

## Characteristics and Classification of Living Organism

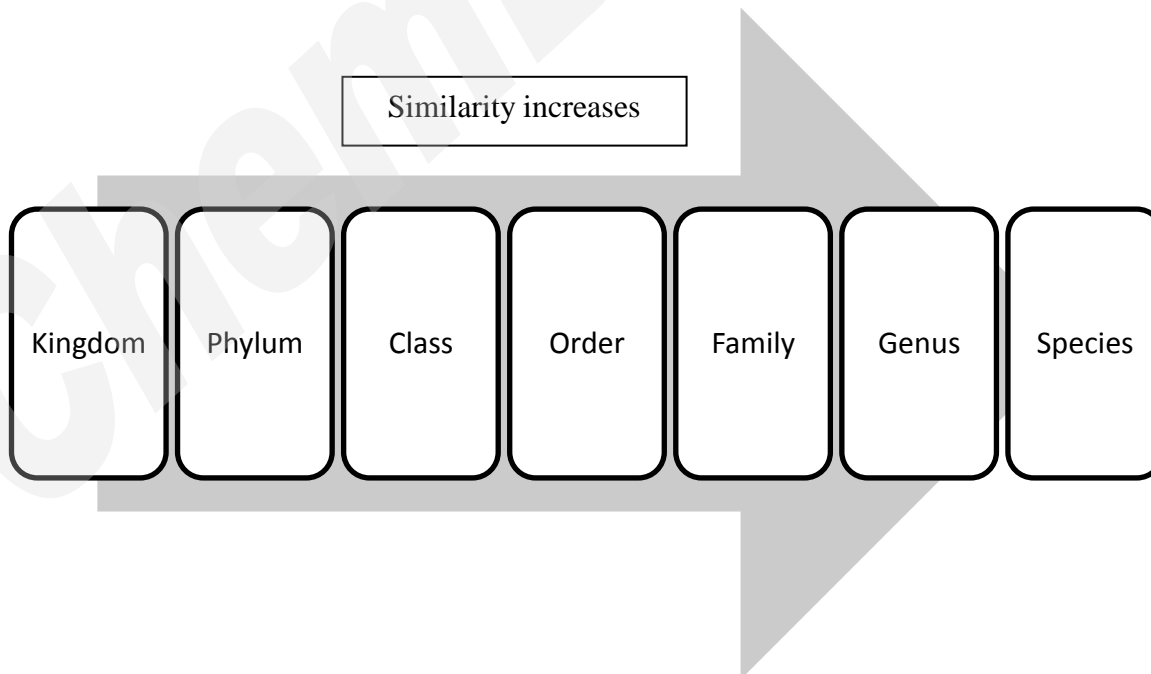
(IGCSE Biology Syllabus 2016-2018)

### Characteristics of Living Organisms

- Movement
- Respiration
- Sensitivity
- Growth
- Reproduction
- Excretion
- Nutrition

### Classification System

- Organism can be classified into groups by the features that they share
- **Species:** organisms which can reproduce successfully
- Classification is based on studies on morphology and anatomy
- **Morphology:** the form and shape of their bodies
- **Anatomy:** the detailed body structure determined by dissection
- **Binomial system:** a system of naming, in which the scientific name of an organism is made up of two parts showing the **genus (capital letter)** and **species (lower case letter)**, written in italics, e.g. *Homo sapiens*



- DNA molecule is made up of strands of smaller molecules containing four bases
- Biologists **compare the sequence of the bases** in the DNA of organisms from two different species
- **The more similar the base sequence, the more closely related the species** are to one another
- Organisms which share a more recent ancestor have base sequences in DNA that are more similar than those that share only a distant ancestor

### Kingdom

Kingdom	Details
Animal	<p><b>Phyla</b></p> <p><b>Vertebrates</b></p> <ul style="list-style-type: none"> <li>○ Mammals           <ul style="list-style-type: none"> <li>- Fur/hair on skin</li> <li>- Can live on land and in water</li> <li>- 4 legs</li> <li>- Lungs to breath</li> <li>- Give birth to live young</li> </ul> </li> <li>○ Reptiles           <ul style="list-style-type: none"> <li>- Scales on skin</li> <li>- Usually 4 legs</li> <li>- Lungs to breath</li> <li>- Hard eggs</li> </ul> </li> <li>○ Fish           <ul style="list-style-type: none"> <li>- Wet scales</li> <li>- External fertilization and soft eggs</li> <li>- Gills to breath</li> </ul> </li> <li>○ Amphibians           <ul style="list-style-type: none"> <li>- Smooth, moist skin</li> <li>- External fertilization and soft eggs</li> <li>- Gills/lungs to breath so can live on land and in water</li> <li>- 4 legs</li> </ul> </li> <li>○ Birds           <ul style="list-style-type: none"> <li>- Feathers on body and scales on legs</li> <li>- Have 2 legs and 2 wings</li> <li>- Lungs to breath</li> <li>- Hard eggs</li> </ul> </li> </ul>

### Arthropods

- Crustaceans (e.g. crabs)
  - Have an exoskeleton
  - 1 pair of compound eyes
  - 2 body segments – cephalothorax and abdomen
  - More than 4 pairs of legs
  - 2 pairs of antennae sensitive to touch and chemicals



- Arachnids (e.g. spiders)
  - 2 body segments - cephalothorax and abdomen
  - Four pairs of legs
  - Pairs of chelicerae to hold prey
  - Two pedipalps for reproduction
  - Simple eyes



- Myriapods (e.g. centipede)
  - Segmented body
  - Additional segments formed
  - One pair of antennae
  - 70+ pairs of legs
  - Fused head and thorax and segmented abdomen
  - Simple eyes



- Insects (e.g. bees)
  - 3 body segments – head, thorax and abdomen
  - 3 pairs of legs
  - 1 pair of antennae
  - 1 or 2 pairs of wings
  - Compound and simple eyes



**Annelids (e.g. earthworm)**

- Many segments on long body
- Body covered with mucus to conserve water
- Mouth and anus present
- Bristles (stiff hair) usually present for movement
- Many are intersex




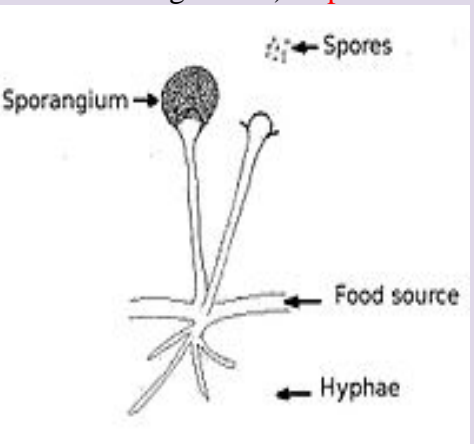
**Molluscs (e.g. snail)**

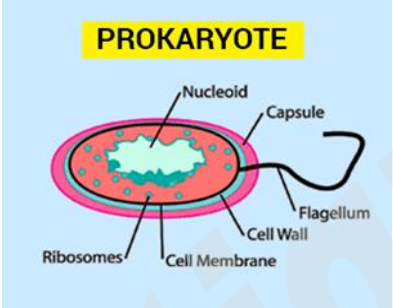
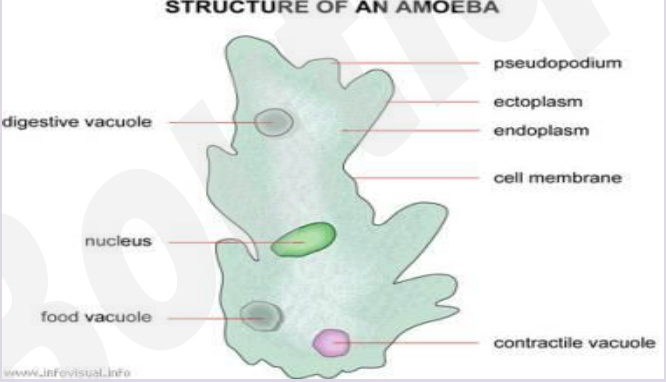
- Soft, unsegmented body
- Muscular foot for movement
- Have eyes on retractable tentacles



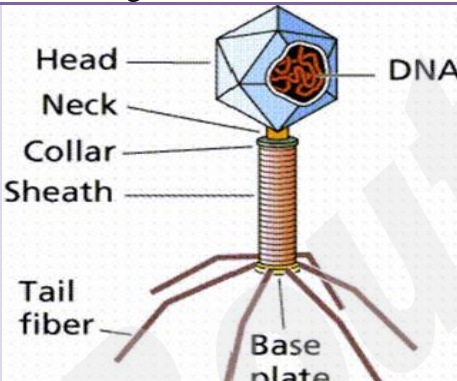
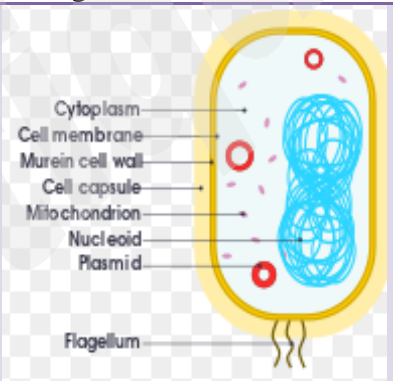
**Nematodes (e.g. worm)**

- No segments
- Long cylindrical body
- Body pointed at both ends

			
<p><b>Plant</b></p>	<p>Multi-cellular photosynthetic autotrophic (make their own food)</p> <p><b>Ferns</b></p> <ul style="list-style-type: none"> <li>○ Do not produce flowers</li> <li>○ They are plants with roots, stems and leaves</li> <li>○ Have leaves called fronds</li> <li>○ Reproduce by spore</li> </ul> <p><b>Flowering plants</b></p> <ul style="list-style-type: none"> <li>○ They are plants with roots, stems and leaves</li> <li>○ Reproduce sexually by means of flowers and seeds</li> <li>○ Seeds are produced inside the ovary in the flower</li> <li>○ <b>Monocotyledons</b> <ul style="list-style-type: none"> <li>- One cotyledon</li> <li>- Parallel veins</li> <li>- Fibrous root</li> </ul> </li> <li>○ <b>Dicotyledons</b> <ul style="list-style-type: none"> <li>- Two cotyledons</li> <li>- Veins netlike</li> <li>- Taproot present</li> </ul> </li> </ul>		
<p><b>Fungi</b></p>	<p>Single celled or multi-cellular heterotrophic organism with cell wall not made of cellulose, spread by <b>spreading of spores</b>, <b>saprotrophs</b> (feed on dead organisms) or <b>parasites</b></p> <div data-bbox="771 1375 1242 1816" style="text-align: center;">  <p>The diagram illustrates a fungus with a central sporangium at the top, from which several spores are being released. Below the sporangium, a network of hyphae is shown growing from a food source. Labels include 'Sporangium', 'Spores', 'Food source', and 'Hyphae'.</p> </div>		

<p><b>Prokaryotes</b></p>	<p>Single celled organisms with no true nucleus</p>  <p><b>PROKARYOTE</b></p> <p>Nucleoid, Capsule, Flagellum, Cell Wall, Cell Membrane, Ribosomes</p>
<p><b>Protocist</b></p>	<p>Single celled organism with a nucleus</p>  <p><b>STRUCTURE OF AN AMOEBIA</b></p> <p>pseudopodium, digestive vacuole, nucleus, food vacuole, contractile vacuole, ectoplasm, endoplasm, cell membrane</p> <p><small>www.infovisual.info</small></p>

### Viruses and Bacteria

	Virus	Bacteria
Covered by cell membrane	Protein coat	Cell wall
Cytoplasm	No	Yes
Genetic material	RNA	DNA
Living or not	Non-living unless in host	Living
Structure		

### Dichotomous Key

- Use visible features to classify organisms.

