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| Science | **Pedagogical Knowledge****Science pedagogy is based in the development of conceptual understanding, processes, skills of enquiry and developing scientific attitudes.**There are many ways to elicit children’s ideas including:* Drawing
* Writing
* Responding to a stimulus
* Concept mapping
* Individual or group discussions

**Best Practice Specific Pedagogies for Science*** Analogues and illustrations to help children visualise abstract concepts.
* Demonstrations to bring concepts to life.
* Models to represent ideas such as the structure of a flower.
* Animated models to support understanding of dynamic systems.
* New ideas need to be related to children’s experiences, for example talking about puddles when teaching about evaporation.
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| Y1&2Cycle A | **Autumn****Childhood** | **Spring****Bright Lights, Big City** | **Summer****School Days** |
| Unit | Everyday Materials | Human Senses | Seasonal Changes | Plant Parts | Animal Parts |
| Local Heritage |  |  |  |  |  |
| Y1 | **Know that objects are made from different materials.****Know that some objects are human made; others are natural.****Describe the properties of everyday materials.**Test the properties of materials.Compare and group materials.Record results in a Venn diagram. | **Identify, name and label parts of the human body.** **Know which part of the body is associated with each sense.**With support, record information on a Venn diagram. | **Know there are four seasons: Spring, Summer, Autumn and Winter.****Know that some trees lose their leaves during Autumn.** **Know day length is the number of daylight hours.****Know that people must stay safe in the sun.**Observe how day length changes.Gather and record data to help answer questions about different seasons.Investigate weather using toys, models or simple equipment. | **Identify and name a variety of common wild and garden plants.** **Identify and describe the parts of plants(root, stem, leaf, flower, petal, fruit)****Know that plants grow from seeds or bulbs.**Use observations and ideas to suggest answers to questions. | **Know that different animal groups have some similar body parts.****Know there are different groups of animals.****Know that living things need warmth, food, water, and shelter.****Know animals can be grouped according to their diet (carnivores, herbivores and omnivores)**Label and describe the basic structures of fish, amphibians, reptiles, birds and mammals.Group and sort animals based upon what they eat. |
|  | Greater Depth |
|  | Explain what happens to certain materials when they are heated or cooled. | Name some parts of the human body that cannot be seen. | Observe features in the environment and explain that these are related to a specific season.Observe and talk about changes in the weather. | Begin to describe what each part of a plant does (e.g. roots, stem, leaves, petals, pollen) on a range of plants. | Say why certain animals have certain characteristics.Begin to classify animals according to a number of given criteria. |
| Y2 | **Know a variety of different everyday materials and name them.** **Identify human made and natural materials.****Know that materials with different properties have different uses.**Compare and group materials in a variety of ways.Gather and sort simple data in a range of ways. | **Name the basic body parts of the human body explain their uses.****Know how senses keep people safe.**Label a diagram of the human body.Sort animals based upon their features.Record similarities and differences in Venn diagrams. | **Know that some trees are evergreen; others are deciduous.****Describe typical UK seasonal weather patterns.****Know that day length is longer in the summer months and shorter in the winter months in the UK.****Know and explain how to stay safe in the sun.****Know that wind strength is measured by the Beaufort scale**.Observe and describe how day length changes across the year.Ask questions then use simple equipment to measure weather. | **Name the parts of a plant and their function.** **Know what a plant needs to survive.** Observe and record the growth of a plant. | **Name the processes that define living things.****Name the 6 animal groups( mammal, amphibian, bird, reptile, fish, reptiles)****Know that carnivores eat other animals; herbivores eat plants; and omnivores eat animals and plants.**Use Carroll diagrams to classify animals.Ask scientific questions and answer them using research, observation or simple tests. |
|  | Greater Depth |
|  | Describe the properties of different materials using words like, transparent or opaque, flexible. | Describe what animals need to survive and link this to their habitats. | Talk about weather variation in different parts of the world. | Describe what plants need to survive and link it to where they are found. | Name some characteristics of an animal that help it to live in a particular habitat. |
| Y3&4Cycle A | **Autumn****Through The Ages** | **Spring****Rocks, Relics and Rumbles** | **Summer****Emperors and Empires** |
| Unit | Skeletal & Muscular Systems | Forces and Magnets | Light & Shadows | Plant Nutrition & Reproduction  |
| Local Heritage | Centre for Life, Newcastle | John Walker - Friction Match |  |  |
| Y3 | **Know that animals need the right type and amount of nutrition.****Know that animals get nutrition from what they eat.** * **Identify that humans and some animals have skeletons and muscles for support, protection and movement.**
* **Know what vertebrates and invertebrates are.**

With support, set up and carry out some simple, comparative, and fair tests, making predictions for what might happen. | **Know rocks are organised into three groups: metamorphic, igneous and sedimentary.****Compare and group rocks based on their appearance, properties or uses.****Describe simply how fossils are formed, using pictures or a model.****Describe different types of soil based upon their properties.**Investigate soils from the local environment, making comparisons and identifying features.**Know that objects move differently on different surfaces.****Know that some forces need contact between two objects.****Know that magnetic forces can act at a distance.**Use straightforward scientific evidence to answer question or to support their findings.Compare how objects move over different surfaces. | **Know that light can be reflected from different surfaces.****Know that shadows are formed when the light from a light source is blocked by a solid object.** Investigate how shadows change during the day.**Know that there are transparent, translucent and opaque materials.** | **Identify the different parts of flowering plants.****Know what plants need to grow.****Know that a plant has a life cycle.****Know the process of pollination.**Investigate the way in which water is transported within plants. Draw and label the life cycle of a plant. |
|  | Greater Depth |
|  | Explain how the muscular and skeletal systems work together to create movement. | Investigate the strengths of different magnets and find fair ways to compare them. | Explain what happens to the electricity when more batteries are added. | Classify a range of common plants according to many criteria (environment found, size, climate required etc). |
| Y4 | **Identify components of a balanced diet.****Know the three main types of muscle are skeletal, cardiac and smooth.****Identify and label major bones of the human skeleton.****Identify and name three types of joints.****Describe the advantages and disadvantages of exoskeletons and endoskeletons.**Plan and carry out an investigation to answer a question of their choice. | **Know how metamorphic, igneous and sedimentary rocks are formed.****Identify, compare and group rocks based on their appearance, properties or uses.****Describe how fossils are formed.****Identify different types of soil based upon their properties.**Investigate soils from the local environment, making comparisons and identifying features.**Explain how magnets attract or repel each other and attract some materials and not others.** **Explain what friction is and why different objects move differently on different surfaces.**Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet and identify some magnetic materials. Take measurements using force meters. | **Know the difference between reflective and non- reflective materials.****Know how shadows are formed.****Know why shadows change size.**Identify transparent, translucent and opaque materials.Find patterns in the way that the size of shadows change**.** | **Explain how the structure of a leaf enables it to support the plant through transpiration photosynthesis.****Explain the stages in the life cycle of a plant.****Explain different types of pollination (wind, animals, explosion and water).**Investigate how water is transported in plants.Gather, record, classify and present data in a variety of ways to help in answering questions.Draw and label the life cycle of a plant. Explain each stage. |
|  | Greater Depth |
|  | Classify living things and non-living things by a number of characteristics that they have thought of. | Begin to relate the properties of rocks with their uses. | Explain why their shadow changes when the light source is moved closer or further from the object. | Give reasons for how they have classified animals and plants, using their characteristics and how they are suited to their environment. |
| Y5&6Cycle A | **Autumn****Dynamic Dynasties** | **Spring****Sow Grow and Farm** | **Summer****Groundbreaking Greeks** |
| Unit | Forces & Mechanisms | Earth & Space | Human Reproduction & Ageing*(Plants- taught through Sow, Grow, Farm)* | Properties and Changes of Materials |
| Local Heritage | George Stephenson | Wynyard Planetarium & Observatory |  | ICI – PerspexJohn Dorman, Dorman Long |
| Y5 | **Identify different contact and non-contact forces.****Know that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.**Plan different types of scientific enquires to answer questions including, recognising and controlling variable where necessary. | **Know that day and night are caused by the rotation of Earth around the sun.****Identify the different phases of the moon.**Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.Describe the movement of the Moon relative to the Earth. | **Know population changes in a habitat can have significant consequences for food chains and webs.*****Compare the life cycles of animals, including a mammal, an amphibian, an insect and a bird.******Describe the life process of reproduction in some plants and animals.****Group and sort plants by how they reproduce.****Identify the parts of a flower involved in sexual reproduction in plants (stamen, filament, anther, pollen, carpel, stigma, style, ovary, ovule and sepal).*****Describe the stages of mammalian life cycles.****Describe the changes as humans develop to old age.**Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. | **Know materials have different properties including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.****Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.****Know there are reversible and irreversible changes.** Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. |
|  | Greater Depth |
|  | Describe and explain how motion is affected by forces. | Compare the time of day at different places on the earth. | Draw a timeline to indicate stages in the growth and development of humans. | Describe methods for separating mixtures. (filtration, distillation) |
| Y6 | **Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.** **Explain the effects of air resistance, water resistance and friction that act between moving surfaces.****Explain how some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.**Plan different types of scientific enquires to answer questions including, recognising and controlling variable where necessary. | **Explain how day and night and the seasons occur due Earth’s orbit of the sun.****Explain how the different phases of the moon occur.****Know why gravity causes planets to be spherical.** | *Describe, using their knowledge of food chains and webs, what could happen if a habitat had a living thing removed or introduced.*Describe the difference between asexual and sexual reproduction.*Explain the process of sexual reproduction in plants (stamen, filament, anther, pollen, carpel, stigma, style, ovary, ovule and sepal).***Know that human growth charts are line graphs that show the projected growth for juveniles.**Report and present findings from enquiries, including conclusions, causal relationships and explanations. | **Demonstrate that dissolving, mixing and changes of state are reversible changes.** **Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.****Explain the process of reversible and irreversible changes giving examples.** |
|  | Greater Depth |
|  | Work out how water can cause resistance to floating objects. | Explore the work of some scientists (Ptolemy, Alhazen, Copernicus) | Compare the life cycles of plants and animals in their local environment with the life cycles of those around the world, e.g. rainforests. | Explore changes that are difficult to reverse, e.g. burning, rusting and reactions such as vinegar with bicarbonate of soda. |