

Name: _____

Date: _____ Section: _____

Cell Structures

Bacteria Basics

INTRODUCTION

Have you gotten a sore throat recently? You go to the doctor's office and the doctor swabs your throat. The results come back and the doctor tells you that you have strep throat. That means these guys below have taken up residence in your body



Illustration: Don Smith

The test performed was called a strep test and tested you for *Streptococcus pyogenes* – that's science talk for a chain of bacteria - microscopic organisms made up of a single cell. So how can such a puny single cell cause you to be so miserable?

Don't take it personally. They don't intend to hurt you; they're just trying to find something to eat, something to drink, and a place to live and raise a family.

Not all bacteria are bad though. Did you know that you have 4-5 different kinds of bacteria that live with you on and in your body right now? These bacteria do not hurt you at all. These bacteria are called **mutualistic symbionts**. That's another science term that mean they help us and we help them.

As a matter of fact, these very bacteria help you more than you know. In your intestines right now there are literally hundreds of thousands of bacteria that are helping you break down your breakfast and lunch. In fact, *you have more bacteria in your intestines than all the people that have ever lived on this planet!* These tiny, single-celled organisms are everywhere. Let's go find some....



LEARNING GOAL(S):

By successfully completing this lab...

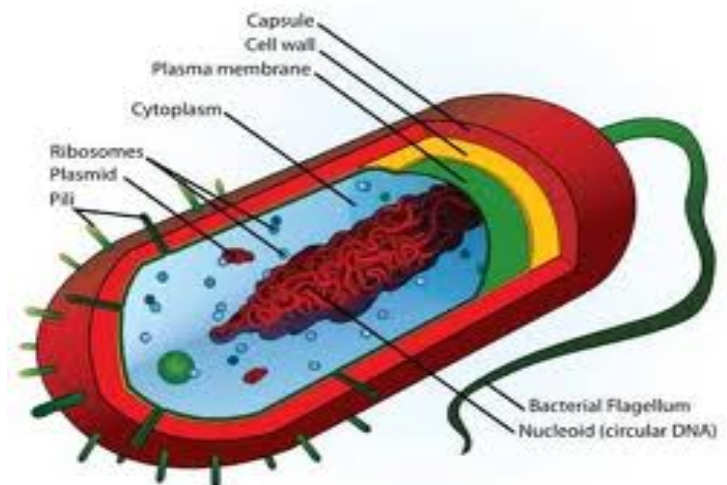
> **I will be able to** explain the difference between two different types of cells, prokaryotic and eukaryotic.

BIG THE Idea

Cells are the basic unit of life and contain specific parts that do specific jobs.

KEY TERMS

- **Aerobic** [ai-roh-bik]: requires oxygen.
- **Anaerobic** [an-uh-roh-bik]: does not require oxygen.
- **Bacteria** [bak-teer-ee-uh]: a type of single celled organism.
- **Eukaryote** [yoo-kar-ee-oht]: a cell with a nucleus.
- **Organism** [awr-guh-niz-uh m]: a living thing.
- **Prokaryote** [proh-kar-ee-oht]: a cell without a nucleus.
- **Yogurt**- a food made from milk that has been spoiled by bacteria.



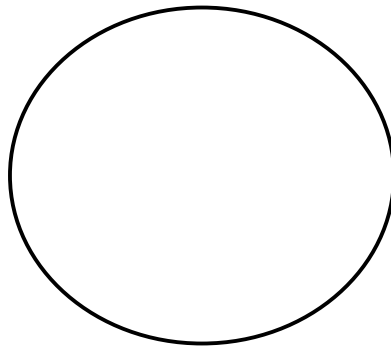
Self-Check

1. Can you explain the difference between a prokaryotic and eukaryotic cell? ____ **YES** ____ **NO**
2. Can you give an example of a prokaryotic cell? ____ **YES** ____ **NO**
3. Can you give an example of a eukaryotic cell? ____ **YES** ____ **NO**
- 4.. Do you know what to do if you see bubbles under the cover slip? ____ **YES** ____ **NO**

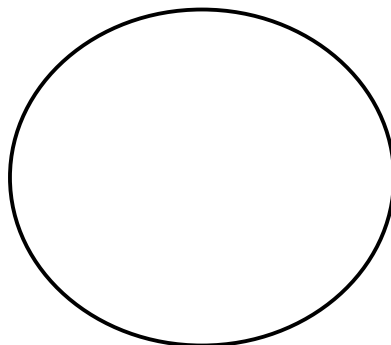
Put an **X** in the boxes to show which organelles are in the different types of cells listed in the LEFT column:

	Cell membrane	Cell Wall	Cytoplasm	Nucleus	Mitochondria	Chloroplasts	Vacuoles
Prokaryotic cell							
Eukaryotic cell							

Draw a eukaryotic cell and label all its parts



Draw a prokaryotic cell and label its parts



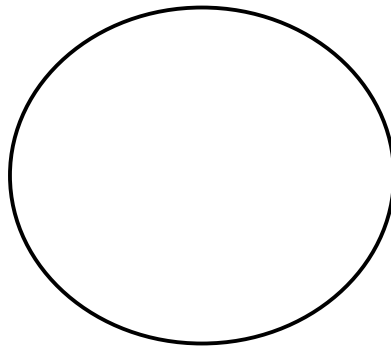
Self-Check

1. Can you explain the difference between a prokaryotic and eukaryotic cell? ____ **YES** ____ **NO**
2. Can you give an example of a prokaryotic cell? ____ **YES** ____ **NO**
3. Can you give an example of a eukaryotic cell? ____ **YES** ____ **NO**
4. Do you know what to do if you see bubbles under the cover slip? ____ **YES** ____ **NO**

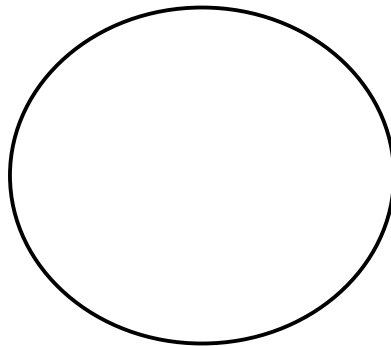
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Prokaryotic cell							
Eukaryotic cell							

Draw a eukaryotic cell and label all its parts



Draw a prokaryotic cell and label its parts



BACTERIA LAB



MATERIALS

- slide x1
- cover slip x1
- dropper x1
- microscope x1
- yogurt
- cup of water
- toothpick x1

**ALWAYS CARRY A
MICROSCOPE IN AN
UPRIGHT POSITION.
USE 2 HANDS!!**



PROCEDURES



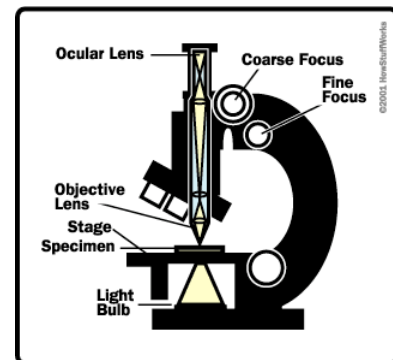
STEP 1

Go to the rubric(s) **on the last page** and read the criteria for level 3 work.



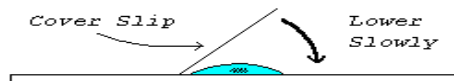
STEP 2

Set up your microscope in a secure location to avoid an expensive crash!



STEP 3

Using a toothpick, place a small dab of yogurt on a slide. Add one drop of water to the yogurt and place the cover slip on top.



Technique Tip: NEVER PRESS ON THE COVER SLIP TO TRY TO REMOVE AIR BUBBLES. This will break the cover slip and/or damage your specimen.



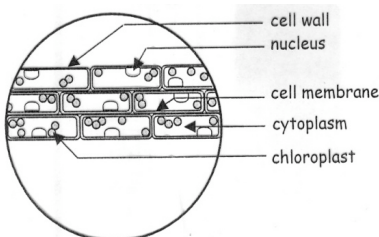
STEP 5

Switch to the next two powers and make drawings for each one on the data sheet.



STEP 4

Under **LOW power**, find a section where the yogurt is pretty thin; this is where you will find the bacteria. Draw, what you see and label the structures on the data sheet.



STEP 6 Clean up!

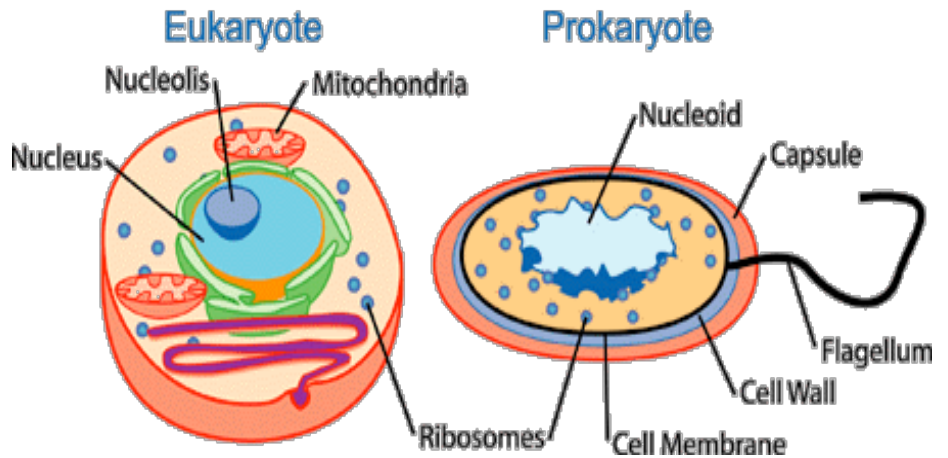


KEY INFO

Cells (the smallest individual units of life) are divided into two basic categories: **prokaryotic** cells, and **eukaryotic** cells.

- Bacteria are prokaryotes. All other organisms are eukaryotes.
- Most prokaryotic cells are extremely small and do not have a nucleus.
- Most prokaryotic cells have flagella, whip like structures used for movement and pili, small hair like structures that help bacteria stick to surfaces or to other bacteria.
- Eukaryotic cells are larger and have a nucleus.

Bacteria Basics



The best way to identify bacteria is by cell shape. Each of the shapes on the right shows a specific bacterium (means only one). Each shape has a letter that gives its scientific name on the list.

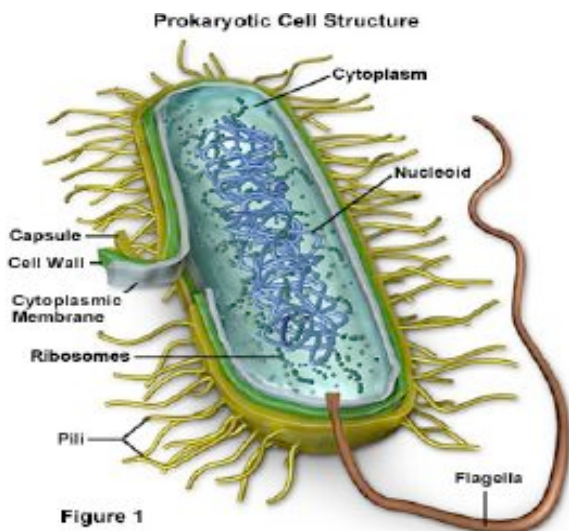
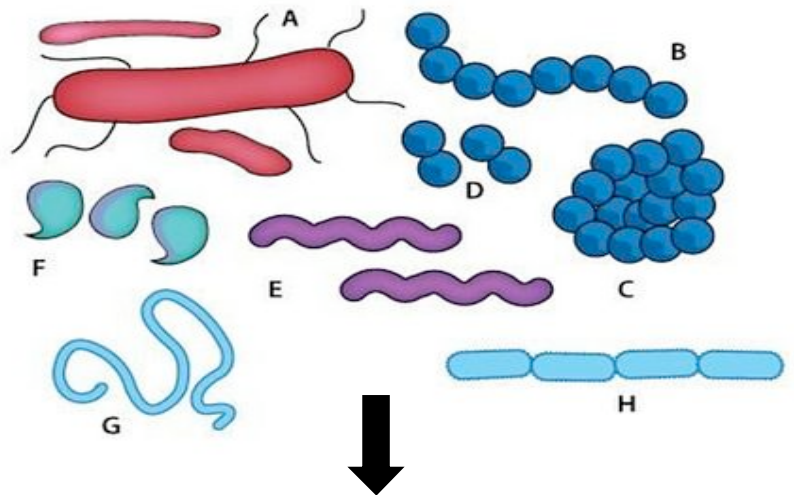
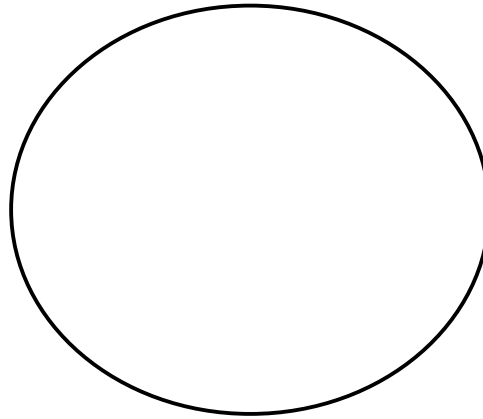


Figure 1

Types of Bacteria

- A Bacilli with and without flagella
- B Streptococci
- C Staphylococci
- D Diplococci
- E Spirochete
- F Club rod
- G Filamentous
- H Streptobacilli

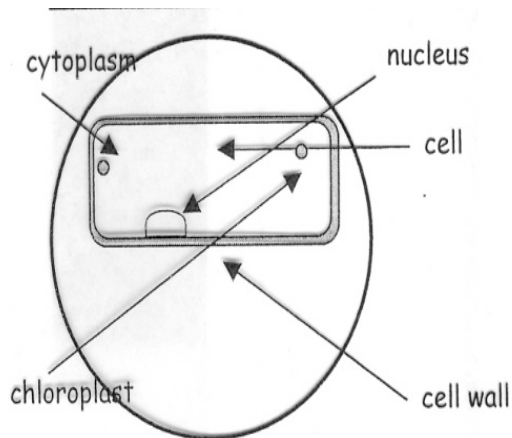
Mag. _____



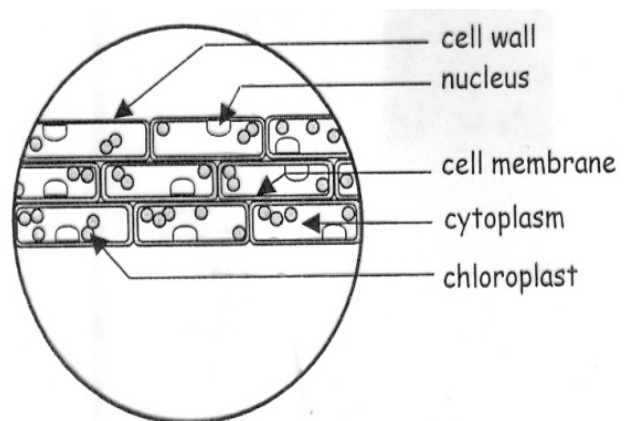
- ☐ **YES** I provided a written explanation of what my drawing shows, including the specimen's shape and structures
- ☐ **YES** I underlined the key terms I used in my description
- ☐ **YES** My description contains key information that is neatly written and legible in a clear and understandable way
- ☐ **YES** My drawing uses shading for highlights
- ☐ **YES** My title and magnification are on top

- ☐ **YES** My drawing is large enough so all of the parts can be easily seen
- ☐ **YES** My line quality is sharp and precise (no smudges)
- ☐ **YES** My labels are outside the circle on the left or right and have straight lines that point to the specific parts inside the drawing; it's clear what is being labeled

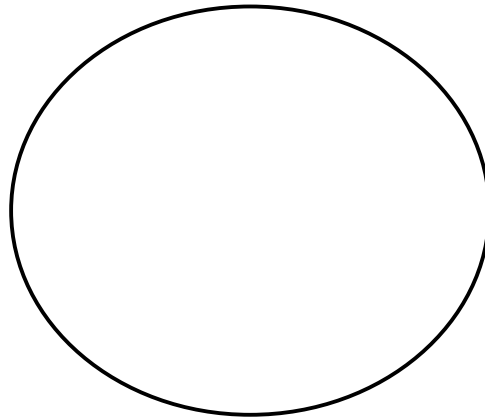
Incorrect Drawing



Correct Drawing

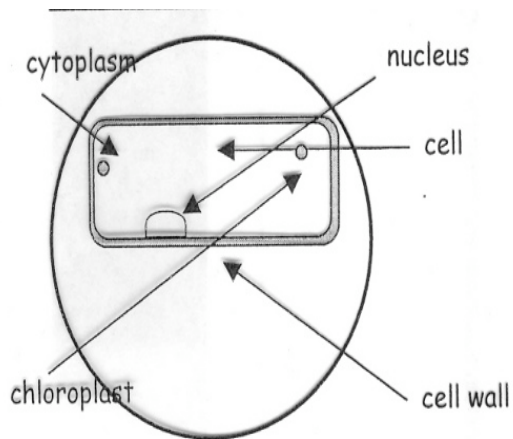


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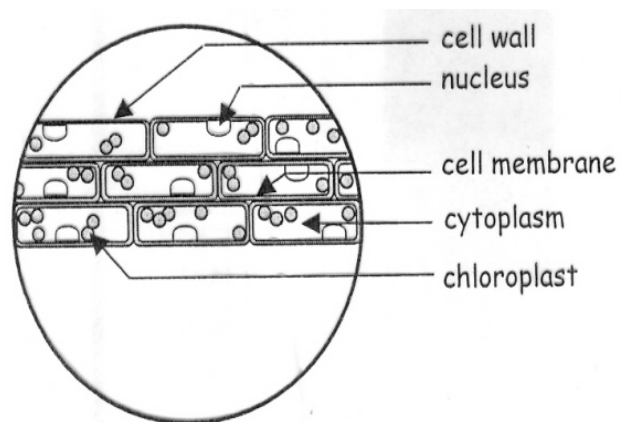


- | | |
|---|---|
| <input type="checkbox"/> YES I provided a written explanation of what my drawing shows, including the specimen's shape and structures
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|---|---|

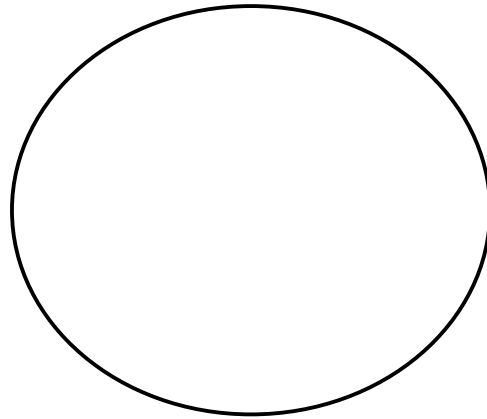
Incorrect Drawing



Correct Drawing



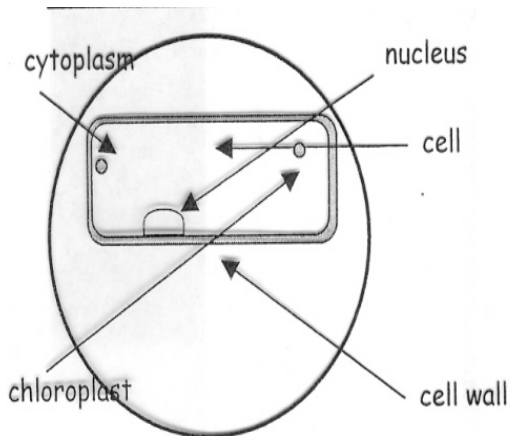
Mag. _____



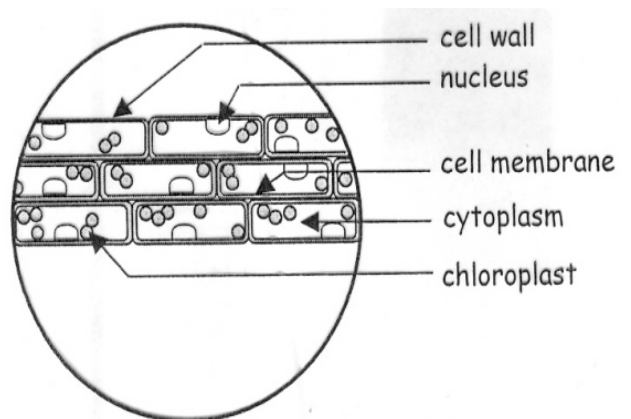
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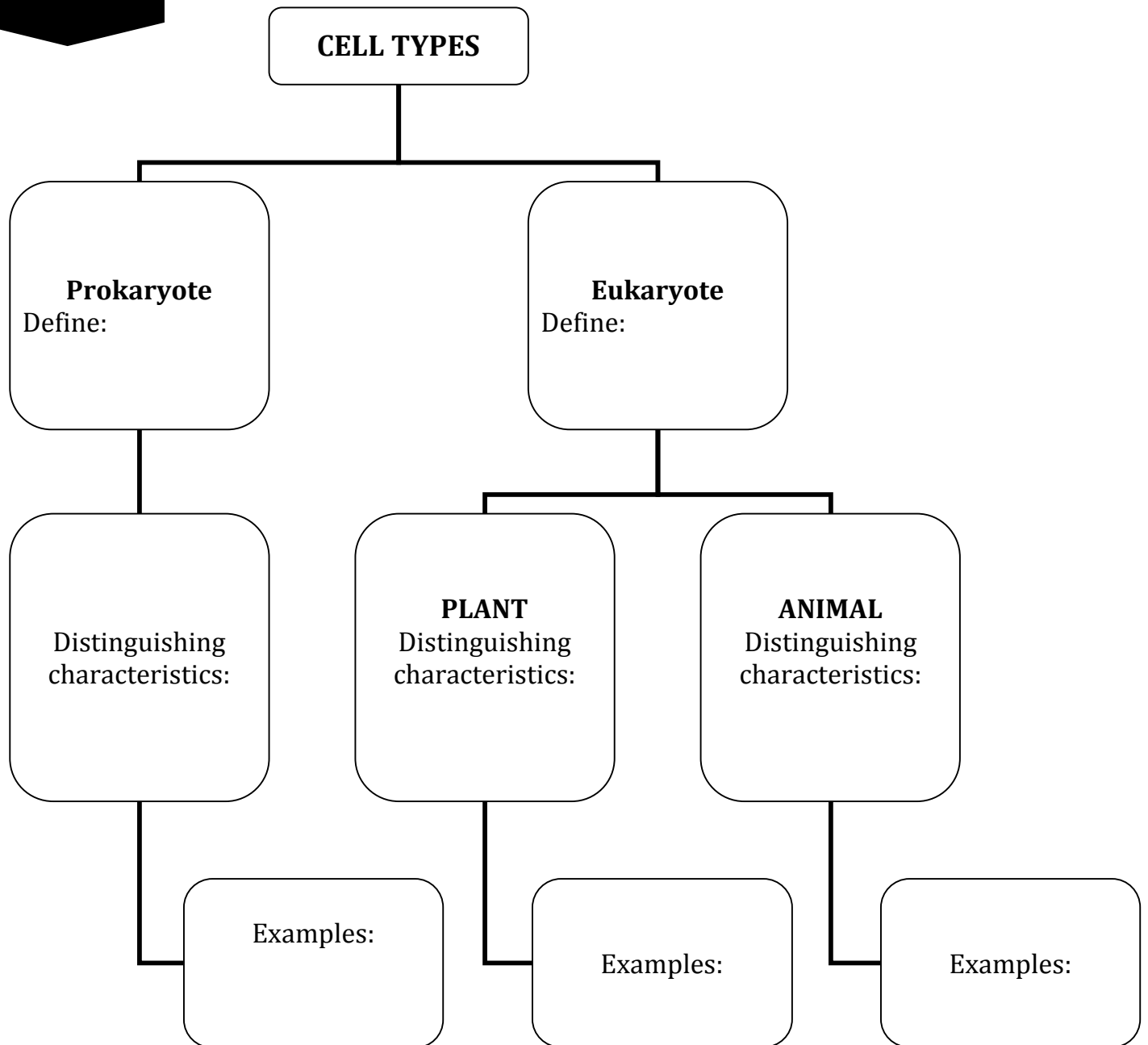
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Incorrect Drawing



Correct Drawing





Performance Indicators

- At Level 1, work needs to improve a lot.
- At Level 2, work meets the minimum requirements.
- At Level 3, work is satisfactory.
- At Level 4, work is excellent.

SCIENTIFIC DRAWING RUBRIC	4 Yes, and in addition...	3 Yes	2 Yes, but...	1 Not yet
1. Each drawing follows the checklist as required, has a title, power of magnification and provides an attractive presentation without smudges or erasure marks.	S____ T____	S____ T____	S____ T____	S____ T____
2. Each drawing has labels on the outside with straight lines pointing to the specific parts inside the drawing. The labels are correctly spelled and scientifically accurate.	S____ T____	S____ T____	S____ T____	S____ T____
3. Each drawing is large enough to see all the structures and details	S____ T____	S____ T____	S____ T____	S____ T____
4. Each drawing has a full and accurate description that includes: <ul style="list-style-type: none"> ▪ The shape and color of the specimen ▪ The structures that are visible and their locations ▪ Key terms that are underlined 	S____ T____	S____ T____	S____ T____	S____ T____

Scoring Key					
16-15 pts A+ (98%)	14 pts A (95%)	13 pts A- (90)	12 pts B + (88%)	11pts B (85%)	10 pts B- (80%)
9 pts C+ (78%)	8 pts C (75%)	7pts C- (70%)	6 pts D + (68%)	5 pts D (65%)	4 pts. D- (63-60%)

Total (S) _____ Total (T) _____

My Effort	My Strategies
<input type="checkbox"/> 4: I worked on the lab the entire time until it was completed. I pushed myself to continue and did not get distracted by social conversations or other difficulties.	<input type="checkbox"/> 4: I was highly focused and repeatedly used my notes, textbook and other resources to solve problems by myself to achieve the goal(s) of this lab.
<input type="checkbox"/> 3: I worked on the lab most of the time and finished it even though I might have been distracted some of the time.	<input type="checkbox"/> 3: I used my notes, textbook and other resources to solve problems and achieve the goal(s) of this lab before I asked for help from my classmates or teacher.
<input type="checkbox"/> 2: I worked on the lab some of the time but was distracted by social conversations or other difficulties. I might have finished but just barely.	<input type="checkbox"/> 2: I made some progress and might have used my notes, textbook and other resources to solve problems and achieve the goal(s) of this lab.
<input type="checkbox"/> 1: I put very little effort into this lab and spent a lot of time in social conversations, making unrelated comments to others and didn't finish on time.	<input type="checkbox"/> 1: I asked for help as soon as any problems arose and did not use my textbook, notes or other resources. I waited for the teacher or my classmates do it for me.