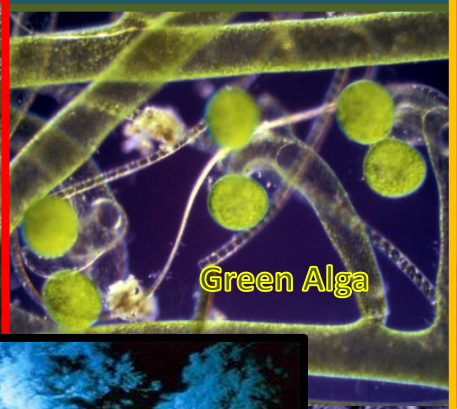
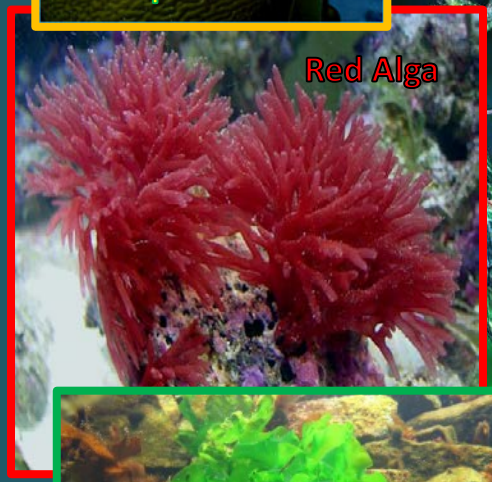
Microbes

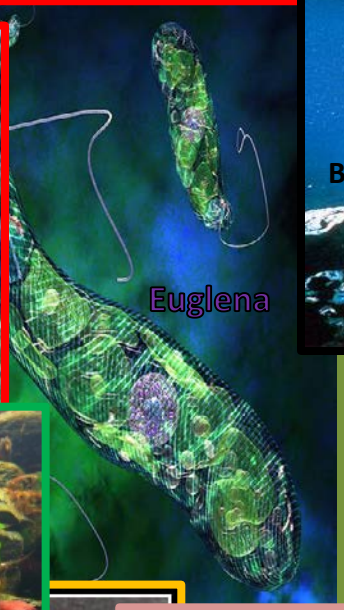

Kelp


Slime Mold

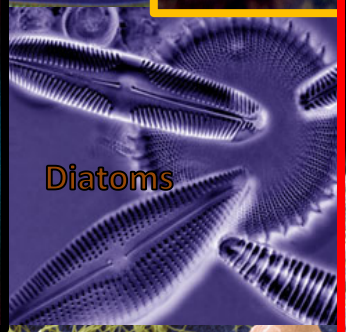

Green Alga


Slime Mold


Red Alga

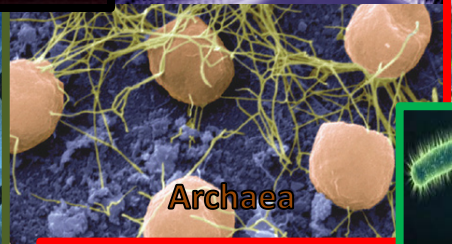

Euglena


Black Smoker


Diatoms


Coral
Alga


Archaea


Archaea


Sea
Lettuce


Reino
Protista


Slime Mold
Oozing -
Multinucleated
stage


Slime Mold


Halteria sp.

Systematics, Taxonomy & Phylogeny

- **Systematics:** Is the study of how to place organisms into groups or taxa (taxa = group). Traditionally called classification.
- **Taxonomy:** Sectioned into three (3) parts…
  - …Natural Classification (or categorizing).
  - …Nomenclature (or naming).
  - …Identification, or "keying-out" an organism that has already been named.
- **Phylogeny:** The evolutionary history of any group.

-8 Taxa are used in Categorizing-

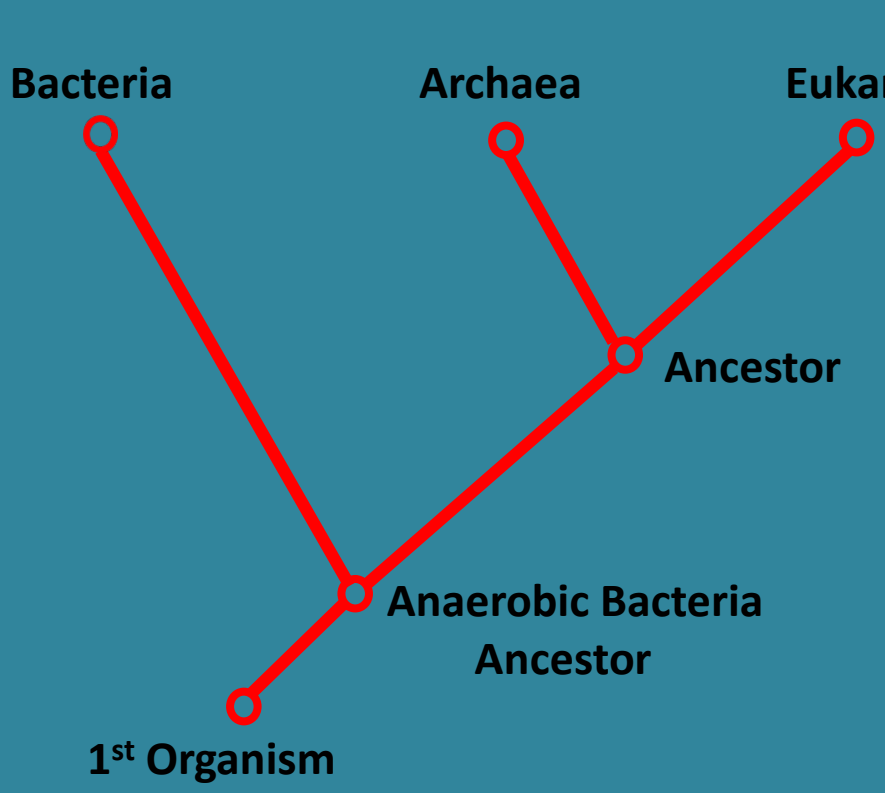
Domain
Kingdom
Phylum (Division)
Class
Order
Family
Genus
Species

*<u>Note</u>: To be a member of a more specific group means that you have a more recent common ancestor with all members within that group, than with <u>any</u> member of a <u>more</u> generalized group. "You're getting bunched into greater and greater commonality!"

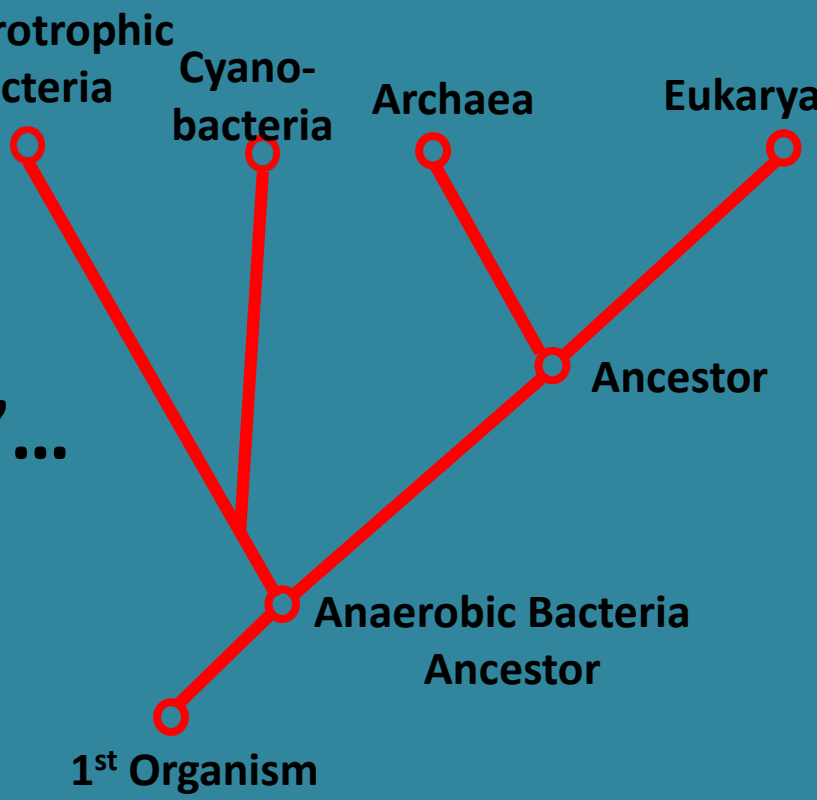
-Cladistics-

- In order to show how recent the common ancestry is, cladistics is a specific way of assorting organisms where "newer similar characteristics" are weighted more heavily than "older similar characteristics."
- A phylogenetic system reflects shared, recently derived (synapomorpous) characteristics, whereas, a phenotypic system reflects degrees of general similarities. In cladistics, only homologous characteristics are considered.
- Every organism is related to all other organism. This means that there are similar traits among all organism…which is why we use a branching system!
- Not only are organisms older or newer, but their individual traits are also older or newer.
- The question is,… "how recent" is that ancestry, and "how accurate" is your phylogenetic tree in depicting the historical events of evolution."
- Schematically, this tree is usually depicted as a flat-top tree, with the top representing all organisms that are currently in existence. When going down the tree, you're going back in time (to a shorter tree, and older organism types), and when the array of organisms was different than it is now.

Cladistics of the Three Domains

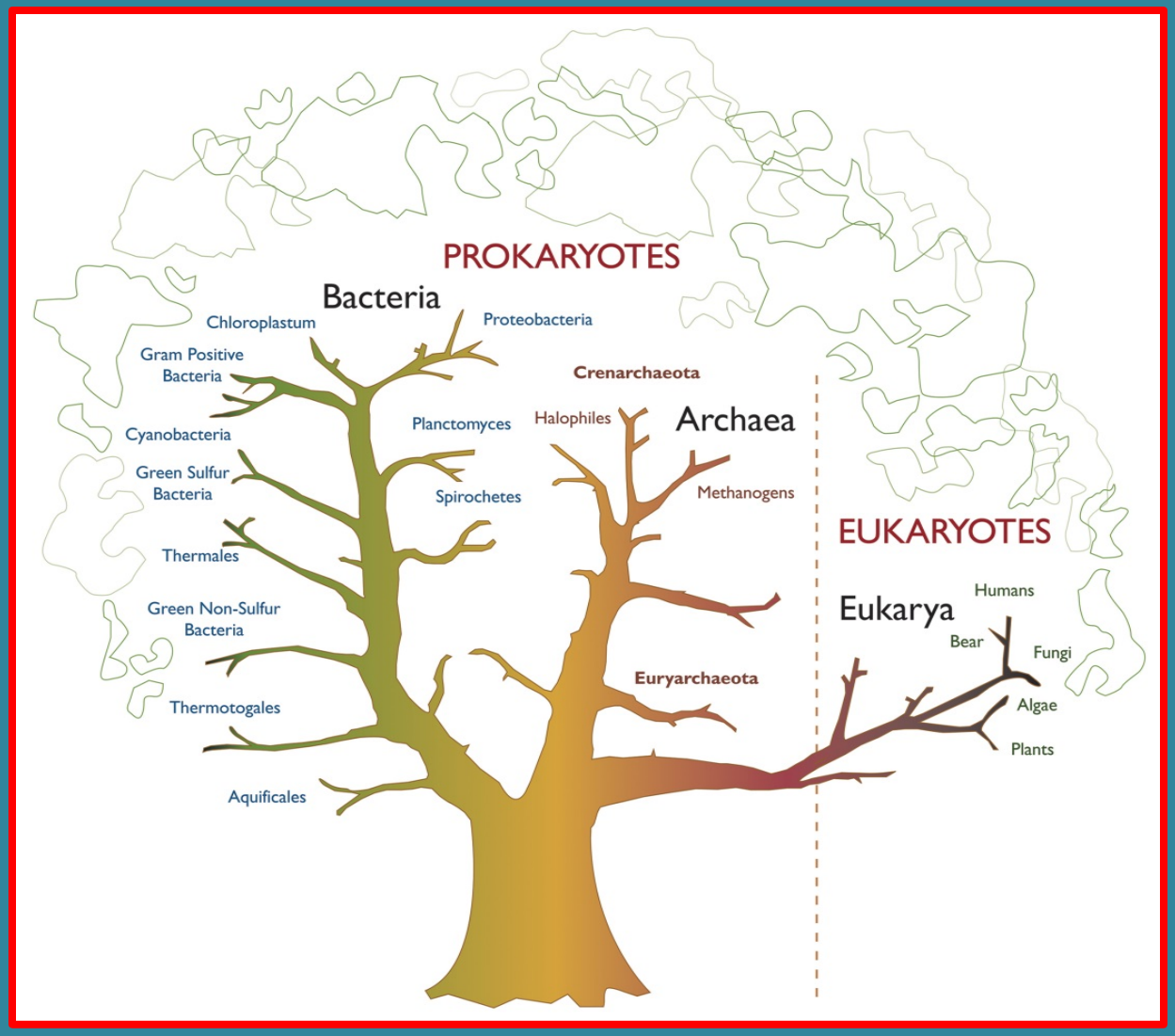


"Or"...



Note: Because the Archaea and Eukarya do not contain protein in their cells walls, because their growth is not inhibited, have proteins in DNA, have "introns," and initiate translation with methionine, they are considered to have a more recent common ancestor, sharing traits that are more recent than the older traits they share with bacteria.

Domain Tree of Organisms With Three Main Trunks



Exercise 2: What Are Some Basic Characteristics of Organisms (Note - Ex.1 was covered in the last lab)

- First Characteristic: Cell Type (Answer questions 1-2, page 230)

Prokaryotic vs. **Eukaryotic**

(Pro = Before nucleus) (Eu = True nucleus)

- Second Characteristic: One or more cells. (Answer another set of questions 1-2, page 230)

Unicellular vs. **Multicellular**

- Third Characteristic:

Phototrophic vs. **Heterotrophic**

(Light feeder) (Other feeder)

Exercise 3: Bacteria

Bacterial Molds

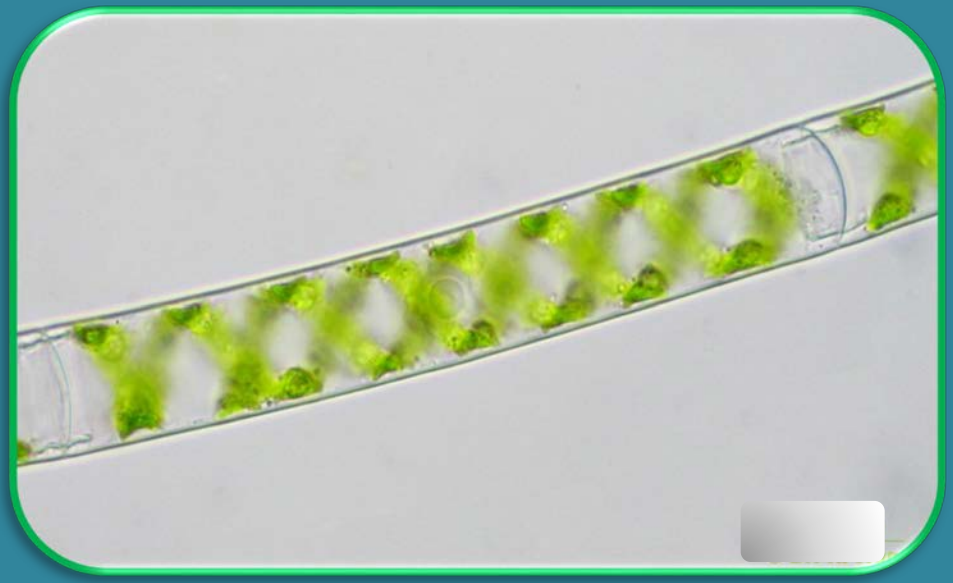
(Gelatinous or Slimy looking)

Fungal Mold

(Fuzzy or Hairy looking)

Answer questions 1-3, and circle Basic Characteristic, page 232.

Exercise 4: Cyanobacteria and the True Algae

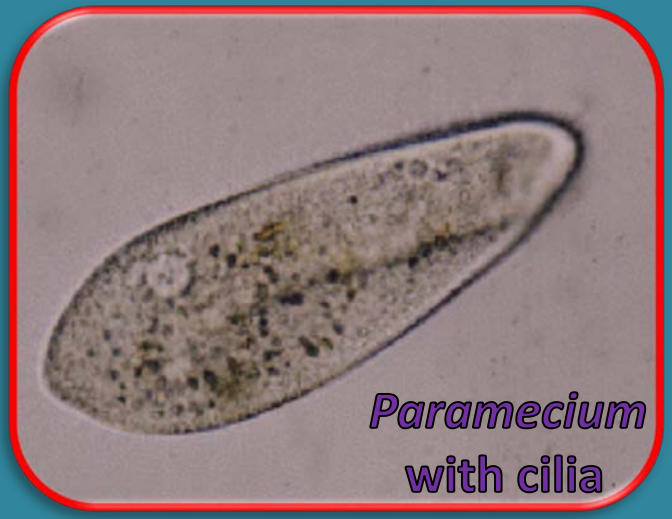


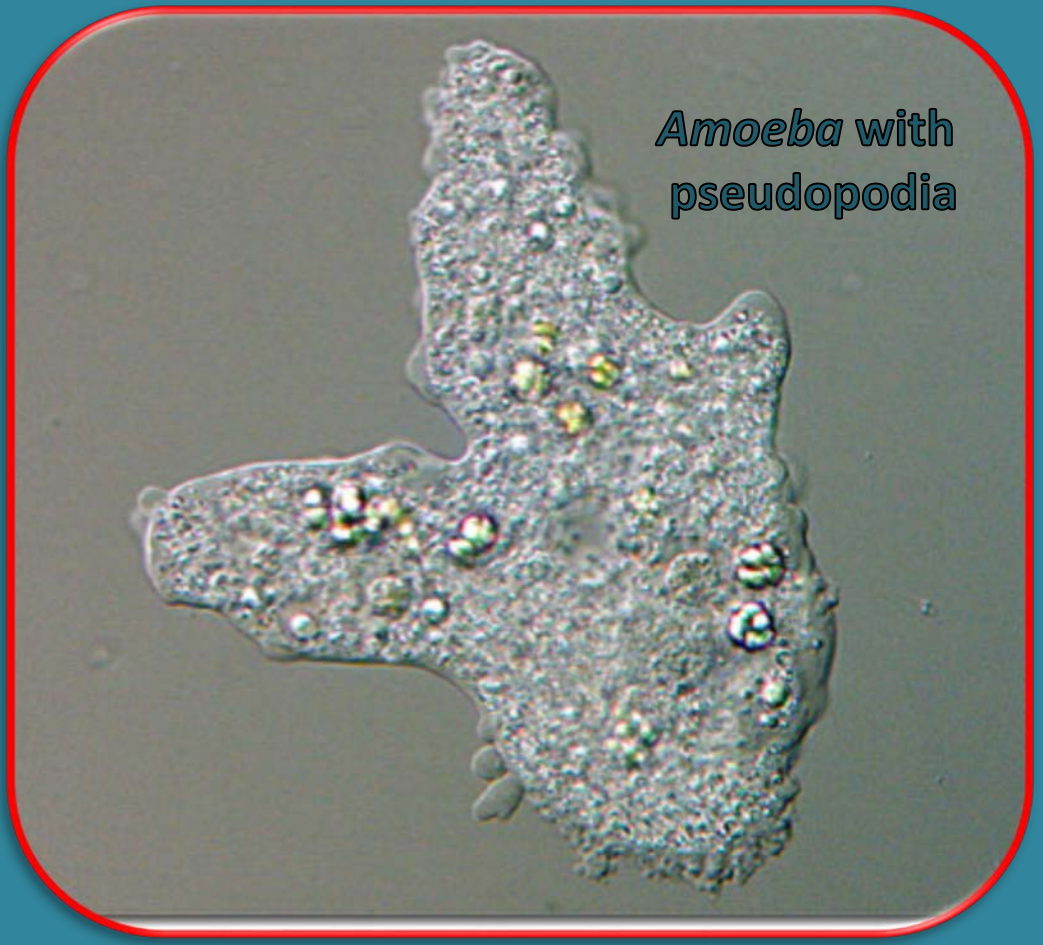
***Spirogyra* with spiral chloroplasts**

Nostoc ⟶

Draw pictures on pages 232 and 233, and circle Basic Characteristics on page 233. Answer questions 1-2 on Test Your Skills, page 234.

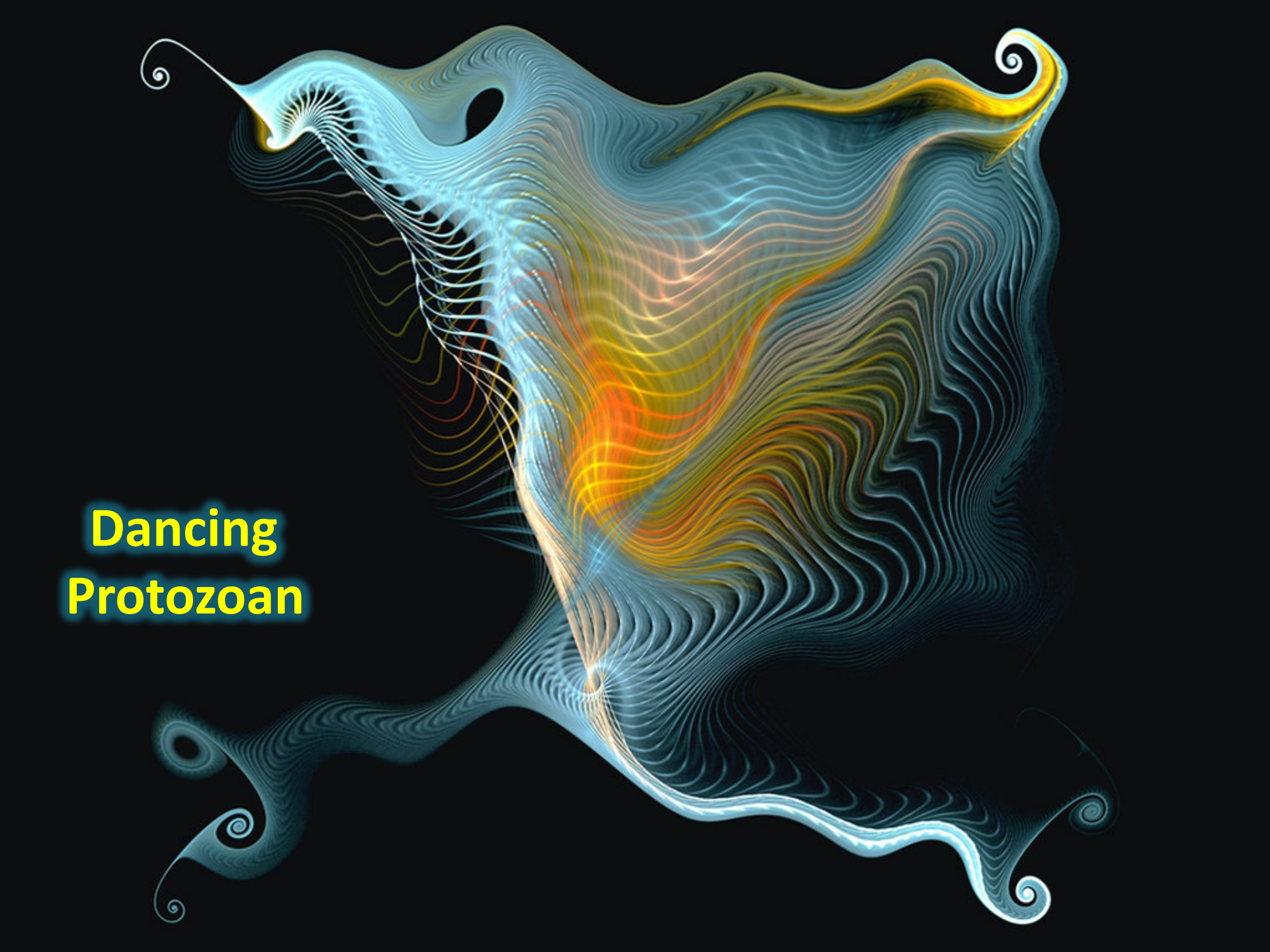
Exercise 5: Protozoans



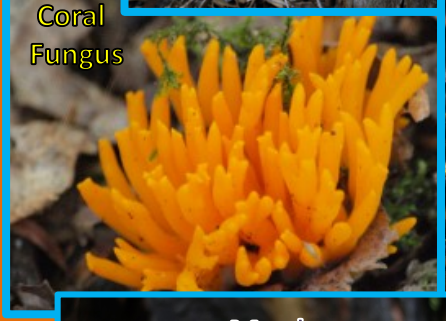


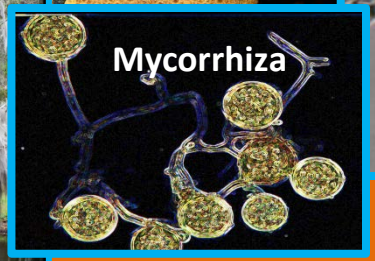
Vorticella

Circle Basic Characteristic on Page 234.

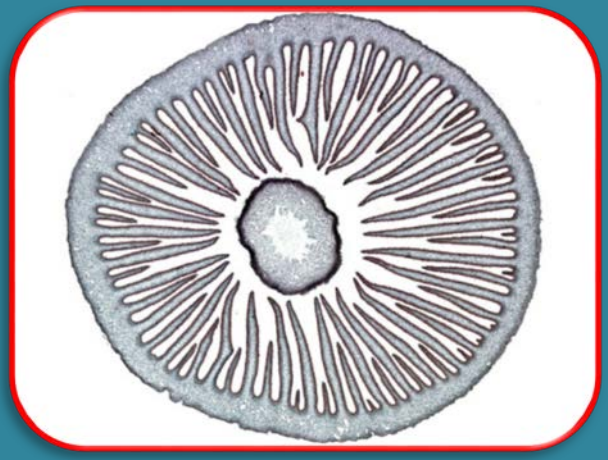

Dancing
Protozoan

-Fungi Survey Collage-

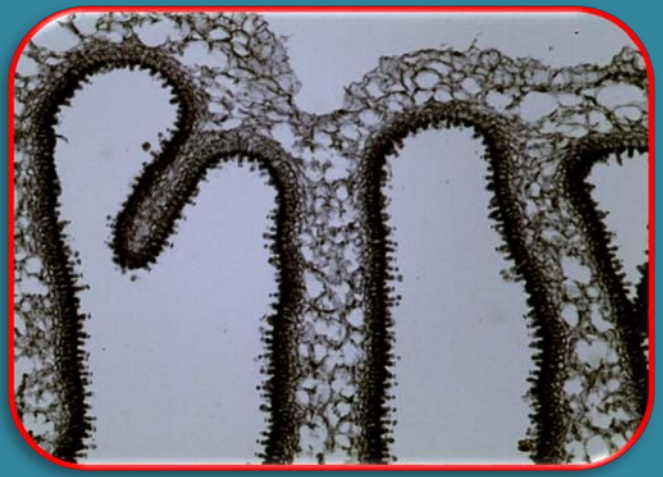




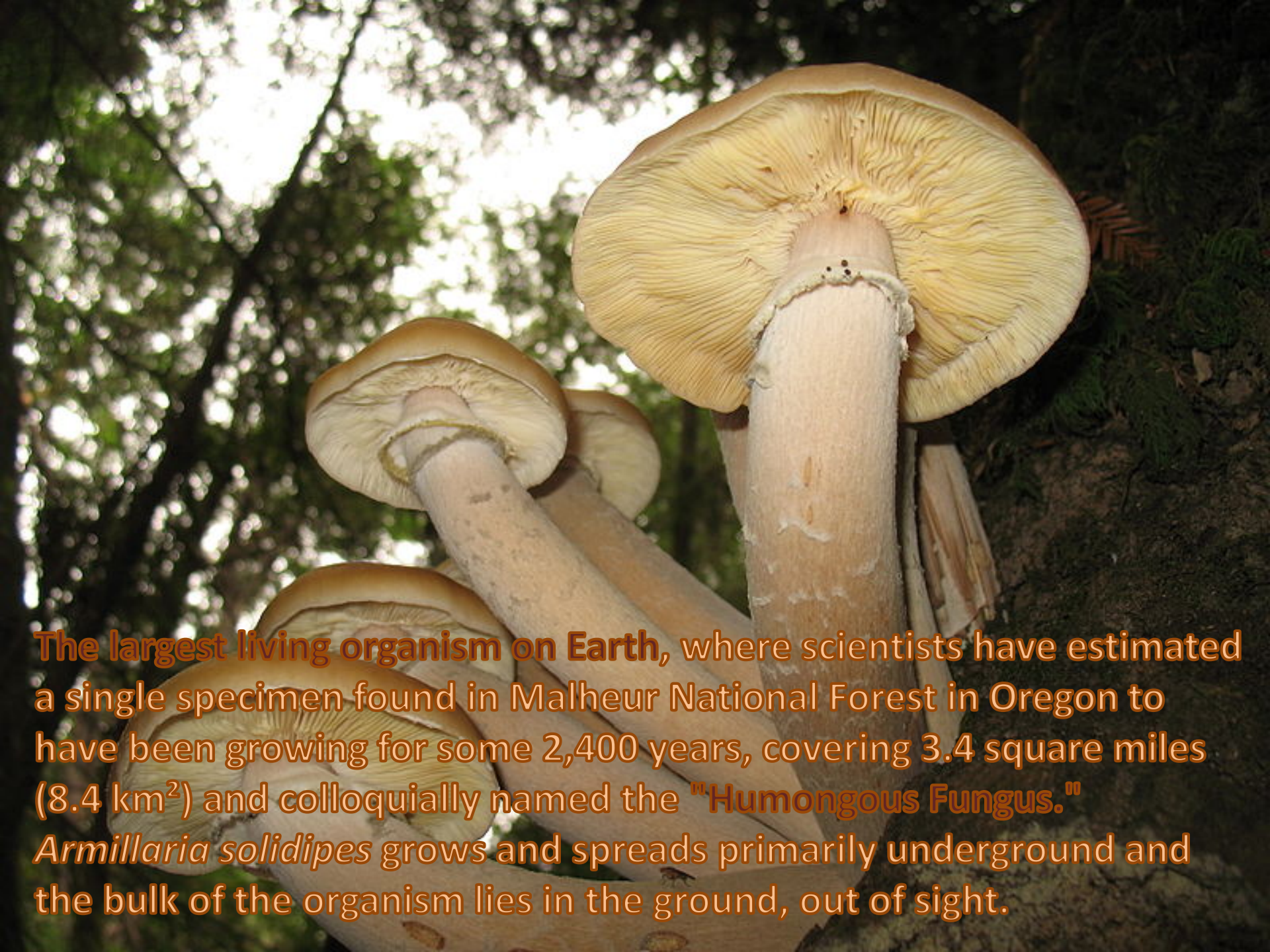
Exercise 6: Bread Mold and Mushrooms



Mushroom Cap

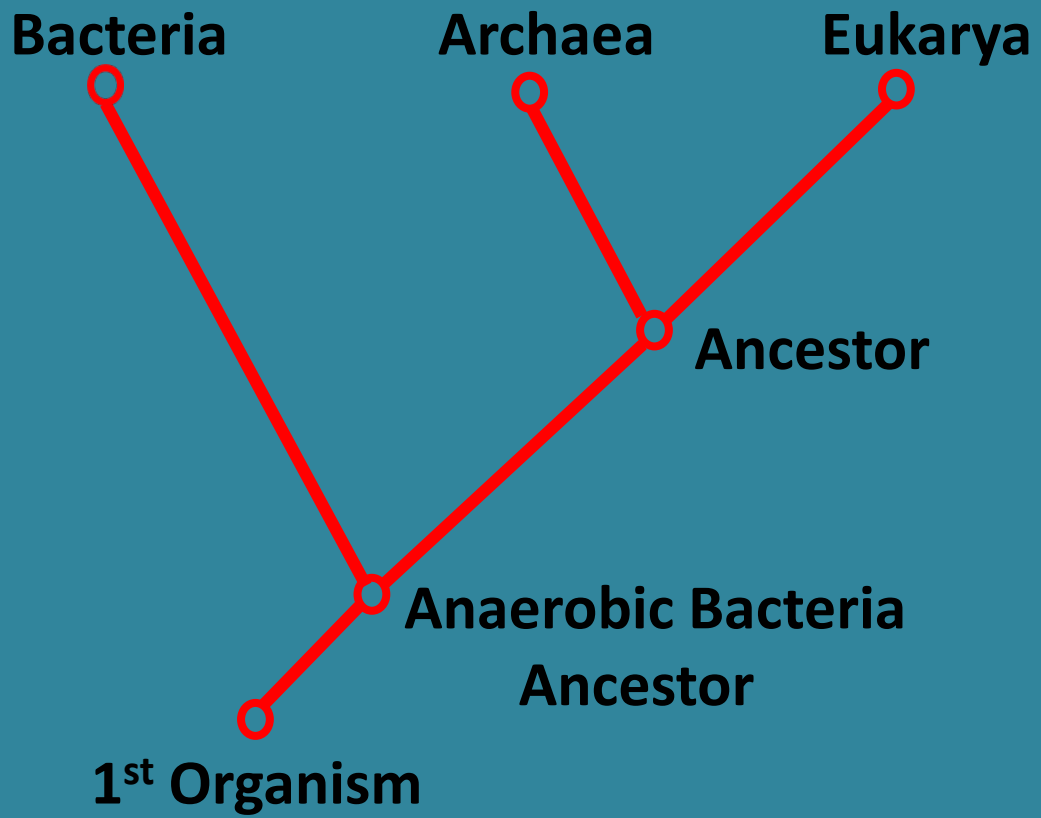


Make drawings on pages 235 and 236; answer questions 1-2 on page 236; circle Basic Characteristic on page 236.



The largest living organism on Earth, where scientists have estimated a single specimen found in Malheur National Forest in Oregon to have been growing for some 2,400 years, covering 3.4 square miles (8.4 km^2) and colloquially named the **"Humongous Fungus."** *Armillaria solidipes* grows and spreads primarily underground and the bulk of the organism lies in the ground, out of sight.

Exercise 7: Basic Characteristics of Eubacteria and Eukarya



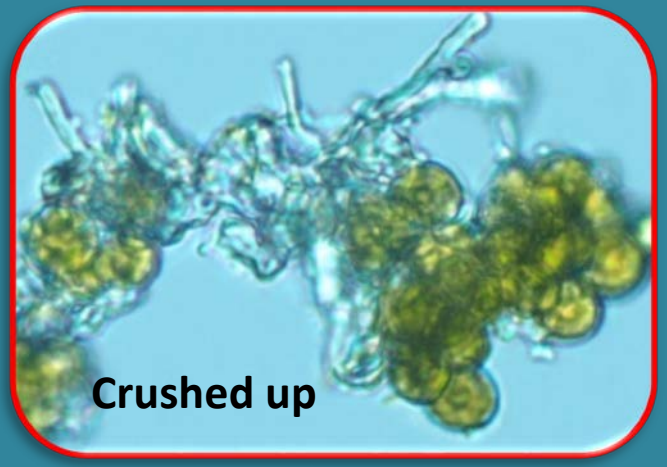
Answer questions on page 237 and 238.

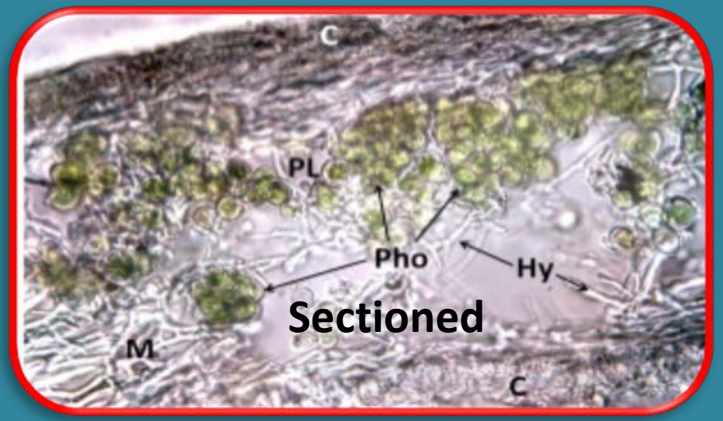
Exercise 8: Lichens

Foliose

Fruticose

Crustose





Make drawings and answer questions on pages 239-240.