**Microorganisms**

**Protozoa**

**By**

**Adam**

**Pam**

**Deborah**

**Kathy**

**Microorganism Engagement Activity:**

**Garbage Can Classification Lesson:**

**Supplies needed:**

1. 3 Garbage Cans:
   1. First garbage can labeled “Green Recycle” (Yard Clippings, etc.)
   2. Second garbage can labeled “Recycle” (Plastic, Aluminum, Glass)
   3. Third garbage can labeled “Garbage” (Everything Else)
2. Enough laminated pictures of microorganism;
   1. One per student
   2. Including fungus, bacteria, protozoa (ciliates, flagellates, ameba’s)

* Discuss the different types of garbage cans, explain the differences between garbage cans, if it does not qualify for green, or recycle it goes in garbage.
* Explain that green recycle qualifies for fungus only.
* Recycle qualifies for bacteria only.
* Everything else is labeled as garbage (Protozoa).

**Procedures:**

Have students look at their cards and classify if the card is a fungus, bacteria, or protozoa.

Attach their card to an item in the room, (i.e. leaves, paper, or plastic). Then place the item in the appropriate garbage can, and then justify their placement to the class.

**Cards to copy and laminate for classification activity:**

|  |  |  |
| --- | --- | --- |
| http://www.worsleyschool.net/science/files/decomposers/mold.JPG**Fungus** | **Bacteria**  strep | **[https://encrypted-tbn3.google.com/images?q=tbn:ANd9GcTk4sMgHwR1cnGcSzqE_oW0MyymDxWp0uXG5Qd5xsoh3DQGcc7ZgA](http://www.google.com/imgres?hl=en&biw=1536&bih=717&gbv=2&tbm=isch&tbnid=9rFzct0iRBkd-M:&imgrefurl=http://vivadiversa.wikispaces.com/Euglena&docid=tbDLBG6iOhYrAM&imgurl=http://vivadiversa.wikispaces.com/file/view/Euglena_gracilis3.jpg/179883787/Euglena_gracilis3.jpg&w=322&h=278&ei=v0vZT8bDGYeYiAf_-YSFAw&zoom=1&iact=hc&vpx=190&vpy=389&dur=3963&hovh=209&hovw=242&tx=158&ty=121&sig=109989388732039945326&page=2&tbnh=160&tbnw=185&start=21&ndsp=25&ved=1t:429,r:7,s:21,i:230)Euglena** |
| **Ameba[https://encrypted-tbn0.google.com/images?q=tbn:ANd9GcRBhACFhb1DTWTn5sh6IDyExKC8dYjWzQviWluNptIV-R7zfX51iw](http://www.google.com/imgres?hl=en&gbv=2&biw=1536&bih=717&tbm=isch&tbnid=VSkYjDACEj5umM:&imgrefurl=http://www.noticiassin.com/2011/08/rara-ameba-que-vive-en-el-agua-se-cobra-tres-vidas-en-ee-uu/ameba/&docid=hOie5zUEz3LheM&imgurl=http://www.noticiassin.com/wp-content/uploads/2011/08/ameba.jpg&w=640&h=563&ei=c0zZT5TIIceeiQet15WoAw&zoom=1&iact=hc&vpx=710&vpy=349&dur=499&hovh=211&hovw=239&tx=110&ty=154&sig=109989388732039945326&page=1&tbnh=150&tbnw=171&start=0&ndsp=21&ved=1t:429,r:10,s:0,i:169)** | **[https://encrypted-tbn0.google.com/images?q=tbn:ANd9GcQ0iPo5sSkJaJ-__-BC0u773-tf2yNMTeWc1pMkPrbZZF8YNRbVWQ](http://www.google.com/imgres?hl=en&gbv=2&biw=1536&bih=717&tbm=isch&tbnid=FzoYiIiIeIj-sM:&imgrefurl=http://microbewiki.kenyon.edu/index.php/Paramecium&docid=SMXp2owBXRtxBM&imgurl=http://microbewiki.kenyon.edu/images/9/90/99184C.jpg&w=275&h=343&ei=CE3ZT8OEF4Sy2QXcs8CkDw&zoom=1&iact=hc&vpx=740&vpy=327&dur=1966&hovh=251&hovw=201&tx=118&ty=139&sig=109989388732039945326&page=1&tbnh=154&tbnw=121&start=0&ndsp=21&ved=1t:429,r:10,s:0,i:169)Paramecium** |  |

**Using Content to Teach Common Core Standards**

Use this form to help you examine your existing lessons and units with an eye to shaping instruction around outcomes intended in the Common Core.

**Focus Question:** Can we observe and summarize information about microorganisms in order to classify them.

|  |  |
| --- | --- |
| **Content Objective:** | Students will compare characteristics common in observed organisms (e.g., color, movement, appendages, shape) and infer their function (e.g., green color found in organisms that are producers, appendages help movement). |
| **Language Objective:** | Students will be able to support and show evidence in written form to show understanding of the differences in microorganisms. |
| 1. What **core content standard** is the focus? | 6th grade standard 5, Objective 1  Observe and summarize information about microorganisms. |
| 1. What is the **essential question** I would like students to engage? | What are some of the characteristics of specific microorganisms? |
| 1. What is the **intended outcome** of student learning? | **a**. Examine and illustrate size, shape, and structure of organisms found in an environment such as pond water.  **b**. Compare characteristics common in observed organisms (e.g., color, movement, appendages, shape) and infer their function (e.g., green color found in organisms that are producers, appendages help movement).  **c**. Research and report on a microorganism's requirements (i.e., food, water, air, waste disposal, temperature of environment, reproduction). |
| 1. What will the final **product** be? | Collaborative and independent worksheets. |
| 1. Have I developed a **rubric or assessment list** to define elements and level of quality for the expected outcome or product? | |  |  |  |  | | --- | --- | --- | --- | |  | 1 | 2 | 3 | | Questions | Need guided support (<40%) | Needs minimal support  (<75%) | Understanding  (>76%) | | Label | Need guided support (<40%) | Needs minimal support  (<75%) | Understanding  (>76%) | | Coloring | Need guided support (<40%) | Needs minimal support  (<75%) | Understanding  (>76%) | |
| 1. What **digital resources** will I use to support lesson activities, assignments, or the final product? | <http://www.squidoo.com/protists-paramecium-amoebas-algae> |
| 1. What type of **writing** will instruction and/or the intended outcome result in:  * **Argumentation/Opinion** (supported opinion, argumentation, building a case), * **Informative/Explanatory**   (an explanation, a report of findings, a statement of information), or   * **Narrative**   (Tell a story; relate an experience). | Informative/Explanatory |
| 1. What strategies will I use to move students through **multiple revisions** of the document? |  |
| 1. What are the **narrative texts** I will have students read to gain background on the essential question? |  |
| 1. What are the **informational texts** I will have students read to gain facts and information about the essential question? | Please see attachments. |
| 1. What instructional activity will you use to put **students in groups** (providing opportunity for speaking, listening, sharing of ideas, collaborating)? | Leveled by reading groups |
| 1. When and in what structure will I **critically examine this student work**, and discuss the instruction with colleagues? | Worksheets in groups guided collaboration then graded as a class to insure complete understanding.  Final and Individual Activity: Picture of Paramecium colored and labeled correctly, this will clearly define individual understanding. Activity will be graded according to Rubric above. |

**Notes:**

**First Activity: Paramecium**

**Using Content to Teach Common Core Standards**

Use this form to help you examine your existing lessons and units with an eye to shaping instruction around outcomes intended in the Common Core.

**Focus Question:** Can we observe and summarize information about paramecium in order to classify them.

|  |  |
| --- | --- |
| **Content Objective:** | Students will compare characteristics common in observed paramecium (e.g., color, movement, appendages, shape) and infer their function (e.g., green color found in organisms that are producers, appendages help movement). |
| **Language Objective:** | Students will be able to support and show evidence in written form to show understanding of the differences in microorganisms. |
| 1. What **core content standard** is the focus? | 6th grade standard 5, Objective 1  Observe and summarize information about microorganisms. |
| 1. What is the **essential question** I would like students to engage? | What are some of the characteristics of specific microorganisms? |
| 1. What is the **intended outcome** of student learning? | **a**. Examine and illustrate size, shape, and structure of organisms found in an environment such as pond water.  **b**. Compare characteristics common in observed organisms (e.g., color, movement, appendages, shape) and infer their function (e.g., green color found in organisms that are producers, appendages helping movement).  **c**. Research and report on a microorganism's requirements (i.e., food, water, air, waste disposal, temperature of environment, reproduction). |
| 1. What will the final **product** be? | Collaborative and independent worksheets. |
| 1. Have I developed a **rubric or assessment list** to define elements and level of quality for the expected outcome or product? | |  |  |  |  | | --- | --- | --- | --- | |  | 1 | 2 | 3 | | Questions | Need guided support (<40%) | Needs minimal support  (<75%) | Understanding  (>76%) | | Label | Need guided support (<40%) | Needs minimal support  (<75%) | Understanding  (>76%) | | Coloring | Need guided support (<40%) | Needs minimal support  (<75%) | Understanding  (>76%) | |
| 1. What **digital resources** will I use to support lesson activities, assignments, or the final product? | <http://www.squidoo.com/protists-paramecium-amoebas-algae> |
| 1. What type of **writing** will instruction and/or the intended outcome result in:  * **Argumentation/Opinion** (supported opinion, argumentation, building a case), * **Informative/Explanatory**   (an explanation, a report of findings, a statement of information), or   * **Narrative**   (Tell a story; relate an experience). | Informative/Explanatory |
| 1. What strategies will I use to move students through **multiple revisions** of the document? |  |
| 1. What are the **narrative texts** I will have students read to gain background on the essential question? |  |
| 1. What are the **informational texts** I will have students read to gain facts and information about the essential question? | Please see following attachments. |
| 1. What instructional activity will you use to put **students in groups** (providing opportunity for speaking, listening, sharing of ideas, collaborating)? | Leveled by reading groups |
| 1. When and in what structure will I **critically examine this student work**, and discuss the instruction with colleagues? | Worksheets in groups guided collaboration then graded as a class to insure complete understanding.  Final and Individual Activity: Picture of Paramecium colored and labeled correctly, this will clearly define individual understanding. Activity will be graded according to Rubric above. |

**Notes:**

**The “Kingdoms” of Microorganisms**

Characteristics of the organism that classifies its kingdom: cell type, body form, cell wall composition, mode of nutrition, nervous system, and locomotion.

Protista: protozoa, some are motile and feed upon bacteria and other organic matter. Algae are part of this kingdom. Alga photosynthesizes and lives in water.

**Paramecium**

**Paramecium** are unicellular protozoans classified in the phylum **Ciliophora** (pronounced sill-ee-uh-FORE-uh), and the Kingdom Protista. They live in quiet or stagnant ponds and are an essential part of the food chain. They feed on algae and other microorganisms, and other small organisms eat them. All members of the Phylum Ciliophora move by tiny hair-like projections called cilia. 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.

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. The much smaller micronucleus is used only during reproduction.

**Contractile vacuoles** are used in animal cells to remove the excess water. The contractile vacuole is shaped like a star.

Paramecium’s are **heterotrophs**, meaning they must consume food for their energy. Food enters the paramecium through the mouth pore and goes to the **gullet**. The areas of a paramecium appear pinched inward and are called the **oral groove**; cilia sweep food into this area. At the end of the gullet, **food vacuoles** are formed. Food vacuoles then remain in the **cytoplasm** until the food is digested.

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 they appear bigger. Paramecium is also known to exhibit avoidance behavior. This is where the paramecium will move away from a negative or unpleasant stimulus.

There are two kinds of cytoplasm in the paramecium. The cytoplasm around the edges is clear and is called **ectoplasm**. The rest of the cytoplasm is more dense and appears darker. This is called the **endoplasm**. Remember that the word "**ecto**" means outside, and the word "**endo**" means inside.

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**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 ameba? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**7. What do the macronucleus and micronucleus do? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**8. Define conjugation. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**9. What is the oral groove? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**10. Wastes exit the paramecium through what structure? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**11. What is the function of the trichocysts?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**12. Compare the endoplasm to the ectoplasm.**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**13. Define avoidance behavior.**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

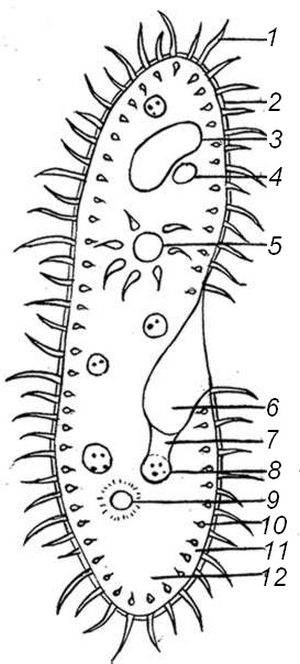
**14. Where do paramecium live?**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**1. Color all cilia black. 2. Color the pellicle light blue. 3. Color the macronucleus red. 4. Color the micronucleus pink. 5. Color the contractile vacuole dark green. 6. Color the mouth pore orange 7. Color the gullet dark blue 8. Color all food vacuoles light brown. 9. Color the trichocysts purple. 10. Color the endoplasm yellow. 11. Leave the ectoplasm clear.**



**Second Activity: Ameba**

**Using Content to Teach Common Core Standards**

Use this form to help you examine your existing lessons and units with an eye to shaping instruction around outcomes intended in the Common Core.

**Focus Question:** Can we observe and summarize information about ameba in order to classify them.

|  |  |
| --- | --- |
| **Content Objective:** | Students will compare characteristics common in observed ameba (e.g., color, movement, appendages, shape) and infer their function (e.g., green color found in organisms that are producers, appendages help movement). |
| **Language Objective:** | Students will be able to support and show evidence in written form to show understanding of the differences in microorganisms. |
| 1. What **core content standard** is the focus? | 6th grade standard 5, Objective 1  Observe and summarize information about microorganisms. |
| 1. What is the **essential question** I would like students to engage? | What are some of the characteristics of specific microorganisms? |
| 1. What is the **intended outcome** of student learning? | **a**. Examine and illustrate size, shape, and structure of organisms found in an environment such as pond water.  **b**. Compare characteristics common in observed organisms (e.g., color, movement, appendages, shape) and infer their function (e.g., green color found in organisms that are producers, appendages help movement).  **c**. Research and report on a microorganism's requirements (i.e., food, water, air, waste disposal, temperature of environment, reproduction). |
| 1. What will the final **product** be? | Collaborative and independent worksheets |
| 1. Have I developed a **rubric or assessment list** to define elements and level of quality for the expected outcome or product? | |  |  |  |  | | --- | --- | --- | --- | |  | 1 | 2 | 3 | | Organization | Need guided support (<40%) | Needs minimal support  (<75%) | Understanding  (>76%) | | Content | Need guided support (<40%) | Needs minimal support  (<75%) | Understanding  (>76%) | | Summarization | Need guided support (<40%) | Needs minimal support  (<75%) | Understanding  (>76%) | |
| 1. What **digital resources** will I use to support lesson activities, assignments, or the final product? | <http://www.squidoo.com/protists-paramecium-amoebas-algae> |
| 1. What type of **writing** will instruction and/or the intended outcome result in:  * **Argumentation/Opinion** (supported opinion, argumentation, building a case), * **Informative/Explanatory**   (an explanation, a report of findings, a statement of information), or   * **Narrative**   (Tell a story; relate an experience). | Informative/Explanatory |
| 1. What strategies will I use to move students through **multiple revisions** of the document? |  |
| 1. What are the **narrative texts** I will have students read to gain background on the essential question? |  |
| 1. What are the **informational texts** I will have students read to gain facts and information about the essential question? | Please see following attachments. |
| 1. What instructional activity will you use to put **students in groups** (providing opportunity for speaking, listening, sharing of ideas, collaborating)? | Leveled by reading groups |
| 1. When and in what structure will I **critically examine this student work**, and discuss the instruction with colleagues? | Worksheets in groups guided collaboration then graded as a class to insure complete understanding.  Final and Individual Activity: Picture of ameba colored and labeled correctly, this will clearly define individual understanding. Activity will be graded according to Rubric above. |

**Notes:**

**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 do not 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.”) . 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 the ameba to change shape. Ameba’s 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**. 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**. The food will eventually be digested by the cell.

Also visible in the ameba is the **nucleus**, which contains the ameba's DNA. 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.

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.

Ameba’s 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.

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. How does an ameba move? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. What structure contains the ameba's DNA? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. How does an ameba reproduce? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. During unfavorable conditions, an ameba forms a ... ?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. Fingerlike extensions of the ameba's cytoplasm are called ...? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. What disease is caused by the ameba? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

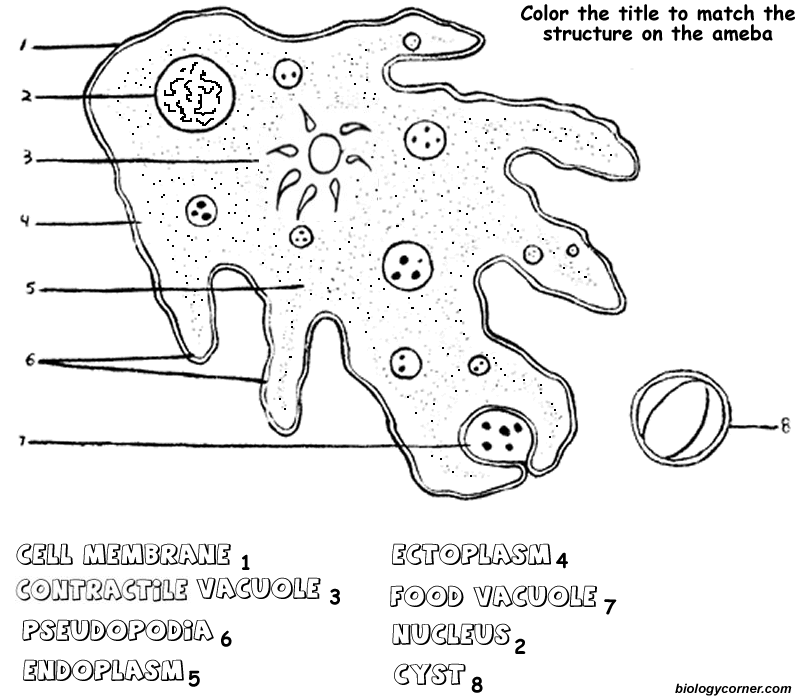
7. To what Kingdom does the ameba belong?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. How are protozoans classified? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

On the illustration below, there are several pseudopodia, use a yellow highlighter, or pencil to highlight each of them (color around the outside of them). Color the cell membrane red. (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. There are several food vacuoles on the drawing – color each brown. Color the nucleus purple. Color the contractile vacuole orange. Color the cyst green.



Third Activity: Euglena

**Using Content to Teach Common Core Standards**

Use this form to help you examine your existing lessons and units with an eye to shaping instruction around outcomes intended in the Common Core.

**Focus Question:** Can we observe and summarize information about euglena in order to classify them.

|  |  |
| --- | --- |
| **Content Objective:** | Students will compare characteristics common in observed euglena (e.g., color, movement, appendages, shape) and infer their function (e.g., green color found in organisms that are producers, appendages help movement). |
| **Language Objective:** | Students will be able to support and show evidence in written form to show understanding of the differences in microorganisms. |
| 1. What **core content standard** is the focus? | 6th grade standard 5, Objective 1  Observe and summarize information about microorganisms. |
| 1. What is the **essential question** I would like students to engage? | What are some of the characteristics of specific microorganisms? |
| 1. What is the **intended outcome** of student learning? | **a**. Examine and illustrate size, shape, and structure of organisms found in an environment such as pond water.  **b**. Compare characteristics common in observed organisms (e.g., color, movement, appendages, shape) and infer their function (e.g., green color found in organisms that are producers, appendages help movement).  **c**. Research and report on a microorganism's requirements (i.e., food, water, air, waste disposal, temperature of environment, reproduction). |
| 1. What will the final **product** be? | Collaborative and independent worksheets. |
| 1. Have I developed a **rubric or assessment list** to define elements and level of quality for the expected outcome or product? | |  |  |  |  | | --- | --- | --- | --- | |  | 1 | 2 | 3 | | Questions | Need guided support (<40%) | Needs minimal support  (<75%) | Understanding  (>76%) | | Label | Need guided support (<40%) | Needs minimal support  (<75%) | Understanding  (>76%) | | Coloring | Need guided support (<40%) | Needs minimal support  (<75%) | Understanding  (>76%) | |
| 1. What **digital resources** will I use to support lesson activities, assignments, or the final product? | <http://www.squidoo.com/protists-paramecium-amoebas-algae> |
| 1. What type of **writing** will instruction and/or the intended outcome result in:  * **Argumentation/Opinion** (supported opinion, argumentation, building a case), * **Informative/Explanatory**   (an explanation, a report of findings, a statement of information), or   * **Narrative**   (Tell a story; relate an experience). | Informative/Explanatory |
| 1. What strategies will I use to move students through **multiple revisions** of the document? |  |
| 1. What are the **narrative texts** I will have students read to gain background on the essential question? |  |
| 1. What are the **informational texts** I will have students read to gain facts and information about the essential question? | Please see following attachments. |
| 1. What instructional activity will you use to put **students in groups** (providing opportunity for speaking, listening, sharing of ideas, collaborating)? | Leveled by reading groups |
| 1. When and in what structure will I **critically examine this student work**, and discuss the instruction with colleagues? | Worksheets in groups guided collaboration then graded as a class to insure complete understanding.  Final and Individual Activity: Picture of euglena colored and labeled correctly, this will clearly define individual understanding. Activity will be graded according to Rubric above. |

**Notes:**

**Euglena**

Euglena are unicellular organisms classified into the Kingdom **Protista**, and the Phylum (fī'ləm) **Euglenophyta** (Eu·gle·noph·y·ta). 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 lives 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. It is attached at an inward pocket called the reservoir***.***

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. 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. 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.

In the center of the cell is the **nucleus**, which contains the cell's DNA and controls the cell's activities. The **nucleolus** can be seen within the nucleus. The interior of the cell contains a jelly-like fluid substance called cytoplasm**.** 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.

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. Are euglena unicellular or multicellular? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. What Kingdom do euglena belong to? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. What organelle carries out photosynthesis? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. On which end is the flagellum located? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. Define autotrophic. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. Define heterotrophic. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7. Describe the two ways in which the euglena get their nutrients. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. What is the eyespot used for? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9. What is the function of the nucleus? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10. What is the function of the contractile vacuole? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

11. What would happen if the cell did not have this organelle. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

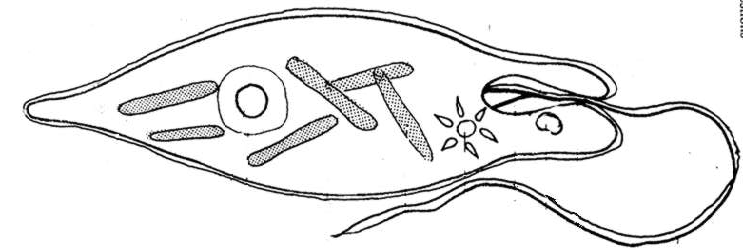
12. What are Phylum? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

***Euglena***

***Color and label*** the flagellum black. ***Color and label*** the reservoir grey. ***Color and label*** the chloroplasts green. ***Color and label*** the eyespot red**. *Color and label*** the pellicle blue. ***Color and label*** the nucleus purple. ***Color and label*** the nucleolus pink. ***Color and label*** the cytoplasm light yellow. ***Color and label*** the contractile vacuole orange.



Final Activity: Final written narrative to demonstrate understanding of the complete unit.

**Using Content to Teach Common Core Standards**

Use this form to help you examine your existing lessons and units with an eye to shaping instruction around outcomes intended in the Common Core.

**Focus Question:** Can we observe and summarize information about microorganisms in order to classify them.

|  |  |
| --- | --- |
| **Content Objective:** | Students will compare characteristics common in observed paramecium (e.g., color, movement, appendages, shape) and infer their function (e.g., green color found in organisms that are producers, appendages help movement). |
| **Language Objective:** | Students will be able to support and show evidence in written form to show understanding of the differences in microorganisms. |
| 1. What **core content standard** is the focus? | 6th grade standard 5, Objective 1  Observe and summarize information about microorganisms. |
| 1. What is the **essential question** I would like students to engage? | What are some of the characteristics of specific microorganisms? |
| 1. What is the **intended outcome** of student learning? | **a**. Examine and illustrate size, shape, and structure of organisms found in an environment such as pond water.  **b**. Compare characteristics common in observed organisms (e.g., color, movement, appendages, shape) and infer their function (e.g., green color found in organisms that are producers, appendages help movement).  **c**. Research and report on a microorganism's requirements (i.e., food, water, air, waste disposal, temperature of environment, reproduction). |
| 1. What will the final **product** be? | Written 5 paragraph narrative complete with labeled illustrations. This narrative will be a choice of, paramecium, ameba, or euglena, completed individually by the student. |
| 1. Have I developed a **rubric or assessment list** to define elements and level of quality for the expected outcome or product? | |  |  |  |  | | --- | --- | --- | --- | |  | 1 | 2 | 3 | | Ideas, Thesis, | Unclear and does not answer the question (<40%) | Answers the Questions and Reader knows what to expect  (<75%) | Meets expectations and readers wants to read more.  (>76%) | | Evidence | Does not support the Thesis (<40%) | Evidence supports Thesis, more information needed. Three pieces of evidence are used  (<75%) | Clear link between thesis and all evidence used, three or more pieces of evidence are present.  (>76%) | | Reasoning-  Evidence | Not specific to the Thesis, and explanation is inaccurate (<40%) | Explanation is accurate and supports the evidence but not enough depth  (<75%) | Evidence meets all expectations and is convincing  (>76%) | | Conclusion | Does not tie the main points together  (<40%) | Ties main points together and leaves reader with final thought.  (<75%) | Meets all expectations and conclusion is thought provoked  (>76%) | | Organization-Conventions | Information is out of order, writing is confusing, There are 6 or more convention errors  (<40%) | Transitions are used to connect thoughts and ideas, paper is organized, there are 3-5 convention errors  (<75%) | Paper meets all expectations, all transitions are clear, well organized, less than 3 conventional errors  (>76%) | |
| 1. What **digital resources** will I use to support lesson activities, assignments, or the final product? | <http://www.squidoo.com/protists-paramecium-amoebas-algae> |
| 1. What type of **writing** will instruction and/or the intended outcome result in:  * **Argumentation/Opinion** (supported opinion, argumentation, building a case), * **Informative/Explanatory**   (an explanation, a report of findings, a statement of information), or   * **Narrative**   (Tell a story; relate an experience). | Informative/Explanatory |
| 1. What strategies will I use to move students through **multiple revisions** of the document? |  |
| 1. What are the **narrative texts** I will have students read to gain background on the essential question? |  |
| 1. What are the **informational texts** I will have students read to gain facts and information about the essential question? | Please see attachments. |
| 1. What instructional activity will you use to put **students in groups** (providing opportunity for speaking, listening, sharing of ideas, collaborating)? | Leveled by reading groups |
| 1. When and in what structure will I **critically examine this student work**, and discuss the instruction with colleagues? | Share the final five-paragraph narrative including labeled illustrations that clearly define individual understanding. Activity will be graded according to Rubric above. |

**Notes:**