**UKS2 Cycle A**

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| **Forces:**  Pupils should be taught to:   * 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. | **Questions (and different enquiries used to answer them):**  Can I identify and explain different forces acting on objects?  Can I explore and explain the effect of gravity on unsupported objects?  Can I investigate and explain the effects of air resistance?  Can I identify the effects of water resistance?  Can I identify streamlined shapes?  Can I investigate the effects of friction?  Can I explore and design mechanisms? | **Tests including comparatives and fair tests (include recognising and controlling variables):**  Identify the effects of air resistance by investigating the best parachute to slow a person down- comparative test changing variables such as materials.  Identify the effects of water resistance by creating and racing streamlined boats- fair test and controlling variables.  Identify the effects of friction by investigating brakes- comparative test changing variables such as materials for suitability. |
| **Equipment (including thermometers and data loggers):**  Newton meters, junk modelling | **Recording and presenting data (scientific language, drawings, classification keys, labelled diagrams, keys, bar/line graphs, and tables):**  Reporting on findings from enquiries: oral/written explanations  Using results to: draw conclusions/make predictions/ set up further comparative tests  Identifying differences, similarities or changes related to scientific ideas and processes, including causal relationships and explanation of trust in results:  Using scientific evidence to answer questions or to support findings and that which refutes ideas: |
| **Data gathering (systematic careful observation and accurate, precise recording, standard units of measure, taking repeat recordings when appropriate):**  During enquiries, they make decisions with more independence  e.g. whether they need to: take repeat readings using the Newton meters (fair testing); increase the sample size of objects to measure gravity dependent on what they notice (pattern seeking); adjust the  observation period and frequency when testing the water and air resistance (observing over time); or check further secondary sources (researching); in order  to get accurate data (closer to the true value). |
| **Other links/information:** | |
| **Properties and changes of materials:**  Pupils should be taught to:   * compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets * know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution * use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating * give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic * demonstrate that dissolving, mixing and changes of state are reversible changes * explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda. | **Questions (and different enquiries used to answer them):**  Can I compare materials according to their properties?  Can I investigate thermal conductors and insulators?  Can I investigate which electrical conductors make a bulb shine brightest?  Can I investigate materials which will dissolve?  Can I use different processes to separate mixtures of materials?  Can I identify and explain irreversible chemical changes? | **Tests including comparatives and fair tests (include recognising and controlling variables):**  Investigate thermal insulators and conductors by using comparative and fair tests to look at changing and controlling of variables.  Investigate which electrical conductors make a bulb shine brightest by using comparative and fair tests to look at changing and controlling of variables.  Investigate materials which will dissolve and explain why using findings? Investigate materials which dissolve by using comparative and fair tests to look at changing and controlling of variables. |
| **Equipment (including thermometers and data loggers):**  Containers Thermometers  Ice cubes Rulers Stopwatches Different materials, batteries Bulbs Wires Connectors such as crocodile clips different metals to test in the circuit - ideas include: copper coin, iron nail, steel spoon, silver jewellery, gold jewellery,  Materials to dissolve: sand, chalk, flour, rice, coffee, sugar, salt, gravy. Differently shaped/ sized beakers; Different types of water (sparkling, flavoured, still); Teaspoons, Weighing scales; Different temps of water | **Recording and presenting data (scientific language, drawings, classification keys, labelled diagrams, keys, bar/line graphs, and tables):**  Reporting on findings from enquiries: oral/written explanations  Using results to: draw conclusions/make predictions/ set up further comparative tests  Identifying differences, similarities or changes related to scientific ideas and processes, including causal relationships and explanation of trust in results:  Using scientific evidence to answer questions or to support findings and that which refutes ideas: |
| **Data gathering (systematic careful observation and accurate, precise recording, standard units of measure, taking repeat recordings when appropriate):**  During enquiries, they make decisions with more independence  e.g. whether they need to: take repeat readings using the thermometers, weighing scales and stopwatches (fair testing); increase the sample size of objects to measure thermal and electrical conductor and insulators dependent on what they notice (pattern seeking); adjust the observation period and frequency when testing the reversible and irreversible and changes of state tests (observing over time) |
| **Other links/information:**  URENCO workshop Autumn 1 | |
| **Earth and Space:**  Pupils should be taught to:   * describe the movement of the Earth, and other planets, relative to the Sun in the solar system * describe the movement of the Moon relative to the Earth * describe the Sun, Earth and Moon as approximately spherical bodies * use the idea of the Earth’s rotation to explain day and night and the apparent movement of the sun across the sky. | **Questions (and different enquiries used to answer them):**  Can I explain why we know the Sun, Earth and Moon are spherical?  Can I name and describe features of the planets in our solar system?  Can I explain how planets move in our solar system?  Can I explain day and night and the apparent movement of the sun across the sky?  Can I investigate night and day in different parts of the Earth?  How can we check if our predictions are correct? Where would we get the information from?  Can I explain the movement of the Moon? | **Tests including comparatives and fair tests (include recognising and controlling variables):**  I can investigate night and day in different parts of the Earth.  Investigate and explain the movements of the moon- discuss reliability of sources and feasibility of using a source of information. |
| **Equipment (including thermometers and data loggers):**  Globes, planets , access to Google maps, Ipads for recording and researching.  Trip to planetarium/ planetarium to come in- CM Governor. | **Recording and presenting data (scientific language, drawings, classification keys, labelled diagrams, keys, bar/line graphs, and tables):**  Reporting on findings from enquiries: oral/written explanations  Using results to: draw conclusions/make predictions/ set up further comparative tests  Identifying differences, similarities or changes related to scientific ideas and processes, including causal relationships and explanation of trust in results:  Using scientific evidence to answer questions or to support findings and that which refutes ideas: |
| **Data gathering (systematic careful observation and accurate, precise recording, standard units of measure, taking repeat recordings when appropriate):**  During enquiries, they make decisions with more independence.  Check further secondary sources (researching planets and movements of the moon); in order to get accurate data (closer to the true value). |
| **Other links/information:**  Trip to planetarium/ planetarium to come in- CM Governor-Spring 2.  Ignite STEAM festival Autumn 1 | |
| **Living things and their environments:**  Pupils should be taught to:   * describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird * describe the life process of reproduction in some plants and animals. | **Questions (and different enquiries used to answer them):**  Can I describe how some plants reproduce?  Can I describe how some plants reproduce?  Can I explain what Jane Goodall discovered about chimpanzees?  Can I describe the life cycles of different mammals?  Can I compare the life cycles of amphibians and insects? | **Tests including comparatives and fair tests (include recognising and controlling variables):**  Describe and explore how different plants reproduce- comparative test and look at different plant cuttings.  Investigate asexual and sexual reproduction in plants- make new plants from cuttings- Fair test, observation over time and comparative test- look at conditions and compare different plant cuttings.  Explore and investigate how different mammals grow- We will also set up another observation over time experiment and look at chicks hatching from eggs.  From this, we can also have an opportunity to compare how different animals grow and reproduce and give the greater depth children a chance to compare the results from how plants grow and reproduce with how animals grow and reproduce. |
| **Equipment (including thermometers and data loggers):**  Jar/ beakers, Plant for cuttings- spider plants, strawberry plants, he’s egg for looking at embryos,  Incubator with chick eggs. | **Recording and presenting data (scientific language, drawings, classification keys, labelled diagrams, keys, bar/line graphs, and tables):**  Reporting on findings from enquiries: oral/written explanations  Using results to: draw conclusions/make predictions/ set up further comparative tests  Identifying differences, similarities or changes related to scientific ideas and processes, including causal relationships and explanation of trust in results:  Using scientific evidence to answer questions or to support findings and that which refutes ideas: |
| **Data gathering (systematic careful observation and accurate, precise recording, standard units of measure, taking repeat recordings when appropriate):**  During enquiries, they make decisions with more independence  e.g. whether they need to: take repeat readings when recording results of cuttings (fair testing); increase the sample size of cuttings (pattern seeking); adjust the observation period for watching how plants and animals develop (observing over time) |
| **Other links/information:**  Tam O’Shanter- incubator. | |
| **Animals (including humans):**  Pupils should be taught to:   * describe the changes as humans develop to old age. | **Questions (and different enquiries used to answer them):**  Can I describe the stages of human development?  Can I explain how babies grow and develop?  Can I describe and explain the main changes that occur during puberty?  Can I identify the changes that take place in old age?  Can I report findings from enquiries?  Can I record complex data using graphs and models? | **Tests including comparatives and fair tests (include recognising and controlling variables):**  Compare the changes that happen in boys and girls during puberty  Research and report findings of the gestation period for a range of different animals.  Compare the gestation periods and life expectancy for different animals using graphs and models. |
| **Equipment (including thermometers and data loggers):**  Squared paper, computers with appropriate graphing software (Excel, Google Sheets, Numbers, Graphs iOS app- for recording results. | **Recording and presenting data (scientific language, drawings, classification keys, labelled diagrams, keys, bar/line graphs, and tables):**  Reporting on findings from enquiries: oral/written explanations  Using results to: draw conclusions/make predictions/ set up further comparative tests  Identifying differences, similarities or changes related to scientific ideas and processes, including causal relationships and explanation of trust in results:  Using scientific evidence to answer questions or to support findings and that which refutes ideas: |
| **Data gathering (systematic careful observation and accurate, precise recording, standard units of measure, taking repeat recordings when appropriate):**  During enquiries, they make decisions with more independence  e.g. whether they need to: take repeat readings when gathering evidence3 and data and recording it(fair testing); increase the sample size of data/ results when comparing gestation periods (pattern seeking); adjust the observation period for watching how plants and animals develop (observing over time) |
| **Other links/information:**  SRE links- Christopher Winter Project | |