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|  | **Topic** | **National Curriculum Outcomes**  *(Endpoints children will achieve)* | **Substantive Knowledge**  *(specific facts, e.g. herbivores feed on plants linked to: Living things and habitats; Animals including humans, Plants, materials, Rocks, Forces and magnets, evolution and inheritance, electricity, light, Earth and space.* | **Disciplinary Knowledge**  *(Know how to … be able to… know that…because….)*  *Working scientifically* | **Concepts**  *(discovery, change, investigation, cause and consequence)* | **Vocabulary** | **Culture**  *(What is wonderful and awesome in Science? How do children feel successful and show/ promote this?What enrichment?)* |
|  |  |  | Children will know how to/be able to: | Children will know how to/be able to: | Children will appreciate: | Children will recall and verbalise: |  |
|  | **Living Things and Their Habitats** | Sc4/2.1a recognise that living things can be grouped in a variety of ways  Sc4/2.1b explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment  Sc4/2.1c recognise that environments can change and that this can sometimes pose dangers to living things. | **Know that animals can be grouped based on their physical characteristics and based on their behaviour.**  **Know that a classification key uses questions to sort and identify different living things and how to use a classification key.**  **Know that changes to the environment can make it more difficult for animals to survive and reproduce**  **Know that in extreme cases this leads to extinction, where an entire species dies**  **Know, in simple terms, what climate change is and the effect it can have to living things.** | **WORKING SCIENTIFICALLY**   * Know that we can ask questions and answer them by setting up scientific enquiries * Know how to draw bar charts; how to label a diagram using lines to connect information to the diagram; how to use a coloured key how to draw a neat table; how to draw a classification key; how to show the relationship between an independent variable in a two-way table; and how to label specific results in a two-way table * Know that they can draw conclusions from the findings of other scientists   Know that a theory is an explanation of observations that has been tested to some extent and that a hypothesis is an explanation that has not yet been tested, but that can be tested through a scientific enquiry |  | Vertebrates, Fish, Amphibians, Reptiles, Birds, Mammals, Invertebrates, Snails, Slugs, Worms, Spiders, Insects, Environment, Habitats  **WORKING SCIENTIFICALLY**  prediction, theory, hypothesis | science day led by Sublime Science. |
| **Sound** | Sc4/4.1a identify how sounds are made, associating some of them with something vibrating  Sc4/4.1b recognise that vibrations from sounds travel through a medium to the ear  Sc4/4.1c find patterns between the pitch of a sound and features of the object that produced it  Sc4/4.1d find patterns between the volume of a sound and the strength of the vibrations that produced it.  Sc4/4.1e recognise that sounds get fainter as the distance from the sound source increases | **Know that a sound is generated when an object vibrates.**  **Know that sound vibrations travel through a medium to the ear**  **Know that pitch is how high or low a sound and how this is made.**  **Know that volume of a sound is quieter if the listener is further away from the source.** |  | * Know that scientific enquiries can suggest relationships, but that they do not prove whether a prediction is true * Know that scientific enquiries are limited by the accuracy of the measurements (and measuring equipment) and by the extent to which conditions can vary even, and that repeating enquiries, measurements and taking measures to keep conditions as consistent as possible can improve an enquiry * Know that the conclusions of scientific enquiries can lead to further questions, where results can be clarified or extended to different contexts (e.g. effect of changing sunlight on a plant – does this work with other plants / different types of light / etc) | Know and use the terms particle, vibration, frequency, volume, pitch, transverse wave, longitudinal wave, medium, vacuum  **WORKING SCIENTIFICALLY**  prediction, measurement, enquiry, dependent variable, independent variable, fair test, similar, theory, hypothesis |  |

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|  | **Electricity** | Sc4/4.2a identify common appliances that run on electricity  Sc4/4.2b construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers  Sc4/4.2c 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  Sc4/4.2d recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit  Sc4/4.2e recognise some common conductors and insulators, and associate metals with being good conductors. | **Know a source of electricity (mains of battery) is needed for electrical devices to work.**  **Know electricity sources push electricity round a circuit.**  **Know some materials allow electricity to flow easily and these are called conductors. Materials that don’t allow electricity to flow easily are called insulators.** | **Know that more batteries will push the electricity round the circuit faster and devices work harder when more electricity goes through them.**  **Know that a complete circuit is needed for electricity to flow and devices to work.**  **WORKING SCIENTIFICALLY**   * Know that we can ask questions and answer them by setting up scientific enquiries * Know how to make relevant predictions that will be tested in a scientific enquiry * Know that in a fair test one thing is altered (independent variable) and one thing that may change as a result is measured (dependent variable) while all other conditions are kept the same * Know how to use a range of equipment to measure accurately, including thermometers, data loggers, rulers and stopwatches * Know how to draw bar charts; how to label a diagram using lines to connect information to the diagram; how to use a coloured key how to draw a neat table; how to draw a classification key; how to show the relationship between an independent variable in a two-way table; and how to label specific results in a two-way table * Know – with structured guidance - how to write a simple scientific enquiry write-up including an introduction, a list of equipment, a numbered method, a detailing of results and a conclusion * Know how to precis a scientific enquiry write-up into a brief oral discussion of what was found in a scientific enquiry * Know that they can draw conclusions from the findings of other scientists   Know that a theory is an explanation of observations that has been tested to some extent and that a hypothesis is an explanation that has not yet been tested, but that can be tested through a scientific enquiry | * Know that scientific enquiries can suggest relationships, but that they do not prove whether a prediction is true * Know that scientific enquiries are limited by the accuracy of the measurements (and measuring equipment) and by the extent to which conditions can vary even, and that repeating enquiries, measurements and taking measures to keep conditions as consistent as possible can improve an enquiry * Know that the conclusions of scientific enquiries can lead to further questions, where results can be clarified or extended to different contexts (e.g. effect of changing sunlight on a plant – does this work with other plants / different types of light / etc) | Cells, Wires, Bulbs, Switches,  Buzzers, Battery, Circuit,  Series, Conductors, Insulators  **WORKING SCIENTIFICALLY**  prediction, measurement, enquiry, dependent variable, independent variable, fair test, similar, theory, hypothesis | October half term – research an inventor/invention of their choice. |
| **Animals, Including Humans** | Sc4/2.2a describe the simple functions of the basic parts of the digestive system in humans  Sc4/2.2b identify the different types of teeth in humans and their simple functions  Sc4/2.2c construct and interpret a variety of food chains, identifying producers, predators and prey. | **Know that digestion is when food passes through the body with nutrients being extracted and the waste products are excreted**  **Know the function of the types of teeth in humans** | **Know that a food chain traces an energy path from the sun, through a habitat**  **Identify the types of teeth in humans.**  **WORKING SCIENTIFICALLY**   * **Know that we can ask questions and answer them by setting up scientific enquiries** * **Know how to make relevant predictions that will be tested in a scientific enquiry** * **Know that in a fair test one thing is altered (independent variable) and one thing that may change as a result is measured (dependent variable) while all other conditions are kept the same** * **Know how to use a range of equipment to measure accurately, including thermometers, data loggers, rulers and stopwatches** * **Know how to draw bar charts; how to label a diagram using lines to connect information to the diagram; how to use a coloured key how to draw a neat table; how to draw a classification key; how to show the relationship between an independent variable in a two-way table; and how to label specific results in a two-way table** * **Know – with structured guidance - how to write a simple scientific enquiry write-up including an introduction, a list of equipment, a numbered method, a detailing of results and a conclusion** * **Know how to precis a scientific enquiry write-up into a brief oral discussion of what was found in a scientific enquiry** * **Know that they can draw conclusions from the findings of other scientists**   **Know that a theory is an explanation of observations that has been tested to some extent and that a hypothesis is an explanation that has not yet been tested, but that can be tested through a scientific enquiry** | * Know that scientific enquiries can suggest relationships, but that they do not prove whether a prediction is true * Know that scientific enquiries are limited by the accuracy of the measurements (and measuring equipment) and by the extent to which conditions can vary even, and that repeating enquiries, measurements and taking measures to keep conditions as consistent as possible can improve an enquiry * Know that the conclusions of scientific enquiries can lead to further questions, where results can be clarified or extended to different contexts (e.g. effect of changing sunlight on a plant – does this work with other plants / different types of light / etc) | Mouth, Tongue, Teeth, Oesophagus, Stomach, Small Intestine, Large Intestine, Herbivore, Carnivore, Canine, Incisor, Molar  **WORKING SCIENTIFICALLY**  prediction, measurement, enquiry, dependent variable, independent variable, fair test, similar, theory, hypothesis | Visit to the Science Museum. |
| **States of Matter** | Sc4/3.1a compare and group materials together, according to whether they are solids, liquids or gases  Sc4/3.1b observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)  Sc4/3.1c identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. | **Know the differences between solids and liquids.**  **Know what a gas is and be able to compare it to solids and liquids.**  **Know how particles behave in different states.**  **Know about the water cycle.** | **WORKING SCIENTIFICALLY**   * Know that we can ask questions and answer them by setting up scientific enquiries * Know how to make relevant predictions that will be tested in a scientific enquiry * Know that in a fair test one thing is altered (independent variable) and one thing that may change as a result is measured (dependent variable) while all other conditions are kept the same * Know how to use a range of equipment to measure accurately, including thermometers, data loggers, rulers and stopwatches * Know how to draw bar charts; how to label a diagram using lines to connect information to the diagram; how to use a coloured key how to draw a neat table; how to draw a classification key; how to show the relationship between an independent variable in a two-way table; and how to label specific results in a two-way table * Know – with structured guidance - how to write a simple scientific enquiry write-up including an introduction, a list of equipment, a numbered method, a detailing of results and a conclusion * Know how to precis a scientific enquiry write-up into a brief oral discussion of what was found in a scientific enquiry * Know that they can draw conclusions from the findings of other scientists   Know that a theory is an explanation of observations that has been tested to some extent and that a hypothesis is an explanation that has not yet been tested, but that can be tested through a scientific enquiry | * Know that scientific enquiries can suggest relationships, but that they do not prove whether a prediction is true * Know that scientific enquiries are limited by the accuracy of the measurements (and measuring equipment) and by the extent to which conditions can vary even, and that repeating enquiries, measurements and taking measures to keep conditions as consistent as possible can improve an enquiry * Know that the conclusions of scientific enquiries can lead to further questions, where results can be clarified or extended to different contexts (e.g. effect of changing sunlight on a plant – does this work with other plants / different types of light / etc) | Solid, Liquid, Gas, Evaporation,  Condensation, Particles,  Temperature, Freezing, Heating  **WORKING SCIENTIFICALLY**  prediction, measurement, enquiry, dependent variable, independent variable, fair test, similar, theory, hypothesis |  |
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