Science Curriculum Progression Map

Working scientifically

Year group		Key skills and 'sticky' knowledge	Key vocabulary	Links to curriculum drivers VOCABULARY DIVERSITY ASPIRATION HEALTH AND WELL BEING (Including aspirational figures to be studied)
F1		*30-50 Months - Children comment and asks questions about aspects of their familiar world such as the place where they live or the natural world. They can talk about some of the things they have observed such as plants, animals, natural and found objects. They talk about why things happen and how things work. Children are developing an understanding of growth, decay and changes over time. They show care and concern for living things and the environment.* Knowledge *Skills*	Look listen touch smell find see feel, magnifying glass, view, pour fil container, explore, magnet, material, stack, balance, plant, grow, change,	On going throughout the year
	After 1 term in F1	I know that we can use magnifying glasses to observe objects. *I can test out using magnets on different materials.* *I can test out using torches and explore shining the light on different items and materials.*		
	After 2 terms in F1	I know that we can draw what we see. *I can test out using equipment in the sand and water areas and observe the effects of pouring and filling and using different containers.* *I can test out stacking and building with different blocks and explore balancing them on top of each other.* *I can explore the outdoor environment.*		
	By the end of F1	I know that we can listen and talk to others to find out. I know that we can look at pictures in books to find out. *I can observe plants grow and change.* *I an observe animals and talk about what they see.* *I can explore different materials in the sand/water/messy play and talk about how they feel/what happens/how they change.*		
F2		40-60 Months - Children look closely at similarities, differences, patterns and changes. ELG- Children know similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. Knowledge *Skills*	Experiment, equipment, observe, watch, record, magnifying glass, hunt, test out, same, different, look, listen, smell, touch, tools, describe, why	On going throughout the year
	After 1 term in F2	I know that we can ask questions about the world and that we can observe and test things out to find things out and answer our questions. *I know that we can use magnifying glasses to observe objects* *I can test out what happens when a biscuit is put in different materials.*		
	After 2 terms in F2	I know that we can write down, draw and use technology to record what we find. I know that we can ask relevant questions to experts to find out more information and to deepen our knowledge. *Test out ways to melt ice.* *I can explore the outdoor environment, talk about findings and record what has been found out.* *I can test out the effects of physical activity on the body.*		
	By the end of F2	*I can test out materials for building houses and castles.* *I can test out materials in water with the purpose of making a boat.* *I can test out items in water to see if they float or sink.* *I can observe minibeasts growing and transforming and record findings.* *I can plant, observe and help different plants to grow.* *I can go on a minibeast hunt to find out where they are most likely to live.* *I can compare habitats/environments/animals/minibeasts.*		

Year 1	• NC asking simple questions and recognising that they can be answered in different ways • NC observing closely, using simple equipment • NC performing simple tests • NC identifying and classifying • NC using their observations and ideas to suggest answers to questions • NC gathering and recording data to help in answering questions	properties, observe, test, magnifying glass, object, record, equipment, why, find out	On going throughout the year Aspiration: Alexander Bell - invented the telephone- Spring 2
Year 2	• NC asking simple questions and recognising that they can be answered in different ways • NC observing closely, using simple equipment • NC performing simple tests • NC identifying and classifying • NC using their observations and ideas to suggest answers to questions • NC gathering and recording data to help in answering questions	**Continued from Y1** properties, observe, test, magnifying glass, object, record, equipment, measure, check, fair test, predict, thermometer, temperature	On going throughout the year
Year 3	• NC asking relevant questions and using different types of scientific enquiries to answer them • NC setting up simple practical enquiries, comparative and fair tests • NC making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • NC gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • NC recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • NC reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • NC using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • NC identifying differences, similarities or changes related to simple scientific ideas and processes • NC use straightforward scientific evidence to answer questions or to support their findings.	prediction, measurement, enquiry, dependent variable, independent variable, fair test, similar, theory, hypothesis	On going throughout the year
Year 4	• NC asking relevant questions and using different types of scientific enquiries to answer them • NC setting up simple practical enquiries, comparative and fair tests • NC making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • NC gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • NC recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • NC reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • NC using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • NC identifying differences, similarities or changes related to simple scientific ideas and processes • NC use straightforward scientific evidence to answer questions or to support their findings.	<u>Ongoing from Year 3</u> prediction, measurement, enquiry, dependent variable, independent variable, fair test, similar, theory, hypothesis	
Year 5	• NC planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • NC taking measurements, using a range of scientific equipment, with increasing accuracy and precision • NC recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, and bar and line graphs • NC using test results to make predictions to set up further comparative and fair tests • NC reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of results, in oral and written forms such as displays and other presentations • NC identifying scientific evidence that has been used to support or refute ideas or arguments.	Continue from year 3 and 4 and line graph, relationship, , outlier	**Throughout the year**
Year 6	• NC planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • NC taking measurements, using a range of scientific equipment, with increasing accuracy and precision • NC recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, and bar and line graphs • NC using test results to make predictions to set up further comparative and fair tests • NC reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of results, in oral and written forms such as displays and other presentations • NC identifying scientific evidence that has been used to support or refute ideas or arguments. • NC Explore and talk about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically • NC Draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.	line graph, relationship, outlier, prediction, measurement, enquiry, dependent variable, independent variable, fair test, similar, theory, hypothesis	

	• describe and evaluate their own and others' scientific ideas related to topics in the national curriculum (including ideas that have changed over time), using evidence from a range of sources (end KS2 TAF) • ask their own questions about the scientific phenomena that they are studying, and select the most appropriate ways to answer these questions, recognising and controlling variables where necessary (i.e. observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests, and finding things out using a wide range of secondary sources) (end KS2 TAF) • use a range of scientific equipmentto take accurate and precise measurements or readings, with repeat readings where appropriate (end KS2 TAF) • record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs (end KS2 TAF) • draw conclusions, explain and evaluate their methods and findings, communicating these in a variety of ways (end KS2 TAF) • raise further questions that could be investigated, based on their data and observations (end KS2 TAF)		

Biology

Biology 'Big Ideas'

B1: Living things are special collections of matter that make copies of themselves, use energy and grow.
B2: Living things on Earth come in a huge variety of different forms that are all related because they all came from the same starting point 4.5 billion years ago.
B3: The different kinds of life, animals, plants and microorganisms, have evolved over millions of generations into different forms in order to survive in the environments in which they live.

Year group		Key skills and 'sticky' knowledge (including working scientifically)	Key vocabulary	Links to curriculum drivers VOCABULARY DIVERSITY ASPIRATION HEALTH AND WELL BEING (Including aspirational figures to be studied)
F1		30-50 Months - Children comment and asks questions about aspects of their familiar world such as the place where they live or the natural world. They can talk about some of the things they have observed such as plants, animals, natural and found objects. They talk about why things happen and how things work. Children are developing an understanding of growth, decay and changes over time. They show care and concern for living things and the environment. *Skills* *-See Working Scientifically*	Farm, animal, cow, calf, pig, piglet, sheep, lamb, chicken, hen, chick, horse, foal, cat, kitten, dog, puppy, cub, elephant, zebra, giraffe, , tiger, egg, hatch, change, grow, same, different, body, head, shoulders, arms, neck, chest, legs, knees, ankles, feet, toes, fingers, wrist, spider, hamster, gerbil, fish, bird, lizard, rabbit, pears, apple, carrots, banana, peas, tomatoes, cucumber, lettuce, broccoli, cauliflower, cabbage, potato, eggs, flour, milk, meat, cheese, plant, soil, sunlight, water	Health and Well-being Know that we get food - meat, vegetables and dairy from a farm. Know how to look after animals and grow plants. Know about eating healthy and about different occupations for people who can help us Aspiration Visits from local optician, nurse, dentist, ZooLab, Ashfield District Council, visit from Asda community worker
	After 1 term in F1	**Animals including humans** I know some parts of their body and facial features. I know the names of some pets. **Plants** I know some fruits and vegetables.		
	After 2 terms in F1	**Animals including humans** I know that animals and humans grow up and change. I know some similarities and differences between themselves and their friends. **Plants** I know that plants need water.		
	By the end of F1	**Animals including humans** I know the names of some farm animals and their young. I know the names of some wild animals and their young. I know that some animals come from an egg and that animals change as they grow. I know some features of wild animals and talk about them. I know that they don't always like the same things as their friends. **Plants** I know that plants grow and change. I know that some plants grow on farms. I know that we eat some foods that come from a farm.		
F2		40-60 Months - Children look closely at similarities, differences, patterns and changes. ELG- Children know similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. Skills -See Working Scientifically	Bear, claws, paws, brown bear, giant panda, bamboo, polar bear, cold, black bear Goat, farm, kid, bleating, climbing,	Health and Well-being Know about things humans need to be healthy. Know some parts of the body. Know about some people who can help us.

	After 1 term in F2	**Animals including humans** I know about different types of bears, where they live and labelling parts of their body I know which animals live on the farm with a focus on goats. Find out what a goat is like and how you can get goats' milk. I know some nocturnal and diurnal animals. I can make observations of an owl and know some facts about owls and their life cycle and how it changes as it grows. I know about the woodland habitat, some animals that live there and what it looks like, compared to their home. **Plants** I know that some of our food comes from a farm. I know some changes with a tree through the times of the year and specifically what happens during Autumn. I know that plants need water and light to grow-Plant beans and observe them grow. Plant bulbs and care for them in the outdoor area.	mountains, billy goat, nanny goat, leap Plant, beanstalk, soil, water, sunlight, grow, change, bulb, cress, care Farm, harvest, food, grow, fields Nocturnal, diurnal, woodland, habitat, talons, owl, hunt, feathers, beak, life cycle, changes, grows Camouflage Skeleton, blood, heart, breathe, pump, exercise, healthy, fruit, vegetables, water, milk, teeth, bones	Aspiration Visits from Optician, nurse, dentist, ZooLab, Ashfield District Council Inspirational person - Jane Goodall
	After 2 terms in F2	**Animals including humans** I know there are different types of habitats and match some animals to their correct habitat, talking about features of the environment and how some animals camouflage with their environment. I know some animals that live in a hot climate, like the African Savannah or a jungle compared to England and talk about some differences. I know the names of animals from a range of habitats and be able to describe some features of them. I know the names of some parts of the body. I know ways to keep healthy through eating, sleeping, exercising, keeping safe, people who can help us. Know the importance of looking after themselves and how it is some peoples' job to help with this - dentist/optician/nurse/doctor **Plants** I know that plants need water and light to grow-Plant bulbs and care for them in the outdoor area. Plant cress and find out what happens when it isn't looked after. I know some fruits can't grow in England, they only grow in other warmer countries.		
	By the end of F2	**Animals including humans** I know the life cycle of a caterpillar. Observe a caterpillar grow and transform. I know about and name some minibeast and be able to talk about where they live and some features. I know about the ocean environment and some animals that live there and why and how they camouflage or have other features. **Plants** I know about the purpose of the parts of a plant and label the parts of a plant - root/stem/leaf/flower/petal. I know that plants need water and light to grow- Plant sunflower seeds and help it to grow. I know that human activity can impact on the environment negatively and ways that they can help to care for the environment.		
Year 1		**Animals including humans** BIG IDEAS - B2 and B3 • NC identify and name a variety of common animals including, fish, amphibians, reptiles, birds and mammals • NC describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) **Describe and compare the observable features of animals from a range of groups (end KS1 TAF)** Know that a trout is an example of fish, a frog is an example of an amphibian; a lizard is an example of a reptile; a robin is an example of a bird; a rabbit, a tiger, a meerkat and a human are examples of a mammal. Know that fish are different in having gills so that they can breathe underwater **and** scaly skin Know that amphibians are different in that they begin their lives with gills but then develop lungs and breath on land Know that reptiles are different in that they breath air **and** have scaly skin Know that birds are different to other animals in that they have feathers and wings Know that mammals are different to other animals in that they have fur/hair **and** they feed milk to their young WS Know that we can use magnifying glasses to observe objects - animals, plants and trees • NC identify and name a variety of common animals that are carnivores, herbivores and omnivores **Know, group and classify animals by what they eat (carnivore, herbivore and omnivore) (end KS1 TAF)** **Ask questions such as: Why do some animals eat meat and others do not?** Know that herbivorous animals eat plants; a carnivorous animal eats other animals; omnivorous animals eat both animals a plants	Senses (touch, see, taste, hear, smell), growth, habitat, fish, amphibian, reptile, bird, mammal, offspring, carnivore, herbivore, omnivore, vertebrate, skeleton, torso, ears, nose, mouth, hands, feet, head, skull, tongue	Autumn 1 and Autumn 2 HEALTH & WELL- BEING Know the parts of the body and discuss taking care of them Developing a positive self-image Comparing what is the same and celebrating what is unique about us and our bodies. Explore the sense of taste - Create healthy fruit salad for The Tiger who Came to Tea. Walk to ASDA to collect fruit. ASDA staff member to visit school and talk about healthy eating.

	Know that a tiger is an example of a carnivore; that a rabbit is an example of a herbivore; know that many humans are examples of omnivores (though not vegetarians) • NC identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. **Know and locate parts of the human body that can be seen, including those related to the senses (end KS1 TAF)** Know that feet, legs, arms, hands, head, skin, ears, eyes, nose, mouth, skull, torso and tongue are part so the body and identify them WS Set up a test to see eg If you've got big hands, have you got big feet? **WS Know that we can use measures (YI appropriate) to help us investigate.** Know the five senses are touch, smell hear, see, taste Know which body part is associated with each sense eg that eyes are associated with sight, ears with sound, nose with smell, tongue with taste and skin with touch. **Plants** BIG IDEAS: B2 • NC identify and name a variety of common wild and garden plants, including deciduous and evergreen trees **WS Ask questions such as: Why are flowers different colours?** **Know and name a variety of common wild and garden plants** Know a rose bush, a sunflower and a dandelion by sight Know an oak tree, a silver birch tree, a willow and a horse chestnut tree by sight Know that evergreen trees maintain their leaves throughout the year and that deciduous trees shed their leaves in autumn WS Know how to find out eg Do plant's grow bigger if watered with milk, coke or water? WS Explore which will grow fastest: lentils, black beans, pop corn, split peas or chick peas? Know if the test has been successful and say what they have learned WS Know that we can write down numbers and words or draw pictures to record what we find WS Begin to use scientific language • NC identify and describe the basic structure of a variety of common flowering plants, including trees **Know and name the petals, stem, leaves and root of a plant** **Know and name the roots, trunk, branches and leaves of a tree** WS Know that we can use magnifying glasses to observe objects - animals, plants and trees WS Begin to use scientific language	growth, deciduous, evergreen, flower, plant, tree, branch, roots, stem, leaf, trunk,, bulb petal, fruit, seed	African animal experience - meerkats Summer 1 Aspiration/Diversity: Jagadish Chandra Bose proved plants have life 125 years ago. Visit Sutton Lawn to observe and begin to identify plants and trees
Year 2	**Living things and their habitats** BIG IDEAS: B1 B3 • *NC explore and compare the differences between things that are living, dead, and things that have never been alive* **Identify whether things are alive, dead or have never lived (end KS1 TAF)** Know that living things move, grow, consume nutrients and reproduce; that dead things used to do these things, but no longer do; and that things that never lived have never done these things. • *NC 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* **Describe the basic needs of animals for survival (end KS1 TAF)** **Name different plants and animals and describe how they are suited to different habitats (end KS1 TAF)** and how that habitat provides for their basic needs • *NC identify and name a variety of plants and animals in their habitats, including microhabitats* Know that woodland, wetland and grassland are examples of micro-habitats • *NC 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.* **Describe how animals get their food from other animals and /or plants, and use simple food chains to describe these relationships (end KS1 TAF)** Know that simple food chains starts with a plant; that this energy from the plant is consumed by herbivorous animals; and that carnivorous animals eat other animals. Know that this is a food chain. Know that the arrows on a food chain show the direction that the energy travels.	birth, living, once lived, never alive, dead habitat energy, microhabitat, life cycle, food chain, source, producer, consumer environment conditions for life, air, rest, water,	Spring 1 - Why do we love our pets? Summer 1 - Should we really want the rain to go away? Spring 2 - Would you go down to the woods today? ASPIRATION Meet and work with local people who work with animals - Vet- Sarah Hydrotherapist/Physiotherapist- Tina McAdam Spring term Living eggs experience to learn about life cycles

	Animals, including humans BIG IDEAS:B1 and B3 • *NC notice that animals, including humans, have offspring which grow into adults* **Know the main changes as young animals , including humans, grow into adults (end KS1 TAF) and this is called a life cycle** • *NC find out about and describe the basic needs of animals, including humans, for survival (water, food and air)* Know that animals, including humans, need food, water and air to survive • *NC describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.* **Describe the importance of exercise, a balanced diet and hygiene for humans (end KS1 TAF)** Know the basic food groups and sort foods according to ones that we should eat lots of, some we should eat some of and some that we have as a treat. Know that the food we eat gives us energy, helps us to grow and keep us healthy. Know that people need to exercise often to help their body stay strong and fit Know that water is important to keep hydrated Know that keeping clean, including washing and brushing teeth, is an important part of staying healthy **Plants** BIG IDEAS:B1 • *NC observe and describe how seeds and bulbs grow into mature plants* **Know and explain how seeds and bulbs grow into plants** • *NC find out and describe how plants need water, light and a suitable temperature to grow and stay healthy* **Know what plants need in order to grow and stay healthy (water, light & suitable temperature)** Know that seeds and bulbs need to be buried underground in soil and that they will grow into adult plants under the right conditions (water, warmth) Know that plants deprived of light, food, water or air will not grow and will die.	exercise, life cycle, adult,, exercise, young growth, healthy balanced diet, carbohydrate, protein, fat, vitamins bulb, seed, temperature, drought, nutrients, conditions	HEALTH and WELL BEING – caring for pets and the link to exercise and mental well being Summer 2 Why do we like to be beside the sea-side? HEALTH & WELL-BEING Learn the importance of exercise, understand the importance of a balanced diet, explore healthy recipes and design a healthy lunch for MrGrinling, the lighthouse keeper. Summer 1 2 – Should we really want the rain to go away? Spring 2 – Would you go down to the woods today? Autumn 1 – Would plants grow on the moon?
Year 3	**Animals including humans** BIG IDEAS: B1, B2 and B3 • *NC identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat* **Know that animals including humans need the right types and amount of nutrition to keep them healthy.** Know that proteins are good for growth, carbohydrates for energy and fruit and vegetables provide vitamins and minerals which help keep us healthy (e.g. calcium for healthy bones and teeth) Know that getting the right amount of each food group is called a balanced diet (revise from Year 2) Know that lack of a nutrient or excess of a food group can cause ill health, such as tooth decay due to excess sugar • *NC identify that humans and some other animals have skeletons and muscles for support, protection and movement* **Know about the skeletal and muscular system of a human (end KS2 TAF)** Know and group animals that have no skeleton, an internal skeleton (endoskeleton) and an external skeleton (exoskeleton) Know that skeletons provide support for muscles and protect the body Know that human skeletons are made up of bones and cartilage Know that muscles help animals, including humans, to move. **Plants** BIG IDEAS: B1, B2 and B3 • *NC identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers* • *NC investigate the way in which water is transported within plants* • **Know the function of different parts of flowing plants and trees** • **Know how water and nutrients are transported within plants (end KS2 TAF)** Know that the roots collect water and minerals from the soil, and hold the plant firmly in the ground Know that the stem holds up the leaves so that they can gather light to make food and holds up the flowers so that they can receive pollen and disperse their fruits; know that the stem also transports water and minerals from the roots to the other parts of the plant Know that the leaves make food by using energy form the sun • *NC explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant* • **Describe the requirements of plants for life and growth (end KS2 TAF)**	vitamins and , minerals balanced diet, calcium, cartilage, invertebrate, contract, loosen, ribcage, insect, skeleton, muscles, nutrition, protection, protein, carbohydrate, sugars bud, blossom, bulb, seed, pollination, dispersal, germination, reproduction, nutrients, air, soil, fruit, nectar,	Summer 1 What is down the rabbit hole? HEALTH AND WELLBEING Healthy eating and looking after our bodies INSPIRATION Usain Bolt Ellie Simmonds Spring 1 How does our planet look after us? HEALTH AND WELLBEING Planting improves mental wellbeing.

	• *NC explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.* **Know the plant life cycle, especially the importance of flowers**	pollen, stigma, stamen, dispersal,	
Year 4	**Animals, including humans** BIG IDEAS: B3 • *NC describe the simple functions of the basic parts of the digestive system in humans* **Identify and name the parts of the human digestive system (end KS2 TAF)** **Know the functions of the organs in the human digestive system (end KS2 TAF)** Know that the process of digestion begins with food being chewed in the mouth by the teeth and saliva added Know that food is squeezed down the oesophagus towards the stomach Know that the stomach releases acid and enzymes to continue breaking down the food; the stomach is an organ. Know that the small intestine adds more enzymes and then absorbs the nutrients Know that the large intestine absorbs water from the undigested food Know that undigested food is stored in the rectum before being excreted through a muscle called the anus • *NC identify the different types of teeth in humans and their simple function* **Identify and know the different types of human teeth and their functions** Describe what damages teeth and how to look after them. • *NC construct and interpret a variety of food chains, identifying producers, predators and prey.* **Use and construct food chains to identify producers, predators and prey (end KS2 TAF)** Know that a food chain traces the path of energy through a habitat and this can be shown using the direction of arrows. Know that all energy for a food chain initially comes from the Sun which is absorbed and turned into energy by plants which are called producers Know that consumers take in energy by eating Know that an animal that is eaten by another is called prey, and that an animal that eats other animals is called a predator **Living things and their habitats** BIG IDEAS:B2, B3 • *NC recognise that living things can be grouped in a variety of ways* Know that animals can be grouped based on their physical characteristics (e.g. vertebrates and invertebrates) and based on their behaviour (e.g. herbivores, carnivores and omnivores) • *NC explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment* **Use classification keys to identify and group living things** Know that a classification key uses questions to sort and identify different living things Know how to use a classification key to identify living things including vertebrates and invertebrates. • *NC recognise that environments can change and that this can sometimes pose dangers to living things* **Know how changes to an environment could endanger living things (end KS2 TAF)** Describe how environments can change, both positive and negatively, due to human and natural influences and the impact this can have on living things.	digestion, excretion, anus, small intestine, large intestine, stomach, rectum, oesophagus, tongue, saliva, acid, bile, enzymes, incisors, canines, molars, predator, prey, producer, consumer, kingdom, classification key, species,, climate change, characteristics, offspring, vertebrate, invertebrate, extinction, impact, environment	Aspiration- expert input – our local dentist Aspiration/vocabulary/health and wellbeing- visit to Yorkshire Wildlife Park, focus on conservation, protection of animals. Inspirational people Joy and George Adamson – conservationists Diversity Gerald Durrell- naturalist **Tom Lalampaa** One of Africa's greatest conservation pioneers, who long before many other recognised how critical it is to engage local communities in the conservation of the natural heritage.
Year 5	**Animals, including humans** BIG IDEAS: B1 • *NC describe the changes as humans develop to old age.* **Create a timeline to indicate stages of growth in humans** Know that humans go through stages of development; they begin as fertilized eggs and then develop into embryos before developing into babies; once they are born, these newborn babies become infants (roughly 2 months to 2 years) then into young children (roughly 2-12 years old); children develop into adults during adolescence (roughly 12-16 years old) at which age they become physically capable of reproduction; as adults develop into old age (roughly 55+ years old) they experience changes in their body which require them to move more carefully and rest more frequently. Learn about changes experienced in puberty. **Living things and their habitats** BIG IDEAS: B1 • *NC describe the differences in the life cycle of a mammal, an amphibian, an insect and a bird* **Know the life cycle of different living things e.g. mammal, amphibian, insect and bird** **Know the differences between different life cycles** Know that the life cycle of a living thing is a series of stages of development starting with a fertilized egg in animals or a seed in many plants	life span, embryo, womb, weaned, adolescence. puberty Metamorphosis, pupa, larva, chrysalis, fledgling	HEALTH AND WELL BEING Caring for ourselves and our bodies, deepening our understanding of the concept of change and growth. Exploring positive self-image and exploring how change is normal and ok. **Spring** Inspirational people - Maria sibylla merian- entomologist.

	• *NC describe the life process of reproduction in some plants and animals* **Know the process of reproduction in plants** **Know the process of reproduction in animals** **Describe and compare different reproductive processes and life cycles in animals (end KS2 TAF)** Know that in most mammals (e.g. dogs) a fertilized egg develops in the womb into an embryo and is then born and fed on milk before it is weaned onto the food that is adapted to eat; it then develops to maturity in a period called adolescence after which it can reproduce and the cycle can begin again Know that in amphibians (e.g. frogs) a fertilized egg develops into an embryo and then hatches into a tadpole; the tadpole develops adult characteristics, metamorphoses into the adult form after which it can reproduce and the cycle can begin again Know that in many insects (e.g. butterflies) a fertilized egg develops into wingless feeding form called a larva (caterpillar); the larva feeds then later becomes a pupa (chrysalis) with a protective cocoon; inside this cocoon, the pupa metamorphoses into the adult butterfly after which it can reproduce and the cycle can begin again Know that in birds (e.g. robins) a fertilized egg hatches in a nest (a hatchling) and is fed by its parents until it is ready to fly (i.e. becomes a fledgling); it then leaves the nest and grows into an adult after which it can reproduce and the cycle can begin again. Know that in most plants, pollen is produced by a plant which is then carried by an insect or the wind to another flower (pollination);the pollen reaches another flower and travel to the ovary where it fertilises the egg cells to make a seed (fertilisation); the seeds are scattered by animals or the wind(dispersal); some of these will start to grow new plants from the seeds (germination); roots grow under the soil and stem, leaves, flower emerge above the soil. Know that some plants can reproduce themselves by producing bulbs (daffodils/snowdrops) or tubers (potatoes) that sit under the soil and develop into new plants to next year.		Bittu Sahgal- saving tigers to save the world. Earth heroes. Christiane Nusslein Volhard **Ernest Everett Just (1883-1941)** Biologist, academic and science writer. Pioneered cell development, cell splitting and cell fertilisation. NC recommendation - Naturalists and animal behaviourists, for example, David Attenborough and Jane Goodall.
Year 6	**Living things and their habitats** BIG IDEAS: B2 • *NC 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* • *NC give reasons for classifying plants and animals based on specific characteristics.* **Classify living things into broad groups according to observable characteristics and based on similarities and differences (end KS2 TAF)** **Give reasons for classifying plants and animals in a specific way** Should classify animals into commonly found invertebrates (Arachnids, molluscs, insects) and vertebrates (fish, amphibians, birds, reptiles and mammals) Know that there are three types of micro-organism: viruses, fungi and bacteria; of these three, viruses are often not really considered to be alive by many scientists mainly because they don't have the 'machinery' to reproduce inside them Know that germs are disease-causing bacteria **Animals, including humans** BIG IDEAS: B1 • *NC identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood* **Identify and name the main parts of the human circulatory system (end KS2 TAF)** **Know the function of the heart, blood vessels and blood** Know that the heart and lungs are organs protected by the ribcage Know that blood travels around the body transporting nutrients that have been absorbed into the blood stream from digestion; blood also carries oxygen around the body which is used to power the body; this use of oxygen to create energy is called respiration Know that the heart beats, pumping blood around the body and that blood vessels carry the blood; arteries carry blood away from the heart; veins carry blood towards the heart; capillaries are tiny blood vessels that connect arteries and veins Know that the heart is composed of four chambers: two atria and two ventricles; the aorta is the largest artery in the body and most major arteries branch off from it • *NC recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function* **Know the impact of diet, exercise, drugs and lifestyle on health (end KS2 TAF)** Know that when we exercise, our heart beats more frequently so that the oxygen that is used around the body can be replenished; it returns to a resting heart rate afterwards; fitter people tend to have lower resting heart rates Know that drugs are chemicals that have an impact on the natural chemicals in a person's body; know that drugs can be harmful or helpful, depending on what they are and how they are used; know that all drugs can be harmful if overused Know that paracetamol and aspirin are examples of drugs that can be helpful as a painkiller Know that cannabis and cocaine are examples of illegal drugs that can have serious negative effects Know that alcohol and tobacco are examples of drugs that are legal to adults but that can have serious negative effects, such as liver disease and lung disease, respectively	micro-organism, virus, thorax, arthropod, abdomen, arachnid, antenna, jointed limbs artery, aorta, atrium, blood vessels capillary, circulatory system, vein, pulse, ventricle, replenished, resting heart rate Oxygen	Inspirational people - Carl Linnaeus Charles Darwin Alfred Wallace Gregor Mendel **Charles Richard Drew (1904-1950)** American surgeon and medical researcher. Pioneered research into the use and preservation of blood. He used his knowledge to develop blood banks in WW2. HEALTH AND WELL-BEING Study of impact of exercise, drugs, and health lifestyles on both physical and mental well being

	• *NC describe the ways in which nutrients and water are transported within animals, including humans* **Know the ways in which nutrients and water are transported in animals, including humans** **Evolution and inheritance** BIG IDEAS: B3 • *NC recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago* **Know how the Earth and living things have changed over time** **Know how fossils can be used to find out about the past** Know that all life on Earth began from a single point around 4.5 billion years ago Know that living things changes over time and that this gradual change is called evolution Know that the gradual change of species over millions of years can be observed by looking at examples of fossil • *NC recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents* **Know about reproduction and offspring (recognising that offspring normally vary and are not identical to their parents)** Know that offspring vary and are not identical to their parents • *NC identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.* **Know how animals and plants are adapted to suit their environment** **Explain evolution and how this is linked to adaptation over time.** **Provide evidence for evolution (end KS2 TAF)** **Use the basic ideas of inheritance, variation and adaptation to describe how living things have changed over time and evolved (end KS2 TAF)** Know about natural selection and how it works as across a species there is natural variation within a species; there is also competition to survive and reproduce and that members of a species with advantageous characteristics survive and reproduce – these characteristics are passed down to their offspring; members of a species with less advantageous characteristics do not survive and reproduce – these characteristics are **not** passed down to offspring Know that Charles Darwin posited this theory of evolution by natural selection	evolution, natural selection, variation, advantageous	Charles Darwin

Chemistry

C1: All matter (stuff) in the universe is made up of tiny building blocks.
C2: The arrangement, movement and type of the building blocks of matter and the forces that hold them together or push them apart explain all the properties of matter (e.g. hot/cold, soft/hard, light/heavy, etc).
C3: Matter can change if the arrangement of these building blocks changes.

Year group		Key skills and 'sticky' knowledge (including working scientifically)	Key vocabulary	Links to curriculum drivers VOCABULARY DIVERSITY ASPIRATION HEALTH AND WELL BEING (Including aspirational figures to be studied)
F1		30-50 Months - Children comment and asks questions about aspects of their familiar world such as the place where they live or the natural world. They can talk about some of the things they have observed such as plants, animals, natural and found objects. They talk about why things happen and how things work. Children are developing an understanding of growth, decay and changes over time. They show care and concern for living things and the environment. *Skills* -See Working Scientifically	Balance, build, construct, sink, float, bottom, top, change, play, explore,, different, describe, natural, materials, textures	Health and well being Forest schools
	After 1 term in F1	I know the names of some natural objects found in the outdoor area – e.g. pine cones, sticks, bark. I know the names of some materials.		
	After 2	I know that I can balance some blocks together and not others. I know that some objects go to the bottom of the water tray and others do not.		

	terms in F1			
	By the end of F1	I know that some materials can change - playing and exploring with different items in the sand/water/messy play/tuff spot/paint/dough I know that some blocks need to be put in a certain way when building in order to balance them. I know the names of some natural objects found in the outdoor area - e.g. pine cones, sticks, bark and describe these. I know the names of some materials and talk about textures.		
	F2	40-60 Months - Children look closely at similarities, differences, patterns and changes. ELG- Children know similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. *Skills* -See Working Scientifically	Changes, same, different, dissolve, colour, happened, broken, mix, experiment Hard, soft, strong, straw, bricks, sticks, wood, best, experiment, materials Castle Bridge, strong, design, experiment, materials, wood, bricks, hard, soft Plastic, cardboard, paper. Ice, cold, melt, water, salt, hot, warm, break, crack Float, sink, surface Colour, mix, dissolve, change, combine	
	After 1 term in F2	I know that bricks are strong and hard, etc I can explore materials for building houses and comparing straw, sticks and bricks and which are the strongest. Know some of their properties. I know some of the properties of materials. Explore which materials to use when building a bridge and ensuring that a goat can stand on the bridge without it falling down. I know that objects can change over time - observe a gingerbread man biscuit in different substances - water/flour/ air/ baked beans and observing the changes that occur over periods of time.		
	After 2 terms in F2	I know ways to melt ice and that it turns into water and that a larger block of ice will take longer to melt compared to a smaller piece. I know that colours can be mixed together to make new colours and experiment with this with different materials - water/ paint/ dough/ skittles.		
	By the end of F2	I know the properties of materials and their suitability for a particular purpose. I know which items are plastic or cardboard or paper from a range given. I know how to compare some materials and use words to describe them e.g. heavy/light, hard/soft, straight/round. I know the effects that water has on paper, cardboard, plastic and identify the best material for a boat. I know what floating and sinking looks like with some objects and why they float or sink.		
Year 1		**Everyday materials** BIG IDEAS: C1, C2 • NC distinguish between an object and the material from which it is made **Distinguish objects from materials, describe their properties, identify and group every day materials (end KS1 TAF)** **WS Carry out simple comparative tests (end KS1 TAF)** **WS Group and classify things (end KS1 TAF)** Know from observation how to distinguish between materials made of wood, plastic, glass, metal, water, rock Know that an object is made from/of a material and that these are different things • NC identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock **Know the name of the materials an object is made from** • NC describe the simple physical properties of a variety of everyday materials **Know about and describe the properties of everyday materials** Know that materials can be hard, soft, strong, weak, absorbent, heavy, light, solid and runny, smooth and rough; these descriptions denote the properties of a material **WS Begin to use scientific language** • NC compare and group together a variety of everyday materials on the basis of their simple physical properties **WS Set up a test to see which materials keeps things warmest,/coolest/dry etc and know if the test has been successful and can say what has been learned** **WS Explain to someone what has been learned from an investigation they have been involved with and draw conclusions from the answers to the questions asked** **WS Know that we can use measures (YI appropriate) to help us investigate.** WS Know that we can write down numbers and words or draw pictures to record what we find	property, wood, plastic, glass, metal, water, rock man-made, natural, hard, strong, rough, bendy, solid, smooth, light, soft, transparent waterproof	Spring 1 Getting around our town. Summer 2 - Are modern toys better than olden day toys Visit Mansfield Museum toys old and new

Year 2	**Uses of everyday materials** BIG IDEAS: C1, C2 • *NC identify and compare the uses of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses .* **Compare a range of materials and their suitability for different uses (end KS1 TAF)** • *NC Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching* Know how materials can be changed by squashing, bending, twisting and stretching to change their shape Know that many types of plastic are waterproof, that steel (a type of metal) is strong, that rock is hard, that cotton wool is soft, that rubber is flexible, that rock is rigid, that polystyrene (a type of plastic) is light and that iron (a type of metal) is heavy,	Revise Year 1 and … brick, paper, cardboard, movement, suitable, stretch, twist, waterproof, flexible, rigid, absorb, force	Autumnn 2 Does everyone in London live like the Queen? ASPIRATION Inspirational people: Roma Agurwal Structural engineer
Year 3	**Rocks** BIG IDEAS: C1, C2, C3 • *NC compare and group together different kinds of rocks on the basis of their appearance and simple physical properties* **Compare and group rocks based on their appearance and physical properties, giving reasons (end KS2 TAF)** Know that igneous rocks form from molten rock below the Earth's crust (e.g. granite, pumice) Know that sedimentary rock is formed from mud, sand and particles that have been squashed together over time to form rock. (e.g. sandstone, limestone) Know that metamorphic rock is formed when rocks are heated by magma under the earth's crust or squashed by the movement of the earth's tectonic plates. (e.g. slate, marble) • *NC describe in simple terms how fossils are formed when things that have lived are trapped within rock* **Know how fossils are formed (end KS2 TAF)** Know and describe simply how fossils are formed, using words, pictures or a model. • *NC recognise that soils are made from rocks and organic matter.* **Know that soil is made from rocks and organic matter like plants and animals.**	extinction, igneous, metamorphic, sedimentary, archaeologist, weathering, molten rock, crust, grains, crystals, fossils	Mary Anning ASPIRATION Inspirational people: Expert input - archaeologist Dr Ian Heath.
Year 4	**States of matter** BIG IDEAS: C1, C2, C3 • *NC compare and group materials together, according to whether they are solids, liquids or gases* **Describe the characteristics of different states of matter and group materials based on this basis (solid, liquid, gas) (end KS2 TAF)** Know that solids hold their shape; liquids form a pool not a pile; gases escape from an unsealed container • *NC observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)* **Describe how materials change state at different temperatures (end KS2 TAF)** **Use this to explain everyday phenomena, including the water cycle. (end KS2 TAF)** Know that materials can change state when temperature changes Know that when solids turn into liquids, this is called melting and that the reverse process is called freezing Know that when liquids turn into gases, this is called evaporation and that the reverse process is called condensation Know that the melting point of water is 0° C and that the boiling point of water is 100° C • *NC identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.* **Describe the water cycle using words and diagrams and explain the part played by evaporation and condensation.** Know that evaporation and condensation are caused by temperature changes.	condensation, evaporation, reversible, boiling point, melting point, liquid, gas, thermometer, water cycle, absorption, dissolving, energy, evaporation, freezing, matter, melting, particle, temperature, ice, water, solid, degrees celsius.	Diversity- Asian Origin- Deborah Shiu-lan Jin Alfred Nobel- wellbeing- following the invention of dynamite he felt guilt for the damage it could cause, hence setting up the Nobel Peace Prize
Year 5	**Properties and changes of materials** BIG IDEAS:C2, C3 • *NC compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets* • *NC give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic* **Compare and group materials based on their properties (e.g. hardness, solubility, transparency, conductivity, [electrical & thermal], and response to magnets. (end KS2 TAF)** **Justify the use of different everyday materials for different uses, based on their properties. (end KS2 TAF)** Know that materials can be sorted in a variety of ways based on their properties Know that materials' different properties can be tested through acting upon them, including testing to find whether materials are magnetic, thermally conductive and electrically conductive; know that the various properties of different materials make them suitable for a given function Know how to explain orally and in writing the reasons why various materials are suited or unsuited to a function	irreversible, dissolve, soluble, insoluble, solvent, solute, solution, filter, sieve, saturation, evaporating filtering sieving melting disolving	Diversity Inspirational people - Spencer Silver - invented the glue for sticky notes. Ruth Benerito - invented wrinkle-free cotton

	• *NC know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solute* **Know and explain how a material dissolves to form a solution (end KS2 TAF)** **Know and show how to recover a substance from a solution (end KS2 TAF)** Know that some solid materials break down to allow the liquid to absorb the solid; when this happens, the solid is called a solute, the liquid is called a solvent and the result is a solution; when a solid does dissolve in a liquid it is described as being soluble in that solvent (e.g. sugar in water); when it cannot it is insoluble (e.g. sand in water) Know that a given amount of solvent can only absorb a certain amount of solid before no more will dissolve; when this happens the liquid is said to be saturated Know how to dissolve a solute in a solvent and then how to evaporate the solvent to recover the solute • *NC use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating* **Know and demonstrate how some materials can be separated (e.g. through filtering, sieving and evaporating) (end KS2 TAF)** Know that filtering allows solids and liquids to be separated and that sieving allows solids made up of different sizes parts to be separated Know how to separate a mixture of sand, salt and small stones by sieving (to remove the small stones), followed by dissolving in water (so the salt is absorbed), followed by filtering to remove the sand from the mixture, followed finally by evaporation of the water to recover the salt. • *NC demonstrate that dissolving, mixing and changes of state are reversible changes* • *NC explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.* **Know and demonstrate that some changes are reversible and some are not (end KS2 TAF)** Know that a reversible change is one that can be reversed and that examples of this are mixing, dissolving and changes of state where no chemical reaction takes place Know that an irreversible change is one that cannot be reversed and that examples of this often involve a chemical change where a new material is made, often a gas (e.g. burning, boiling an egg, the reaction of bicarbonate of soda and acid)		
Year 6			

Physics

P1: The universe follows unbreakable rules that are all about forces, matter and energy.
P2: Forces are different kinds of pushes and pulls that act on all the matter that is in the universe. Matter is all the stuff, or mass, in the universe.
P3: Energy, which cannot be created or destroyed, comes in many different forms and tends to move away from objects that have lots of it.

Year group		Key skills and 'sticky' knowledge (including working scientifically)	Key vocabulary	Links to curriculum drivers VOCABULARY DIVERSITY ASPIRATION HEALTH AND WELL BEING (Including aspirational figures to be studied)
F1		30-50 Months - Children comment and asks questions about aspects of their familiar world such as the place where they live or the natural world. They can talk about some of the things they have observed such as plants, animals, natural and found objects. They talk about why things happen and how things work. Children are developing an understanding of growth, decay and changes over time. They show care and concern for living things and the environment. *Skills* -See Working Scientifically	Explore, shine, torch, light, dark, magnet, stick, electric, switch, turn, on, off, battery, flat, charge, safe	Health and well being Using equipment safely and correctly
	After 1 term in F1	I can explore shining torches on different items.		
	After 2 terms in F1	I know that some electrical equipment has a switch to turn it on and off. I know the need for safety when using equipment and that some things they should not touch.		

	By the end of F1	I know that some items will stick to a magnet and others will not. I know that some electrical equipment requires batteries to work and might need charging up.		
F2		40-60 Months – Children look closely at similarities, differences, patterns and changes. ELG- Children know similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. *Skills* -See Working Scientifically	Light, dark, material, magnetic, magnet, test, ramp, battery, electricity, power, movement, ramp, height, safe	Aspiration Steven Hawking
	After 1 term in F2	I know that the sun is light. I can explore shining light on objects to see shadows. I know that light shining through objects can change in colour from what they are shining it through. I know that some equipment and batteries need to be charged to give them power to work.		
	After 2 terms in F2	I know that batteries or electricity are needed to power some things and how to turn some electrical equipment and toys on and off. I know the need for safety when using equipment and that some things they should not touch. I know that the shape of an object can affect its movement e.g. round objects can roll.		
	By the end of F2	I know that some materials are magnetic and this can be tested out with a magnet. I know that the height of a ramp effects how far an item travels down it.		
Year 1				
Year 2				
Year 3		**Light** BIG IDEAS: P1, P3 • *NC recognise that they need light in order to see things and that dark is the absence of light* • *NC notice that light is reflected from surface* **Know that dark is the absence of light and that we need light to be able to see.** Know that light is reflected when it travels from a light source and then 'bounces' off an object/surface Know that the Sun is a light source, but that the Moon is not and is merely reflecting light from the Sun Know that many light sources give off light and heat • *NC recognise that light from the Sun can be dangerous and that there are ways to protect their eyes* **Know and explain why light from the sun can be dangerous to vision and the skin.** • *NC recognise that shadows are formed when the light from a light source is blocked by a solid object* **Know and demonstrate how a shadow is formed (end KS2 TAF)** Know and explain using words or diagrams how shadows are formed when a light source is blocked by an opaque object. • *NC find patterns in the way that the size of shadows change.* **Explain how a shadow changes size. (end KS2 TAF)** Know that as objects move towards a light source, the size of the shadow increases **Forces and magnets** BIG IDEAS:P2 • *NC compare how things move on different surfaces* **Know about and describe how objects move on different surfaces** Know that objects move differently on rough and smooth surfaces; objects resist movement more on rough surfaces because there is higher friction as the object moves Know that a force can be thought of as a push or a pull • *NC notice that some forces need contact between 2 objects, but magnetic forces can act at a distance* **Know how some forces require contact and some do not, giving examples** **Describe the effects of simple forces that act at a distance (magnetic forces, including those between like and unlike magnetic poles) (end KS2 TAF)** Know that magnetism is an example of a non-contact force	mirror, image, beam, solid, opaque, transparent, object, source, opaque, transparent, translucent, reflection, dark, light source, shadow, solid, straight, natural, artificial, travels, shortest, longest, highest, lowest, shape, change, block	Autumn 1 Should we be afraid of the dark? Aspiration Inspirational people: Thomas Edison Autumn 1 and 2.

	• *NC describe magnets as having 2 poles* • *NC observe how magnets attract or repel each other and attract some materials and not others* **Know about and explain how magnets attract and repel** Know that magnets have two poles called north and south Know that like poles (south-south and north-north) of two magnets repel each other and that opposite poles of two magnets (north-south) attract each other Know that some materials are magnetic, meaning that they are attracted to a magnet, while other materials are non-magnetic • *NC predict whether 2 magnets will attract or repel each other, depending on which poles are facing.* **Predict whether magnets will attract or repel and give a reason** • *NC 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*	metal, material, surface, friction, force magnetic, non-magnetic, pole, north, south, forces, repel, attract, magnets	
Year 4	**Sound** BIG IDEAS: P1, P3 • *NC identify how sounds are made, associating some of them with something vibrating* **Know how sound is made, associating some of them with vibrating (end KS2 TAF)** Know that sound is generated when an object vibrates. • *NC recognise that vibrations from sounds travel through a medium to the ear* **Know that sound needs a medium to travel through to explain how sounds are heard. (end KS2 TAF)** Know that sound travels through a medium (e.g. particles in the air) Know that sound travels at different speeds through different objects; • *NC find patterns between the pitch of a sound and features of the object that produced it* **Describe the relationship between the pitch of a sound and the features of its source. (end KS2 TAF)** Know that pitch is how high or low a sound is and that this is determined by the speed of vibrations. • *NC find patterns between the volume of a sound and the strength of the vibrations that produced it.* **Know the correlation between the volume of a sound and the strength of the vibrations that produced it (end KS2 TAF)** Know that volume is how loud or quiet a sound is and that this is determined by the amount of energy in the wave (e.g. from how hard or soft a percussion instrument is hit) • *NC recognise that sounds get fainter as the distance from the sound source increases* **Describe the relationship between the strength of the vibrations and the distance from its source. (end KS2 TAF)** Know that the volume of a sound is quieter if the listener is further away from the object **Electricity** BIG IDEAS: P1, P3, C2 • *NC identify common appliances that run on electricity* **Identify and name appliances that require electricity to function** • *NC construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers* **Identify, name , construct and record a series circuit (including cells, wires, bulbs, switches and buzzers)** Know that electrical current can flow if there is a complete circuit Know that wires – which contain a conductor inside them, usually made of metal – can allow electrical current to flow around a circuit Know that when electrical current flows through circuit components within that circuit – such as buzzers which make a noise and bulbs which emit light – begin to work Know how to record a circuit using pictorial representations. • *NC identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery* • *NC recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit* **Predict and test whether a lamp will light within a circuit** Know that a switch functions by completing or breaking a complete circuit	Wave vibration, percussion instrument, wind instrument, string instrument, volume, pitch component, conductor, insulator, current, property, material circuit, appliance battery, cell, bulb, buzzer, switch, wire,	Inspirational people - **Evelyn Glennie (1965-present),** percussionist **William Kamkwamba (1987 – present)** Malawian inventor and author who built a wind turbine to power multiple electrical devices usign materials colected from sum treet, bicycle parts ad scrap yards. Since invented solar powered water pump. See book and film 'The Boy Who Harnessed The Wind.' **Nikola Tesla** **Ada Lovelace** (local scientist)

	• *NC recognise some common conductors and insulators, and associate metals with being good conductors* **Know the difference between a conductor and an insulator; giving examples of each** Know that electrical current flows well through some materials, called electrical conductors, and poorly through other materials, called electrical insulators Know that electrical conductivity (how well a material conducts electricity) is an example of a property Know that metals are good electrical conductors Know that insulators are important for safety reasons when working with electricity.		
Year 5	**Forces** BIG IDEAS:PI, P2 • *NC explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object* **Know what gravity is, describe its effects and its impact on our lives (end KS2 TAF)** Know that a force is measured in a unit called Newtons, named after a British scientist called Sir Isaac Newton who discovered lots about gravity and how planets move Know that pull forces can be measured using a device called a force meter Know that the amount of matter (stuff) in an object is its mass Know that gravity is a force that acts between all objects in the universe, but that it acts much more strongly between objects that have more mass and that are close together Know that unsupported objects are pulled towards the Earth by the force of gravity • *NC identify the effects of air resistance, water resistance and friction, that act between moving surface* **Identify and know the effect of air and water resistance (end KS2 TAF)** **Identify and know the effect of friction (end KS2 TAF)** Know that air resistance is a force felt by an object as it moves through the air Begin to understand that it is caused by the object bumping into the gas particles that make up air; the quicker an object moves, the more gas particles it bumps into and the more air resistance it experiences Know that a parachute's shape increases the air resistance that a falling object experiences, giving it a much lower terminal velocity Know that water resistance is a force felt by an object as it moves through water; it is caused by the object bumping into the water particles Know that the shape of an object determines how much air resistance or water resistance it experiences; shapes of object that experience little air resistance or water resistance are described as streamlined Know how to draw a force diagram with arrows representing the different forces acting on an object • *NC recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect* **Explain how levers, pulleys and gears allow a smaller force to have a greater effect (end KS2 TAF)** Know that gears, levers and pulleys are simple machines that used to allow a smaller force to have a greater effect; they do this by moving a smaller force over a longer distance at one end of the machine, which the machine turns into a larger forcer over a small distance at the other end.	energy, matter, particle, surface, friction, force, , rotation, acceleration, air resistance, effort, force meter, gravity, load, mass, rigid, streamlined, water resistance, air resistance, levers, pulleys, friction	Isaac Newton. Galileo Galilei **Summer**
Year 6	**Light** BIG IDEAS:PI, P3 • *NC recognise that light appears to travel in straight lines* **Know that light from light sources, or reflected light, travels in straight lines (end KS2 TAF)** Know that when light passes from one medium to another (e.g. from air to water), it changes direction; this is called refraction; this happens because light travels at different speeds in different media. Know that when light reflects off an object, the angle of incidence is equal to the angle of reflection • *NC 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* **Know that light from light sources, or reflected light, travels in straight lines and enters our eyes to explain how we see objects (end KS2 TAF)** Know that translucent objects allow some light to pass through, but some of the light changes direction as it passes through the object; this means that an something seen through a translucent object is not clearly defined Know that white light comprises all the colours of light Know that white light refracted by two surfaces in a prism will spread out so that all of its constituent colours can be seen; this array of colours is called a spectrum; it happens because the different colours of that constitute white light travel at different speeds. • *NC explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes*	absorption, energy, property, reflection, wave, mirror, incident ray, image, beam, photons, solid, opaque, transparent, object, source, angle of incidence, angle of reflection, refraction, spectrum, translucent, medium, periscope	Inspirational person - James Clerk Maxwell (Electricity) **Patricia Bath (1942-2019)** Pioneered laser cataract eye surgery **Lewis Latimer (1848 - 1928)** Inventor of the carbon filament lightbulb. The invention helped to make the lightbulb affordable and practical for the average household.

	Know how simple optical instruments work e.g. periscope, telescope, binoculars, mirror, magnifying glass etc. Know that a periscope takes advantage of the predictable angles of incidence and reflection to allow an image to be shown to a viewer (working scientifically to design and make a periscope) • *NC use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them* **Know why shadows have the same shape as the object that casts them** Know how to draw a diagram to show why the shape of a shadow will match the shape of an object **Electricity** BIG IDEAS: P1, P3 **Use simple apparatus to construct and control a series circuit. (end KS2 TAF)** • *NC associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit* **Know how the number and voltage of cells in a circuit links to the brightness of a lamp or the volume of a buzzer (end KS2 TAF)** Know that voltage is a measure of the power of a cell to produce electricity; it is a measure of the 'push' of electric current, **not** the size of the electric current Know that as the number and voltage of cells in a circuit increases, the brightness of a bulb or the volume of a buzzer will increase (though too high a voltage may 'blow' the bulb or buzzer) • *NC compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches* **Compare and give reasons for why components work and do not work in a circuit (end KS2 TAF)** Know how to predict whether components will function in a given circuit, depending on whether or not the circuit is complete; whether or not a switch is in an on or off position; and whether or not there is a cell to provide electrical current to the circuit Know that two bulbs in a circuit can be wired up to create a series circuit; if one bulb blows in a series circuit the other will not shine as the circuit has been broken • *NC use recognised symbols when representing a simple circuit in a diagram.* **Draw circuit diagrams using correct symbols (end KS2 TAF)** Know how to draw simple circuit diagrams including using the scientific symbols Know the recognized symbols for a battery, bulb, motor, buzzer and wire	circuit, component, conductor, energy, insulator, charge, electron, battery, cell, bulb, buzzer, switch, wire, current electricity, static electricity, negative terminal, positive terminal, voltage, resistance	

Earth science

E1: The Earth is one of eight planets that orbit the sun.
E2: The Earth is tilted and spins on its axis leading to day and night, the seasons and the climate.
E3: The Earth is made up of several layers, including a relatively thin rocky surface which is divided into tectonic plates, and the movement of these plates leads to many geologic events (such as earthquakes and volcanoes) and geographical features (such as mountains.)

Year group		Key skills and 'sticky' knowledge (including working scientifically)	Key vocabulary	Links to curriculum drivers VOCABULARY DIVERSITY ASPIRATION HEALTH AND WELL BEING (Including aspirational figures to be studied)
F1		30-50 Months - Children comment and asks questions about aspects of their familiar world such as the place where they live or the natural world. They can talk about some of the things they have observed such as plants, animals, natural and found objects. They talk about why things happen and how things work. Children are developing an understanding of growth, decay and changes over time. They show care and concern for living things and the environment. *Skills* -See Working Scientifically	Stars, moon, planetarium, sun, planets, identify, weather, sunny, hot, cold, ice, raining, snowing, hail, frost, farms, fields, woods, jungle, safari, seaside, beach, town, houses	Planetarium visit
	After 1 term in F1	I know that they can see stars and the moon in the night sky.		

	After 2 terms in F1	I know and identify some basic types of weather.		
	By the end of F1	I know some different geographical features of the environment – farms/fields/woods/jungle/safari/seaside/beach/town/houses		
F2		40-60 Months – Children look closely at similarities, differences, patterns and changes. ELG- Children know similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. *Skills* -See Working Scientifically	Sun, light, space, planet, moon, star, rocket, travel, Earth, sphere, season, Spring, Summer, Autumn, Winter, changes	Aspiration Inspirational person – Steven Hawking, Planetarium visit
	After 1 term in F2	I know that the sun is light. I know that they live on Earth and it is sphere shaped. I know that they can see stars and the moon in the night sky. I know there are four seasons and some features of the seasons – focus on the changes with a tree. I know and identify different types of weather.		
	After 2 terms in F2	I know some different geographical features of the environment – mountains/oceans/fields/rivers/woodland		
	By the end of F2			
Year 1		**Seasonal changes** BIG IDEAS:E2 • *NC observe changes across the 4 seasons* • *NC observe and describe weather associated with the seasons and how day length varies.* **Name the seasons and know about the type of weather in each season** **Describe seasonal changes (end KS1 TAF)** Know that days are longer in the summer and shorter in winter Know that weather changes through the year, getting hotter in the summer and colder in the winter Know that the winter is likely to bring ice on the ground when water freezes due to the cold	freezing, melting, , clouds, wind, snow, ice, spring, summer, autumn, winter, temperature, weather, season Winter, Spring, Summer, Autumn	(revisited each term/season) Health and well-being: Relate to how we feel in different temperatures/weathers.
Year 2				
Year 3				
Year 4				
Year 5		**Earth and space** BIG IDEAS: E1, E2 • *NC describe the movement of the Earth, and other planets, relative to the Sun in the solar system* • *NC describe the Sun, Earth and Moon as approximately spherical bodies* **Know about the shapes (using the term spherical) and relevant movements of the Sun, Moon, Earth and other planets in the Solar Systems (end KS2 TAF)** Know that a celestial body is a large object in the universe Know that a star is an exceptionally hot ball of gas, originally made from hydrogen and helium Know that the Sun is a star Know that a planet (e.g Earth) is defined as a spherical celestial body that orbits a star Know it was once thought that everything orbited the Earth, but that scientists like Copernicus and Galileo used telescopes and measurement to show that the Earth orbited the Sun Know that there are eight major planets in our solar system: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune Know that the universe is utterly vast and that our solar system makes up a tiny fraction of the universe Know that all the planets in the solar system orbit the Sun and that the further away they are from the Sun, the longer their orbit	planet, satellite, sphere, solar system, eclipse, star, universe, constellation, axis, celestial body, Moon, rotating, lunar, solar, telescope, rotation	ASPIRATION Inspirational people Women in the race to space and the part they played Hidden figures – diversity link Neil Arstrong, Buzz Aldron. **Katherine Johnson (1918-2020)** – Major contributor to US aeronautics and digital computers. Woked with

	• *NC describe the movement of the Moon relative to the Earth* **Know about and explain the movement of the Moon relative to the Earth** Know that a satellite orbits a planet and that moons are natural satellites Know that the Moon orbits the Earth roughly every 28 days Know that as the Moon orbits the Sun, different parts of it are lit up by the Sun, which is why we see a different shape lit up on the Moon as the lunar cycle progresses Know that humans have sent man-made satellites into orbit that assist with telecommunication • *NC use the idea of the Earth's rotation to explain day and night, and the apparent movement of the Sun across the sky.* **Explain the apparent movement of the sun across the sky in terms of the Earth's rotation and that this results in day and night. (end KS2 TAF)** Know that the Earth spins around an imaginary line through its centre called an axis and that this axis is tilted relative to the Earth's orbit Know that night and day are the result of the Earth rotating on its axis Know that the tilt of the Earth towards and away from the Sun's light as the Earth orbits the Sun leads to the seasons as during winter the light is spread over a wider area Know that a solar eclipse occurs when the Moon is between the Sun and the Earth, casting a shadow on the Earth; a lunar eclipse occurs when the Earth is between the Sun and the Moon, casting a shadow on the Moon		NASA and made a significant impact on the first flight to the moon. **Autumn term.** Ptolemy, Alhazen and Copernicus – understanding how the geocentric model of the solar system gave way to the heliocentric model
Year 6			