multicellular tissues to organs to if the human digestive itions to function and how ests food equirements in a healthy valances in the diet including deficiency diseases ms of the gas exchange ding adaptations to function il drugs on behaviour health
Comparative tests	Teaching Identify & classify	g Ideas (Working Scientifically)	Dattorn S	Coobing	Pasaarch
How does the length of time we exercise for affect our heart rate?	Which organs of the body make up the circulation system and where are they found?	How does my heart rate change over the day? How much exercise do I do in a week?	Is there a pa breakfast an	ittern between what we eat for id how fast we can run?	How have our ideas about disease and medicine changed over time?

Year 6-Animals, including Humans

 National Curriculum Objectives know about evolution and can explain what it is. Know how fossils can be used to find out about the past. 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 adaptations may lead to evolution-recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago 		 Sticky knowledge Life cycles have evolved to help organisms survive to adulthood. Over time the characteristics that are most suited to the environment become in common. 	Vocabulary Fossils Adaptations, Evolution Characteristics, Reproduction Genetics, Variation, Inherited Environmental Mutation Competition Survival Of The Fittest Evidence	Key Scientists Charles Darwin Jane Goodall	
Prior Learning From Key Stages 1/2, children should: Understand there is a variety of life on Earth Know that some animal's differences are important to their survival Know how animals and plants reproduce Know how fossils form over time		 ey Questions (s): Why are we all different? What is variation and why is it important How did life begin on Earth? How do we change? What is evolution? What evidence is there for evolution? How does evolution happen? What reasons do animals become extinct? Polar Bear's habitat is rapidly changing which is most likely? How did Darwin come up with the theory Why was his theory not initially accepted 	Learning in KS3 (Ne In KS3 children will learn the foll t? • heredity as the process is transmitted from one • the variation between i being continuous or dis measurement and grap variation ? • the variation between s individuals of the same organisms compete mo drive natural selection p? • changes in the environ within a species and so adapted to complete su which in turn may lead • the importance of mair use of gene banks to pu	 Learning in KS3 (Next Stage of Study) In KS3 children will learn the following: heredity as the process by which genetic information is transmitted from one generation to the next the variation between individual within a species being continuous or discontinuous to include measurement and graphical representation of variation the variation between species and between individuals of the same species means some organisms compete more successfully which can drive natural selection changes in the environment may leave individuals within a species and some entire species less well adapted to complete successfully and reproduce which in turn may lead to extinction the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material. 	
	Teachii	ng Ideas (Working Scientifically)	· · · · · ·	×	
Comparative tests What is the most common eye colour in our class?	Identify & classify Compare the skeletons of apes/humans and Neanderthals- how are they similar and how are they different?	Observation over time How has the skeleton of the horse changed over time?	Pattern Seeking Is there a pattern between the size and shape of a bird's beak and the food it will eat?	Research What happened when Charles Darwin visited the Galapagos islands?	

 National Curriculum Objectives Explore and compare the differences between things that are living/dead and things that have never been alive. Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants and how they depend on each other. Identify and name a variety of plants and animals in their habitats including micro habitats. Describe how animals obtain their food from plants and other animals using the idea of a simple food chain and identify and name the different sources of food. 		 Sticky knowledge Some things are living some were once living but now dead and some things never lived. There is variation between living th Different animals and plants live in places. Living things are adapted to different habitats. Environmental change can affect planimals that live there. 	Vocabulary Living dead Never, alive Habitats Micro-habitats Food, Food chain Leaf, litter Shelter, Seashore Woodland, Ocean Rainforest Conditions, Desert Damp, shade	J Key Scientists Terry Nutkins		
Prior Learning. In EYFS children should: • Be able to comment and question about the place they live or the natural world. • Shows care and concern for living things and the environment. • Can talk about things they have observed • Notices features of objects in their environment. • Comments and asks questions about their familiar world.		 Key Questions (s): How to animals eat? Do all animals eat the same thing? Which animals hunt and which an hunted? Why? What animals live in our school en How are animals and plants 'adaption their habitats? Why do animals and plants like to different places? How do seasons affect our animals plants? Which animals hibernate and why? Why do snails hibernate but slugs How do habitats change over our s 	Year 4 Le In Year 4 children wi Recognise th of ways. • Explore and and name a wider enviro • Know and le live in and and do not?	Year 4 Learning (Next Stage of Study) In Year 4 children will: • 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. • Know and label the features of a river • Recognise that environments can change and that this can sometimes pose danger to living things.		
Comparative tests	Identify & classify	Teaching Ideas (Working Scientif	cally) Dattern Seebing	Posoarch		
Comparative testsIdentify & classifyWhich pets are the easiest to look after?How would you group these plants and animals based on what habitat you would find them in?Is there the same level of light in the everygreen wood compared with the deciduous wood?How would you group these plants and animals based on what habitat you would find them in?		How does the school pond change over the year?	What conditions do woodlice prefer to live in? Which habitats do worms prefer where can we find the most worms?	How are the animals in Australia different to the ones that we find in Britain? How does the habitat of the Arctic compare with the habitat of the rainforest?		

Year 2-Living Things & their Habitats

 National Curriculum Objectives 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 danger to living things. 		 Living things can be divided into groups based upon their characteristics Environmental change affects different habitats differently Different organisms are affected differently by environmental change Different food chains occur in different habitats Human activity significantly affects the environment 			Vocabulary Environment, flowerin Nonflowering, plants Animals, vertebrates Fish amphibians Reptiles, invertebrate Mammals, human imp Nature, reserves deforestation	g pact	Key Scientists Cindy Looy (environmental change/extinction)
 Prior Learning. In Year 2 children should: Explore and compare the differences between things that are living/dead and things that have never been alive. Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants and how they depend on each other. Identify and name a variety of plants and animals in their habitats including micro habitats. Describe how animals obtain their food from plants and other animals using the idea of a simple food chain and identify and name the different sources of food. 		 Key Questions (s): What food chains & webs are there in our local habitat? How does energy move through the food chain? How does removal of one species from an environment affect others? How does environmental change affect different organisms? What are the most important things we could do to improve our outside area? How does human activity affect our environment? 		Year 5 Lea In Year 5 children will Describe the mammal/an Describe the and animals	Year 5 Learning (Next Stage of Study) In Year 5 children will: • 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.		
		Т	eaching Ideas (Working Scientific	ally)		1	
Comparative tests	Identify & classify		Observation over time	Patterr	r Seeking	Researc	ch
Does the amount of light affect how many woodlice move around? How does the average temperature of the pond water	can we use the classification keys to identify all the anima that we caught pond dipping	, ils ,?	How aves the variety of invertebrates on the school field change over the year?	affected	s the use of insecticides bee population?	Why are rainfores have?	, people cutting down the sts and what effect does that
change in each season?							

Year 4-Living Things & their Habitats

 National Curriculum Objectives Know the life cycle of different living things Know the process of reproduction in plants Know the process of reproduction in animals 		 Different animals mature at different rates and live to different ages. Some organisms reproduce sexually where offspring inherit information from both parents. Some organisms reproduce asexually by making a copy of a single parent. Environmental change can affect how well an organism is suited to its environment. Different types of organisms have different lifecycles. 		Vocabulary eproduction, sexual sexually, pollination spersal, reproduction ell, Fertilisation ale, Female egnancy, young ammal etamorphosis nphibian, Insect gg, Embryo rd, Plant	Key Scientists James Brodie (reproduction of plants by spores)	
Prior Learning		Key Questions (s):		Year 6 Learning (Next Stage of Study)		
 In Year 4 children should: Construct and interpret a variety of food chains, identifying producers/predators and prey. Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants and how they depend on each other. Identify and name a variety of plants and animals in their habitats including micro habitats 		 What is a life cycle? What types of li are there? Are life cycles the same? Do plants reproduce in the same way How do plants spread their seeds? 	fe cycles In js as us?	 Vear 6 children will: Classify living observable ch differences. Give reasons specific chara 	: g things into broad groups according to aracteristics and based on similarities and for classifying plants and animals based on acteristics.	
		Teaching Ideas (Working Scientifi	cally)			
Comparative tests	Identify & classify	Observation over time	Pattern Seek	king	Research	
How does the level of salt affect how quickly brine shrimp hatch?		How do brine shrimp change over their lifetime?	Is there are rela number of peta stamens?	lationship between als and number of	What are the differences between the life cycle of an insect and a mammal?	

Year 5-Living Things & their Habitats

 National Curriculum Objective Classify living things into broa observable characteristics and l differences. Give reasons for classifying plo specific characteristics 	S d groups according to pased on similarities and ints and animals based on	Si Varia Orga envir long Orga likely Orga charc Comp	icky knowledge tion exists within a population. nisms best suited to their mment are more likely to survive enough to reproduce. nisms are best adapted to reproduce to do so. nisms reproduce and offspring have cteristics patterns. wetitions exists for resources and mat	are more similar tes.	Vocabulary Variation. Organisms Populations Classification Characteristics, Environm Flowering, Nonflowering Animals, Vertebrates, Fish Amphibians, Reptiles Mar Invertebrate Human, Imp Nature, Reserves Deforest Classify Compare Bacteri Microorganism, Organism Linnaean	, Plants h mmals, vact ation a	Key Scientists Carl Linnaeus (identifying/ naming/classifying organisms)
Prior Learr In Year 4 children should: • Recognise that living things can ways. • Explore and use classification k name a variety of living things environment. • Recognise that environments co sometimes pose danger to livin	earningKey Questions (s):KS3 Learning (Netus can be grouped in a variety of ion keys to help group identify and uings in their local and wider tts can change and that this can living things.• Why do we need to classify living things? • How do we classify? • What are the difficulties with classification? • Why does variation exist? • What happens if animals of different species breed? • What are microorganisms? • How can we prevent the spread of disease? • Why do animals and plants compete- and what for?In KS3 children will: • the dependence of almost al photosynthetic organisms affect and c • the importance of plant repr human food security. • how organisms affect and c		lext Stage of Study) all life on Earth on the ability of such as plants and algae to use sunlight organic molecules that are an essential ain levels of oxygen and carbon dioxide in for photosynthesis. anisms in an ecosystem including food crops production through insect pollination in are affected by their environment r of toxic materials.				
Comparative tests	Identify & classify	Teach Observ	ing Ideas (Working Scienti ation over time	fically) Pattern S	Seeking	Researc	h
How does the temperature affect how much gas is produced by yeast?	How would you make a classification key for vertebrates/invertebrates or microorganisms?	What h leave it	appens to a piece of bread if you In the windowsill for two weeks?	Do all flowe number of p	ers have the same petals?	What do	σ different types of microorganisms do?

Year 6-Living Things & their Habitats

 National Curriculum Objectives Identify common appliances that run on Construct a simple series electrical circuit basic parts including cells wires bulbs sw Identify whether a lamp will light in a si whether the lamp is part of a complete la Recognise that a switch opens and closes this with whether a lamp lights in a simp some common conductors and insulators being good conductors. Know the difference between a conductor examples of each. Safety when using electricity. 	electricity. i identifying and naming its vitches and buzzers. imple series circuit based on vop with a battery. is the circuit and associate ple series circuit. Recognise and associate metals with r and an insulator giving	 Sticky knowledge A source of electricity is needed for electrical devices to work. Electricity sources push electricity roucircuit faster. More batteries will push the electricit the circuit faster. Devices work harder when more elect goes through them. A complete circuit is needed for electriflow and devices to work. Some materials allow electricity to flue devices to work. Some materials allow electricity to flue and these are called conductors. Mat don't allow electricity to flow easily of the source of the so	Vocabularyund theElectricity, Electric Current Appliancesund theMains , Crocodile Clips Wires, Bulb, Battery Cell Battery Holder Motor BuzzertricityElectrical Insulator Componentcow easily terials that are calledImage: Call of the second seco	Key Scientists Thomas Edison (Lightbulb)
		u isuluuri s.		
Prior Learning	Kej	y Questions (s):	Year 6 Learning (N	ext Stage of Study)
In EYFS children should have: • Some understanding that objects need electricity to work. • Understand that a switch will turn something on or off.		 What would life to be like without el What sorts of things use/need electri What electricity do I use? In which ways can we get electricity? How do we make electricity? How do batteries work? How quickly can batteries run out? How does the number of batteries ad circuit affect a device? What materials can carry electricity? 	ectricity? In Year 6 children will: icity? Link the brightness of buzzer with the num in the circuit. Compare and give re components function bulbs/the loudness of position of switches. Use recognised sympt simple circuit in a di	f a lamp or the volume of a ber and voltage of cells used asons for variations in how including the brightness of f buzzers and the on/off ols when representing a agram.
	Teachin	rg Ideas (Working Scientifically)		
Comparative tests	Identify & classify	Observation over time	Pattern Seeking	Research
How does the thickness of a conducting material affect how bright the lamp is?	How would you group these electrical devices based on where the electricity comes from>	How long does a battery light a torch for?	Which room has the most electrical sockets in a house?	How has electricity changed the way we live?

Year 4-Electricity

Year 6-Electricity

 National Curriculum Objectives Link the brightness of a lamp or the volum and voltage of cells used in the circuit. Compare and give reasons for variations in including the brightness of bulbs/the loudr position of switches. Use recognised symbols when representing 	e of a buzzer with the number how components function tess of buzzers and the on/off a simple circuit in a diagram.	•	 Sticky knowledge Batteries are a store of energy. This energy pushes electricity round the circuit. When the battery's energy is gone it stops pushing. Voltage measures The greater the current flowing through a harder it works. Current is how much electricity is flowing circuit. When current flows through wires heat is The greater the current the more heat is reference. 	the push. 1 device the 2, round a 5 released. eleased.	Vocabulary, Electricity, Neutrons Protons, Electrons Nucleus Atom. Electric Current Appliances Mains, Crocodile Clips Wires, Bulb, Battery Cell Battery Holder Motor Buzzer Switch Conductor Electrical Insulator Candustar	Key Scientists Alessandro Volta (Electrical Battery)
Prior Learning		Key	Questions (s):		KS3 Learning (Next	Stage of Study)
 In Year 4 children should: Identify common appliances that run on el Construct a simple series electrical circuit is parts including cells wires bulbs switches of Identify whether a lamp will light in a sim whether the lamp is part of a complete loo Recognise that a switch opens and closes t with whether a lamp lights in a simple series common conductors and insulators and as conductors. Know the difference between a conductor of each. Safety when using electricity. 	ectricity. lentifying and naming its basic ind buzzers. ple series circuit based on p with a battery. he circuit and associate this es circuit. Recognise some sociate metals with being good ind an insulator giving examples	•	 Do all batteries push as hard as each oth What is electricity? How does the voltage of a batters affect l current is pushed? How does the length of time I leave the c flowing for affect the brightness of the bit How does number of bulbs affect the brighulb? Are all types of wires as good as conduct electricity? Why are wires insulated in plastic? Does length of wire make a difference? Does the type of circuit affect how the co work/long the battery lasts? What renewable ways can we generate e How does current affect heat? What are the dangers of a short circuit? 	ter? how much ulb? ghtness of a ting mponents lectricity?	 In KS3 children will: Electric current measured series and parallel circuit branches meet and curred Potential differences met bulb ratings resistance ratio of potential differences in resistance insulating components Separation of positive on objects are rubbed toget forces between charged The idea of electric field space between objects n 	I in amperes in circuits ts currents add where ent as flow of charge asured in volts/battery and neasured in ohms as the nee to current between conducting and negative charges when her: transfer of electrons objects forces acting across the ot in contact.
Camparative tests	Teac Identify & classify	hing	Ideas (Working Scientifically)	Pattorn.	Seeking	Research
How does the voltage of the batteries in a circuit affect the brightness of the lamp?	How would you group electrical components and appliances based on what electricity makes them do	d o?	How does brightness of a bulb change as the battery runs out?	Does the ter longer it is o	nperature of a light bulb go up the on?	How has our understanding of electricity changed over time?

Year 2-Forces

National Curriculum Objectives		Sticky knowledge	Vocabular	Key Scientists
There are no specified NC objectives for forces in KS1		 Fushing unit putting cut mute things for things move faster or slower. Pushing and pulling can make things move or stop. Things can move in different ways. Larger masses take bigger pushes and pulls to move or stop them. Pushing and pulling can change the shapes of things. Bigger pushes and pulls have bigger effects. 		The Wright Brothers (Aeroplane)
Prior Learning		ey Questions (s):	Year 3 Le	arning (Next Stage of Study)
 In EYFS, children should: know about similarities and differences in relation to places/objects/materials and living things. talk about the features of their own immediate environment and how environments could vary from one another. make observations of animals and plants, explain why some things occur, and talk about changes. 		 How can we move objects? How can we change the way an obj How does a material affect how fast rolls down a slope? How does the length/steepness of a affect how far a ball/car/tin will rol end? How does length of an elastic band elastic it is? Which sock is the most elastic? 	In Year 3 children wil ect moves? a ball slope l off the affect how affect how affect whet other depend	k: w things move on different surfaces. w simple pulley works and use making lifting upler ome forces need contact between two objects c forces can act at a distance. magnets attract and repel each other and materials and not others. d group together a variety of everyday sed on whether they are attracted to a magnet some magnetic materials. ynets as having two poles. her two magnets with attract or repel each ing on which poles are facing.
		Teaching Ideas (Working Scientifi	cally)	
Comparative tests	Identify & classify	Observation over time	Pattern Seeking	Research
Which materials would be best for the roof of the little pig's house?	Which materials will float and which will sink?	Would a paper boat float forever?	How does changing the force change the speed of a toy car?	Why do objects float or sink?

National Curriculum Objective	&	Sticky knowledge	S	Vocabulary		Key Scientists
 Compare how things move on Know how a simple pulley wor object simpler Notice that some forces need c magnetic forces can act at a di Observe how magnets attract of some materials and not others Compare and group together a based on whether they are attr some magnetic materials. Describe magnets as having tw Predict whether two magnets or depending on which poles are 	different surfaces. rks and use making lifting an ontact between two objects but istance. und repel each other and attract variety of everyday materials acted to a magnet and identify ro poles. vith attract or repel each other facing.	 Magnets exert attractive and repulsive forces on each other. Magnets exert non-contact forces which work through some materials. Magnets exert attractive forces on some Magnet forces are affected by magnet si mass/ distance from object and object r 	, materials. trength/object naterial.	Attract, repel Compass, Friction Magnet Magnetic Magnetic field Pole, north South Magnet Learning (Next Strage of Study)		William Gilbert (Theories of Magnetism)
Prior Lean	ring	Key Questions (s):		Year 5	Learning (Next	Stage of Study)
 In Year 2 children: Could have an awareness of how to make things stop and start using simple pushes and pulls. They could know about floating and sinking. 		 What are magnetic materials? Can I make a magnetic material non-m How far away does a magnet have to b a magnetic material? How far away can the magnetic attract magnets be experiences? Is the repulsive force the same size? How is the magnetic attraction of repuls by putting materials between the magnet Are bigger magnets stronger? How could you use magnets to measure pages in a book? 	agnetic? ie before it attracts ion between two sion force affected ets? e the number of	In Year 5 children Explain because and the lives. Identify friction recogniz and gec Describe Describe Describe Spherice Describe spherice Sky.	will: that unsupported object of the force of gravit falling object and th the effects of air resi which act between m se that some mechani urs allow a smaller fo e the movement of th to the sun in the sold e the sun, Earth and I al bodies. e the idea of the Earth ad the apparent move	iects fall towards the Earth cy acting between the Earth e impact of gravity on our istance/water resistance and ioving surfaces. isms including levers/pulleys rce to have a greater effect. e Earth and other planets ur system. e Moon relative to the Earth Moon as approximately n's rotation to explain day and ement of the sun across the
		Teaching Ideas (Working Scient	ifically)			
Comparative tests	Identify & classify	Observation over time	Pattern Seekir	ıg	Research	
How does the mass of an object affect how much force is needed to make it move?	Which materials are magnetic?	If we magnetise a pin how long does it stay magnetised for?	Do magnetic mater conduct electricity?	rials always ?	How have our ideas	s on forces changed over time?

Year 3-Forces & Magnetism

 Explain the unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object and the impact of gravity on our lives. Identify the effects of air resistance/water resistance and friction which act between moving surfaces. Recognise that some mechanisms, including leavers, pulleys, and gears, allow a smaller force to have a greater effect 		 Sticky knowledge Air resistance and water resistance are forces against motion caused by objects having to move air and water out of their way. Friction is a fore against motion caused surfaces rubbing against each other. Some objects require large forces to mak gears, pulley and leavers can reduce the needed to make things move 	Vocco Air resistance Water resistance Friction, Gravity Newton, Gears Pulleys, Force Push, Puller opposing, Streaml Brake Mechanism, Lever Cog, Machine	ibulary Gal (Gri	Key Scientists lileo Galilei avity/Acceleration)	
In Year 3 children should: • Compare how things move on different surfaces.		 What is a force? How can a force act on an object? 	In KS3 children wi • opposin	 In KS3 children will learn: opposing forces and equilibrium: weight held by stretched spring or supported on a compressed surface forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion change depending on direction of force and its size 		
 Know how a simple pulley works and use making lifting an object simpler Notice that some forces need contact between two objects but magnetic forces can act at a distance. 		 How can we see forces? How can we measure forces? How does the saltiness of water affect th resistance? 	• forces by e water change to • change to			
 Observe how magnets attract and i some materials and not others. Compare and group together a vari 	epel each other and attract ety of everyday materials based	 How does the length of a piece of a pape helicopter's wings affect the time it takes How does changing the shape of a piece 	er ν to fall?			
on whether they are attracted to a magnetic materials. • Describe magnets as having two po	nagnet and identify some rles.	 plasticine affect water resistance? How does adding holes to a parachute a time it takes to fall? 	ffect the			
 Predict whether two magnets with attract or repel each other depending on which poles are facing 		 How does the amount/depth of tread aff friction between a shoe and a surface? How can we use levers to lift heavy obje How do see-saws work? 	ect the cts?			
		Can you create a pulley system to life a	given load?			
		Teaching Ideas (Working Scientif	ically)			
Comparative tests	Identify & classify	Observation over time	Pattern Seeking	Research		
Computative tests Interrupty & Classify How does the angle of launch affect how far a paper rocket will go? Can you label and name all the forces acting on the objects in e		How long does a rope on a climbing frame ch swing for before it comes still?	Do all objects fall through water the same way?	r in 🛛 How do submarines	sink if they are full of air?	

Year 5-Forces

 ational Curriculum Objectives 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 Describe the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. 		 Sticky knowledge Stars, planets and moons have so much mass they attract other things including each other due to a force called gravity. Gravity works over distance. Objects with larger masses exert bigger gravitational forces. Objects like planets, moons and stars spin. Smaller mass objects like planets orbit large mass objects like stars. Stars produce vast amounts of heat and light. All other objects are lumps of rock, metal or ice and can be seen because they reflect the light of stars. 		Vocabulary Earth, Sun Moon, Axis, Rotation Day, Night , Phrases of the Moon, Star, Constellation Waxing, Waning Crescent, Gibbous Mercury, Venus Mars, Jupiter, Saturn Uranus, Neptune, Planets, Solar system, Rotate, Orbit Axis Spherical Geocentric Heliocentric		Key Scientists Tim Peake
Prior Learnir	ıg,	Key Questions (s):	KS3 Learning (Next Stage of Study)			
 In KS1 and in Year 3 children should: Understand changes in weather patterns and seasons. Compare how things move on different surfaces. Notice that some forces need contact between two objects, but magnetic forces can act at a distance. Describe magnets as having two poles. Predict whether two magnets with attract or repel each other, depending on which poles are facing. 		 How does distance from a light source affect how much light hits an object? Does having more moons result in more light hitting a planet? How does speed/size of a meteorite affect the size of the moon crater formed? Gravity force, weight= mass x gravit strength(g), on Earth g=10 N/kg, dig and stars; gravity forces between Ea between Earth and Sun Our Sun as a star, other stars in our The seasons and the Earth's tilt, day times of year, in different hemispher unit of astronomical distance. 		im: weight= mass x gravitati n Earth g=10 N/kg, differ ivity forces between Earth i and Sun star, other stars in our go ind the Earth's tilt, day le in different hemispheres omical distance.	onal field ent on other planets , and Moon, and Ilaxy, other galaxies ngth at different the light year as a	
		Teaching Ideas (Working Scientific	cally)			
Comparative tests	Identify & classify	Observation over time	Pattern S	Seeking	Research	
How does the length of daylight hours change in each season?	How could you organise all the objects in the solar system into groups?	e Can you observe and identify all the σ phrases in the cycle of the Moon?	Is there a p size of a pl takes to tro	pattern between the lanet and the time it avel around the Sun?	What unusual objects di discov	d Jocelyn Bell Burnell er>

Year 5-Earth & Space

 National Curriculum Objectives Observe changes across the four seasons Observe and describe weather associated with the seasons and how day length varies 		 Weather can change There are lots of different types of weather: Rain, Sun, Cloud, Wind, Snow, etc Days are longer and hotter in the summer Days are shorter and colder in the winder There are four seasons: Spring, Summer Autumn & Winter 		Vocabulary Key Scientists Seasons, Spring Summer Autumn, Windy, Sunny Overcast, Snow Rain, Temperature Vocam 2 Learning (Next Strate of Study)	
Prior Learning. In EYFS, children should: • Have developed an understanding of change. • Observed and explained why certain things may occur • Looked closely at similarities, differences, patterns and change. • Commented and questioned about the place they live or the natural world.		 Key Questions (s): Why do more frequent days of rain saturate the ground? How long does it take for the ground to dry after it has been raining? Does more rain take longer to dry? Do countries with higher temperatures have less rain? How does rainfall and temperature change over time in our school grounds? Which leaf is the strongest/best shade cover/best at directing water? What do you notice about different leaves? What do you think leaves turn brown in Winter? What colours can we find outside? What effect does rain have on the environment? What would happen if there wasn't enough rain? 		 Year 3 Learning (Next Stage of Study) In Year 3 children will: 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 a solid object. Find patterns in the way that the sizes of shadows change. 	
Communities hash		Teaching Ideas (Working Scientifi	cally)	Paulta a	Decemb
Comparative testsIdentify & classifyIn which season does it rain the most?How could you organise all the objects in the solar system into groups?		How does the colour of a UV bead change over the day?	Does the wi	Seeking nd always blow the same way?	Kesearch Are there plants that are in flower in every season?

Year 1-Energy (Seasons & How they Change)

 National Curriculum Objectives. Recognise that they need ligh that dark is the absence of lig Notice that light is reflected for the that there are ways to protect Recognise that shadows are for a light source is blocked by a Find patterns in the way that change. 	t in order to see things and pht. rom surfaces. sun can be dangerous and their eyes. formed when the light from solid object. the sizes of shadows	 Sticky knowledge There must be light for us to see. Without light it is dark. We need light to see things even s Transparent materials let light trathem, and opaque materials don't through. Beams of light bounce off some n Shiny materials reflect light beam non-shiny materials. 	hiny things. vel through let light aterials. s better than	Vocabulary Light source Dark, Reflect Ray Mirror, Bounce Visible, Beam Sun, Glare Travel, Straight Opaque, Shadow Block, Transparent, Translucent	Key Scientists James Clerk Maxwell (visible/invisible Waves of Light)
ø		• Light comes from a source.			
Prior Learn	ing	Key Questions (s):		Year 6 Learning (Nex	t Stage of Study)
 In Year 1 children should: Observe changes across the file Observe and describe weather seasons and how day length Pupils could: have some knowledge of whe have seen their shadows and when it is sunny. have some understanding of a could understand they need lite 	our seasons cassociated with the varies re light comes from. may know they appear a reflection. ight to be able to see things.	 A coin is lost, what would be the find it? How does distance from a light su how bright it looks? How does being in darkness affect of hearing? What colour would be the best m make a blind for a baby's room? How does thickness of a material much light can pass through it? How many pieces of tracing pape translucent as a single piece of w How does the shape of a mirror a light reflects? How can we change the darkness shapes of a shadow? 	best way to rurce affect t your sense uterial to affect how affect how are as nite paper? ffect how the size and	In Year 6 children will: • Recognise that li straight lines. • Use the idea tha to explain that o give out or reflec • Explain that we travels from ligh light sources to o • Know how simp	ght appears to travel in t light travels in straight lines hjects are seen because they t light into the eye. see things because light t sources to our eyes or from objects that cast them. le optical instruments work.
		Teaching Ideas (Working Scient	fically)		
Comparative tests	Identify & classify	Observation over time	Pattern	Seeking	Research
How does the distance between the shadow puppet and the screen affect the seize of shadow?	How would you organise the light sources into natural an artificial sources?	ese When is our classroom darkest? id	Are you n to wear g	rore likely to have bad eyesight and lasses if you are older?	How does the Sun make light?

Year 3-Energy (Light & Sight)

Year 4-Energy (Sound)

National Curriculum Objectives		Sticky knowledge	55	Vocabulary	Key Scientists
 Know how sound is made associati Know what happens to a sound as ears. Know the correlation between the v strength of the vibrations that prod Know how sound travels from a so Know the correlation between pitch sound. 	ng some of them vibrating. it travels from its source to our olume of a sound and the uced it. urce to our ears. and the object producing a	 Sound travels from its source in all directions and we hear it when it travels to our ears. Sound travel can be blocked. Sound spreads out as it travels. Changing the shape, size and material of will change the sound it produces. Sound is produced when an object vibrate Sound moves through all materials by muvibrate. Changing the way an object vibrates cha sound. Bigger vibrations produce lounder sounds smaller vibrations produce quieter sounds Faster vibrations produce higher pitched s 	e an object es. aking them nges its and s. sounds	amplitude, volume quiet, loud ear, pitch high, low particles, instruments wave	Aristotle (sound waves)
Prior Learnii	ıg	Key Questions (s):		KS3 Learnin	g (Next Stage of Study)
 In KS1 children: Could have some understanding that objects make different sounds. Could have some understanding that they use their ears to hear sounds. Know about their different senses. 		 How can you change the volume of a sound? How does the size of an ear trumpet affect the volume of sound detected? How does the type of material affect how well is blocks a sound? How does thickness of material affect how well it blocks a sound? Which materials vibrate better and produce lounder sounds? Which materials make the best string telephone components? How does length of the tube affect the pitch and volume? Can you predict the relative pitch of tuning forks from the patterns of ripples they make in the water? 		 In KS3 children will leam: frequencies of sound waves measured in hertz, echoes, reflection and absorption of sound sound needs a medium to travel, the speed of sound in air, in water, in solids sound produced by vibrations of objects, in loudspeakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal auditory range of humans and animals. 	
		Teaching Ideas (Working Scientifi	cally)		
Comparative tests	Identify & classify	Observation over time	Pattern Se	eeking	Research
How does the volume of a drum change as you move further away from it?	Which material is best to use for muffling sound in ear defenders?	When is our classroom the quietest?	Is there a link school and th	k between how loud it is in re time of day?	Do all animals have the same hearing range?

 National Curriculum Objectives 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 that cast them. Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. Know how simple optical instruments work. 	 Sticky knowledge Animals see light sources when light travels from the source into their eyes. Animals see objects when light is reflected off that object and enters their Light reflects off all objects. Light travels in straight lines. 	veyes. veyes. Vocabulary, Light source, Dark Reflect, Ray, Mirror, Bounce Visible, Beam Sun, Glare Travel, Straight Opaque, Shadow Block, Transparent Translucent, Reflect Absorb, Emitted Scattered, Refraction	Key Scientists Thomas Young (Wave Theory of Light)
Prior Learning In Year 3 children should: • 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 a solid object. • Find patterns in the way that the sizes of shadows change.	Key Questions (s):KS3 Learning (Next Stage• How does the size of an object affect the size of a shadow?In KS3 children will learn: • the similarities and different and waves in matter• How does the distance between the light and the object change the size of a shadow?• the similarities and different and waves in matter• How does the distance between the object and the size of the screen affect the size of a shadow?• the transmission of light thr absorption, diffuse scatterin a surface Science• How would a solar eclipse be different if: • The moon was a different size? • The earth span faster or slower? • If the earth and moon where the same size but further away in the solar system?• use of ray model to explain pinhole camera, the refracti convex lens in focusing, the light transferring energy fro leading to chemical and ele sensitive material in the reti water?• How does a periscope/microscope/telescope work?• colours and the different fre light and prisms; differentic absorption and diffuse refle		Iext Stage of Study) and differences between light waves matter welling through a vacuum; speed of on of light through materials: fuse scattering and specular reflection at rec del to explain imagining in mirror, the a, the refraction of light and action of focusing, the human eye ng energy from source to absorber mical and electrical effects; photo- rial in the retina and in cameras e different frequencies of light, white ns; differential colour effects in 1 diffuse reflection.
Comparative tests Identify & classify	Observation over time	Pattern Seeking	Research
How does the angle that a light ray hits a plan mirror affect the angle at which it reflects off the surface? Can you identify all the colour light that make white light wh mixed together?	s of Does the temperature of a light bulb go up en the longer it is on?	Is there a pattern to how bright it is in school ov the day?	er Why do some people need to wear glasses to see clearly?

Year 6-Energy (Light & Sight)

National Curriculum Objective	S∕	Sicky knowledge	15	Vocabulary	Key Scientists	
 Distinguish between and object and the material from which it is made. Identify and name a variety of everyday materials, including wood, metal, plastic, glass, water and rock, Describe the simple physical properties of a variety of everyday materials. Compare and group together a variety of everyday materials based on their simple properties 		 There are many different materials that have different describable and measurable properties. Materials that have similar properties are grouped into metals, rocks, fabrics, wood, plastic and ceramics. The properties of a material determine whether they are suitable for a purpose. 		Hard Soft, Stretchy Stiff, Shiny Dull, Rough Smooth, Bendy/not bend Waterproof/not waterpro Absorbent, Opaque	William Addis (Toothbrush Inventor)	
Prior Lean	ring Ke	y Questions (s):		Year 2 Learning (Next Stage of Study)		
 In EYFS children should: be able to ask questions about the place they live. talk about why things happen and how things work. discuss the things they have observed such as natural and found objects. manipulates materials to achieve a planned effect. 		 times through KS1. Find example below. Buildings Which rocks are the least crumbly? Toys Which fabric would make the softest blanket? Clothing & Materials Which material could be used make a waterproof hat for the teacher when she/he is on the playground at playtime? Identify and compare the suitability of materials, including wood, metal, plast paper and cardboard for particular uses a materials can be changed by squashing and stretching. 		upare the suitability of a variety of everyday ing wood, metal, plastic, glass, brick, rock, pard for particular uses. upes of solid objects made from some changed by squashing, bending, twisting		
		Teaching Ideas (Working Scient	ifically)			
Comparative tests	Identify & classify	Observation over time	Pattern S	Seeking I	lesearch	
Which materials are the most flexible? We need to choose a material to make an umbrella so we need to find materials that are waterproof?		What happens to materials over time if we bury them in the ground?	Is there a materials t objects in	pattern in the types of that are used to make a school?	low are bricks made?	

Year 1-Materials

Year 2-Materials								
National Curriculum Objectives		Ś	Sticky knowledge	Vocabulary	Key Scientists			
 Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. Find out how shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. 		• Materials can be changed by physical force		Waterproof, Fabric Rubber, Cars Rock, Paper Cardboard, Wood Metal, Plastic Glass, Brick Twisting, Squashing Bending, Matches Cans, Spoons	William Addis (Toothbrush Inventor)			
Prior Learnin	ug, I	Key	Questions (s):	Year 3 Learni	rg (Next Stage of Study)			
 Prior Learning. In Year 1 children should: Distinguish between and object and the material from which it is made. Identify and name a variety of everyday materials, including wood, metal, plastic, glass, water and rock, Describe the simple physical properties of a variety of everyday materials. Compare and group together a variety of everyday materials based on their simple properties 		It is recommended that materials to be taught three times through KS1. Aim is to investigate a couple of classes of materials and properties in each topic so children get a depth of experience in each topic. Please find an example below. Buildings • Which rocks are the least crumbly? Toys • Which fabric would make the softest blanket? Clothing & Materials		 Compare and group together different kinds of rocks based on 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. 				
			teacher when she/he is on the					
Teaching Ideas (Warking Scientifically)								
Comparative tests	Identify & classify		Observation over time	Pattern Seeking	Research			
Which shapes make the strongest paper bridge?	Which materials will float and which will sink?	,	How long do bubble bath bubbles las for?	t How do materials change with heat?	How have the materials we use changed over time?			

Year 3-Materials

 National Curriculum Objectives Compare and group together different rocks based on their appearance and physical properties. Describe in simple terms how fossils formed when things that have lived trapped within rock. Recognise that soils are made from a organic matter. 	nt kinds of t simple , are are rocks and	Sticky kr There are differ There are differ Soil changes or Different plant Fossils tell us v Fossils provide Palaeontologis Fossils provide over time.	nowledge erent types of rock. erent types of soil. over time. ts grow in different soils. what has happened before. e evidence. sts use Fossils to find out about the past. e evidence that living things have changed	Vocabulary Rocks, Igneous Metamorphic, Sedimentary Anthropic, Permeable, Impermeable Chemical Fossil, Body fossil, Trace fossi Mary Anning Cast fossil, Mould fossil Replacement fossil, Extinct Organic Matter, Topsoil Sub soil, Base rock	L	Key Scientists Mary Anning (Discovery of Fossils)
Prior Learning In Year 2 children should: Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. • Find out how shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.		 Key Questions (s): How are the so Which do you 	: oils different? think has best drainage?	Year 4 Learning (Next Stage of Study) In Year 4 children will: Compare and group materials together, according to whether they are solids,		
		 Which more likely to lead to flooding? How many soil types have we found? How might the soil be different in different countries? What rock is best for a kitchen chopping board? What types of rocks are there? How do rocks change? 		 liquids or gasses. Observe that some materials change state when heated or cooled, and measure and research the temperature at which this happens in degrees Celsius. Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. In Year 6 children will: 		
Pupils could also have some prior knowledge of rocks and what a fossil is.		 What would gi Why do you the of soil? How can we use to be can be	prow best in your soil? hink worms are important to the creation use composting to make our own soil? tly look like real soil? you think this process will take and why? ls created? s help us find out about historical events?	worms are important to the creation mposting to make our own soil? ok like real soil? hink this process will take and why? ated? p us find out about historical events?		time and that fossils provide he Earth millions of years ago.
		 If you could fo 	ossilise an object, what would it be? Teaching, Ideas, (Warking, Scient	lieallu)		
Comparative tests	Identilu &	dassilu	Observation over time	Pattern Seeking	Research	
How does adding different amounts of sand to soil affect how quickly water drains through it?	Can you use the identification key to find out the name of each of the makes in your callection?		How does tumbling change a rock over time?	Is there a pattern in where we find volcanos on planet Earth?	Who was Mary / discover?	Anning and what did she

Year 4-Materials-Solids, Liquids & Gases

National Curriculum Objectives		Sticky knowledge	Vocabulary	Key Scientists
 Compare and group materials toget according to whether they are solid gasses. Observe that some materials chang heated or cooled, and measure and temperature at which this happens. Celsius. Identify the part played by evapore condensation in the water cycle and the rate of evaporation with temperature of evaporation with	her, Sc s, liquids or by e state when lic research the Hi in degrees lic tion and st l associate ature.	olids, liquids and gases are described y observable properties. laterials can be divided in to solids, quids and gases. eating causes solids to melt in to liquids and quids evaporate in to gases. he temperature at which given substances change cate are always the same.	Solid, Liquid, Gas Particles, State, Materials Properties, Matter Melt, Freeze Water, Ice Temperature, Process Condensation, Evaporation Water, Vapour Energy, Precipitation Collection	Anders Celsius (Celsius Temperature Scale)
Prior Learning	Key Ques	stions (s):	Year 5 Lear	ning (Next Stage of Study)
 In KS1 children should: Distinguish between an object and from which it is made. Identify and name a variety of ever materials, including wood, plastic, water, and rock. Describe the simple physical proper of everyday materials. Compare and group together a vari everyday materials based on their s physical properties. Identify and compare the suitability everyday materials, including wood plastic, glass, brick, rock, paper and for particular uses. Find out how the shapes of solid of from some materials can be change squashing, bending, twisting and s 	ihe material its yday, glass, metal, ies of variety, imple i of a variety, metal, l cardboard gjects made d by, tretching.	ow does the amount of water added to flour affect s state? ow does the amount of detergent added to water flect how slippery it is? ow does the temperature affect how viscous a quid is? s melting temperature of wax the same as its eezing temperature?	 In Year 5 children will: Compare and group together everyday materials based on their properties, ir their hardness, solubility, transparency, conductivity, and response to magn Know that some materials will dissolve in liquid to form a solution and desc recover a substance from a solution. Use knowledge of solids, liquids and gases to decide how mixtures might be including through filtering/sieving and evaporating. Give reasons based on evidence from comparative and fair tests, for the uses everyday materials including wood/metals and plastic. Demonstrate that dissolving mixing and changes of state are reversible chan Explain that some changes result in the formation of new materials and this change is usually not reversible including changes associated with burning of action of acid on bicarbonate of soda. 	
Pupils could also have some prior knowledge what a fossil is.	of rocks and	Tarahing Idage (Marking Ca		
		Teaching Ideas (Working Sc		
Comparative tests	Identify & classify	Observation over time	Pattern Seeking	Kesearch
How does the mass of a block of ice affect how long it takes to melt?	Can you group these materic objects in to solids, liquids a gases?	ais and Which material is best for keeping our ind chocolate warm?	not Is there a pattern in how long it takes different sized ice lollies to melt?	What are hurricanes and why do they happen?

 National Curriculum Objectives Identify the part played by evin the water cycle and association with temperatures. Know that some materials will a solution and describe how ta solution. Use knowledge of solids, liqui mixtures could be separated in filtering/sieving and evaporation. 	raporation and condensation ate the rate of evaporation Il dissolve in liquid to form o recover a substance form ds and gases to decide how ncluding through ing.	 Sticky knowledge When two or more substances are mixed and remain present the mixture can be separated. Some changes can be reversed, and some cannot. Materials change state by heating and co 	e oroling. Vocabul Solid, Liquid, Gas Particles, State, Materi Properties, Matter, Mel Freeze, Water, Ice Temperature, Process, Evaporation, Water, V Energy, Precipitation,	lary Key ials It Spencer Condensation 'apour Collection
Prior Learni	ing k	Key Questions (s):	Year 5 Learnii	ng (Next Stage of Study)
 Prior Learning. In KS1 children should: Distinguish between an object and the material from which it is made. Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. Describe the simple physical properties of variety of everyday materials. Compare and group together a variety of everyday materials based on their simple physical properties. Identify and compare the suitability of a variety everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. 		 What are mixtures? What does dissolve mean? Which of the following dissolve in water: sugar, bicarbonate of soda, oil, chocolate coffees, dark vinegar and wax? How does the amount of water used affer how much sugar will dissolve in it? Which sweets dissolve in water? How can we separate mixtures? How can we clean our dirty water? 	 tures? isolve mean? following dissolve in water: mate of soda, oil, chocolate, inegar and wax? amount of water used affect gar will dissolve in it? dissolve in water? clean our dirty water? In Year 5 children will: Compare and group together materials based on their prop. their hardness, solubility, tranconductivity, and response to Give reasons based on eviden comparative and fair tests, for everyday materials including plastic. Demonstrate that dissolving r changes of state are reversible Explain that some changes re formation of new materials a change is usually not reversit changes associated with burr of acid on bicarbonate of sod 	
	Т	eaching Ideas (Working Scientifically)		
Comparative tests	Identify & classify	Observation over time Pa	uttern Seeking	Research
How does the temperature of tea affect how long it takes a sugar cube to dissolve?	Can you group these materials based on whether they are transparent or not?	How does a container of saltwater Do change over time?	r all stretchy materials stretch the same way?	What are microplastics and why are they harming the planet?

Year 5-Materials (Mixtures & Separation)

Year 5-Materials (Changes)

 National Curriculum Objectives Compare and group together evaluated on their properties included solubility, transparency, conduct thermal) and response to magn Comparative and fair tests, for imaterials including wood, meta Demonstrate that dissolving, mistate are reversible changes. Explain that some changes result new materials and this kind of reversible including changes asses and the action of acid on bicart 	eryday materials ing their hardness, tivity (electrical and ets. the uses of everyday ls and plastics. ixing and changes of lt in the formation of change is usually not sociated with burning ponate of soda.	St • All • So rec • He ch • In arr dif • If ba an (in	ticky knowledge I matters have mass. metimes mixed substances act to make a new substance. eating can sometimes cause materials to ange permanently. dicators that something new has made e: The properties of the material are fferent. it is not possible to get the material uck easily it is likely that it is not there aymore and something new has made reversible change).	Vocabulary Hardness, Solubility, Transparency Magnetic, Filter, Evaporation Dissolving, Mixing, Material, Cond Dissolve, Insoluble, Suspension, Cl Physical, Irreversible, Solution Reversable, Separate, Mixture, Insu Transparent, Flexible, Permeable Soluble, Property, Magnetic hard	1, Conductivity, - uctor remical ılator	Key Scientists Spencer Silver (Post- it-notes)
Prior Learning		Key Questions (s):		KS3Learning (Next Stage of Study)		
 In Year 4 children should: Compare and group materials together, according to whether they are solids, liquids or gasses. Observe that some materials change state when heated or cooled, and measure and research the temperature at which this happens in degrees Celsius. Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. 		 Th int su Ad α Ad up 	ie key questions we want children to terrogate is "have we made a new bstance"? Id sugar to fizzy water; it fizzes up. Has new substance been made? Id baking powder to vinegar, it fizzes D. Has a new substance been made?	 In KS3 children will learn: the concept of a purse substance mixtures including dissolving. diffusion in terms of the particle model simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography. the identification of pure substances 		
			Teaching Ideas (Working Scientific	ally)		
Comparative tests	Identify & classify		Observation over time	Pattern Seeking	Research	
Which materials rusts fastest/slowest?	Can you identify and cla these reactions and chan to reversible and irreversi	assify nges in ible?	How does a nail in saltwater change over time?	What patterns can you notice in different reactions?	What are smart help us?	materials and how can they