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| **Year 1 Theme** | **Working scientifically element** | **Resources** |
| Plants  identify and name a variety of common wild and garden plants, including deciduous  and evergreen trees   identify and describe the basic structure of a variety of common flowering plants,  including trees. | Use the local environment throughout the year to explore and answer  questions about plants growing in their habitat. Observe the  growth of flowers and vegetables that they have planted.  Collect and name common flowers, examples of deciduous  and evergreen trees, Compare & name plant structures leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem).  Work scientifically observing closely, using magnifying glasses, drawing.  Compare and contrast familiar plants; identify  and group them describing how they did  Draw diagrams of different plant parts flowers, fruit, seeds  trees. Keep records (word and photographic) of seasonal plant changes over the year for example the leaves colour change light green, deep green, yellow, orange, red, dead falling off trees. In spring light green buds appearing then opening; compare spring leaf summer leaf autumn leaf of same plant take photographs compare and contrast what they have found out about different plants. |  |
| Animals including humans  identify and name a variety of common animals including fish, amphibians, reptiles,  birds and mammals  identify and name a variety of common animals that are carnivores, herbivores and  omnivores describe and compare the structure of a variety of common animals (fish,  amphibians, reptiles, birds and mammals, including pets)  identify, name, draw and label the basic parts of the human body and say which part  of the body is associated with each sense. Smell nose taste tongue touch skin hear ears see eyes | Use the local environment over year; explore and answer  questions about animals in their habitat. Care of  animals taken from their local environment and the need to return them safely after. Become familiar with the common names of some fish, (supermarket?) amphibians,  reptiles, birds and mammals, including those that are kept as pets. Visit pet shop?  Name compare & measure (non standard) head, neck, arms, elbows, legs, hands, feet, knees, face, ears, eyes, hair, mouth, teeth using mirrors and observation Using their observations to compare and contrast each other and  animals at first hand or through videos and photographs, Guess the animal Describe how they identify and group them; Grouping animals according to what they eat; and using their senses to compare different textures, sounds and smells. |  |
| Everyday materials distinguish between an object and the material from which it is made   identify and name a variety of everyday materials, including wood, plastic, glass,  metal, water, and rock   describe the simple physical properties of a variety of everyday materials   compare and group together a variety of everyday materials on the basis of their  simple physical properties. | Pupils should explore, name, discuss and raise and answer questions about everyday  materials so that they become familiar with the names of materials and properties such  as: hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent. Pupils should explore and experiment with a wide variety of materials, not only those listed in the programme of study, but including for example: brick, paper, fabrics, elastic, foil.  Pupils might work scientifically by: performing simple tests to explore questions,  for example: ‘What is the best material for an umbrella? ...for lining a dog basket?  ...for curtains? ...for a bookshelf? ...for a gymnast’s leotard?’ |  |
| Seasonal changes autumn observe changes  observe and describe weather associated with the seasons and how day length varies. | What time does it go dark October 1st ask mum or dad  Weather temperature in word colour number  Clothing weather animals plants |  |
| Seasonal changes winter | What time does it go dark January 1st ask mum or dad Weather temperature in word colour number weather animals plants  Clothing wooly hats scarves boots thick coats compare and describe materials |  |
| Seasonal changes spring | What time does it go dark April 1st ask mum or dad  Weather temperature in word colour number  Clothing weather animals plants |  |
| Seasonal changes summer | What time does it go dark July 1st ask mum or dad Summer clothes compare & describe materials Need for sunglasses & sun cream  Make tables and charts about the weather; make displays of what happens in the world around them, including how long it stays light for, as the seasons change. Keep previous seasons’ display and view all together at the end of school year. Compare and contrast. weather animals plants |  |

**Year 2**

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| **Theme** | **Working Scientifically element** | **Resources** |
| Living things and their habitats  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 microhabitats   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. | sorting and classifying things according to whether  they are living, dead or were never alive, and recording their findings using charts. They  should describe how they decided where to place things, exploring questions for  example: ‘Is a flame alive? Is a deciduous tree dead in winter?’ and talk about ways of  answering their questions. They could construct a simple food chain that includes  humans (e.g. grass, cow, human). They could describe the conditions in different  habitats and micro-habitats (under log, on stony path, under bushes) and find out how  the conditions affect the number and type(s) of plants and animals that live there. |  |
| Plants  observe and describe how seeds and bulbs grow into mature plants   find out and describe how plants need water, light and a suitable temperature to grow  and stay healthy. | Use the local environment throughout the year to observe how different  plants grow. Pupils should be introduced to the requirements of plants for germination,  growth and survival, as well as to the processes of reproduction and growth in plants.  Note: Seeds and bulbs need water to grow but most do not need light; seeds and bulbs  have a store of food inside them.  Pupils might work scientifically by: observing and recording, with some accuracy, the  growth of a variety of plants as they change over time from a seed or bulb, or observing  similar plants at different stages of growth; setting up a comparative test to show that  plants need light and water to stay healthy. |  |
| Animals including humans notice that animals, including humans, have offspring which grow into adults   find out about and describe the basic needs of animals, including humans, for  survival (water, food and air)   describe the importance for humans of exercise, eating the right amounts of different  types of food, and hygiene. | Plants and animals are able to make another just like themselves life cycles from beginning to growth to adult. The following examples might be used: egg, chick, chicken;  egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep. Calf cow; Puppy dog  Kitten cat; Foal horse; Growing humans baby, toddler, child, teenager, adult.  Work scientifically: observe through video or first-hand observation  and measurement, how different animals, including humans, grow; ask questions  about what things animals need for survival and what humans need to stay healthy; and  suggest ways to find answers to their questions. |  |
| Uses of everyday materials  identify and compare the suitability of a variety of everyday materials, including  wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses   find out how the shapes of solid objects made from some materials can be changed  by squashing, bending, twisting and stretching. | identify and discuss the uses of different everyday materials so that they  become familiar with how some materials are used for more than one thing (metal can  be used for coins, cans, cars and table legs; wood can be used for matches, floors, and  telegraph poles) or different materials are used for the same thing (spoons can be made  from plastic, wood, metal, but not normally from glass).  **comparing** the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits, and in stories, rhymes and songs); observing closely, **identifying and classifying** the uses of different materials, and **recording** their observations. |  |

**Year 3**

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| **Theme** | **Working Scientifically** | **Resources** |
| Plants  identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers   explore the requirements of plants for life and growth (air, light, water, nutrients from  soil, and room to grow) and how they vary from plant to plant   investigate the way in which water is transported within plants   explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. | Pupils should be introduced to the relationship between structure and function: the idea that every part has a job to do. They should explore questions that focus on the role of the roots and stem in nutrition and support, leaves for nutrition and flowers for reproduction.  Pupils might work scientifically by: comparing the effect of different factors on plant  growth, for example, the amount of light, the amount of fertiliser; discovering how seeds are formed by observing the different stages of plant life cycles over a period of time; looking for patterns in the structure of fruits that relate to how the seeds are dispersed. They might observe how water is transported in plants, for example, by putting cut, white carnations into coloured water and observing how water travels up the stem to the flowers. Also celery in food colouring to see “rising tracks” |  |
| Animals including humans  identify that animals, including humans, need the right types and amount of nutrition,  and that they cannot make their own food; they get nutrition from what they eat   identify that humans and some other animals have skeletons and muscles for  support, protection and movement. | Main body parts associated with the skeleton and muscles, finding out  how different parts of the body have special functions. Build a “skeleton” from Knex or similar. See as a framework for support like a tent frame keeps it up. Build a Knex frame/cage to protect a jelly  Identifying and grouping animals with and without skeletons (eg snail slug) and observing and comparing their movement; exploring ideas about what would happen if humans did not have skeletons. They might compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat. They might research different food groups and how they keep us healthy and design meals based on what they find out. |  |
| Rocks  compare and group together different kinds of rocks on the basis of their appearance  and simple physical properties   describe in simple terms how fossils are formed when things that have lived are  trapped within rock  recognise that soils are made from rocks and organic matter. | explore different kinds of rocks and soils, including those in the local environment.  Pupils might work scientifically by: observing rocks, including those used in buildings  and gravestones, and exploring how and why they might have changed over time; using a hand lens or microscope to help them to identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them. Pupils might research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed. Pupils could explore different soils and identify similarities and differences between them and investigate what happens when rocks are rubbed together (hardness scale) or what changes occur when they are in water. They can raise and answer questions about the way soils are formed. Children can make different types of rock from different types of chocolate, in layers = metamorphic; in bubbles= areo |  |
| Light  recognise that they need light in order to see things and that dark is the absence of  light   notice that light is reflected from surfaces   recognise that light from the sun can be dangerous and that there are ways to protect their eyes   recognise that shadows are formed when the light from a light source is blocked by an opaque object   find patterns in the way that the size of shadows change. | Pupils should explore what happens when light reflects off a mirror or other reflective surfaces, including playing mirror games to help them to answer questions about how light behaves. They should think about why it is important to protect their eyes from bright lights. They should look for, and measure, shadows, and find out how they are formed and what might cause the shadows to change.  Pupils might work scientifically by: looking for patterns in what happens to shadows  when the light source moves or the distance between the light source and the object changes. |  |
| Forces & magnets  compare how things move on different surfaces   notice that some forces need contact between two objects, but magnetic forces can  act at a distance   observe how magnets attract or repel each other and attract some materials and not others   compare and group together a variety of everyday materials on the basis of whether  they are attracted to a magnet, and identify some magnetic materials   describe magnets as having two poles   predict whether two magnets will attract or repel each other, depending on which  poles are facing. | observe that magnetic forces can act without direct contact, unlike most  forces, where direct contact is necessary (for example, opening a door, pushing a  swing). They should explore the behaviour and everyday uses of different magnets (for example, bar, ring, button and horseshoe).  Pupils might work scientifically by: comparing how different things move and grouping them; raising questions and carrying out tests to find out how far things move on different surfaces and gathering and recording data to find answers their questions; exploring the strengths of different magnets and finding a fair way to compare them; sorting materials into those that are magnetic and those that are not; looking for patterns in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another; identifying how these properties make magnets useful in everyday items and suggesting creative uses for different magnets eg purse fastener mobile phone clip, picking up dropped staples How many things can they think of in ten minutes challenge. |  |
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| **Year 4Theme** | **Working Scientifically element** | **Resources** |
| Living things and their habitats  recognise that living things can be grouped in a variety of ways   explore and use classification keys to help group, identify and name a variety of living  things in their local and wider environment   recognise that environments can change and that this can sometimes pose dangers  to living things. | use the local environment throughout the year to raise and answer  questions that help them to identify and study plants and animals in their habitat. They should identify how the habitat changes throughout the year. Pupils should explore possible ways of grouping a wide selection of living things that include animals and flowering plants and non-flowering plants. Pupils could begin to put vertebrate animals into groups such as fish, amphibians, reptiles, birds, and mammals; and invertebrates into snails and slugs, worms, spiders, and insects.  Note: Plants can be grouped into categories such as flowering plants (including grasses) and non-flowering plants, such as ferns and mosses. .Pupils should explore examples of human impact (both positive and negative) on environments, for example, the positive effects of nature reserves, ecologically planned parks, or garden ponds, and the negative effects of population and development, litter or deforestation. Pupils might work scientifically by: using and making simple guides or keys to explore and identify local plants and animals; making a guide to local living things; raising and answering questions based on their observations of animals and what they have found out about other animals that they have researched and found in micro habitats in their locality. |  |
| Animals including humans  describe the simple functions of the basic parts of the digestive system in humans   identify the different types of teeth in humans and their simple functions   construct and interpret a variety of food chains, identifying producers, predators and prey. | Work scientifically by: comparing the teeth of carnivores and herbivores,  and suggesting reasons for differences; make out of plasticine the different tooth shapes; finding out what damages teeth and how to look after them. The power of fluoride test on a boiled egg shell; draw and discuss their ideas about the digestive system and compare them with models or images. |  |
| States of matter  compare and group materials together, according to whether they are solids, liquids or gases   observe that some materials change state when they are heated or cooled, and  measure or research the temperature at which this happens in degrees Celsius (°C)   identify the part played by evaporation and condensation in the water cycle and  associate the rate of evaporation with temperature. | Pupils should explore a variety of everyday materials and develop simple descriptions of the states of matter (solids hold their shape; liquids form a pool not a pile; gases escape from an unsealed container). Pupils should observe water as a solid, a liquid and a gas and should note the changes to water when it is heated or cooled. Pupils might work scientifically by: grouping and classifying a variety of different materials; exploring the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party). They could research the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid. They might observe and record evaporation over a period of time, for example, a puddle in the playground or washing on a line, and investigate the effect of temperature on washing drying or snowmen melting. |  |
| Sound  identify how sounds are made, associating some of them with something vibrating   recognise that vibrations from sounds travel through a medium to the ear   find patterns between the pitch of a sound and features of the object that produced it   find patterns between the volume of a sound and the strength of the vibrations that  produced it   recognise that sounds get fainter as the distance from the sound source increases. | find out how the pitch and volume of sounds can be changed in a variety of ways.  Pupils might work scientifically by: finding patterns in the sounds that are made by  different objects such as saucepan lids of different sizes or elastic bands of different  thicknesses. They might make earmuffs from a variety of different materials to  investigate which provides the best insulation against sound. They could make and play their own instruments by using what they have found out about pitch and volume.  Recognise that sounds get fainter as the distance from the sound source increases; use a.sound sensor to investigate how distance increased affects the sound recorded in decibels at every metre with the same sound source. With different sound sources.  Use sound sensor to explore and investigate how the force at which the instrument is played affects the loudness of the sound (the amplitude of the wave increases T info) |  |
| Electricity  identify common appliances that run on electricity   construct a simple series electrical circuit, identifying and naming its basic parts,  including cells, wires, bulbs, switches and buzzers   identify whether or not a lamp will light in a simple series circuit, based on whether or  not the lamp is part of a complete loop with a battery   recognise that a switch opens and closes a circuit and associate this with whether or  not a lamp lights in a simple series circuit   recognise some common conductors and insulators, and associate metals with being good conductors. | construct simple series circuits, trying different components, for example,  bulbs, buzzers and motors, and including switches, and use their circuits to create  simple devices. Pupils should draw the circuit as a pictorial representation  observing patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit. |  |

**Year 5**

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| **Theme** | **Working Scientifically element** | **Resources** |
| Living things and their habitats  describe the differences in the life cycles of a mammal, an amphibian, an insect and  a bird   describe the life process of reproduction in some plants and animals | raise questions about their local environment throughout the year. They should observe life-cycle changes in a variety of living things, for example,  plants in the vegetable garden or flower border, and animals in the local environment. Raise questions about their local environment throughout the  year. They should observe life-cycle changes in a variety of living things, for example, plants in the vegetable garden or flower border, and animals in the local environment. |  |
| Animals including humans  describe the changes as humans develop to old age. | work scientifically by researching the gestation periods of other animals and  comparing them with humans; by finding out and recording the length and mass of a baby as it grows. |  |
| Properties and changes of materials  compare and group together everyday materials on the basis of their properties,  including their hardness, solubility, transparency, conductivity (electrical and  thermal), and response to magnets   know that some materials will dissolve in liquid to form a solution, and describe how  to recover a substance from a solution   use knowledge of solids, liquids and gases to decide how mixtures might be  separated, including through filtering, sieving and evaporating   give reasons, based on evidence from comparative and fair tests, for the particular  uses of everyday materials, including metals, wood and plastic   demonstrate that dissolving, mixing and changes of state are reversible changes   explain that some changes result in the formation of new materials, and that this kind  of change is not usually reversible, including changes associated with burning and  the action of acid on bicarbonate of soda. | carrying out tests to answer questions, for example,  ‘Which materials would be the most effective for making a warm jacket, for wrapping ice cream to stop it melting, or for making blackout curtains?’ They might compare materials in order to make a switch in a circuit. They could observe and compare the changes that take place, for example, when burning different materials or baking bread or cakes. They might research and discuss how chemical changes have an impact on our lives, for example, cooking, and discuss the creative use of new materials such as polymers, super-sticky and super-thin materials. |  |
| Earth & Space  describe the movement of the Earth, and other planets, relative to the Sun in the  solar system   describe the movement of the Moon relative to the Earth   describe the Sun, Earth and Moon as approximately spherical bodies   use the idea of the Earth’s rotation to explain day and night and the apparent  movement of the sun across the sky. | Comparing the time of day at different places on the  Earth through internet links and direct communication; creating simple models of the solar system; constructing simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day; finding out why some people think that structures such as Stonehenge might have been used as astronomical clocks. Secondary sources  planetarium |  |
| Forces  explain that unsupported objects fall towards the Earth because of the force of  gravity acting between the Earth and the falling object   identify the effects of air resistance, water resistance and friction, that act between  moving surfaces   recognise that some mechanisms, including levers, pulleys and gears, allow a  smaller force to have a greater effect. | Pupils should explore falling objects and raise questions about the effects of air  resistance. They should explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall. They should experience forces that make things begin to move, get faster or slow down. Pupils should explore the effects of friction on movement and find out how it slows or stops moving objects, for example, by observing the effects of a brake on a bicycle wheel. Pupils should explore the effects of levers, pulleys and simple machines on movement. Pupils might work scientifically by: exploring falling paper cones or cup-cake cases, and designing and making a variety of parachutes and carrying out fair tests to determine which designs are the most effective. They might explore resistance in water by making and testing boats of different shapes. They might design and make products that use levers, pulleys, gears and/or springs and explore their effects. |  |

**Year 6**

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| **Theme** | **Working Scientifically element** | **Resources** |
| Living things and their habitats  describe how living things are classified into broad groups according to common  observable characteristics and based on similarities and differences, including microorganisms, plants and animals  give reasons for classifying plants and animals based on specific characteristics. | Through direct observations where possible, they should classify animals into commonly found invertebrates (such as insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals). They should discuss reasons why living things are placed in one group and not another.  Use classification systems and keys to identify some  animals and plants in the immediate environment. They could research unfamiliar  animals and plants from a broad range of other habitats and decide where they belong in the classification system. |  |
| Animals including humans  identify and name the main parts of the human circulatory system, and describe the  functions of the heart, blood vessels and blood   recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies  function   describe the ways in which nutrients and water are transported within animals,  including humans. | Explore and answer questions that help them to understand how the circulatory system enables the body to function.  Research in groups evidence about the relationship between diet, exercise, drugs, lifestyle and health and present their findings to class |  |
| Evolution & inheritance  recognise that living things have changed over time and that fossils provide  information about living things that inhabited the Earth millions of years ago   recognise that living things produce offspring of the same kind, but normally offspring  vary and are not identical to their parents   identify how animals and plants are adapted to suit their environment in different  ways and that adaptation may lead to evolution. | Observing similar features in siblings and families observing and raising questions about local animals and how they are adapted to their environment; comparing how some living things are adapted to survive in extreme conditions, for example, cactuses, penguins and camels.  They might analyse the advantages and disadvantages of specific adaptations, such as being on two feet rather than four, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers. Secondary sources |  |
| Light  recognise that light appears to travel in straight lines   use the idea that light travels in straight lines to explain that objects are seen  because they give out or reflect light into the eye   explain that we see things because light travels from light sources to our eyes or  from light sources to objects and then to our eyes   use the idea that light travels in straight lines to explain why shadows have the same  shape as the objects that cast them. | Explore the way that light behaves, including light sources, reflection and shadows. Talk about what happens and make predictions.  Pupils might work scientifically by: designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works. They might investigate the relationship between light sources, objects and shadows by using shadow puppets. They could extend their experience of light by looking a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters (they do not need to explain why these phenomena occur). |  |
| Electricity  associate the brightness of a lamp or the volume of a buzzer with the number and  voltage of cells used in the circuit   compare and give reasons for variations in how components function, including the  brightness of bulbs, the loudness of buzzers and speed of a motor and the on/off position of switches  use recognised symbols when representing a simple circuit in a diagram. | KWL grids elicitation exercises about electricity Electrical safety  Free exploration of simple electrical components Wat can they name and label crocodile clips, buzzers batteries or cells, bulbs (lamps) motors batteries of different shapes, sizes Observe What can you see 1.5, 3 6 9 Volts and voltages) power. Observe + - ends of the battery If the place ++ or - - together circuit won’t work.  How does a switch work why do we use them? How many different types of switches can you find? Mae  With just the equipment out can they light the bulb, move the motor sound the buzzer.  Do crocodile clips work with knots in? Lengths of foil and pencils sharpened at both ends. Conduct electricity and make the circuit work electricity flows  construct simple series circuits, to help them to answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors. They should learn how to represent a simple circuit in a diagram using recognised symbols.  How does the number of batteries (the amount of voltage affect the brightness of the bulb/lamp? Sensor Set up lamps /bulbrs in series (in a row) Observe brightness of the bulbs diminishing successively. Why ? Prove it with quantitative data ie using sensor not just description in words dim dimmer dimmest.  Pupils might work scientifically by: systematically identifying the effect of changing one component at a time in a circuit; designing and making a set of traffic lights, a burglar alarm or some other useful circuit.   1. Increase the voltage (number of batteries) Take care because with voltage increase bulbs will blow 1 battery 2 t3 etc making sure all bulbs/lamps are of same voltage. 2. Aluminium foil lengths 3. Pencils 4. Number of components 5. Speed of motors 6. Loudness of buzzer 7. Extension spin the bow tie on clown/carousel/ferris wheel/colour wheel for colour mixing 8. Looking at heat light and sound appliances and combinations |  |
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| **Theme** | **Working scientifically element** | **Resources** |
| **Plants Year 1**  identify and name a variety of common wild and garden plants, including deciduous  and evergreen trees   identify and describe the basic structure of a variety of common flowering plants,  including trees. | Use the local environment throughout the year to explore and answer  questions about plants growing in their habitat. Observe the  growth of flowers and vegetables that they have planted.  Collect and name common flowers, examples of deciduous  and evergreen trees, Compare & name plant structures leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem).  Work scientifically observing closely, using magnifying glasses, drawing.  Compare and contrast familiar plants; identify  and group them describing how they did  Draw diagrams of different plant parts flowers, fruit, seeds  trees. Keep records (word and photographic) of seasonal plant changes over the year for example the leaves colour change light green, deep green, yellow, orange, red, dead falling off trees. In spring light green buds appearing then opening; compare spring leaf summer leaf autumn leaf of same plant take photographs compare and contrast what they have found out about different plants. |  |
| **Plants Year 2**  observe and describe how seeds and bulbs grow into mature plants   find out and describe how plants need water, light and a suitable temperature to grow  and stay healthy. | Use the local environment throughout the year to observe how different  plants grow. Pupils should be introduced to the requirements of plants for germination,  growth and survival, as well as to the processes of reproduction and growth in plants.  Note: Seeds and bulbs need water to grow but most do not need light; seeds and bulbs  have a store of food inside them.  Pupils might work scientifically by: observing and recording, with some accuracy, the  growth of a variety of plants as they change over time from a seed or bulb, or observing  similar plants at different stages of growth; setting up a comparative test to show that  plants need light and water to stay healthy. |  |
| **Plants Year 3**  identify and describe the functions of different parts of flowering plants: roots,  stem/trunk, leaves and flowers   explore the requirements of plants for life and growth (air, light, water, nutrients from  soil, and room to grow) and how they vary from plant to plant   investigate the way in which water is transported within plants   explore the part that flowers play in the life cycle of flowering plants, including  pollination, seed formation and seed dispersal. | Pupils should be introduced to the relationship between structure and function: the idea that every part has a job to do. They should explore questions that focus on the role of the roots and stem in nutrition and support, leaves for nutrition and flowers for reproduction.  Pupils might work scientifically by: comparing the effect of different factors on plant  growth, for example, the amount of light, the amount of fertiliser; discovering how seeds are formed by observing the different stages of plant life cycles over a period of time; looking for patterns in the structure of fruits that relate to how the seeds are dispersed. They might observe how water is transported in plants, for example, by putting cut, white carnations into coloured water and observing how water travels up the stem to the flowers. Also celery in food colouring to see “rising tracks” |  |
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| **Animals including humans Year 1**  identify and name a variety of common animals including fish, amphibians, reptiles,  birds and mammals  identify and name a variety of common animals that are carnivores, herbivores and  omnivores describe and compare the structure of a variety of common animals (fish,  amphibians, reptiles, birds and mammals, including pets)  identify, name, draw and label the basic parts of the human body and say which part  of the body is associated with each sense. Smell nose taste tongue touch skin hear ears see eyes | Use the local environment over year; explore and answer  questions about animals in their habitat. Care of  animals taken from their local environment and the need to return them safely after. Become familiar with the common names of some fish, (supermarket?) amphibians,  reptiles, birds and mammals, including those that are kept as pets. Visit pet shop?  Name compare & measure (non standard) head, neck, arms, elbows, legs, hands, feet, knees, face, ears, eyes, hair, mouth, teeth using mirrors and observation Using their observations to compare and contrast each other and  animals at first hand or through videos and photographs, Guess the animal Describe how they identify and group them; Grouping animals according to what they eat; and using their senses to compare different textures, sounds and smells. |  |
| **Animals including humans Year 2**  notice that animals, including humans, have offspring which grow into adults   find out about and describe the basic needs of animals, including humans, for  survival (water, food and air)   describe the importance for humans of exercise, eating the right amounts of different  types of food, and hygiene. | Plants and animals are able to make another just like themselves life cycles from beginning to growth to adult. The following examples might be used: egg, chick, chicken;  egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep. Calf cow; Puppy dog  Kitten cat; Foal horse; Growing humans baby, toddler, child, teenager, adult.  Work scientifically: observe through video or first-hand observation  and measurement, how different animals, including humans, grow; ask questions  about what things animals need for survival and what humans need to stay healthy; and  suggest ways to find answers to their questions. |  |
| **Animals including humans Year 3**  identify that animals, including humans, need the right types and amount of nutrition,  and that they cannot make their own food; they get nutrition from what they eat   identify that humans and some other animals have skeletons and muscles for  support, protection and movement. | main body parts associated with the skeleton and muscles, finding out  how different parts of the body have special functions. Build a “skeleton” from Knex or similar. See as a framework for support like a tent frame keeps it up. Build a Knex frame/cage to protect a jelly  Identifying and grouping animals with and without skeletons (eg snail slug) and observing and comparing their movement; exploring ideas about what  would happen if humans did not have skeletons. They might compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat. They might research different food groups and how they keep us healthy and design meals based on what they find out. |  |
| **Animals including humans Year 4**  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. | Work scientifically by: comparing the teeth of carnivores and herbivores,  and suggesting reasons for differences; make out of plasticine the different tooth shapes; finding out what damages teeth and how to look after them. The power of fluoride test on a boiled egg shell; draw and discuss their ideas about the digestive system and compare them with models or images. |  |
| **Animals including humans Year 5**  describe the changes as humans develop to old age. | work scientifically by researching the gestation periods of other animals and  comparing them with humans; by finding out and recording the length and mass of a baby as it grows. |  |
| **Animals including humans Year 6**  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. | Explore and answer questions that help them to understand how the circulatory system enables the body to function.  Research in groups evidence about the relationship between diet, exercise, drugs, lifestyle and health and present their findings to class |  |
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| **Living things and their habitats Year 2**  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 microhabitats   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. | sorting and classifying things according to whether  they are living, dead or were never alive, and recording their findings using charts. They  should describe how they decided where to place things, exploring questions for  example: ‘Is a flame alive? Is a deciduous tree dead in winter?’ and talk about ways of  answering their questions. They could construct a simple food chain that includes  humans (e.g. grass, cow, human). They could describe the conditions in different  habitats and micro-habitats (under log, on stony path, under bushes) and find out how  the conditions affect the number and type(s) of plants and animals that live there. |  |
| Living things and their habitats Year 4  recognise that living things can be grouped in a variety of ways   explore and use classification keys to help group, identify and name a variety of living  things in their local and wider environment   recognise that environments can change and that this can sometimes pose dangers  to living things. | use the local environment throughout the year to raise and answer  questions that help them to identify and study plants and animals in their habitat. They should identify how the habitat changes throughout the year. Pupils should explore possible ways of grouping a wide selection of living things that include animals and flowering plants and non-flowering plants. Pupils could begin to put vertebrate animals  into groups such as fish, amphibians, reptiles, birds, and mammals; and invertebrates into snails and slugs, worms, spiders, and insects.  Note: Plants can be grouped into categories such as flowering plants (including  grasses) and non-flowering plants, such as ferns and mosses.  Pupils should explore examples of human impact (both positive and negative) on  environments, for example, the positive effects of nature reserves, ecologically planned parks, or garden ponds, and the negative effects of population and development, litter or deforestation.  Pupils might work scientifically by: using and making simple guides or keys to explore and identify local plants and animals; making a guide to local living things; raising and answering questions based on their observations of animals and what they have found out about other animals that they have researched. |  |
| Living things and their habitats Year 5  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 | raise questions about their local environment throughout the year. They should observe life-cycle changes in a variety of living things, for example,  plants in the vegetable garden or flower border, and animals in the local environment. Raise questions about their local environment throughout the  year. They should observe life-cycle changes in a variety of living things, for example, plants in the vegetable garden or flower border, and animals in the local environment. |  |
| Living things and their habitats Year 6  describe how living things are classified into broad groups according to common  observable characteristics and based on similarities and differences, including microorganisms, plants and animals  give reasons for classifying plants and animals based on specific characteristics. | Through direct observations where possible, they should classify animals into commonly found invertebrates (such as insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals). They should discuss reasons why living things are placed in one group and not another.  Use classification systems and keys to identify some  animals and plants in the immediate environment. They could research unfamiliar  animals and plants from a broad range of other habitats and decide where they belong in the classification system. |  |
| Year 1 Everyday materials distinguish between an object and the material from which it is made   identify and name a variety of everyday materials, including wood, plastic, glass,  metal, water, and rock   describe the simple physical properties of a variety of everyday materials   compare and group together a variety of everyday materials on the basis of their  simple physical properties. | Pupils should explore, name, discuss and raise and answer questions about everyday  materials so that they become familiar with the names of materials and properties such  as: hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent. Pupils should explore and experiment with a wide variety of materials, not only those listed in the programme of study, but including for example: brick, paper, fabrics, elastic, foil.  Pupils might work scientifically by: performing simple tests to explore questions,  for example: ‘What is the best material for an umbrella? ...for lining a dog basket?  ...for curtains? ...for a bookshelf? ...for a gymnast’s leotard?’ |  |
| Uses of everyday materials  identify and compare the suitability of a variety of everyday materials, including  wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses   find out how the shapes of solid objects made from some materials can be changed  by squashing, bending, twisting and stretching. | identify and discuss the uses of different everyday materials so that they  become familiar with how some materials are used for more than one thing (metal can  be used for coins, cans, cars and table legs; wood can be used for matches, floors, and  telegraph poles) or different materials are used for the same thing (spoons can be made  from plastic, wood, metal, but not normally from glass).  **comparing** the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits, and in stories, rhymes and songs); observing closely, **identifying and classifying** the uses of different materials, and **recording** their observations. |  |
| Rocks  compare and group together different kinds of rocks on the basis of their appearance  and simple physical properties   describe in simple terms how fossils are formed when things that have lived are  trapped within rock  recognise that soils are made from rocks and organic matter. | explore different kinds of rocks and soils, including those in the local environment.  Pupils might work scientifically by: observing rocks, including those used in buildings  and gravestones, and exploring how and why they might have changed over time; using a hand lens or microscope to help them to identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them. Pupils might research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed. Pupils could explore different soils and identify similarities and differences between them and investigate what happens when rocks are rubbed together (hardness scale) or what changes occur when they are in water. They can raise and answer questions about the way soils are formed. |  |
| States of matter  compare and group materials together, according to whether they are solids, liquids or gases   observe that some materials change state when they are heated or cooled, and  measure or research the temperature at which this happens in degrees Celsius (°C)   identify the part played by evaporation and condensation in the water cycle and  associate the rate of evaporation with temperature. | Pupils should explore a variety of everyday materials and develop simple descriptions of the states of matter (solids hold their shape; liquids form a pool not a pile; gases escape from an unsealed container). Pupils should observe water as a solid, a liquid and a gas and should note the changes to water when it is heated or cooled. Pupils might work scientifically by: grouping and classifying a variety of different materials; exploring the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party). They could research the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid. They might observe and record evaporation over a period of time, for example, a puddle in the playground or washing on a line, and investigate the effect of temperature on washing drying or snowmen melting. |  |
| Properties and changes of materials  compare and group together everyday materials on the basis of their properties,  including their hardness, solubility, transparency, conductivity (electrical and  thermal), and response to magnets   know that some materials will dissolve in liquid to form a solution, and describe how  to recover a substance from a solution   use knowledge of solids, liquids and gases to decide how mixtures might be  separated, including through filtering, sieving and evaporating   give reasons, based on evidence from comparative and fair tests, for the particular  uses of everyday materials, including metals, wood and plastic   demonstrate that dissolving, mixing and changes of state are reversible changes   explain that some changes result in the formation of new materials, and that this kind  of change is not usually reversible, including changes associated with burning and  the action of acid on bicarbonate of soda. | carrying out tests to answer questions, for example,  ‘Which materials would be the most effective for making a warm jacket, for wrapping ice cream to stop it melting, or for making blackout curtains?’ They might compare materials in order to make a switch in a circuit. They could observe and compare the changes that take place, for example, when burning different materials or baking bread or cakes. They might research and discuss how chemical changes have an impact on our lives, for example, cooking, and discuss the creative use of new materials such as polymers, super-sticky and super-thin materials. |  |
| Light Year 3  recognise that they need light in order to see things and that dark is the absence of  light   notice that light is reflected from surfaces   recognise that light from the sun can be dangerous and that there are ways to protect  their eyes   recognise that shadows are formed when the light from a light source is blocked by  an opaque object   find patterns in the way that the size of shadows change. | Pupils should explore what happens when light reflects off a mirror or other reflective surfaces, including playing mirror games to help them to answer questions about how light behaves. They should think about why it is important to protect their eyes from bright lights. They should look for, and measure, shadows, and find out how they are formed and what might cause the shadows to change.  Pupils might work scientifically by: looking for patterns in what happens to shadows  when the light source moves or the distance between the light source and the object changes. |  |
| Light Year 6  recognise that light appears to travel in straight lines   use the idea that light travels in straight lines to explain that objects are seen  because they give out or reflect light into the eye   explain that we see things because light travels from light sources to our eyes or  from light sources to objects and then to our eyes   use the idea that light travels in straight lines to explain why shadows have the same  shape as the objects that cast them. | Explore the way that light behaves, including light sources, reflection and shadows. Talk about what happens and make predictions.  Pupils might work scientifically by: designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works. They might investigate the relationship between light sources, objects and shadows by using shadow puppets. They could extend their experience of light by looking a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters (they do not need to explain why these phenomena occur). |  |
| Forces & magnets Year 3  compare how things move on different surfaces   notice that some forces need contact between two objects, but magnetic forces can  act at a distance   observe how magnets attract or repel each other and attract some materials and not  others   compare and group together a variety of everyday materials on the basis of whether  they are attracted to a magnet, and identify some magnetic materials   describe magnets as having two poles   predict whether two magnets will attract or repel each other, depending on which  poles are facing. | observe that magnetic forces can act without direct contact, unlike most  forces, where direct contact is necessary (for example, opening a door, pushing a  swing). They should explore the behaviour and everyday uses of different magnets (for example, bar, ring, button and horseshoe).  Pupils might work scientifically by: comparing how different things move and grouping them; raising questions and carrying out tests to find out how far things move on different surfaces and gathering and recording data to find answers their questions; exploring the strengths of different magnets and finding a fair way to compare them; sorting materials into those that are magnetic and those that are not; looking for patterns in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another; identifying how these properties make magnets useful in everyday items and suggesting creative uses for different magnets eg purse fastener mobile phone clip, picking up dropped staples How many things can they think of in ten minutes challenge. |  |
| Forces Year 5  explain that unsupported objects fall towards the Earth because of the force of  gravity acting between the Earth and the falling object   identify the effects of air resistance, water resistance and friction, that act between  moving surfaces   recognise that some mechanisms, including levers, pulleys and gears, allow a  smaller force to have a greater effect. | Pupils should explore falling objects and raise questions about the effects of air  resistance. They should explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall. They should experience forces that make things begin to move, get faster or slow down. Pupils should explore the effects of friction on movement and find out how it slows or stops moving objects, for example, by observing the effects of a brake on a bicycle wheel. Pupils should explore the effects of levers, pulleys and simple machines on movement. Pupils might work scientifically by: exploring falling paper cones or cup-cake cases, and designing and making a variety of parachutes and carrying out fair tests to determine which designs are the most effective. They might explore resistance in water by making and testing boats of different shapes. They might design and make products that use levers, pulleys, gears and/or springs and explore their effects. |  |
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| Sound  identify how sounds are made, associating some of them with something vibrating   recognise that vibrations from sounds travel through a medium to the ear   find patterns between the pitch of a sound and features of the object that produced it   find patterns between the volume of a sound and the strength of the vibrations that  produced it   recognise that sounds get fainter as the distance from the sound source increases. | find out how the pitch and volume of sounds can be changed in a variety of ways.  Pupils might work scientifically by: finding patterns in the sounds that are made by  different objects such as saucepan lids of different sizes or elastic bands of different  thicknesses. They might make earmuffs from a variety of different materials to  investigate which provides the best insulation against sound. They could make and play their own instruments by using what they have found out about pitch and volume.  Recognise that sounds get fainter as the distance from the sound source increases; use a.sound sensor to investigate how distance increased affects the sound recorded in decibels at every metre with the same sound source. With different sound sources.  Use sound sensor to explore and investigate how the force at which the instrument is played affects the loudness of the sound (the amplitude of the wave increases T info) |  |
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| Electricity Year 4  identify common appliances that run on electricity   construct a simple series electrical circuit, identifying and naming its basic parts,  including cells, wires, bulbs, switches and buzzers   identify whether or not a lamp will light in a simple series circuit, based on whether or  not the lamp is part of a complete loop with a battery   recognise that a switch opens and closes a circuit and associate this with whether or  not a lamp lights in a simple series circuit   recognise some common conductors and insulators, and associate metals with being  good conductors. | construct simple series circuits, trying different components, for example,  bulbs, buzzers and motors, and including switches, and use their circuits to create  simple devices. Pupils should draw the circuit as a pictorial representation  observing patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit. |  |
| Electricity Year 6  associate the brightness of a lamp or the volume of a buzzer with the number and  voltage of cells used in the circuit   compare and give reasons for variations in how components function, including the  brightness of bulbs, the loudness of buzzers and speed of a motor and the on/off position of switches  use recognised symbols when representing a simple circuit in a diagram. | construct simple series circuits, to help them to answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors. They should learn how to represent a simple circuit in a diagram using recognised symbols.  Pupils might work scientifically by: systematically identifying the effect of changing one component at a time in a circuit; designing and making a set of traffic lights, a burglar alarm or some other useful circuit. |  |
| Seasonal changes autumn observe changes  observe and describe weather associated with the seasons and how day length varies. | What time does it go dark October 1st ask mum or dad  Weather temperature in word colour number  Clothing weather animals plants |  |
| Seasonal changes winter | What time does it go dark January 1st ask mum or dad Weather temperature in word colour number weather animals plants  Clothing wooly hats scarves boots thick coats compare and describe materials |  |
| Seasonal changes spring | What time does it go dark April 1st ask mum or dad  Weather temperature in word colour number  Clothing weather animals plants |  |
| Seasonal changes summer | What time does it go dark July 1st ask mum or dad Summer clothes compare & describe materials Need for sunglasses & sun cream  Make tables and charts about the weather; make displays of what happens in the world around them, including how long it stays light for, as the seasons change. Keep previous seasons’ display and view all together at the end of school year. Compare and contrast. weather animals plants |  |
| Earth & Space  describe the movement of the Earth, and other planets, relative to the Sun in the  solar system   describe the movement of the Moon relative to the Earth   describe the Sun, Earth and Moon as approximately spherical bodies   use the idea of the Earth’s rotation to explain day and night and the apparent  movement of the sun across the sky. | Comparing the time of day at different places on the  Earth through internet links and direct communication; creating simple models of the solar system; constructing simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day; finding out why some people think that structures such as Stonehenge might have been used as astronomical clocks. Secondary sources  planetarium |  |