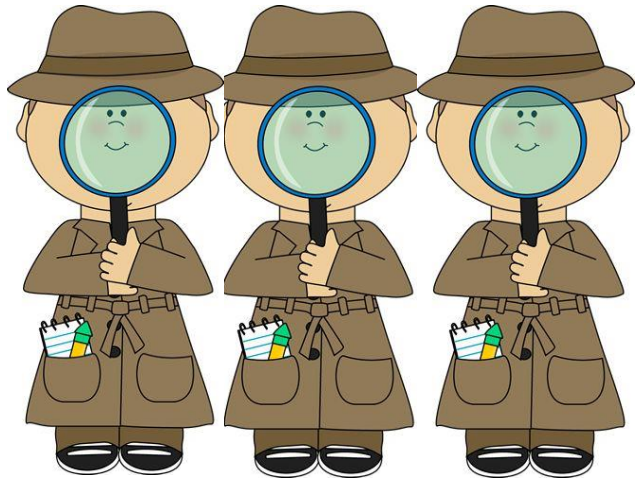
Plants Week 3 Booklet

- Living vs. Non-Living
- Foss Investigation #2 The Microscope
- Part 3: Microscopic Life: Brine Shrimp
- Foss Investigation #3 The Cell
- Part 1: Discovering Cells-Elodea



Drawing to Learn (D2L's)

Vocabulary Word	Define	Draw a Picture Representation
functions		
waste		
gas exchange		
habitat		
elodea		
paramecium		
protists		

FOSS INVESTIGATION #2.3
FOCUS QUESTIONS

1. How do objects appear when they are viewed through a microscope?

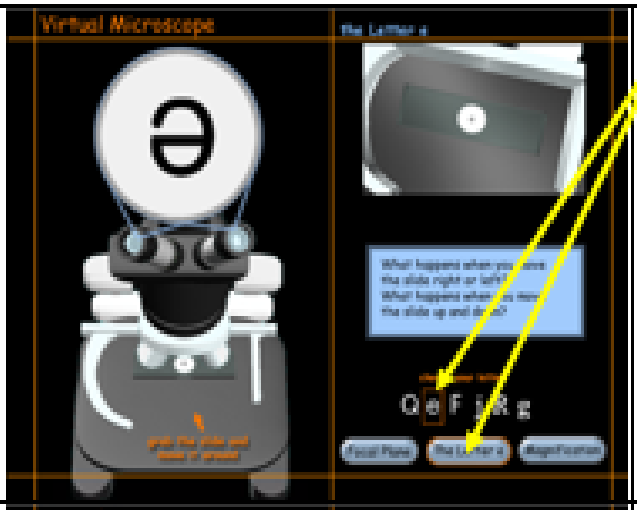
2. How can we estimate the size of an object by looking at it through the microscope?

3. What evidence can we find that brine shrimp are living organisms?

PROTISTS, FUNGI & PLANT UNIT
FOSS INVESTIGATION #2.3
MICROSCOPIC LIFE
BLENDED LEARNING LESSON TASK CARD

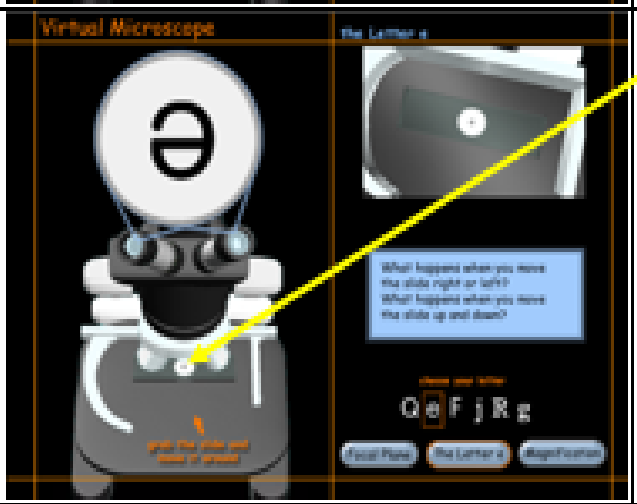
GROUP A:	GROUP B:	GROUP C:
Independent-Digital Content **Virtual Microscope** **(10 min)**	**Teacher Directed:** **Brine Shrimp Microscope Demonstration** **(20 min)**	**Collaboration/Individual/Group** **Think Questions** **(10 min)**
• Link Virtual Microscope and complete the lesson. • Fill out the Virtual Microscope Form (slide 2). • Finished early? Do group C and then Discovery Ed Assignments or USATestPrep.	• Teacher will complete this with the student (see slides 5-8). • Student fills out the Brine Shrimp Notebook Page 10 (slide 3).	• Student will read pages 3-7 and the History of the Microscope. • Student will answer the Think Questions 1-6. • Finished early? Do group A and then Discovery Ed Assignments or USATestPrep.

Teacher group will take more than 1 day to complete the whole class, early finishers can complete the next group and then do Discovery Education or USATestPrep.



1. Click on the letter e in both places. The objective lens is set to 4X, or low power.
2. Center the image in the field of view on one e and draw *exactly* what you see.

3. Move the slide away from you (up). What direction did the image move? _____
4. Draw *exactly* what you see.



5. Move the slide to the right. What direction did the image move? _____
6. Draw *exactly* what you see.

7. Is the image seen through the microscope oriented the same way as the object on the stage of the microscope? Explain.

8. If you want to move the image to the right, which way should you move the slide?
9. If you want to move the image up, which way should you move the slide?

WARNING — This set contains chemicals that may be harmful if misused. Read cautions on individual containers carefully. Not to be used by children except under adult supervision.

Brine Shrimp

Part 1: Observe brine shrimp in the vial.

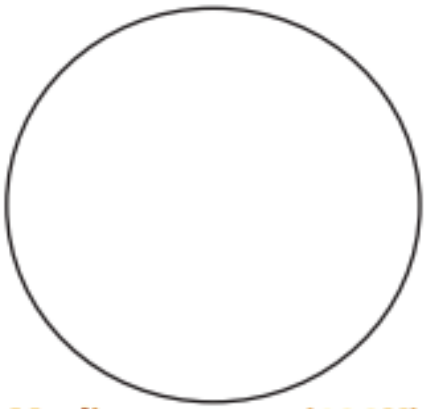
1. How do brine shrimp respond to light? See your teacher's demonstration or shine a flashlight through the vial.

2. Compare the size of the brine shrimp now to the size of the brine shrimp when they first hatched. How are they different?

Part 2: Observe brine shrimp under the microscope.

3. Use a dropper to take up a few brine shrimp. Put one drop on the surface of a slide. If no brine shrimp are on the slide, wipe the slide dry and put on another drop.
4. Use a piece of blotter paper to soak up part of the water.
5. Do not put a coverslip on the slide.
6. Observe and draw an illustration of the brine shrimp at **100X**.
7. Estimate the size of the brine shrimp.

_____



Medium power (100X)

Part 3: Add yeast to the brine shrimp.

8. Carefully add one tiny drop of Congo red–dyed yeast to the slide.
9. Observe the yeast and the brine shrimp. Describe what you see.

FOSS INVESTIGATION #2.3
MICROSCOPIC LIFE
BLENDED LEARNING GROUP C- THINK QUESTIONS

1. What is an organism?

2. What are the basic needs of all living organisms?

3. What functions are performed by all living organisms?

4. Why do you think movement is not considered a characteristic of life?

5. Under what circumstances might a living organism not appear living?

6. What is the difference between living, nonliving, and dead?

FOSS INVESTIGATION #2.3
MICROSCOPIC LIFE

1. How did the brine shrimp and yeast interact?

2. Is the feeding behavior evidence of life?

3. What did the brine shrimp do when we shined light into their habitat?

4. Did you notice any other evidence of life while observing the brine shrimp?

FOSS INVESTIGATION EVIDENCE OF LIFE CHART TO REVISIT LAB

EVIDENCE OF LIFE

Teacher Master K

Organism	Needs energy (food)	Needs water	Grows	Reproduces	Needs a suitable environment	Responds to environment	Exchanges gases	Eliminates waste	

Quick Write Date: _____

What evidence can we find that brine shrimp are living organisms?

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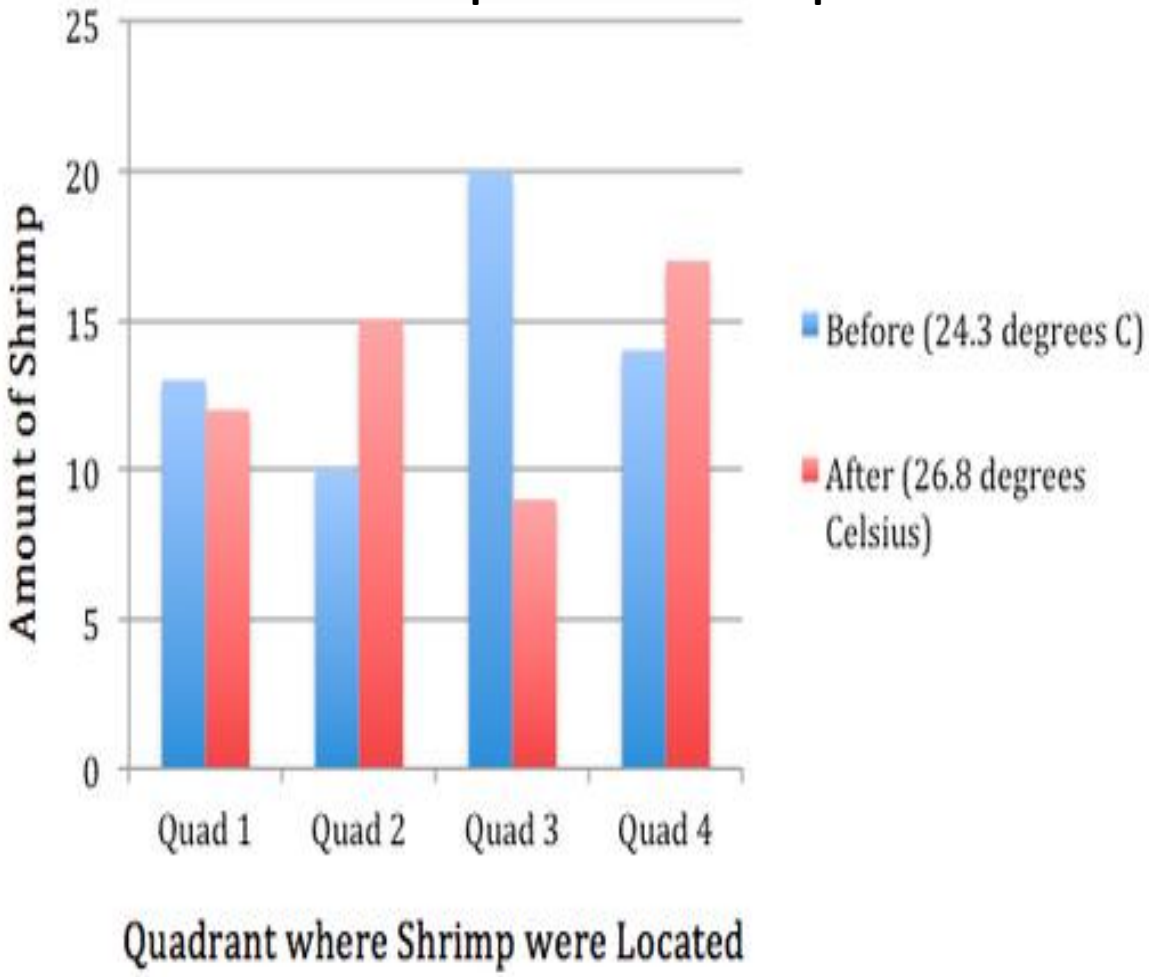
Draw your LINE OF LEARNING here. Date when your ideas have changed. Date: ___

Scientific Argument: Claim, Evidence, Reasoning

6.E.2A.2

Brine Shrimp vs. Habitat Temperature



Find a fact: Which quad had the most brine shrimp in it according to this graph in the AFTER temperature at 26.8 °?
Answer:_____

Using the graph, use your scientific argument skills to make a claim, find evidence and reasoning about the concept of what habitat temperature brine shrimp prefer to thrive in.

Claim:_____
_____

Evidence:

_____
_____
_____
_____
_____

Reasoning:

_____
_____
_____
_____

FOSS INVESTIGATION #3.1 DISCOVERING CELLS
FOCUS QUESTION

1. What microscopic structures make up organisms such as elodea?

2. How are elodea and the paramecium alike, and how are they different?

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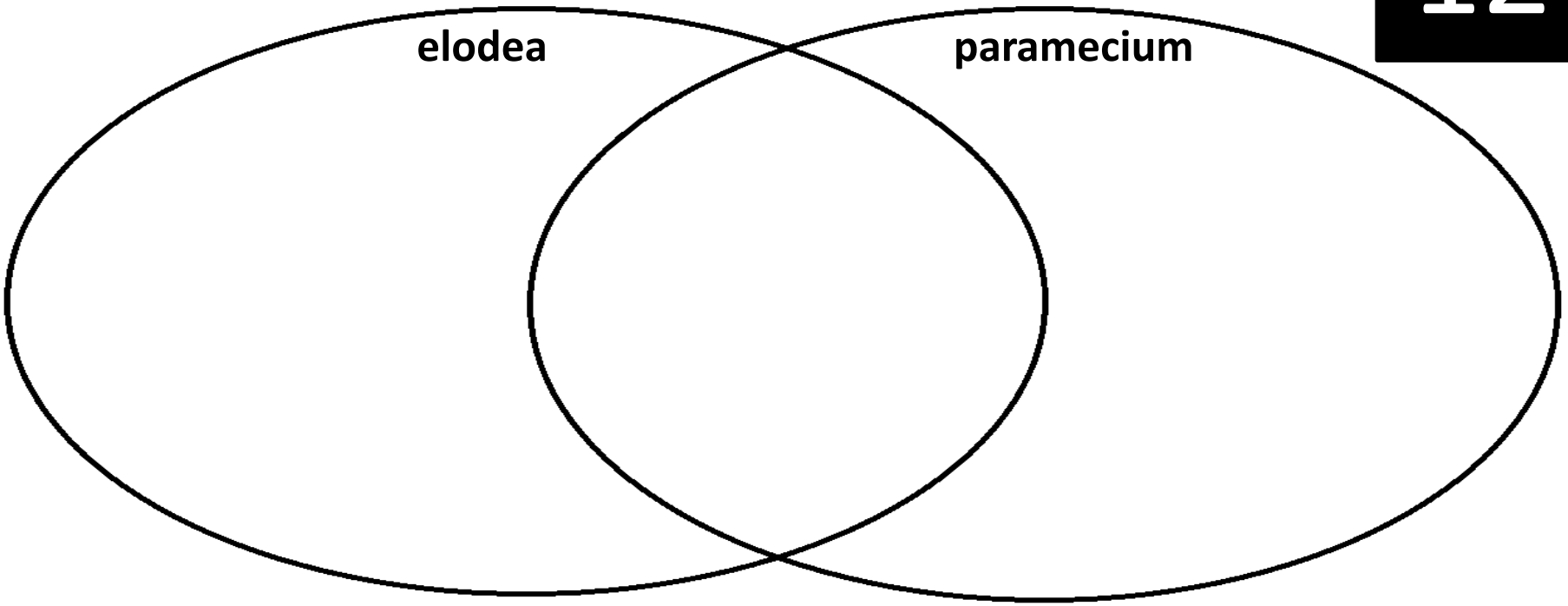


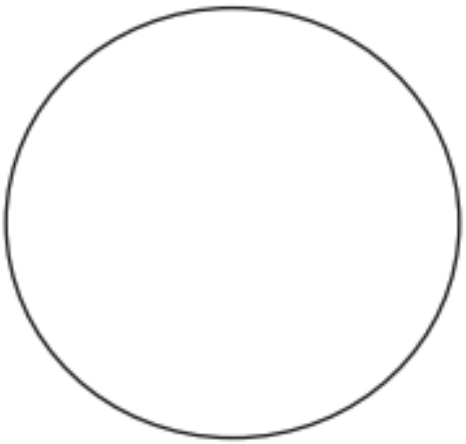
Looking at Elodea

Part 1: Observe elodea leaf layers.

1. Place a small elodea leaf on a slide, top side up, bottom side against the slide. Prepare a wet mount, using pond water and a coverslip.
2. Focus the microscope at 40X and then increase to 100X.
3. Increase the magnification to 400X. Using the fine focus knob, carefully focus up and down through the different layers of the leaf. How many layers can you see?_____
4. Describe what you observe.

Part 2: Observe elodea details and cell size.

5. Look carefully for movement inside the leaf. Describe what you observe.



High power (400X)

6. Draw a few representative *large* brick-like structures to scale in the circle. Do not fill in the entire field of view. Use color and include detail.
7. How many of the *large* green "bricks" fit lengthwise across the field of view?

   _____

8. Estimate the size of one of the "bricks."

   _____

Part 3: Label the drawing.

Label the cell wall, chloroplasts, and cytoplasm.

FOSS INVESTIGATION #3.1 ELODEA OBSERVATION
PART 1: DISCOVERING CELLS

1. **What do you see when you look at the elodea?**

2. **When you focus up and down through the leaf sample, what do you notice?**

3. **Are the rectangles flat, like designs drawn on the surface of the leaf or are they three-dimensional?**

4. **Are the boxes empty?**

5. **How many layers of these boxes or bricks do you see?**

FOSS INVESTIGATION #3.1 ELODEA OBSERVATION
PART 1: DISCOVERING CELLS

6. What is a cell?

7. Are all of the cells in an elodea leaf the same size?

8. How many layers of cells are there in an elodea leaf?

9. Are the large cells on the top of the leaf or the bottom?

10. How big are elodea cells?

FOSS INVESTIGATION #3.1 ELODEA OBSERVATION
PART 1: DISCOVERING CELLS

11. What did Robert Hooke do with a microscope that made him famous?

12. What is a cell wall?

13. What was moving inside the cell wall?

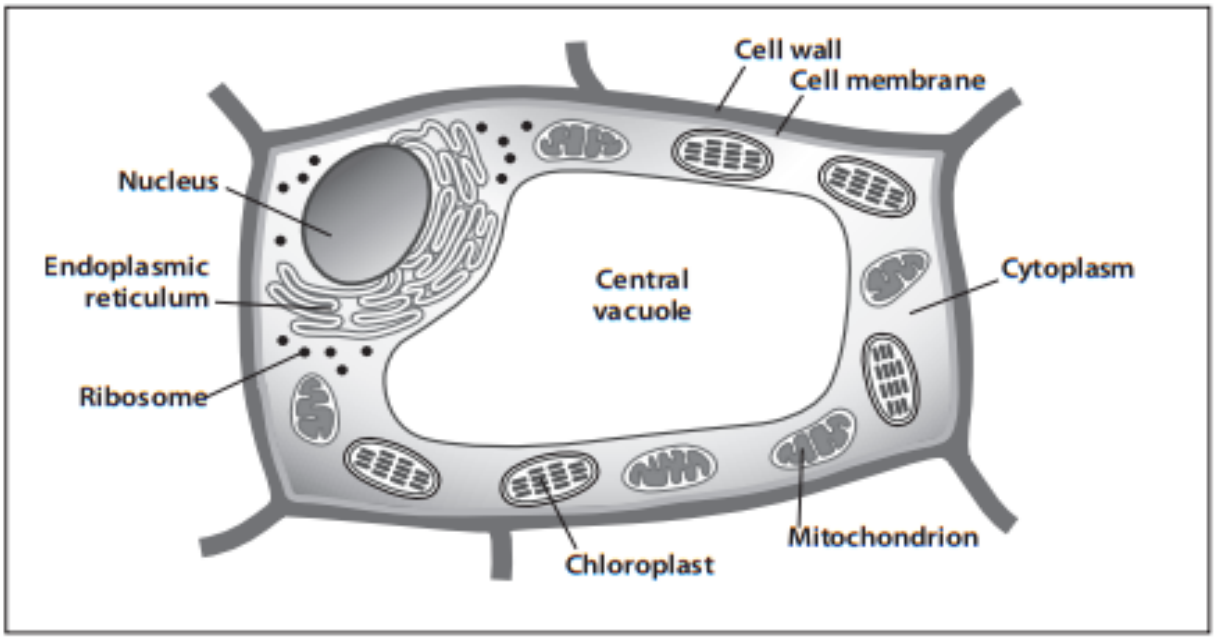
14. What is cytoplasm?

15. What do you see floating inside the cytoplasm?

16. What are chloroplast used for?

11. What do chloroplasts have inside them?

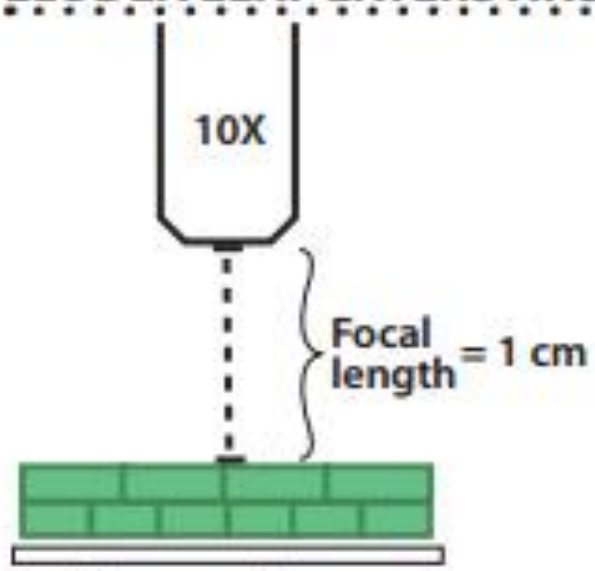
Plant Cell Structures and Functions



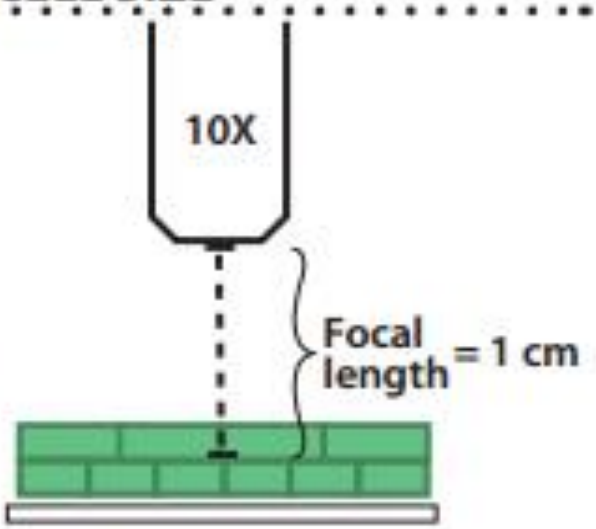
Cell structure	Function
Cell membrane	
Cell wall	
Chloroplasts	
Cytoplasm	
Endoplasmic reticulum	
Mitochondrion	
Nucleus	
Ribosomes	
Central vacuole	

FOSS INVESTIGATION #3.1-DISCOVERING CELLS
LAB SHEET-PLANT CELLS STRUCTURES AND FUNCTIONS

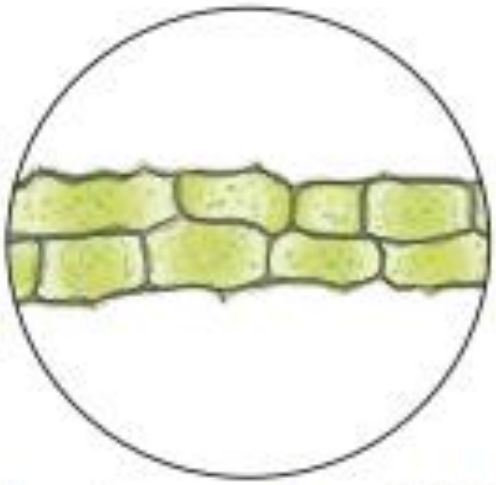
ELODEA LEAF LAYERS AND CELL SIZE



Focus is on top layer of leaf.



Focus is on bottom layer of leaf.



Elodea cells at 400X

CORK CELLS

A view of cork cells based on Robert Hooke's observations in 1665

FOSS INVESTIGATION #3.1
STUDYING ELODEA

20

Cells of the Elodea plant. Note the shape of each cell and the green chloroplasts found in them. 400X
Scientific Name: *Elodea canadensis*
Natural History: Elodea grows in freshwater ponds and slow-moving streams throughout North America. Member of the tape-grass family.

FOSS INVESTIGATION #3.1
STUDYING ELODEA

Chloroplasts in plant cells are in constant motion due to streaming of the cytoplasm. 400X

Scientific Name: *Elodea canadensis*

Natural History: Elodea grows in freshwater ponds and slow-moving streams throughout North America. Member of the tape-grass family.

Scientific Argument: Claim, Evidence, Reasoning

6.E.2A.2

Gas Bubble Production by Elodea

Distance of Plant from Light (cm)	Production of Gas Bubbles/Minute
10	40
20	20
30	10
40	5

Find a fact: Which distance allowed the most bubbles per minute to be produced by the elodea according to this data table?
Answer:_____

Using the data table, use your scientific argument skills to make a claim, find evidence and reasoning about the production of gas bubbles per minute in relation to the distance of the plant to light.

Claim:_____
_____

Evidence:
_____
_____
_____
_____
_____

Reasoning:
_____
_____
_____
_____

- **6.L.5A.1 Analyze and interpret data from observations to compare how the structures of protists (including euglena, paramecium, and amoeba) and fungi allow them to obtain energy and explore their environment.**
- **Essential Knowledge**
  It is essential that the student be able to distinguish between specialized structures that allow protists and fungi to obtain energy and explore their environment.

Protists
Protists are organisms that are classified into the Kingdom Protista. Although there is a lot of variety within the protists, they do share some common characteristics.
● Protists are usually single celled organisms.
● Live in moist environments.
● Vary in the ways they move and obtain energy.

Protists obtain their energy in several ways.
● Animal-like protists ingest or absorb food after capturing or trapping it.
● Plant-like protists produce food through photosynthesis.
● Fungus-like protists obtain their food by external digestion either as decomposers or as parasites.
● Some protists have both autotrophic and heterotrophic characteristics.

Protists have three main ways to move (locomotion) :
● Flagellum (flagella) - a long whip-like tail used to move and/or catch food. An example of a flagellated protist is the Euglena.
● Cilia - small hair-like projections on the surface (cell membrane) of the cell used to sweep food into mouth-like structures and/or beat them in rhythm to move. An example of a ciliated protist is a paramecium.
● Pseudopod – (false foot) a finger-like projection of the cell membrane and cytoplasm used to catch food and/or movement. An example of a protist with pseudopod is the amoeba.

- **6.L.5A.1 Analyze and interpret data from observations to compare how the structures of protists (including euglena, paramecium, and amoeba) and fungi allow them to obtain energy and explore their environment.**
- **Essential Knowledge**

Fungi

Fungi are classified into the Kingdom Fungi. This includes microorganisms such as yeast and molds as well as multicellular organisms such as mushrooms.
There are three main ways Fungi obtain energy:
● Saprophytic - Fungi that get their energy from decaying organic matter.
● Parasitic - Fungi that feed on other living organisms (host) and harm the host.
● Symbiotic - Fungi that feed on other living organisms (host) but do not harm the host. In many cases the host benefits from the fungi.
In most cases, fungi are not mobile organisms.
Fungi can be categorized based on their fruiting structures (structures for reproduction and spore dispersal).

Extended Knowledge

• There are many other examples of protists that use the various methods mentioned above to move or obtain energy. Euglena, paramecium, and amoeba are only a small sample.
• In order to observe the movement and structure of protists, students could be introduced to basic microscopy and observe the organisms first-hand.
• Other cells outside of Protista that have flagellum (many bacteria or sperm cells), cilia (cells in the trachea), and pseudopods (white blood cells).
• Fungi are a very diverse group of organisms. Students may develop and use models that show the methods of fungal reproduction and spore dispersal.

Assessment Guidance

The objective of this indicator is to analyze and interpret data from observations to compare how the structures of protists (including euglena, paramecium, and amoeba) and fungi allow them to obtain energy and explore their environment. Therefore, the primary focus of assessment should be for students to analyze and interpret data from informational texts, observations, measurements, or investigations that supports the claim that protists and fungi have specialized structures that allow them to obtain energy and explore their environment. This could include, but is not limited to, students observing videos of protists and constructing 2-D models to explain how the specialized structures of protists that allow for movement and obtaining energy. Students can also analyze informational text and use that as evidence to argue whether a sample fungus is saprophytic, parasitic, or symbiotic. These fungal examples can be diagrams, images, or live specimens.

In addition to analyze and interpret data, students should ask questions; plan and carry out investigations; use mathematics and computational thinking; engage in argument from evidence; construct explanations; develop and use models; obtain, evaluate, and communicate information; and construct devices or define solutions.