Key Learning in Science: Year 3

Please Note: There should be plenty of opportunities throughout the year for children to use the school/local environment to observe plant lifecycles with a particular focus on the different parts of a plant (e.g. comparing fruits and seeds and looking for examples of pollination). This could be done through an ongoing/monthly nature journal to observe, record and review over a period of time.

Plants – Functions of Parts of a Plant

Pupils should be taught to:

- Identify, locate 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.
  - Roots grow downwards and anchor the plant.
  - Water, taken in by the roots, goes up the stem to the leaves, flowers and fruit.
  - Nutrients (not food) are taken in through the roots.
  - Stems provide support and enable the plant to grow towards the light.
  - Plants make their own food in the leaves using energy from the sun.
  - Flowers attract insects to aid pollination.
  - Pollination is when pollen is transferred between plants by insects, birds, other animals and the wind.
  - Seeds are formed after the flowers are pollinated.
  - Many flowers produce fruits which protect the seed and/or aid seed dispersal.
  - Seed dispersal, by a variety of methods, helps ensure that new plants survive.
  - Plants need nutrients to grow healthily (either naturally from the soil or from fertiliser added to soil).

Notes and Guidance (non-statutory):

Pupils should be introduced to the relationship between structure and function: the idea that every part has a job to do. They should explore questions that focus on the role of the roots and stem in nutrition and support, leaves for nutrition and flowers for reproduction.

Note: Pupils can be introduced to the idea that plants can make their own food, but at this stage they do not need to understand how this happens.

Pupils might work scientifically by:

- **Comparing** the effect of different factors on plant growth, for example the amount of light, the amount of fertiliser;
- Discovering (**research and modelling**) how seeds are formed by
- **Observing** the different stages of plant cycles over a period of time;
- **Looking for patterns** in the structure of fruits that relate to how the seeds are dispersed.
- **Observing** how water is transported in plants, for example, by putting cut, white carnations into coloured water.
- **Observing** how water travels up the stem to the flowers.

Animals - Health/Nutrition

Pupils should be taught to:

- 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.
- An adequate and varied diet is beneficial to health (along with a good supply of air and clean water).
- Regular and varied exercise *from a variety of different activities* is beneficial to health (focus on *energy in versus energy out*. Include information on making informed choices).

Notes and Guidance (non-statutory):

Pupils should continue to learn about the importance of nutrition

Pupils might work scientifically by:

- **Comparing and contrasting** the diets of different animals (including their pets).
- Decide ways of **grouping** them according to what they eat.
- **Researching** different food groups and how they keep us healthy.
- Designing meals based (**Create / Invent/ Design**) on what they find out.

Animals - Skeletons and Movement

Pupils should be taught to:

- Identify that humans and some other animals have skeletons and muscles for support, protection and movement.
- Identify animals (vertebrates) which have a skeleton which supports their body, aids movement & protects vital organs (e.g. name and locate skull, backbone, ribs, bones for movement/limbs, pelvis and be able to name some of the vital organs protected).
- Identify animals without internal skeletons/backbones (invertebrates) and describe how they have adapted other ways to support themselves, move & protect their vital organs.
  - Know how the skeletons of birds, mammals, fish, amphibians or reptiles are similar (backbone, ribs, skull, bones used for movement) and the differences in their skeletons.
  - Know that muscles, which are attached to the skeleton, help animals move parts of their body.
  - Explore how humans grow bigger as they reach maturity by making comparisons linked to body proportions and skeleton growth – e.g. do people with longer legs have longer arm spans?
  - Recognise that animals are alive; they move, feed, grow, use their senses and reproduce.

Notes and Guidance (non-statutory):

Pupils should be introduced to the main body parts associated with the skeleton and muscles, finding out how different parts of the body have special functions.

Pupils might work scientifically by:

- **Identifying and grouping** animals with and without skeletons.
- **Observing** and **comparing** their movement.
- **Exploring** ideas about what would happen if humans did not have skeletons.

Key Learning in Science: Year 3

Material Properties - Rocks

Pupils should be taught to:

- Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.
- 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
  - Recognise that rocks and soils can feel and look different.
  - Recognise that rocks and soils can be different in different places/environments.

Notes and Guidance (non-statutory):

Linked with work in geography, pupils should explore different kinds of rocks and soils, including those in the local environment.

Pupils might work scientifically by:

- **Observing** rocks, including those used in buildings and gravestones.
- **Exploring** how and why they might have changed over time.
- **Using (equipment)** a hand lens or microscope to help them.
- **Identify and classify** rocks according to whether they have grains or crystals, and whether they have fossils in them.
- **Research** and discuss the different kinds of living things whose fossils are found in sedimentary rock.
- **Explore** how fossils are formed.
- **Explore** different soils and …
- **Identify similarities and differences** between them and describe the composition of soil.
- I**nvestigate** what happens when rocks are rubbed together (classify according to hardness) or what changes occur when they are in water.
- **Raise and answer questions** about the way soils are formed.

Light and Astronomy - Light, reflections and shadows

Pupils should be taught to:

- 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 can change**.**

Notes and Guidance (non-statutory):

Pupils should explore what happens when light reflects off a mirror or other reflective surfaces, including playing mirror games to help them answer questions about how light behaves. They should think about why it is important to protect their eyes from bright lights. They should look for, and measure shadows and find out how they are formed and what might cause shadows to change.

Note: Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses.

Pupils might work scientifically by:

- **Looking for patterns** in what happens to shadows when the light source moves or the distance between the light source and the object changes.

Forces and Magnets

Pupils should be taught to:

- Compare how some 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 (like and unlike poles).
- Predict whether two magnets will attract or repel each other, depending on which poles are facing.

Notes and Guidance (non-statutory):

Pupils should observe that magnetic forces can act without direct contact, unlike most forces, where direct contact is necessary (for example, opening a door, pushing a swing). They should explore the behaviour and everyday uses of different magnets (for example, bar, ring, button, horseshoe).

Pupils might work scientifically by:

- **Comparing** how different things move and grouping them.
- **Raising questions** and **carrying out tests** to find out how far things move on different surfaces.
- **Gathering and recording data** to find answers to their questions.
- **Exploring** the strengths of different magnets and **finding a fair way to compare them**.
- **Sorting materials** into those that are magnetic and those that are not.
- **Looking for patterns** in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another.
- **Identifying** how these properties make magnets useful in everyday items and suggesting creative uses for different magnets.

Year Group Expectations: Year 3

Exploring / Observing *LKS2 - developing their own ideas and their understanding of the world around them*	**Grouping & Classifying** *LKS2 - Compare and contrast a variety of examples linked to LKS2 PoS*	**Questioning** *LKS2 - asking relevant questions*	**Researching** *LKS2 - finding things out using a wide range of secondary sources of information*	**Modelling** *using dance, drama or a visual aid to represent science in the real world*	**Collaborating** *interacting effectively as part of a group*
▪ Observe and record relationships between structure and function (linked to Y3 PoS) ▪ Observe and record changes /stages over time (linked to Y3 PoS) ▪ Explore / observe things in the local environment / real contexts and record observations (linked to Y3 PoS) – see 'Communicating' section also re links to vocabulary	▪ Decide ways and give reasons for sorting, grouping, classifying, identifying things/objects, living things, processes or events based on specific characteristics ▪ Compare and contrast and begin to consider the relationships between different things *(e.g. structures of plants, functions of plant parts, diets, skeletons of humans and other animals, changes over time, etc.)* ▪ Record similarities as well as differences *(e.g. what do all skeletons have? as well as the differences between skeletons)*	▪ Explore their own ideas about 'what if….?' scenarios e.g. humans did not have skeletons. ▪ Ask questions such as 'What if we tried….? or 'What if we changed…?' ▪ Begin to understand that some questions can be tested in the classroom and some cannot. ▪ Within a group suggest questions that can be explored, observed, tested or investigated further ▪ Within a group suggest relevant questions about what they observe and about the world around them.	▪ Find things out using a range of secondary sources of information *(e.g. books, photographs, videos and other technology)*	▪ Act out or make a model of something to represent something in the real world using appropriate scientific vocabulary verbally.	▪ Begin to make some decisions about an idea within a group from a list of choices (e.g. let's put them all in a pile first OR I think we should try ….) ▪ With help; support, listen to and acknowledge others in the group *(e.g. Yes. I prefer that one too)* ▪ Build on / add to someone else's idea. *(e.g. we could use x and as well as y)* ▪ Begin to understand that it is okay to disagree with their peers and offer a reason for their opinion

Planning & Testing *LKS2 - making decisions about and setting up simple practical enquiries, comparative tests and fair tests*	**Using Equipment & Measures** *LKS2 - making accurate measurements and gathering data*	**Communicating** *Reporting findings, recording data, presenting findings* *Read, spell and pronounce scientific vocabulary correctly linked to the relevant Yr Grp*	**Considering the results of an investigation / writing a conclusion**		
			Describing results / Looking for patterns *LKS2 - Describing their findings / results*	**Explaining results** *LKS2 - reporting on findings saying why something happened*	**Trusting results** *LKS2 - suggest improvements for further tests*
▪ Help to decide about how to set up a simple **fair test** and begin to recognise when a test is not **fair**. ▪ Make a **prediction** based on everyday experience ▪ With support/as a group, set up simple practical enquiries incl. comparative and **fair tests** e.g. make a choice from a list of a things (variables) to change when conducting a **fair test**. *(e.g. choose which magnets to compare and which method to use to test their strength).* ▪ As a group, begin to make some decisions about the best way of answering their questions. ▪ Find/suggest a practical way to compare things *e.g. rocks, magnets.*	▪ Collect data from their own observations and measurements using notes/ simple tables/standard units ▪ Help to make some decisions about what observations to make, how long to make them for, the type of simple equipment that might be used and how to work safely. ▪ Make simple **accurate** measurements using whole number standard **units**, using a range of equipment ▪ Gather data in a variety of ways to help in answering questions ▪ Use equipment **accurate**ly to improve the detail of their measurements/observations *(e.g. microscopes, measuring syringes, measuring cylinders, hand lenses)*	▪ Record and present findings using simple scientific language and vocabulary from the year 3 PoS, *including discussions, oral and written explanations, notes, annotated drawings, pictorial representations, labelled diagrams, simple tables, bar charts (using scales chosen for them), displays or presentations* ▪ With scaffold / support record, and present data in a variety of ways to help in answering questions. Communicate their findings in ways that are appropriate for different audiences. (linked to Y3 PoS)	▪ With scaffold/support, describe and compare the effect of different factors on something. *(e.g. we noticed that larger magnets are not always stronger)* ▪ With help, look for changes and simple patterns in their observations, data, chart or graph. ▪ Use their results to consider whether they met their **prediction**s.	▪ Use their experience and some **evidence** or results to draw a simple **conclusion** to answer their original question. ▪ Write a simple explanation of why things happened (using the word 'because') and using simple scientific language and vocabulary from the year 3 PoS	▪ Say whether what happened was what they expected and notice any results that seem odd. ▪ Begin to recognise when a test is not **fair** and suggest improvements.