

National Curriculum Science - Knowledge

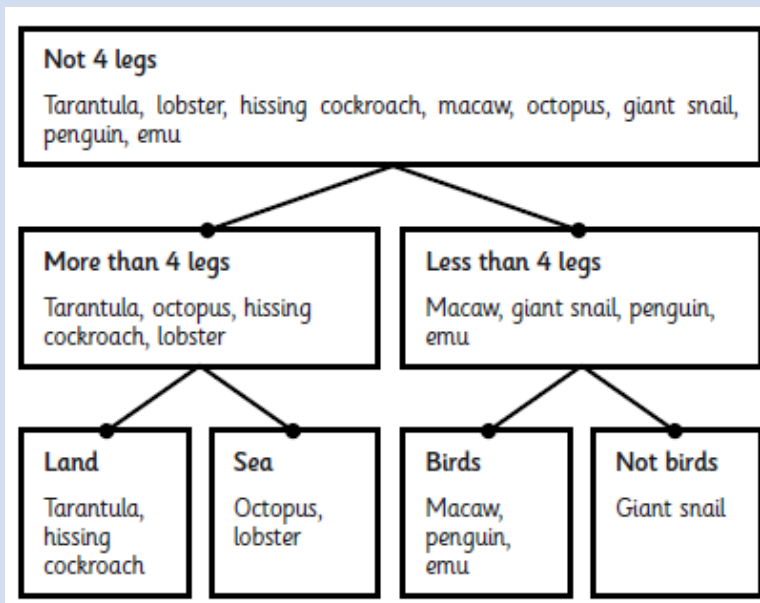
- Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals.
- Give reasons for classifying plants and animals based on specific characteristics

Key Learning

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.

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.

A branch diagram is a type of classification key:



Vocabulary

Classify: sort into categories according to shared qualities or characteristics.

Compare: the similarities and differences between things.

Standard system: a recognised method used in the same way by all scientists e.g. the Linnaean Classification System.

Hierarchy: ranked in levels.

Genus: species that are very closely related and share unique body structures.

Species: a group of animals that can reproduce to produce fertile offspring.

Scientific name: the names of the genus and species are used to give the scientific name (recognised Latin name) of each living thing.

Vertebrate: creatures with a backbone.

Invertebrate: creatures without a backbone.

Groups of animals: a level of classification including mammals, reptiles, amphibians, birds, fish, insects, arachnids, annelids, crustaceans, echinoderms and mollusks.

Observable: can be seen and noticed.

Characteristic: a feature or quality belonging typically to that living thing.

Micro-organism: very tiny living things that are so small they are not visible to the naked eye, so a microscope is needed to see them. Includes bacteria, virus and fungus.

Cell: the smallest structural and functional unit of an organism, which is typically microscopic.

National Curriculum Science – working scientifically

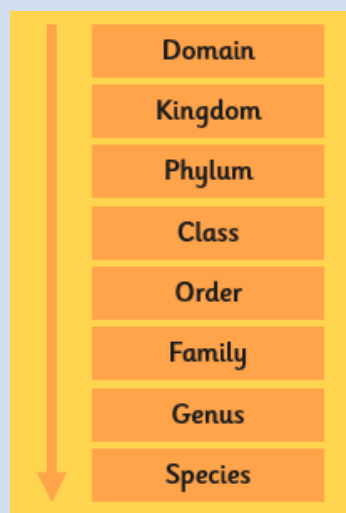
- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
- Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- Use test results to make predictions to set up further comparative and fair tests.
- Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.
- Identify scientific evidence that has been used to support or refute ideas or arguments.

Key Learning continued...

A standard system of classification is useful because it allows scientists to accurately identify, group and properly name animals. Without a standard system, living things could be classified and named differently by different scientists.

Carl Linnaeus was a Swedish scientist who believed it was very important to have a standard system of classification. He published his system in a book called ‘Systema Naturae’.

Living things can be classified by following the levels in the Linnaean System. The number of living things in each group gets smaller and smaller, until there will just be one type of animal in the species group.



Microorganisms are very tiny living things. They are so small that they are not visible to the naked eye, so a microscope is needed to see them. Microorganisms can be found all around us. They can live on and in our bodies, in the air, in water and on the objects around us. They can be found in almost every habitat on Earth.

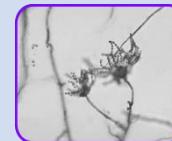
Bacteria



Viruses



Fungi



Scientific investigations


Which conditions cause mould to grow?

- Devise own question to investigate mould growth based on knowledge of living things.
- Plan scientific enquiry to answer this question, identifying and managing independent, dependent and control variables.
- Record and present observations in table and annotate photographic data.
- Conclude on findings, explaining them using knowledge of living things and commenting on reliability of results.
- Use enquiry result to make further prediction and/or propose a further question to investigate.

Record data:

- Use information about the characteristics of an unknown animal or plant to assign it to a group.
- Classify animals, presenting using classification keys (branch diagram, Linnaean System).
- Create an imaginary animal/micro-organism which has features from one or more groups, then classify it using its observable characteristics.

Key Learning: Know that scientists classify living things in order to study them and know about micro-organisms.

- 1 Why do scientists classify living things?**
Recap vocabulary used to classify living things from prior learning (e.g. mammals, birds, reptiles, amphibians, fish, insects, vertebrates, invertebrates, carnivores, herbivores, omnivores etc.) Explain role of taxonomist and discuss the need to classify living things in order to study them. Explore and give reasons for classifying plants and animals based on specific characteristics. Create own branch diagrams to classify different animals.
- 2 What is the standard classification system for living things and why is it needed?**
Retrieve knowledge of classification from previous lesson. Discuss the need for a standard system to avoid disagreements and confusion and to increase scientific accuracy. Describe who Carl Linnaeus was and explain how living things are classified using the Linnaean System, including micro-organisms, plants and animals). Use internet research to classify living things using the Linnaean System.
- 3 How do I use observable characteristics to classify a living thing?**
Recap and recall the characteristics of different types of animals (mammals, birds, insects, reptiles, amphibians, fish, arachnids, annelids, crustaceans, echinoderms and mollusks). Using knowledge, design and classify own 'curious creature' based on its characteristics, providing justifications for choices made.
- 4 What do micro-organisms need to survive? (Part 1)**
Retrieve knowledge of what all living things require in order to survive. Discuss: 'what do we predict micro-organisms required to survive?' Learn that whilst some micro-organisms are helpful, others are harmful. Name common types and uses of helpful and harmful micro-organisms. Use scientific enquiry to investigate the conditions in which mould grows, independently planning and setting up own experiment. *Observations and results will be collected over following two-weeks prior to lesson 6).*
- 5 What are micro-organisms?**
 Learn the three types of micro-organism (bacteria, virus and fungi) and the key features of each. Apply to microscope images to identify each type of micro-organism depicted, then design own micro-organism, classifying its type and justifying this by giving reasons based on observable characteristics (under micro-scope).
- 6 What do micro-organisms need to survive? (Part 2)**
Retrieve knowledge of what all living things require in order to survive, and helpful and harmful micro-organisms. Use scientific enquiry to investigate the conditions in which mould grows, independently recording and concluding on results collected over previous two weeks. *See lesson 4 above.*