# Birchwood Science Curriculum Map

| Comparative and fair testing | Identifying, classifying and grouping | Pattern seeking | Observing over time | Research using secondary sources |
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| Year | Substantive Knowledge | Disciplinary Knowledge | Vocabulary | Resources |
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| **Reception - autumn** | **Autumn 1**<br>Understanding the World<br>-know that all humans have a body.<br>-know that everyone has individual features.<br>-know how to keep their bodies healthy, e.g. eating healthy food, exercising, screen-time, etc.<br>-know that we have a skeleton.<br>-know where to find their skeleton.<br>-know what skin is.<br>-know what a bone is.<br>-know the names of some body parts – support with resource (Head Shoulders Knees and Toes and Hold Ya Head)<br>-know that they have 5 senses.<br><br>Communication and Language<br>-know a question is used to help confirm or challenge understanding.<br>-know that discussions require listening, speaking and attention.<br><br>Personal, Social and Emotional Development<br>-know that unique means that they are one of a kind.<br>-know that similarity means the same.<br>-know that difference means not the same.<br>-know why washing hands is important to keep healthy. | **Autumn 1**<br>Understanding the World<br>-To identify their own body and how it is different from the people around them.<br>-Identify that to have a healthy body we must eat well, sleep well, exercise and not have too much screen time.<br>- Identify their own unique features and those of friends. (hair, height, skin colour, gender, glasses)<br>-Observe their own features using a mirror. They can then make pictures/paintings using the correct colours.<br>- Identify their skeleton underneath their skin.<br>- Use songs and rhymes to help identify parts of their body.<br>-Explore their five senses – sight, hearing, touch taste and smell.<br>-Use feely boxes to explore their different senses.<br><br>Communication and Language<br>-Understand and can respond appropriately to a variety e.g. Why…? Do you think…? What…?<br>-Ask questions to clarify instructions.<br>Take part in discussions in Circle and milk time, e.g. What makes you unique? Is everyone in the world the same? Are humans the same as animals?<br><br>Personal, Social and Emotional Development<br>-Talk about similarities and differences between themselves and their friends.<br>-Manage their toileting routines and know that the importance of hand washing. | **Human, body, individual, feature, unique, healthy, food, exercise, skeleton, skin, bone, senses, hearing, sight, taste, touch, smell, height, skin colour, eyes, hair, gender, boy, girl, mirror, hand-washing.** | Books, pictures, skeleton, mirrors, feely boxes, rhymes, |
| | **Autumn 2**<br>Understanding the World<br>-know that there are four seasons.<br>-know the names of the 4 seasons and the order they are found. ((Autumn, Winter, Spring and Summer)<br>-know the common features of Autumn, Winter, Spring and Summer.<br>-know the how to identify between snowing, sunny, raining, foggy, stormy, cloudy and windy.<br>-know what a tree is.<br>-know some animals hibernate for the winter such as a bear, hedgehog, mouse<br>-know not all animals hibernate – cats, dogs, and guinea pigs.<br><br>Communication and Language<br>-know a question is used to help confirm or challenge understanding.<br>-know that discussions require listening, speaking and attention.<br>-know and use new vocabulary.<br>-know vocabulary connected with trees -, leaf, stem, trunk, branch,<br><br>Personal, Social and Emotional Development<br>-know what tools they will need to complete a task e.g. pencils for drawing/writing, magnifying glass for looking closely, sieves for separating, | **Autumn 2**<br>Understanding the World<br>-Observe changes in the local environment throughout autumn and winter.<br>-Identify different weather types and describe what they look & feel like.<br>-Identify the most common weather feature for each of the seasons.<br>-Identify the seasons and discuss features of each.<br>-Recognise the season of Autumn where the leaves on some trees change colour and fall off.<br>- Recognise the season of winter where very little grows because of the cold.<br>- Recognise the season of spring, plants start to grow because of the warmth.<br>-Recognise that in the season of summer the weather is the hottest and driest time of the year.<br>-Identify names of some parts of a tree – trunk, roots, branches and leaves<br>-Make observations of wooded area, flower beds and school environments.<br>-Investigate hibernation and what animals may or may not hibernate.<br><br>Communication and Language<br>-Understand and can respond appropriately to a variety e.g. Why…? Do you think…? What…?<br>-Ask questions to clarify instructions.<br>Take part in discussions in Circle and milk time, e.g. What is the weather like today, yesterday. What season are we in how do we know.<br><br>Personal, Social and Emotional Development.<br>-Select tools/resources that they need to complete a task of their own choosing. | **Season, Autumn, Winter, Spring, Summer, weather, rain, rainy, clouds, thunder, sunny, windy, snowing, snow, warm, cold, hot, leaves, fall, grow, plants, trunk, roots, branch, leaves, Hibernation, sleep, collect, gather, , mouse, bear, hedgehog** | Use NPP- weather to a virtual experience of all seasons. |

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| **Reception -spring** | **Spring 1**<br>Understanding the World<br>-know that some things can change, e.g. water into ice, chocolate can be melted, etc. ice melting experiment<br>-know that extremely low temperatures will cause water to freeze and become ice.<br>-know that ice can melt when temperatures rise.<br>-know the names of common materials and objects from their own environment.<br>-know that the weather in the Polar regions is significantly different to that in the UK.<br>-know that snow can be made by humans in places such as the Snowdome.<br><br>Communication and Language<br>-know they can extend their spoken language by using connectives: and, because, then, but.<br>-know that talking with others can help when faced with a problem. | **Spring 1**<br>Understanding the World<br>-Experiment with ice and water to see the changes that can be made.<br>-Investigate low temperatures and what effect it has on water to freeze and become ice.<br>-Make observations of the melting process.<br>-Experiment with other things (salt, cold water, paper and sand) to see if they cause ice to melt.<br>-Identify some common weather / environment and animals found in the polar regions. (snow, glaciers, mountains)<br>-Take a trip to the Snowdome to experience real snow.<br><br>Communication and Language<br>-Ask why questions<br>-Begin to connect one idea or action to another using connectives: and, because, then, but.<br>-Describe events in detail and use sequencing words: before, next, after, then. The events will be heavily based on experiences in their own lives.<br>-Use talk to help them work out problems and possible solutions.<br>-Compare different materials and objects using recently introduced vocabulary.<br>-Offer explanations for why things might happen, making use of recently introduced vocabulary.<br>-Explain in words the differences between a Penguin and a Polar bear.<br><br>Personal, Social and Emotional Development<br>Identify that people can live in different environments and understand how these can differ from their own.<br>Explain why it is important to brush their teeth for 2 minutes.<br>Observe what happens to teeth when they decay. | **Arctic, Antarctic, Polar, region, temperature, freeze, ice, melt, frozen, observe, experiment, investigation, warm** | -NPP: the Arctic, ice, snow, ice trays, warm water, photos, salt, paper. |
| | **Spring 2**<br>Understanding the World<br>-know a material is what objects are made of.<br>-know that materials have different qualities.<br>-know that different materials are better than others when constructing.<br>-know what a mirror is.<br>-know that a mirror has a reflective surface.<br>-know what a magnet is.<br>-know that magnets can attract some metals.<br>-know that some materials are not magnetic.<br>-know what floating, sinking and submerging are<br>-know that hatching is the process of a chick exiting an egg.<br>-know that an incubator provided heat for the chick to hatch.<br>-know that being alive is when you have a heartbeat.<br>-know that death is when a heart stops beating.<br>-know a carnivore is a meat eater.<br>-know that herbivores are plant eaters.<br>-know that extinct means no longer living, and not found alive anywhere on the planet.<br><br>Communication and Language<br>-know they can extend their spoken language by using connectives: and, because, then, but.<br>-know that talking with others can help when faced with a problem. | **Spring 2**<br>Understanding the World<br>-Explore and describe some different materials (cork, plastic, metal, cardboard)<br>-Use their senses to describe different materials.<br>-Create a Dinoscape using their knowledge of materials.<br>-Explain why they have chosen the materials they have.<br>-explore and discuss mirrors, magnets and magnifying glasses and explain their purpose.<br>-explore sinking, floating and submerging.<br>-Observe chicks hatching in an incubator.<br>-Understand the vocabulary connected to chicks hatching (chicken, chick, egg, young, adult, hatch, incubator, feathers, beak)<br>-Identify living things (birds, humans, insects, animals)<br>-Identify things that are not living (toys, furniture etc)<br>-Explain that death is when life ends.<br>-Investigate the different diets of dinosaurs.<br>-Identify meat eating dinosaurs such as a T-Rex and refer to them as carnivores.<br>-Identify the plant eating dinosaurs that eat foliage and greens and refer to them as herbivores (Stegosaurus).<br>-Discuss the meaning of extinct<br><br>Communication and Language<br>-Ask why questions<br>-Begin to connect one idea or action to another using connectives: and, because, then, but.<br>-Describe events in detail and use sequencing words: before, next, after, then. The events will be heavily based on experiences in their own lives. | **materials, cork, metal, plastic, cardboard, mirror, magnifying glasses, magnet, attract, reflective, float, sink, submerge, floating, submerging, sinking,** | NPP- Dinosaurs |

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| | | -Use talk to help them work out problems and possible solutions<br>-Compare different materials and objects using recently introduced vocabulary. | | |
| **Reception - summer** | **Summer -1**<br><u>Understanding the World</u><br>-know that a shadow is made from the absence of light.<br>-know that Africa as a continent has much warmer weather than the UK.<br>-know that in summer we have hotter days, wear less clothing and apply sun cream<br><br><u>Communication and Language</u><br>-know the structure of how to speak in a full sentence.<br>-know they can extend their spoken language by using connectives: and, because, then, but.<br>-know that talking with others can help when faced with a problem.<br><br><u>Personal, Social and Emotional development.</u><br>-know that perseverance is when you don't give up. | **Summer - 1**<br><u>Understanding the World</u><br>Investigate how we make shadows.<br>Understand that the common weather in Africa is very different to the UK.<br>Identify the common features of the summer season.<br><br><u>Communication and Language</u><br>-Ask why questions<br>-Begin to connect one idea or action to another using connectives: and, because, then, but.<br>-Describe events in detail and use sequencing words: before, next, after, then. The events will be heavily based on experiences in their own lives.<br>-Use talk to help them work out problems and possible solutions<br>-Compare weather using full sentences.<br><br><u>Personal, Social and Emotional development.</u><br>-Show perseverance and determination to do well in their learning and activities.<br>-Regulate their own behaviour in a variety of different situations.<br>**-F**ollow instructions with multiple steps. | **Shadow, light, dark, weather, Africa, United Kingdom, protection** | |
| | **Summer 2**<br><u>Understanding the World</u><br>-know that plants grow from a seed.<br>-know that plants need water, soil and sun to grow.<br>-know the parts of a plant – roots, stem, leaves, flower<br>-know that mini beasts are insects and arachnids<br>-know how to identify a worm, spider, ant, snail and caterpillar.<br>-know Spiders have 8 legs.<br>-know insects have 6 legs.<br>-know a snail has a shell.<br>-know a worm has no bones.<br>-know the life cycle of a caterpillar.<br><br><u>Communication and Language</u><br>-know that instructions can come in more than 1 step.<br>-know the structure of how to speak in a full sentence.<br>-know they can extend their spoken language by using connectives: and, because, then, but.<br>-know that talking with others can help when faced with a problem. | **Summer 2**<br><u>Understanding the World</u><br>-Investigate seeds, what they look like, feel like and smell like.<br>-Compare different seeds, sizes, shapes and what they become.<br>-Explore what seeds need to grow in to plants.<br>-Discuss the process of planting a seed and growing it into a plant.<br>-Identify the different parts of a plant (roots, stem, leaves, flower)<br>-Participate in growing a plant from seeds.<br>-Identify a range of mini beasts – ladybird, spider, butterfly, ant, worm<br>- Explore the life cycle of a butterfly.<br>-Compare different mini beasts (snail, spider, worm, caterpillar)<br><br><u>Communication and Language</u><br>-Ask why questions<br>-Begin to connect one idea or action to another using connectives: and, because, then, but.<br>-Describe events in detail and use sequencing words: before, next, after, then. The events will be heavily based on experiences in their own lives.<br>-Use talk to help them work out problems and possible solutions<br>-Compare different materials and objects using recently introduced vocabulary. | **hatch, chick, chicken, duck, goose, egg, incubator, feathers, beak, living, dead, alive** | |

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| **Y1 autumn** | **Autumn 1 - Everyday Materials**<br>-know, identify and name a variety of everyday materials including; wood, plastic, glass, water, rock, brick, paper, fabric, elastic and foil. Include liquids and gases to avoid misconception that a material is a solid.<br><br>-know and distinguish between an object and the material which it is made such as scissors, paper, glass and pencils.<br><br>-know and describe some of the physical properties of everyday materials. Use their senses to describe them (bendy, rough etc.).<br><br>-know, compare and group together a variety of everyday materials on the basis of their simple physical properties. | **Autumn 1 - Everyday Materials**<br>  Identify the material that objects are made from (material hunt). Use objects that are made from multiple materials (e.g. scissors, spoons, cups etc.). Children to group them in different materials groups. Challenge: choose own grouping system, can there be more than one possibility?<br><br>  Identify properties and group them. Hot seat/secret bag – describe materials using physical properties. Challenge: are any similar, why? Plot on a Venn diagram.<br><br> Engage children in asking their own question for investigation e.g. what would be the best material for … e.g. an umbrella, a bookshelf, lining a dog bed etc. Carry out investigation. Prediction focus based on prior knowledge of properties.<br><br>Scientist link: Chester Greenwood – inventor of the earmuff.<br>He enjoyed ice skating, but was bothered by his ears getting cold. Hats didn't seem to work, and he didn't like scarves. There were other earmuffs around, but he didn't like how they fastened onto his head. | **Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see through, not see through** | What are materials?<br>https://www.youtube.com/watch?v=340MmuY_osY<br><br>Appropriate materials:<br>https://www.youtube.com/watch?v=eCNade4GFpY<br><br>General:<br>https://www.bbc.co.uk/bitesize/topics/zrssgk7<br><br>NPP – everyday materials<br><br>Materials from the science cupboard<br><br>Grammasaurus quiz for AfL |
| | **Autumn 2 – Seasonal Change**<br>-know and observe changes across the four seasons.<br><br>*Tasks in italics are not restricted to the science lesson and occur across the year to support real experiences and retention.*<br><br>-know, observe and describe weather associated with the seasons and how day length varies. | **Autumn 2 – Seasonal Change**<br>*Note – this unit will need to take place across the year due to the nature of the observations over time. These activities will be indicated by using italics.*<br>  Know the four seasons by looking at the changes with trees, clothes and activities. What clothing changes are needed for each season? How do the plants change throughout the seasons? Classifying -cut out objects/equipment to show their understanding. *Write an acrostic poem as a class/group for each season.*<br>  Observe changes across the four seasons through incidental teaching across the year and included in maths meetings (weather pictograph). *Walk around the local area in each season and take note of the changes. (Note – talk through the risks of each season with the children – e.g. looking directly at the sun and sun safety, ice, snow etc.) Create a diary across the year of their observations (include observations of how trees change to use in summer topic – plants)*<br><br>  *Using the outside space, plant bulbs for each season so they can observe them (see resource list for link)*<br><br>  A week in each season – keep a weather diary. At the end of the year, write a conclusion: can they compare and contrast their findings and use their knowledge of the seasons to explain them.<br>  Use a favourite class bear, each night after school across the year (doesn't have to be every day – 30 times) the bear must go to sleep when it gets dark. How does this change over the year? Add this information to their end of year conclusion.<br><br>Scientist link- Rebecca Wood (Midlands Today weather presenter) show the children video clips of her presenting the weather. Children have a go at their own weather reports to be videoed. Email her for advice on how to present the weather. | **Weather (sunny, rainy, windy, snowy etc.), Seasons (winter, summer, spring, autumn), sun, sunrise, sunset, day length** | When to plant bulbs:<br>https://www.gardenersworld.com/plants/guide-to-bulb-planting-depths/ |

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| **Y1 Spring** | **Spring 1 and 2 – Animals including humans**<br>-know, identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Know how to take care of animals taken from the local environment and the need to return them safely.<br>*Knowledge needed:*<br>• *Fish have scales, fins and gills, lay eggs, and live in water their whole lives.*<br>• *Amphibians start life in water. They have limbs, not fins, can move around on land, but need to stay near water where they lay their eggs.*<br>• *Reptiles have limbs. They lay eggs on land and have scaly skin.*<br>• *Birds have two wings and two legs. They lay eggs. Some, but not all birds can fly.*<br>• *Mammals give birth to live young. They have hair or fur. They produce milk for their offspring.*<br><br>-know, identify and name a variety of common animals that are carnivores, herbivores and omnivores.<br><br>-know, describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)<br><br>-know, identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each of the five senses (sight, hearing, taste, smell and touch). Use games, actions, songs and rhymes. | **Spring 1 – Animals including humans**<br>  <br>Starter – animal body groups game – check current knowledge. Name and identify common animals including fish, amphibians, reptiles, birds and mammals. Sorting plastic models or photographs (from Ash End Farm trip in YR) into groups based on their physical characteristics (e.g. tail, scales, webbed feet etc.). Then use the key vocabulary to classify them using their scientific name (e.g. birds, reptiles etc. *see previous column*). Children to be given the titles for classifying. Challenge: can the children chose their own and explain why?<br><br>  <br>Name and identify carnivores, herbivores and omnivores. Looking at the animal's primary diet, Venn diagram pictures. Children to explain the difference. Children to retrieve their Ash End Farm trip knowledge and discuss which animals meet each criterion. Link to children's experiences – have they been to a zoo/safari etc. Provide children with pictures and speak bubble statements (see ASE), can they match them, group them, explain their reasons?<br><br>  <br>Retrieve learning two lessons ago (types of animals) and link that to the structure of each animal group. Provide pictures that are already grouped, children to explain what's the same, what's different. Repeat sorting activity with same animals as past two lesson, but add this new knowledge layer-look at how the creatures a built and any similarities and differences. Challenge: why do those creatures need to have that? (E.g. why do the shark and fish have gills? Why do the birds have feathers? Etc.– This will be built upon in year 6 evolution.)<br><br>  <br>Identify, name, draw and label the basic parts of the human body (eyes, nose, mouth, ears, hands, legs etc) Children to compare themselves against others (feet size etc.). Can they predict who will have the biggest feet? Why?<br><br>  <br>Go on a senses walk around school and local environment. Can they identify what sense they are using and what they notice (see ASE) and link parts to my senses (e.g. eyes to see, nose to smell etc.)<br>Which is the best body part for the 'touch' sense? (see ASE)<br><br>Retrieve activity: Play 'who am I?' Adult to think of an animal and the children have to ask scientific question using all learnt knowledge from this unit.<br><br>Scientist link- Zoologist, Marine biologist (talk about being that type of scientist when they are looking land and sea-based animals) | **Head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves**<br>**Names of animals experienced first-hand from each vertebrate group: fish, amphibians, reptiles, birds, mammals, carnivore, herbivore, omnivore** | Animal body groups activity: S:\STAFF ONLY\Curriculum\Science\Resources\Lessons\Year 1\Animals including humans\Animal_Body_Groups.pdf |

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| **Y1 Summer** | **<u>Summer – Plants</u>**<br>-know, identify and name a variety of common wild and garden plants, including deciduous and evergreen trees<br>*Wild plants: dandelion, daisy, fox glove, bluebell, dock leaves, nettles*<br>*Garden plants: rose, tulip, daffodil, sunflower, rosemary, mint*<br>*Trees: elm, hazel, juniper, larch, maple, oak, pine, redwood, sycamore, teak, willow, yew, holly*<br>*Mention that some flowers turn into fruit, or the plant's stem or root is the vegetable: tomato, cabbage, carrot, potato, cucumber, strawberry.*<br><br>-know, identify and describe the basic structure of a variety of common flowering plants, including trees. | **<u>Summer – Plants</u>**<br>  <br>Share the class observations made across the year about plants in different season and recap what they noticed about the plants. Complete the summer observation and poem including observations about the plants this season.<br><br>  <br>Identify and name a variety of common plants, including garden plants, wild plants and trees, and those classified as deciduous and evergreen (use photographs from their observation over time from Autumn 2) Leaf hunt exploratory activity on KS2 site (<u>www.woodlandtrust.org.uk</u> – leaf ID sheet). Link to the class names for Birchwood and look at the leaves for each of these trees.<br><br>  <br>Think back to the plants planted in Autumn, what have they noticed about them over the year? Can they now identify them using their names and classify if there are deciduous or evergreen? Go for a senses walk noticing what the plants look like now around the school.<br><br>  <br>Identify and describe the basic structure of a variety of common flowering plants, including roots, stem/trunk, leaves and flowers and describe their purpose. Know that plants can grow from bulbs and seeds.<br>Use a plant and dissect it to identify the parts with a variety of types (only words for key vocabulary – more in depth happens in year 3).<br><br>Scientist link- Beatrix Potter (found and drew 350 types of fungi, this began her journey into books as she was not allowed to present her science paper because she was a girl). Use this in the last lesson, show her work and then emulate her. Create observational diagrams in her style to show the structure of various flowering plants (use in lesson above). | **Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud.**<br>**Names of trees in the local area**<br>**Names of garden and wild flowering plants in the local area (use class named trees), seed, bulb** | Introduction to plants:<br><u>https://www.bbc.co.uk/bitesize/topics/zpxnyrd/articles/zjnmqfr</u><br><u>https://www.bbc.co.uk/teach/class-clips-video/science-ks1-plants-what-is-a-plant/zp6xnk7</u><br><br>Parts of a plant:<br><u>https://www.bbc.co.uk/bitesize/topics/zpxnyrd/articles/z2vhxbk</u><br><br>Deciduous and evergreen:<br><u>https://www.youtube.com/watch?v=jFVOI9Duj8M</u> |

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| **Y2 autumn** | **Autumn 1 - Everyday Materials**<br>-know that some materials are used for more than one thing e.g. metal can be used for coins, cards, cans and table legs; wood can be used for matches, floors and telegraph poles.<br><br>-know that properties of material make them suitable or unsuitable for particular purposed and think of creative uses for everyday materials.<br><br>-know and find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.<br><br>-know, identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses | **Autumn 1 - Everyday Materials**<br>  Recap year 1 knowledge of the types of materials. Allow the children to organise and classify using their current knowledge. Challenge children to see if there is more than one possibility (can that material go in multiple groups?) and more than one method of organising (table, circles – see progression document for expectations).<br>  Identify materials from the classroom and the uses they have. Justify why it has been used. Can they find a pattern? (e.g. is everything that is made from plastic used to hold something? Is everything that is made from material used to keep things warm? Etc.)<br>Use Michael Rosen's poem 'A Woolly Saucepan' – can the children write their own version to show their knowledge? A correct version and a wrong version.<br><br>  Use playdough/plasticine to model the change in shape. Can this happen to all solid objects – use the language of rigid, flexible, stretchy.<br>  Investigate manipulation of objects.<br>Organise and classify objects (e.g. Venn diagram – use progression document for expectations.)<br>  Challenge: is there a pattern between the material it is made from, the object and the manipulation that can occur?<br><br>  Example ideas:<br>  <br>1. Incy Wincy spider – which is the best material to make him an umbrella? Children to look at the suitability of materials for an umbrella and why. Explain their predication then test it out. If time, the children could make one and test it outside.<br>2. The three little pigs – which material would be best to build a house?<br>3. Cinderella – Which material is best to make a shoe out of?<br>4. Humpty Dumpty – How could you protect his head?<br>5. Princess and the Pea – What material would be best for a mattress to not feel the pea?<br><br>Scientist link – Charles Macintosh. The investor of waterproof material that was used to make waterproof coats/Macintoshes.<br>https://www.youtube.com/watch?v=5fcCo0G3Z_w | Materials – wood, plastic, glass, metal, water, rock, brick, paper, fabric, card, rubber, foil, brick etc.<br>**Properties** – rough/smooth, flexible/rigid, strong/weak, stretchy, **reflective/non-reflective, transparent/translucent /opaque**<br>**Changing Shape - squashing, bending, twisting and stretching, pushing and pulling** | https://www.reachoutcpd.com/courses/lower-primary/everyday-materials/everyday-materials-1/objectives/<br><br>https://www.bbc.co.uk/bitesize/topics/zsrfvwx/articles/zd9w8hv<br><br>https://www.bbc.co.uk/bitesize/topics/zsrfvwx/articles/z62txbk<br><br>Woolly Saucepan by Michael Rosen<br>Could I have a woolly saucepan<br>a metal jumper<br>a glass chair<br>and a wooden windowpane please?<br><br>Er - sorry - I mean a woolly chair<br>a glass jumper<br>a wooden saucepan<br>and a metal windowpane please?<br><br>Er – sorry – I mean, Oh blow it!<br>You know what I mean don't you? |

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| | **Autumn 2 – Plants**<br>-know, observe and describe how seed and bulbs grow into mature plants<br>*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 – this will be covered in more depth in year 5.*<br>*Seeds and bulbs need water to grow but most do not need light; seeds and bulbs have a store of food inside them.*<br><br>-know and describe how plants need water, light and a suitable temperature to grow and stay healthy.<br><br>*With all plants, allow them to germinate inside, then plant outside.* | **Summer – Plants**<br>  Recap Y1 knowledge on parts of the plant (roots, leaves, stem, flower). Video 1 up to 3.24 -Talk about where plants come from and draw out the knowledge of seed and bulb. What is the difference? Organise and classify a selection of bulbs and seeds (some that have begun to germinate as well) and see if the children can come to the correct conclusion (use magnifying glasses). Show the children video 2. Could they make a version for next year's year 2s?<br><br>  Odd one out – three different bulbs/seeds – draw out language from previous lesson.<br>Observe and describe how seeds and bulbs grow into mature plants (experiment over time -planting a seed and watching it grow). Include write up of observations and show the life cycle of a plant (amaryllis bulb– 6-8weeks, sunflower seeds– 70 days). Use measuring skills from maths.<br><br>  Use concept cartoon 1.1 -seeds in the dark, what could be another scientific statement? By using cress seeds (4weeks) observe over time their growth and development with 4 different variables (1. light, 2. dark, 3. water, 4. oxygen). Focus on prediction with justifications.<br><br>Scientist link -Luther Burbank (his work on what plants need to thrive lead to his development of 800 types of plants including a spineless cactus that would feed cattle). | Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud.<br>Names of trees in the local area<br>Names of garden and wild flowering plants in the local area, **light, shade, sun, warm, cool, water, grow, healthy,** seed, bulb | Bulb and seed differences:<br>1.https://www.bbc.co.uk/iplayer/episode/m00116h4/bitesize-daily-57-year-olds-science-67-yearolds-1-how-plants-grow<br><br>2.https://www.youtube.com/watch?v=KyDvYQ64ysU<br><br>Germination:<br>https://www.youtube.com/watch?v=ro8Z9qIlWjM<br><br>https://www.youtube.com/watch?v=7a0u5jMYviM - 0.53 |

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| **Y2 spring** | **Spring 1 and 2 – Living things and their habitats**<br>-know and 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.<br><br>-know, identify and name a variety of plants and animals in their habitats, including micro-habitats.<br>*Habitat – a natural environment or home of a variety of plants and animals.*<br>*Micro-habitat – a very habitat, or example woodlice under stones, logs or leaf litter.*<br><br>-know, explore and compare the differences between things that are living, dead and things that never have been alive.<br><br>-know and 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. | **Spring 1 and 2 – Living things and their habitats**<br>  Introduce the next unit (Animals: Caterpillars). What habitat do we create for them? What did it need? What is the purpose of a habitat? Do all animals need the same habitat? Go for a walk in the local environment (playground, field, near the river/canal) and see if they can find some habitats. Take pictures to discuss further back in class.<br><br>  Look at these pictures back in class and discuss patterns of where these habitats are and which type of animal is in them (link to year 1 naming animals).<br>Show some picture of other animals from different habitats (seashore, woodland, ocean, rainforest, desert etc.) and see if they can identify which habitat each animal would be suited in – use some pictures from school.<br><br>  Choose two habitats found in school (e.g. under the garden shed, forest school area, field etc.) and children are to tally the amount of each animal they can find and create a pictogram (link to maths). Why are there more of one type of animal? Children to explain how a habitat is suited to each animal – use examples from the previous lessons.<br><br>  Set up a choice chamber for minibeast and see if their predictions of which habitat they would prefer is correct. Link to previous learning on David Attenborough, could they 'document' their findings and post to the website.<br>Children are to be given a habitat and they can design a creature that would be suitable for it. Children to justify why including Y1 animal classification knowledge (this will be repeated in Y6).<br>Extra: Can they set up minibeast's habitats, take pictures and send them to Chris Packham in support for creating a wildlife haven.<br><br>  Using desert: cactus, woodland, arctic, rainforest and animals in their habitats: ocean, arctic, desert, rainforest, including micro-habitats children to explain where each plant is best suited and why using their Y1 knowledge of weather/climate and what a plant needs to survive.<br><br>  Explore and compare the differences between things that are living and dead and have never been alive. Using pictures of animals, fossils, inanimate objects, feathers, shells, bark etc. get the children to classify the differences. What definition could they give to each of the categories?<br><br>  Describe how animals obtain their food from other animals, using the idea of a simple food chain (berries – mouse – owl; grass, cow, human; leaves, antelope, lion). Use the knowledge of the arrow meaning 'is eaten by' (ASE).<br>Scientist link- Chris Packham (wildlife conservationist and photographer, some of his autumn/spring watch clips about 'breaking the chain' explain the importance of food chains). | Living, dead, **never been alive,** suited, suitable, basic needs, food, food chain, shelter, feed, names of local habitats e.g. pond, woodland etc., names of micro-habitats e.g. under logs, in bushes etc., prey, predator | Caterpillars:<br>https://www.insectlore.co.uk/<br>https://www.insectlore.co.uk/refill-caterpillar-set-for-butterfly-garden.html<br><br>Animals and their habitats:<br>https://www.youtube.com/watch?v=2fmtITOiGjI<br><br>https://www.bbc.co.uk/iplayer/episode/m0011f4g/bitesize-daily-79-year-olds-science-89-yearolds-2-habitats<br><br>https://www.bbc.co.uk/programmes/p0119dpr<br><br>Chris Packham:<br>https://www.worldlandtrust.org/patrons/chris-packham/<br><br>https://www.express.co.uk/news/nature/1697136/chris-packham-wildlife-haven-habitat-destruction-new-forest-rspb<br><br>Contact Chris Packham:<br>https://www.chrispackham.co.uk/contact<br><br>Food chains and webs:<br>https://www.bbc.co.uk/teach/class-clips-video/science-ks2--ks3-food-chains-and-food-webs-in-animals/zn7g92p |

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| **Y2 Summer** | **Summer 1 and 2 – Animals including humans**<br>-know that animals, including humans, have offspring which grow into adults.<br>*This is recognising growth and similarities not reproduction (e.g. egg, chick, chicken; egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep; baby, toddle, child, teenager, adult)*<br><br>-know and describe the basic needs of animals, including humans, for survival (water, food and oxygen).<br><br>-know and describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. | **Summer 1 and 2 – Animals including humans**<br>  Use real life caterpillars in a habitat net in the classroom and observe over time the changes (record observations). Discuss the habitat and environment they discuss in previous unit and create it. Create a nature docuseries with year 5.<br>Scientist link -David Attenborough. He is a biologist, natural historian and author. He looks at the natural world and report on his findings just like we are doing with our caterpillars. Can we make a documentary of the life cycle of a caterpillar just like her does? Children to watch clips of Planet Earth for inspiration – video to go onto the website.<br><br>   Use pictures/videos of the egg and chicks from YR – what happened? How does this show us about offspring? Match pictures of baby animals to adults, explain how they know. Use knowledge of animal structure from Y1 and prior knowledge from YR farm visit and outside experiences. Identify the animals' life cycles (compared in Y5).<br>Using baby pictures of themselves and staff, see if they can identify who they belong to and explain why. Identify key features that have remains the same.<br><br>Introduce a journey e.g. Mission to Mars, or linking to a story they are reading. So that they can apply hygiene, healthy bodies and survival knowledge from the subsequent lessons.<br><br>  'We need to be fit and healthy to travel to ____'. Children to choose different exercise activities and a time frame to complete them in. Talk about the value of controlled variables and how to make it a fair test and then record data and changes to their body on a table (ASE).<br><br>  'We need to take a healthy meal to _____'. Healthy eating: Open ended investigation (Venn) to identify ways to classify foods, see what groups the children make. And prompt them to choose constraints that would cause and overlap for the middle section. Analyse a school dinner. Create a healthy meal using the 'Eat well plate' – link to computing and Purple Mash. Use the Change4Life website to look at healthy swaps – share with parents. Describe the importance for humans of exercise, eating the right amounts of different types of food and hygiene:<br><br>  Link to reception's knowledge of washing hands write instructions. Then discuss how else germs could be spread. Use an aerosol to simulate a sneeze and comment of the spread of germs airborne. Use hair gel and glitter to investigate how germs spread. Model using pepper, milk/water and hand sanitiser. – covered also in PSHE curriculum. | **Survival, exercise, heart rate, blood, oxygen, protein, carbohydrates, vegetables, dairy, fats,** germs, **offspring,** | Match the adult to the offspring: https://www.bbc.co.uk/programmes/p0117xbr<br><br>Cartoon version of life cycles: https://www.youtube.com/watch?v=vDDDwfvVUe4<br><br>David Attenborough documentaries: https://www.youtube.com/playlist?list=PL1YxUBRBoo8aZ90JJLvLCK4KaFMwRmvAo |

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| **Y3 autumn** | **<u>Autumn 1 and 2- Plants</u>**<br>-know, identify and describe the functions of different parts of flowing plants: root- anchors, stem/trunk- carries nutrients, leaves- make food, flowers – petals attract, stamen - male, carpel-female.<br><br>-know and 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.<br>Note – pupils are introduced to the idea that plants can make their own food, but at this stage they do not need to understand how this happens.<br><br>-know and investigate the way in which water is transported within plants.<br><br>-know and explore the part that flowers play in the life cycle of flowing plants, including fertilisation, pollination, seed formation and seed dispersal. | **<u>Autumn 1 and 2- Plants</u>**<br>*Note – this unit will need to take place across the year due to the nature of the observations over time. These activities will be indicated by using italics.*<br>  Recap prior learning by labelling a plant, but ensure that their purpose is explained. Go on a hunt around the local area to collect parts of plants. Back at school, allow the children to classify what they have found using their own keys.<br><br>  *Set up an experiment over time with variables for different types of plants to explore the requirements for life and growth and how they vary from plant to plant. Compare the effect of different factors on plant growth (e.g. the amount of light, amount of fertiliser, air, water, nutrients from soil, and room to grow – link to Y2 etc. but using different plants e.g. cactus, sunflower etc.).*<br><br>  Using either white carnations or celery set up the experiment over time to show how water is transported. Children to measure and plot on a table – extend to line graphs ready for next year if ready or with a bar chart with gaps.<br>Look at different leaves, identify any patterns and discuss how these have a role in the production of food.<br><br>  Observe two types of root formation (tap root and fibrous root) and notice the difference. Ensure that the key knowledge of roots 'absorb' not 'suck' is used.<br><br>  Collect different seed types (blower, banger, animal disperser, and clinger) and explain how these seeds would travel to create new plants. (BBC learning clip- seed dispersal). Look for patterns in the structure of fruits that relate to how the seeds are dispersed.<br><br>  Children to order the life cycle of a plant.<br><br>  *Using plants in the local area go and look for signs of pollination* (use BBC learning clips to show a bee with pollen on his legs).<br><br>  Scientist link - know scientific investigations can lead to discoveries that change the way we live, e.g. George Washington Carver used science to improve farming in America. Originally a slave, Carver was ahead of his time taught about crop rotation to improve soil fertility because different plants use up different nutrients from the soil. He also used organic fertiliser to put nutrients back into the soil. This helped farmers produce more crops. He challenged his students to find answers to their questions through trial and error using the scientific method. | Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud. Names of trees in the local area<br>Names of garden and wild flowering plants in the local area, light, shade, sun, warm, cool, water, grow, healthy **photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal – wind dispersal, animal dispersal, water dispersal, carpel, stamen** | How to grow bulb plants indoors https://www.pennington.com/all-products/fertilizer/resources/forcing-beautiful-bulbs-for-your-indoor-garden<br><br>carnations, celery, tulips, daffodil, chrysanthemums work best with food colouring (2-3 hours). Woody stems take several days<br><br>Plant song https://www.youtube.com/watch?v=ql6OL7_qFgU<br><br>Seed dispersal: https://www.bbc.co.uk/programmes/p0118vw6<br><br>https://www.bbc.co.uk/bitesize/topics/zxfrwmn/articles/z28dpbk<br><br>Pollination: https://www.bbc.co.uk/programmes/p0128z6q<br><br>NPP-plants<br><br>posters / books, propagation kits in the science cupboard, seeds and compost in shed, Kitchen garden, flower beds, orchard<br><br>Local walk to identify where plants are found growing |

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| **Y3 Spring** | **<u>Spring 1 – Forces and magnets</u>**<br>-know that some forces need contact between two objects, but magnetic forces can act at a distance.<br><br>-know and compare how things move on different surfaces<br><br>-know, compare and group together a variety of everyday materials on the bases of whether they are attracted to a magnet, and identify some magnetic materials<br>-know and observe how magnets attract or repel each other and attract some materials and not others.<br><br>-know and describe magnets as having two poles<br><br>-know and predict whether two magnets will attract or repel each other, depending on which poles are facing.<br><br>Recap of all knowledge from the unit. | **<u>Spring 1 – Forces and magnets</u>**<br>  Show a picture of a person on a skateboard being pulled by a dog. Get the children to describe what is moving and how it is moving. Look at the cause and effect of each element. Introduce the idea of forces being push and pull. Use a Venn diagram to show their knowledge of different push and pulls needed to move objects (ASE- Naithan).<br>Set up a carousel of activities to see if all forces act in contract with the objects (see ASE Naithan pg18/19) and organise their findings into contact and non-contact forces (only magnets should appear here).<br><br>  Children to use their previous knowledge of materials (Y1/Y2) and consider how a toy car would move across the different surfaces (e.g. sandpaper, carpet, foam, wood etc.). Predict which car would go further if we were to release it from a ramp. Set up a fair test.<br>Why do the surfaces effect the distance the car travelled? Introduce friction.<br>Write a scientific conclusion and model their results as a bar model (maths link).<br><br>  Scientist link- John Boyd Dunlop (second person to invent the tyre. Link to his fair testing of friction to create a surface to have friction – we want a surface that doesn't).<br><br>  Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet (use a bar, ring, button and horseshoe magnet). Recap knowledge from YR about magnets.<br>Identify some magnetic materials (variety of metals, objects from around the classroom). Record on a table or Venn diagram. They must investigate non-magnetic metals (copper coin, aluminium can, silver coin etc.)<br><br>  Create a magnet swing and discuss the possibilities of two poles. Link to a compass always pointing north – model that their magnets do in their swings, describe that magnets have 2 poles.<br>  Scientist link- William Gilbert (1600, found the earth had a magnetic field – two poles ad compass link).<br><br>  Children to test their magnets (all types) to see what happens when they put their bar magnets together. Observe how magnets attract or repel each other and attract some materials and not others. Draw a conclusion.<br>Predict if 2 magnets will attract or repel by looking at the poles and explain why.<br><br>  How many different ways can you move the paper clip? What forces could you use? Encourage the children to investigate 'pushing, pulling, blowing it as well as magnets and then write a conclusion of the differences: the former needed an element of contact but magnets did not. | Force, push, pull, twist, **contact force, non-contact force, friction, magnetic force,** magnet, strength, **bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel,** magnetic material, metal, iron, steel, **poles, north pole, south pole** | General introduction:<br>https://www.bbc.co.uk/iplayer/episode/m0012bw5/bitesize-daily-79-year-olds-science-78-yearolds-5-forces-and-magnets (use sections and this shows the whole topic)<br><br>Magnets:<br>https://www.bbc.co.uk/programmes/p0119gp1<br><br>Not all metals are magnetic:<br>https://vimeo.com/169319199<br><br>Two poles:<br>https://vimeo.com/169320291<br>https://www.britannica.com/video/163180/bar-magnet-behaviour-magnetic-field-poles (shows a magnet swing) |

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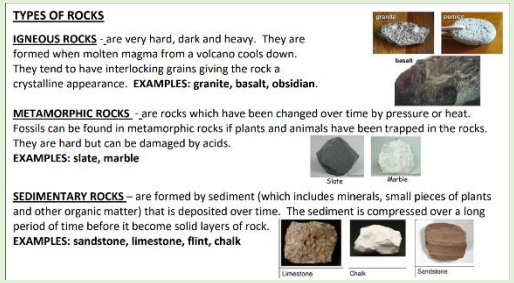
| | **Spring 2 - Rocks**<br>-know, compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.<br>  <br>**TYPES OF ROCKS**<br>**IGNEOUS ROCKS** - are very hard, dark and heavy. They are formed when molten magma from a volcano cools down. They tend to have interlocking grains giving the rock a crystalline appearance. **EXAMPLES: granite, basalt, obsidian.**<br>granite<br>pumice<br>basalt<br>**METAMORPHIC ROCKS** - are rocks which have been changed over time by pressure or heat. Fossils can be found in metamorphic rocks if plants and animals have been trapped in the rocks. They are hard but can be damaged by acids.<br>**EXAMPLES: slate, marble**<br>Slate<br>Marble<br>**SEDIMENTARY ROCKS** – are formed by sediment (which includes minerals, small pieces of plants and other organic matter) that is deposited over time. The sediment is compressed over a long period of time before it become solid layers of rock.<br>**EXAMPLES: sandstone, limestone, flint, chalk**<br>Limestone<br>Chalk<br>Sandstone<br><br>-know and describe in simple terms how fossils are formed when things that have lived are trapped within rock.<br><br>-know and recognise that soils are made from rocks and organic matter. | **Spring 2 – Rocks**<br>What is a rock? What makes a rock different to a pebble, stone or boulder? Go on a walk around the local area and school grounds and find different types of rocks they could use in the classifying activity. Use Y1 properties of materials knowledge based on their appearance and physical simple properties: texture, appearance, size and mass to classify them (have examples of sandstone, marble, limestone, slate, granite). Add permeable knowledge – use the video. Resources: sieves, magnifying glasses, water.<br><br>Introduce the children to the three types of rock. Looking back at the rocks, stones and pebbles they used last lesson, children to repeat the classifying task using this new knowledge.<br><br>Using structures from the local area (Polesworth Abbey, Obelisk at Chapel of St Leonard, The Abbey Church of St Editha) to find out how rocks change over time (the process is sped up using pictures from their library visit walk this term) – look at weathering (sandstone vs marble). Use video for examples of changes. Children to link this and their geographical knowledge to explain what could have happened to rocks in our local area over time.<br><br>Which is best suited to _____? Comparative experiment, record in a table and conclusions based on scientific observations (focus on hardness, durable and permeable).<br><br>Link to knowledge of rocks, what is a fossil and how is it formed? Use the STEM activity to replicate the create of a fossil. Observe this over the rest of the week to watch the process.<br><br>How is soil formed? Look at the construction of different types of soil. Classifying experiment: using a bottle of water and soil, shake, and watch to see the separation.<br>Create a labelled diagram in instruction to show what soil is made from. Look at different types of soil (chalky, clay, sandy, peat), show a labelled diagram and predict which would be best to grow a plant in (link to YR,1,2 plants). Conduct experiment over time and draw conclusion.<br><br>Scientist links -<br>Geologists (link to palaeontologist – study earth history and fossils)<br>Mary Anning (fossils). Leonardo da Vinci (also a scientist who discovered how sedimentary rocks and fossils are formed).<br>Ellie Edwards (local contact) - Agronomist (why this type of job is important – farming, growth, agriculture etc. link to our local area.) | **Rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water: permeable, impermeable, soil, fossil, marble, chalk, granite, sandstone, slate, soil, peat, sandy/chalk/clay soil, igneous, sedimentary, metamorphic** | Rocks and fossil formation: https://www.bbc.co.uk/iplayer/episode/m0011mzf/bitesize-daily-79-year-olds-science-78-yearolds-3-rocks-and-soil?seriesId=m00134dp<br><br>Classifying rocks: https://www.youtube.com/watch?v=iDnkliPVK5o up to 1:08<br><br>Types of rocks: https://www.youtube.com/watch?v=o8heA8e9_zk up to – 1:55<br><br>How rocks change over time: https://www.youtube.com/watch?v=61TGjSk5SJc 2:38 - 5.38<br><br>How are fossils made: https://www.nhm.ac.uk/discover/how-are-fossils-formed.html<br><br>https://www.bbc.co.uk/bitesize/topics/z9bbkqt/articles/z2ym2p3<br><br>STEM activity: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.stem.org.uk/sites/default/files/pages/downloads/Worksheet-Fossil-Creation-ks2.pdf<br><br>Soil: https://www.youtube.com/watch?v=AfpezDaPIdw |

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| **Y3 Summer** | **<u>Summer 1 – Light</u>**<br>-know and recognise that they need light in order to see things and that dark is the absence of light.<br><br>-know that light is reflected from surfaces<br><br>-know that light from the sun can be dangerous and that they are ways to protect their eyes.<br><br>-know that shadows are formed when light from a light source is blocked by an opaque object<br>-know and find patterns in the way that the size of shadows changes. | **<u>Summer 1- Light</u>**<br>  Show the children a candle, a light bulb and a torch. Which is the odd one out? Draw out their current knowledge through their justifications. Can they name as many light sources as they can? Introduce natural and man-made sources – can they now go back over their odd one out work, and their naming activities and add this current knowledge or regroup their sources.<br><br>   Use light boxes with options to increase the light to try and guess objects inside (shoe box with a hole in and a lid with flaps). What do the children notice? If there is no light in the box can you see? Write up findings<br><br>  Watch BBC clip showing the different between glow in the dark and reflective surfaces (*note reflective material was first invented in the 1940s to increase visibility on roads*).<br>  Mrs Oz has asked us to identify which material is best to get some new high vis jackets made from for her road safety project: which would be the best material? Set up a variety of materials (use Y1/2 properties of materials knowledge) Materials to be a mixture of bright and reflective etc. Use a data logger to measure the amount of light being reflective. Write a letter to Mrs Oz to prove their findings.<br>Scientist link- Bob Switzer – while recovering from an industrial injury her came up with the idea of fluorescent paint and then trialled it on clothing using the fabric of his wife's wedding dress.<br><br>  How could we block the sun? Show a pair of broken sunglasses and say you're going on holiday but have broken your sunglasses. Which would be the best material to keep your eyes safe from the sun. Talk about the sun's rays and what is needed. Repeat above experiment, but looking for materials that block out the sun – use data loggers. Design a new pair of sunglasses for the teacher.<br><br>  Use torch and objects to block the light and comment on what is happening. Use the scientific conclusion writing. Find patterns in the way that the size of shadows changes.<br>Can I make a shadow change size? Using torches change the height of the light source to change the length of the shadow, commenting on the shadow still is retaining the shape of the object. Provide scientific diagrams to explain their findings. | Light**, light source, dark, absence of light,** transparent, translucent, opaque, shiny, **matt,** surface, **shadow,** reflect, **mirror, sunlight,** dangerous, reflective, reflection | Reflection:<br>https://www.bbc.co.uk/programmes/p0117vyw<br>https://www.bbc.co.uk/programmes/p0118xm3<br><br>Bob Switzer:<br>https://www.hivis.net/blog/211/the-history-of-hi-vis-clothing/#:~:text=In%20the%201930s%2C%20an%20American,of%20his%20wife's%20wedding%20dress<br>https://www.hbcw.co.uk/news/history-of-high-visibility-workwear<br><br>Making shadows:<br>https://www.stem.org.uk/resources/elibrary/resource/30653/making-shadows |

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| | **Summer 2 – Animals including humans**<br>-know and identify that humans and some other animals have skeletons and muscles for support, protection and movement. | **Summer 2 – Animals including humans**<br>  Give the children three animals to explain the odd one out (link to Y1/2): mouse, snail and worm. Prompt for diet, habitats, off spring, food chain position.<br>  What would it be like if we didn't have a skeleton? Would a skeleton made from a different material be better? How do muscles work? Children to ask these questions in groups and to show their answers in a variety of ways: oral explanation, model, research.<br>  Identify different bones on a human model. Discuss their purpose. Organise and classify the bones in different ways. Encourage the children to think about the position in the body, their purpose and their size.<br>  Repeat previous activity but with skeletons of other animals. Children to organise them for another way to guess the classification keys. Identify two and discuss the similarities and differences using the correct language of their bones. Introduce the idea of an endo- and exo-skeleton to organise again.<br>  Children to create model of their hand using art straws as bones, string and ligaments and card to hold it together. Can they describe how muscles and bones work together to help us move?<br>Scientist link – Osteologist ( person who studies the structure of bones) | **Skeleton, exoskeleton, endoskeleton, vertebrate, invertebrate, bones, muscles, support, protect, skull, collar bone, rib cage, spine, radius, ulna, pelvis, femur, knee cap, tibia, fibular, humerus, muscles, joints, exoskeleton, endoskeleton, protective shell, no protection** | Skeleton:<br>https://www.youtube.com/watch?v=4YMK3ANKD-E<br><br>https://www.youtube.com/watch?v=3haTJCOkyxA<br><br>https://www.youtube.com/watch?v=lgky8HeMNsU |
| | -know and 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. |  Link to Y2 and describe a balanced meal using correct terminology (carbohydrates etc.) Look at three meals (lunch box from Y1, pizza from Y2 and a McDonalds), which is the odd one out? Explain why. Look at some food packaging to link their learning from Y2. Introduce the concept of calories as guide to how much we should consume.<br>  Use the McDonalds website to create the meal they would usually have and see the nutritional value, see if they can spot the main food groups. Then use it to create a balanced meal. Explain the differences between them.<br>  Link this learning to any DT (cooking) they have done in the past. Which was the most healthiest? Why? Challenge: if we had to advise the next year's year R/1/2/3 to adapt any of their recipes to make them healthier – what would you suggest.<br>Writing opportunity if time: could you write a letter to that teacher to adapt the recipe and explain why.<br>Reception: open banana sandwiches, pumpkin soup, ice lollies, fruit kebabs.<br>Year 1: pitta pocket, pasta with roasted vegetables, fruit pots, sandwich for a picnic.<br>Year 2: bread rolls, bean couscous salsa, snack bars, fruit lollies<br>Year 3: American burgers, breakfast pots, fruit chocolates<br><br>Scientist link - Nutritionist (talk through that it is the job they are doing rather than a specific person – link to Y1). | **Nutrition, nutrients,** carbohydrates, **protein,** dairy, vegetables, **sugars, protein, vitamins, minerals, fibre,** fat, water | Food groups:<br>https://www.youtube.com/watch?v=r7VIVmO8PiI<br><br>McDonalds nutrition calculator:<br>https://www.mcdonalds.com/gb/en-gb/good-to-know/nutrition-calculator.html<br><br>Eat well guidance:<br>https://www.cwt.org.uk/wp-content/uploads/2015/02/CHEW-5-11Years-PracticalGuide.pdf |

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| **Y4 autumn** | **<u>Autumn 1 – Electricity</u>**<br>-know how to identify common appliances that run on electricity (mains and battery).<br><br>-know how to construct a simple series electrical circuit, identifying and naming its basic parts (components) including cells, wires, bulbs, switches and buzzers. Using these circuits to create simple devices. Draw circuit and components as pictorial representations not necessarily using circuit symbols – y6.<br><br>-know how to and 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/cell.<br><br>-know how to recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.<br><br>-know how to recognise some common conductors and insulators, and associate some metals with being good conductors – silver, copper, gold, copper, aluminium, steel and brass. | **<u>Autumn 1 – Electricity</u>**<br>  Children to have real photographs of various items and ask the children to sort them in different ways e.g. have lights, need batteries, need main sockets, need to be charged or children to come up with their own titles, using a VENN diagram.<br>  Children to understand what electricity is.<br><br>  Children to be taught about precautions for working safely with electricity. Give the children the correct equipment and ask them to make the bulb light (pre-learning task). Then give the children constraint, if needed – the wires need to connect the components etc.<br>Ask the children to draw their circuit. Talk about the need for things to be labelled as a diagram rather than a drawing in art.<br>  Give the children the same equipment (not the bulb) with a buzzer. Ask them to make the buzzer work. Look at similarities and difference between the two circuits. Draw the buzzer circuit.<br><br>  Show the children drawings of circuits and allow them to explain their reasons.<br>  Move onto using real circuits and look at how to 'debug' (check all components, check filament, loose connections, complete circuit etc). Write observations.<br><br>  Give the children the same equipment as above but this time with a switch. Children to identify patterns in the circuit working and how the switch is positioned.<br><br>  Give the children the equipment for a circuit and a basket of objects (conductors, insulators and some that are made of both materials e.g. scissors). Pattern seeking – which materials are conductors? Is this always, sometimes or never the case?<br>  Predict which will allow electricity to flow through and which wouldn't (identify patterns).<br>Conduct fair test – how would we make it fair?<br><br>Scientist link - Alessandro Volta (1800 – discovered electricity by mixing chemicals and made the first battery). Talk about the types of scientists as he is an inventor.<br>Warren de la Rue – first found that a filament would create light, but it was economical or long lasting.<br>Thomas Edison – use a thinner, more economical filament and produce the first commercial light bulb. | **Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, debug** | Electrical inventions timeline activity<br>https://www.ogdentrust.com/assets/general/scientific-ideas-over-time_electricity_till-roll-timeline.pdf<br><br>NPP- electricity<br><br>What is electricity?<br>https://www.bbc.co.uk/teach/class-clips-video/primary-science-how-is-electricity-made/zfhfgwx<br><br>https://www.bbc.co.uk/teach/class-clips-video/science-ks2-what-is-electricity/znk6s82<br><br>General:<br>https://www.bbc.co.uk/bitesize/topics/zj44jxs<br><br>https://www.youtube.com/watch?v=q4v1lI6XCNc<br><br>https://www.bbc.co.uk/programmes/b0078mt5/clips |

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| | **Autumn 2 – Sound**<br>-know and identify how sounds are made, associating some of them with something vibrating.<br><br>-know and recognise that vibrations from sounds travel through a medium to the ear.<br><br>-know and recognise that sounds get fainter as the distance from the sound source increases.<br><br>-know how to find pattern between the volume of a sound and the strength of the vibrations that produced it.<br><br>- know how to find pattern between the pitch of a sound and features of the object that produced it. | **Autumn 2 – Sound**<br>  With various items that make noise (drum, tuning fork, cymbal, triangle, bottle, boomwhackers), investigate how to make a sound from it. Focus on what they can see when the sound is produced, what they can hear and what they can feel. Link it to feeling the vibrations. Children to classify objects.<br>  <br>  Using a concept cartoon to introduce many different thoughts about how sound travels, gauge current understanding.<br>Drama activity to mimic sound waves. Children to act out how the sound waves travels and reflect off objects. *Challenge: if appropriate explain and show the difference between reverberation and echo.*<br>  Children to design an experiment with soundproofing materials for Birchwood Beats using their knowledge of materials from year 1. Comparative experiment to with different variables (number of layers, types of layers). Use data loggers to measure and record.<br><br>  Link to personal experiences and children to come up with their own question to investigate. Children to design own experiment to test it out and used data loggers to record. Write a scientific conclusion.<br>  <br>  Use a concept cartoon to introduce theories and discuss using own experiences. Using rice on a drum, get the children to test out the theories from the concept cartoon and write up their observations.<br><br>  Using a guitar/violin, look at the thickness of the strings and notice the pattern between the pitch and sound. Is this the same for other things that make sound? Pattern observing experiment. Share.<br>Children should be able to draw the different sound waves (pitch, dynamics – link to music).<br>  *Challenge: can they design a musical instrument based on their knowledge of sound waves and vibrations.*<br><br>Scientist link: Robert Boyle was the first scientist to discover that sound waves needed to travel through a medium (air). Galileo Galilei was the first to discover the link between pitch and features of the instrument. | **sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation, reflection, *reverberation, echo*** | Concept cartoon:<br>S:\STAFF ONLY\Curriculum\Science\Resources\Concept cartoons\Sound\Y4<br><br>General:<br>https://www.bbc.co.uk/bitesize/topics/zgffr82<br><br>Data loggers:<br>https://www.youtube.com/watch?v=kK_1TKU4I-c |

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| **Y4 spring** | **<u>Spring 1 and 2 – States of matter</u>**<br>-know, compare and group materials together, according to whether they are solids, liquids or gases.<br><br>-know and observe some materials that change state when they are heated or cooled, and measure or research the temperature at which this happens in degree Celsius (°C)<br><br>-know and identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. | **<u>Spring 1 and 2 – States of matter</u>**<br>  What would the world be like without solids/liquids/gases? Gauge children's current understanding of the meaning of solids through writing.<br>Show the children a mixture of raisins and lemonade and discuss what's happening, then record observations. Then give the children the three states of matter and see if they can apply them to the mixture, redraft their observation (short observation over time).<br>Give the children cards with some properties of the states of matter (ASE) and get the children to group them (3 circle Venn diagram). Discuss what makes things a solid etc. using particle diagrams. Can they show their understanding through drama.<br>Scientist link- Greeks were the first to find the states of matter, but they called them the four elements (earth - solid, water- liquid, air - gas and fire).<br><br>  Which 'state' is rice? Investigate it based upon the properties. Understand that some solids are made up of parts and each part is a solid, which makes it able to pour.<br>  Give the children objects to explore and classify (3 circle Venn diagram): toothpaste, sand, air freshener, talcum powder, rice, milk, water, ice, steam (picture), pencil, oxygen (picture or 'cup of'). Introduce the idea of things being more than one state.<br><br>  Give the children some foam burst shower gel and a cup. Children to investigate it and decide which state it is and why. Observe over time and see if it changes. Can objects be more than one state? Why?<br>Would chocolate be an appropriate material to make chairs out of? (Link to Y2) Children to use current knowledge of changing states and properties to discuss positive and negatives for chocolate as a material for chairs.<br><br>  <br>  Give the children two chocolate buttons (normal and giant). Which would melt first? Children to predict based on prior knowledge and key vocabulary. Design and experiment to test this out. Discuss fair testing and variables. Children to design and carry out their own experiment.<br><br>  How many states of matter can water be? Discuss previous knowledge of heating, introduce cooling and freezing and discuss the temperature water will do each of these. Show a cup of water, boil it to see steam and bring out an ice cube. Model the change in particles through drama.<br>Can all liquids be changed into the other two states? Look at water, salty water, honey, golden syrup, olive oil, hand soap and washing up liquid. Predict what will happen to them if they are heated/cooled. Conduct experiment and discuss findings, draw conclusion.<br>*Home learning opportunity: research the point at which other materials melt or freeze, is it the same as water? – show learning in poster/video form for display.*<br><br>  Predict what you think will happen to this handprint of a paper towel by the time we get back from lunch. After lunch, ask the children what has happened to find out prior knowledge of evaporation. Link back to previous lesson about water being able to be more than one state. Show the children a picture with a mug, steam, and a steamed-up window. Discuss what they can see (link to changes state). Adult to model with a kettle that evaporation and boiling is the same change but at different temperatures. Then use a mirror near the spout to show condensation is the same as cooling but at a different temperature. | **Solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, heat, temperature, water cycle, precipitation** | General:<br>https://www.bbc.co.uk/iplayer/episode/m0011vb5/bitesize-daily-79-year-olds-science-89-yearolds-3-states-of-matter<br><br>https://www.youtube.com/watch?v=A1ImsqtNi9Q<br><br>https://www.bbc.co.uk/programmes/p0119gwx<br><br>Reversible changes:<br>https://www.stem.org.uk/resources/elibrary/resource/34080/understanding-reversible-change<br><br>Water cycle:<br>https://gpm.nasa.gov/education/water-cycle<br><br>https://gpm.nasa.gov/education/videos/earths-water-cycle up to 1:34.<br><br>NASA Aqua:<br>https://aqua.nasa.gov/ |

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| | |  Show the children a sock that hasn't dried properly and has become smelly or link to the weather if it rained that morning. How could we help the adult to make sure all the washing dries quickly to stop the musty, damp smell? Give small groups socks to design an experiment for the best conditions to dry a sock, conduct experiment. Conclusion: introduce the concept of evaporation (link to temperature and changes in states).<br><br>  Use hot water in a cup, covered with cling film with an ice cube on top. Children to record their findings using the previous lesson's key vocabulary (condensation, evaporation, liquid, gas).<br><br>  Use all knowledge from this section to explore and explain the water cycle. Use 3D model to show the water cycle. Children research elements of the water cycle and use the water cycle song to learn to parts. Create their own song to describe the water cycle.<br>  Scientist link- NASA – Aqua. The satellite is orbiting the Earth collecting data about the water cycle and helps us with our understanding of global warming and climate change. It has found that there in an increase in water vapour which is contributing to the climate change on our planet. | | |

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| **Y4 summer** | **Summer 1 – Animals including humans**<br>-know and identify different types of teeth in humans and their simple functions.<br><br>-know and describe the simple functions of the basic parts of the digestive system in humans.<br><br>-know, construct and interpret a variety of food chains, identifying producers, predators and prey. | **Summer 1 – Animals including humans**<br>Children to bite a piece of fruit and talk about which teeth they used and count them. Then give the children vocabulary for the teeth, they have another bite and then describe again what is happening. Label a diagram of the teeth (annotate with their purpose).<br>What would it be like without teeth? How do we look after our teeth? Talk about the purpose of brushing teeth. With permission children to bring in their toothbrushes and tooth paste. Use dental tablets that stain the plaque and show the children how to clean their teeth effectively – the time and the technique.<br>Scientist link – first tooth brushes were 3500-3000 years ago by ancient Egyptians but they were just frayed twigs. The first natural bristle toothbrush was invented in China using pigs hair and bone or bamboo for the handles. William Addis designed the modern toothbrush in England in 1780.<br><br>How does food effect our teeth? Use an egg as the shell can represent the enamel on our teeth and children to design a comparative experiment to test out the effect of food on our teeth if we do not brush/if we do brush, could look at different types of toothpaste and evaluate for effectiveness. Link to Y3 looking at the sugar contents of some drinks).<br><br>Where does the piece of apple go after being chewed? (link back to last lessons' learning. Use a zoom in/zoom out (Explorify) of the intestines and ask the children to identify what it is.<br>Give the children the names of the parts of the digestive system and the children to research the purpose of each of them.<br>Use a diagram and label the parts of the digestive system.<br><br>Use the names of the parts of the digestive system and then names of equipment, can the children use equipment to recreate it? (plastic bag, Weetabix, orange juice tights etc.) Talk about the time difference between the experiment and real life. Children to link back to their knowledge of the teeth and write a diary entry for the piece of fruit, and what happens after it leaves the mouth.<br><br>Using a food chain that they used in year 2, allow the children to have a go at remaking it. Recap the knowledge of what the arrow is for, and why it is in a certain order. Give the children word cards (producer etc.) and see if they can apply these to their current food chain. Provide the children with more pictures and animals (zoo, farm, woodland) and some arrows and see how many food chains they can make, correctly labelling the producer, prey and predator.<br>Challenge: what would happen if some part of the food chain was affected? Discuss that if there were less predators/prey, how would that effect the food chain? | **Digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, enzymes, small intestine, nutrients, large intestine, rectum, anus, teeth, incisor, canine, molar, premolars,** herbivore, carnivore, omnivore, **producer, predator, consumers, prey, food chain** | Digestive system:<br>https://www.youtube.com/watch?v=WEatCszm6ko<br><br>https://www.bbc.co.uk/programmes/p011n8k1 (has extra language for challenge)<br><br>https://www.youtube.com/watch?v=GqqHvgPXn7Q – link to balanced diet<br><br>Food chains:<br>https://www.bbc.co.uk/bitesize/topics/z7c72v4/articles/zkwgvwx<br><br>Teeth:<br>https://www.youtube.com/watch?v=06jDCHuXRlM<br><br>https://www.youtube.com/watch?v=3QSykqi3R_k (only sections of this video)<br><br>Invention of toothpaste:<br>https://www.colgate.com/en-us/oral-health/brushing-and-flossing/history-of-toothbrushes-and-toothpastes |

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| | **Summer 2 – Living things and their habitats**<br>-know and recognise that living things can be grouped in a variety of ways<br><br>-know, explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment<br><br>-know and recognise that environments can change and that this can sometimes pose dangers to living things. | **Summer 2 – Living things and their habitats**<br>  Show the children three animals, and ask them to find the odd one out (more than one possibility). Check prior knowledge from Y1 and Y2 (carnivore etc. habitats, how they grow). Then show all prior knowledge and see if they can have another go, repeat with another three animals. Use a Venn diagram to group the animals (using prior knowledge as the titles). Introduce a Carroll diagram and group them again. Link to their knowledge of the human skeleton (Y3) and introduce the concept of vertebrates and invertebrates.<br>*Keep a record of all the ways they have grouped them, introduce grouping them based on a question – this links to the classification keys in Y6.*<br><br>   Visit the forest school area and the kitchen garden and identify a range of habitats. While there, discuss the living things that live there and discuss the reasons for that. Start by playing 'guess who' with different types of animals they found, which then is the premise behind classification keys. Once back in class, use classification keys to create a classification diagram (at least 3 layers, with statements or questions, for at least 4/5 animals) about the animals they found in different habitats.<br>Challenge the pupils by providing a classification key diagram half completed, with either the animals at the bottom or part of the keys filled in, for the children to figure out the missing elements.<br><br>  Using their knowledge of other living things (e.g. plants – linking to y1,2, 3 learning, leaves – Y1 etc.) can they create a classification key to show this knowledge – look back at curriculum map for key knowledge.<br><br>  How can environments change? Watch videos in resource section about pollution and the damage to environments e.g. rubbish, deforestation and not replacing them. Children to research one element that they feel most passionately about: cause, impact and possible solution. Verbally present to the class (use ICT PowerPoint, posters, clips etc.)<br>Write a letter to Mr Coleman/Mrs Bayliss/Mrs Davis and the Eco Committee about how they propose we support our wildlife in our community and the changes they would like to implement – link to the community. This links to English.<br>Take part in the Big Bee Count/Big butterfly count. | Classification, **classification keys,** environment, habitat, **human impact,** positive, negative, **migrate, hibernate, pollution, vertebrate, invertebrate** | Pollution:<br>https://www.youtube.com/watch?v=5XDvAGDgZX0<br><br>https://www.wwf.org.uk/get-involved/schools/oceans-and-plastics |

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| **Y5 autumn** | **Autumn 1 – forces**<br><br>-know and identify the effects of air resistance, water resistance and friction, that act between moving surfaces. *Air resistance, water resistance and friction are contact forces that act between moving surfaces. The object may be moving through the air or water or the air and water may be moving over a stationary object.*<br><br>-know and explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. *A force causes an object to start moving, stop moving, speed up, slow down or change direction. Gravity is a force that acts at a distance. Everything is pulled to the Earth by gravity. This causes unsupported objects to fall.*<br><br>-know how to recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. *A mechanism is a device that allows a small force to be increased to a larger force. The pay back is that it requires a greater movement. The small force moves a long distance and the resulting large force moves a small distance, e.g. a crowbar or bottle top remover. Pulleys, levers and gears are all mechanisms, also known as simple machines.* | **Autumn 1 – forces**<br>Initial hook ideas:<br>Balloon rocket (balloon, straw and string.) How does the balloon move across the string? Encourage the children to use the word 'force in their explanation and investigate whether the amount of air changes their findings.<br>Provide the key vocabulary and a prompt to their year 3 learning and get the children to 'show'; their knowledge of these words (drama or picture form).<br><br>Recap of year 3 statement: compare how things move on different surfaces.<br>Friction:<br>Recap learning of friction from year 3. How could we measure the force more accurately? Force meter: Newton meter. Give the children the opportunity to look at what they do and how to measure the 'force'.<br>Using a variety of objects, measure the force needed to move these objects across a surface. Talk about variables (the surface) and the constant (object). Table. Write conclusion with explanation as to why some measures were higher than others based upon the surface.<br>Introduce friction in our everyday lives. Show the children a video of a child and a slide and talk about how there isn't a lot of friction due to the smooth surface, trainers have the bumpy surface to create friction – why? Etc. Write explanation text.<br>Scientist link: Galileo Galilei and Isaac Newton helped to develop the theory of gravitation<br><br>Air resistance: Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. Children to run across the playground once with an open umbrella and once without. Can they explain the difference? (Link to y4 particle knowledge.) Investigate sycamore seeds falling – what patter can they see? What is air resistance? Children to make a QR code, help video to explain.<br>Show video of parachutes. Predict what would happen if you change the size of the parachute, linking to knowledge of air resistance. Parachutes investigation: look at size of parachutes, in relation to the size of the object you want to save. Children to create a hypothesis to test out. Explanation to include air resistance and knowledge on gravity.<br><br>Scientist link – Leonardo Da Vinci drew the first parachute but Sebastien Lenorman demonstrated it first in 1783.<br><br>Water resistance:<br>Roll a ball on the ground and then through a tray of water. Children to explain what they see (use prior knowledge on air resistance and friction). Then explain concept of water resistance (link to Y4 particles).<br>Design a boat out of paper that would be tested for different purposes (movement through the water as well as hold the most weight). Test and conclusion- link to Viking long ships from Y4)<br><br>Provide the children with gears, levers and pulleys. Investigate what they are and how do they create a force.<br>Investigate how a pulley can make lifting a book easier, what happens if you add more pulleys? Conclusion writing. | Force: push, push, magnetic, Earth, friction, **air resistance, water resistance, gravity, gear, lever, pulley, system, mechanism** | Forces video clips :<br>http://www.bbc.co.uk/learningzone/clips/forces-in-action-no-narration/1601.html<br>https://www.bbc.co.uk/bitesize/clips/zp4g9j6<br><br>Scientists' info card:<br>https://www.ogdentrust.com/assets/general/Research-cards_gravity_forces.pdf<br><br>Levers, gears and pulleys :<br>https://www.schoolsofkingedwardvi.co.uk/ks2-science-year-5-5c-forces-simple-machines/ |

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| | | Challenge: create a marble run with all the forces and mechanisms that the children have learnt about in this topic., could split into groups for each one. | | |
| | **Autumn 2 – Earth and Space**<br>-know and use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.<br><br>-know and describe the movement of the moon relative to the Earth<br>-know and describe the Sun, Earth and Moon as approximately spherical bodies.<br><br>-know and describe the movement of the Earth, and other planets, relative to the sun in the solar system. | **Autumn 2 – Earth and Space**<br>  Children to use a torch and ball, to represent the Sun and Earth, and create a model to explain how day and night is formed. QR code a video demonstration of their knowledge about how we get day and night.<br>  How do shadows change throughout the day based upon the position of the sun? Children to design their own experiment over a day and write a conclusion to show their findings. Concept cartoon 9.11<br>  <br>  Give children 3 images of the Earth, Sun and Moon and think about how they are all the same and how they are different. 'Odd one out'.<br>  <br>  Concept cartoon 9.4. Children to act out the movement of the moon and the sun. All children to move accordingly. Concept cartoon 9.10.<br><br>Prior learning activity, give children vocabulary, what level of understanding do children currently have of the solar system? Link back to Y1 knowledge of the four seasons, observing weather associated with the seasons and how day length varies. Fill in gaps or challenge misconceptions as necessary.<br>  Toilet roll activity, exploring the distance between the planets.<br><br>  Out onto the playground, create a moving model of the solar system from themselves (drama), children to describe their findings using scientific language.<br>  Scientist: Ptolemy and Copernicus. Look at the heliocentric and geocentric models of the solar system and why they thought their respective theories. | **Earth, Sun, Moon, Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune, dwarf planet – Pluto, spherical, solar system, rotates, star, orbits, planets, axis, celestial** | General :<br>https://www.bbc.co.uk/bitesize/topics/zkbbkqt<br><br>3 images :<br>S:\STAFF ONLY\Curriculum\Science\Resources\ASE documents\Y5\Y5 Earth and space Melissa.pptx<br><br>Concept cartoons :<br>S:\STAFF ONLY\Curriculum\Science\Resources\Concept cartoons\Earth and beyond\Y5<br><br>Toilet roll activity : chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://astrosociety.org/file_download/inline/cfdf9b2c-5947-4c19-9a23-a790ac3c7ae0<br><br>View of Earth from the moon 1st minute:<br>https://www.youtube.com/watch?v=GfO-3Oir-qM |

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| **Y5 Spring** | **Spring 1 and 2 – Properties and changes of materials**<br>-give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, woods and plastic.<br>*This is then to continue throughout the topic as the comparative and fair tests will happen during filtering, evaporation, thermal insulation etc.*<br><br>-know, compare and group together everyday materials on the bases of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.<br><br>-know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.<br><br>-know how to separate mixtures, including through filtering, sieving and evaporating<br>-know and demonstrate that dissolving, mixing and changes of state are reversible changes. | **Spring 1 and 2 – Properties and changes of materials**<br>  Make observations: children to be taken on a school tour of the school building, identifying different materials used for different purposes and why they are appropriate (using their properties knowledge and any changing state process knowledge from this unit).<br>Select a range of materials, and describe why they were purposeful chosen, i.e. for a bike. Steel for the frame, rubber for the wheels (link to Y3). Repeat the raisins and lemonade demonstration to recall their knowledge of states of matter from Y4. Can prompt with the key vocabulary (solid, liquid, gas, separate) when labelling their findings.<br><br>  Using Y1,2,3 and 4 knowledge, children are given a variety of objects and asked to classify them. The children are to choose their classification diagram (e.g. Carroll, Venn – 3 parts etc.) as well as their headings (properties, ability to change state etc.). Key vocabulary to be retrieved, recalled and reminded.<br>Challenge: can they justify their diagram choice as well as their key choice.<br><br>Dissolving<br>  Add sugar to warm water and comment on what happens (dissolved). It is now a solution. Explanation and labelled diagram.<br>How could you speed up the dissolve process? Children set up their own fair test experiment changing a variable (type of sugar or temperature). Hypothesis writing and creating own table to show results.<br><br>Filtering<br>  Give the children a mixture of water and sand, how could they make change reversible? Show the children filter paper and allow them to investigate. Then give them their sugar solution, can this be filtered?<br>Scientist: Bear Grylls (explorer) use his video of how to filter water to survive in the wild. Not all scientists wear white coats and work in a Laboratory.<br>How do explorers use this process when drinking water in the wild? Investigate the layers needed to make a natural filtration system (moss, stones, soil, rocks in a bottle etc.). Children to label their method and justify their layers order. Test it out and see which order of layers was the most successful.<br><br>Evaporation<br>Show video/model demonstration of the heating process to separate the water and sugar. Make sure the children understand that this is an irreversible change unless other precautions are used (condensation etc.).<br>  Set up the experiment over time using a salt solution. Prediction writing.<br><br>Sieving<br>Show the children a mixture of various sizes solids (e.g. pasta, rocks, flecks of metal, salt, sand, chickpeas etc.) and explain there was an accident in the science cupboard and all of this fell of the shelf and has gotten mixed up but Miss Haynes needs it separating. Will filtering or evaporating help? (Old Y6 SATs question). Children to explain why these change in state process wouldn't work.<br><br>  Have a mixture of sugar, water, sand, pasta shells, iron filings etc. How will the children separate them? They should use all of their knowledge of filtering, evaporation, sieving, magnetic to separate all of these items.<br>  <br><br>Thermal insulation | solid, liquid, gas, **thermal/electrical insulator/conductor**, magnetic, evaporation, condensation, change of state, mixture, **dissolve, solution, soluble, solvent, insoluble, filter, sieve reversible/non-reversible change,** burning, freezing, melting, rusting, new material | Bear Grylls filter<br>Just a shirt:<br>https://www.youtube.com/watch?v=fmrGn9n6KsY<br><br>use moss, rocks etc:<br>https://outdoors.com/how-bear-grylls-makes-his-water-safe-to-drink/<br>https://www.youtube.com/watch?v=oUS-qV- EA<br>The children are not to drink the water, they are to monitor the clarity.<br><br>New material:<br>https://www.bbc.co.uk/programmes/p0119rnc<br><br>Changing materials:<br>https://www.youtube.com/watch?v=xEz_vWt9toc<br>Only sections |

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| | -know and 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. |  Miss Chamberlain is fed up of her tea going cold too quickly in her thermal mug and is looking for some help. Which would be the best material to keep her tea warm? Best thermal insulator. Children to come up with some materials they could test (use prior knowledge Y4) and set up an experiment using thermometers and record results in multi-layer line graph about temperature over time.<br><br>  Allow children to retrieve lots of examples of reversible and irreversible changes. Show them a Berroca tablet fizzing in water. Is this reversible or irreversible? Introduce the idea that in some changes a new material is produced.<br>Using a film canister, model the creation of gas (new material) to explode the lid off. Link this to their forest school learning when building a fire. Is that reversible or irreversible? What is the new material that is created?<br>Create a reversible/irreversible changes knowledge organiser. | | |

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| **Y5 Summer** | **<u>Summer 1 – Living things and their habitats</u>**<br>-know and describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.<br>-know and describe the life process of reproduction in some animals. | **<u>Summer 1- Living things and their habitats</u>**<br>*Plant a strawberry plant and a potato at the end of last term to be used in the last section of this unit.*<br>Look at key vocabulary, what can they remember and what do they know? (Y1 – groups of animals, Y2- life cycles, Y4-classification)<br>  Link back to Year 2 – caterpillars. What can they remember about their life cycle? Can they remember how to draw a life cycle? Introduce 'metamorphosis'. Work alongside year 2 in creating a documentary: year 5 to create the episode about metamorphosis.<br><br>  Compare life cycle between a frog and a beetle (link back to Y2), create Venn diagram.<br>e.g. The female lays hundreds of eggs on a leaf then turns into a larva then the pupa stage and lasts up to 9 months in winter period larva eat a tremendous amount of food to grow and turn into young and then turns into a beetle adult.<br><br>  Children to research the life cycle of a bird and identify the main stages: egg, hatching, fledgling, adult bird, reproduce. Can they describe similarities and differences between bird and mammal life cycles? Add another 'episode' to their documentary.<br>  Compare life cycle of a partridge bird and a robin. What are the similarities and differences? E.g. difference in nesting habitats, egg shape, egg amount, incubation period.<br><br>Compare the life cycle of a mammal to a bird<br>  Provide the children with gestation period graph and identify similarities and difference between the size of the adult and the gestation periods. Look for patterns in life cycle data. Find patterns, can you also find an anomaly? What further questions can you raise based on the data?<br>Challenge: Create your own question and research data to produce graph. E.g. in the life span of mammals.<br><br>Scientist link - David Attenborough (watch his programmes on life cycles that are age appropriate). Look at his importance to the protection of species due to his knowledge of habitats and their breeding needs. | Life cycle, **reproduce, fertilises, live young, mature adult, fledgling, metamorphosis, nymph, larvae** | Life cycle of animals:<br>https://www.youtube.com/watch?v=6SCyMatncy4<br><br>https://www.bbc.co.uk/bitesize/articles/zdvhxbk#zxsqqfr |
| | -know and describe the life process of reproduction in some plants. |  Children have planted a variety of plants in the school grounds (Use knowledge from Y1 of when best to plant each plant as well as Y3 knowledge of what types of seeds you are planting: strawberries, conifers, flowing plants, ornamental grasses, fruit bushes and potatoes. Children to go and see the growth in these plants, and comment of the life cycle of them.<br><br>  Dissect a daffodil and label it's parts (see key vocab) with the purpose. Discuss pollination and why the bees and insect are important.<br><br>  Go back outside and look at all the different plants in the grounds and see whether they can spot the reproduction system in all plants. This will lead to the idea of sexual and asexual plants.<br>Look at how strawberries are asexual and take cuttings from the plants in the grounds for the children to grow and then take home. Children to write their findings.<br>Look at how potatoes have tubers and compare and contrast the reproduction of strawberry, potatoes and flowering plants. | **asexual, tubers, plantlets, pollination, runners,** bulbs, **cuttings,** petal, pollen**, anther, filament, sepal,** leaf, **stigma, style, ovary, ovule** | Life cycle of plants:<br>https://vimeo.com/218127170<br><br>Sexual and asexual reproduction:<br>From 1:48<br>https://www.youtube.com/watch?v=co5jZId0F-g |

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| | **Summer 2 – Animals including humans**<br>-know and describe the changes as human develop to old age. | **Summer 2 – Animals including humans**<br>*This unit links to PSHE Summer 2 curriculum. New learning will take place in PSHE lessons initially to then be used within retrieval Science lessons to reinforce knowledge.*<br><br>  Retrieve knowledge about the main stages of a human's life (prenatal, infancy, childhood, adolescence, early-mid-late adulthood) and what classifies each of these stages.<br>  Challenge – research project: Is there a correlation between the gestation period and the size of the animal? | See PSHE curriculum map | |

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| **Y6 Autumn** | **Autumn 1 – Evolution and inheritance**<br><br>-know and identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.<br><br>-know and recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.<br><br>-know how to recognise that things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. | **Autumn 1 – Evolution and inheritance**<br>Hook activity –<br>Now>press>play – evolution. The introduction to adaptations (in camels), evolution and Charles Darwin.<br><br>Ask the children to create a mind map about the key vocabulary of evolution, inheritance and adaptation. This is to identify their current knowledge (2,3,4) as well as from PHSE lessons and the hook day.<br><br>Provide a picture of a cactus with the key features annotated (thick skin, large, fleshy stems, spikes, shallow roots) and they are to explain how that has adapted to its environment (climate, water etc.)<br>Children are to choose an animal (polar bear, owl, penguin, zebra, starfish, camel, and giraffe) and to research it based upon its adaptability for its environment (link to habitat, climate, food, water etc.). BBC learning clips.<br>Challenge the children to think about the consequences of that animal not adapting to its species as well as others (Y2, 4 life cycles).<br>Look at the peppered moth and how humans have had an impact on its adaptability (industrial revolution) and how through evolution the offspring can vary to their parents – game from the National History Museum<br>Children to be given an environment (possibly linked to their literacy work or geography work) and they are to create an animal that is suited well to it and explain.<br><br>Look into Darwin and the Galapagos Island. Give the children different types of tweezers to represent the beaks and different containers to get food from. Investigate which 'bird' would survive and what adaptations would need to be made through evolution in order for the other species to survive. Write detailed conclusion – 1st person recount (using Darwin's reports as a guide).<br>Use baby pictures of staff/children (where appropriate) with the pictures of their parents and see if the children can match up the child to the correct parents based upon features. Children to explain their justifications and explain that it is not always identical offspring.<br>Use Making Reebops: a model for meiosis (practicalbiology.org) to create reebops to investigate how sometime we take characteristics and sometimes we don't.<br><br>Show the children a picture of a woolly mammoth and an elephant. Find similarities and differences. Can they explain why each are suited for their environment and the adaptions that have taken place.<br>Look at the evolution of a horse (hyracotherium, mesohippus, merychippus, pilohippus, equus) using pictures of fossils. Children to explain the process of evolution using the evidence.<br>Can they use the same theories to explain the evolution of man?<br><br>Scientist: David Attenborough– new findings on how animals live (link to current affairs)<br>Scientist: Charles Darwin – theory of evolution, findings from Galapagos Island and the finches. | **Offspring, sexual reproduction, vary, characteristics, suited, adapted**, environment, **inherited,** species, fossils, habitat, **consequences, evolution, inheritance, adaptation** | Speak to foster carers or adopted parents for children who do not live with their biological family to identify at what stage they are at with their life story work.<br><br>https://www.bbc.co.uk/teach/class-clips-video/science-ks2-the-work-of-charles-darwin-and-alfred-wallace/zrbxgwx intro to Darwin<br><br>David Attenborough video on Darwin: https://www.youtube.com/watch?v=5x6KQvtOg-s<br><br>General: https://www.bbc.co.uk/bitesize/topics/zvhhvcw<br><br>Peppered moth game: https://www.nhm.ac.uk/schools/teaching-resources/key-stage-2/evolution-and-inheritance/species-variation-game-peppered-moth-lucky-landing.html<br><br>Reebops: https://practicalbiology.org/genetics/modelling-inheritance/making-reebops-a-model-for-meiosis?highlight=WyJyZWVib3BzIiwibWFyc2htYWxsb3dzIiwidGhhdCIsInJlZWJvcHMgbWFyc2htYWxsb3dzIiwicmVlYm9wcyBtYXJzaG1hbGxvd3MgdGhhdCIsIm1hcnNobWFsbG93cyB0aGF0Ill0<br><br>Adaptation: https://www.bbc.co.uk/teach/class-clips-video/science-ks2--ks3-how-animals-have-adapted/z4y76v4 |

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| | **Autumn 2 – Electricity**<br><br>-know and use recognised symbols when representing a simple circuit in a diagram<br><br>-know and associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.<br>-know, 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. | **Autumn 2 – Electricity**<br>Recap Y4 electrical knowledge by giving children a bag of electrical equipment and ask them to make a working circuit. Challenge: can you make a circuit using only 1 wire, 1 cell and 1 bulb?<br>  Using the circuits they previously made, give the children the symbols for the components and they are to draw them accurately. Use symbols for: bulb, wire, cell; make sure the batter/cell is at the top, and the wires are straight and draw in a square sort of shape.)<br>  Create a working circuit with motor, switch, and buzzer and draw using recognised symbols.<br>  Give opportunity for children to debug broken or incorrect circuits, both practically and by looking at the symbols in a diagram.<br><br>  Use concept cartoon (5.7) to introduce the hypothesis of how to make the bulb brighter. Children to analyse what is being said and what they believe. Teach 'voltage'. Give children the option for how they want the test their hypothesis e.g. 1 cell, keep adding lots of components, what do you notice? Or 1 component, and keep adding lots of cells increasing the voltage. Or change the voltage of the cell.<br>  Could they relate their previous lesson knowledge to making a buzzer louder or moving the switch? Repeat experiment using their prior findings to influence their decisions. Use the data loggers to measure accurately.<br>  Children to generate their own hypothesis they want to test linking to electrical circuits (experiment over time). How long will it take a cell to run out with only 1 bulb? Will the motor slow down when the cell is running low?<br>Scientist link: Thomas Edison (Y4) and Humphrey Davy. Look at Humphrey's findings of using electrical currents to produce light and the issue of keeping the light and how Edison created filament which then allowed the previous science by Humphrey to continue: there were many people trying to produce the first light bulb.<br>Alessandro Volta – invented the voltaic pile which was the first battery that could provide a steady electrical current in a steady rate in a circuit. | Circuit, complete circuit, series circuit, circuit diagram, **circuit symbols: cell, battery, bulb, buzzer, motor, switch, voltage** | Brightness of the bulb:<br>https://www.bbc.co.uk/programmes/p011931m<br><br>Voltage:<br>https://www.youtube.com/watch?v=w82aSjLuD_8<br>https://www.bbc.co.uk/programmes/p00wv6p6<br>1:30-2:29<br><br>ASE:<br>S:\STAFF ONLY\Curriculum\Science\Resources\ASE documents\Y6\Y6_Electricity_Julie_0.ppt |

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| **Y6 Spring** | **Spring – Living things and their habitats**<br>-know and 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.<br>-know and give reasons for classifying plants and animal based on specific characteristics. | **Spring – Living things and their habitats**<br>Revisit Y4 knowledge, what do you remember? What is classification? What types are there (the children should talk about it grouping items based upon criteria (Carroll, Venn - parts, keys).<br>  Plants: give children a leaf, ask children to describe the features to a partner. Identify similarities and differences. How could you classify and group these with other leaves with similar features? Encourage the children to use different classification diagrams and explain their reasoning.<br>  Animals: Revisit terminology (reptile, birds, mammal, amphibian, fish etc.) define distinguishing features.<br>  Scientist link- Look at Carl Linnaeus and his work on the classification diagram. He created classification as a way of ordering the chaos that is nature and being able to make sense of it. He also created the binominal system where each specie and plant is given a genus name followed by a specific species name, all in Latin. He is most famous for coining the term: homo sapiens.<br>  Practise: give children a range of pasta. Physically classify these objects, what closed questions could we ask to create a classification key diagram with multiple layers.<br>  Children to role play with their own group of animals (as labels) to physically create a classification diagram (try to get a variety of animals for each child so they are all different). Once completed explain their scientific thought process to the others in the class and discuss whether there were other ways of approaching this with the same or different results.<br>  Use Textease to create a classification diagram with given animals.<br>  Where do micro-organisms grow? What are they? Have a look around school/outside of decay.<br>Conduct an experiment over time, in which location and which type of bread goes the mouldiest the quickest (link to current affairs to provide purpose for the need for bread to remain fresh e.g. somebody is running a marathon, going on a school trip etc. Write conclusion. | Vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, flowering and non-flowering<br>Use all previous years' vocabulary within the classification keys. | Organisms:<br>https://www.youtube.com/watch?v=oB-ESbTSzQI<br><br>Classification of organisms:<br>https://www.bbc.co.uk/teach/class-clips-video/science-ks2--ks3-classification-of-organisms/zh7g92p<br><br>Carl Linnaeus:<br>https://kids.britannica.com/kids/article/Carolus-Linnaeus/625446<br><br>https://www.linnean.org/learning/who-was-linnaeus/interesting-stories |

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| **Y6 Summer** | **Summer 1 – Animals including humans**<br>-know, identify and name the main parts to the human circulatory system, and describe the functions of the heart, blood vessels and blood.<br>-know and describe the ways in which nutrients and water are transported within animals, including humans.<br><br>-know and recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. | **Summer 1 – Animals including humans**<br>Provide the children with a copy of a blank body and allow them to name parts that they are familiar with, and the parts that are to do with the circulatory system (pre-learning. Children may link to digestive system Y4 or reproductive system – PSHE Y5).<br><br>  <br>Identify the main parts of the circulatory system:<br>• Heart label the parts and identify its role and how oxygenated and deoxygenated blood travels through the heart<br>• Lungs (ensure that the children are aware that it is the deoxygenated blood that is pumped here and the reason.<br>• Blood (plasma, white blood cells, red blood cells and the purpose of each feature)<br>• Pulse/heart rate<br>• Veins and arteries<br>• How oxygenated and deoxygenated blood travels around the body<br>Create a job advert for each of these parts, record some for a documentary video for website at the end of this unit.<br><br>  <br>Have a large chalk body out on the playground with the blue and red clearly marked for the children to see the movement of the 'blood'. They are to be the blood cells in the circulatory system – drama activity to understand how it works.<br>Children to record their findings in either a 'documentary style video' that could be used for the following year group, or in a blog style written for their class webpage to inform parents. (Don't post yet, link it to the exercise section later on).<br><br>  <br>Create 'blood' (and look at the parts within it (see above) and each of their roles.<br><br>Scientist link - Helen Brooke Taussig. A deaf and dyslexic pioneer of correcting heart defects in children. Her research and operation were the forerunner to adult open-heart surgery.<br><br>  <br>Exercise - Conduct PE experiment and record using excel spreadsheets (link to computing) and present findings in a graph. For example, "Which exercise raises my heart rate the most? How long does it take my heart rate to recover from exercise? Do my heart rate differ according to the amount of exercise I do? Use heart monitors, stop watches etc. Children to design their own table to record the results as well as which graph would be better to show the results (bar, line, scatter) and then to explain their reasoning.<br><br>  <br>Diet, drugs and lifestyle- link to PSHE curriculum, look at the effect of drugs and alcohol on the heart and lungs, sort healthy and unhealthy organs, plan a healthy and unhealthy meal considering all aspects of a balanced diet (link to year 2 learning).<br>Link with writing and PSHE, research healthy lifestyles, produce a non-chronological report with findings. i.e. (smoking and nicotine, alcohol, lifestyle, sleep, mental health, diet, exercise).<br><br>End of unit activity: Using this knowledge as well as the knowledge from the circulatory system, children are to start a 'change4life' campaign with the parents and children of Y6 – could be other year groups to. Children to create video | heart, **aorta, right atrium, right ventricle, left ventricle, left atrium** pulse, **rate, pumps, blood, blood vessels, plasma, veins, arteries, oxygenated, deoxygenated, transported, lungs,** oxygen, carbon dioxide, nutrients, water, muscles, cycle, **circulatory system,** diet, exercise, drugs and lifestyle | Circulatory system:<br>https://www.youtube.com/watch?v=f9ONXd_-anM<br><br>https://school-learningzone.co.uk/key_stage_two/ks2_science/the_human_body/the_circulatory_system/the_circulatory_system.html<br><br>0:39 – 1:09:<br>https://www.youtube.com/watch?v=CWFyxn0qDEU<br><br>https://www.youtube.com/watch?v=mC7-XXmbF90<br><br>How to make blood:<br>https://letsgolivescience.com/activity/how-to-make-blood/ |

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| | | explaining the science and the reasons behind healthy eating, healthy swaps, heart rate for activity. Can come up with a competition/challenge? Link with house captain's competition? | | |
| | **Summer 2 – Light**<br>-know and recognise that light appears to travel in straight lines<br><br>-know and 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.<br>-know and 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.<br><br>-know and use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. | **Summer 2 – Light**<br>Use a concept cartoon (7.5) to recap prior knowledge of light from Year 3, (that darkness is the absence of light, light is reflected from surfaces and shadows are formed).<br><br>Use the question: How does light travel? Give the children a variety of different materials, (hose pipe, tubes, opaque cardboard, coloured plastic) and torch. Children to investigate how light travels and to verbally explain the current findings (use Y3 knowledge of shadows).<br>What happens when the hose pipe is bent? What happens when you a mirror is introduced? What do you notice? Has this changed your view of how light is travelled? Record and analyse findings – scientific diagram<br>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.<br><br>Explain that we see things because of the way light travels from light sources to our eyes or from light sources to objects and then to our eyes.<br>Draw and label image of the eye (see vocab) briefly outline their purpose. Draw and label the process of how light travels from the sun/source, bounces off the object and into our eyes.<br><br>Conduct experiment of reflecting the light, how using reflective objects or mirrors enable us to see objects that are not right in front of us (this could be proven through making a periscope, linking to WW2 knowledge).<br><br>Investigate the idea of refraction (Light travels and reflects off surfaces into our eyes. When light travels from air through water, glass or anything that lets light through, it gets bent. This change in direction is called refraction.)<br><br>Generate own statement to prove through their investigation, i.e. the closer the object is to the light, the larger the shadow (link to year 3 knowledge repeated version of experiment but developing thinking)<br>"*Investigate how the shadow size can be changed depending on the direction of the light"*. Children to use their knowledge of light travelling in straight lines, to explain how shadows can be changed.<br>Maths Link and record data on a line graph. Measure: A, How far was the object form the wall. B, How far away from the light. C, Length of shadow. D, Width of shadow<br>Draw and label the process, linking explanations back to light travelling in straight lines.<br>Scientist link- C.V Raman. First looked into 'light scattering' when it passes through objects. | **Straight lines, Light rays, travel,** light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous, **refraction,** eye lids, cornea, iris, sclera, pupil, anterior chamber, ciliary muscle, optic nerve, lens, retina | How does light travel:<br>https://www.bbc.co.uk/programmes/p0119rsp<br><br>Refraction:<br>https://www.youtube.com/watch?v=2X2U2y93nCk<br><br>Parts of the eye:<br>https://www.youtube.com/watch?v=9OS-9pG1lT0<br>https://www.youtube.com/watch?v=0NR6ArO8iFI |