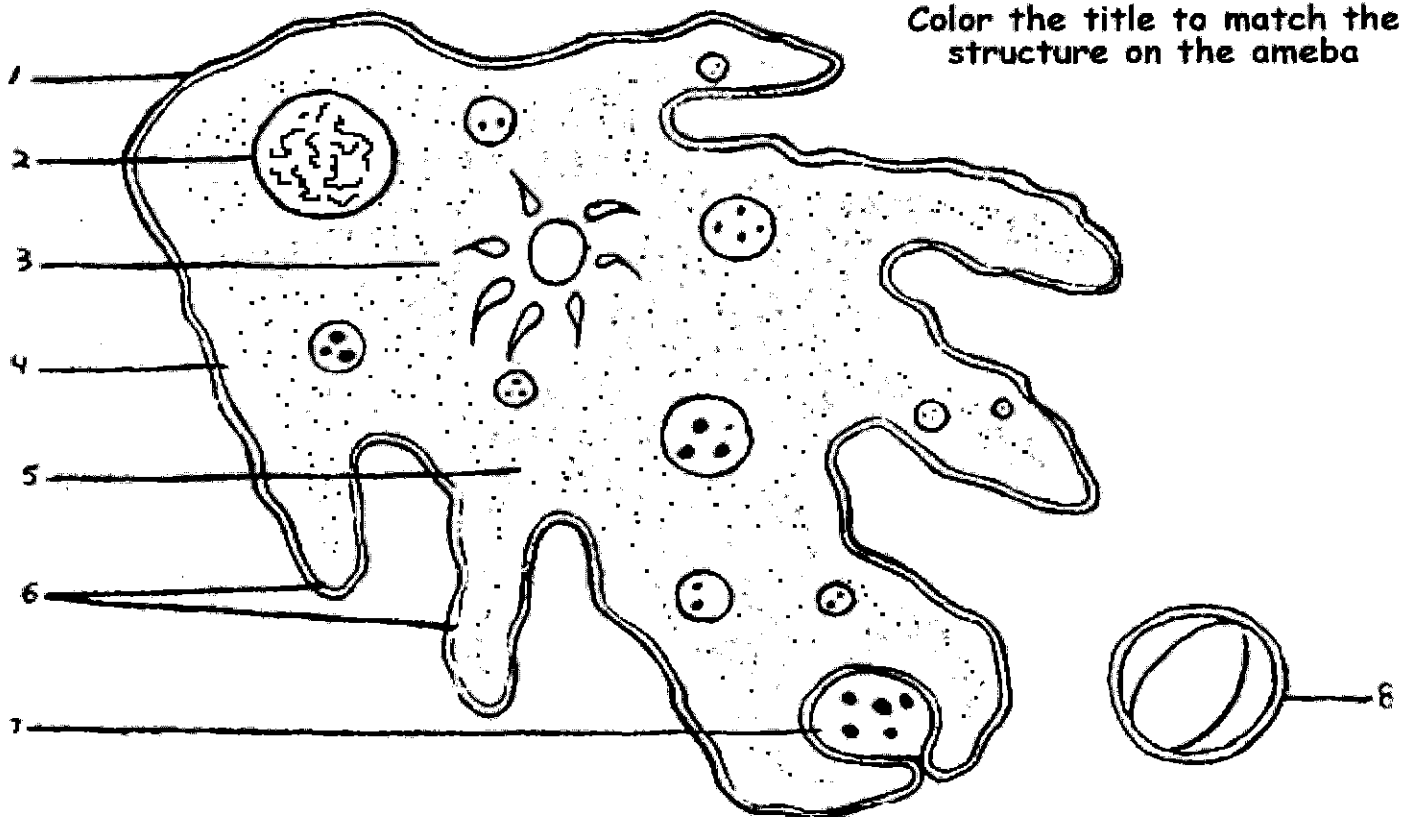


Name _____

Questions:

1. How does an ameba move? _____
2. What structure contains the ameba's DNA? _____
3. When an ameba engulfs a particle of food a _____ is formed.
4. How does an ameba reproduce? _____
5. During unfavorable conditions, an ameba forms a _____
6. Fingerlike extensions of the ameba's cytoplasm are called _____
7. What disease is caused by the ameba? _____
8. To what Kingdom does the ameba belong? _____
9. How are protozoans classified? _____
10. The word "ameba" means _____
11. The process of engulfing food particles is called _____
12. Is an ameba considered a plant-like protist or an animal-like protist? _____



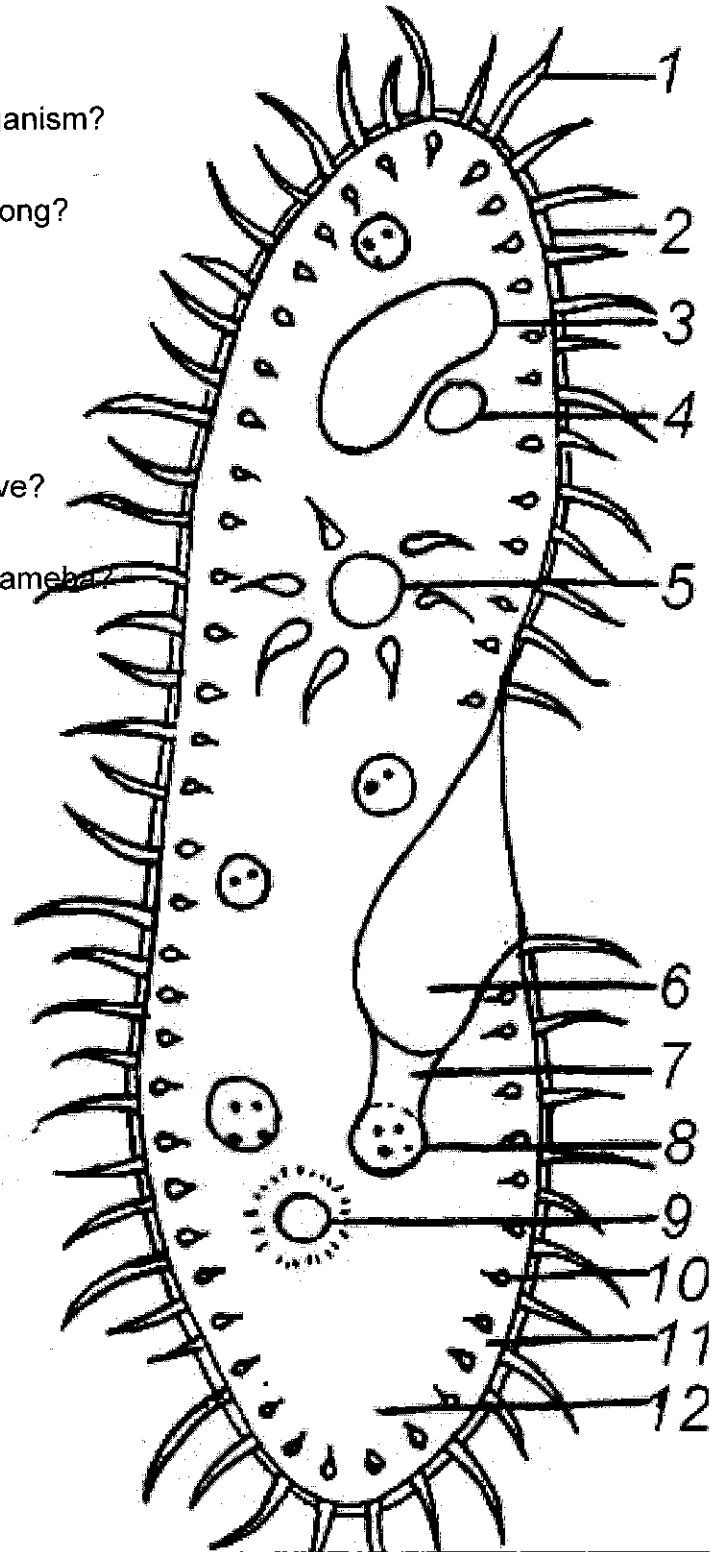
CELL MEMBRANE 1
CONTRACTILE VACUOLE 3
PSEUDOPODIA 6
ENDOPLASM 5

ECTOPLASM 4
FOOD VACUOLE 7
NUCLEUS 2
CYST 8

Name _____

Paramecium Questions:

1. Is the paramecium a unicellular or multicellular organism?
2. To what Phylum and Kingdom do paramecium belong?
3. Define heterotroph.
4. What do paramecium eat?
5. How do all members of the Phylum Ciliophora move?
6. Why can't the paramecium change shape like the amoeba?
7. What do the macronucleus and micronucleus do?
8. Define conjugation.
9. What is the function of the contractile vacuole?
10. What is the oral groove?
11. Wastes exit the paramecium through what?
12. What is the function of the trichocysts?
13. Compare the endoplasm to the ectoplasm.
14. Define avoidance behavior.
15. Where do paramecium live?



- | | |
|---|--|
| 1. Cilia <input type="checkbox"/> | 7. Gullet <input type="checkbox"/> |
| 2. Pellicle <input type="checkbox"/> | 8. Food Vacuole <input type="checkbox"/> |
| 3. Macronucleus <input type="checkbox"/> | 9. Anal Pore <input type="checkbox"/> |
| 4. Micronucleus <input type="checkbox"/> | 10. Trichocysts <input type="checkbox"/> |
| 5. Contractile Vacuole <input type="checkbox"/> | 11. Ectoplasm <input type="checkbox"/> |
| 6. Mouth Pore <input type="checkbox"/> | 12. Endoplasm <input type="checkbox"/> |

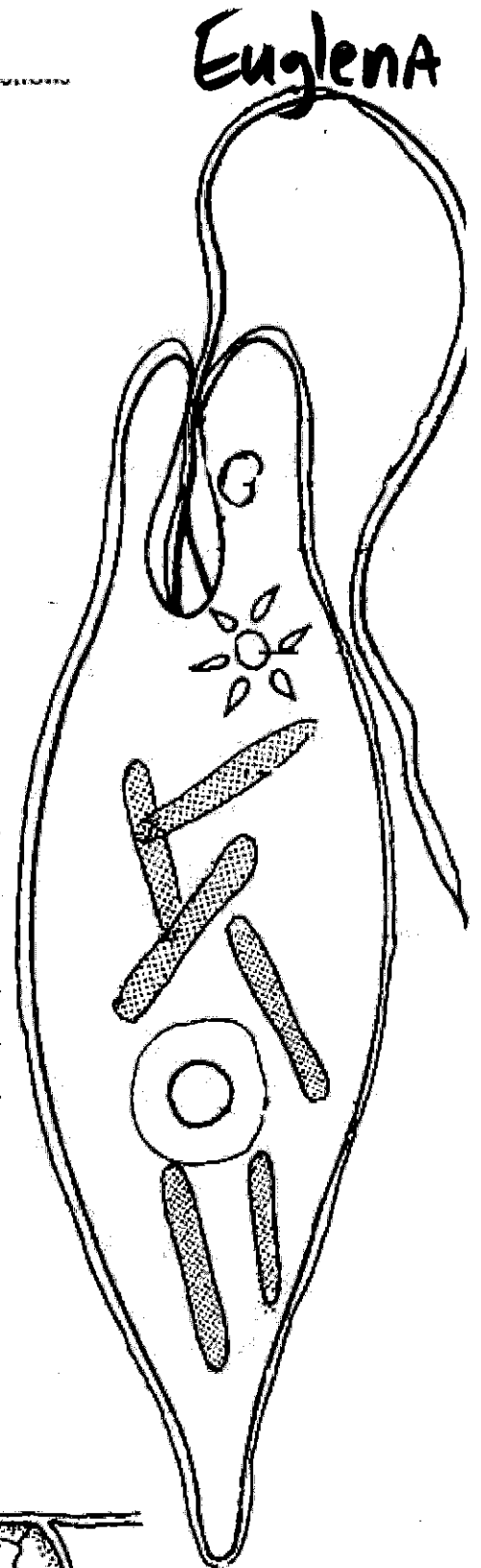
Name _____

Color the Euglena according to the directions.

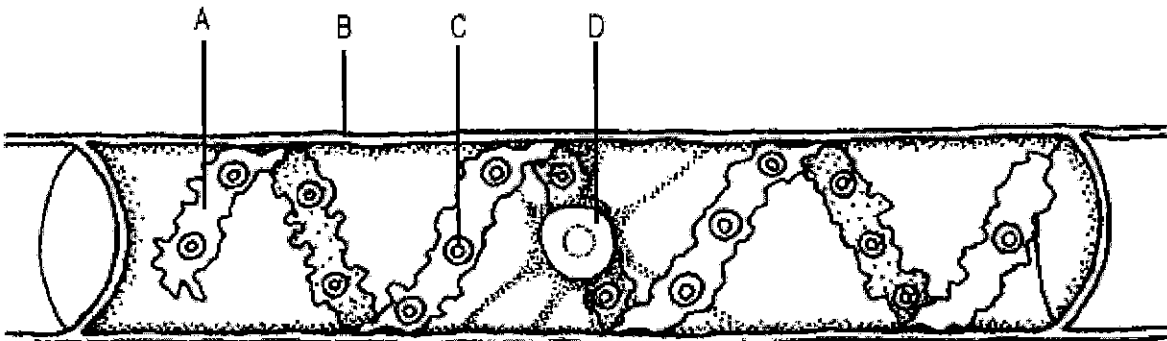
1. Are euglena unicellular or multicellular? _____
2. What Kingdom do euglena belong to? _____
What Phylum? _____
3. What organelle carries out photosynthesis? _____
- 4 Is the flagella located at the anterior or posterior end? _____
5. Define autotrophic. _____
6. Define heterotrophic. _____
7. When a euglena becomes heterotrophic,
how does it obtain nutrients? _____
8. What helps the euglena keep its shape _____
9. What is the eyespot used for? _____
10. What is the function of the nucleus? _____
What is the function of the nucleolus? _____
11. What is the function of the contractile vacuole?

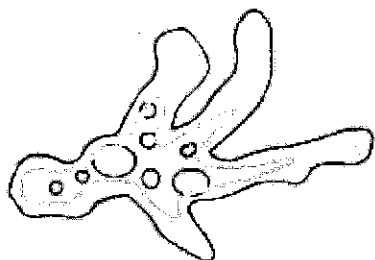
What would happen if the cell did not have this organelle?

12. What do the pyrenoids do? _____
13. Where might you find spirogyra? _____
14. Is the spirogyra unicellular or multicellular? _____



SPIROGYRA





Name _____

Ameba

The **ameba** is a protozoan that belongs to the **Kingdom Protista**. The name ameba comes from the Greek word *amoibe*, which means change. (Amoeba is also spelled amoeba.) 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 ameba 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 ameba has an unusual way of creeping along by stretching its cytoplasm into fingerlike extensions called **pseudopodia**. (The word "pseudopodia" means "false foot".) On the coloring sheet, there are several pseudopodia, use a yellow highlighter or pencil to highlight each of them (color around the outside of them). When looking at ameba under a microscope, an observer will note that no ameba looks the same as any other, the **cell membrane** is very flexible and allows for the ameba to change shape. Color the cell membrane red. Amebas live in ponds or puddles, and can even live inside people.

There are two types of cytoplasm in the ameba, 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**. (On the coloring, the endoplasm is indicated by the dotted area, and the ectoplasm by the white area.) Color the endoplasm blue, and leave the ectoplasm uncolored. By pushing the endoplasm toward the cell membrane, the ameba causes its body to extend and creep along. It is also by this method that the ameba consumes its food. The pseudopodia extend out and wrap around a food particle in a process call **phagocytosis**. The engulfed food then becomes a **food vacuole**. There are several food vacuoles on the drawing - color each brown. The food will eventually be digested by the cell's **lysosomes**.

Also visible in the ameba is the **nucleus**, which contains the ameba's DNA. Color the nucleus purple. In order to reproduce the ameba goes through **mitosis**, 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 ameba is the **contractile vacuole**, whose job is to pump out excess water so that the ameba does not burst. Color the contractile vacuole (labeled vacuole) orange.

During unfavorable conditions, the ameba 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 ameba emerges. Often cysts are created during cold or dry periods where the ameba could not survive in its normal condition. Color the cyst green.

Amebas can cause disease. A common disease caused by the ameba is called **Amebic Dysentery**. A person becomes infected by drinking contaminated water. The ameba 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.

PARAMECIUM

Paramecium are unicellular protozoans classified in the phylum Ciliophora (pronounced sill-ee-uh-FORE-uh), and the Kingdom Protista. Recall that protozoans are animal-like protists, named that way because they move and eat just like animals only they are made of a single cell. Paramecia live in quiet or stagnant ponds and feed on algal scum and other microorganisms. All members of the Phylum Ciliophora move by tiny hair-like projections called cilia. **Color the cilia black** and the corresponding box for cilia black also. **Each box should match the color of the structure.**

The paramecium cannot change its shape like the ameba because it has a thick outer membrane called the pellicle. The pellicle surrounds the cell membrane. **Color the pellicle light blue.**

There are two types of nuclei (plural of nucleus). The large nucleus is called the macronucleus which controls cell activities such as respiration, protein synthesis and digestion. **Color the title above and macronucleus red.** The much smaller micronucleus is used only during reproduction. **Color the micronucleus purple.** Reproduction in paramecium involves the exchanging of DNA within the micronucleus. In order to do this, two paramecium lie side by side and join at the mouth pore. This process is called conjugation and is a method of sexual reproduction in other microorganisms.

Contractile vacuoles are used in animal cells to remove the excess water. It is easy to identify the contractile vacuole due to its star shape. **Color the contractile vacuole dark green.**

Food enters the paramecium through the **mouth pore (color orange)** and goes to the **gullet (color dark blue)**. The area of the paramecium appears pinched inward and is called the oral groove, cilia sweep food into this area. At the end of the gullet, food vacuoles are formed. **Color all food vacuoles light brown.** Undigested food particles are eliminated through the **anal pore (color dark brown)**. T

Paramecium can respond to temperature, food, oxygen and toxins and have a very simple defense mechanism. Just inside the pellicle are threadlike organelles called trichocysts. The paramecium can shoot tiny threads out of the cell to entangle a predator or to make themselves appear bigger. **Color the trichocysts grey or light black.** Paramecium are also known to exhibit avoidance behavior. This is where the paramecium will move away from a negative or unpleasant stimulus.

There are 2 kinds of cytoplasm in the paramecium. The cytoplasm around the edges is clear and is called ectoplasm. **Leave the ectoplasm clear, uncolored.** The rest of the cytoplasm is more dense is called endoplasm. **Color the endoplasm yellow.**

THE EUGLENA

Euglena 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 twirls in such a way as to pull the cell through the water. It is attached at an inward pocket called the reservoir. **Color the reservoir grey and the flagellum black.**

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 throughout the cell. **Color 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 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 the pellicle blue.**

In the center of the cell is the nucleus, which contains the cell's DNA and controls the cell's activities. The nucleolus, which makes ribosomes, can be seen within the nucleus. **Color the nucleus purple, and the nucleolus pink.**

The interior of the cell contains a jelly-like fluid substance called cytoplasm. **Color 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 the contractile vacuole orange.**

SPIROGYRA

In almost every ditch with reasonably clean water we can find slimy masses of filamentous algae, floating as scum on the surface. It looks rather distasteful, but a ditch like that is not polluted, only eutrophic (rich in nutrients). *Spirogyra* owes its name to a chloroplast (the green part of the cell) that is wound into a spiral, a unique property of this genus which makes it easily to recognize. Spirogyra is called a filamentous algae because it consists of long filaments of many cells. You can see the cell walls between each individual cell. **Color the cell wall (B) pink. Color the long spiral chloroplast green(A).** The small round bodies in the chloroplast are pyrenoids, centers for the production of starch. **Color the pyrenoids (C) red.** In the middle of the cell we can see the transparent nucleus. **Color the nucleus (D) blue.**