

Understandings:

1. Explain the history of binomial system.

- The binomial system is a language for all biologists to have a common name system.

International Botanical Congresses (IBC) was held to agree to this new system during 1892.

2. Explain what binomial system is.

Binomial system is literally “two name” system. Let’s take a trivial example. *Homo sapiens*.

“Homo” is the genus and “sapiens” is the specific specie’s name. Notice that all are in italics because this indicates that it is a name, and also that genus starts with capital letter while species is not.

3. Define hierarchy of taxa.

- This is the stages we divide the organisms into. Remember this!

The hierarchies	Example (humans!)
Domain	Eukarya
Kingdom	Animalia
Phylum	Chordata
Class	Mammalia
Order	Primate
Family	Hominidae
Genus	Homo
Species	sapien

We are “wise men” apparently.

4. State the three domains and show the differences.

- Domain is the starting point of division. Back in the old days, we only had two, which were eukaryotes and prokaryotes. But when our knowledge for RNA backtracking developed, we saw that we could divide the prokaryotes into two more groups: Eubacteria (more known as bacteria) and archaea.

Archaea is still not very well known.

	Eubacteria	Archaea	Eukaryote
Histones (the round proteins that are entangled in DNA)	Absent	Proteins similar to histones, but not quite	Present
Presence of introns (a type of nucleotide sequence)	Rare/absent	Present in some genes.	Frequent
Structure of cell wall	Made of peptidoglycan	No peptidoglycan	No peptidoglycan
Organelles	No	No	Yes
Ribosomes	70s	70s	80s

5. State the principle of taxa for classifying eukaryotes.

- The order stated in 3 is the answer. However, we must be aware that this order is only definite for eukaryotes.

6. Distinguish between natural classification and artificial classification.

- Natural classification is when we classify with the basis of common ancestor. Ex, mammals.

Artificial classification is when we classify with the basis of common function or living habit. Ex, flying organisms, insects, etc.

Both methods have their ups and downs. Natural classification may sometimes have a hard time tracing back whether a species has got the same ancestor. Artificial classification may sometimes misjudge the convergent evolutions and classify them as similar species.

However, with new molecular methods and DNA backtracking, natural classification is getting more accurate.

7. Explain how species may get reclassified.

- Since new technology arises very frequently, we gain more knowledge of things we did not know before. As a result, if we notice that a species have different ancestor from another, they may get reclassified.

8. State the advantage of natural classification.

- New species are being discovered even today. Natural selection helps us classify the newly identified species easily.

1. We can identify the species much easier. We can use molecular research to assign it into kingdom, phyla, class, etc. Artificial selection has a big risk of misleading the classification, because there are variations in species.

2. Since they have a common ancestor, they also inherit similar characteristics. We can be sure that bats have mammary gland, placenta, heart, etc.

Application and skills:

1. Know that at least one classification of each plant and animal species from domain to species level.

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Taxon	Human	Date palm
Domain	Eukaryote	Eukaryote
Kingdom	Animalia	Plantae
Phylum	Chordata	Angiospermophyta
Class	Mammalia	Monocotyledoneae
Order	Primate	Palmales
Family	Hominidae	Arecaceae
Genus	<i>Homo</i>	<i>Phoenix</i>
Species	<i>sapien</i>	<i>dactylifera</i>

2. Recognize the features of bryophyta, filicinophyta, coniferophyta and angiospermophyta.

	Roots, leaves and stems	Maximum height	Reproductive structures
Bryophytes Ex, moss	No roots, instead they have structures similar to root hairs called rhizoids. Mosses have simple leaves and stems.	0.5 m	Spores are produced in capsule. The capsule develops at the end of a stalk
Filicinophytes Ex, fern	Have roots, leaves and short non-woody stems. Leaves are usually pinnate (divided into leaflets) and curled up in a bud.	15 m	Spores are produced in sporangia, usually on the underside of the leaves
Coniferophytes Ex, pine (x-mas tree)	Shrubs or trees with roots, leaves and woody stems. Leaves are usually narrow with thick waxy cuticle.	100 m	Seeds are produced from ovules on the surface of the scales of female cones. Male cones produce pollen.
Angiospermophyta Ex, palm trees and all flowering plants!	Many different characteristics but usually have roots, leaves and stems. Stems of flowering plants that develop into shrubs and trees are woody.	100 m	Seeds are produced from ovules inside the ovaries. The ovaries are part of the flower. The fruits then develop from the ovaries and disperse the seeds.

3. Recognize the features of porifera, cnidaria, platylhelmintha, annelida, mollusca, arthropoda and chordata (chordata is us so just look at yourself).

	Porifera	Cnidaria	Platyhelminthes	Annelida	Mollusca	Arthropoda
Symmetry	Asymmetrical	Radial (symmetrical in circle)	Bilateral	Bilateral	Bilateral	Bilateral
Body layers	No mouth or anus	Mouth and no anus	Mouth and no anus	Mouth and anus	Mouth and anus	Mouth and anus
Other features	Pores on body	May have tentacles	Very flat	Segmented body	May have shell	Jointed legs and exoskeleton
Example	Sponge	Jellyfish & anemones	Flatworms & tapeworms	Earthworms & leeches	Squids, slugs & snails	Spiders, insects and crustaceans

4. Recognize the features of birds, mammals, amphibians, reptiles and fish.

- Really? Are you taking the piss IB? Well we know the obvious features, but this is just too much...so I will just mention the “less obvious” features (I mean, we all know birds have two wings and mammals four legs etc.)

Bony ray-finned fish	Amphibians	Reptiles	Birds	Mammals
Cold-blooded			Warm-blooded	
No limbs. Sad bro, sad.	Pentadactyl limbs			
Gills	Lungs	Lungs	Lungs	Lungs
External fertilization	External fertilization	Internal fertilization	Internal fertilization	Internal fertilization
Eggs	Larvae	Eggs	Eggs	Live birth

5. Construction of dichotomous keys for use in identifying specimens.

- Do this in class.

TOK:

The adoption of a system of binomial nomenclature is largely due to Swedish botanist and physician Carolus Linnaeus (1707–1778). Linnaeus also defined four groups of humans, and the divisions were based on both physical and social traits. By 21st-century standards, his descriptions can be regarded as racist. How does the social context of scientific work affect the methods and findings of research? Is it necessary to consider the social context when evaluating ethical aspects of knowledge claims?