



# Lilycroft Primary School

## Science Curriculum Overview\*\*

### Our School Intent

The intention of the Science Curriculum at Lilycroft Primary School is to inspire our children's curiosity, awe and wonder to explore the world in which we live. We ensure that our children understand our world by carefully thinking about it and testing our guesses with investigations and experiments.

- Pupils will be curious and inquisitive about biology, chemistry and physics.
- Pupils will be confident when planning and conducting investigations/experiments.
- Pupils' learning is planned sequentially to ensure that prior scientific knowledge is built upon and revisited to aid the transfer of knowledge to long term memory.
- Pupils will be able express an understanding the impact of science on the modern world.

### Our Implementation

- Scientific knowledge points are covered.
- Use of a range of sources.
- Experiential learning within a topic.
- Classroom Environment to support knowledge, vocabulary and learning for all pupils.
- Prior scientific knowledge will be revisited each lesson.
- Explicit teaching of vocabulary.
- Opportunities for debate and collaborative learning.

### **Knowledge Points:**

- Develop scientific knowledge and conceptual understanding linked to a specific unit of study.
- Conduct a scientific enquiry to include observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources.
- Understanding the uses and implications of science, today and for the future.
- Vocabulary will be taught throughout the unit.

### **Assessment:**

Pupils are required to recall and remember key facts and scientific knowledge and skills that they have learnt across a unit of work. Pre-learning tasks and skills assessment will be built into each unit of work using TAPS resources so that pupils are knowing more, learning more and remembering more. Enquiry questions within the substantive knowledge section (highlighted in green) support assessment for learning opportunities (AfL) throughout the unit being taught.

### **SEND:**

Every child accesses the same curriculum as their peers with scaffolding and support that is appropriate for their individual needs. All children are given the opportunity to work collaboratively with their peers and different adults, maintaining an inclusive learning environment.

### **PD**

All the personal development opportunities are added to the units.

**Science in the EYFS:** Science in the EYFS takes a child centred focus. The focus topics are not taught in a particular order as we follow the interests of the children. ELG objectives with science content are mapped against Key Stage 1 objectives to ensure teaching is sequential throughout the school, building upon the children's prior learning.

## ELG - Understanding the World — The Natural World

- Explore the natural world around them, making observations and drawing pictures of animals and plants
- Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

### WS VOCABULARY

Look closely, observe, watch, touch, feel, smell, listen, same, different, ask questions, record, sort, group

[Now Press Play – EYFS Natural World Experiences](#)

Animals Including Humans	Plants and Seasons	Living Things and their habitats	Everyday Materials
<p>* Describe what they see, hear, smell &amp; feel (senses)</p> <p>* Identify, name and describe familiar animals (farm animals, wild animals and sea creatures)</p> <p>* Observations of familiar animals – draw, record and label with animal names and any body parts they know independently (observational drawing)</p> <p>* Be able to show care and concern for living things</p> <p>* Talk about things they have seen outside including animals</p> <p>* Encourage children to observe how animals behave differently as the seasons change</p> <p><b>Vocabulary</b> names of animals, hair (e.g. black, brown, dark, light, blonde, ginger, grey, white, long, short, straight, curly), eyes (e.g. blue, brown, green, grey), skin, fur (e.g. black, brown, white),</p>	<p>*Describe what they see, hear &amp; feel whilst outside (senses)</p> <p>*Identify, name &amp; describe some familiar plants – sunflower, daffodil</p> <p>* Observations of plants – draw, record and label these – use a magnifying glass.</p> <p>* Talk about things they have seen outside including plants</p> <p>*Plant a seed and record growth using camera/IPAD</p> <p>* Understand the effect of changing seasons on the natural world around them (weather and seasonal features such as: Autumn -leaves drop Why do leaves fall? Signs of Spring and growth What do we know about winter? Summer -clothes for a trip – our sunny holiday)</p> <p><b>Vocabulary</b> plant, tree, bush, flower, fruit, vegetable, herb, weed, seed, berry, dig, water, grow, die, soil</p> <p>sun, rain, wind, snow, thunder, lightning, ice, rainbow</p>	<p>*Describe what they see, hear, smell &amp; feel whilst outside – focused observation of the natural world</p> <p>*Discuss how we care for the natural world around us.</p> <p>* Observe closely -draw pictures of the natural world, including animals and plants e.g. minibeast hunt at the park</p> <p>*Life cycle of a caterpillar/butterfly</p> <p>*Minibeast habitats (summer)</p> <p><b>Vocabulary</b> names of contrasting environments (e.g. beach, pond, sea, sky) light, dark, wet, dry, hot, cold,</p>	<p>*Observe &amp; interact with natural processes, such as ice melting, a sound causing a vibration, a magnet attracting an object &amp; a boat floating on water or sinking</p> <p>*Model the vocabulary needed to name specific features of the natural world, both natural &amp; man-made e.g. light/dark - travelling through transparent material and an object casting a shadow</p> <p>*Recycling in class</p> <p><b>Vocabulary</b> ice, frozen, melt, wet, cold, sink, float, strong, weak, hot, hard, soft, bend, stretch</p>

## Long term Plan

Year group	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<b>R</b>	Animals Including Humans * me and my body (senses)	Everyday Materials * float/sink *Light/dark Seasons (Autumn)	Living things and their habitats *caterpillars - life cycle Seasons (Spring)	Plants *grow a seed	Living things and their habitats *minibeasts Seasons (Summer)	Animals Including Humans * familiar animals - farm
<b>1</b>	Animals Including Humans *human bodies and our senses Seasons (Autumn)	Everyday Materials	Animals Including Humans (animals) Seasons (Spring)		Plants Seasons (Summer)	
<b>2</b>	Animals Including Humans	Uses of everyday materials		Plants	Living things and their habitats	
<b>3</b>	Animals Including Humans – nutrition and skeletons	Rocks, Fossils and Soils	Light		Plants	Magnets
<b>4</b>	Living things and their habitats - Classification	States of Matter	Animals including humans – teeth and digestion	Sound	Electricity	Living things and their habitats habitats
<b>5</b>	Forces	Earth and Space	Properties and Changes of materials		Animals Including Humans – Human growth	Living Things and their Habitats – Life Cycles
<b>6</b>	Living Things and their Habitats	Electricity	Light	Evolution and Inheritance	Animals Including Humans	

## YEAR 1 WORKING SCIENTIFICALLY

### Asking Questions and planning an enquiry (TAPS Reflectiveness; Transparency; Dunlop Balls)

\*Ask simple Qs and recognise that they can be answered in different ways.

### Set up enquiries (TAPS Teddy Zipline; Floating and Sinking)

\*Perform simple tests.

### Observe and Measure (TAPS Seasonal Change; Plant Structure; Leaf Look; shades of colour)

\*Observe closely, using simple equipment.

### Record (TAPS Seasonal Change; Bridge Material Testers)

\*Gather and record data to help in answering questions.

### Evaluate (TAPS Surprise Materials; Human body parts)

\*Use their observations and ideas to suggest answers to questions.

### Interpret and Report (TAPS Animal Classification)

\*Identify and classify.

\*Use appropriate scientific language to communicate ideas.

## WS VOCABULARY

changes, patterns, grouping, sorting, compare, identify (name), measure, data, record results, drawing, picture, table, tally chart, present, pictogram, block chart, Venn diagram, test, investigate, explore, equipment, resources, magnifying glass, hand lens, ruler, tape measure, metre stick, pipette, syringe, spoon, teaspoon, interpret results, scientific enquiry, pattern seeking, comparative testing, observing over time, classifying, researching using secondary sources

Year	Unit	Substantive knowledge	Vocabulary
1	<b>Seasonal changes</b> <b>Now Press Play – Seasons</b> PD opportunities - walk around Lister Park to look at the different plants/flowers/tree during the different seasons	<b>*Observe and describe weather associated with the seasons and how day length varies.</b> <i>*Through observation, understand that the weather constantly changes. It includes temperature, wind strength as well as rain, clouds, sun and snow.</i> <i>*Know that daylight is when it is light outside and that the amount of daylight changes with the seasons eg it becomes darker earlier in the winter and daylight hours are longer in the summer.</i> <b>How could we identify and record the weather over a week/month?</b> <b>In which month does it rain the most?</b> <b>Does the wind always blow in the same direction?</b> <b>*Observe changes across the 4 seasons</b> <i>*Understand that in winter the temperature is lower and less plants grow</i> <i>*Know that In Spring it becomes gradually warmer and new life appears eg daffodils; new leaves; chicks.</i>	seasons, winter, summer, spring, autumn, sunrise, sunset, day length, weather

		<p>*Know that in Summer the weather becomes warmer and we can see more growth, especially flowers.          *Know that in Autumn leaves change colour and fall off the trees.  <b>How does a tree near our school change over a year?</b>  <b>What colours can we find outside and how does this change across the seasons?</b></p>	
<p><b>Animals Including Humans 1 – humans: our bodies and our senses</b></p> <p><b>Animals Including Humans 2 - animals</b></p> <p>Now Press Play – Humans, Animals</p> <p>PD opportunities          Zoo lab          Predators, Prey and Food chains- looking at what the animals eat-          Herbivores,          Carnivores and          Omnivores</p>		<p><b>*Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</b>          *Know that most bodies have head, face, neck, arms, elbows, fingers, legs, knees, eyes, ears, mouth, teeth, skin, nose, ears, tongue.  <b>Do the oldest children have the longest feet? (simple data collection and pattern seeking)</b>          *Understand that animals including humans have senses to help them to survive eg they can sense danger and respond.          *Know that humans use their eyes to see; we can see when there is light but not in the dark; some people cannot see.          *know that humans use their ears to hear sounds; quiet sounds are harder to hear than loud sounds.          *know that the tongue helps us to taste; the 5 basic tastes are sweet, salty, bitter, sour and savoury.          *know that skin is the body part that helps us to sense touch; it covers the whole body and we can sense touch with our whole body.          *know that the nose helps us to sense smell; some items have a stronger smell than others.  <b>Is our sense of smell/touch better when we can't see? (performing simple tests)</b>  <b>Which sense is the most accurate at identifying food?</b></p> <p><b>*Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.</b>          *Understand that there are many different animals with different characteristics and name at least 2 or 3 examples from each group.  <b>How can we sort the zoo animals? (identify and classify)</b>  <b>*Identify and name a variety of common animals that are carnivores, herbivores and omnivores.</b>          *Understand that animals need food to survive but different animals have different diets. They need a variety of food to help them grow, repair their bodies, be active and stay healthy. Know at least 2 examples from each group.  <b>What do animals eat to survive?</b>  <b>*Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).</b></p>	<p>head, face, neck , body, eyes, ears, mouth, teeth, leg, fingers, skin, nose, ears, tongue (parts of the human body including those within the school's RSE policy) senses, touch, see, smell, taste, hear, blind</p> <p>tail, wing, claw, fin, scales, feathers, beak, paws, hooves, fish, amphibians, reptiles, birds, mammals, gills.          (names of animals experienced first-hand from each vertebrate group)          herbivore, omnivore, carnivore</p> <p><b>Possible Misconceptions</b></p> <p>Children will have different names for body parts eg tummy, belly</p> <p>Children think we only use our fingers to sense touch</p> <p>Children may think we can only hear 1 sound at once</p>

	<p>*Understand that fish, amphibians, reptiles, birds and mammals are similar because they have internal skeletons and organs.</p> <p>*Know that fish are different to other animals because they have gills to breathe underwater and scaly skin.</p> <p>*Know that amphibians.... begin life with gills then develop lungs and breathe on land.</p> <p>*Know that reptiles ....breathe air and have dry scaly skin.</p> <p>*Know that birds ..... have feathers and wings</p> <p><b>Why are animals different colours and patterns?</b></p>	<p>Children might struggle to identify a range of smells or tastes and have limited vocabulary to describe them</p>
<p><b>Everyday Materials</b></p> <p>PD opportunities</p> <p>Now Press Play – Everyday Materials</p>	<p><b>*Distinguish between an object and the material from which it is made.</b></p> <p><b>Is glass only used for windows?</b></p> <p><b>Is there a pattern in the types of materials used to make objects in our school?</b></p> <p><b>*Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock</b></p> <p><b>*Describe the simple physical properties of a variety of everyday materials.</b></p> <p>*Understand that there are many different materials that have different describable and measurable properties.</p> <p>*Understand that the properties of a material help us decide whether they are suitable for a job.</p> <p><b>*Compare and group together a variety of everyday materials based on their simple physical properties</b></p> <p>*Use Venn diagrams to sort materials based on whether they are rough, smooth, shiny, dull etc</p> <p><b>Which materials are waterproof?</b></p> <p><b>Which materials are the most absorbent?</b></p> <p><b>Are all metals the same? Is all glass see-through?</b></p> <p><b>What happens to materials over time if they are buried in the ground?</b></p> <p><b>Which materials can be recycled?</b></p>	<p>object, material, wood, plastic, glass, metal, rock, brick, fabric, rubber, waterproof, absorbent, rough, smooth, shiny, dull, see-through</p>
<p><b>Plants</b></p> <p>Now Press Play – Plants</p>	<p><b>*Identify and name a variety of common wild and garden plants in the local area including deciduous and evergreen trees on a tree hunt</b></p> <p>*Understand that garden plants are plants that people choose to grow in a garden. Rose, sunflowers and daffodils are examples of garden flowers.</p> <p>*Know that wild plants do not need to be planted; they grow wherever the seed lands. Dandelion, nettle and ivy are examples of wild plants.</p> <p>*Understand that plants need light and water to grow and survive</p>	<p>leaf, blossom, petal, root, trunk, branch, stem, bark, bud, deciduous and evergreen</p>

<p>PD opportunities -gardener – Looking at the plants in the school garden. - Walk to Lister Park to compare different types of trees.</p>	<p>*Identify oak, birch and horse chestnut as examples of deciduous trees which means they shed their leaves in the autumn, and fir and pine as examples of evergreen trees which means they keep their leaves throughout the year. <b>How many plants can we identify in our school grounds?</b> <b>*Identify and describe the basic structure of a variety of common flowering plants, including trees by observing common plants/flowers in the garden and drawing what they identify.</b> *Know that roots, stem, leaves and flowers are parts of a flowering plant. *Know that a trunk, bark and branches are parts of a tree. <b>How can we sort the leaves we collected on our walk?</b> <b>How does my sunflower change each week?</b> <b>Are all plants green?</b> <b>Where do plants grow the best in our school?</b></p>	
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## YEAR 2 WORKING SCIENTIFICALLY

### Asking Questions and planning an enquiry. (TAPS Waterproof; Separating colours; Animal home build)

\*Ask people questions and use simple secondary sources to find answers.

### Set up enquiries. (TAPS Rocket mice, Daisy footprints; Feeding simulation)

\*Experience different types of science enquiries, including practical activities.

\*Begin to suggest equipment needed.

### Observe and Measure. (TAPS Plant growth; Ice escape, Drops on coin)

\*With guidance, they should begin to notice patterns and relationships.

\*Use simple measurements and equipment (e.g. hand lenses, egg timers) to gather data.

### Record (TAPS Woodlice habitats; Materials hunt)

\*Record simple data using tables and bar charts.

### Evaluate (TAPS Nature spotters, Living and non-living)

\*Use their observations and ideas to suggest answers to questions.

### Interpret and Report (TAPS Human handspan, Boat materials)

\*Use their observations and ideas to suggest answers to questions.

\*Talk about what they have found out and how they found it out.

## WS VOCABULARY

changes, patterns, grouping, sorting, compare, identify (name), measure, data, record results, drawing, picture, table, tally chart, present, pictogram, block chart, Venn diagram, test, investigate, explore, equipment, resources, magnifying glass, hand lens, ruler, tape measure, metre stick, pipette, syringe, spoon, teaspoon, interpret results, scientific enquiry, pattern seeking, comparative testing, observing over time, classifying, researching using secondary sources



<p><b>2</b></p>	<p><b>Animals Including Humans</b></p> <p>PD opportunities - zoo lab-Life cycles -Chicks in the shared area</p>	<p><b>*Notice that animals, including humans, have offspring which grow into adults.</b></p> <p>*Understand that animals reproduce new animals when they reach maturity. Some animals give birth to live young and some animals lay eggs. Animals grow until maturity and then don't grow any larger. All animals eventually die.</p> <p>*Compare known lifecycles (tadpole, butterfly) and understand how they change over time.</p> <p><b>Do all animals grow and live the same way?</b></p> <p><b>Do all babies look like their parents? Which offspring belong to which parent?</b></p> <p><b>Which animals lay eggs and which give birth to live babies?</b></p> <p><b>*Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).</b></p> <p>*Understand that different animals move in different ways to help them survive. Exercise and a good diet keep animals' bodies in good condition and increases survival chances.</p> <p>*know that all <b>mammals, birds, fish, amphibians and reptiles</b> and need air, water, food and shelter to survive; they can be carnivores, herbivores or omnivores, or <b>insectivores</b>; reptiles also need direct heat to survive.</p> <p>*know that humans are mammals and need the same as other mammals to survive.</p> <p><b>How can we group these animals on their needs for survival? (identifying, grouping and classifying)</b></p> <p><b>*Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</b></p> <p>*Understand that to stop illness and infection we need to maintain a healthy lifestyle and keep ourselves clean by washing and brushing our teeth.</p> <p>*Understand that people need to exercise often to help their bodies stay strong and fit.</p> <p>* Know the basic food types: fruit and vegetables, meat, fish, dairy, carbohydrates, fat and sugary foods and sort food into the correct groups</p> <p>*Know that fats and sugary foods should be eaten rarely and in small amounts.</p> <p><b>How much food and drink do I have over a week?</b></p> <p><b>Which age group of children wash their hands the most in a day?</b></p> <p><b>What food do you need in a healthy diet and why?</b></p>	<p>Lifecycle. Insectivore, reproduction, growth, baby, toddler, child, teenager, adult, old person, offspring, hygiene, heart rate, food types (e.g. meat, fish, vegetables, bread, rice, pasta, dairy)</p> <hr/> <p><b>Possible Misconceptions</b></p> <p>*avoid using "insect" as a generic term for minibeast ie worms, slugs and spiders are not insects – they learn this in year 4</p>
	<p><b>Use of Everyday Materials</b></p>	<p><b>*Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.</b></p> <p>*Understand that materials have useful properties for a given job. Ie plastic is waterproof; steel is strong; rock is hard; cotton wool is soft; rubber is flexible. To know that suitability means having the right properties for a particular purpose.</p>	<p>natural, man-made, opaque, transparent, translucent, flexible, rigid, shape, push, pull, twist, squash</p>

	<p>PD opportunities- Visit to the recycling centre to look at different materials that can be recycled and made into something else</p>	<p>*Understand that materials can be used for more than one thing e.g. metal: coins, cans, cars, table legs and different materials can be used for the same thing e.g. a spoon made from wood, metal, plastic.</p> <p>*Know that opaque, translucent and transparent describe the amount of light which can pass through a material or object or how “see through” they are.</p> <p><b>Which material makes the bounciest ball?</b> <b>Which material would be the most suitable to make a bridge for a toy truck?</b> <b>Which objects block the most light?</b></p> <p><b>*Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching (applying force)</b></p> <p><b>Are all objects made out of metal rigid?</b> <b>How is corrugated cardboard made?</b></p>	
	<p><b>Plants</b> PD opportunities Harlow Carr – looking at plants and workshop on growing plants.</p>	<p><b>*Observe and describe how seeds and bulbs grow into mature plants.</b></p> <p>*Know that seeds and bulbs need to be buried underground in soil and that they will grow into adult plants under the right conditions. <i>NOTE: Seeds and bulbs need water to grow but most do not need light; seeds and bulbs have a store of food inside them.</i></p> <p><b>Do all plants produce flowers?</b> <b>Do plants flower all year round?</b> <b>Where do seeds come from?</b> <b>Do bigger seeds grow bigger plants?</b></p> <p><b>*Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.</b></p> <p>*Investigate what happens if a plant is deprived of light, water or nutrients</p> <p><b>How does light/warmth affect plant growth?</b> <b>Do plants grow the same amount every week?</b></p>	<p>sunlight, shade, healthy, bulb, germination (growth), shoot, seedling, air, warmth</p>
	<p><b>Living Things and their Habitats</b></p> <p>Now Press Play – Habitats</p>	<p><b>*Explore and compare the differences between things that are living, dead, and things that have never been alive.</b></p> <p>*Understand that some things are living, some were once living but now dead and some things never lived.</p> <p>*Know that all living things move, breathe, sense, grow, make babies, get rid of waste and get their energy from food.</p> <p><b>*Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other.</b></p>	<p>living, dead, never been alive, basic needs, food chain, shelter, survival, conditions, shady, damp, names of habitats (e.g. arctic, desert etc.), names of micro-habitats (e.g. under logs, in bushes etc.)</p>

PD opportunities –  
Yorkshire Wildlife  
Park with Habitat  
workshops or  
Zoolab Habitats

\*Understand that different animals and plants live in different places where they can get the things they need.  
\*Understand that living things are adapted to survive in different habitats. Eg polar bears have thick fur for warmth and oily paw pads to ensure they do not freeze to the ice; cacti are adapted to their environment by having a thick skin to store water and spikes to keep animals away.  
**Why do animals and plants live in different places?**  
**How can we group these animals based on what habitat we would find them in?**  
**How does the habitat of the Arctic compare with a British forest?**  
**\*Identify and name a variety of plants and animals in their habitats, including microhabitats.**  
\*Identify and sort some British woodland wildlife; polar animal; safari animals; desert animals; seashore animals  
\*Know that woodlice live under logs which is an example of a microhabitat as they need somewhere dark and damp; frogs can live in ponds – a microhabitat – as they need water in which to lay their eggs.  
\*Begin to understand that environmental change can affect plants and animals that live there.  
**What animals live in our school environment?**  
**How do seasons affect our animals and plants?**  
**Which animals hibernate and why?**  
**\*Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.**  
\*Understand that plants absorb energy from the sun; that this energy is consumed by herbivorous animals; and that carnivorous animals eat other animals.  
\*Know that arrows in a food chain show the direction of this flow of energy.  
**Which animals hunt, and which animals are hunted?**  
**Which animals hibernate and why?**

### YEAR 3 WORKING SCIENTIFICALLY

#### Asking Questions and planning an enquiry (TAPS Investigating skeletons)

\*Ask relevant questions and use different types of scientific enquiries to answer them.

#### Set up enquiries. (TAPS Shoe grip forces; Magnet tests)

\*Set up simple practical enquiries, comparative and fair tests.

#### Observe and Measure. (TAPS Measuring plants, Plant close obs, Ice cream Forensic fingerprints)

\*Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers, stopwatches and data loggers.

#### Record (TAPS Making shadows, Cars down ramps)

\*Gather, record, classify and present data in a variety of ways to help in answering questions.

**Evaluate (TAPS Rock reports, Wind power vehicle)**

\*Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.

**Interpret and Report (TAPS Function of stem, Balloon rockets, Egg drop packaging, Dunking biscuits)**

\*Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.

**WS VOCABULARY**

practical work, fair testing, relationships, accurate, thermometer, data logger, stopwatch, timer, estimate, data, diagram, identification key, chart, bar chart, prediction, similarity, difference, evidence, information, findings, criteria, values, properties, characteristics, conclusion, explanation, reason, evaluate, improve

<p><b>3</b></p>	<p><b>Animals Including Humans</b>          PD opportunities          Bone doctor talking to the children about our bodies and skeletons-see LE</p>	<p><b>*Identify that humans and some other animals have skeletons and muscles for support, protection and movement</b>          *Know that humans have skeletons which are made up of different bones (206 bones) Identify and label some bones on the human skeleton e.g. <b>skull, ribcage, femur, pelvis and spine.</b>          *Know that mammals, birds, reptiles, amphibians and fish have skeletons to protect vital organs inside the body; allow movement, support the body and stop it from falling on the floor.          *Know that some animals do not have a spine (<b>invertebrates</b>); Some invertebrates such as insects have an <b>exoskeleton</b> – a solid covering on the outside of their body to provide support and protection and some (such as earthworms and slugs) have water held inside by muscles which act like a skeleton.  <b>What types of skeletons are there? Are all skeletons the same?</b>  <b>How can we sort and group animals based on their skeletons? (identify, group and classify)</b>  <b>Can something survive without a skeleton?</b>  <b>What happens if we break a bone?</b>          *Know that muscles are connected to bones and move them when they contract. They are arranged in pairs so that when one contracts the other loosens.  <b>How do we move? Why do we need joints? Why do muscles get tired?</b>  <b>*Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat</b>          *Know that different animals are adapted to eat different foods.          *Know that to stay healthy, humans need to exercise regularly eat a healthy diet and be hygienic.</p>	<p>skeleton, bones, muscles, joints, support, protect, move, skull, ribcage, ribs, spine, femur, pelvis</p> <p>vertebrate, invertebrate, exoskeleton</p> <p>nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat,</p> <hr/> <p><b>Possible Misconceptions</b></p> <p>* Children may think that all bones in the leg are called "leg bones"</p> <p>*Children may think that all bones have the same function</p>
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		<p>*Know that proteins are good for growth; carbohydrates for energy and fruit/vegetables provide vitamins and minerals which help us to keep healthy. Eg calcium for strong bones and teeth. Getting the right amount of each food group (half made up of fruit, vegetables and carbohydrates) is called a balanced diet</p> <p>*Know that excess body fat can lead to heart disease and increases the strain on joints and growing bones</p> <p><b>Why do different types of vitamins keep us healthy and which foods can we find them in?</b></p>	<p>*Children may think that all animals have a skull, femur, pelvis etc</p> <p>Not all animals in the same group have the same skeletal structure eg human and whales; snakes and lizards</p>
<p><b>Rocks, Fossils and Soils</b></p> <p><b>Now Press Play – Rocks</b></p> <p>PD opportunities -Farcliffe- looking at rocks/soil at Farcliffe. What types of rocks are they? - Hook- find fossils in the playground</p>		<p><b>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</b></p> <p>*Through close observation, explore the similarities and differences between different rock types eg are they porous, grainy or do they contain crystals?</p> <p>*Understand that there are 3 types of natural rocks (sedimentary, metamorphic and igneous) and that each type has typical properties. Begin to identify some examples of each.</p> <p>*Understand that rocks are used for building. They have different textures and appearances and change over time.</p> <p><b>Can you use the identification key to find out the name of each of the rocks in our collection?</b></p> <p><b>What rock would be best to use for a kitchen chopping board?</b></p> <p><b>How can we test the permeability or durability of different rocks?</b></p> <p><b>*Describe in simple terms how fossils are formed when things that have lived are trapped within rock.</b></p> <p>*Understand that fossils form when a plant or animal dies and is covered by mud or silt before it rots or is eaten. In time layers of sediment build (sedimentary rock) and the mud turns to stone. The material in the dead plant or animals is replaced by minerals, leaving a rock in the shape of the animal or plant that was once there.</p> <p>*Understand that fossils help us to learn about things that lived long ago (palaeontology)</p> <p>*Mary Anning was a famous British palaeontologist whose discoveries taught us a lot about dinosaurs.</p> <p><b>How do fossils tell us about the past?</b></p> <p><b>How are fossils different from bones?</b></p> <p><b>*Recognise that soils are made from rocks and organic matter.</b></p> <p>*Know that soil is the uppermost layer of the earth and is made up of minerals (tiny particles of rock); organic matter (live or decaying plants or animals); air and water.</p>	<p>metamorphic, sedimentary, igneous, layers, molten rock, <b>grains, crystals</b>, texture, fossil, flesh, minerals, marble, chalk, granite, sandstone, slate, types of soil (e.g. peaty, sandy, chalky, clay)</p>

		<p>*Research the different processes involved in soil formation including the role of worms and the weather.</p> <p>*Know that there are different types of soil eg clay, sandy, peaty or chalky and that different plants grow in different soils.</p> <p><b>Which soil has the best drainage?</b></p> <p><b>In which soil does a plant grow best?</b></p> <p><b>How can we use composting to make our own soil?</b></p>	
	<p><b>Light</b></p> <p>PD opportunities - shadow puppet theatre in the sports hall. - Science and Media Museum to look at the light section and complete activities on how light is reflected.</p>	<p><b>*Know that light is a form of energy</b></p> <p>*Energy comes in different forms and can be neither created or destroyed, only changed from one form to another</p> <p><b>*Recognise that we need light in order to see things and that dark is the absence of light.</b></p> <p>*Understand that everything that we see is either a light source or something that is reflecting light from our light source into our eyes; the sun is a light source but the moon is not – it is reflecting light from the sun. Many light sources give off light and heat – both are forms of energy.</p> <p><b>*Can we see shiny things in the dark?</b></p> <p><b>*Notice that light is reflected from surfaces</b></p> <p>*Understand that light travels in straight lines and is reflected when it travels from a light source and then “bounces” off an object.</p> <p>*Understand that smooth, shiny materials reflect light beams better than bumpy, non-shiny materials. Reflectiveness is a property of a material and reflective materials can be very useful eg cat's eyes and high-vis jackets.</p> <p><b>If a coin was lost in the dark, which is the best way to find it?</b></p> <p><b>Which would be the best material for a reflective strip for a school bag?</b></p> <p><b>Are some colours more reflective than others?</b></p> <p><b>*Recognise that shadows are formed when the light from a light source is blocked by an opaque object.</b></p> <p>*Know that transparency/opacity are properties of a material</p> <p>Understand that transparent materials let light through them; translucent materials let some light through and opaque materials don't let light through.</p> <p><b>How many pieces of tracing paper are as translucent as a single piece of white paper?</b></p> <p><b>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.</b></p> <p><b>How do sunglasses protect our eyes?</b></p> <p><b>Which pair of sunglasses will be best at protecting our eyes?</b></p>	<p>light source, absence of light, surface, translucent, shadow, reflect, mirror, dangerous, energy</p>

	<p><b>*Find patterns in the way that the size of shadows change.</b></p> <p>*Understand that as objects move towards a light source, the size of a shadow increases.</p> <p>*Understand how to show the changing of shadow size by drawing a diagram with straight lines representing light.</p> <p><b>How does the distance between the shadow puppet and the screen affect the size of the shadow?</b></p> <p><b>How can we change the darkness, size and shape of a shadow?</b></p> <p><b>How does my shadow change over a day/month/year?</b></p>	
<p><b>Plants</b></p> <p><b>Now Press Play – Plants</b></p> <p>PD opportunities -gardener-caring for the plants in the school playground</p>	<p><b>*Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.</b></p> <p>*Know that plants are producers, they make their own food; their leaves absorb light and use its energy to turn carbon dioxide and water into carbohydrates</p> <p>*Know that roots provide support and draw water and minerals from the soil</p> <p>*Know that the stem holds up the leaves so they can absorb light and make food and holds up the flowers so they can receive pollen</p> <p><b>*Investigate the way in which water is transported within plants</b></p> <p>*Know that the stem transports water and minerals to the other parts of the plants</p> <p><b>What happens to celery when it is left in a glass of coloured water?</b></p> <p><b>How does the length of the carnation stem affect how long it takes for the food colouring to dye the petals?</b></p> <p><b>*Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, warmth and room to grow) and how they vary from plant to plant.</b></p> <p>*Know that seeds/bulbs require the right conditions to germinate and grow.</p> <p><b>Can a plant survive or grow without soil? Can a plant live without its leaves?</b></p> <p><b>Do all plants need exactly the same thing? (eg a cactus and a herb)</b></p> <p><b>*Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</b></p> <p>*Know that the function of the flower is reproduction. Understand that flowering plants have specific adaptations which help it to carry out pollination, fertilisation and seed production. <i>Flowers of the same kind exchange pollen; Pollen reaches the flower's ovary and makes a seed; the ovary then becomes a fruit which helps the seed leave the plant by different methods of dispersal.</i></p>	<p>photosynthesis, pollen, insect/wind pollination, male, female, fertilisation, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal), absorb</p>



		<p>*Understand that a plant needs their seeds to find more space to improve its chances of successful reproduction. Seeds contain enough food for the plant's initial growth.</p> <p>*Explore the different methods of seed dispersal</p> <p><b>How do insects know which flowers to pollinate?</b></p> <p><b>*Why do flowers smell?</b></p> <p><b>*How does the space between seeds affect how well they grow?</b></p> <p><b>What are all the different ways that seeds disperse? How is a cactus the same/different to a birch tree?</b></p>	
	<p><b>Forces and Magnets</b></p> <p>PD opportunities - STEM workshop robotics push/pulleys and magnetic movements</p>	<p><b>*Notice that some forces need contact between two objects, but magnetic forces can act at a distance.</b></p> <p>*Understand that a force can be thought of as a push or a pull. There are different types of contact forces: impact forces (when 2 surfaces collide), frictional forces (when 2 surfaces are already in contact) and strain forces (when an elastic material is stretched or squashed).</p> <p>*Magnetism is an example of a non-contact force where the objects do not touch.</p> <p><b>How does the mass of an object affect how much force is needed to make it move?</b></p> <p><b>*Compare how things move on different surfaces by investigating using different objects.</b></p> <p>*Know that objects move differently on rough and smooth surfaces; objects resist movement more on rough surfaces because there is higher friction as the object moves.</p> <p><b>*Observe how magnets attract or repel each other and attract some materials and not others by testing objects made of different materials.</b></p> <p><b>*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.</b></p> <p>*Understand that a magnet's force can work through some materials</p> <p>*Understand that a magnet's force on an object can be affected by the mass of the object; the strength of a magnet or the distance from the object.</p> <p><b>How can test which materials are magnetic?</b></p> <p><b>How can we find out which magnet is strongest?</b></p> <p><b>Are bigger magnets stronger?</b></p> <p><b>Which magnets can still attract a magnetic material through cardboard? A table?</b></p> <p><b>*Describe magnets as having two poles.</b></p> <p><b>*Predict whether two magnets will attract or repel each other, depending on which poles are facing</b></p> <p><b>How near does a magnet have to be before it attracts a magnetic material?</b></p> <p><b>Can I make a magnetic material non-magnetic?</b></p> <p><b>How far away can the magnetic attraction between two magnets be?</b></p>	<p>Force, contact force, non-contact force, magnetic force, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, iron, steel, north pole, south pole,</p>



## YEAR 4 WORKING SCIENTIFICALLY

### Asking Questions and planning an enquiry (TAPS Investigating pitch, Cornflour slime, Microfibrres)

\*Raise their own relevant questions about the world around them.

### Set up enquiries (TAPS Drying materials)

\*Start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions

\*Recognise when a simple fair test is necessary and help to decide how to set it up.

### Observe and Measure (TAPS Measure temperature, Circuit products)

\*Begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them.

\*Choose the most appropriate equipment to make measurements with increasing precision and explain how to use it accurately.

\*Take repeat measurements where appropriate.

### Record (TAPS Local survey of living things)

\*Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.

### Evaluate (TAPS Digestion model)

\*Use straightforward scientific evidence to answer questions or to support their findings.

### Interpret and Report (TAPS Electrical conductors, String phones)

\*Identify differences, similarities or changes related to simple scientific ideas and processes.

## WS VOCABULARY

practical work, fair testing, relationships, accurate, thermometer, data logger, stopwatch, timer, estimate, data, diagram, identification key, chart, bar chart, prediction, similarity, difference, evidence, information, findings, criteria, values, properties, characteristics, conclusion, explanation, reason, evaluate, improve

<p><b>4</b></p>	<p><b>Living things and their habitats</b></p> <p>PD opportunities- Environmental protest in the playground- climate change/ pollution on our living world</p>	<p><b>*Recognise that living things can be grouped in a variety of ways. (recap)</b></p> <p>*Know that animals can be grouped based on their physical characteristics (<b>e.g: vertebrates and invertebrates</b>) and based on their behaviour (<b>eg herbivores, carnivores and omnivores</b>)</p> <p>*Know that <b>insects</b> have 3 body sections, six legs and antennae; spiders have 2 body sections and 8 legs; slugs and snails are <b>soft-bodied invertebrates</b>.</p> <p><b>How can we group and classify living things?</b></p> <p><b>*Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.</b></p> <p>*Know that a <b>species</b> is a group of living things that have many similarities and that can reproduce together to produce offspring; Understand that a classification key uses <b>closed</b> questions to sort and identify living things and know how to use one to identify living things.</p> <p>*Know how to create a classification key to sort animals.</p> <p>*Know how to create a classification key to sort plants.</p>	<p>Insect, soft-bodied invertebrate, species, environment, human impact, positive, negative, hibernate</p> <p><b>Possible Misconceptions</b></p> <p>*some children may classify a whale as a fish as it lives in water; there are several examples of animals that are difficult to classify.</p>
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		<p><b>Can we use the classification keys to identify invertebrates in the playground?</b></p> <p><b>*Recognise that environments can change and that this can sometimes pose dangers to living things</b></p> <p>*Know that environmental change can make it more difficult for living things to survive and reproduce; in extreme cases this leads to extinction, where an entire species dies.</p> <p>*Know that human activity such as climate change caused by pollution – can change the environment for many living things, endangering their survival. eg the polar bear is a famous example of a species' existence being threatened by climate change.</p> <p><b>How does removal of one species from an environment affect others?</b></p> <p><b>How does environmental change affect different organisms?</b></p> <p><b>What are the most important things we could do to improve our outside area? (pond, compost, wildflowers, litter picking)</b></p> <p><b>How does human activity affect our environment? (new house buildings, use of pesticides, deforestation)</b></p>	<p>*when learning about classification keys, children might ask questions that are subjective or too broad and not useful for classifying</p>
	<p><b>States of Matter</b></p> <p><b>Now Press Play – Materials and changing states</b></p> <p>PD Opportunities- Make the states as a class in the playground. Solid- The children stand next to each other. Liquid -the children stand further apart. Gas – The children spread out in the playground.</p>	<p><b>*Compare and group materials together, according to whether they are solids, liquids or gases</b></p> <p>*Understand that all things are made of matter which is either in the state of solid (holds its shape); liquid (forms a pool not a pile) or gas (will escape from an unsealed container)</p> <p>*Know that all things are made of particles (tiny building blocks) and that these are organised differently in different states. The bonds between the particles in a solid weaken as the particles absorb heat energy and can turn into a liquid. With more heat energy the particles move apart more so a liquid can turn into a gas.</p> <p><b>Are all liquids the same?</b></p> <p><b>How does the amount of water added to flour affect its state?</b></p> <p><b>At what point is the cornflour a solid or a liquid?</b></p> <p><b>*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)</b></p> <p>*Understand that some materials can change state from one to another and back again. Know that when solids turn to liquids this is called melting and the reverse process is called freezing and when liquids turn to gas, this is called evaporation and the reverse is condensation.</p> <p>*Know that the melting point of water is always 0°C and the boiling point of water is always 100°C</p> <p><b>How does the type of chocolate affect its melting temperature?</b></p> <p><b>How does the evaporation rate change as you add more salt to your water?</b></p>	<p>Matter, solid, liquid, gas, heating, cooling, state change, melting point, boiling point, evaporation, condensation, water cycle</p>

	<p><b>How does the mass of a block of ice affect how long it takes to melt?</b>  <b>How does the surface area of water affect how long it takes to evaporate?</b>  <b>*Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</b>  *Understand that water flows around our world in a continuous process called the water cycle:  Water on Earth's surface evaporates then condenses in clouds and falls to Earth as rain, snow or hail in a process called precipitation. Water flows across the land in rivers and streams in a process called surface run-off and under the ground as groundwater.</p>	
<p><b>Animals including humans – teeth and digestion</b>  PD opportunities- visit from the toothbrushing people- mouth health</p>	<p><b>*Describe the simple functions of the basic parts of the digestive system in humans.</b>  *Know that as food passes through the body, the nutrients are extracted then the waste products are excreted. This process is digestion, and it involves breaking complex foodstuffs into simpler parts that can be absorbed by the body.  1. Food is chewed in the mouth and saliva is added  2. Food is squeezed down the oesophagus towards the stomach.  3. The stomach releases acid and enzymes to continue breaking down the food.  4. Next it reaches the small intestine which absorbs the nutrients  5. Then the large intestine absorbs water from undigested food  6. Undigested food is stored in the rectum before being excreted through the anus (muscle)  <b>Why do some people need different diets? (Weightlifter vs marathon runner)</b>  <b>What are the names for all the organs involved in the digestive system?</b>  <b>*Identify the different types of teeth in humans and their simple functions.</b>  *Know that the teeth of animals (including humans) are designed to eat different foods depending on the diet of the animal.  *Know that a human has 3 types of teeth – incisors, canines and molars – and that these perform different functions: incisors slice food; canines tear food (especially meat) and molars grind food.  <b>Why are teeth important?</b>  <b>Look at examples of teeth. Can we organise them into groups?</b>  <b>How do dentists fix broken teeth?</b>  <b>*Construct and interpret a variety of food chains, identifying producers, predators and prey.</b>  *Know that a food chain traces the path of energy through a habitat and the arrows show the direction the energy travels.  *Know that all energy in a food chain initially comes from the sun which is absorbed and turned into energy by plants.</p>	<p>digestion, saliva, oesophagus, stomach, small intestine, large intestine, rectum, anus, incisor, canine, molar, premolar, producer, predator, prey</p>

		<p>*Know that an animal that is eaten by another is called prey, and that an animal that eats other animals is called a predator.</p> <p><b>How does energy move through the food chain?</b></p>	
	<p><b>Sound</b></p>	<p><b>*Know that sound is a form of energy</b></p> <p>* Recap that energy comes in different forms – light already taught.</p> <p><b>*Identify how sounds are made, associating some of them with something vibrating.</b></p> <p>*Understand that sound is generated when an object vibrates; some of the energy from the vibrating object is transferred to the air, making the air particles move.</p> <p>*Know that sound is a form of energy that transfers in a longitudinal wave (like a slinky – not like ripples in water)</p> <p>Know that sound travels through a medium (eg particles in the air); changing the way an object vibrates changes its sound.</p> <p><b>How does changing the shape, size and material of an object change the sound it produces?</b></p> <p><b>How can we block sound from travelling?</b></p> <p><b>How does the type/thickness of material affect how well it blocks a sound (eg for ear-defenders)</b></p> <p><b>*Recognise that vibrations from sounds travel through a medium to the ear.</b></p> <p>*Understand that longitudinal sound waves are detected in the ear by humans and that the brain interprets this as the sound we hear.</p> <p>*Know that sound travels at different speeds through different objects. It travels through air much slower than light, which is why we often see thunder before we hear it.</p> <p><b>*Find patterns between the pitch of a sound and features of the object that produced it.</b></p> <p>*Understand that pitch is how high or low a sound is and this depends on how many vibrations per second are being made by the vibrating object; the number of vibrations per second is called frequency.</p> <p>*Understand that faster vibrations (higher frequencies) produce higher pitched sounds. (A whistle is a high-pitched sound, thunder is a low-pitched sound)</p> <p><b>Can you predict the relative pitch of tuning forks from the patterns of ripples they make in the water?</b></p> <p><b>*Find patterns between the volume of a sound and the strength of the vibrations that produced it.</b></p> <p>*Know that volume is how loud or quiet a sound is and this is determined by the amount of energy in the wave (eg from how hard or soft a percussion instrument is hit); the louder the sound, the bigger the vibration.</p> <p><b>Which materials vibrate better and produce louder sounds?</b></p> <p><b>*Recognise that sounds get fainter as the distance from the sound source increases.</b></p>	<p>medium, vibrate/vibration, travel, pitch (high, low), volume, faint, insulation, longitudinal wave, frequency</p>

	<p>*Know that volume of a sound is quieter if the listener is further away from the object.  <b>Which materials make the best string telephone components? (tin cans, paper cups, plastic cups, wire, cable, string, plastic or elastic)</b>  <b>How does the length of the tube (when making a straw oboe) affect the pitch and volume?</b>  <b>How does the length of a guitar string affect the pitch of the sound?</b>  <b>When is our classroom the quietest?</b>  <b>Is there a link between how loud it is in school and the time of day?</b>  <b>Do all animals have the same hearing range?</b></p>	
<p><b>Electricity</b>  <b>Now Press Play – Electricity</b></p>	<p><b>*Know that electricity is one of many forms of energy</b>  * Recap that energy comes in different forms – light and sound already taught.  <b>*Identify common appliances that run on electricity</b>  *Know that a source of electricity (mains or battery) is needed for electrical devices to work and that electrical sources push electrical currents round a circuit  <b>How long does a battery light a torch for?</b>  <b>Which room has the most electrical sockets in a house? Why?</b>  <b>How has electricity changed the way we live?</b>  <b>*Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</b>  *Know that when electrical current flows through a circuit, components within that circuit (buzzers, bulbs) begin to work  <b>*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.</b>  *Know that electrical current can flow if there is a complete circuit  <b>*Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</b>  <b>*Recognise some common conductors and insulators, and associate metals with being good conductors.</b>  *Know that electrical current flows well through some materials (such as metals), called electrical conductors, and poorly through other materials, called electrical insulators  *Know that wires contain an electrical conductor inside them usually made of metal  *Know that electrical conductivity (how well a material conducts electricity) is an example of a property  <b>What materials can carry electricity? (conductors/insulators)</b>  <b>Which metal is the best electrical conductor?</b>  <b>How does the number of batteries added to the circuit affect a device?</b>  <b>How does the thickness of a conducting material affect how bright the lamp is?</b></p>	<p>mains, plug, circuit, bulb, current, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, motor, conductor, insulator, symbol</p>

## YEAR 5 WORKING SCIENTIFICALLY

### Asking Questions and planning an enquiry (TAPS Dissolving, Nappy absorbency, Paper planes, Space travel Qs)

\*Use their science experiences to explore ideas and raise different kinds of questions

### Set up enquiries (TAPS Thermal insulation layers Zipline testing)

\*Use test results to make predictions to set up further comparative and fair tests.

\*Select and plan the most appropriate type of scientific enquiry to use to answer scientific questions.

### Observe and Measure (TAPS Human growth survey, Spinner dropping Titanic pulleys)

\*Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.

### Record (TAPS Sugar cubes, Space craters, Bottle flip Seed dispersal)

\*Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables.

### Evaluate (TAPS Champion tapes, Research: Life cycle, Solar system, Dirty water filter)

\*Explain degree of trust in results.

### Interpret and Report (TAPS Aqua dynamics, Marblerun force, Forensic powders Jump patterns)

\*Report and present findings from enquiries, inc conclusions and causal relationships, in oral and written forms such as displays and other presentations, using appropriate scientific language

## WS Vocabulary

variables, independent variable, dependent variable, control variable, evidence, justify, argument (science), causal relationship, accuracy, precision, scatter graphs, bar graphs, line graphs, force meter

<b>5</b>	<b>Forces</b> Now Press Play – Forces	<p><b>*Identify the effects of air resistance, water resistance and friction, that act between moving surfaces.</b></p> <p><b>*(Recap)</b> know that forces (pushes and pulls) can cause an object to start moving, stop moving speed up, change shape or change direction.</p> <p><b>*(Recap)</b> Know that friction is a contact force against motion caused by 2 surfaces rubbing against each other. It works in the opposite direction to that which the object is moving. A stationary object will only move when the force applied to it is greater than the friction.</p> <p><b>How does the amount/depth of tread affect the friction between a shoe and a surface?</b></p> <p>*Know that air resistance is a type of friction force between an object and air. A falling object will accelerate until its air resistance matches the gravitational force pulling it down. Air resistance is greater when the surface area of the moving object is large</p> <p><b>Does the surface area of a parachute affect the time it takes to fall to the ground? (Plan different types of enquiries including recognising and controlling variables; use a range of scientific equipment)</b></p> <p>*Know that water resistance is a force caused by friction slowing things down that are moving through a liquid.</p>	<p>force, gravity, mass, newtons, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pivot, pulleys, gears</p>
			<p>Possible Misconceptions</p> <p><b>*Children may think that friction only occurs between rough surfaces</b></p> <p><b>*Children may think no air resistance is acting on an object if it is travelling at the same speed or in the same direction.</b></p>

		<p>*know that the shape of an object determines how much air resistance or water resistance it experiences; shapes of objects that experience little air or water resistance are described by streamlined</p> <p><b>How does changing the shape of a piece of plasticine affect water resistance?</b>  <b>Can you draw a force diagram with arrows representing the different forces acting on objects?</b></p> <p><b>*Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</b></p> <p>*Understand that gravity is a non-contact force that acts between all objects in the universe, but that it acts more strongly between objects that have more mass and that are closer together.</p> <p><b>How can we see/measure forces?</b>  <b>Do heavier objects fall faster than lighter objects?</b></p> <p><b>*Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect</b></p> <p>*Know that a lever is a rigid length resting on a pivot.</p> <p>*Know that a pulley is a rope or cable on one or more wheels, use to lift heavy objects.</p> <p>*Know that a gear is a rotating wheel with cut teeth that mesh with the teeth of another gear so that turning one gear turns an adjacent gear in the opposite direction.</p> <p>*Know that gears, levers and pulleys are simple machines that are used to allow a smaller force to have a greater effect.</p> <p>*Know that some objects require large forces to make them move; gears, pulley and levers can reduce the force needed to make things move.</p> <p><b>How can we use levers to lift more?</b>  <b>What is the most effective way to move an object?</b>  <b>How do see-saws work?</b>  <b>Can you create a pulley system to lift a given load?</b></p>	<p>*Children may think it is wind acting on a parachute rather than air resistance slowing it down.</p> <p>*Children may think that heavier objects fall faster than light objects.</p>
	<p><b>Earth and Space</b>  <b>Now Press Play –</b>  <b>Mission to Mars</b>  <b>PD opportunities</b>  <b>-planetarium</b></p>	<p><b>*Describe the movement of the Earth and other planets relative to the sun in the solar system.</b>  <b>*Describe the sun, Earth and moon as approximately spherical bodies.</b></p> <p>*Understand that stars, planets and moons have so much mass they attract other things, including each other due to a force called gravity. Gravity works over distance and objects with larger masses exert bigger gravitational forces.</p>	<p>Sun, Moon, Earth, planets (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical, Solar System, rotate, star, orbit</p>



		<p>*Know that objects like planets, moons and stars spin; smaller mass objects like planets orbit large mass objects like stars; stars are extremely hot balls of gas producing vast amounts of heat and light; all other objects are lumps of rock, metal or ice and can be seen because they reflect the light of stars.</p> <p>*Know that the sun is a star and a planet (e.g. Earth) is a spherical celestial body that orbits a star (the sun)</p> <p>*Know that the sun and the objects that orbit it are collectively known as our Solar System</p> <p>*Know that there are 8 major planets in our solar system: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune. These planets all orbit the sun and the further away they are from the sun, the longer their orbit.</p> <p><b>How have our ideas about the solar system changed over time?</b></p> <p><b>How could you organise all the objects in the solar system into groups?</b></p> <p><b>Can we use secondary sources to research facts about the planets?</b></p> <p><b>Is there a pattern between the size of a planet and the time it takes to travel around the Sun?</b></p> <p><b>*Describe the movement of the moon relative to the Earth.</b></p> <p>*Know that a satellite orbits a planet and that moons are natural satellites.</p> <p>*Know that the Moon orbits the Earth roughly every 28 days.</p> <p>*Understand that as the Moon orbits the Earth, different parts of it are lit up by the Sun which is why we see a different shape lit up on the Moon as the lunar cycle progresses; these are called phases of the Moon.</p> <p><b>How do we know that the Moon is moving?</b></p> <p><b>*Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.</b></p> <p>*Understand that the Earth spins around an imaginary line through its centre called an axis and that this is tilted relative to the Earth's orbit.</p> <p>*Understand that night and day are the result of the Earth's rotating on its axis.</p> <p><b>Why do we have day/night/months/years/seasons?</b></p> <p><b>Why does day length change?</b></p> <p><b>Why does shadow size change over the course of a day?</b></p> <p><b>How do we know the Earth is moving?</b></p> <p><b>Can we use secondary sources to research man-made satellites?</b></p>	
	<p><b>Properties and Changes of materials</b></p>	<p><b>*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.</b></p>	<p>thermal insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve,</p>



	<p>*Know that materials' different properties can be tested through acting upon them, including testing them to find whether they are magnetic, thermally conductive, and electrically conductive.</p> <p><b>Which is the best material to insulate my coffee? How do you know?</b></p> <p><b>*Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.</b></p> <p>*Know that the various properties of different materials make them suitable for a given function and explain why.</p> <p><b>Which material would be the best for a pan handle? Explain why.</b></p> <p><b>*Know that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution.</b></p> <p>*Know that in some solid materials the bonds between particles break when surrounded by a liquid; this allows the liquid to absorb the solid; when this happens, the solid is called a solute, the liquid is called a solvent and the result is a solution; when a solid does dissolve in a liquid it is described as being soluble in that solvent (eg sugar in water); when it cannot it is insoluble.</p> <p><b>*How can we recover dissolved salt or sugar from a solution?</b></p> <p><b>*Use knowledge of solids, liquids and gases to decide how mixtures might be separated – look at filtering, sieving and evaporating techniques.</b></p> <p>*Know that when a solvent is evaporated from a solution, the original solute is left behind. (The remaining solid will often form crystals e.g. salt or sugar when left on a warm, sunny windowsill)</p> <p>*know how to dissolve a solute in a solvent and then how to evaporate the solvent to recover the solute.</p> <p>*Know that mixtures of solids made up of different sized particles can be sieved and some mixtures of solids and liquids can be filtered (coffee grounds, sand)</p> <p><b>Is it possible to separate even very small things like sand, salt, stones and water?</b></p> <p><b>*Demonstrate that dissolving, mixing and changes of state are reversible changes.</b></p> <p>*Understand that reversible changes mean that no chemical reaction has taken place. Examples of reversible changes are ice melting, water freezing or evaporating, chocolate melting; salt or sugar dissolving in water; sand and water mixing or many solids mixing.</p> <p><b>Does the temperature of the water affect the speed the solute dissolves?</b></p> <p><b>*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.</b></p>	<p>reversible/non-reversible change, burning, rusting, new material</p>
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		<p>*Know that heating can sometimes cause materials to change permanently and that when this happens, a new substance is made (often a gas (e.g. burning, boiling an egg or reactions such as bicarbonate of soda and vinegar where a new gas has been made)</p> <p>*Recognise when a new material has been made by the change in properties of the material such as state, texture, hardness, temperature.</p> <p><b>How will we know when we have made a new material?</b></p> <p><b>When we use lemon juice as an invisible ink, heating gently makes the ink visible. Is this a new substance?</b></p> <p><b>When water is added to jelly and it is set, is it a new substance?</b></p> <p><b>Can you identify and classify these reactions and changes into reversible and irreversible?</b></p> <p><b>How does a nail in salt water change over time?</b></p> <p><b>How does the amount of bicarbonate of soda, washing up liquid and vinegar affect the reaction?</b></p>	
	<p><b>Animals Including Humans – growth and development</b></p>	<p><b>*Describe the changes as humans develop to old age.</b></p> <p>*Know that humans go through stages of development; they begin as fertilized eggs and then develop into embryos before developing into babies; once they are born, these newborn babies become infants (roughly 2 months to 2 years) then into young children (roughly 2-12 years old); children develop into adults during adolescence (roughly 12-16 years old) at which age they become physically capable of reproduction; as adults develop into old age (roughly 55+ years old) they experience changes in their body which require them to move more carefully and rest more frequently</p> <p><b>Do bigger mammals have longer gestation periods?</b></p> <p><b>How does the mass of a human baby change over time?</b></p>	<p>puberty, the vocabulary to describe sexual characteristics in line with the school's RSE policy</p>
	<p><b>Living Things and their Habitats</b>  <b>PD opportunities</b>  <b>-zoolab-</b>  <b>classification</b></p>	<p><b>*Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.</b></p> <p>*Know that different animals mature at different rates and live to different ages.</p> <p>*Know that the lifecycle of a living thing is a series of stages of development starting with a fertilised egg in a mammal or a seed in many plants</p> <p>*Know that in most mammals, a fertilised egg develops in the womb into an embryo and is then born and fed on milk before it is weaned onto the food that it is adapted to eat; it then develops to maturity in a period called adolescence after which it can reproduce and the cycle can begin again.</p> <p>*Know the stages in a lifecycle of an amphibian such as a frog</p> <p>*Know the stages in a lifecycle of an insect such as a dragonfly</p> <p>*Know the stages in a lifecycle of a bird such as a robin</p> <p>*Understand that complete metamorphosis is when an animal completely transforms and metamorphosis is when there are several different stages, each stage bigger than the last.</p>	<p>life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, larvae, asexual, plantlets, runners, cuttings</p>

**What are the similarities and differences between different lifecycles?**

**\*Describe the life process of reproduction in some plants and animals.**

\*Know that some organisms reproduce sexually where offspring inherit information from both parents and some organisms reproduce asexually by making a copy of a single parent.

\*Understand the reproductive process of a flowering plant

\*Know that non-flowering plants reproduce differently e.g with runners and plantlets or

**How do flowers reproduce without flowers?**

**How do plants spread their seed?**

## **YEAR 6 WORKING SCIENTIFICALLY**

**Asking Questions and planning an enquiry (TAPS Bulb brightness, Light Qs O-wing flight, Flower sampling)**

\*Plan different types of scientific enquiries to answer their own questions, including recognising and controlling variables where necessary.

**Set up enquiries. (TAPS Human heart rate Bird beaks)**

\*Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why.

**Observe and Measure (TAPS Conductive dough, Terrific tasters)**

\*Make their own decisions about what observations to make, what measurements to use and how long to make them for.

\*Choose the most appropriate equipment to make measurements with increasing precision and explain how to use it accurately. Take repeat measurements where appropriate.

**Record (TAPS Living things keys, Shadows invest, Camouflaged moths)**

\*Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.

**Evaluate (TAPS Invertebrate research)**

\*Identify and evaluate scientific evidence (their own and others') that has been used to support or refute ideas or arguments.

**Interpret and Report (TAPS Bridge engineers, Pollution survey Fossil habitats, Egg strength)**

\*Report and present findings from enquiries, inc conclusions and causal relationships, in oral and written forms such as displays and other presentations, using appropriate scientific language

## **WS Vocabulary**

variables, independent variable, dependent variable, control variable, evidence, justify, argument (science), causal relationship, accuracy, precision, scatter graphs, bar graphs, line graphs, force meter

<p><b>6</b></p>	<p>Living Things and their Habitats</p>	<p><b>*Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals.</b></p> <p><b>*Give reasons for classifying plants and animals based on specific characteristics.</b></p> <p>*To understand the conditions for life: An animal is living because it can breathe, move, eat, grow, excrete and reproduce. A plant is living because it can move towards sunlight, make its own food, grow and reproduce. Plants can reproduce sexually or asexually.</p> <p>*To know that scientists, called Taxonomists, sort and group living things according to their characteristics (similarities and differences) To <b>recap</b> different organisms including flowering and non-flowering plants, vertebrates (mammals, birds, fish, amphibians and reptiles) and invertebrates and give examples of each type.</p> <p>*To understand that a classification key is a way of separating organisms into groups or types. Yes and know questions and answers lead to further questions and answers until the identity of the animal is determined. This can help us to understand how they are related to one another.</p> <p>*To know that plants can be classified in different ways.</p> <p><b>*Invertebrates can be classified further:</b></p> <p>Know that an arthropod is an invertebrate with a hard, external skeleton and jointed limbs          Know that insects are a type of arthropod; their bodies consist of six legs, a head, a thorax and an abdomen; most insects also have a pair of antennae and a pair of wings (e.g. wasp)          Know that an arachnid (e.g. spider) is a type of arthropod with eight legs and no antennae or wings          Know that a crustacean is a type of arthropod with two pairs of antennae (e.g. woodlouse)          Know that a myriapod is an arthropod with a flat and long or cylindrical body and many legs (e.g. centipede)          know that a mollusc is a soft-bodied invertebrate, including slugs and snails.</p> <p>*Know that there are three types of <b>micro-organism</b>: viruses, fungi and bacteria; of these three, viruses are often not really considered to be alive by many scientists mainly because they don't have the "machinery" to reproduce inside them.</p> <p>*know that bacteria can be helpful or unhelpful. Humans have good bacteria in their bodies which help to digest food. Viruses are invisible micro-organisms which need a host. They can cause diseases. Some fungi are micro-organisms which may cause infections; some can be involved in bread-making. Know that germs are disease-causing micro-organisms.</p> <p>*Micro-organisms can be classified according to shape or what diseases/infections they can cause.</p>	<p>excretion, reproduction, coniferous, arachnid, crustacean, arthropod, mollusc, myriapod, fungi, bacteria, single-cell organisms, micro-organism, virus</p> <p><b>Possible Misconceptions</b></p> <p>*Children may be confused between living and non-living things</p> <p>*Children may need to recap that not all plants have flowers</p> <p>*Children may think that all animals in the sea are fish.</p> <p>*Children often think that all bacteria are harmful</p> <p>*Children may think that all micro-organisms can be seen with the eye; clarify that a powerful microscope is needed to view them.</p>
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	<p>*To learn about the work of Karl Linnaeus and his system for classifying organisms.</p> <p><b>What are the difficulties with classification? (penguins, whales, platypus)</b></p> <p><b>What are microorganisms? Are they all harmful?</b></p> <p><b>How can we prevent the spread of disease?</b></p> <p><b>Why do animals and plants compete – and what for?</b></p> <p><b>How would you make a classification key for microorganisms?</b></p>	
Electricity	<p><b>*Use recognised symbols when representing a simple circuit in a diagram – design/draw and complete this.</b></p> <p>*Know how to draw a simple circuit diagram</p> <p>*Know the symbols for: lamp, wire, buzzer, cell, battery, motor, open switch, closed switch.</p> <p><b>*Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.</b></p> <p>*Know that voltage is a measure of the power of a cell to produce electricity; it is a measure of the “push” of electric current, <b>not</b> the size of the electric current.</p> <p>*Know that as the number and voltage of cells in a circuit increases, the brightness of a bulb or the volume of a buzzer will increase (though too high a voltage may “blow” the bulb or buzzer).</p> <p><b>How does the voltage of a battery affect how much current is pushed?</b></p> <p><b>How can we measure how quickly a battery is used up?</b></p> <p><b>*Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches.</b></p> <p><b>How does the number of bulbs affect the brightness of a bulb?</b></p> <p><b>Are all types of wires as good at conducting electricity?</b></p> <p><b>Does the length of a wire make a difference?</b></p> <p><b>How has our understanding of electricity changed over time?</b></p> <p><b>What renewable ways can we generate electricity?</b></p> <p><b>What are the dangers of a short circuit?</b></p>	circuit diagram, circuit symbol, series circuit, current, voltage, dependent variable, independent variable, controlled variable
Light	<p><b>*Recognise that light appears to travel in straight lines.</b></p> <p><b>*Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.</b></p> <p>*Know that light travels in straight lines called beams or rays.</p> <p>Know that translucent objects allow some light to pass through, but some of the light changes direction as it passes through the object; this means that something seen through a translucent object is not clearly defined.</p>	light rays, angle of incidence, angle of reflection, refraction, spectrum, periscope

		<p>*Know that when light passes from one medium to another (e.g from air to water), it changes direction; this is called refraction; this happens because light travels at different speeds in different media.</p> <p><b>What happens to light when it is shone through water?</b></p> <p><b>How is this affected by putting glitter, salt or talc in the water?</b></p> <p>*Know that when light reflects off an object, the angle of incidence is equal to the angle of reflection</p> <p>*Know that a periscope takes advantage of the predictable angles of incidence and reflection to allow an image to be shown in a viewer.</p> <p><b>How does the angle that a light ray hits a plane mirror affect the angle at which it reflects off the surface?</b></p> <p><b>How does a periscope work?</b></p> <p><b>How perfect are our mirrors? Do some scatter light more than others?</b></p> <p><b>*Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.</b></p> <p><b>How do my pupils change throughout the day?</b></p> <p><b>*Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them – use torches to investigate shadows</b></p> <p>*Know how to draw a diagram to show why the shape of a shadow will match the shape of an object</p> <p><b>How does the size of an object affect the size of a shadow?</b></p> <p>*observe how light is refracted (bent, changes direction) when it passes from one transparent substance to another</p> <p>Know that white light comprises all the colours of light</p> <p>*observe how white light refracted by two surfaces in a prism will spread out so that all of its constituent colours can be seen; this array of colours is called a spectrum</p> <p><b>What colours do you get if you mix different colours of light together?</b></p>	
	<p><b>Evolution and Inheritance</b></p> <p><b>Now Press Play – Evolution</b></p> <p>PD opportunities -zoolab- evolution</p>	<p><b>*Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.</b></p> <p>*Know that all life on Earth began from a single point around 4.5 thousand million years ago</p> <p>*Know that the gradual change of species over millions of years can be observed by looking at examples of fossils</p> <p><b>*Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.</b></p>	<p>sexual reproduction, vary, characteristics, adapted, inherited, species, evolve, evolution, variation</p>

		<p><b>*Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</b></p> <p>*Know that living things change over time and that this gradual change is called evolution</p> <p>*Know that natural selection is the cause of this change; natural selection works as there is natural variation within a species. There is also competition to survive and reproduce. Members of a species with characteristics most suited to the environment are more likely to survive and reproduce - these characteristics are passed down to their offspring who will then be more likely to reproduce; members of a species with less of these characteristics do not survive and reproduce – these characteristics are not passed down to offspring</p> <p>*Know that Charles Darwin posited this theory of evolution by natural selection</p> <p>*Know that Darwin was a naturalist whose theory of evolution by natural selection developed while travelling through the Amazon rainforest</p> <p>*Know that Darwin's theory is accepted as fact by the scientific community</p> <p>*Know that Darwin did not know similarities were passed between parents and their offspring; know DNA, a chemical discovered in the 20th century, is contains the “code” that passes on information between parents and their offspring in all living things</p> <p><b>What is variation, and why is it important?</b></p> <p><b>What evidence is there for evolution?</b></p> <p><b>Why do animals become extinct?</b></p> <p><b>The habitat for polar bears is rapidly changing, what possible futures do they face and can we predict which is most likely?</b></p> <p><b>How did Darwin come up with the theory and why was his theory not initially accepted?</b></p> <p><b>What is the most common eye colour in our class?</b></p> <p><b>Can you identify the characteristics you have inherited from your parents?</b></p> <p><b>How has the skeleton of the horse changed over time?</b></p> <p><b>Is there a pattern between the size and shape of a bird's beak and the food it will eat?</b></p> <p><b>What happened when Charles Darwin visited the Galapagos islands</b></p>	
	<p><b>Animals Including Humans</b></p>	<p><b>*Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.</b></p> <p>*Know that the heart and lungs are organs protected by the ribcage</p> <p>*Know that the heart beats, pumping blood around the body and that blood vessels carry the blood; arteries carry blood away from the heart; veins carry blood towards the heart; capillaries are tiny blood vessels that connect arteries and veins</p> <p>*Know that the heart is composed of four chambers: two atria and two ventricles; the aorta is the largest artery in the body and most major arteries branch off from it.</p> <p>*Know that blood absorbs oxygen from the lungs and carries it around the body which is used to power the body; this use of oxygen to create energy is called respiration</p>	<p>heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, circulatory system, diet, drugs, lifestyle</p>

	<p>PD opportunities - visit from a nurse /dietician to discuss the way our body's function and how to keep them healthy.</p>	<p><b>*Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.</b></p> <ul style="list-style-type: none"> <li>*Know that when we exercise, our heart beats more frequently so that the oxygen that is used around the body can be replenished; it returns to a resting heart rate afterwards; fitter people tend to have lower resting heart rates</li> <li>*Know that drugs are chemicals that have an impact on the natural chemicals in a person's body; know that drugs can be harmful or helpful, depending on what they are and how they are used; know that all drugs can be harmful if overused</li> <li>*Know that paracetamol and aspirin are examples of drugs that can be helpful as a painkiller</li> <li>*Know that cannabis and cocaine are examples of illegal drugs that can have serious negative effects</li> <li>*Know that alcohol and tobacco are examples of drugs that are legal to adults but that can have serious negative effects, such as liver disease and lung disease, respectively</li> </ul> <p><b>*Describe the ways in which nutrients and water are transported within animals, including humans.</b></p> <ul style="list-style-type: none"> <li>*Know that blood travels around the body transporting nutrients that have been absorbed into the bloodstream from digestion</li> </ul> <p><b>Do fish and plants breathe?</b></p> <p><b>Are there ways to increase/decrease our lung capacity?</b></p> <p><b>Why do we have blood?</b></p> <p><b>How does my heart rate change over the day?</b></p> <p><b>Which type of exercise has the greatest effect on our heart rate?</b></p> <p><b>How might the circulatory system of an elephant, a hummingbird, or a polar bear differ?</b></p> <p><b>Is the air you breathe out, the same as that you breathe in?</b></p> <p><b>How do our choices affect how our bodies work?</b></p>	
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