Year Group Expectations: Year 6

Please Note: There should be plenty of opportunities throughout the year for children to use the school/local environment to observe and identify a variety of plants and animals that live there focusing on their adaptations for survival. This could be done through an ongoing/monthly nature journal to observe, record and review a variety of examples over a period of time and would support their learning and wider research in the 'Living Things and Their Habitats' unit and the 'Evolution and Inheritance' unit.

Environment – Classification

Pupils should be taught to:

- 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.
- Living things can be grouped into micro-organisms, plants and animals.
- Vertebrates can be grouped as fish, amphibians, reptiles, birds and mammals.
- Invertebrates can be grouped as snails and slugs, worms, spiders and insects.
- Plants can be grouped as flowering plants (incl. trees and grasses) and non-flowering plants (such as ferns and mosses).

Notes and Guidance (non-statutory):

Pupils should build on their learning about grouping living things in Year 4 by looking at the classification system in more detail. They should be introduced to the idea that broad groupings, such as micro-organisms, plants and animals can be subdivided. Through direct observations where possible, they should classify animals into commonly found invertebrates (e.g. insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals). They should discuss reasons why living things are placed in one group and not another. Pupils might find out about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification.

Pupils might work scientifically by:

- Using classification systems and keys.
- Identifying some animals and plants in the immediate environment.
- Researching unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.

Environment – Evolution And Inheritance

Pupils should be taught to:

- 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.

Notes and Guidance (non-statutory):

Building on what they have learnt about fossils in the topic on rocks in Year 3, pupils should find out more about how living things on earth have changed over time. They should be introduced to the idea that characteristics are passed from parents to their offspring, for instance by considering different breeds of dogs, and what happens when, for example, labradors are crossed with poodles. They should also appreciate that variation in offspring over time can make animals more or less able to survive in particular environments, for example by exploring how giraffes' necks got longer, or the development of insulating fur on the arctic fox. Pupils might find out about the work of palaeontologists such as Mary Anning and about how Charles Darwin and Alfred Wallace developed their ideas on evolution.

Note: At this stage, pupils are not expected to understand how genes and chromosomes work.

Pupils might work scientifically by:

- Observing and raising questions about local animals and how they are adapted to the environment.
- Comparing how some living things adapt to survive in extreme conditions, e.g. cactuses, penguins and camels.
- Analysing the advantages and disadvantages of specific adaptations, such as being on two feet rather than four, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers.

Animals/Health – Exercise, Health & The Circulatory System

Pupils should be taught to:

- 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.
- The heart is a major organ and is made of muscle.
- The heart pumps blood around the body through vessels and this can be felt as a pulse.
- The heart pumps blood through the lungs in order to obtain a supply of oxygen.
- Blood carries oxygen/essential materials to different parts of the body.
- During exercise muscles need more oxygen so the heart beats faster and our breathing and pulse rates increase.
- Animals are alive; they move, feed, grow, use their senses, reproduce, breathe/respire and excrete.
- An adequate, varied and balanced diet is needed to help us grow and repair our bodies (proteins), provide us with energy (fats and carbohydrates) and maintain good health (vitamins and minerals).
- Tobacco, alcohol and other 'drugs' can be harmful.
- All medicines are drugs, not all drugs are medicines.

Notes and Guidance (non-statutory):

Pupils should build on their learning from years 3 and 4 about the main body parts and internal organs (skeletal, muscular and digestive system) to explore and answer questions that help them to understand how the circulatory system enables the body to function. Pupils should learn how to keep their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body.

Pupils might work scientifically by:

- Exploring the work of scientists.
- Scientific research about the relationship between diet, exercise, drugs, lifestyle and health.

*Additional suggestion beyond NC2014 to support pupils working scientifically and to provide an opportunity to use ICT to collect/interpret data

- Observing/Measuring changes to breathing, heart beat and or pulse rates after exercise.

Year Group Expectations: Year 6

Light and Astronomy – How Light Travels	Electricity
Pupils should be taught to: ▪ 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 the light that 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. **Notes and Guidance (non-statutory):** Pupils should build on the work in year 3, exploring the way that light behaves, including light sources, reflection and shadows. They should talk about what happens and make predictions. **Pupils might work scientifically by:** ▪ Deciding [observe/explore] where to place rear-view mirrors on cars. ▪ Designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works. ▪ Investigating the relationship between light sources, objects and shadows by using shadow puppets. ▪ Extend their experience [explore and observe] of light by looking at a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters (they do not need to explain why these phenomena occur).	Pupils should be taught to: ▪ 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. ▪ Circuit diagrams can be used to construct a variety of more complex circuits predicting whether they will 'work'. **Notes and Guidance (non-statutory):** Building on their work in Year 4, pupils should construct simple series circuits, to help them answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors. They should learn how to represent a simple circuit in a diagram using recognised symbols. **Note:** Pupils are expected to learn only about series circuits, not parallel circuits. Pupils should be taught to take the necessary precautions for working safely with electricity. **Pupils might work scientifically by:** ▪ Systematically identifying the effect of changing one [thing] component at a time in a circuit. ▪ Designing and making a set of traffic lights, a burglar alarm or some other useful circuit.

Sort / group / compare / classify / identify	Research *finding things out using a wide range of secondary sources of information and recognising that scientific ideas change and develop over time*	Modelling	Recording of 'Explore / Observe' *developing a deeper understanding of a wide range of scientific ideas encountering more abstract ideas*	Questioning *asking their own questions about scientific phenomena*	Planning *using different types of scientific enquiry making decisions about and explaining choices for testing*

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▪ Compare and contrast things beyond their locality and analyse advantages/disadvantages, pros/cons of their findings. ▪ Use and develop classification systems, keys and other information records [databases] to classify or identify. ▪ Compare and contrast more complex processes, systems, functions (e.g. sexual and asexual reproduction).	▪ [Research the work of famous scientists (historical & modern day) and use this to] explain how scientific ideas have developed over time and had an impact on our lives. ▪ Interview [people to find out information and collect data]. ▪ Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact.	▪ [Identify some positives and some limitations of models used to describe/explain scientific ideas]. ▪ Use and make own versions of simple models to describe and explain scientific ideas (e.g. periscopes, simple lever, burglar alarm).	▪ Encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. ▪ Use correct scientific knowledge and understanding and relevant scientific language to explain their findings and justify their scientific ideas. ▪ Explore more abstract systems/functions /changes/behaviours and record their understanding of these (e.g. the relationship between diet, exercise, drugs, lifestyle and health; evolutionary changes; burning, rusting; reflection and refraction of light; friction, air resistance, gravity). ▪ Read, spell and pronounce scientific vocabulary correctly.	▪ Recognise scientific questions that do not yet have definitive answers. ▪ Use observations/data gathered to construct a further (testable or research) question. ▪ Raise different kinds of questions (Y5/6).	▪ Plan enquiries, including recognising and controlling variables where necessary. ▪ Select and plan the most appropriate type of science enquiry to use to answer scientific questions.
Equipment and measurement *increasing complexity with increasing accuracy and precision make their own decisions about the data to collect*	**Communicating Recording** *recording data, reporting findings, presenting findings*	**Considering the results of an investigation / writing a conclusion**	**Collaborating**		
		Describe results *Looking for patterns analysing functions, relationships and interactions more systematically*	**Explain results** *Draw conclusions based on evidence*	**Trusting my results**	
▪ Recognise that data might be unreliable and describe how to make it more reliable. ▪ Make their own decisions about what measurements to take [and identify the ranges and intervals used]. ▪ Take measurements, using a range of equipment, with increasing accuracy and precision. ▪ Choose and use the most appropriate equipment to support observation, make measurements, collect data. ▪ Record data and results of increasing complexity (Y5/6) ▪ Follow [and suggest] safety guidelines.	▪ Make decisions on the most appropriate format to present scientific data. ▪ Record data and results of increasing complexity using scientific diagrams and labels, recognised symbols, classification keys, tables, bar and line graphs, and models. ▪ Report findings from enquiries using discussion, drawings [annotated], oral and written explanations of results, explanations involving causal relationships, and conclusions. ▪ Present findings in written form, displays and other presentations (Y5/6).	▪ Look for different causal (cause and effect) relationships in their data (something effecting something else) and (describe the pattern succinctly). ▪ Identify patterns that might be found in the natural environment over long periods of time and describe how these have been used to develop scientific theories (e.g. evolution).	▪ Identify evidence that refutes or supports their ideas (Y5/6). ▪ Use their evidence to justify their ideas. ▪ Use correct scientific knowledge and understanding and relevant scientific language to explain their findings. ▪ Read, spell and pronounce scientific vocabulary correctly (Y5/6).	▪ Use their results to identify when further comparative tests and observations might be needed. ▪ Be able to explain differences in repeated measurements/readings or unexpected results. ▪ Recognise the limitations of some data.	