

Protist Coloring Sheet

Euglena

Euglenas are unicellular organisms classified into the Kingdom **Protista**, and the Phylum **Euglenophyta**. All euglena have **chloroplasts** and can make their own food by **photosynthesis**. They are not completely **autotrophic** though, euglena can also absorb food from their environment. Euglena usually live in quiet ponds or puddles. Euglena move by a **flagellum** (plural, **flagella**), which is a long whip-like structure that acts like a little motor. The flagellum is located on the **anterior** (front) end, and rotates in such a way as to pull the cell through the water. *Color and label* the flagellum black. It is attached at an inward pocket called the **reservoir**. *Color and label* the reservoir grey.

The Euglena is unique in that it is both **heterotrophic** (must consume food) and **autotrophic** (can make its own food). **Chloroplasts** within the euglena trap sunlight that is used for photosynthesis, and can be seen as several rod-like structures though out the cell. *Color and label* the chloroplasts green. Euglena also have an **eyespot** at the anterior end that detects light, it can be seen near the reservoir. This helps the euglena find bright areas to gather sunlight to make their food. *Color and label* the eyespot red. Euglena can also gain nutrients by absorbing them across their cell membrane, hence they become heterotrophic when light is not available, and they cannot photosynthesize. The euglena has a stiff **pellicle** outside the cell membrane that helps it keep its shape, though the pellicle is somewhat flexible and some euglena can be observed scrunching up and moving in an inchworm type fashion. *Color and label* the pellicle blue.

In the center of the cell is the **nucleus**, which contains the cell's DNA and controls the cell's activities. *Color and label* the nucleus purple. The **nucleolus** can be seen within the nucleus. *Color and label* the nucleolus pink. The interior of the cell contains a jelly-like fluid substance called cytoplasm. *Color and label* the cytoplasm light yellow. Toward the posterior of the cell is a star-like structure, the **contractile vacuole**. This organelle helps the cell **remove excess water**, and without it, the euglena could take in some much water due to osmosis that the cell would explode. *Color and label* the contractile vacuole orange.

Amoeba

The **amoeba** is a protozoan that belongs to the **Kingdom Protista**. The name amoeba comes from the Greek word "**amoibe**", which means change. Amoeba is also spelled **ameba**. **Protists** are microscopic unicellular organisms that don't fit into the other kingdoms. Some protozoans are considered plant-like while others are considered animal-like. The animal-like protists are known as **protozoans**. The amoeba is considered an animal-like protist because it moves and consumes its food. Protists are classified by how they move, some have **cilia or flagella**, but the amoeba has an unusual way of creeping along by stretching its cytoplasm into fingerlike extensions called **pseudopodia**. The word "pseudopodia" means "**false foot**". *Label* the pseudopodia. When looking at amoeba under a microscope, an observer will note that no amoebas looks the same as any other, the **cell membrane** is very flexible and allows for the amoeba to change shape. *Color and label* the cell membrane red. Amoebas live in ponds or puddles, and can even live inside people.

There are two types of **cytoplasm** in the amoeba, the darker cytoplasm toward the interior of the protozoan is called **endoplasm**, and the clearer cytoplasm that is found near the cell membrane is called **ectoplasm**. *Color and label* the ectoplasm light blue and the

endoplasm pink. By pushing the endoplasm toward the cell membrane, the amoeba causes its body to extend and creep along. The amoeba also uses this method to consume its food. The pseudopodia extend out and wrap around a food particle in a process called **phagocytosis**. The food is then engulfed into the amoeba and digested by the **enzymes** contained in the amoeba's **lysosomes**. As the food is digested it exists in a structure called a **food vacuole**. *Color and label* the food vacuole green.

Also visible in the amoeba is the **nucleus**, which contains the amoeba's DNA. *Color and label* the nucleus purple. In order to reproduce the amoeba goes through mitotic division, where the nucleus duplicates its genetic material and the cytoplasm splits into two new daughter cells, each identical to the original parent. This method of reproduction is called **binary fission**. Another structure easily seen in the amoeba is the **contractile vacuole**. This organelle pumps out excess water so that the amoeba does not burst or **lyse**. *Color and label* the contractile vacuole yellow.

During unfavorable conditions, the amoeba can create a **cyst**, this hard walled body can exist for a long period of time until conditions become favorable again. At this point it opens up and the amoeba emerges. Often cysts are created during cold or dry periods where the amoeba could not survive in its normal condition. Amoebas can cause disease. A common disease caused by the amoeba is called **Amebic Dysentery**. A person becomes infected by drinking contaminated water. The amoeba then upsets the person's digestive system and causes cramps and diarrhea. A person is most likely to be infected in countries where the water is not filtered or purified.

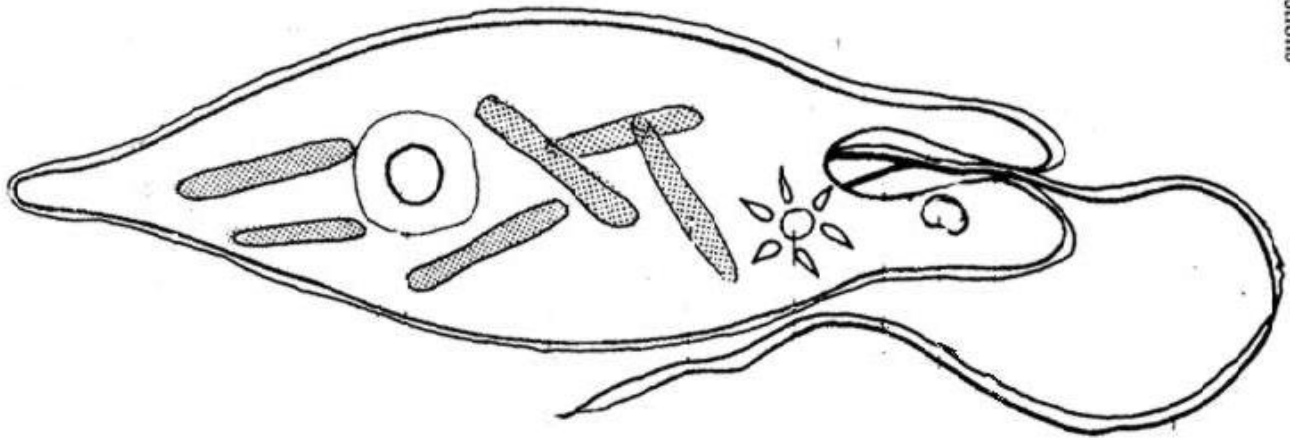
Paramecia

The Genus *Paramecium* is commonly found throughout the world, in fresh and marine water containing bacteria and decaying organic matter. *Paramecium* is a small unicellular organism. It is elongated and ranges in size from **120 to 300 microns**. The outside of the cell is covered with a tough pellicle. *Label* the pellicle. The **posterior** half is slightly wider than the **anterior** half and is bluntly pointed, while the anterior end is rounded. On its underside there is a large and long **groove** running about half the length of its body. The outer surface of the organism is covered with many hundreds of minute hair-like projections called **cilia**. *Label* the cilia. This large **ciliate** protozoan that lives in stagnant freshwater has an **oral groove** on one side that leads inward to the **gullet** and eventually the mouth. *Color and label* the oral groove light pink and the gullet red. Paramecia have two nuclei --- a larger **macronucleus** and a smaller **micronucleus**. The **macronucleus**, which is relatively large and located near the center of the organism, and controls most of the metabolic functions of the cell. *Color and label* the macronucleus light blue. The micronucleus, which lies partly within a depression on the oral side of the macronucleus, is involved primarily in reproductive and hereditary functions. *Color and label* the micronucleus dark blue.

Because paramecia live in water, they require an organelle to pump out excess water so they do not **lyse** (burst). These organelles are the **contractile vacuoles**, usually one at each end, each surrounded by several **radiating canals** which collect water from the surrounding cytoplasm. *Color and label* BOTH contractile vacuoles purple. The contractile vacuoles serve a critical function of **osmoregulation**, as water tends to accumulate inside the cytoplasm due to osmotic pressure. These structures are absent in marine *Paramecium*. **Food vacuoles, which are round in shape**, contain enzymes to digest the other smaller protozoans that the paramecium feeds on. These vacuoles can be seen at the mouth where the food is loaded into them for digestion. Undigested food leaves through the anal pore. *Color and label* the anal pore brown. At the base of the cilia are defensive structures called trichocysts. These structures can discharge their contents as long threads. *Label* the trichocysts.

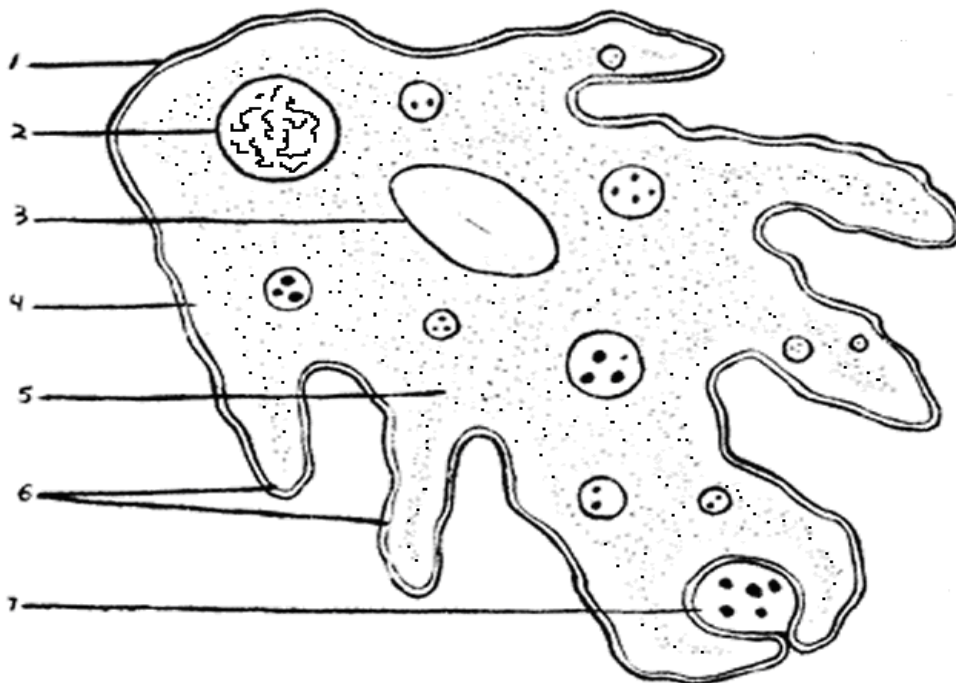
Protist Labeling & Color Sheet

Euglena



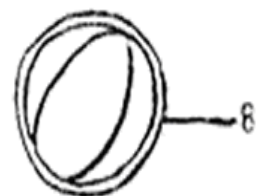
1. Unicellular or Multicellular?
2. Give the two ways they get food.
3. Where could you find a Euglena?
4. What detects light in the Euglena?
5. What is the function of the pellicle?
6. What is the function of the contractile vacuole?

Amoeba



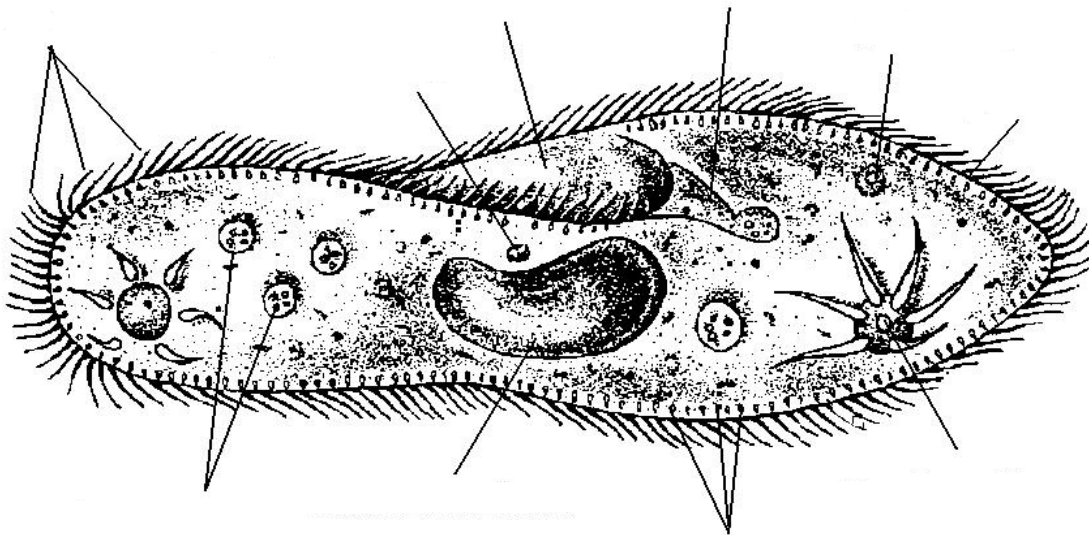
CELL MEMBRANE 1
VACUOLE 3
PSEUDOPODIA 6
ENDOPLASM 5

ECTOPLASM 4
FOOD VACUOLE 7
NUCLEUS 2
CYST 8



1. What are animal-like protists called?
2. How does an amoeba move?
3. Where would you find an amoeba?
4. What is the difference between the endoplasm and the ectoplasm?
5. How does an amoeba use its endoplasm?
6. Describe the eating process of the Amoeba.
7. How does the amoeba reproduce?
8. Describe the disease caused by Amoebas. (name, symptoms etc).

Paramecium



1. Where can you find Paramecium?
2. What is the function of the Macronucleus?
3. What is the function of the Micronucleus?
4. What would happen if the Paramecium didn't have a contractile vacuole?
5. How does undigested food leave?
6. What are the little hairs that cover the outside of the paramecium?