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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: |  |
|  | **Forces** | Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object•identify the effects of air resistance, water resistance and friction, that act between moving surfaces•recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect**WORKING SCIENTIFICALLY**• Sc5/1.1 planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary• Sc5/1.2 taking measurements, using a range of scientific equipment, with increasing accuracy and precision• Sc5/1.3 recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, and bar and line graphs• Sc5/1.4 using test results to make predictions to set up further comparative and fair tests• Sc5/1.5 reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of results, in oral and written forms such as displays and other presentations• Sc5/1.6 identifying scientific evidence that has been used to support or refute ideas or arguments. | **Know the effects of air resistance, that acts between moving surfaces.****Know that some mechanisms, including levers and pulleys, allow a smaller force to have a greater effect.****Know the effects of friction, that acts between moving surfaces.****Know the effects of water resistance, that acts between moving surfaces.** | **Be able to explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object*** **Know how to choose appropriate variables to test a hypothesis**
* **Know how to identify conditions that were imperfectly controlled and can explain how these might affect results**
* **Know how to accurately use further measuring devices, including digital and analogue scales, measuring cylinders and beakers, recognizing the relative accuracy of each device**
* **Know how and when to repeat measurements, how to find an average of a set of measurements and how to recognize and remove outliers from a set of data, justifying the removal as a potential mis-measurement**
* **Know how to independently 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 present brief oral findings from an enquiry, speaking clearly and with confidence and using notes where necessary**
* **Know about scientific evidence that has been used to support or refute ideas or arguments.**
 |  | Air resistance, Water resistance, Friction, Gravity, Newton, Gears, Pulleys**WORKING SCIENTIFICALLY** **Revision:**prediction, measurement, enquiry, dependent variable, independent variable, fair test, similar, theory, hypothesis**New learning and vocabulary**line graph, relationship, outlier |  |
| **Earth and Space** | Sc5/4.1a describe the movement of the Earth, and other planets, relative to the Sun in the solar systemSc5/4.1b describe the movement of the Moon relative to the EarthSc5/4.1c describe the Sun, Earth and Moon as approximately spherical bodiesSc5/4.1d use the idea of the Earth’s rotation to explain day and night, and the apparent movement of the Sun across the sky.**WORKING SCIENTIFICALLY**• Sc5/1.5 reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of results, in oral and written forms such as displays and other presentations• Sc5/1.6 identifying scientific evidence that has been used to support or refute ideas or arguments. | **Know the movement of the Earth and other planets relative to the sun in the solar system.****Know the movement of the moon relative to the Earth.****Know that the sun, Earth and moon are approximately spherical bodies.****Know that the Earth’s rotation explain day and night are the apparent movement of the sun across the sky.** | * **Know how to present brief oral findings from an enquiry, speaking clearly and with confidence and using notes where necessary**
* **Know about scientific evidence that has been used to support or refute ideas or arguments.**
 |  | Earth, Sun, Moon, Axis, Rotation, Day, Night, Phases of the Moon, star, constellation**WORKING SCIENTIFICALLY****Revision:**Theoryhypothesis**New learning and vocabulary**relationship | Planetarium visit to the school.Space project (homework). |
| **Changes of Materials** | Sc5/3.1a compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets Sc5/3.1b know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution Sc5/3.1c use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating Sc5/3.1d give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plasticSc5/3.1e demonstrate that dissolving, mixing and changes of state are reversible changesSc5/3.1f 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.**WORKING SCIENTIFICALLY**• Sc5/1.1 planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary• Sc5/1.2 taking measurements, using a range of scientific equipment, with increasing accuracy and precision• Sc5/1.3 recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, and bar and line graphs• Sc5/1.4 using test results to make predictions to set up further comparative and fair tests• Sc5/1.5 reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of results, in oral and written forms such as displays and other presentations• Sc5/1.6 identifying scientific evidence that has been used to support or refute ideas or arguments. | **Know that some materials will dissolve in a liquid to form a solution.****Know that dissolving, mixing and changes of state are reversible changes.****Know that some changes result in the formation of new materials, and this is usually not reversible.** | **Be able to explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object*** **Know how to choose appropriate variables to test a hypothesis**
* **Know how to identify conditions that were imperfectly controlled and can explain how these might affect results**
* **Know how to accurately use further measuring devices, including digital and analogue scales, measuring cylinders and beakers, recognizing the relative accuracy of each device**
* **Know how and when to repeat measurements, how to find an average of a set of measurements and how to recognize and remove outliers from a set of data, justifying the removal as a potential mis-measurement**
* **Know how to independently 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 present brief oral findings from an enquiry, speaking clearly and with confidence and using notes where necessary**
 |  | Hardness, Solubility, Transparency, Conductivity, Magnetic, Filter, Evaporation, Dissolving, Mixing**WORKING SCIENTIFICALLY****Revision:**prediction, measurement, enquiry, dependent variable, independent variable, fair test, similar, theory, hypothesis**New learning and vocabulary**line graph, relationship, outlier |  |
| **Living Things and Their Habitats** | Sc5/2.1a describe the differences in the life cycles of a mammal, an amphibian, an insect and a birdSc5/2.1b describe the life process of reproduction in some plants and animals.**WORKING SCIENTIFICALLY**• Sc5/1.5 reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of results, in oral and written forms such as displays and other presentations• Sc5/1.6 identifying scientific evidence that has been used to support or refute ideas or arguments. | Know that the life cycle of a living thing is a series of stages of development starting with a fertilized egg in animals or a seed in many plantsKnow that different animals mature at different rates and live to different ages.Know that some organisms reproduce sexually where offspring inherit information from both parents.Know that some organisms reproduce asexually by making a copy of a single parent.Know that environmental change can affect how well an organism is suited to its environment. | * Know how to present brief oral findings from an enquiry, speaking clearly and with confidence and using notes where necessary
 |  | Mammal, Reproduction, Insect, Amphibian, Bird, Offspring**WORKING SCIENTIFICALLY****Revision:**prediction, measurement, enquiry, dependent variable, independent variable, fair test, similar, theory, hypothesis**New learning and vocabulary**line graph, relationship, outlier |  |
| **Animals including Humans** | describe the changes as humans develop to old age**WORKING SCIENTIFICALLY**• Sc5/1.5 reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of results, in oral and written forms such as displays and other presentations• Sc5/1.6 identifying scientific evidence that has been used to support or refute ideas or arguments. | **Know the changes as humans develop** **to old age.****Know the key stages in the human** **timeline.****Know the changes that take place to** **boys and girls during puberty.****Know about different gestation and life** **expectancies for animals.** | Know how to interpret data linked to gestation periods and life expectancies* Know how to present brief oral findings from an enquiry, speaking clearly and with confidence and using notes where necessary
 |  | Foetus, Embryo, Womb, Gestation, Baby, Toddler, Teenager, Elderly, Growth, Development, Puberty**WORKING SCIENTIFICALLY****Revision:**prediction, measurement, enquiry, dependent variable, independent variable, fair test, similar, theory, hypothesis**New learning and vocabulary**line graph, relationship, outlier |  |