Springcroft Primary School

Year 5
Science Programme of Study

Inc. Core-Standard Coverage of Enquiry Types and 'Working Scientifically' Skills:

Enquiry Types	
Research Using Secondary Sources	✓✓✓
Observing Over Time	✓✓✓
Pattern Seeking	✓✓✓✓
Identifying, Classifying and Grouping	✓✓✓
Comparative and Fair Testing	✓✓✓✓✓

Working Scientifically	
Conducting Secondary Research	✓✓✓
Asking Questions	✓
Making Predictions and Hypothesising	✓✓✓
Setting up Investigations	✓✓✓
Observing and Measuring	✓✓
Recording Data	✓✓
Interpreting and Communicating Results	✓✓
Evaluating and Questioning Further	✓✓

Aims

'The National Curriculum for Science' aims to ensure that all pupils:

- develop **scientific knowledge and conceptual understanding** through the specific disciplines of biology, chemistry and physics
- develop understanding of the **nature, processes and methods of science** through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the **uses and implications** of science, today and for the future.

Scientific Knowledge and Conceptual Understanding:

The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression: pupils may struggle at key points of transition (such as between primary and secondary school), build up serious misconceptions, and/or have significant difficulties in understanding higher-order content.

Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. The social and economic implications of science are important but, generally, they are taught most appropriately within the wider school curriculum: teachers will wish to use different contexts to maximise their pupils' engagement with and motivation to study science.

The Nature, Processes and Methods of Science:

'Working Scientifically' specifies the understanding of the nature, processes and methods of science for each year group. It should not be taught as a separate strand. The notes and guidance give examples of how 'working scientifically' might be embedded within the content of biology, chemistry and physics, focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. These types of scientific enquiry should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils should seek answers to questions through collecting, analysing and presenting data. 'Working Scientifically' will be developed further at key stages 3 and 4, once pupils have built up sufficient understanding of science to engage meaningfully in more sophisticated discussion of experimental design and control.

Year 5 – Science Programme of Study - ***Timelines of Learning (The Bigger Picture)***

Unit	Prior Learning…	What I will learn now…	What I don't need to learn yet…
Earth and Space	**Pupils should be taught to:** • Observe changes across the four seasons. (1-Seasonal Changes) • Observe and describe weather associated with the seasons and how day length varies. (1-Seasonal Changes)	**Pupils should be taught to:** • Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. (5-Earth and Space) • Describe the movement of the Moon relative to the Earth. (5-Earth and Space) • Describe the Sun, Earth and Moon as approximately spherical bodies. (5-Earth and Space) • Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. (5-Earth and Space)	**Pupils in Key Stage 3 should be taught about:** • Gravity force, weight = mass x gravitational field strength (g), on Earth g=10 N/kg, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (qualitative only) • Our Sun as a star, other stars in our galaxy, other galaxies • The seasons and the Earth's tilt, day length at different times of year, in different hemispheres • The light year as a unit of astronomical distance.
Forces	**Pupils should be taught to:** • Compare how things move on different surfaces. (3-Forces) • Notice that some forces need contact between two objects, but magnetic forces can act at a distance. (3-Forces) • Observe how magnets attract or repel each other and attract some materials and not others. (3-Forces) • 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. (3-Forces) • Describe magnets as having two poles. (3-Forces) • Predict whether two magnets will attract or repel each other, depending on which poles are facing. (3-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. (5-Forces) • Identify the effects of air resistance, water resistance and friction that act between moving surfaces. (5-Forces) • Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. (5-Forces)	**Pupils in Key Stage 3 should be taught about:** • Forces as pushes or pulls, arising from the interaction between two objects. • Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces. • Moment as the turning effect of a force. • Forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water. • Forces measured in newtons, measurements of stretch or compression as force is changed.
Living Things and their Habitats	**Pupils should be taught to:** • Notice that animals, including humans, have offspring which grow into adults. (2-Animals, including Humans) • Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (3-Plants)	**Pupils should be taught to:** • Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. (5-Living things and their Habitats) • Describe the life process of reproduction in some plants and animals. (5-Living things and their Habitats)	**Pupils in Key Stage 3 will be taught about:** • Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta. • Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms.

Year 5 – Science Programme of Study Continued - ***Timelines of Learning (The Bigger Picture)***

Unit	Prior Learning…	What I will learn now…	What I don't need to learn yet…
Properties and Change of Materials	**Pupils should be taught to:** • Distinguish between an object and the material from which it is made. (1-Everyday materials) • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. (1-Everyday materials) • Describe the simple physical properties of a variety of everyday materials. (1-Everyday materials) • Compare and group together a variety of everyday materials on the basis of their simple physical properties. (1-Everyday materials) • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (2-Uses of Everyday materials) • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (2-Uses of Everyday materials) • Compare and group materials together, according to whether they are solids, liquids or gases. (4-States of Matter) • 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). (4-States of Matter) • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. (4-States of Matter)	**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. (5-Properties and changes of Materials) • Know that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution. (5-Properties and changes of Materials) • Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. (5-Properties and changes of Materials) • Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. (5-Properties and changes of Materials) • Demonstrate that dissolving, mixing and changes of state are reversible changes. (5-Properties and changes of Materials) • 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. (5-Properties and changes of Materials)	**Pupils in Key Stage 3 should be taught about:** • Chemical reactions as the rearrangement of atoms. • Representing chemical reactions using formulae and using equations. • Combustion, thermal decomposition, oxidation and displacement reactions. • Defining acids and alkalis in terms of neutralisation reactions. • The pH scale for measuring acidity/alkalinity; and indicators.
Animals inc. Humans	**Pupils should have been taught to:** • Notice that animals, including humans, have offspring which grow into adults (2-Animals including Humans)	**Pupils should be taught to:** • Describe the changes as humans develop to old age (5-Animals including Humans)	**Pupils in Key Stage 3 will be taught about:** Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta.

Year 5 – Science Programme of Study - *Timelines of Learning* ***(Working Scientifically)***

	Plan		**Do**			**Review**		
Stages	Recognise the best type of enquiry to answer a question	Choose equipment, select tests, use secondary sources to decide how to obtain accurate observations and measurements	Obtain observations and measurements using equipment and/or secondary sources	Record observations and measurements	Present observations and measurements	Draw conclusions and make explanations	Evaluate the data collected	Evaluate the process used (including next steps)
Prior learning… **End of Year 4**	I ask relevant questions and use different types of scientific enquiries to answer them.	I can set up simple practical enquiries, comparative or fair tests. I decide what observations and measurements to make and what equipment to use.	I use a range of equipment (including thermometers and data-loggers). I make systematic and careful observations and take accurate measurements using standard units. I use information sources provided to find things out.	I gather, record and classify data in a variety of ways to help me answer my questions. I record my findings using simple scientific language, tables, drawings and labelled diagrams.	I present my data in a variety of ways using e.g., Venn diagrams, bar charts, simple scatter graphs and keys.	I use my results to draw simple conclusions and I make predictions for new values. I communicate what I have found out using straightforward scientific ideas and I report my findings using oral and written explanations and displays.		I suggest improvements to the way I carried out the enquiry. I suggest further questions to investigate.
What I will learn now… **End of Year 5**	I ask relevant questions (containing scientific knowledge and understanding) and with help I recognise which type of enquiry is best to answer a question.	I decide what observations and measurements to make (controlling variables with help where necessary) and what equipment to use to make my measurements and observations.	I use a range of equipment independently. The series of observations and measurements I take are adequate for the task. I use information sources provided to find things out. I identify possible risks to myself and others.	I gather and record non-complex results (data and observations) using e.g., tables and scientific diagrams.	I present the results (data and observations) in a range of formats e.g., bar and line graphs, simple scatter graphs, keys and frequency charts.	I draw conclusions from my data and observations. I begin to use basic scientific evidence to support or refute the ideas or arguments for my conclusion.	I look at my results and decide if any observations or measurements are unsuitable.	I use what I have found out to suggest improvements to my work, giving reasons for these suggestions. I can set up further questions to investigate.
What I don't need to learn yet… **End of Year 6**	I ask relevant questions (containing scientific knowledge and understanding). I recognise which type of enquiry is best to answer a question.	I can plan different types of science enquiries to answer questions. I recognise and control variables where necessary. I decide what observations and measurements to make and what equipment to use (giving reasons) to make my measurements and observations.	I take measurements, using a range of scientific equipment with increasing accuracy and precision. I take repeat readings when appropriate. I use relevant information sources to find things out. I identify possible risks to myself and others.	I record data and results of increasing complexity using e.g., scientific diagrams and labels and tables. I choose a method to suit the results, e.g., a two-column table.	I present the data and results in suitable formats using e.g., line graphs, bar graphs, scatter graphs and classification keys.	From my data and observations, I draw valid conclusions (i.e., consistent with the evidence) including causal relationships. I identify scientific evidence to support or refute the ideas or arguments for my conclusion.	I look at my results and decide if any observations or measurements are unsuitable and need to be carried out again. I offer simple explanations for differences in results.	I use my test results to make predictions to set up further enquiries e.g., comparative and fair tests and suggest how my working methods could be improved, with reasons.

KEY: **NAVY BLUE – EYFS Framework (pre-2021) or National Curriculum - statutory**
RED – Non-statutory to support progression

Year 5 – Science Programme of Study – *Yearly Overview* ***(Knowledge and Understanding)***

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 5	**Forces**	**Earth and Space**	**Properties and Change of Materials**		**Living Things and their Habitats**	**Animals inc. Humans**
	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. ***Cross Curricular Links:*** ***Maths*** *- Calculate the difference between the effects that forces have as a result of using a pulley system.*	Describe the movement of the Earth, and the 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. ***Cross Curricular Links:*** ***Maths*** *- Comparing the relative sizes of planets with the sun or our moon will provide opportunities to read large numbers and also to explore ratios.* ***Maths*** *- Calculate, using a calculator, how long it would take to get to different planets if you were to travel at (an average of) 70 mph.* ***Geography –*** *Research time zones, the Equator, tropics, hemispheres and seasons.*	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. 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. ***Cross Curricular Links:*** ***Maths*** *- Convert between different units of measure by exploring how much sugar/salt can dissolve in a 200ml of water until the water is saturated.* ***DT –*** *Explore reversible and irreversible changes in cooking (e.g., baking, melting, boiling, etc,).*		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. ***Cross Curricular Links:*** ***English*** *– Produce an information text about the life cycles of mammals, amphibians. Insects and birds.*	Describe the changes as humans develop to old age. ***Cross Curricular Links:*** ***Maths*** *- Children may complete a table using secondary sources of information which look at gestation periods, the average number of offspring or the life spans of specific animals.* ***PSHE / RSE –*** *Discuss changes that animals, inc. humans, experience at various stages of life.*

Exemplification *of 'Scientific Enquiry Types' and 'Working Scientifically'*

5 Enquiry Types

Research Using Secondary Sources
Where the answer is found or developed using secondary sources. This is usually where it is impossible or unsafe for pupils to fully answer with first-hand enquiries, or where confirmation of the conclusions drawn during first-hand enquires is sought. This enquiry skill helps pupils to evaluate sources, distinguish between fact and opinion and recognise conflicting evidence and bias.

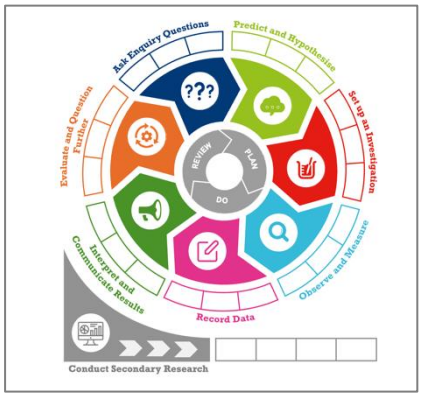
Observing Over Time
Pupils identify and measure events and changes in living things, materials and physical process or events. These observations may take place over time spans of minutes or hours (e.g., puddles evaporating) up to several weeks or months (e.g., rearing young chicks).

Pattern Seeking
Pupils observe, measure and record events and systems when carrying out pattern seeking enquires. They also collect and interpret data from secondary sources. They make observations and conduct surveys where the variables can't easily be controlled for practical or ethical reasons.

Identifying, Classifying and Grouping
Pupils make sense of how the world is organised. Identification is the process of using differences to name something and classification is organising things into groups. Opportunities to identify arise when pupils recognise not all birds are the same for example and can identify and name them. They can then use observable and behavioural similarities to group them and add new things.

Comparative and Fair Testing
Helps pupils explore relationship between variables. Comparative tests children compare one event with another. E.g., does the red car go faster than the green car? A fair test identifies the causal relationship between two variable. E.g., does the height of the ramp affect how quickly the toy car rolls down the ramp and everything else remains the same?

Definitions adapted from 'It's not fair - or is it?' (Turner, Keogh, Lawrence & Naylor, 2011)
Enquiry Symbols - © University of Manchester
Working Scientifically Symbols - © - Primary Science Teaching Trust



The **Working Scientifically Wheel** may be used in lessons to draw attention to the focused 'working scientifically' skill being covered.

Colouring or dating a section for each focused skill provides an opportunity to check that all of the skills are covered across the year, and also track children's progress in relation to the identified skills.

Working Scientifically – Processes of Science

Asking Questions
Asking questions that can be answered using a scientific enquiry. E.g., how does the road surface affect the speed at which a car travels?

Making Predictions and Hypothesising
Using prior knowledge (inc. that developed through secondary research) to suggest what will happen in a scientific enquiry. E.g., I think that a smoother road surface will allow a car to travel faster.

Setting up an Investigation
Deciding on the method and equipment to use to carry out an enquiry. E.g., children may use a timing ramp, different surface coverings and a data logger to test how the road surface affects the speed at which a car travels.

Observing and Measuring
Using measuring equipment and the senses to make observations or take measurements relating to the enquiry. E.g., the car took 1.5 seconds to travel between point A and point B on a smooth surface.

Recording Data
Using tables, drawing and other means to note observations and measurements. E.g., children record the results of their investigation using a two-way table.

Interpreting and Communicating Results
Using information from the recorded data to say what you found out and presenting this in an appropriate form. E.g., children draw and explain a bar chart showing how the time taken for a car to travel between points A and B changes depending on the surface covering.

Evaluating and Questioning Further
Reflecting on the success of the enquiry approach and identifying further questions for enquiry. E.g., children may ask how the angle of the ramp may also affect the speed at which the car travels between points A and B.

Year 5 – Core Investigations– ***Coverage of 'Working Scientifically' and 'Scientific Enquiry'***

	Forces	Earth and Space	Properties and Change of Materials	Living Things and their Habitats	Animals inc. humans
Year 5	**NC OBJ** - Explain that unsupported objects fall towards the Earth because of the force of gravity acting between… *[see more].* **Enquiry Type:** *Pattern Seeking* **Working Sci. Skill:** *Recording Data* **(1) Investigation Overview:** ***TAPS Focussed Assess. – Craters*** Investigate the formation of 'craters' by dropping marbles into a tray of sand. Identify if there is a link between mass of the marble and depth of the crater that is creates, or similar.	**NC OBJ** - Use the idea of the Earth's rotation to explain day and night and the apparent movement of the… *[see more].* **Enquiry Type:** *Observe Over Time* **Working Sci. Skill:** *Conduct Research* **()1 Investigation Overview:** ***STEM Learning – Day and Night*** Using a world map, children conduct sec. research at diff points of the day (over time) to identify where it is daytime and where it is night-time. Link to idea of the Earth's rotation to explain day and night.	**NC OBJ** - Give reasons, based on evidence from comparative / fair tests, for the uses of everyday materials… *[see more].* **Enquiry Type:** *Comparative / Fair Testing* **Working Sci. Skill:** *Set up Investigations* **(1) Investigation Overview:** ***TAPS Focussed Assess. – Nappies*** Set up a comparative investigation to find out which nappy absorbs the most water. Focus is on planning a fair test.	**NC OBJ** - Describe the life process of reproduction in some plants and animals. **Enquiry Type:** *Pattern Seeking* **Working Sci. Skill: Sec.** *Conduct Research* **(1)Investigation Overview:** ***Ogden Trust – Gestation Period*** Children use secondary sources to research and identify if there is a link between the size of a mammal and the length of its gestation period.	**NC OBJ** - Describe the changes as humans develop to old age. **Enquiry Type:** *Pattern Seeking* **Working Scientifically Skill:** *Observe and Measure* **(1) Investigation Overview:** ***TAPS Focussed Assessment – Growth Survey*** Children consider what to measure to show humans developing as they get older. Set up and carry out this investigation, considering how accurate measurements need to be, the number of children / adults that need to be measured, etc. Ensure that children understand the need to record to age of the person measured.
	NC OBJ - Identify the effects of air resistance, water resistance and friction that act between moving surfaces. **Enquiry Type:** *Pattern Seeking* **Working Sci. Skill:** *Observe and measure* **(2) Investigation Overview:** ***TAPS Focussed Assess. – Spinners*** Children make and drop a spinner; test how the length of wing/number of paper clips/etc. affect the time it takes to fall?	**NC OBJ** - Describe the movement of the Moon relative to the Earth. **Enquiry Type:** *Identify, Classify and Group* **Working Sci. Skill:** *Observe and Measure* **(2) Investigation Overview:** ***Ogden Trust – Phases of the Moon*** Children observe and identify all the phases in the cycle of the moon. Children may use a lamp (sun), themselves (Earth) and a foam ball (moon) to model these.	**NC OBJ** - Know that some materials will dissolve in liquid to form a solution. **Enquiry Type:** *Observing Over Time* **Working Sci. Skill:** *Evaluate / Q. Further* **(2) Investigation Overview:** ***Ogden Trust. – Sugar Cubes*** Children explore what happens over time when sugar cubes are placed in a glass of water. They may then question further how this may change if one or more variable change – e.g. temperature, etc.	**NC OBJ** - Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. **Enquiry Type:** *Identify, Classify and Group* **Working Sci. Skill:** *Interp. & Com. Results* **(2)Investigation Overview:** ***Ogden Trust – Similarities and Differences*** Children compare animals based on similarities and difference in life cycles. Present results using Carroll diagrams.	**NC OBJ** - Describe the changes as humans develop to old age. **Enquiry Type:** *Research - Sec. Sources* **Working Scientifically Skill:** *Interpreting and communicating results* **(2) Investigation Overview:** Children research the life expectancies of different animals and use the data collected to produce a bar/line graph to communicate the results.
	NC OBJ - Identify the effects of air resistance, water resistance and friction that act between moving surfaces. **Enquiry Type:** *Comparative / Fair Testing* **Working Sci. Skill:** *Evaluate and Question further* **(3) Investigation Overview:** ***TAPS Focussed Assess. – Aquadynamics*** Children are challenged to make a ball of plasticine fall as slowly as possible through water. Children change the shape, etc.	**NC OBJ** - Describe the movement of the Earth, and the other planets, relative to the Sun in the solar system. **Enquiry Type: Sec.** *Research - Sec. Sources* **Working Sci. Skill:** *Recording Data* **(3) Investigation Overview** ***Ogden Trust – Moving Planets*** Children use sec. sources to research and record the time that it takes for different planets to travel around the sun. Compare planets to see if there is a link between planet size and time taken to orbit the sun.	**NC OBJ** - Compare and group together everyday materials on the basis of their properties, including… *[see more].* **Enquiry Type:** *Pattern Seeking* **Working Sci. Skill:** *Evaluate / Q. Further* **(3) Investigation Overview:** ***TAPS Focussed Assess. – Champion Tape*** Design a test to identify if there is a link between the cost of tape and how sticky it is. Children carry this out and evaluating the success of their test.	**NC OBJ** - Describe the life process of reproduction in some plants and animals. **Enquiry Type:** *Observe Over Time* **Working Sci. Skill:** *Observe and Measure* **(3) Investigation Overview:** ***Ogden Trust - Germination*** Children plant broad beans and observe closely how the bean changes over time. Children may produce detailed drawings of the bean at each stage of its life cycle.	
	NC OBJ - Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force… *[see more].* **Enquiry Type:** *Comparative / Fair Testing* **Working Sci. Skill:** *Set up Investigations* **(4) Investigation Overview:** ***OWN PLANS – Length of a Lever*** Children investigate the force required to lift an object of the same mass using a lever of different lengths. Measure using a Newton metre.		**NC OBJ** - Explain that some changes result in the formation of new materials, and that this… *[see more].* **Enquiry Type:** *Comparative / Fair Testing* **Working Sci. Skill:** *Set up Investigations* **(4) Investigation Overview:** ***OWN PLANS. – Bicarb and Vinegar*** Compare how the amount of bicarbonate of soda added to vinegar affects the amount of carbon dioxide produced. Fill a balloon with bicarb., stretch over a bottle containing vinegar, and measure the inflation of the balloon.	Need an asking Questions	

Year 5 – Science Knowledge Builder– ***Small Steps and Suggested Lesson-Level Overview***

Small Steps Overview – Forces (Y5)

(1)	*Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.*
(2)	*Identify the effects of air resistance, water resistance and friction that act between moving surfaces.*
(3)	*Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.*
(4)	***Providing further depth and breadth of understanding***

NOTE – SOME STEPS WILL TAKE MORE THAN 60 MINUTES

Pupils will know…		***Key Vocab (MUST be introduced) ****	
All knowledge (inc. key vocab) linked to prior learning (see page 3 for linked objectives)			
that mass is how much matter is inside an object and it is measured in kilograms (kg). ***(4)***	***Step 1***	*mass, matter, kilogram, gram, weight, newton, force, push, pull*	← ***Core Investigation 1***
that weight is how strongly gravity is pulling an object down. It is measured in newtons (N). ***(4)***			
that forces are always a 'push' or a 'pull'. ***(4)***			
that forces can make an object… ***(4)*** - *start to move; stop moving; change direction; move faster; change shape; move more slowly*			
that the force of gravity pulls unsupported objects towards to centre of the Earth. ***(1)***	***Step 2***	*gravity, Earth*	
that several forces may act on one object. ***(4)***	***Step 3***	*air resistance, streamlined, aerodynamic*	
that the direction of forces is represented by arrows. ***(4)***			
that air resistance may reduce the speed at which objects travel through the air. ***(2)***			
that air resistance acts in the opposite direction to the travelling object. ***(2)***			
that air resistance is reduced when a moving object is streamlined (and vice versa). ***(2)***			← ***Core Investigation 2***
that water resistance may reduce the speed at which objects travel through water. ***(2)***	***Step 4***	*water resistance, streamlined, buoyant, float, upthrust*	
that water resistance acts in the opposite direction to the travelling object. ***(2)***			
that water resistance is reduced when a moving object is streamlined (and vice versa). ***(2)***			← ***Core Investigation 3***
that an object is buoyant (floats) because the weight of the object is equal to the upthrust. ***(4)***			
that friction may reduce the speed at which an object moves across a surface. ***(2)***	***Step 5***	*friction, smooth, rough, motion*	
that friction is reduced when surfaces moving across each other are smoother. ***(2)***			
that friction acts in the opposite direction to the motion of an object across the surface. ***(2)***			
that friction can be a useful force (i.e. car tyres). ***(4)***			
that pulleys can be used to make a small force lift a heavier load. ***(3)***	***Step 6***	*pulley, load*	
that the more wheels in a pulley, the less force is needed to lift a weight. ***(3)***			
that gears or cogs can be used to change the speed, force or direction of a motion. ***(3)***	***Step 7***	*gear, cog, speed, direction of motion*	
that when two gears are connected, they always turn in the opposite direction to each other. ***(3)***			
that levers can be used to make a small force lift a heavier load. ***(3)***	***Step 8***	*lever, load, pivot*	← ***Core Investigation 4***
that a lever always rests on a pivot. ***(3)***			
that a spring can be used to return an object to its original position. ***(3)***	***Step 9***	*spring, squash, stretch*	
that a spring can be stretched by pulling it or squashing by pushing it. ***(3)***			
that the greater the force pulling/pushing a spring, the greater the force the spring uses to return to its original shape. ***(3)***			

****Vocabulary may already have been introduced but must be covered in the given context***

Year 5 – Science Lesson Objectives

Forces (Y5)

To identify forces acting on objects. (forces that make things begin to move, get faster or slow down.)
To explore the effect gravity has on objects and how gravity was discovered.
To explore the effects of air resistance by designing a variety of parachutes to determine which designs are the most effective.
To explore the effects of water resistance. (making and testing boats of different shapes)
To investigate the effects of friction.
1. To investigate if there is a pattern between the mass of a marble and depth of the crater that is creates. (TAPS – Craters)
2. To observe and measure the effects of air resistance (TAPS – Spinners)
3. To reflect on the success of our enquiry (TAPS – Aquadynamics)
4. To investigate the force required to lift an object of the same mass using a lever of different lengths.
Assessment - apply their scientific knowledge of friction and gravity to predict the variables which could affect a zipline. (TAPS – Zipline testing)

Black - Learning objective Red – Suggested Activities or useful information. Purple – Core investigations

Year 5 – Science Knowledge Builder– ***Small Steps and Suggested Lesson-Level Overview***

Small Steps Overview – Earth and Space (Y5)

(1)	*Describe the movement of the Earth, and the other planets, relative to the Sun in the solar system.*
(2)	*Describe the movement of the Moon relative to the Earth.*
(3)	*Describe the Sun, Earth and Moon as approximately spherical bodies.*
(4)	*Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.*
(5)	***Providing further depth and breadth of understanding***

NOTE – SOME STEPS WILL TAKE MORE THAN 60 MINUTES

Pupils will know…		***Key Vocab (MUST be introduced) ****	
All knowledge (inc. key vocab) linked to prior learning (see page 3 for linked objectives)			
that the Sun, Earth and Moon are approximately spherical bodies. ***(3)***	***Step 1***	*Sun, Earth, Moon, perspective, planet, star, celestial*	
that the Sun and Moon appear similar in size in the sky due to the distance from Earth that each of them is (perspective). ***(3)***			
that the moon is approximately one quarter of the size of Earth. ***(3)***			
that the sun is approximately 110 times bigger than the Earth. ***(3)***			
that the Sun is at the centre of our solar system. ***(5)***	***Step 2***	*solar system, orbit, asteroid, comet, meteorite, space*	
the solar system is made up of the sun and everything that orbits around it, including planets, moons, asteroids, comets and meteoroids. ***(5)***			
That there are 8 planets within our solar system, they are: Mercury, Venus, Earth, Mars, Jupiter, Saturn Uranus and Neptune. ***(5)***			
that our solar system is a small part of a galaxy called The Milky Way. ***(5)***	***Step 3***	*galaxy, The Milky Way*	
that our solar system and galaxy are small parts of the entire universe, including the whole of space (all stars, planets, matter and energy). ***(5)***		*universe, matter, energy*	
that the sun appears to move across the sky during the day, but in fact the Sun does not move. ***(4)***	***Step 4***	*sky*	
that it is the Earth that moves and not the sun. ***(4)***			
that as the Earth rotates, shadows that are formed change in size and orientation. ***(4)***	***Step 5***	*rotate, shadow*	
that day and night is caused by the rotation of the Earth on its axis once every 24 hours. ***(4)***	***Step 6***	*day, night, axis, daylight, daytime, night-time*	← ***Core Investigation 1***
that different parts of the Earth experience daylight at different times. ***(4)***			
that it is daytime in the part of the Earth facing the sun. ***(4)***			
that it is night-time in the part of the Earth facing away from the sun. ***(4)***			
that the sun rises in the general direction of the east. ***(4)***	***Step 7***	*east, west, rise, set,*	
that the sun sets in the general direction of the west. ***(4)***			
that the time at which the sun rises and sets changes depending on the time at which it is in the year. ***(5)***			
that the moon takes approximately 28 days to orbit the Earth. ***(2)***	***Step 8***	*lunar, lunar month*	
that the different appearances of the moon over 28 days provide evidence of a 28-day cycle. ***(2)***			
that the Moon has different phases depending on where it is in its orbit. ***(2)***	***Step 9***	*phase (of the moon), illuminated, unilluminated*	
that each lunar month, the moon is unilluminated, this is called the new moon. ***(2)***			
that as the lunar month continues, more of the moon is illuminated by the sun until it becomes a full moon. ***(2)***			
that waxing occurs after a new moon and before a full moon, as more of the moon is illuminated. ***(2)***	***Step 10***	*full moon, waxing gibbous, first quarter, waxing crescent, new moon, waning crescent, last quarter, half moon, waning gibbous*	← ***Core Investigation 2***
that waning occurs after a full moon and before a new moon, as less of the moon is illuminated. ***(2)***			
that the Earth takes approximately 1 year to orbit the sun, rotating as it goes. ***(1)***	***Step 11***		← ***Core Investigation 3***
that because of the Earth's tilt, the poles experience 24 hours of sunlight in the summer, and very few hours of sunlight in the winter. ***(5)***	***Step 12***	*tilt, axis, North Pole, South Pole*	
that Earth's tilted axis causes the seasons. ***(5)***	***Step 13***	*Northern Hemisphere, Southern Hemisphere, equator*	
that when the North Pole tilts towards the Sun, it's summer in the Northern Hemisphere and winter in the Southern Hemisphere. ***(5)***			
that when the South Pole tilts towards the Sun, it's summer in the Southern Hemisphere and winter in the Northern Hemisphere. ***(5)***			

****Vocabulary may already have been introduced but must be covered in the given context***

Year 5 – Science Lesson Objectives

Earth and Space (Y5)

To explain why we know the Sun, Earth and Moon are spherical.
To name and describe features of the planets in our solar system.
To order the planets in our solar system
To explain how planets move in our solar system.
To explain day and night and the apparent movement of the sun across the sky
To explain the movement of the Moon.
To describe the work of Nicolaus Copernicus.
1. To use secondary sources to compare the time of day at different places on the Earth.
2. To observe and identify all the phases in the cycle of the moon.
3. To compare planets to see if there is a link between planet size and time taken to orbit the sun.
Assessment - Report and present findings from enquiries (TAPS – Solar system research)

Black - Learning objective Red – Suggested Activities or useful information. Purple – Core investigations

Year 5 – Science Knowledge Builder– ***Small Steps and Suggested Lesson-Level Overview***

Small Steps Overview – Properties and Change of Materials (Y5)

(1)	*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.*
(2)	*Know that some materials will dissolve in liquid to form a solution.*
(3)	*Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.*
(4)	*Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.*
(5)	*Demonstrate that dissolving, mixing and changes of state are reversible changes.*
(6)	*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.*
(7)	***Providing further depth and breadth of understanding***

NOTE – SOME STEPS WILL TAKE MORE THAN 60 MINUTES

Pupils will know…		***Key Vocab (MUST be introduced) ****
All knowledge (inc. key vocab) linked to prior learning (see page 3 for linked objectives)		
That materials have a range of physical properties. ***(1)***	***Step 1***	*physical properties*
That hardness is the resistance of a material to deformation. ***(1)***	***Step 2***	*hardness, resistance, deformation*
That absorption is the process in which a material 'takes in' another substance. ***(1)***	***Step 3***	*substance, absorb(ing/tion)*
That transparency is the property of allowing light to pass through something (and therefore a person's ability to see through it). ***(1)***	***Step 4***	*transparency, light*
That an opaque material does not let light pass through it (and therefore a person cannot see through it). ***(1)***	***Step 5***	*opaque, transparent, translucent*
That a transparent material lets lots of light pass though it (and therefore a person can see though it easily). ***(1)***		
That a translucent material lets some light pass through it (and therefore a person can somewhat see through it). ***(1)***		
That a conductor is a material that heat or electricity can easily travel through. ***(1)***	***Step 6***	*conductor, insulator, thermal, electrical*
That an insulator is a material that does not let heat or electricity travel through it. ***(1)***		
That a good thermal insulator will not allow heat to pass through it easily, and vice versa ***(1)***	***Step 7***	*thermal conductivity, thermal insulator, thermal conductor*
That a good thermal conductor will allow heat to pass through it easily, and vice versa ***(1)***		
That metals are not good thermal insulators but wood and plastics are. ***(1)***		
That a good electrical insulator will not allow electivity to pass through it easily, and vice versa. ***(1)***	***Step 8***	*electrical conductivity, electrical insulator, electrical conductor*
That a good electrical conductor will allow electivity to pass through it easily, and vice versa ***(1)***		
That most metals are not good electrical insulators but wood and plastics are. ***(1)***		
That materials such as metals, which are good electrical conductors, are usually good thermal conductors. ***(1)***	***Step 9***	
That magnetism is the force exerted by magnets when they attract or repel each other. ***(1)***	***Step 10***	*magnet, magnetism, magnetic, non-magnetic, attract, repel*

← Core Investigation 1

****Vocabulary may already have been introduced but must be covered in the given context***

SMALL STEPS CONTINUED ON NEXT PAGE

Small Steps Overview – Properties and Change of Materials (Y5) - CONTINUED

Pupils will know…		***Key Vocab (MUST be introduced) ****	
All knowledge (inc. key vocab) linked to prior learning (see page 3 for linked objectives)			
That solubility is the ability of a substance (referred to as the solute) to dissolve in a solvent (usually a liquid) and form a clear solution (which may be coloured). ***(2)***	***Step 11***	*solubility, solute, solvent, solution, dissolve*	← ***Core Investigation 2***
That materials can be grouped together on the basis of their properties. ***(1)***	***Step 12***		
That the properties of certain materials make them more suitable for certain uses than others. ***(4)***	***Step 13***	*suitability*	← ***Core Investigation 3***
That solids can be mixed with solids, and it is sometimes possible to separate them by sieving. ***(3)***	***Step 14***	*solid, liquid, mix, separate, sieving, filtration, filter paper, soluble, insoluble, saturated*	
That solids can be mixed with solids, and it is sometimes not possible to separate them by sieving. ***(3)***			
That solids can be mixed with liquids, and it is sometimes possible to separate them by filtration, which is similar to sieving. ***(3)***			
That solids can be mixed with liquids, and it is sometimes not possible to separate them by filtration. ***(3)***			
That when it is not possible to separate a solid and a liquid by filtration, this is because the solid is dissolved into the liquid to form a solution. ***(3)***			
That when solids will not dissolve into a liquid, this is ***often*** *because the solid is insoluble or the liquid is saturated.* ***(7)***			
That solutions can be separated using evaporation and condensation. ***(3)***	***Step 15***	*evaporation, condensation, gas*	
That when a liquid evaporates from a solution, a solid is left behind. ***(3)***			
That mixing and dissolving are reversible changes, but some changes that occur when two substances are mixed cannot easily be reversed. ***(5)***	***Step 16***	*acid, alkaline, bicarbonate of soda, reversible, irreversible*	← ***Core Investigation 4***
That when acid is added to bicarbonate of soda, new substances are formed. ***(6)***			
That the changes that occur when acid is added to bicarbonate of soda are not reversible. ***(6)***			
That some changes result in the formation of new materials and this is not usually reversible. ***(6)***	***Step 17***	*burn(ing), combust(ion/ing), hazardous*	
That when a material burns, new materials are formed. ***(6)***			
That the changes that occur when materials burn are not reversible. ***(6)***			
That burning is a hazardous process and the risks of doing so must be assessed and managed. ***(7)***			
That something hot will cool down and something cool will warm up until it is at the same temperature as its surroundings. ***(7)***	***Step 18***	*heat(ing/ed), cool(ing/ed), changing state, melting, cooling, thawing*	
That heating some materials can cause them to change. ***(6)***			
That cooling some materials can cause them to change. ***(6)***			
Thatmaterials changing state (as a result of heating / cooling) is a reversible change. ***(5)***			
That the sense of touch is not an accurate method of judging temperature. ***(7)***	***Step 19***	*temperature, thermometer, data logger*	
That a thermometer can be used to take accurate measurements of temperature. ***(7)***			

****Vocabulary may already have been introduced but must be covered in the given context***

Year 5 – Science Lesson Objectives

Properties and Change of Materials (Y5)

To compare and group materials according to their properties. (including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets)
To give reasons for the particular uses of everyday materials. (including metals, wood and plastic).
To investigate thermal conductors and insulators.
To demonstrate that dissolving, mixing and changes of state are reversible changes.
To use knowledge of solids, liquids and gases to decide how mixtures might be separated. (filtering, sieving and evaporating)
To investigate materials which will dissolve.
To identify and explain irreversible chemical changes.
To find out about the work of Spencer Silver.
1. Set up a comparative investigation to find out which nappy absorbs the most water
2. To observe what happens over time when sugar cubes are placed in a glass of water
3. To evaluate the success of our investigation. (TAPS. – Champion Tapes)
4. To compare how the amount of bicarbonate of soda added to vinegar affects the amount of carbon dioxide produced.
Assessment - Provide a collection of different materials and invite the children to discuss their ideas about which might be good for keeping a drink warm. The children could order the materials according to which will be best insulators. (TAPS -Insulation layers).

Black - Learning objective Red – Suggested Activities or useful information. Purple – Core investigations

Small Steps Overview – Living Things and their Habitats (Y5)

(1)	*Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.*
(2)	*Describe the life process of reproduction in some plants and animals.*
(3)	***Providing further depth and breadth of understanding***

NOTE – SOME STEPS WILL TAKE MORE THAN 60 MINUTES

Pupils will know…		***Key Vocab (MUST be introduced) ****	
All knowledge (inc. key vocab) linked to prior learning (see page 3 for linked objectives)			
That all living things are capable of reproduction. ***(2)***	***Step 1***	*reproduction, species, extinct*	
That if a living thing (species) does not reproduce then it will become extinct. ***(3)***			
That mammals produce offspring by means of sexual reproduction. ***(2)***	***Step 2***	*mammal, sexual reproduction, sperm, fertilise, egg, cell, gestation*	← ***Core Investigation 4***
That the sexual reproduction of most mammals includes the following stages: ***(2)*** • *the male sex cell, called the sperm, fertilises the female sex cell, called the egg.* • *The fertilised cell divides itself into different cells, which eventually forms a 'baby' with a beating heart (also explore other mammals, in addition to humans).* • *the 'baby' will grow inside the female parent until the end of the gestation period when it is born.*			
That most mammals give birth to live young. ***(1)***	***Step 3***	*echidnas, platypus*	
That echidnas and platypus are mammals but they lay eggs rather than give birth to live young. ***(1)***			
That the life cycle of a mammal includes the following stages: embryo → young → adult ***(1)***	***Step 4***	*life cycle, embryo, foetus, baby, child, adolescent, adult, puppy, young dog, adult dog, cub, young lion, adult lion*	
That the life cycles of the following mammals may be described in the following ways: ***(1)*** • ***human*** *= embryo → foetus → baby → child → adolescent → adult* • ***dog*** *= embryo → foetus → puppy → young dog → adult dog* • ***lion*** *= embryo → foetus → cub → young lion → adult lion*			
That amphibians produce offspring by means of sexual reproduction. ***(2)***	***Step 5***	*amphibian, metamorphosis*	
That sexual reproduction of amphibians includes the following stages: ***(2)*** • *the male sex cell, called the sperm, fertilises the female sex cell, called the egg (this often takes place externally, once the female has laid a number of eggs);* • *the fertilised cell divides itself into different cells, which eventually forms a 'baby' with a beating heart.* ○ *This process is called metamorphosis.*			
That the life cycle of an amphibian includes the following stages: egg → tadpole → tadpole with legs → froglets, toadlets or newtlets, etc. → adult. ***(2)***	***Step 6***	*tadpole, tadpole with legs, froglet, adult frog, newtlet, adult newt, larva with gill buds, larva with forelimbs, larva with forelimbs and hindlimbs, adult salamander*	
That the life cycles of the following amphibians may be described in the following ways: ***(2)*** • ***frog*** *= egg → tadpole → tadpole with legs → froglet → adult frog* • ***newt*** *= egg → tadpole → tadpole with legs → newtlet → adult newt* • ***salamander*** *= egg → larva with gill buds → larva with forelimbs → larva with forelimbs and hindlimbs→ adult salamander*			

****Vocabulary may already have been introduced but must be covered in the given context***

SMALL STEPS CONTINUED ON NEXT PAGE

Small Steps Overview – Living Things and their Habitats (Y5) - CONTINUED

That the life cycle of an insect that undergoes complete metamorphosis includes the following stages: egg → larva → pupa → metamorphosis→ adult ***(2)***	***Step 7***	*larva, pupa, emerging butterfly, adult butterfly, emerging ladybird, adult ladybird*	
That the life cycles of the following insects undergoing complete metamorphosis may be described in the following ways: ***(2)*** • ***butterfly*** *= egg → caterpillar (larva) → pupa → emerging butterfly → adult butterfly* • ***ladybird*** *= egg → larva → pupa → emerging ladybird → adult ladybird*			
That the life cycle of an insect that undergoes incomplete metamorphosis includes the following stages: egg → nymph→ adult ***(2)***	***Step 8***	*nymph, adult dragonfly, adult grasshopper*	
That the life cycles of the following insects undergoing complete metamorphosis may be described in the following ways: ***(2)*** • ***dragonfly*** *= egg → nymph→* adult dragonfly • ***grasshopper*** *= egg → nymph→* adult grasshopper			
That the life cycle of a bird includes the following stages: egg → chick → adult ***(1)***	***Step 9***	*embryo, chick, hatchling, chicken, penguin, ostrich*	← ***Core Investigation 2***
That the life cycles of the following birds may be described in the following ways: ***(1)*** • ***chicken*** *= egg → embryo → hatchling → chick → chicken* • ***penguin*** *= egg → embryo → hatchling → chick → penguin* • ***ostrich*** *= egg → embryo → hatchling → chick → ostrich*			
Plants are able to reproduce in two different ways - sexual reproduction and asexual reproduction. ***(2)***	***Step 10***	*asexual reproduction, fertilising, flowering plant, flower, seed, bulb, runner, tuber, propagate*	
Sexual reproduction in flowering plants involves pollen from one flower fertilising the egg of another to produce a seed. ***(2)***			
That natural asexual reproduction is when a plant reproduces by growing a blub, runner, or tuber. ***(2)*** - *Bulbs are underground food storage organs with fleshy leaves that store food and can grow and develop into new plants* - *Runners are horizontal stems that grow from a main plant.* - *Tubers are underground stems on a plant from which new plant shoots grow.*			
That humans can make a plant reproduce asexually by taking cuttings that are then propagated. ***(3)***			

That the main parts of a flower and their functions are: ***(2)***
• *stamen – the male part of a flower that produces pollen*
  ○ *anther – the part of the stamen where pollen is produced*
  ○ *filament – the part of the stamen that supports the anther*
• *Pistil – the part of the flower that is topped by the stigma*
  ○ *stigma – the female part of a flower where pollen from another plant is collected*
  ○ *style – the part of the flower that joins the stigma to the ovary*
  ○ *ovary – contains female eggs cells called ovules*
• *petal – the often-coloured parts of a flower*
• *sepal – the outer parts of a flower (often green and leaf like) that enclose an unopened bud*
	Step 11	*stamen, pollen, anther, filament, pistil, stigma, style, ovary, ovule, petal, sepal, bud*	

That flowering plants have a life cycle and this includes: ***(2)*** • *pollination - pollen is carried by insects or blown by the wind from one flower to another.* • *fertilisation - pollen reaches the new flower and travels to the ovary where it fertilises egg cells (ovules)* • *seed production – seeds are made by the ovules following fertilisation.* • *seed dispersal - the seeds are scattered by animals or the wind.* • *germination – the process in which a seed starts to grow.*	***Step 12***	*pollination, fertilisation, seed production, seed dispersal, germination*	← ***Core Investigation 3***

***Vocabulary may already have been introduced but must be covered in the given context**

Year 5 – Science Lesson Objectives

Living things and their habitats (Y5)

To describe the sexual reproduction of mammals.
To describe the life cycles of different mammals.
To compare the life cycles of amphibians and insects.
To describe the differences in the life cycles of mammals, amphibians, insects and birds.
To describe how plants reproduce. (sexual and a sexual)
To compare the life cycles of plants and animals in the local environment with other plants and animals around the world.
To explain what Jane Goodall discovered about chimpanzees.
1. To conduct secondary research to find a pattern between the size of a mammal and the length of its gestation period.
2. To compare the life cycles of animals.
3. To observe the life cycle of a broad bean.
Assessment - Children create their own new species for a classification group and design its life cycle based on the life cycle of similar animals within that group.

Black - Learning objective Red – Suggested Activities or useful information. Purple – Core investigations

Small Steps Overview – Animals inc. Humans (Y5)

(1)	*Describe the changes as humans develop to old age.*
(2)	***Providing further depth and breadth of understanding***

NOTE – SOME STEPS WILL TAKE MORE THAN 60 MINUTES

Pupils will know…		***Key Vocab (MUST be introduced)***	
All knowledge (inc. key vocab) linked to prior learning (see page 3 for linked objectives)			
that humans can produce offspring which grow into adults. ***(1)***	***Step 1***	*reproduction, adult, humans, offspring*	
That male and female sex cells fuse together in a process called fertilisation. ***(1)***	***Step 2***	*male, female, sex cells, sperm, egg, fertilisation foetus, uterus, prenatal*	← ***Core Investigation 1***
That fused cells develop and grow into a foetus inside a mother's uterus. ***(1)***			
That the stage of development between fertilisation and birth is called 'prenatal'. ***(1)***			
That the human gestation period is around nine months. ***(1)***	***Step 3***	*gestation*	
That the gestation period of humans is different to that of some other animals. ***(2)***			
That after nine months of gestation, a baby is born. ***(1)***	***Step 4***	*baby, birth, growth, development, infancy*	
That in the first few years of human life, growth and development is rapid. ***(1)***			
That children learn to walk and talk during infancy. ***(1)***			
That throughout childhood, children learn new skills and become more independent. ***(1)***			
That the stage of development between childhood and adulthood is called adolescence. ***(1)***	***Step 5***	*childhood, adulthood, adolescence,*	
That human adolescence usually takes places between 10 and 19 years after birth. ***(1)***			
That the human body starts to change during adolescence to enable reproduction to occur during adulthood. ***(1)***			
That humans develop even greater independence during adolescence. ***(1)***			
That during adolescence, boys and girls experience a physical stage of development called 'puberty'. ***(1)***	***Step 6***	*puberty*	
During puberty, the following changes usually occur for females: ***(1)*** • *Menstruation begins* • *Breasts start to grow* • *Shoulders begin to broaden*		*menstruation, breasts, scrotum, testes, penis, larynx, armpits, pubic hair, sweat glands*	
During puberty, the following changes usually occur for males: ***(1)*** • *Hair begins to grow on the chest* • *Scrotum, testes and penis develop*			
During puberty, the following changes usually occur for both males and females: ***(1)*** • *The larynx (voice box) grows* • *Hair begins to grow on arms and legs, as well as under the armpits* • *Pubic hair starts to grow* • *Continue to grow taller* • *All other parts of the body continue to grow* • *Sweat glands produce more sweat* • *Skin becomes oilier*			
That in early adulthood, the human body is at peak fitness and strength. ***(1)***	***Step 7***	*fitness, strength*	
That humans' ability to reproduce decreases as they move through middle adulthood. ***(1)***	***Step 8***		
That during middle adulthood, humans may begin to lose their hair. ***(1)***			
That during middle adulthood, humans' hair may begin to turn grey. ***(1)***			
That into late adulthood, the human body begins to decline in fitness and strength. ***(1)***	***Step 9***	*healthy lifestyle*	← ***Core Investigation 2***
That leading a healthy lifestyle can help to delay or reduce the effects of a decline in fitness and strength. ***(2)***			
That the average life expectancy of a male in the UK is 79.0 years (2018-2020). ***(2)***	***Step 10***	*life expectancy*	
That the average life expectancy of a female in the UK is 82.9 years (2018-2020). ***(2)***			

****Vocabulary may already have been introduced but must be covered in the given context***

Year 5 – Science Lesson Objectives

Animals inc. Humans (Y5)

To draw a timeline to describe the stages of human development.
To explain how babies grow and develop.
To describe and explain the main changes that occur during puberty.
To identify the changes that take place in old age.
1. To take measurements to show how humans develop as they grow older.
2. Present the data collected to compare the life expectancies of animals.
Assessment -

Black - Learning objective Red – Suggested Activities or useful information. Purple – Core investigations

Year 5 - Possible Misconceptions

Year 5	Living Things and their Habitats	Animals inc. Humans	Properties and Changes of Materials
	Some children may think: • all plants start out as seeds • all plants have flowers • plants that grow from bulbs do not have seeds • only birds lay eggs.	***Some children may think:*** • a baby grows in a mother's tummy • a baby is "made".	***Some children may think:*** • thermal insulators keep cold in or out • thermal insulators warm things up • solids dissolved in liquids have vanished and so you cannot get them back • lit candles only melt, which is a reversible change.
	Earth and Space	**Forces**	
	Some children may think: • the Earth is flat • the Sun is a planet • the Sun rotates around the Earth • the Sun moves across the sky during the day • the Sun rises in the morning and sets in the evening • the Moon appears only at night • night is caused by the Moon getting in the way of the Sun or the Sun moving further away from the Earth.	***Some children may think:*** • the heavier the object the faster it falls, because it has more gravity acting on it • forces always act in pairs which are equal and opposite • smooth surfaces have no friction • objects always travel better on smooth surfaces • a moving object has a force which is pushing it forwards and it stops when the pushing force wears out • a non-moving object has no forces acting on it • heavy objects sink and light objects float.	

Useful Resources and Websites

Name	Link / Location
• Primary Science Teaching Trust (website)	https://pstt.org.uk
• Teacher Assessment in Primary Science (TAPS)	https://pstt.org.uk/resources/curriculum-materials/assessment
• STEM	https://www.stem.org.uk/primary-science
• Explorify	https://explorify.uk
• ReachOut CPD	https://www.reachoutcpd.com