5.2 CLASSIFICATION

Species: A group of organisms, which can interbreed and produce fertile offspring

The value of classifying organisms:

Living organisms need to be organized into manageable groups in order for humans to study them. This grouping is called: **classification**

How does classification help?

a) *Allows species identification*: we can find out to which species an organism belongs

b) *Prediction of characteristics*: if several members of a group share a common characteristic, another species in this group will might have it.

c) *Shows evolutionary links:* species that are in the same group, probably share characteristics due to common ancestors. We can therefore, predict how they evolved through time.

Binomial System of Nomenclature

Organisms had to be given a scientific name.

Swedish Botanist Carolus Linnaeus (1707 – 1778) came up with a system of nomenclature.

Example: *Genus species (Tursiops truncates)*

Classification into Domains

1) **Archaea** (referred to as archaeans). Examples include thermophiles and halophiles
2) **Eubacteria** (referred to as bacteria). Examples include *E. coli* and photosynthetic cyanobacteria
3) **Eukaryota** (referred to as eukaryotes). Examples include animals, plants and fungi

Classification into Kingdoms

All organisms are classified into kingdoms (by Margulis & Schwartz)

1) **Prokaryotae** (all types of bacteria)
2) **Protoctista** (unicellular organisms, like amoeba)
3) **Fungi** (moulds & yeasts)
4) **Plantae** (ferns, conifers, plants)
5) **Animalia** (sponges, corals, insects, birds, mammals)

! Viruses are separated because they are in the borders of living and non-living

Classification from Species to Kingdom

Taxa	The blue whale	Coast redwood (sequoia)
Kingdom	Animalia	Plantae
Phylum	Chordata	Coniferophyta
Class	Mammalia	Pinopsida
Order	Cetacea	Pinales
Family	Balaenopteridae	Taxodiaceae
Genus	*Balaenoptera*	*Sequoia*
Species	*musculus*	*sempervirens*

Distinction between four different phyla of terrestrial plants

	Roots, leaves, stems
Bryophytes (mosses)	No roots (**rhizoids**) Simple leaves and simple stems.
Filicinophytes (ferns)	Have roots, leaves and short woody stems. Leaves are often curled up in bud.
Coniferophytes (conifers)	Conifers are shrubs or trees with roots, leaves and woody stems
Angiospermophytes (flowering plants)	Very variable, but usually have roots, woody stems and leaves &, FLOWERS!

Distinction between seven different phyla of marine animals

Porifera (sea urchins, sea star, sponges)	Parapodia, two openings (mouth, anus), pentaradial symmetry
Cnidaria (eg jelly fish)	Tentacles, radial symmetry, mouth but no anus
Platyhelminthes (marine worms)	Flat and elongated, mouth but no anus
Annelida (marine worm)	Rounded body, distinct head and parapodia and segmented, mouth and anus
Mollusca (shells, octopus)	Soft body, some produce one or two shells, mouth and anus
Arthropoda (marine or terrestrial eg lobster)	Exoskeleton, joint appendages
Chordate (fish)	Pharyngeal gills, post-anal tail, dorsal nerve cord

Distinction between five different phyla of vertebrates

Bonny ray-finned fish	Scales grow from skin, gills, fins supported by rays, external fertilization
Amphibians	Soft moist permeable skin, lungs with small internal folds, external fertilization, protective gel around eggs, larval stage lives in water
Reptiles	Dry scaly impermeable skin, lungs with extensive folding, internal fertilization, soft shells around eggs, one type of teeth
Birds	Feathers grow from skin, lungs with parabronchial tubes, wings instead of front legs, hard shell around eggs, beak but no teeth
Mammals	Hairs growing from skin, lungs with alveoli, give birth to live young, mammary glands secrete milk, teeth of different types

Dichotomous Keys (exercise!)

http://www.youtube.com/watch?v=gh-O6EDTs5c&feature=related

Identification example :

http://website.nbm-mnb.ca/mycologywebpages/Moulds/Identification.html