

Topic 4. Diversity Exploratory

Introduction. In this activity you will practice using your microscope to identify examples of the major groups of organisms studied by botanists.

Procedure. This lab is a type of scavenger hunt. Explore the samples provided macroscopically and microscopically until you have found and drawn examples of the organisms listed. Have your TA credit your discovery by checking off each drawing on the class data sheet. Write down any additional info about each that your TA may give you. Also indicate the magnification represented by your drawing.

1. **Autotrophic prokaryotes (Cyanobacteria)**. These are photosynthetic bacteria lacking a nucleus or any other obvious subcellular component when viewed through the light microscope. Examples may be found on soil in saucer at the front. Make a wet mount of the greenish-black film on the surface.

2. **Heterotrophic prokaryotes (Bacteria)**. In lab, these are colorless rod or sphere-shaped bacteria lacking a nucleus or any other obvious subcellular component. Some are flagellated and free-swimming. Examples may be found in a decay culture in a bowl at the front. Sample from the bottom.

2. **Photosynthetic protists (Algae)**. Protists are eukaryotic. Their cells have nuclei and other obvious cellular structures. As organisms, however, protists

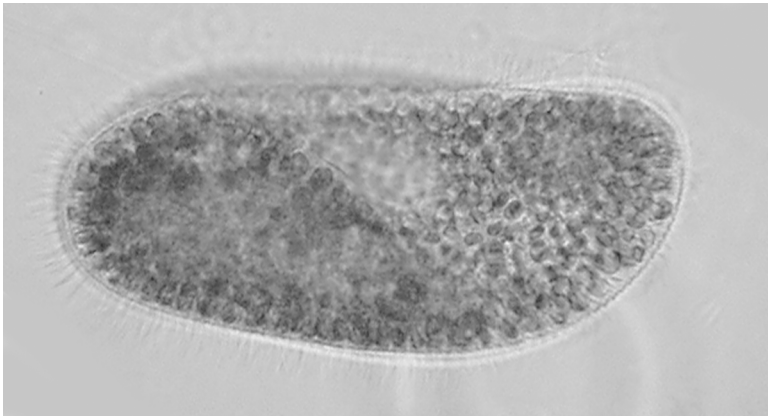
are simple in structure. If a eukaryotic organism is not a fungus a plant or an animal, it is a protist. **Photosynthetic protists are commonly called algae.** Label the chloroplast/s (the green pigmented structure/s in the cell) in your drawing. What is the shape of chloroplasts in your algal cell?

3. **Heterotrophic protists (Protozoa)**. These are animal-like but are not. Animals are multicellular and have a high level of cellular differentiation, and Protozoans are unicellular. These live as herbivores eating bacteria and algae; as predators eating each other, or as parasites. Protozoans move by flagella, cilia, or, if ameboid, by pseudopodia.

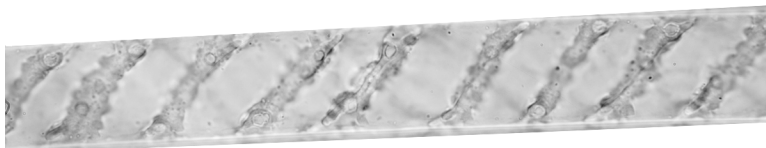
4. **Plants**. Observe the uprooted aquatic plant at the front. This is *Sagittaria*. Plants are structurally complex, and the bodies of higher plants can be divided into roots and shoot. Draw *Sagittaria* and label shoot and root.

5. **Animals**. Animals are heterotrophic multicellular organisms with a high level of cellular differentiation (i.e. They have muscle, nerve, bone... cells). List below any animals you observe in any of the samples you have explored. You may also find microscopic animals (not protozoans!).

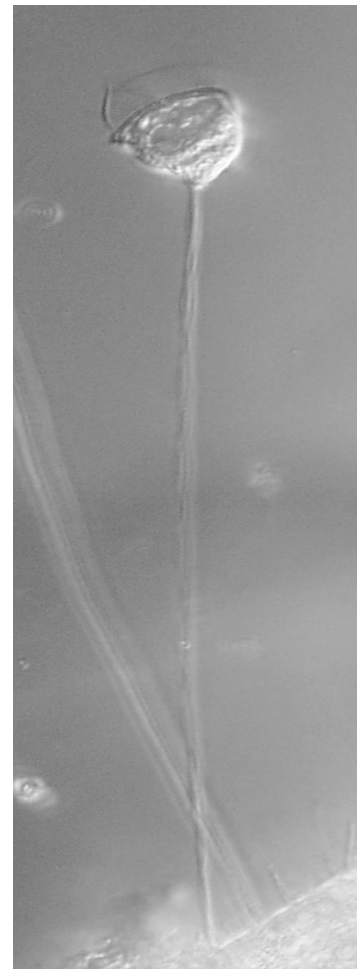
6. **Fungi.** Fungi are heterotrophic eukaryotes. They are important ecologically as decomposers, and as symbionts (either as parasites or in mutualistic relationships with other organisms). Fungi typically grow as filaments called hyphae. They are mostly terrestrial and you won't find them in the aquarium. Prepare a wet mount of the hyphae growing in the petri dish at the front and make a drawing.



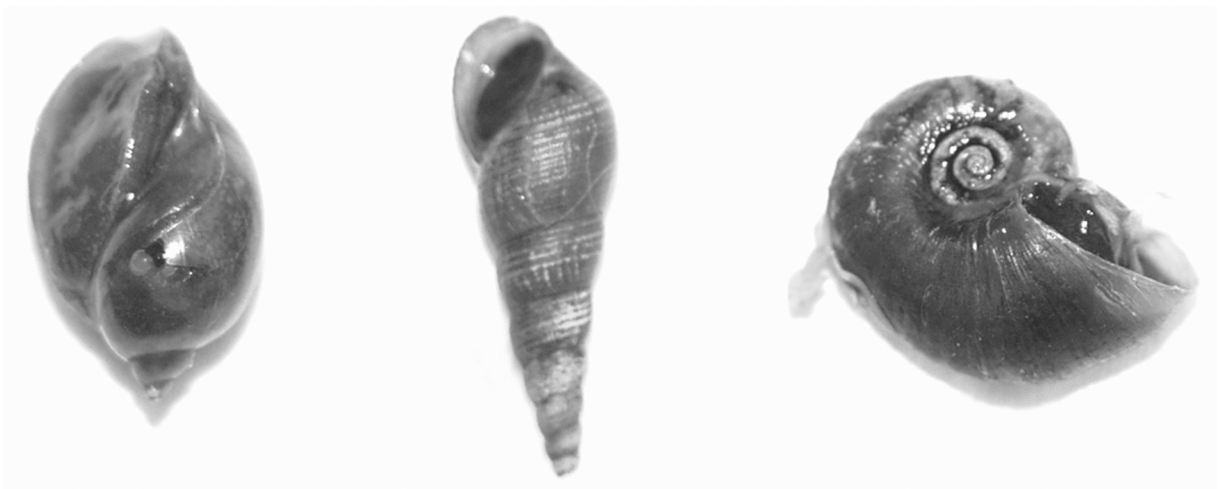
Paramecium - a heterotrophic protist



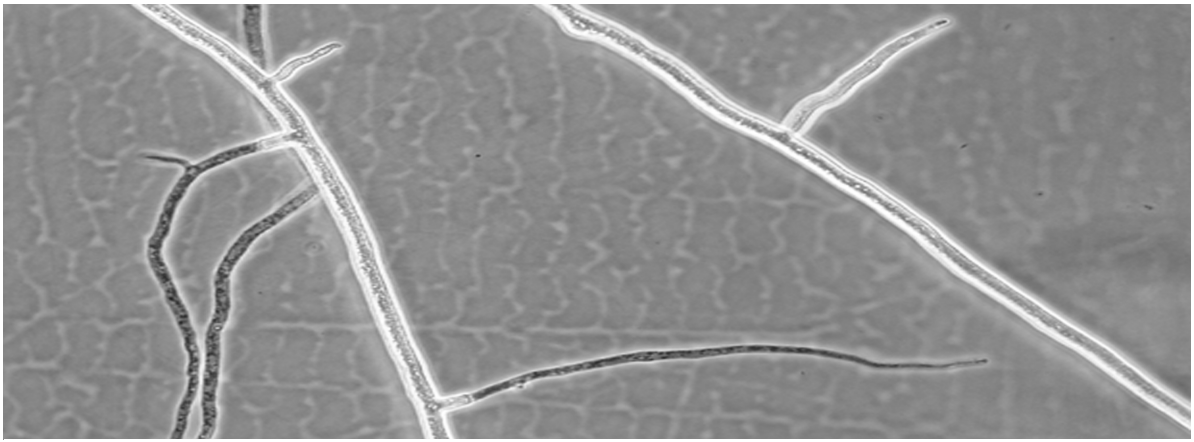
Spirogyra - an autotrophic protist



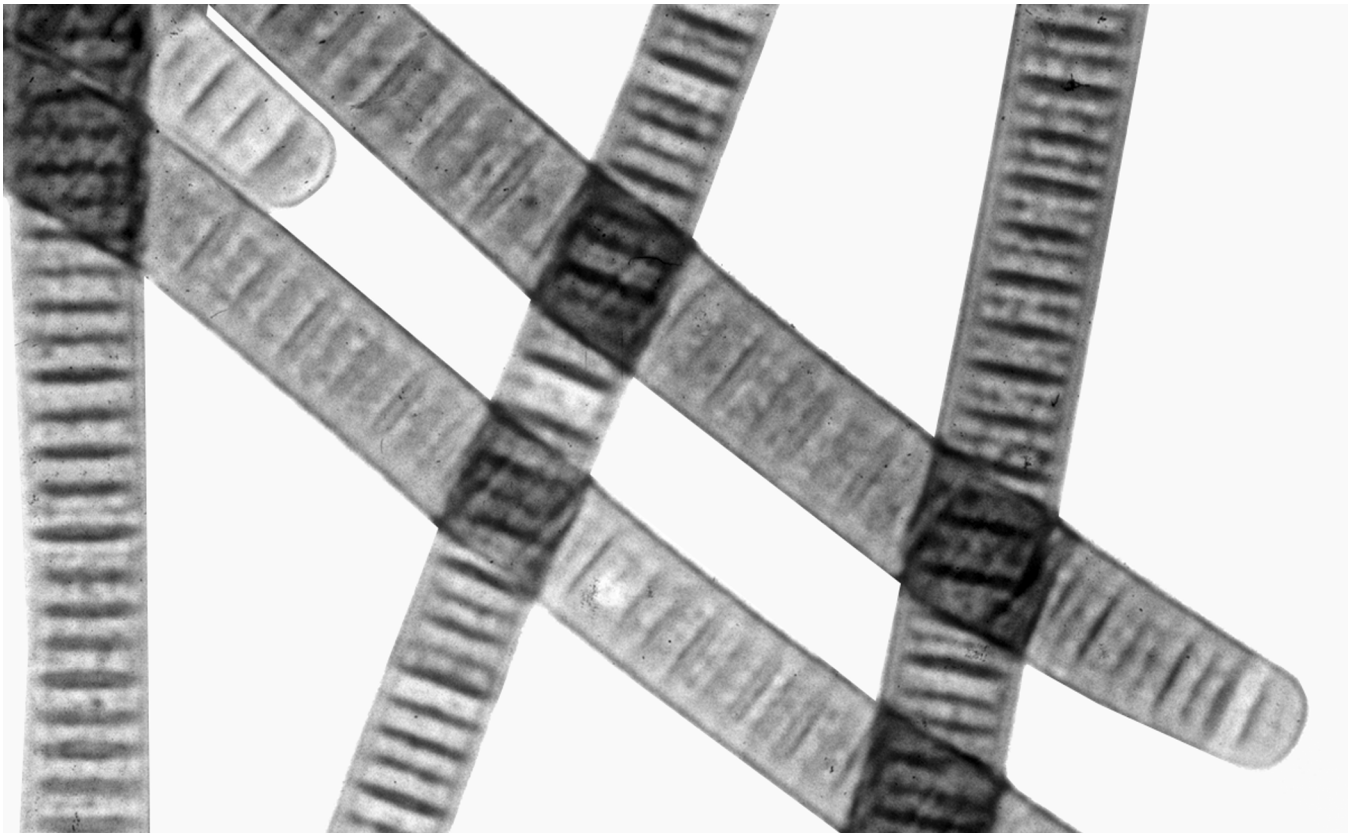
Vorticella - A heterotrophic protist



Three species of snail



Hyphae of a fungus



Oscillatoria - a photosynthetic bacterium