



Science

Year 6

Term: 3 and 4

Topic Title: Living Things and their Habitats.

Key Question: How can we classify and group all living things based on their characteristics?

National Curriculum Objectives:

- 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.

Vocabulary: Classification, kingdom, phylum, class, order, family, genus, species, Linnaeus, opinion, similarities, differences, vertebrates, fish amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, molluscs, worms flowering-non flowering.

National Curriculum requirement: Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge.

Prior Learning:

Recognise that living things can be grouped in a variety of ways. Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. (Y4 - Living things and habitats)
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. (Y5- Living things and their habitats)

Common misconceptions:

All micro-organisms are harmful
Mushrooms are plants.

Knowledge: Living things can be formally grouped according to characteristics. Plants and animals are two main groups but there are other living things that do not fit into these groups e.g. micro-organisms such as bacteria and yeast, and toadstools and mushrooms. Plants can make their own food whereas animals cannot. Animals can be divided into two main groups: those that have backbones (vertebrates); and those that do not (invertebrates). Vertebrates can be divided into five small groups: fish; amphibians; reptiles; birds; and mammals. Each group has common characteristics. Invertebrates can be divided into a number of groups, including insects, spiders, snails and worms. Plants can be divided broadly into two main groups: flowering plants; and non-flowering plants.

Investigative skills

Fair/comparative testing	Identifying and classifying	Observations over time	Pattern seeking	Research
<p>How does the temperature affect how much gas is produced by yeast?</p> <p>Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter, line and bar graphs.</p> <p>Report and present findings from enquiries, including conclusions, causal relationships and explanations of trust in results, in oral and written forms.</p>	<p>How can we classify all living things based on their characteristics?</p> <p>How would you make a classification key for vertebrates/invertebrates or microorganisms?</p> <p>Record data using scientific diagrams, labels and classification keys.</p> <p><i>Differences between species (KS3)</i></p>	<p>What happens to a piece of bread if you leave it on the windowsill for two weeks?</p> <p>Can household organic waste be composted and made into usable soil?</p> <p>Make systematic and careful observations. Make decisions such as whether or not to adjust observation period and frequency</p>	<p>Do all flowers have the same number of petals?</p> <p>Which is the most common invertebrate on our school playing field?</p> <p>Present the same data in different ways in order to help with answering a question.</p> <p>Use test results to make predictions to set up further comparative and fair tests.</p>	<p>Who is Carl Linnaeus?</p> <p>What do different types of microorganisms do?</p> <p>Are microorganisms always harmful? Recognise which secondary sources will be most useful to research ideas. Identify scientific evidence that has been used to support or refute ideas. Communicate findings to an audience using relevant scientific language and illustrations.</p>

<p>Significant Scientists:</p> <p>Carl Linnaeus- Identifying, Naming and Classifying Organisms</p> <p>Edward Jenner- smallpox vaccination</p>	<p>End point:</p> <p>Can give examples of animals in the five vertebrate groups and some of the invertebrate groups</p> <p>Can give the key characteristics of the five vertebrate groups and some invertebrate groups</p> <p>Compare characteristics of animals in different groups.</p> <p>Can use classification materials to identify unknown plants and animals</p> <p>Can create classification keys for plants and animals</p> <p>Can give a number of characteristics that explain why an animal belongs to a particular group</p>
<p>Science stories:</p> <p>Beetle Boy- M G Leonard</p> <p>Insect Soup- Barry Louis Polisar</p>	
<p>Cross Curricular Links:</p> <p>English: diary entry, instructions, non-chron factfile, explanation- differences between invertebrates and vertebrates.</p> <p>Maths: Count and record, construct tables and graphs</p> <p>DT/Art: Create micro-organisms using materials</p> <p>Geography: Where do most in/vertebrates live in the world?</p> <p>Computing: Make a blog/vlog-informative text</p> <p>PSHE: Recognise how medicines, when used responsibly, contribute to health; that some diseases can be prevented by vaccinations and immunisations; how allergies can be managed.</p>	<p>Oracy:</p> <p>Back to back drawing (verbal instructions)</p>
Wider Reading	Enrichment
<p>Carl Linnaeus- BBC teach class clips.</p> <p>Information about Carl Linnaeus</p> <p>e-bug resources- a range of resources on micro-organisms.</p>	<p>Seasonal box including Linnean Society classification activity pack.</p>

Sequence of Learning		
Lesson	Key Question	Key learning/notes
1	How can we classify and group all living things based on their characteristics?	<ul style="list-style-type: none"> All living things are grouped according to similarities and differences. Ask the key question of the unit and provide table groups with flipchart paper, pens, lolly sticks, vocabulary cards (including some blank ones should chn want to add ideas), pictures of a variety of living organisms from each classification group, including flowering and non-flowering plants and a picture of the world. Start the children off by using the lollysticks to create two different branches "living things" and "non-living things" from a picture of Earth. Explain that you would like chn to continue by sorting/grouping the living things category. What sub groups might there be based on these pictures? Are there any extra categories, creatures or vocabulary cards you would like to add? Why? Take photos for WS floor book. Note comments/misconceptions from chn and use as an initial assessment and talking point for the unit. Who is responsible for creating classification systems that help us to identify and group living things today? Introduce key scientist Carl Linnaeus through the BBC teach class clip. Children to create a social media page for Carl Linnaeus including a profile picture, top photos (pictures/diagrams of his classification system) a quote (made up and based on what they learn about his interests/discoveries) and mini biography.
2	What are the seven levels of classification?	<ul style="list-style-type: none"> Explain that today we have 7 levels of classification compared to Linnaeus's 5: Kingdom, Phylum, Class, Order, Family, Genus, and Species. Make up a mnemonic to remember these. Find out about the 5 Kingdoms now described and draw poster How can classification keys help us to identify living things of the same species? In groups research and classify living things from different habitats. children create classification keys to identify e.g. a selection of

		<p>birds, butterflies or bumblebees using photographs and information gathered from their research.</p> <ul style="list-style-type: none"> • Chn discuss the features that could be used then use their expertise to create and trial keys for a selection of tree leaves. • Point out that members of a species may not always look the same, which causes some problems for classification. • Discuss the idea of continuous variation using heights of chn
3	<p>What are micro-organisms?</p>	<ul style="list-style-type: none"> • Introduce the concept of micro-organisms through the oracy back to back activity: draw the given picture based on the verbal instructions given by a partner. • Once revealed and compared to original images ask chn what they already know about germs or bugs. • Take a closer look at micro-organisms - from Monera, Protista and Fungi Kingdoms. Explore to understand that bacteria, viruses and fungi are three different types of microbes and that microbes come in different shapes and sizes. Use the e-bug materials for support and further information (resources) • Are viruses an example of living things? Find out that some cause diseases, but that they can be very useful too. • Examine different images of micro-organisms as they would look under a microscope. Look especially at common viruses such as: chicken pox, influenza, measles and mumps. Next, look at bacteria such as food poisoning, pneumonia, soil bacteria, and live bacteria present in foods e.g yoghurt or cheese. • Chn recreate these scientific images using plasticine, observational drawings or collage materials and collect further information using secondary sources to research both useful and harmful micro-organisms. • Children gather their research to create Science blogs, vlogs or explanation tests on different types of micro-organisms.
4	<p>How can micro-organisms be useful to us?</p> <p>Investigation: can household organic waste be composted and made into usable soil?</p> <p>Note: this is originally a US resource so some of the language and stats need to be adapted for the UK.</p>	<ul style="list-style-type: none"> • Explain the idea of Decomposition (the natural breaking down of organic material (materials derived from plants or animals) into soil. Composting is a way that people speed up the natural process of decomposition. When we throw away rubbish, it is taken to a landfill where it is buried and can take years to decompose. Landfills are quickly filling up. When natural, organic waste is separated into a compost pile, it is mixed with bacteria and fungi in the soil, a little water, and lots of oxygen and should quickly decompose into nutrient-rich soil that is perfect for the garden! • Introduce the scraps into soil investigation (resources). In small groups, make mini compost bins as per the instructions. Gather materials and observe if and how they decompose over time in a natural setting. • Once set up, explain and explore the school's composting system and how it is one way the school is utilising waste sustainably. How can we dispose of our investigations responsibly once we have finished?
5	<p>How does the temperature affect how much gas is produced by yeast?</p>	<ul style="list-style-type: none"> • Use the e-bug resources • carry out a yeast enquiry.
6	<p>What key details help scientists to classify flowering plants?</p>	<ul style="list-style-type: none"> • Look carefully at observable characteristics of a common plant. Can chn generate words to describe its appearance in detail? E.g daffodils: six yellow outer petals; inner petals that create a trumpet shaped cup; a tall, green stem; thin, tipped leaves that point upwards etc. • Explore as a class what latin names these characteristics may have had in the 1700s. Repeat for a range of common plants and animals. What might be problematic about naming living things in this long and details way? • Return to Carl Linnaeus whose system gave each living thing just two latin names. The first name identifies the group it belongs to (genus) and the second name tells you which type (species) is within that group. e.g. types of roses- wild rose: Rosa woodsii beach rose: Rosa rugosa • Observe buttercup plants, daisies and other common flowering plants in

		<p>local environment and identify them using classification keys to understand the details that taxonomists use to classify living things. Look in detail at a flowering plant and describe features. Do all flowers have the same number of petals? Look for patterns.</p>
7	<p>How can we classify and group all living things based on their characteristics?</p> <p>Assessment lesson</p>	<ul style="list-style-type: none"> • Complete the end of unit quiz. • Report on compost bins and graphed results using I see (to observe what is in the compost pile) I notice (what changes have occurred/differences in rates of decomposition) and I wonder (raise further questions). What conclusions have you drawn from this investigation? Which materials can be composted? • Think about the rubbish that you throw away at home or at school - is most of it natural, organic material or non-natural/inorganic? What would happen to the amount of waste you produce if you composted all of your organic waste? Children should reflect on the purpose of the investigation and how it impacts their own lives, both at home and in school. Composting reduces rubbish in our landfills while also creating healthy soil that we can use to group new living things! • Generate new wonders that children may wish to explore further for themselves.