



140 MIC
Lab 9 (Microorganisms)

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- Grouping of organisms into kingdoms is based on 3 factors :

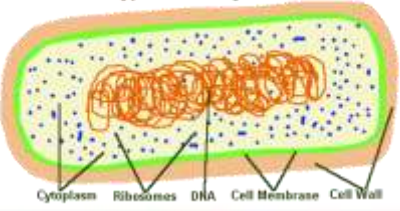
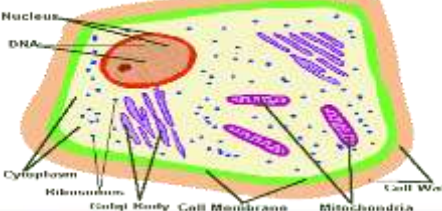
1 Cell Type (prokaryotic or eukaryotic)

2 Cell Number (unicellular or multicellular)

3 Feeding Type (autotroph or heterotroph)

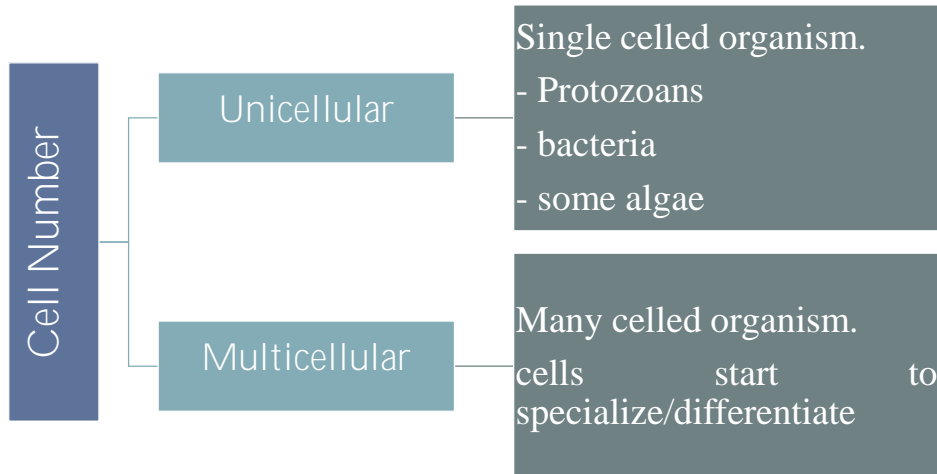
❖ 1st : Cell Type

The presence or absence of cellular structures such as the nucleus, mitochondria, or a cell wall.

Prokaryotes	Eukaryotes
Bacteria, Cyanobacteria	Fungi, Animal
Do not have : <ul style="list-style-type: none"> • An organized nucleus • Structured organelles 	Do have : <ul style="list-style-type: none"> • Nucleus organized with a membrane other organelles
<p>A Typical Prokaryote Cell</p>  <p>Cytoplasm Ribosomes DNA Cell Membrane Cell Wall</p>	<p>A Typical Eukaryote Cell</p>  <p>Nucleus DNA Cytoplasm Ribosomes Golgi Body Cell Membrane Mitochondria Cell Wall</p>

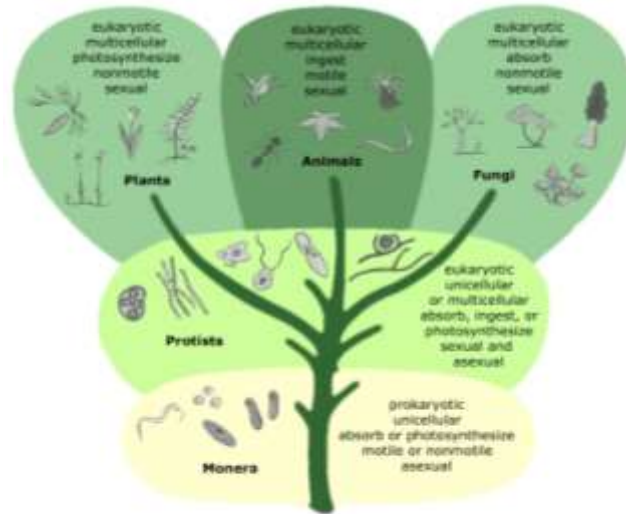


❖ 2nd : Cell Number

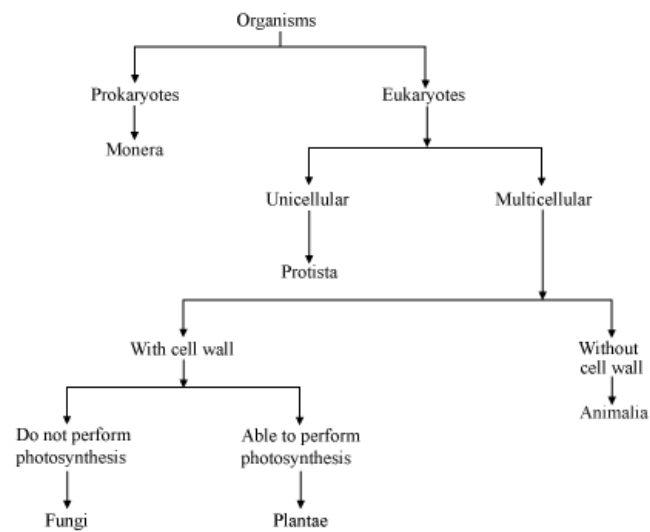


❖ 3rd : Feeding Type


How the organisms get their food ?	
Autotroph or Producer	Heterotroph or Consumer
Make their own food	<ul style="list-style-type: none"> • Must eat other organisms to survive • Includes decomposers – those that eat dead matter!
Plant, Cyanobacteria	Animal, Human



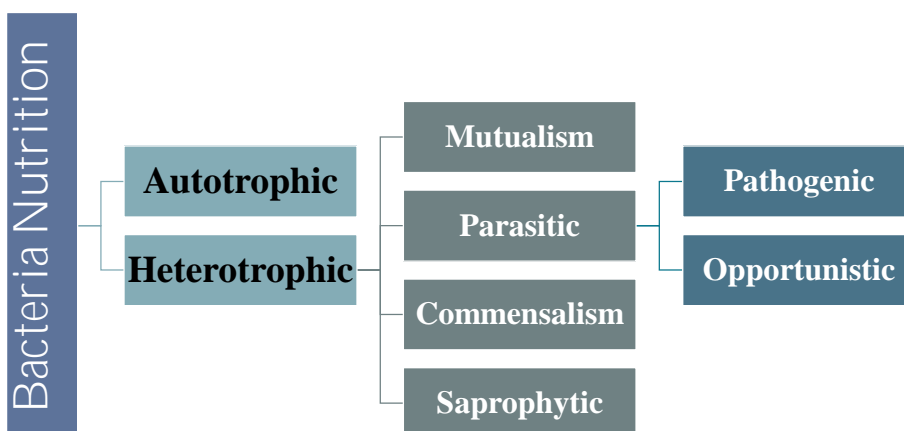
The Five-kingdom System of Classification






Whittaker's 5 kingdoms

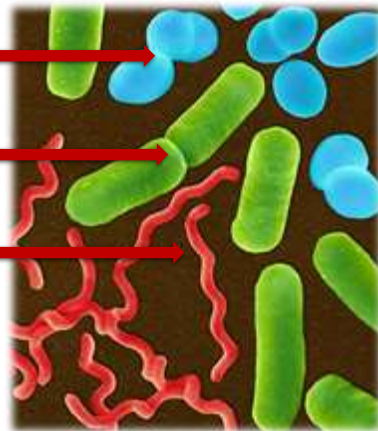
Organisms	Characteristics	Examples
Monera	Prokaryotes Unicellular	 
Protista	Eukaryotes Unicellular	   
Fungi	Eukaryotes Multicellular With cell wall Don't perform photosynthesis	  
Plantae	Eukaryotes Multicellular With cell wall Perform photosynthesis	   
Animalia	Eukaryotes Multicellular No cell wall	   

❖ 1st : Monera Kingdome (Bacteria)



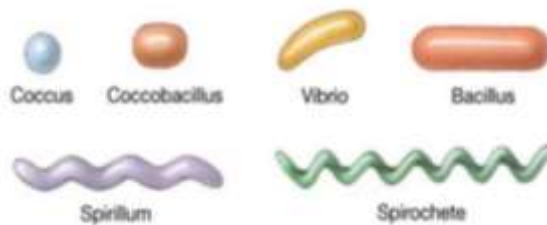
■ Bacterial Morphology

- Coccus. 
- Bacillus. 
- Spirillum 
- Filamentous.

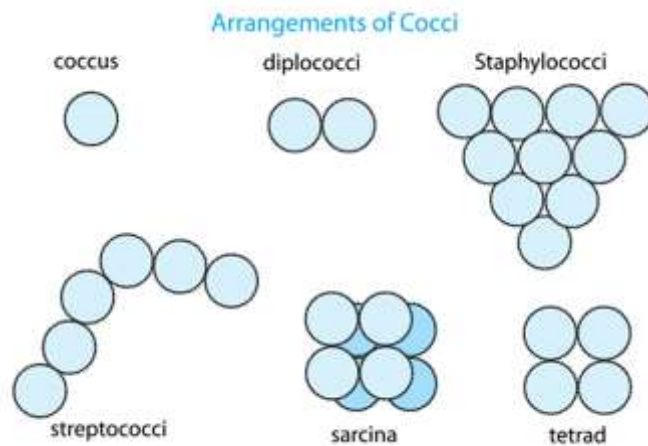


■ Aggregation System

- Mono –
- Diplo –
- Strepto –
- Staphylo –



1. Cocci



For example :

Staphylococcus aureus

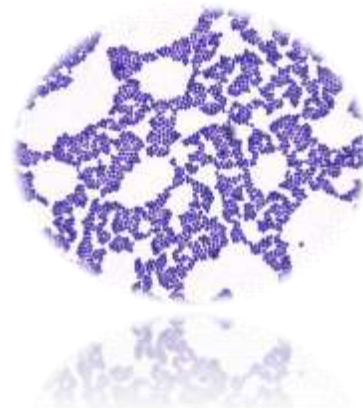
Shape : cocci

Arrangement : cluster (staph)

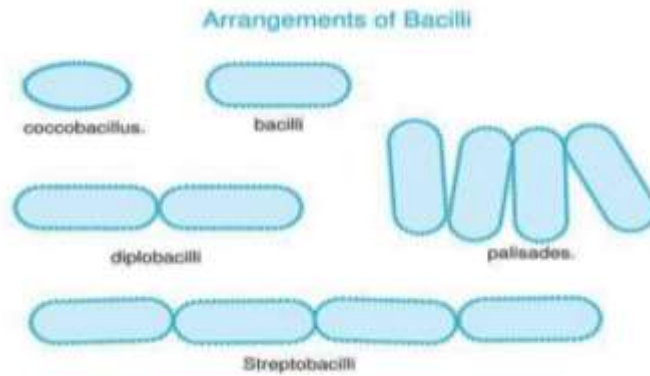
Reaction with gram stain :

Positive (purple).

Disease : skin infection.



2. Bacilli



For example :

Yersinia pestis

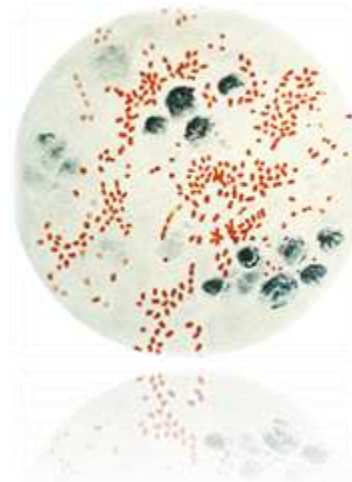
Shape : rod (coccobacilli)

Arrangement : bipolar

Reaction with gram stain :

Negative (red).

Disease : Plaque



For example :

Escherichia coli

Shape : rod (cocci bacilli)

Arrangement : single

Reaction with gram stain :

Negative (red).

Disease : coliform bacteria



For example :

Bacillus anthracis

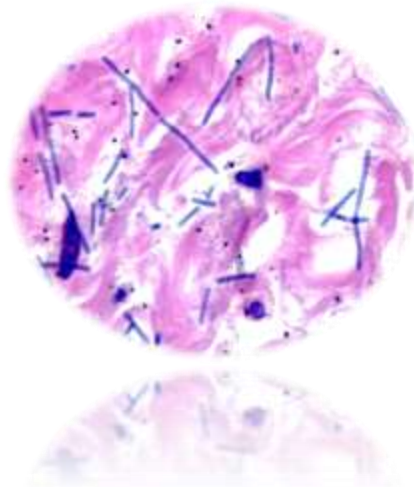
Shape : bacilli

Arrangement : chain (strep)

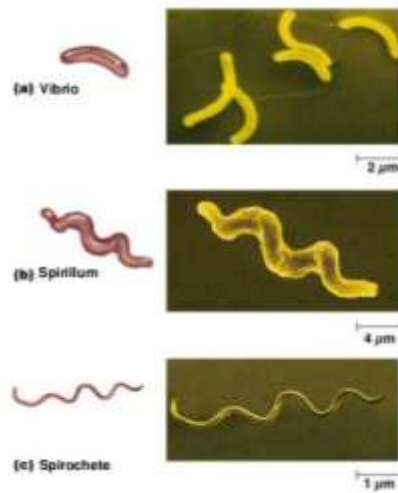
Reaction with gram stain :

Positive (purple).

Disease : anthrax



3. Spirillum



For example :

Vibrio cholera

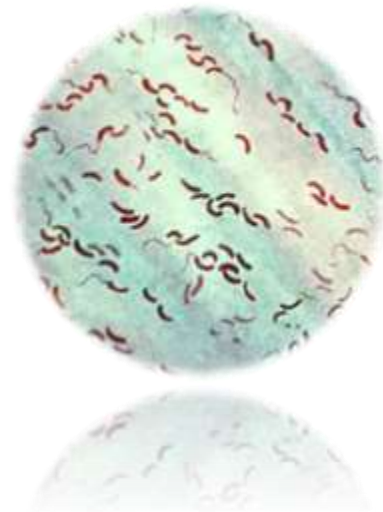
Shape : spirillum (comma shape)

Arrangement : single

Reaction with gram stain :

Negative (red).

Disease : cholera



For example :

Treponema pallidum

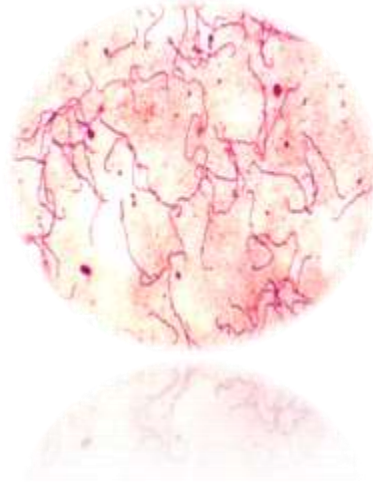
Shape : spirochete

Arrangement : single

Reaction with gram stain :

Negative (red).

Disease : syphilis



4. Filamentous (Actinomycetes)

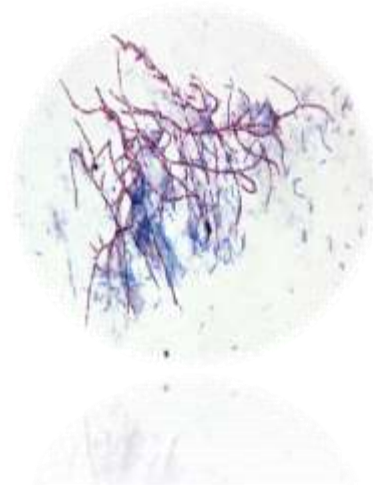
Branch bacilli

Nocardia sp.

Arrangement : single

Reaction with gram stain :

Positive (purple).



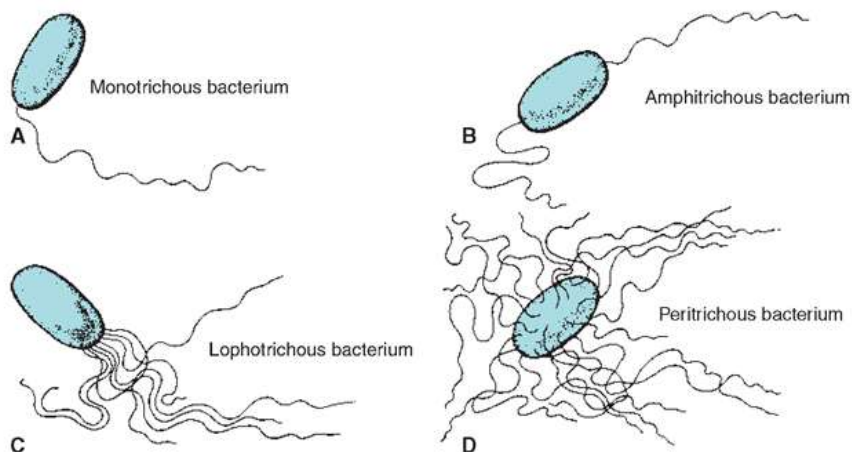
■ Motility of Bacteria

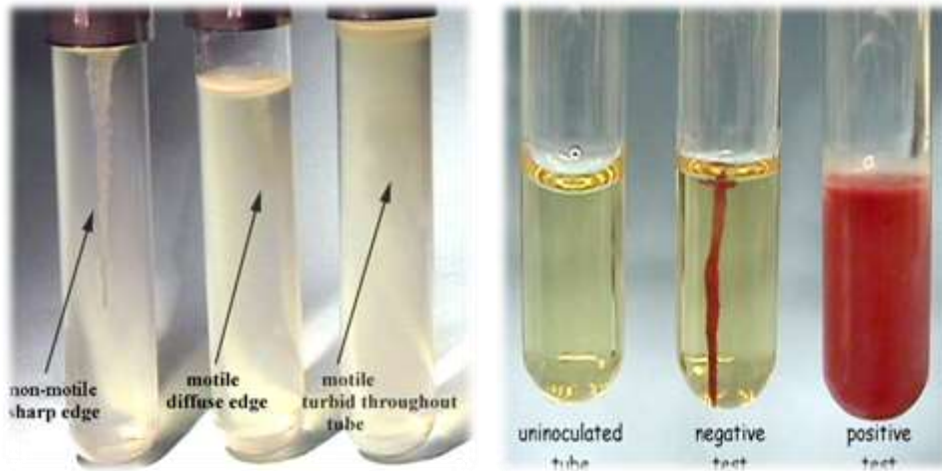
- Non-motile such as the most of cocci.
- Motile, with two way :

1. Flagella → *E. coli*

2. Gliding → *Myxobacteria*

Types of Flagellum

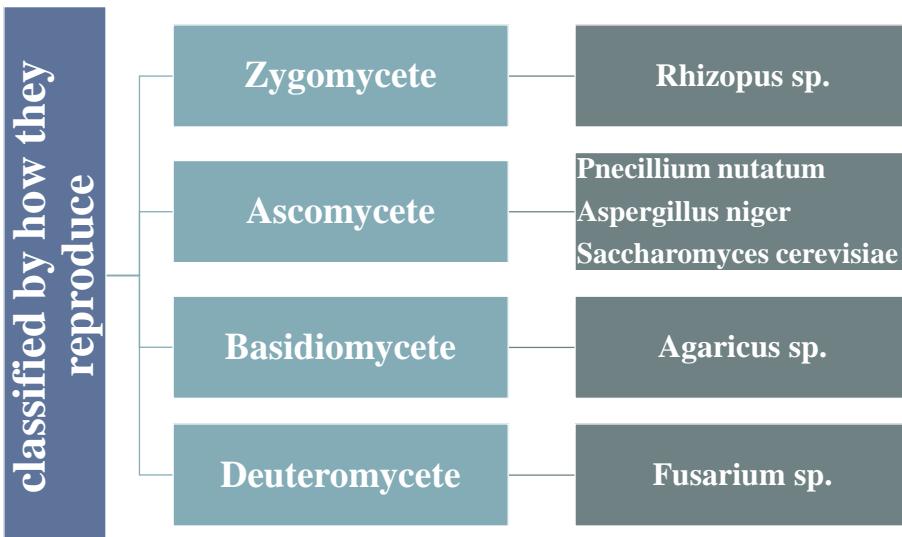




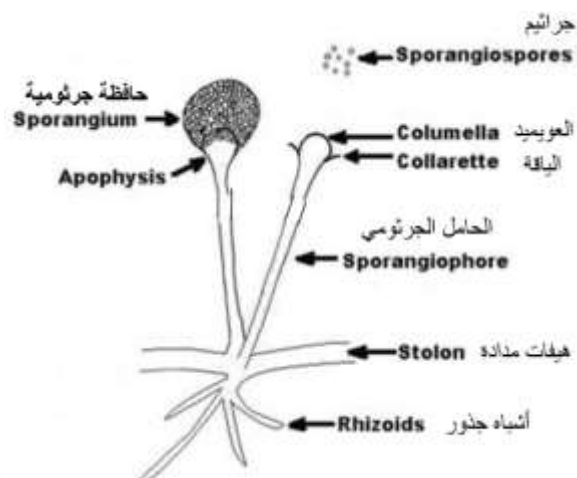
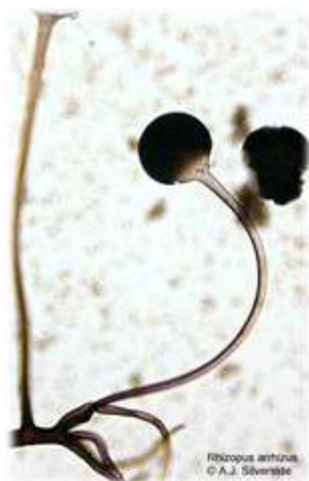
❖ 2nd : Fungi Kingdome

- All fungi are eukaryotic
- They may be:
 - Unicellular → yeast
 - Multicellular → mushroom
- All fungi have a cell wall.

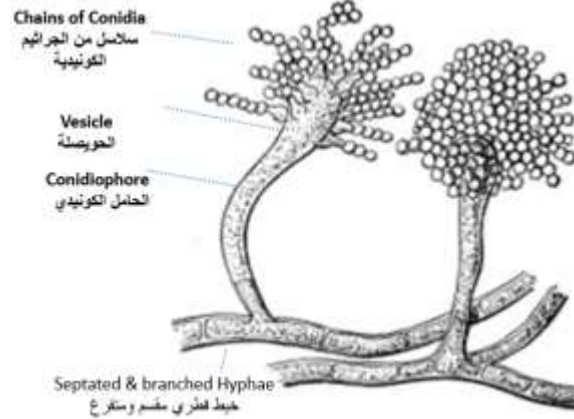




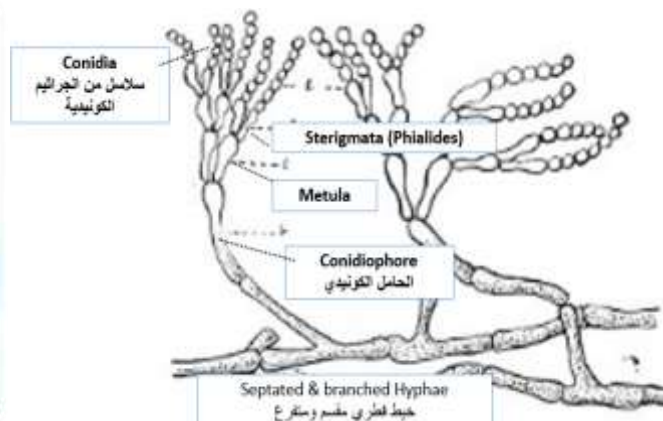
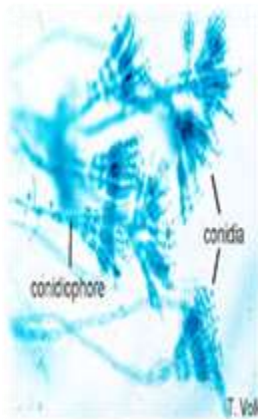
Rhizopus sp.



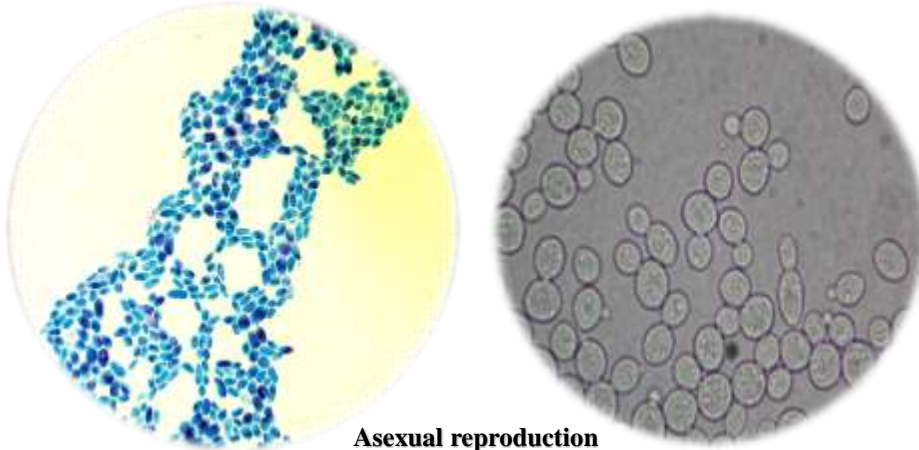
Aspergillus sp.



Pneicillium sp.

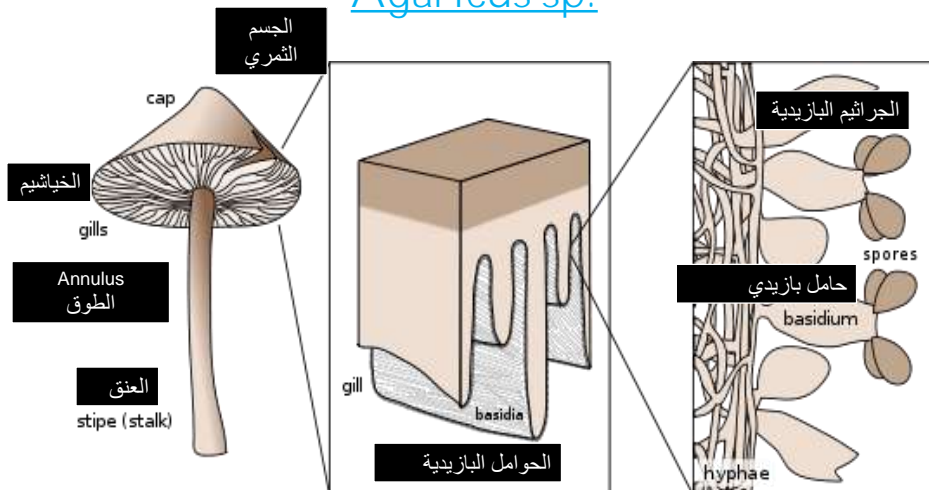


Saccharomyces sp.



Asexual reproduction
By Budding

Agaricus sp.



❖ 3rd : Protista Kingdome (Algae)

- Thallus.
- Contains Chlorophyll and other pigments.
- Autotrophs.



▪ Where can Algae live ?

- Soil → *Nostoc* sp.
- Sea water → Diatoms
- Fresh water → *Volvox* sp.



Structure

Unicellular algae

Chlamydomonas sp.

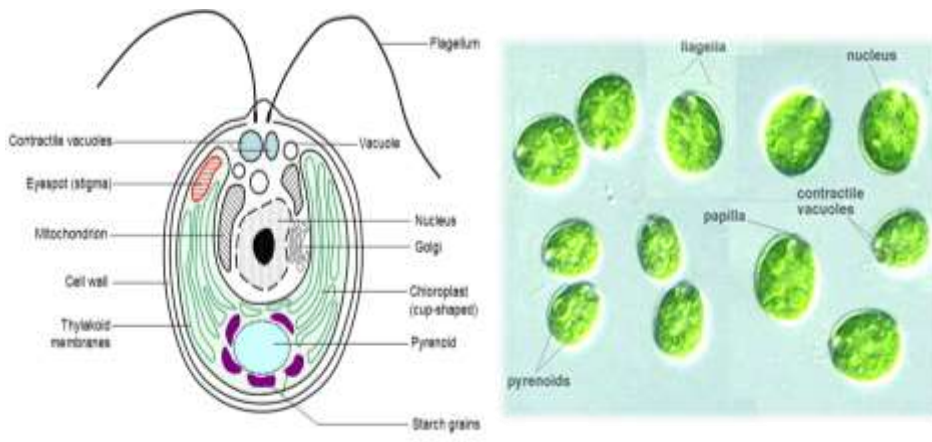
Filamentous Algae

Spirogyra sp.

Algal colonies

Volvox sp.

Chlamydomonas sp.



1- Cyanophyta

2- Chlorophyta

3- Phaeophyta

4- Rhodophyta

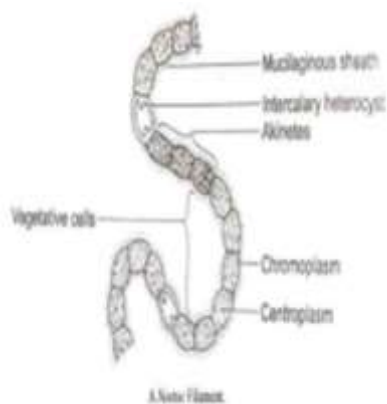
5- Chrysophyta

6- Euglenophyta

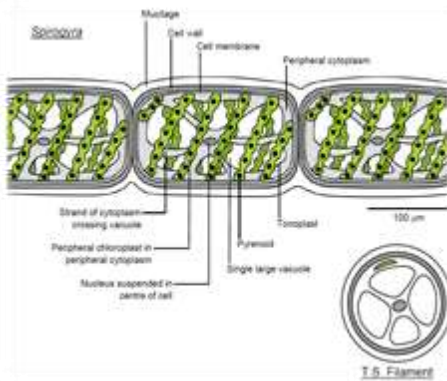
7- Diatoms

Algae Classification
(Pigments inclusions)

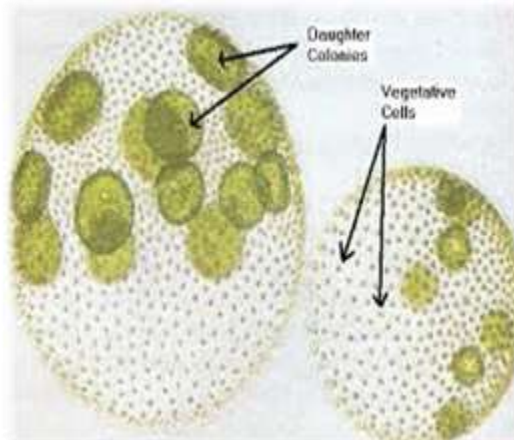
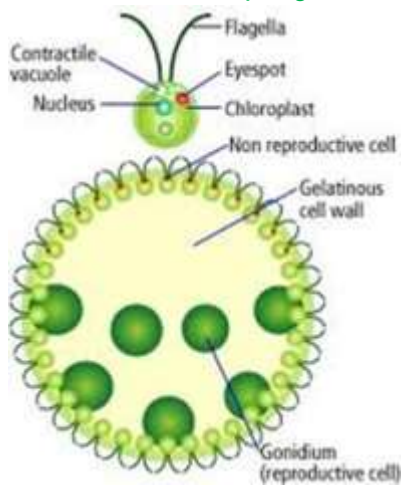
1. Cyanophyta (*Nostoc* sp.)



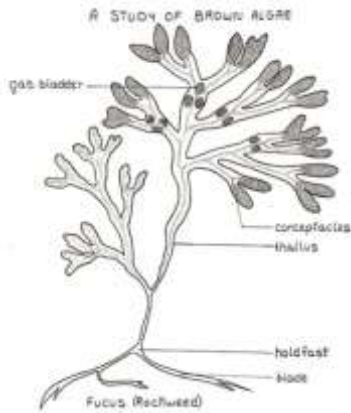
2. Chlorophyta (*Spirogyra* sp.)



2. Chlorophyta (*Volvox* sp.)



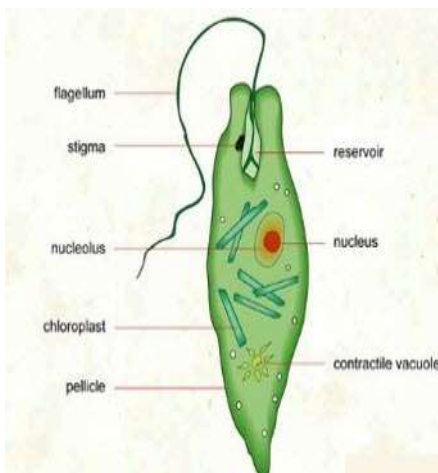
3. Phaeophyta (*Fucus* sp.)



حوائل جنسية
Conceptacles



6. Euglenophyta (*Euglena* sp.)



❖ 4th : Lichens

- A composite organism that arises from algae or cyanobacteria (or both) living among filaments of a fungus in a symbiotic relationship.



Fungi

- Actinomycetes
- Basidiomycetes
- Ascomycetes

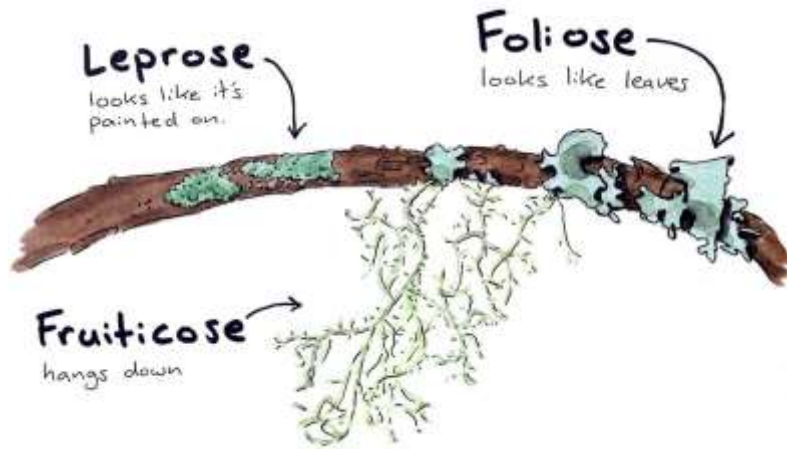
Algae

- Cyanobacteria
- Chlorophyta

Lichens

e.g.

Caloplaca sp.



Types of lichens

lichens are composed of an algae and fungus hyphae



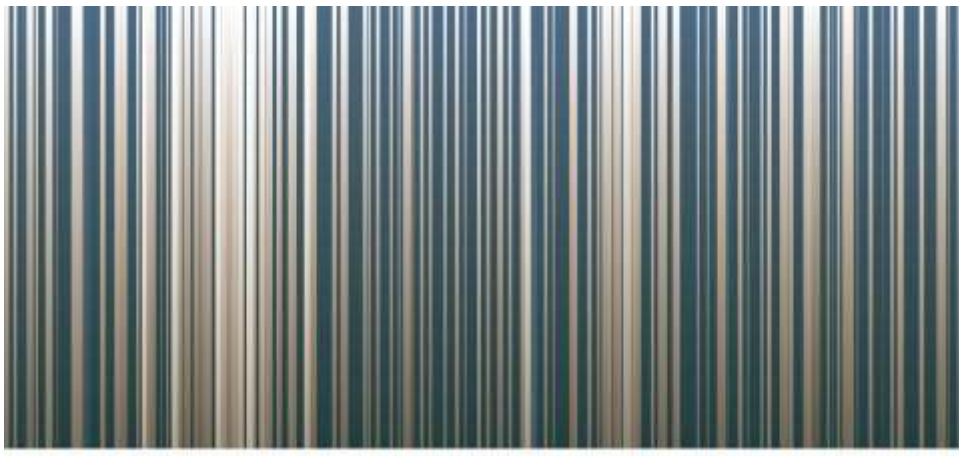
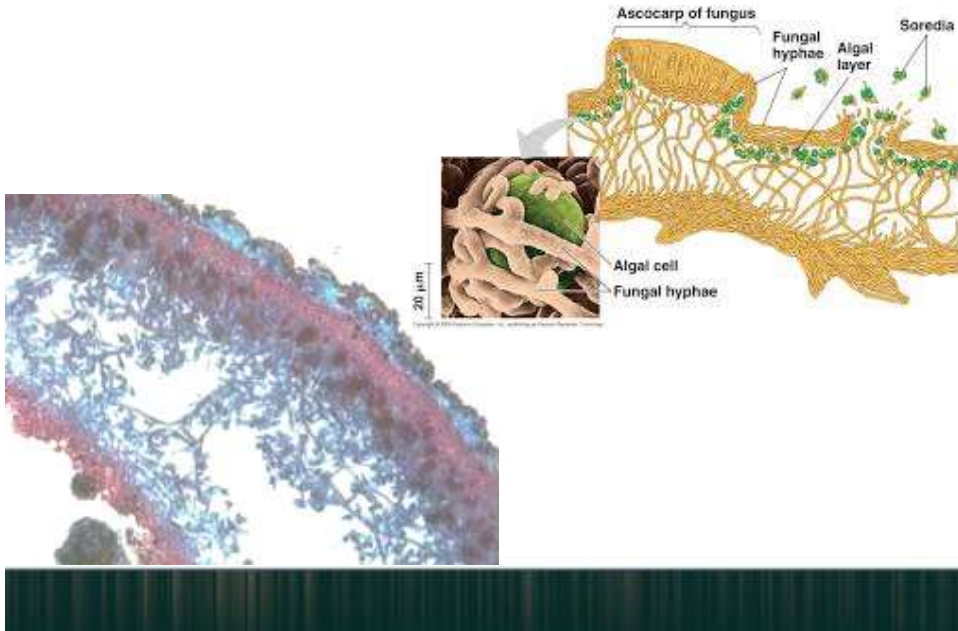
1. **Crustose** - encrusting



2. **Foliose** - leaf-like, no branching



3. **Fruticose** - bush-like with branching



Any Questions ?