

Signs of Micro-Life

WRU Thinking?

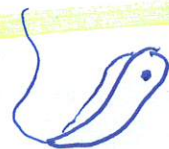
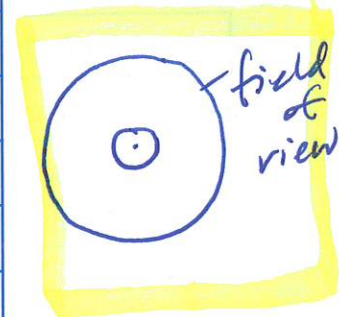
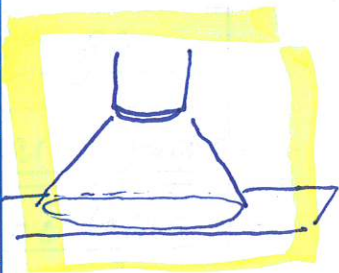
If you like to draw, explain why.
If you don't like to draw, explain why not?

Vocabulary:

Scanning lens: wide angle lens that allows you to see a large area at one time.

Field of View: the area on the slide that you can see when looking through a microscope lens. The area on the slide you can see gets smaller at higher magnification.

Microbe / Microorganism: living things too small to be seen with the naked, human eye.



Spirotrycho-
nympha
bispira

Signs of Micro-Life

WRU Thinking?

If you like to draw, explain why.
If you don't like to draw, explain why not?

Vocabulary:

Scanning lens: wide angle lens that

NAME: _____

ACT 36: MICROSCOPE DRAWINGS

Date _____ Period _____

See page C-24 in book.

Rules for Microscope Drawings:

- Use color or shading
- Use ruler for all lines
- Labels and lines in ink ✓ in pencil
- Lines parallel
- Labels all horizontal
- Labels outside of circle
- Line up labels (if possible)
- Spelling counts
- Correct title and total magnification

Part B: Microscopy Drawing Made Easy

Below is a picture taken through a microscope of the alga *Spirulina*. The diagram to the right shows what a biologist or biological illustrator might draw and how he or she would label the drawing. Did you know that some artists draw only scientific illustrations?



SOME TIPS FOR BETTER DRAWINGS:

- Use a sharp pencil and have a good eraser handy.
- Try to relax your eyes when looking through the eyepiece. You can cover one eye or learn to look with both eyes open. Try not to squint.

40x
100x
400x

10x
(ocular x
objective)
4, 10, 40x

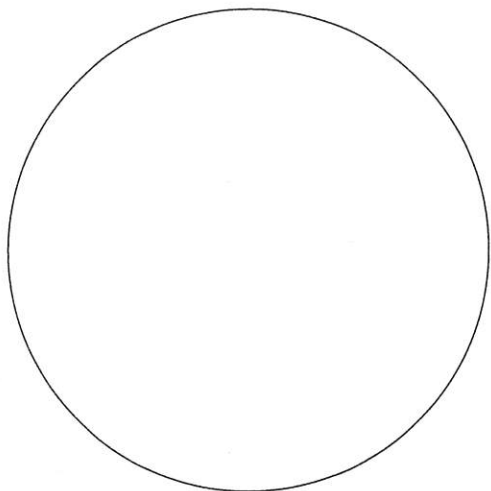


Hint: Plan out where labels will go before you draw/write them!

NAME: _____

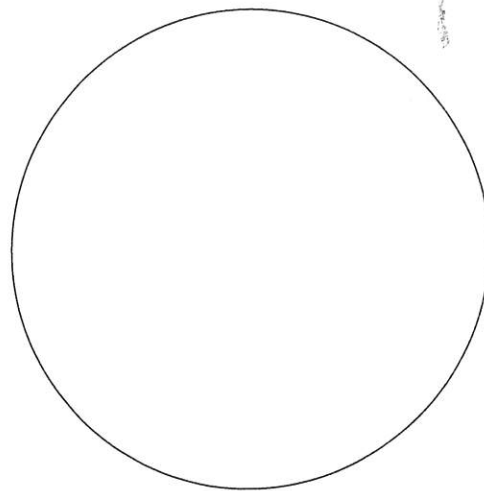
ACT 36: MICROSCOPE DRAWINGS

Date _____ Period _____



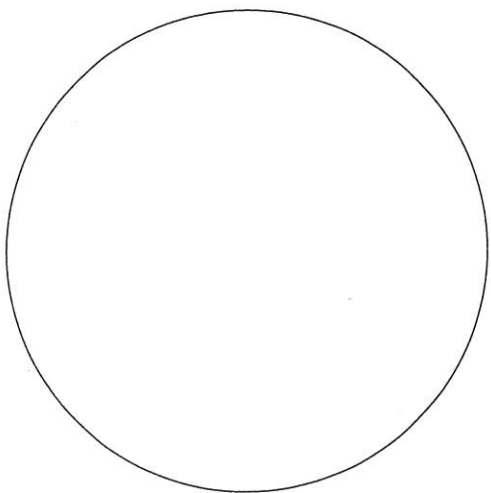
Total Magnification

Title of Slide



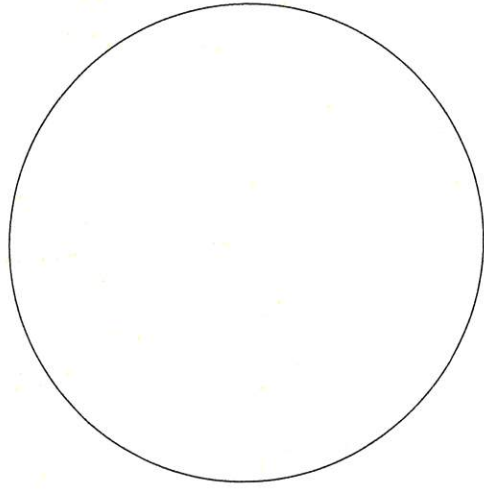
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Total Magnification

Title of Slide



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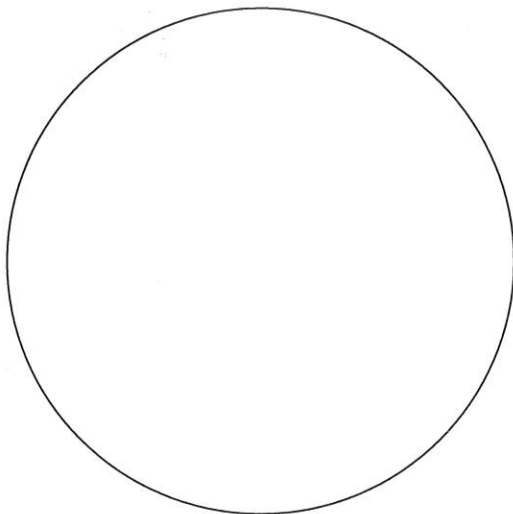
Title of Slide

Name: _____

ACT 36: MICROBE ILLUSTRATIONS /

Period: _____ Today's Date: _____

STRUCTURE AND FUNCTION



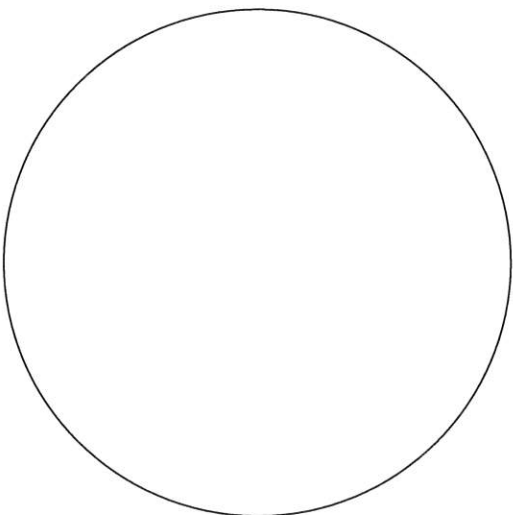
Structure description:

Function prediction:

Research shows (include source):

Title: _____

Total Magnification: _____



Structure description:

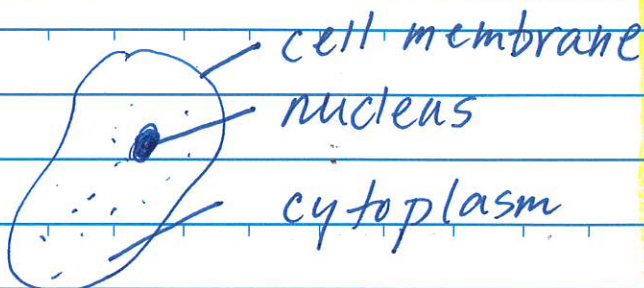
Function prediction:

Research shows (include source):

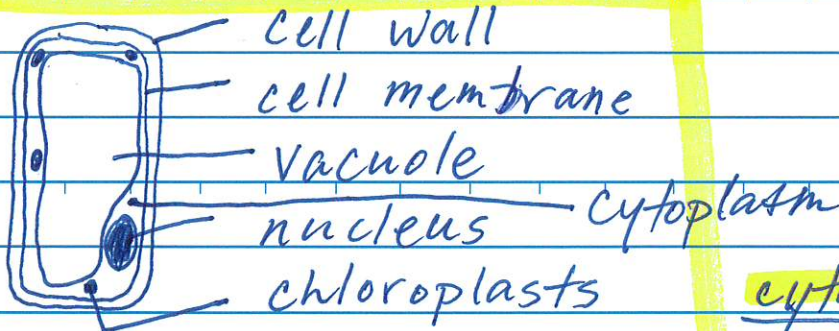
Title: _____

Total Magnification: _____

Vocabulary, continued



typical animal
cell



typical plant
cell
(similar to algae)

cyto =
cell

plasm =
fluid

Analysis Questions (#3,4)

ANALYSIS

1. Is it possible that microbes exist that are smaller than those you observed? Explain how you might try to collect evidence to prove or disprove your idea.
2. Develop three rules you will use the next time you do microscopy drawings.
3. As a scientist, you are asked to describe two of the microbes that you saw to someone who has never looked through a microscope. Write a short paragraph describing the microbes that you observed.
4. **Reflection:** Imagine that you are a researcher studying microbes. Would you choose to study a disease-causing microbe or one that does not cause disease? Explain.

Draw a line under the last part of the AQ that you did.

Name: _____

FRIDAY NOTEBOOK REVIEW # 1

Period: _____ Date: _____

Learning Summary of Last Week: Notebook Pages 1 to 8 (Activities 35 to 36)

- Names of microscope parts and what they do.
(diaphragm, ocular lens, stage clips, revolving turret, etc)
- Rules for how to use microscopes (never use coarse focus w/ 40x lens)
- Draw what you see, not what you think you see.
- Basic cells of plants & animals (nucleus, cell membrane, cytoplasm, & plants have chloroplasts)
- How to label drawings from 'scopes

* Something that was interesting from this week, and <u>why</u> did you find it interesting:	* Draw a diagram that will help you remember something from this week:

* Question(s) that I have related to the topics learned: (you must come up with something!)

You

WRU Thinking?

What do you think are differences between plants & animals, and their cells?

Name:

Activity 38: Analysis Questions and Drawings RUBRICS

CELL DRAWING RUBRIC (SEP #3 and 8):

For self-assessment, put a small dot (•) next to proposed score in each category.

Guideline Category	Score			
Accuracy and Neatness (realistic interpretation and attention to detail, shape and size accurately reflect slides viewed)	1	2	3	4
Coloring / Shading (neatly done, accurate, attempts to capture realistic colors)	1	2	3	4
Labeling and Title/Magnification (labels accurately and neatly done, thoughtful [cited], correct spelling, followed formatting rules, title and magnification correct, in pen)	1	2	3	4
Teacher Overall Score:	Teacher Comments:			

ANALYSIS QUESTION RUBRIC (Knowledge and Understanding):

For self-assessment, put a small dot (•) next to proposed score.

Level	Description	Characterized by ...
4 Highly Proficient	Advanced, Above and Beyond	Student accomplishes Level 3 AND goes beyond in some significant way, such as: <ul style="list-style-type: none"> Using relevant information not provided in class to elaborate on your response. Outside sources of information must be cited using MLA format from www.oslis.org. Information is extremely detailed, clear, Venn Diagram has extra details that go above and beyond what was discussed in class.
3 Proficient	Complete and Correct	Student accurately and completely explains or uses relevant scientific concepts. Responses are full sentences and clearly address questions. Venn diagram has material covered in class correctly placed in circles.
2 Close to Proficiency	Partially Correct	Student explains or uses scientific concepts BUT has some omissions or slight errors.
1 Developing Proficiency	Incorrect or Incomplete	Student incorrectly explains or uses scientific concepts, or not enough evidence to show understanding of content.
Teacher Overall Score:	Teacher Comments:	

Name: _____

**ACT 38: WHAT'S THE DIFFERENCE BETWEEN
PLANT AND ANIMAL CELLS?**

Period: _____ Today's Date: _____

Question: What are similarities and differences between animal and plant cells?Materials:

- Compound Microscope
- Glass Slides
- Cover slip
- Methylene Blue (as a stain)
- Iodine (Lugol's solution – stain)
- Onion layers
- Flat toothpicks
- Tissue paper
- Eye dropper
- Pure (distilled) water
- Tweezers

Bromothymol (BTB)Procedure for Cheek Cells

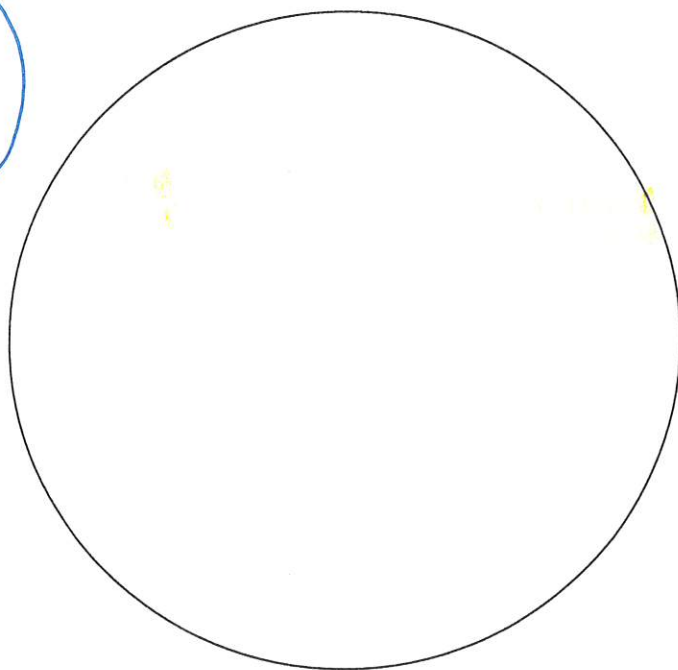
1. Put a small drop of water on the slide.
2. Using the flat end of a toothpick, scrape inside your cheek about ten times on both sides of your mouth.
3. Gently stir the water on slide with the toothpick to mix the cheek cells and water.
4. Add 1 drop of Methylene blue, and carefully, at an angle, lower on a coverslip.
5. Examine the cells at 100x and 400x. BE SURE TO ONLY use the FINE FOCUS when using the 400x lens!!!
6. In the space below, draw, in color, a cheek cell at 400x in detail. You can draw more than one cell if you want to.
7. On your drawing, label (use ruler!) the cell membrane, nucleus, and cytoplasm.

Guidelines for labeling drawings:

- Use blue or black ink for lines/labels/title/mag
- Use ruler for lines
- Lines/labels should be parallel
- Labels go outside the circle
- Labels all horizontal
- Correct spelling
- Plan out where labels will go

Title: _____

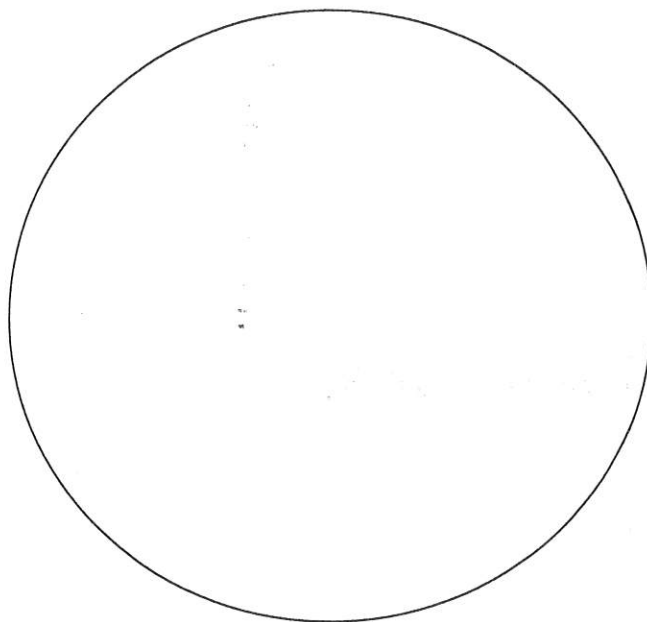
Magnification: _____ X

Procedure for Onion Skin Cells:

1. Carefully peel one layer of skin off the onion and put it on a slide. It must be very thin!!!
2. Put two drops of iodine on the slide and then carefully, at an angle, lower the coverslip.
3. Make sure the onion skin appears flat and not folded over. Redo if folded over.
4. Examine onion skin using 40x magnification.
5. Now move to 100x and 400x and draw your observations on the next page. Above your drawing, indicate which magnification you used for your drawing. It's best to use 400x if possible. Use color.
6. Label the cell wall, cytoplasm, and nucleus.

Title: _____

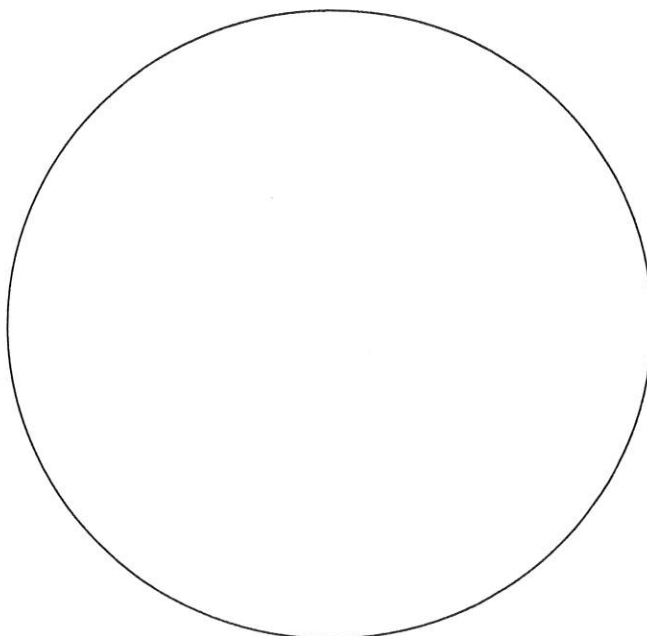
Magnification: _____ X

Procedure for Elodea Leaf:

1. Carefully pinch off a small portion of an elodea leaf and put it on a slide.
2. Put a couple drops of water on the leaf, and carefully put on a cover slip.
3. Examine the leaf under 40x, 100x, and 400x magnification.
4. Draw what you observe, and indicate magnification that you used.
It's best to use 400x.
5. Label the cell wall, nucleus (if visible), vacuole, cytoplasm, and chloroplasts. Use color.

Title: _____

Magnification: _____ X



Name:

Activity 38: Microbes, Plants, and You

1. Describe the shape and structure of the cheek cells, onion skin cells, and Elodea cells. Be detailed in your descriptions.

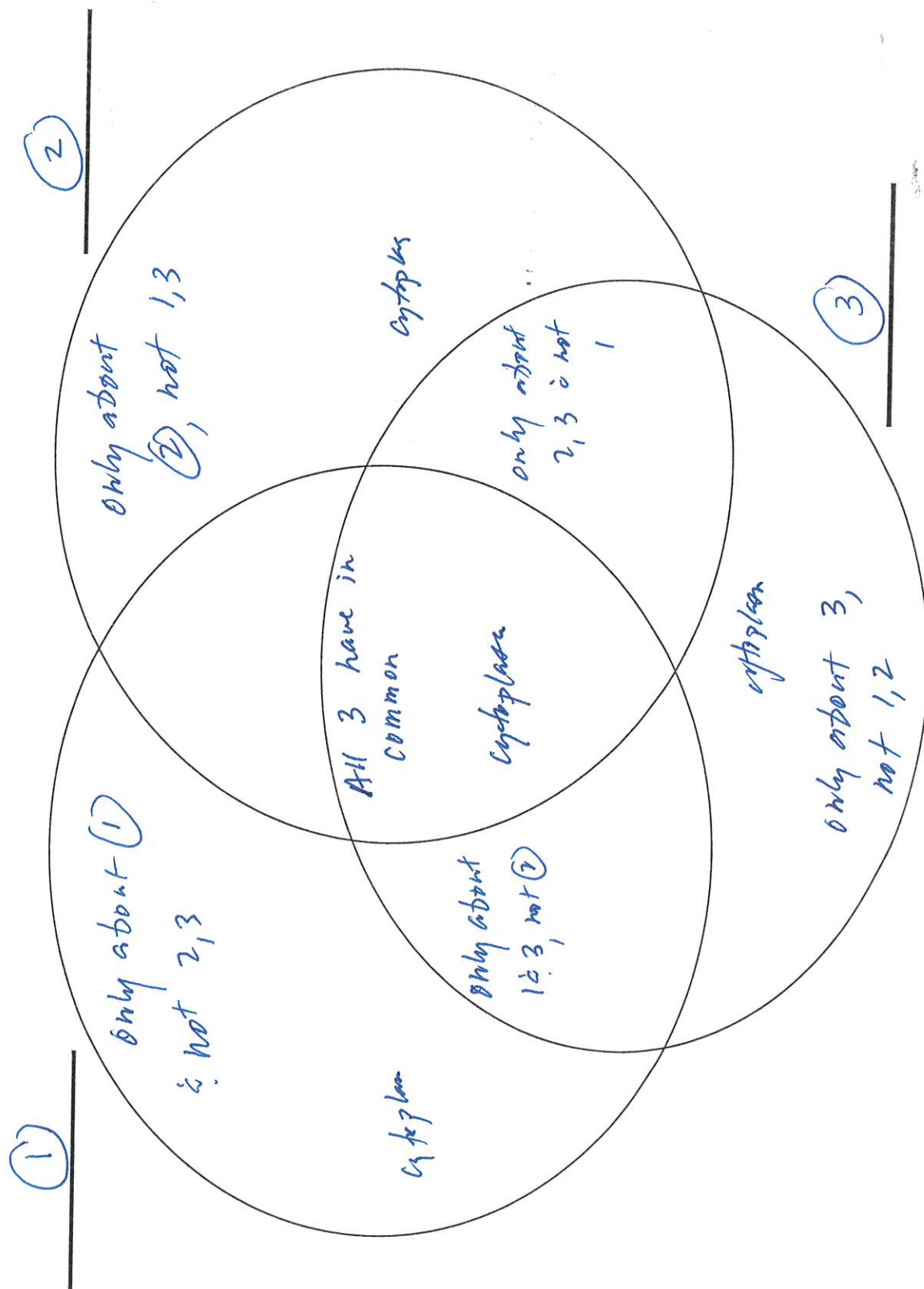
Handwriting practice lines (10 lines) with a small blue mark on the 5th line.

2. Why do you think stains are used when viewing cells under a microscope? Give examples to help explain your answer.

[illegible]

3. Use the triple Venn Diagram on the back to describe similarities and differences between the types of cells we observed in this activity. Use evidence from the microscope/drawing work, and from discussions in class.

3. Look for similarities and differences between the types of cells you viewed. Write clearly, and you may have to write small in places.



You

1.10.11 Th 1.1.11

Name:

Activity 38: Cell Lab Grading Comments

✓	Correct/good point	WCS	What can you see?
INC	Incomplete	FS	Full sentences
X	Incorrect	MSI	Missing something important
D	Describe / description?	DNA	Drawing Not Accurate
CS?	Could you see it?	L	Labeling
WT?	Whole thing?	FLR	Follow Labeling Rules
C?	Color?	T	Title
WE?	What Else?	VD	Venn Diagram
WP?	What parts?	N	Nucleus
sp	Spelling	CM	Cell Membrane
S?	Size?	POL	Plan Out Labels
R	Ruler	CW	Cell Wall
E	Elodea	CM	Cell Membrane

General comments that were very common:

- ★ Be professional – spell the words correctly, especially when the correct spelling is inches away from where you wrote them.
- Be professional – this was an Academic assignment and should have been your best effort.
- On AQ #1, describe, not list parts. Examples: What did nuclei look like? What did chloroplasts look like? How were cells arranged together? How big were things compared to size of the cells?
- Could you really see the cell membrane? How can you describe something that you can't see? Focus on the visible parts that you saw in the microscope.
- Were Elodea cells green? Or did they *appear* green because of all the green chloroplasts?
- You saw examples of what cells should look like – if you weren't sure – ask!
- Needed to show a more complete picture of Elodea and onion skin cells – how are they organized?
- ★ Labeling guidelines are very clear – you should have paid more attention to them.
- Plan out where labels go so you leave enough room to write the whole word and not have it all scrunched up on the margin.
- Cytoplasm is not a thing – it's a fluid. It's not the dots inside the cell. The dots (organelles and nucleus) float in the fluid.
- ★ When talking about staining, what parts could you see better?
- Horizontal Labels vs. Crooked Labels
- Be very careful about saying generic things like "irregular shape". That conjures up all sorts of shapes.

For
PERI
only

WRU Thinking:

If I have a cold and I cough into my hand, would you want to shake my hand? Why or why not?

Notes:

- Robert Hooke - observations on what you see
- Micrographia - tiny drawings
- He developed his own microscope

WRU Thinking: Why do you think it is important for scientists to work together?

The Germ Theory of Disease

WRU Thinking?

What did ancient/older generations think caused illnesses?

FOR
PERIOD 4
only

My person/people:

Name _____

Date _____

Role Play Guide

for

Characters

Setting

Time Period

✱

Additional Props or Material Required _____

Important Contribution(s) to Science _____

*

Name _____

Date _____

Timeline of the Germ Theory of Disease

Provide the date and a short summary of the contribution provided by each person named on the timeline below.

1650

1665 Hooke (Robert)

First recorded observations of cells

1673 Leeuwenhoek

First viewing of living cells

1700

1838 Schleiden

All plants are made of cells

1839 Schwann

All animals are made of cells

cell theory

1845 Siebold

Microbes made of single cells

1750

~~1850s~~ Semmelweis 1840s

Need to wash hands between patients

1850s Virchow

Cells reproduce to make other cells

1800

1860 Nightingale clean materials / bedding prevent disease - be clean!

1860s Pasteur process of pasteurization, Germ Theory of Disease: germs cause

1850

1867 Lister diseases and can be spread by people using chemicals to kill microbes

1876 Koch proved different microbes caused certain diseases, invented agar.

1900

1890 Halsted using gloves during surgery

TENSION



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climate
Post)

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Name: _____

Period: _____

ACT 37: EXTENSION

Teen girls are leading the climate strikes and helping change the face of environmentalism

By Sarah Kaplan, with contributions from Emily Guskin

September 24, 2019 at 7:04 p.m. PDT
Washington Post

Dana Fisher has studied environmental activism for decades, but the crowds of people who took to the streets Friday to demand aggressive measures against climate change were unlike any she'd seen.



About 100 students from Blair High and Northwood Middle schools rallied outside the Silver Spring Metro station in Maryland on Friday to kick off the climate strike. (Astrid Riecken for The Washington Post)

They were young. They were diverse. And they were overwhelmingly girls.

"Something different is happening here," the University of Maryland sociologist said. "We have a new wave of contention in society that's being led by women. ... And the youth climate movement is leading this generational shift."

In a survey of more than 100 U.S. organizers of the climate strike and nearly 200 participants in Friday's Washington protest, Fisher found that 68 percent of organizers and 58 percent of participants identified as female. People of color made up more than a third of protesters in Washington — a proportion that almost matches the racial demographics of the United States.

These findings jibe with results of a recent poll of American teenagers conducted by The Washington Post and the Kaiser Family Foundation. The poll found that 46 percent of girls said climate change was "extremely important" to them personally, compared with 23 percent of boys. At least twice as many black and Hispanic teens participated in school walkouts on climate change than their white counterparts, and girls were slightly more likely to have attended a walkout than boys.

The female leadership of the climate strikes represents a significant change for a movement that has traditionally been dominated by white men, Fisher said. A 2014 study by the Green Diversity Initiative found that people of color made up about 12 percent of staff members and leadership at nongovernmental environmental organizations and foundations. Thirty percent of top positions in these groups were held by women.

But those numbers may be starting to shift. A follow-up survey in 2018 found that women constituted 52 percent of senior staff and 40 percent of board members at environmental NGOs, though people of color represented 21 percent of both groups.

The more diverse crowd at Friday's strike reflects a sea change that has been underway since the Women's March in January 2017, Fisher said. Women are at the helms of many of the progressive activist organizations that have sprung up in recent years, including Indivisible and the Sunrise Movement, she noted.

Marine biologist Ayana Elizabeth Johnson, founder of the Urban Ocean Lab and a speaker at the New York climate strike, said she was "amazed" by the diversity at Friday's event. Johnson, who is 39 years old and black, has long felt that perspectives like hers were sidelined in environmentalism — a reflection of the

Analysis Questions (#1-3)

ANALYSIS

1. Why is the germ theory of disease important in understanding infectious diseases?
2. How important was the development of the microscope in discovering the cause of infectious diseases?
3. **Reflection:** Imagine that each of the scientists in this activity wanted to hire an assistant. With which scientist would you most like to work? Why?

ACTIVITY	Date	Page 14
Cells Quiz #1	10/18	
Study Guide		

Name: _____

Unit C: Cell Biology and Disease

Per. _____ Date: _____

Unit Quiz #1 Study Guide

To study for quizzes:

1. Review all Learning Targets – can you do what you're supposed to do?
2. Review all the handouts carefully.
3. Take notes from the handouts and your Notebook. Just reading them over is the absolute minimum of what it takes.
4. Review (and even re-write) the Analysis Questions.
5. Have a friend/adult quiz you.
6. Teach someone else what you've learned.

Activity (in NB order)	Topics/Concepts
35: A License to Learn	<ul style="list-style-type: none"> • Microscope parts and how to use a microscope • Handouts: Microscope Parts, Use and Letter E Lab, Microscope Quiz • AQ #2-4
36: Looking for Signs of Micro-Life	<ul style="list-style-type: none"> • What a microbe is and how you know something is a microbe • Vocabulary: scanning lens, field of view, <i>resolution</i> • Handout: How to draw and label something in a microscope • AQ #3, 4
38: Microbes, Plants, and You (Cheek/Onion/Elodea Lab)	<ul style="list-style-type: none"> • Differences and similarities between plant and animal cells • What different types of cells look like under the microscope • AQs from microscope lab and cell drawings
37: The History of the Germ Theory of Disease	<ul style="list-style-type: none"> • Read over pages C-31-38 • Contributions of people to the development of the Germ Theory of Disease • Approximate timeframes of discoveries • Background Info about old ideas on infectious diseases and the Germ Theory • Cell Theory and who came up with it • Handout: Timeline with pictures (and don't forget the posters in the hall!) • AQ #1 - 3
42: A Closer Look	<ul style="list-style-type: none"> • Read over pages C56 – C60. • Parts of a cell (know difference between plants and animals) • Prokaryotes vs. eukaryotes • What organelles are, and their main functions • Organism – Organ System – Organ – Tissue – Cell – Organelles (see diagram on page C-59) • Handouts: Reading Outline, Song lyrics • AQ #1, 2, 4

ACTIVITY	Summary of Pages	Date	10/18	Page 15
10-14				

Name: _____

FRIDAY NOTEBOOK REVIEW # 2

Period: _____ Date: _____

Learning Summary of Last Week: Notebook Pages 10 to 14 (Activities 38 to 37)

--

Something that was interesting from this week, and why did you find it interesting:	Draw a diagram that will help you remember something from this week:

Question(s) that I have related to the topics learned: (you must come up with something!)

--

WRU Thinking:

What do you think cells do? What functions must they perform?

Activity 42: A Closer Look

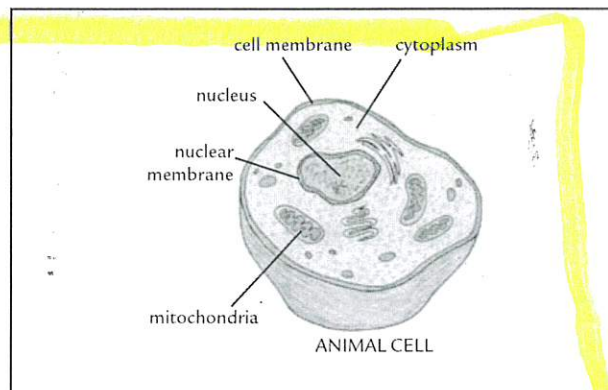
READING OUTLINE

Name:

1. In the space to the right, draw and label a typical animal cell:

2. What does the **cell membrane** do?

*Controls what enters and leaves the cell.
Acts as a barrier between cell and outside.*



3. What do you call the fluid inside a cell that contains all the cell parts?

cytoplasm

4. What does the **nucleus** do? Do all organisms have a nucleus?

*Controls what the cell does – directs all the activities within a cell.
Bacteria do not have a nucleus!*

5. What is an **organelle**?

A little organ – does a specific job for the cell.

6. Which organelle is responsible for producing **energy** that the cell can use?

mitochondria

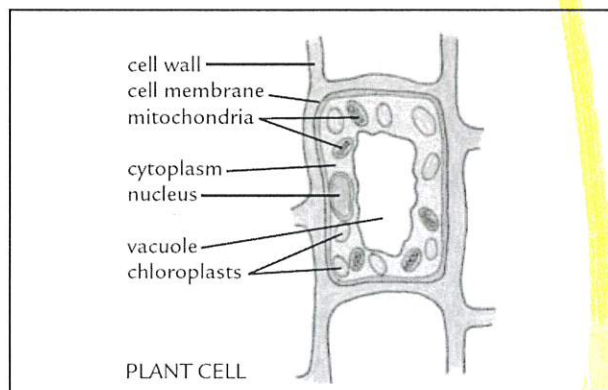
7. "Aerobic cellular respiration" is the name of the process a cell uses to produce that energy. What do mitochondria need to do this?

Oxygen and nutrients (glucose – a type of sugar)

8. In the space to the right, draw and label a typical plant cell:

9. What is the function of a **cell wall**?

Protects and supports plant cells.



10. What is a **chloroplast** and what do they do? Describe in detail.

It is an organelle in plant cells that takes energy from the sun and changes it into food for the plant. The food is sugar, and there are different kinds of sugars. Glucose is one. Chloroplasts also produce oxygen.

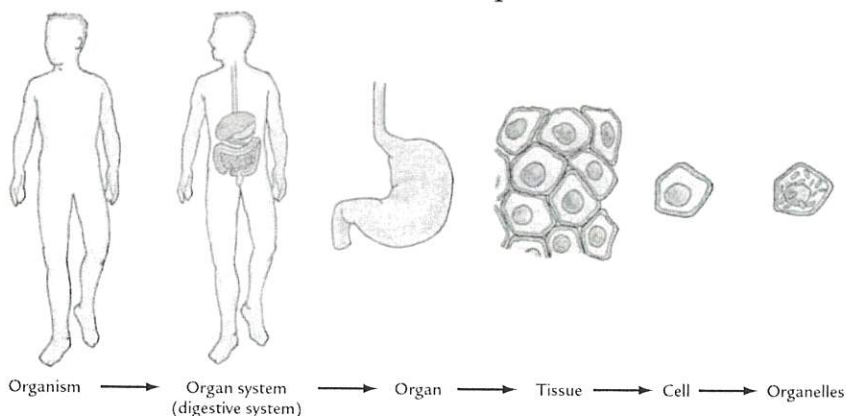
11. Is it just plants that have chloroplasts? Explain.

No, it is not just plants. Algae and phytoplankton, which are protists, also have chloroplasts.

12. Multicellular organisms (organisms made of more than one cell) have a distinct level of organization beyond cells and organelles. Complete the following table:

Level of Organization	Description and/or Definition	Examples
Tissue	group of similar cells that work together to do a specific job	bone, muscle, blood
Organ	group of tissues that are organized together into a structure that does a special job	stomach, heart, lungs, leaves, roots, flowers
Organ System	several organs working together to perform a job	digestive, cardiovascular, root system
Organism	living thing made up of different organ systems working together to make it survive	human, tree, fungus

13. Draw and label the image of the organization system for multicellular organisms using the digestive system and stomach as examples.



14. Studying Cells: What is one very important reason why scientists study cells?

So we can learn more about how to treat or cure different diseases

15. Cell biologists study a lot of different things. Which 2 of the 5 questions listed in the book (and below) do you find the most intriguing, and **why**?

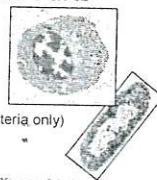
- How do the different cells in an organism work?
- What does each part of the cell do, and how?
- How do the different cells in an organism communicate and control their activities so that things happen in the right place and at the right time?
- How can one fertilized human egg cell grow into a complex adult with many kinds of cells?
- How does a cell know when to divide?

Name

CELL PARTS,
ORGANELLES, and
FUNCTIONS:
A Study Guide

Main Cell Parts

- Cytoplasm
- Cell
- Cell Wall (plants/bacteria only)



Nucleus – the “Control Center”

- The “brain” or _____ of the cell
- Sends signals to other parts of the cell

- Don't forget:

- Prokaryotes: _____
- Eukaryotes: _____

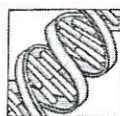


- Nucleus
- Membrane

- control center
- No nucleus
- contain nuclei

Chromatin

- Made of double stranded _____ (nucleic acid)
- Contains all the instructions for the cell
- _____ whenever cell divides to make two cells
- Prokaryotes (bacteria) have slightly different nucleic acids



Found in nucleus

- DNA
- copies itself

Cell Membrane



- The “gate” of the cell
- In plant cells, it's just inside the cell wall

- Like: _____

- controls what enter or leaves the cell
- O_2 , CO_2 , H_2O , glucose

Cell Wall

- Provides structure and _____
- Plants don't have backbones, so they have cell walls for structure and support
- (bacteria) also have cell walls



- Support
- prokaryotes

Cytoplasm

- Cyto = _____, and _____
- Plasm = _____, so _____
- Fluid throughout the cell
- Prevents the cell parts from drying out
- Think: “I’ve been slimed by cytoplasm!”



- cell
- fluid

Main Organelles

- Organelles – _____
- Carry out specific _____
- Found in varying amounts in different kinds of cells

- little organs
- functions

Mitochondria



- The powerhouse of the cell!
- _____
- Sort of looks like it has lightning bolts inside!
- Remember: “Mighty Mitochondria”

- releases energy from food

Activity 42: A Closer Look

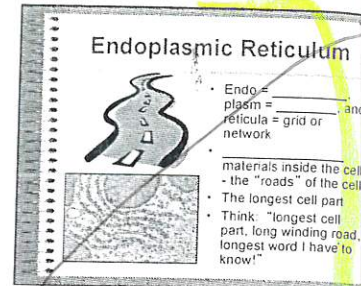
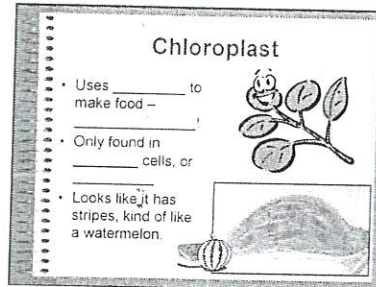
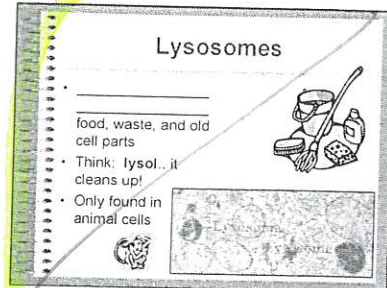
READING OUTLINE

Name:

1. Int
typ

2. Wh

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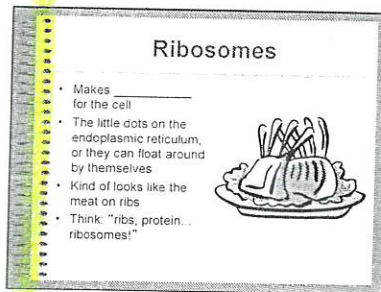


3. Wh
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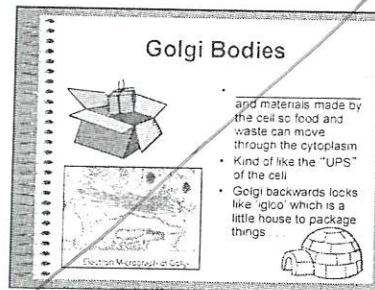
• sunlight
• photosynthesis
• plant / algae

4. Wh

5. Wh



6. Wh

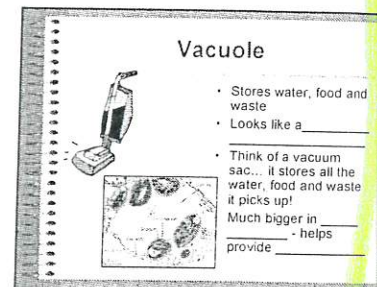


7. "A
enc

• proteins

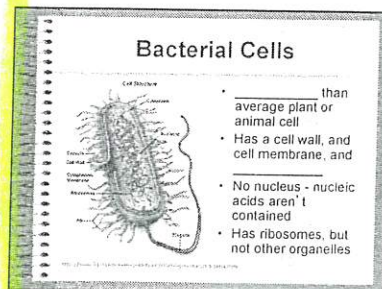
8. In
typ

9. Wh



• large, clear bubble
• plant cells
• support for plants

10. Wh
do



• smaller
• cytoplasm

11. Is
No

Name _____

The Cell Song

View it at <http://www.youtube.com/watch?v=rABKB5aS2Zg>

Glenn Wolkenfeld © 2012

I went into a cell, to get out of the rain,
 And there was the gatekeeper, the cell membrane.
 I went into a cell, and what did I see?
 The mitochondria, it's the energy factory.
 I went into a cell, and said "who drives this bus?"
 And found myself talking to the boss, the nucleus.
 I went into a cell, to recover from a spasm,
 And found myself swimming in some clear cytoplasm.

I went into the nucleus to ask how to get home,
 And got genetic info, stored in a chromosome.
 I went into a cell, and stretching o' so far,
 Was a thin and wavy network, it's called the E.R.
 I went into a cell, trying not to be perplexed,
 By the packaging and sorting in the Golgi complex.
 I went into a cell, and said "who makes proteins here?"
 And somebody responded "it's the ribosome, my dear."
 I went into a cell, and was feeling pretty fine,
 'Til a lysosome engulfed me, and dissolved me in enzymes.
 I went into a cell, and was feeling pretty nimble,
 'Til a centriole lassoed me, tying me up in a spindle.

I went into a plant cell to see how trees get so tall,
 And all around the outside was a rigid cell wall.
 I went into a plant cell, "why's it so green I asked?"
 "'Cause I make food from sunlight," said a green chloroplast.
 I went into a plant cell to see how plant cells store food,
 When a vacuole informed me that he was the storage dude.

So when you go inside a cell, remember what you see,
 There's over a trillion cells in both you and me.
 Just sing this song if you ever feel confusion,
 And remember active transport is the opposite of diffusion.

Analysis Questions (#1, 2, 4)

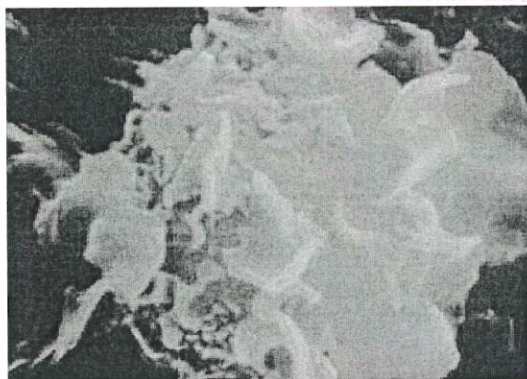
* done orally in class

ANALYSIS



1. Observe the pictures of animal cells shown below. Cells 1, 2, and 4 were taken with a scanning electron microscope which shows the surface (and not the inside) of the cell. This type of microscope magnifies the cells much more than the microscopes you use in class. You can see that the cells have quite different shapes: some are rounded, while others are elongated, flat, or ruffled. These shapes depend on the cells' functions in the body. Try to match each cell with one of the following descriptions.

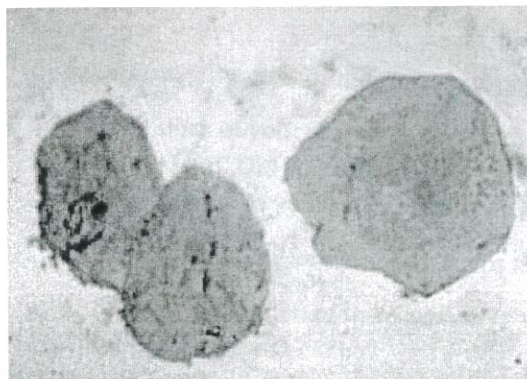
- These cells have long branching parts that send signals to distant parts of the body.
- These flat cells form an even covering on the surface of areas like the inside of the mouth.
- These round human cells are unusual because they do not have a nucleus. They are full of a protein that carries oxygen to all parts of the body.
- These cells are able to crawl around the body to attack bacteria and other foreign material. Ruffles on the cell membrane lead the way as the cells move.



1



2



3



4

Analysis Questions (#1, 2, 4)

* done orally in class



2. Based on its description, which of the four cells described in Question 1 is a nerve cell? Which is a red blood cell? Which is a white blood cell? Which is a skin cell? Explain how you were able to match the type of cell with its function.



3. Complete the third column of Student Sheet 42.1, "KWL: The Wonderful World of Cells." Discuss your answers with your group of four.

4. Imagine the cell is a factory. List the parts of a factory that the following parts of the cell correspond to because of similar functions.

Parts of a Cell	Parts of a Factory
Cell membrane	
Cytoplasm	
Nucleus	
Nuclear membrane	
Mitochondria	

5. Explain why membranes are so important to cells.
6. Look back at your drawings from Activity 36, "Looking for Signs of Micro-Life." Did you observe any structures within the microbes that you drew? What do you think these structures are?
7. Explain how the study of cells helps treat disease.
8. **Reflection:** Which of the questions studied by cell biologists is most interesting to you? Why?