

BIODIVERSITY

- biodiversity has a number of different levels
- 1st is the level of **species**
- 2nd is the level of **ecosystem**
- 3rd is the level of **genetics**
- populations with higher genetic diversity are more resilient
- although every individual is different, we all belong to the same species - homo sapien
- biodiversity represents **different species**, not individuals
- a species is an interbreeding 'kind' - biological species concept
- biological species model does not apply to fossils or extinct organisms
- occasionally two separate species breed, creating a hybrid

CLASSIFICATION

- the classification of organisms can always change
- use classification system to - organise info and show **patterns, trends** and **relationships**
- is based upon shared features, modes of reproduction, biochemistry and genetics
- standardised classification internationally
- communication between scientists

- **Archaea**: Prokaryotes live in extreme environments
- **Bacteria**: Aka Monera - are prokaryotes
- Difference between them: how **cells** store **DNA** and how **proteins** are made and synthesised
- **Eukarya** - Protista kingdom, fungi kingdom, plantae kingdom, Animalia kingdom (membrane bound DNA, have a nucleus)

Six kingdoms include

Animalia	Plantae	Protista	Funghi	Archea	Bacteria
includes all animals	includes all mosses, ferns and flowering plants	includes amoeba	includes yeast, moulds and mushrooms	microscopic single-celled organisms known for living in extreme conditions	microscopic single-celled organisms

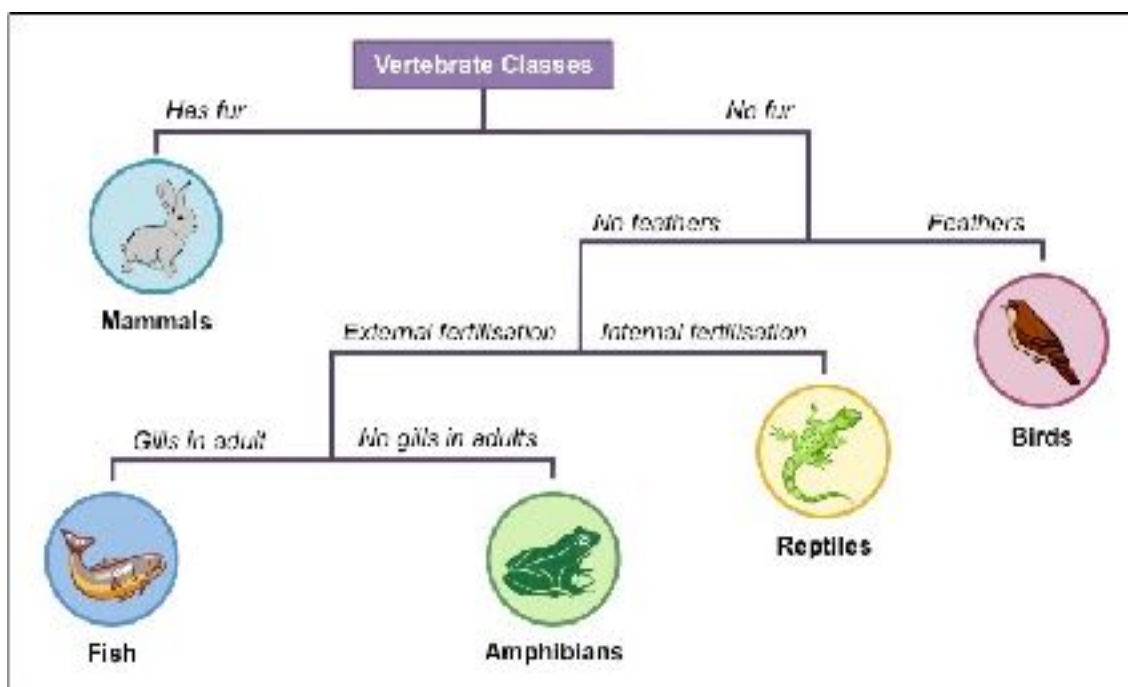
- **morphological species concept** - characterises a species by its form/ **morphology** e.g. a skull
- **phylogenetic species concept** - identifies a species as the smallest group of organisms that can trace their origins to a **single common ancestor**
- e.g. all primates share a common ancestor

- **ecosystem** - composed of all living organisms with the physical environment being in **one area**
- most organisms in an ecosystem have uniform physical conditions
- German explorer **Alexander Van Humboldt** - father of ecology - believed that the interrelationship of many sciences (biology and meteorology) was why different organisms were found in particular regions
- our understanding of ecosystems is ongoing, ecosystem regarded as **homogeneous**

- organisms classified into a number of groups that form a **hierarchy** or series of levels
 - groups are known as **TAXA** - taxonomic groups
 - names of the major TAXA are in order from largest to smallest in terms of how many organisms belong to each group
 - is based on the **characteristics** of organisms
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- order goes from **Kingdom, Phylum, Class, Order, Family, Genus, Species**
 - the higher the taxonomic group, the greater the diversity
 - each TAXA contains fewer and fewer organisms
 - organisms become more similar as you descend the hierarchy
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- **Carl Linnaeus** - father of taxonomy
 - began with his work Species Plantarum in 1753
 - first part of the name identifies the genus to which the species belongs
 - second part identifies the species within the genus

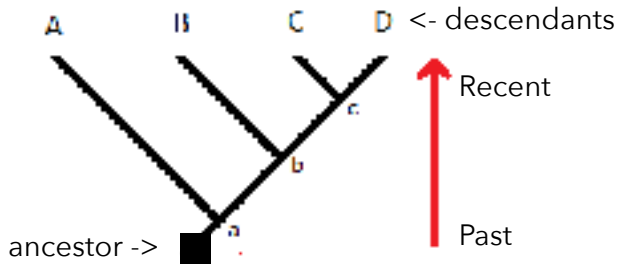
DICHOTOMOUS KEY

- a way of determining something by going through a series of choices that leads to the correct name of the item
 - Dichotomous means "**divided in two parts**"
 - at each step of the process by using the key the user is given two choices, each alternative leads to another question until the item is identified
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- Taxonomist's try to make sure that classification reflects the **evolutionary relationship** between organisms
 - ideally in each TAXA, all the organisms descended from a **common ancestor**
 - when viewing a **cladogram**, the branch contains all of the group and is said to be **monophyletic**
 - Class of Reptilia is not a clade and is known as a **paraphyletic** because birds and reptiles were classified into separate classes before their evolutionary relationship was known
 - now known that birds share a common ancestor with crocodiles, alligators and the dinosaur



CLASSIFICATION AND EVOLUTIONARY RELATIONSHIPS

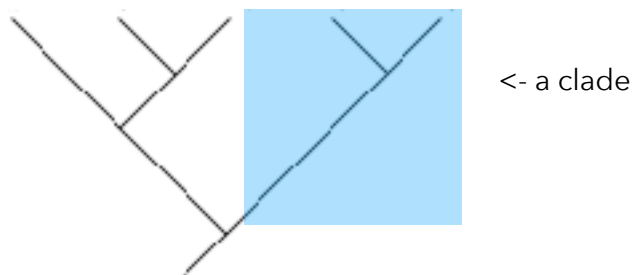
- **Phylogenetic's** is a term used to describe the study of evolutionary relationships among and within a species
- phylogenetic trees can be called **cladograms**



- branches on the tree represent **speciation**, the formation of a new species
- the event that causes the speciation is shown as the fork of the V



- A and B's relationship is that of having a **similar ancestor** up until speciation occurs



- A **clade** is a group of organisms that come from a **common ancestor**
- if you cut a branch off the tree, you could remove all the organisms that make up a clade