**Science Curriculum – Knowledge Progression Ladder (investigations to be carried out in red)**

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|  | REC | Y1 | Y2 | Y3 | Y4 | Y5 | Y6 |
| **Plants** | HOW LIVING THINGS GROW-plantsWhat do we already know?What do we want to know?What have we learnt? Plant beans* Working towards ELG14
* They make observations of animals and plants and explain why some things occur, and talk about changes.
* Steps to achieving this include:
* 40 – 60 months: Looks closely at similarities, differences, patterns and change.
* Focussed Activities Include:
* Plant own bean. Discuss what might happen to the seeds.

Encourage children to go into nature area and explore other plants. (Remind children of health and safety – not touching berries/ nettles etc.) | * identify and name a variety of common wild and garden plants, including deciduous and evergreen trees
* identify and describe the basic structure of a variety of common flowering plants, including trees.

How does a plant grow? Why do plants have stems? | * observe and describe how seeds and bulbs grow into mature plants
* find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.

What does a seed need to grow? grow cress grow into mature plants*What keeps a plant healthy?**Investigate what plants need to be healthy , each seed missing** *water*
* *light*
* *temp.*
* *1 with all*
 | * identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
* explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant
* investigate the way in which water is transported within plants
* explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.
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| **Animals, including humans** | PC11. Knows some of the things that make them unique and can talk about some of the similarities and differences in relation to friends or family.TW6. Comments and asks questions about aspects of their familiar world such as the place where they live or the natural world. Passage of time-photo of them as a baby* How have they grown? Changed? What could they do then? Now?
 | * identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals
* identify and name a variety of common animals that are carnivores, herbivores and omnivores
* describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)
* identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense

How do we change as we grow? (Over the year)Smell investigationDo we all smell the same?Taste investigationWhat does it taste like? | * notice that animals, including humans, have offspring which grow into adults
* find out about and describe the basic needs of animals, including humans, for survival (water, food and air)
* describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.

*What happens to our bodies when we exercise?* | * 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
* identify that humans and some other animals have skeletons and muscles for support, protection and movement.

Which muscles do we use to maintain certain positions? | * describe the simple functions of the basic parts of the digestive system in humans (banana through tights)
* identify the different types of teeth in humans and their simple functions
* construct and interpret a variety of food chains, identifying producers, predators and prey.
 | * describe the changes as humans develop to old age.
 | * identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood
* recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function
* describe the ways in which nutrients and water are transported within animals, including humans.

*Experiments to investigate: What happens to our heart rate during exercise.**Lung capacity.* |
|  | REC | Y1 | Y2 | Y3 | Y4 | Y5 | Y6 |
| **Living things and their habitats**  | VISIT TO THE FARM AND SCHOOL PONDHow living things grow-animalsUW-W-11. Looks closely at similarities, differences, patterns and changes.6. Comments and asks questions about aspects of their familiar world such as the place where they live or the natural world. UW-W-6. Comments and asks questions about aspects of their familiar world such as the place where they live or the natural world. 7. Can talk about some of the things they have observed such as animals and natural and found objects. UW-W-11. Looks closely at similarities, differences, patterns and changes. | -------------------------------- | * explore and compare the differences between things that are living, dead, and things that have never been alive

 * 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
* identify and name a variety of plants and animals in their habitats, including micro- habitats
* 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.

*How does a local habitat meet the needs for animal’s survival?**What does a micro-habitat provide for animals living there?* | -------------------------------- | * recognise that living things can be grouped in a variety of ways (mysterious living thing investigation)
* explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment (mini beast hunt)
* recognise that environments can change and that this can sometimes pose dangers to living things – changes in seasons, plants and animals, negative effects of population and development, litter or deforestation. (outdoor land survey)
 | * 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(germination, pollination, seed dispersal).(spider plants investigation will the plant reproduce better in soil and water?)
 | * describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro- organisms, plants and animals
* give reasons for classifying plants and animals based on specific characteristics.

Investigating the characteristics of minibeasts and using these to classify them. |
|  | REC | Y1 | Y2 | Y3 | Y4 | Y5 | Y6 |
| **Materials****(Rocks Y3, States of matter Y4)**  | ------------------- | * distinguish between an object and the material from which it is made
* identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock
* describe the simple physical properties of a variety of everyday materials
* compare and group together a variety of everyday materials on the basis of their simple physical propertiesWhich is the lightest material?How long will our kites fly for?
 | * identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses
* find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

*Test – strength, waterproof, flexibility of paper, plastic , cupboard, foil**Which surface makes wooden wheels travel the furthest?**How far will wooden wheels travel on our chosen surface? – movement* *Will rubber wheels travel more distance than wooden wheels? on surface**Which wheels will make the race car travel quicker?**Combination of rubber wheels for speed on 1 surface* | * compare and group together different kinds of rocks on the basis of their appearance and simple physical properties (objectives under rocks in NC)
* describe in simple terms how fossils are formed when things that have lived are trapped within rock
* recognise that soils are made from rocks and organic matter.
 | * compare and group materials together, according to whether they are solids, liquids or gases (objectives under states of matter in NC)
* 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) (melting water and freezing water the process, rice crispy making)
* identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.(best environment for a tea towel to dry)
 | * 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 (ice cube in different material – check in the materials are insulators or conductors?)
* know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution (dissolve materials in water)
* use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating (separate sand, paper clips rice and water using 4 different ways)
* 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.
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| **Forces**  | Cars –rampsMagnets-super hero powers using a paper clip. | -------------------------------- | -------------------------- | * compare how things move on different surfaces
* notice that some forces need contact between two objects, but magnetic forces can act at a distance
* observe how magnets attract or repel each other and attract some materials and not others
* 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
* describe magnets as having two poles
* predict whether two magnets will attract or repel each other, depending on which poles are facing.
 | ---------------------------- | * explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object (dropping weights into sand and measuring diameter and impact)
* identify the effects of air resistance, water resistance and friction, that act between moving surfaces (parachutes, boat building)
* recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.(making/designing bike brakes testing how well they slow a moving object)
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| **Electricity**  | Simple wire circuits--light up play dough-Chinese lantern | -------------------------------- | -------------------------------- | ----------------------------- | * identify common appliances that run on electricity
* construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers
* 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 (will it light up experiment - pictures)
* recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit (use of a a switch)
* recognise some common conductors and insulators, and associate metals with being good conductors.(materials/objects light up bulb in a circut)
 | -------------------------------- | * associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
* 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
* use recognised symbols when representing a simple circuit in a diagram.

*Experiment to investigate:**The brightness of bulb in a circuit.* |

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| **Light and sound**  | Torches provided for exploration but not direct teaching | -------------------------------- | -------------------------------- | * recognise that they need light in order to see things and that dark is the absence of light
* notice that light is reflected from surfaces
* recognise that light from the sun can be dangerous and that there are ways to protect their eyes
* recognise that shadows are formed when the light from a light source is blocked by a solid object
* find patterns in the way that the size of shadows change.
 | * identify how sounds are made, associating some of them with something vibrating
* recognise that vibrations from sounds travel through a medium to the ear
* find patterns between the pitch of a sound and features of the object that produced it (balloon orchestra investigation)
* find patterns between the volume of a sound and the strength of the vibrations that produced it
* recognise that sounds get fainter as the distance from the sound source increases (sound metre/ tuning fork testing distance)
 | -------------------------------- | * recognise that light appears to travel in straight lines
* 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
* 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
* use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

*Experiment to demonstrate: How light travels in a staight line.**How light is reflected.**How light is made of of all the colours of the spectrum.**How light is refracted.* |
|  | REC | Y1 | Y2 | Y3 | Y4 | Y5 | Y6 |
| **Other**  | An egg-what’s in it? Who can it belong to? Weather words.Words related to seasons.Changes of state:-water to ice-ice to water-Chocolate as a solid and melted-Vegetables as a solid then as soup liquid | Seasonal Changes* observe changes across the four seasons
* observe and describe weather associated with the seasons and how day length varies.

How do seasons change? Not using planning house but recording findings and making a conclusion at the end.  | -------------------------------- | ----------------------------- | ----------------------------- | Earth and Space* describe the movement of the Earth, and other planets, relative to the Sun in the solar system
* describe the movement of the Moon relative to the Earth
* describe the Sun, Earth and Moon as approximately spherical bodies
* use the idea of the Earth’s rotation to explain day and night and the apparent movement of the sun across the sky.
 | Evolution and inheritance* recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
* recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
* identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

Experiment to demonstrate:How different types of “beak” are more efficient for different types of food - STEM |