



Ants

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Oak Trees

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Chickadees

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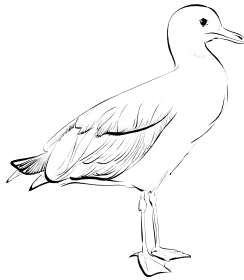
Rain

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Rabbit

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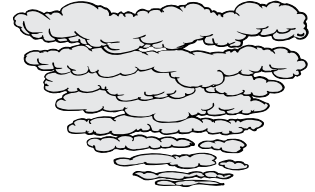
California Gull

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Pond

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Clouds

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Rabbits

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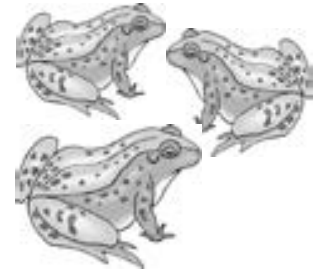
Forest

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Fox

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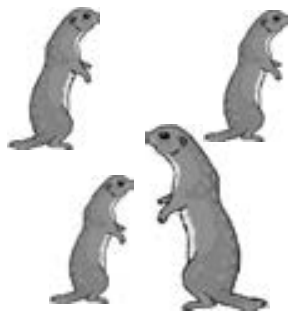
Frogs

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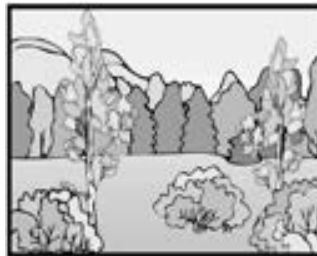
Hillside

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Prairie Dogs

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Trees, Shrubs,
and Grass

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Butterflies, Bees,
and Flowers

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Hawk

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Mushrooms

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Lightning

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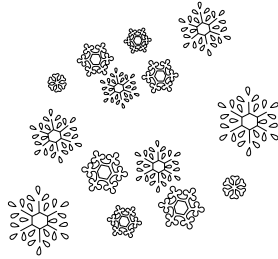
Mice

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Rocks

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Snowflakes

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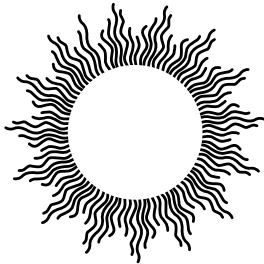
Poppies

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Elodea and Guppies

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Sunlight

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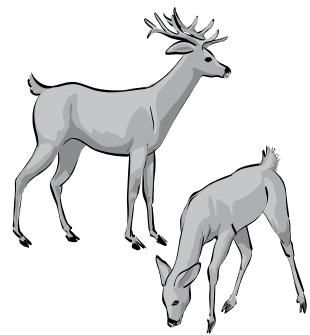
Heat

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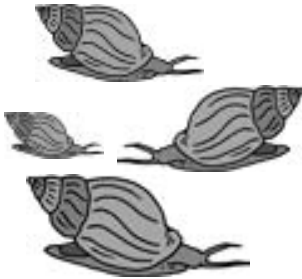
Chickens

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Deer

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Snails

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Fire

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Brine Shrimp

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Ocean

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Name:
Period:
Date:

Biotic or Abiotic?

1. In the list below, place an "X" next to the name of the things that are living or part of living (Biotic), leave alone things that were never living (abiotic).

_____ pencil	_____ computer	_____ squirrel	_____ seed
_____ flower	_____ bird	_____ dinosaur	_____ chair
_____ sun	_____ wind	_____ rocks	_____ grass
_____ paper	_____ water	_____ soil	_____ apple

2. Compare your response with your group discuss the differences.
3. In the space below, write a brief explanation for how you determined whether the object is biotic or abiotic.



NOTES ON WRITING A CER



The Martian and the Car

Using A CER format respond to the following Synopsis.

Marty Martian was sent to Earth by the Martian government to find life. While on Earth, Marty captured a car and brought it back to Mars. He thought he'd found a good example of life on Earth. The Martian government does not believe that the car Marty brought back is alive. Marty must stand trial for failing to perform his Martian duties.

At the trial, Marty spoke in his defense. "I first saw these life forms rolling along roads in great numbers. They were giving off thick clouds of poisonous waste as they moved. They seemed to exhibit herding behavior, as many of the cars moved in the same direction. They appeared to have a great deal of energy, some of them moved faster than 60 kilometers per hour when one of these life forms stopped or slow down, the others behind it responded. They slowed down and gave off a reddish light from the back, and sometimes they would make honking noises. I observed that they would stop to feed on a liquid substance."

Marty makes some good points. Is Marty right? Is car living? Explain using supporting evidence.

STEP 1 - Make a CLAIM

Performance Indicator	Exceeding	Meeting	Approaching	Not Meeting
SC.3 Develop a claim that answers a question or is in support of a position (ELA.W.1)	I can... Incorporate background information to develop a reasonable claim that clearly answers the question or is in support of a position	I can... Construct a reasonable claim that clearly answers the question or is in support of a position	I can... Write a claim that is not fully developed	I can... Write a claim that does not relate to the question OR Write a response that does not include a claim

For each example of a CLAIM below decide where it lands in the rubric.

- Marty the Martian came to planet Earth to get a proof of life. After making some observations, he took a car back as sample of a living thing. Martian Government disagreed with Marty and decided to prosecute him for not completing his Martian duty. Marty did observe characteristic of living things in the car, but he jumped the gun by assuming that the car is living. Car may have some characteristic of living things but it does not have all six characteristic of living things therefore it is not a living thing.*
- Though Marty does make some good points, he is incorrect. Any living organism must have six specific characteristic to be designated as living. Marty only observed some of the six in the car. Therefore car can not be living.*
- No, car is not living.*

Performance Indicator	Exceeding	Meeting	Approaching	Not Meeting
SC.4 Support a claim with evidence ELA.W.4./R.1.	I can... Support claim(s) with comprehensive analysis or can draw logical conclusions that are not immediately obvious	I can... <i>Support claim(s) with relevant evidence demonstrating an understanding of the science concept</i>	I can... Provide evidence related to the claim or evidence is inferred	I can... Provide evidence that does not support the claim OR Evidence is missing

Performance Indicator	Exceeding	Meeting	Approaching	Not Meeting
SC.5 Demonstrate understanding of scientific concepts by explaining the relationship between a claim and evidence ELA.W.5.	I can... Support/defend the relationship between claim and evidence by applying the concept in a new context	I can... Apply science concepts to accurately explain the relationship between claim and evidence	I can... Use a basic understanding of science concepts to explain the relationship between claim and evidence	I can... Attempt to connect the evidence to the claim or connection may be based on misconceptions

STEP 2 - Provide Evidence- (List a fact or data to support your claim.)	STEP 3 - Provide Reasoning- (Explain how your evidence proves your claim.)
<p>Marty saw the car using energy because some of them “moved faster than 60 km.”</p> <p>Marty saw the car give “off thick clouds of poisonous waste as they moved.”</p> <p>Marty saw the car respond to their surrounding. He said “ when one of these life forms stopped or slowed down the others behind it responded. They slowed down and gave off a reddish light from the back.</p> <p>Mart saw the car “stop to feed on a liquid substance.”</p>	<p>Marty saw that the car shows evidence of using energy because Marty saw the car moving fast. He also saw the car feeding and producing waste. He also saw the car react to changes because it slowed down when cars in front of it slowed down. This lead Marty to believe that the car is living.</p>
<p>For the car to be living it also has to be made of cells, adapt to their surroundings, reproduce, and grow.</p>	<p>Unfortunately for Marty an organism is only considered living if it has all six of the following characteristic: use energy, produce waste, reproduce, adapt to their surrounding, react to changes grow and be made of cells. Marty was unable to provide any evidence of car’s ability to grow or reproduce. Also there was no evidence car’s ability to adapt or be made up of cells.</p>

STEP 3 - Final Draft (Put it together in a paragraph than check and edit for writing style, transition, voice and convention.)

Performance Indicator	Exceeding	Meeting	Approaching	Not Meeting
Writing Style		<i>I can establish and maintain a formal scientific writing style</i>	<i>I inconsistently uses a formal scientific writing style</i>	<i>I use informal writing style</i>
Vocabulary	<i>I have extensive use of additional related scientific vocabulary</i>	<i>I accurately use related scientific vocabulary</i>	<i>I accurately use some related scientific vocabulary</i>	<i>I used minimal related scientific vocabulary</i>
Conventions		<i>I communicate ideas clearly (conventions do not interfere with reader’s understanding)</i>	<i>I did not communicate ideas clearly (conventions may interfere with the reader’s understanding)</i>	<i>My writing is incoherent</i>
Conclusion	<i>I can provide comprehensive analysis or draw logical conclusion that are not immediately obvious.</i>	<i>I can provide concluding statement that relates back to the claim(s)</i>	<i>I can provides concluding statement that is not fully developed</i>	<i>I can provides concluding statement that does not relate back to the claim(s)</i>

Final Draft- Highlight any changes you see from the rough draft.

Marty the Martian came to planet Earth to get a proof of life. After making some observations, he took a car back as sample of a living thing. Martian Government disagreed with Marty and decided to prosecute him for not completing his Martian duty. Marty did observe characteristic of living things in the car, but he jumped the gun by assuming that the

car is living. Car may have some characteristic of living things but it does not have all six characteristic of living things therefore it is not a living thing. Marty saw the car using energy because some of them “moved faster than 60 km.” He also saw the car give “off thick clouds of poisonous waste as they moved.” Marty saw the car respond to their surrounding because he said “ when one of these life forms stopped or slowed down the others behind it responded. They slowed down and gave off a reddish light from the back. Marty thought that car was living because it was using energy when he saw the car moving fast. He also saw the car acquire energy by stopping to feed and produce waste. This lead Marty to believe that the car is living. Unfortunately for Marty an organism is only considered living if it has all six of the following characteristic: use energy, produce waste, reproduce, adapt to their surrounding, react to changes grow and be made of cells. Marty was unable to provide any evidence of car’s ability to grow or reproduce. Also there was no evidence that the car is able to adapt. There was definately zero evidece that the car is made up of cells. Therefore we can conclude that the car is not living. Marty jumped to inaccurate conclusion because he saw the car exhibit some of the six characteristic. He did not understand that for something to be living it has to have all of the six characteristics.

Rules and Care for Using Microscopes

Direction: Read the article below. Use the information to repond to the questions on Google form.

- ALWAYS make sure your microscope is 3 or more inches from the edges of your table.
- ALWAYS begin focusing your microscope using the LOW POWER OBJECTIVE.
- DO NOT use the coarse adjustment knob when using the high power objective. Use the fine adjustment knob to bring the specimen into focus.
- Do not move the slide when you are using the high power objective.
- NEVER touch the objective lenses themselves. Only touch the nosepiece when switching between powers.
- ALWAYS use a cover slip when you are looking at a wet mount slide.
- If something happens to your microscope while you are using it, report it IMMEDIATELY to the teacher.
- Leave microscopes in place on the table. People move to look through the microscope- the microscope doesn't move to them.
- Always return your microscope to low power, bring the stage all the way up, and turn your microscope off when you are done using it.
- In the event you need to move a microscope, you must use TWO HANDS (one on the bottom, one on the arm) to support your microscope.

Parts of Microscope

Direction: Use the information below to fill in the blanks of Microscope diagram below.

Eyepiece: The lens the viewer looks through to see the specimen. The eyepiece usually contains a 10X or 15X power lens.

Body tube (Head): The body tube connects the eyepiece to the objective lenses.

Arm: The arm connects the body tube to the base of the microscope.

Coarse adjustment knob: Brings the specimen into general focus.

Fine adjustment knob: Fine tunes the focus and increases the detail of the specimen.

Nosepiece: A rotating turret that houses the objective lenses. The viewer spins the nosepiece to select different objective lenses.

Objective lenses: One of the most important parts of a compound microscope, as they are the lenses closest to the specimen. A standard microscope has three, four, or five objective lenses that range in power from 4X to 100X. (low, medium, and high). When focusing the microscope, be careful that the objective lens doesn't touch the slide, as it could break the slide and destroy the specimen.

Stage: The flat platform where the slide is placed.

Stage clips: Metal clips that hold the slide in place.

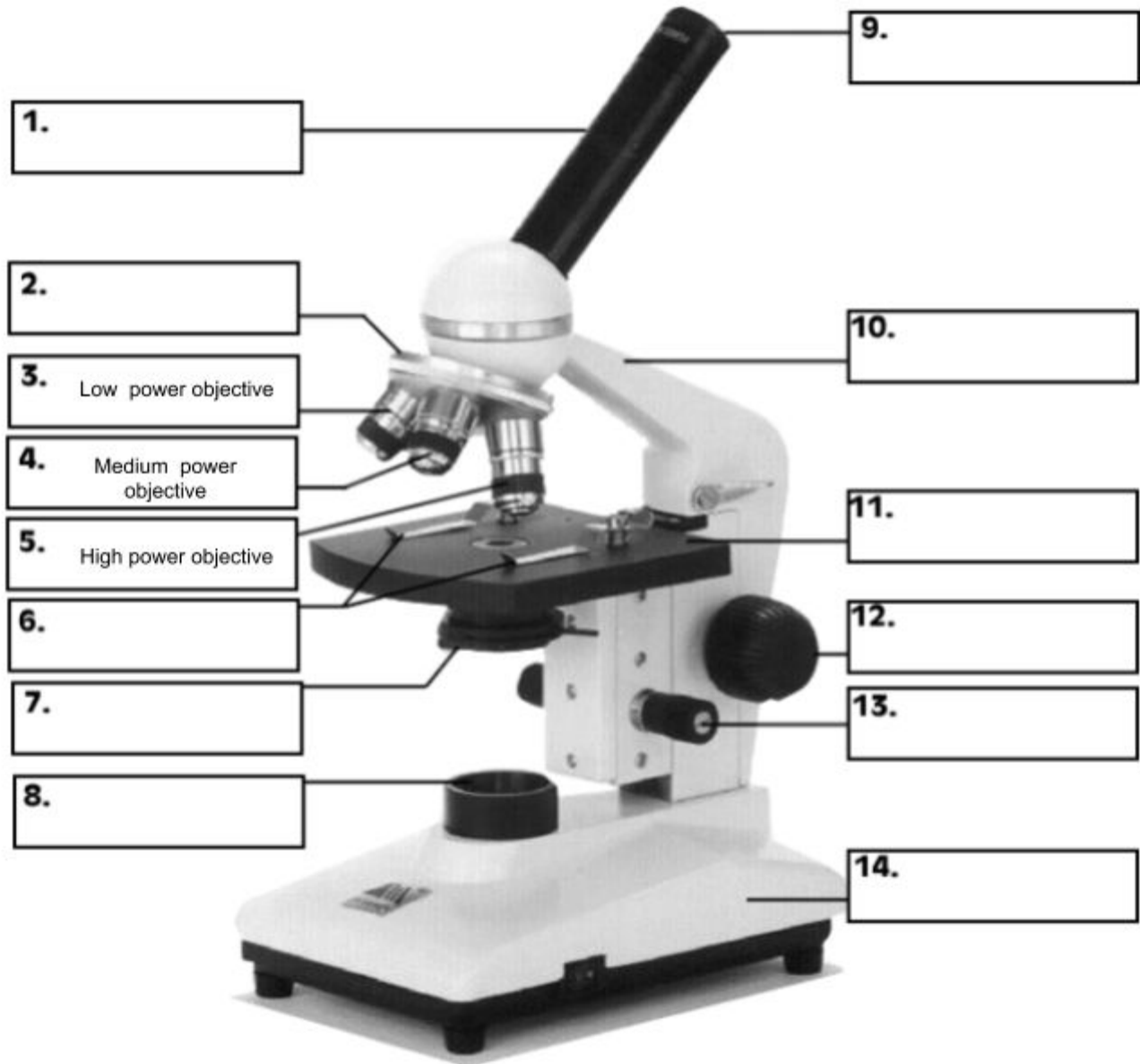
Light source: The light source for a microscope. Older microscopes used mirrors to reflect light from an external source up through the bottom of the stage; however, most microscopes now use a low-voltage bulb.

Diaphragm: Adjusts the amount of light that reaches the specimen.

Base: The base supports the microscope and it's where illuminator is located.

Revolving nosepiece: Holds the objective lenses.

Magnification: Number of times a specimen is made larger.



WHAT are CELLS?

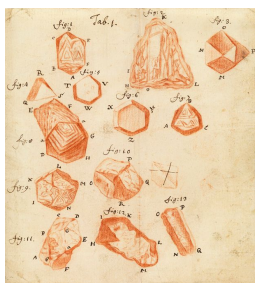
Objective: State the cell theory in your own words.

Vocabulary:

1. cell - basic unit of structure and function in all living things
2. theory - idea that explains something and is supported by data

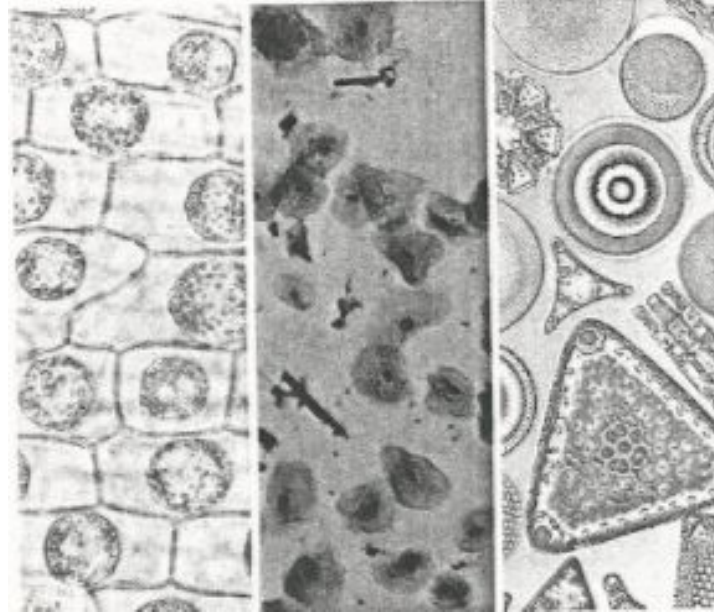
Cells A brick house is made up of many bricks. A brick is the basic unit of structure of a brick house. The basic unit of structure in living things is a **cell**. All living things are made up of one or more cells. It is also the basic unit of function. Cells carry out all life processes. For example, a cell takes in food and breaks the food down. It breaks down a simple sugar called glucose to produce energy. This life process is called cellular respiration.

Discovery of Cells The first person to observe cells was Robert Hooke. Hooke was an English scientist. He used a compound microscope to look at thin slices of cork. Cork is found in some plants. The cork seemed to be made up of many small boxes. Each box looked like a small room with walls around it. The boxes reminded Hooke of the rooms in which monks slept. These rooms were called cells. Hooke named the structures that made up the cork "cells."



without a microscope.

Hooke saw only dead plant cells in cork. Anton van Leeuwenhoek was the first person to observe living cells. Van Leeuwenhoek was a Dutch lensmaker. In 1675, he saw single-celled organisms in a drop of pond water. These living things were microscopic. They could not be seen



Three types of cells

Cell Theory By 1800, better microscopes were being made. Many plants and animals were studied. Scientists had many ideas about cells. In the mid-1800s, these ideas were put together as a **theory**. A theory is an idea that explains something. The ideas in a theory are supported by data over and over. The theory that was developed is the cell theory. The cell theory states:

- All living things are made up one or more cells.
- Cells are the basic units of structure in living things, and cells carry on all life processes.
- Cells come only from other living cells.

Name : _____

Period _____

Date

-
1. What is a theory?
 2. What is the basic unit of structure in living things?
 3. Who was the first person to see cells?
 4. What did Anton van Leeuwenhoek see in a drop of pond water?
 5. Where do cells come from?
 6. **Relate:** What is the relationship between improved microscopes and discoveries about cells?
 7. **Apply :** Could new cells be produced by the cork that Hooke observed? Explain.

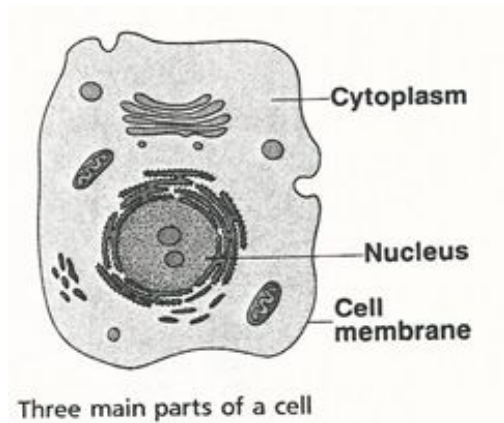
WHAT are THE Main CELL PARTS?

Objective: Identify the main parts of the cell and describe their functions.

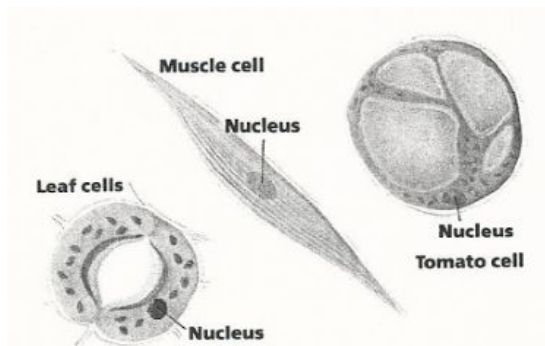
Vocabulary:

1. **Cell membrane:** thin structure that surrounds the cell
2. **Cytoplasm:** all the living material inside the cell except the nucleus
3. **Nucleus:** control center of the cell

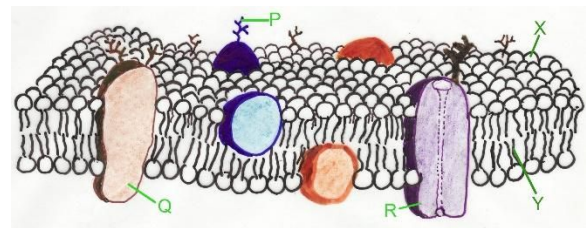
Three Main Parts Most cells have three main parts. The three main parts of the cell are shown in Figure 1. They are the cell membrane (MEM-brayn), the nucleus (NEW-klee-us), and the cytoplasm (SYT-up-plaz-um).



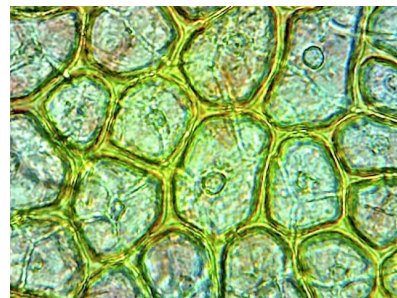
Nucleus The nucleus of a cell is round or egg-shaped. It usually is near the middle of a cell. The nucleus is darker than the rest of the cell. It is the control center of a cell. The nucleus also controls cell reproduction.



Cytoplasm The **cytoplasm** is all the living material in a cell except the nucleus. The nucleus floats in the cytoplasm. Most of a cell is made up of cytoplasm looks like the white part of a raw egg. Organelles, (little organs), are part of the cytoplasm. Most of the cell's activities are carried out by the organelles.



Cell Membrane The cell membrane is a thin structure that surrounds a cell. Sometimes, the cell membrane is called the plasma (PLAZ-muh) membrane. The cell membrane has three important jobs. It protects the inside of a cell. The cell membrane also supports and gives a cell its shape. The cell membrane controls the movement of materials into and out of a cell. Food, water, and oxygen move through the membrane into the cell. Wastes move out of the cell through cell membrane.



Skin Cell

WHAT are THE Main CELL PARTS?

CHECK Complete the following.

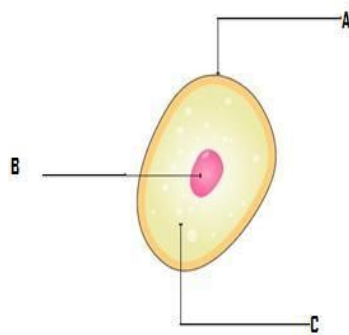
1. All the life processes of a cell are controlled by the _____.
2. The cell membrane also is called the _____ membrane.
3. The three main parts of the cell are nucleus, the cell membrane, and the _____.
4. The cell membrane controls the _____ of materials into and out of the cell.
5. Most of a cell is made up of _____.
6. What would happen to the cell if the Nucleus was taken out?

APPLY Complete the following.

1. **Apply:** What part of a cell controls respiration?

2. **Infer:** The nucleus of a cell also is surrounded by a membrane. What do you think the jobs of the nuclear membrane are?

3. **Model:** Label the three main parts of the skin cell in the model below.



Skin cell

- A. _____
- B. _____
- C. _____

Name: _____ Period _____ Date: _____

CELLS EQUAL LIVING

Scientific Investigation

All living or once-living things contain cells. Living things, whether unicellular or multicellular, also display life functions. Some of the important life functions are:

- Obtaining food and water
- Disposing of waste
- The ability to grow and reproduce

In addition to life functions, living things must have an environment in which they can live. **In some organism the labor is divided while in others all job is done by one.**

Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.

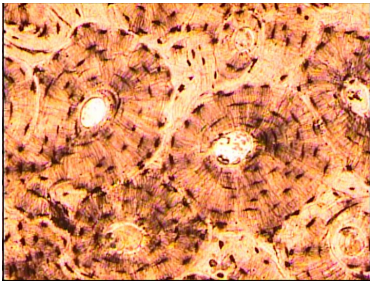
Procedure:

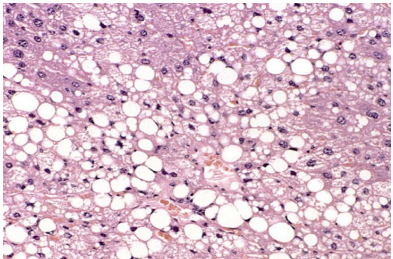
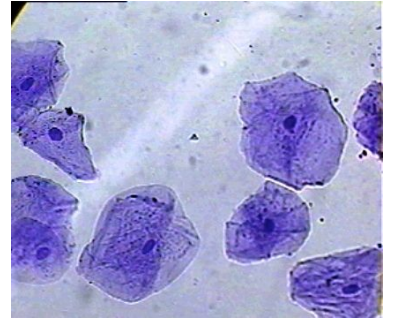
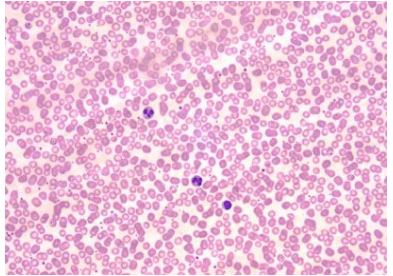

1. Make observation of variety of human tissue slides.
2. Identify the type of tissue shown.

Materials

- Microscope
- Slides of human tissue (bone, blood, cheek cell)
- Slide of single cell organism

Data:

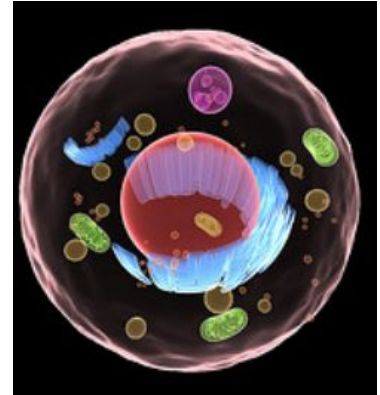
	Sample is from Living	or	Non-living
	Unicellular	Multicellular	N/A
	Total Magnification of the image:		
	Evidence to support your claim:		

	<p>Living or Non-living</p> <p>Unicellular Multicellular N/A</p> <p>Total Magnification:</p> <p>Evidence to support your claim:</p>
	<p>Living or Non-living</p> <p>Unicellular Multicellular N/A</p> <p>Total Magnification:</p> <p>Evidence to support your claim:</p>
	<p>Living or Non-living</p> <p>Unicellular Multicellular N/A</p> <p>Total Magnification:</p> <p>Evidence to support your claim:</p>
	<p>Living or Non-living</p> <p>Unicellular Multicellular N/A</p> <p>Total Magnification:</p> <p>Evidence to support your claim:</p>

Functions of a Cell

Activity

All organisms are made of at least one or more cells. Complex organisms, such as plants and animals, are made up of millions of cells. These cells have several differences and similarities but each cell performs certain functions essentially like a unicellular organism. Both cells and organisms transport nutrients, require energy, remove waste, reproduce, grow, and respond to the environment.



Warm Up

1. What functions do animals need to perform to grow and thrive?

2. What functions do plants need to perform to grow and thrive?

3. What functions do cells need to perform to grow and thrive?

Procedure

1. Obtain an envelope with function cards from your teacher. Separate the headings “Animal”, “Plant” and “Cell”. Read and discuss the remaining cards with your group and determine the best heading under which each card should be placed.
2. Once you have sorted the cards by Animal, Plant or Cell, analyze the cards by comparing the functions for each column. Arrange the cards within the columns to align with similar functions in other columns.

3. Once the cards are in rows of similar function decide which function they serve.
 - a. Transportation
 - b. Energy needs
 - c. Waste Removal
 - d. Protection
 - e. Support
 - f. Instruction or control
 - g. Reproduction

4. Some function statements may have more than one letter associated with its total function. Have your teacher check your card placement, then type the functions into the appropriate column in the Table below.

Life Process	Animal	Plant	Cell
transportation of nutrients (T)			
Energy needs (E)			
Waste Removal (W)			
Protection (P)			
Support (S)			
Instruction or Control (I)			
Reproduction (R)			

Post-Activity Discussion

1. What functions did animals, plants, and cells have in common?

2. Why were some functions for plants, animals, and cells different?

3. How are all cells like a unicellular organism?

Functions of a Cell

Teacher Printout: Functions

Print one *Teacher Printout: Functions* for each group. Cut out the statement cards, and place into an envelope for each group. KEY is located at the bottom.

<p>Ground tissue – provides support and storage among other life functions; found in the shoot system of plants</p>	<p>Photosynthesis – a process used by plants to combine the Sun’s energy, water, and carbon dioxide to supply energy for the plant</p>
<p>Brain – control center of the body</p>	<p>Skeleton – provides a rigid structure and protects vital body parts like the brain and heart</p>
<p>Epidermis – outer covering that serves as a protective barrier; located in the shoot system of a plant</p>	<p>Pollination – a form of sexual reproduction that involves flowers and seed.</p>
<p>Nucleus – an organelle that contains the genetic material for reproduction and is responsible for controlling the activities of the cell</p>	<p>Cell wall – in plants, is composed of cellulose which forms a stiff and rigid structure</p>
<p>Cell membrane – a porous thin structure that forms the outer surface of a cell and serves as a protective barrier</p>	<p>Epidermis – outer covering that serves as a protective barrier, such as skin in humans</p>
<p>Plant</p>	<p>Animal</p>

<p>Cell membrane – gives structure and protection to the cell, allows some substances to move through such as H₂O, O₂, and CO₂</p>	<p>Vegetative propagation – form of asexual reproduction that only need one parent to produce offspring</p>
<p>Digestive system – breaks down plant and animal matter taken in as food to supply energy</p>	<p>Reproductive system – sexual reproduction requiring a male and female to create offspring</p>
<p>Chloroplast – converts light energy into chemical energy</p>	<p>Producer - able to convert radiant energy from the Sun to a supply of chemical energy</p>
<p>Stomata – brings CO₂ into the leaf and removes O₂</p>	<p>Respiratory system – brings O₂ into the body and removes CO₂</p>
<p>Cell division – one cell divides into two to create offspring</p>	<p>Mitochondria – an organelle that breaks down sugars to release energy in a form usable by the cell; the powerhouse of the cell</p>
<p style="text-align: center;">Cell</p>	

KEY

Life Process	Animal	Plant	Cell
transportation of nutrients (T)	Respiratory system - brings O ₂ into the body and removes CO ₂ , T, W	Stomata - brings CO ₂ into the leaf and removes O ₂ , T, W	Cell membrane - gives structure and protection to the cell, allows some substances to move through such as H ₂ O, O ₂ , and CO ₂ ,
Energy needs (E)	Digestive system - breaks down plant and animal matter taken in as food to supply energy, E Skeleton - provides a rigid structure and protects vital body parts like the brain and heart, P, S	Producer - able to convert radiant energy from the sun to a supply of chemical energy, E Photosynthesis - a process used by plants to combine the Sun's energy, water, and carbon dioxide to supply energy in the form of carbohydrates for the plant, E	Mitochondria - an organelle that breaks down sugars to release energy in a form usable by the cell; the powerhouse of the cell, E Chloroplast - converts light energy into chemical energy, E
Waste Removal (W)	Reproductive system - sexual reproduction requiring a male and female to create offspring, R Respiratory system - brings O ₂ into the body and removes CO ₂ , T, W	Stomata - brings CO ₂ into the leaf and removes O ₂ , T, W	Cell membrane - gives structure and protection to the cell, allows some substances to move through such as H ₂ O, O ₂ , and CO ₂ ,
Protection (P)	Epidermis - outer covering that serves as a protective barrier, such as skin in humans, P Skeleton - provides a rigid structure and protects vital body parts like the brain and heart, P, S	Epidermis - outer covering that serves as a protective barrier; located in the shoot system of a plant, P	Cell membrane - gives structure and protection to the cell, allows some substances to move through such as H ₂ O, O ₂ , and CO ₂ , Cell wall - in plants is composed of cellulose which forms a stiff and rigid structure, S, P
Support (S)	Skeleton - provides a rigid structure and	Ground tissue - provides support and	Cell membrane - gives structure and protection

	protects vital body parts like the brain and heart, P, S	storage among other life functions; found in the shoot system of plants, S	to the cell, allows some substances to move through such as H ₂ O, O ₂ , and CO ₂ , Cell wall - in plants is composed of cellulose which forms a stiff and rigid structure, S, P
Instruction or Control (I)	Brain - control center of the body, I		Nucleus - an organelle that contains the genetic material for reproduction and is responsible for controlling the activities of the cell, I
Reproduction (R)	Reproductive system - sexual reproduction requiring a male and female to create offspring, R	Pollination - a form of sexual reproduction that involves flowers and seeds, R Vegetative propagation - form of asexual reproduction that only needs one parent to produce offspring, R	Cell division - one cell divides into two to create offspring, R

Name:

Period:

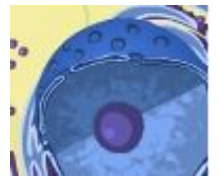
Date:

Activity A: Animal cells

Get the Gizmo ready:

Check that an **Animal cell** is mounted on the microscope

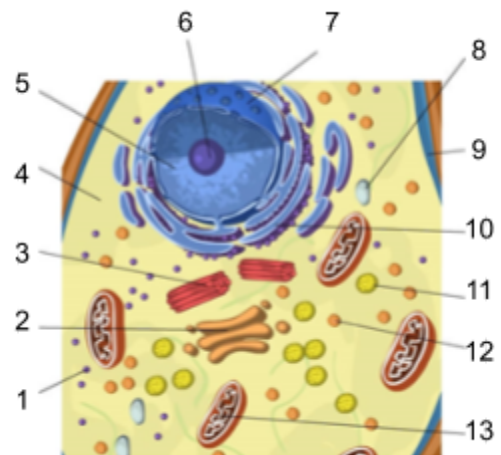
Check that the **Zoom** is set to 2000x.



Question: **Organelles** are specialized structures that perform various functions in the cell. What are the functions of the organelles in an animal cell?

I. Label: Locate each organelle in the animal cell. Label the organelles in the diagram below.

1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	



II. . Match: Read about each organelle. Then match each organelle to its function/description.

___ **Cytoplasm**

___ **Lysosome**

___ **Mitochondria**

___ **Centriole**

___ **Endoplasmic reticulum**

___ **Vacuole**

___ **Cell membrane**

___ **Nucleus**

___ **Ribosome**


___ **Nuclear membrane**

___ **Golgi apparatus**

___ **Vesicle**

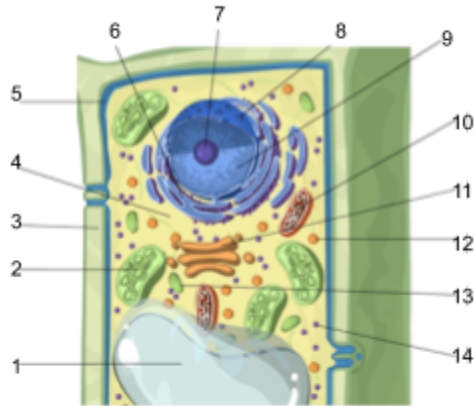
___ **Nucleolus**

1. Structure that organizes motion of chromosomes
2. Stack of membranes that packages chemicals.
3. Membrane that protects the nucleus.
4. Membrane that surrounds and protects the cell.
5. Sac filled with digestive chemicals.
6. Structures that converts nutrients to energy.
7. Passageways where chemicals are made.
8. Jelly-like substance within the plasma membrane.
9. Structure that manufactures ribosomes.
10. Structure that contains DNA and directs the cell.
11. Package created by the Golgi apparatus.
12. Small structure that synthesizes proteins.
13. Sac that stores water, nutrients, or waste products.

Activity B: Plant cells	<p><u>Get the Gizmo ready:</u> Select the PLANT CELL tab, and click Sample. Set the Zoom to 2000x.</p>	
------------------------------------	---	---

Question: What functions do the organelles in a plant cell perform?

Label: Locate each organelle in the plant cell. Label the organelles in the diagram below.

1			8	
2			9	
3			10	
4			11	
5			12	
6			13	
7			14	

1. Compare: What structures are present in an animal cell, but not in a plant cell?

What structures are present in a plant cell, but not in an animal cell?

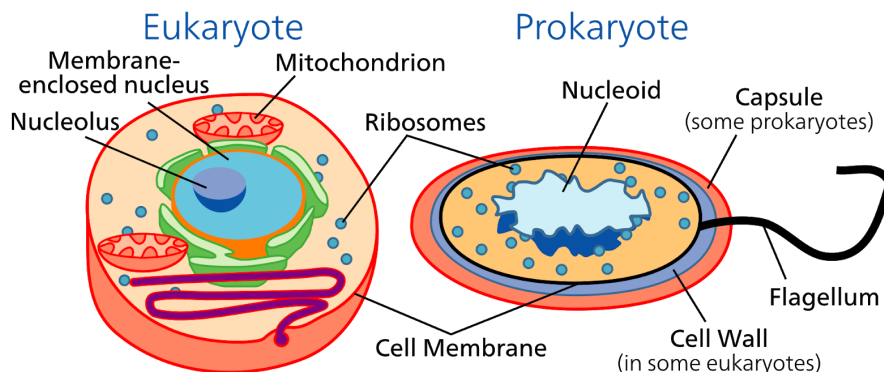
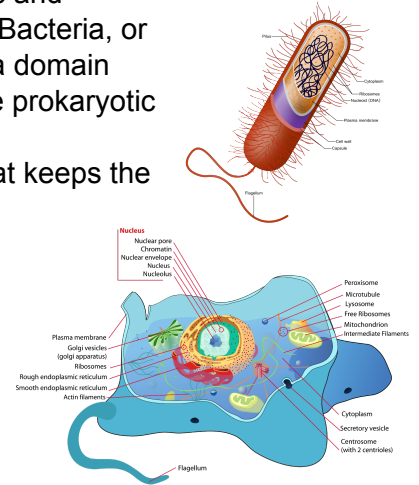
2. Fill in: Name the organelle or organelles that perform each of the following functions.

- a. _____ convert sunlight to chemical energy.
- b. The _____ and the _____ help to support the plant cell and help it to maintain its shape.
- c. _____ store food or pigments.
- d. The _____ converts food into energy. It is found in both plant cells and animal cells.

Prokaryotic and Eukaryotic Cells

You learned about Prokaryotic and Eukaryotic cells from Amoeba sisters. Now show me what you know. Read the article below then click on the [link](#) to complete the google form.

- All living things are made up of cells, which are the basic building blocks of life. Cells can be organized into two distinct categories known as prokaryotic and eukaryotic. All living organisms fall into one of three domains: Eukarya, Bacteria, or Archaea. All animals, fungi, protists, and algae are a part of the Eukarya domain because they have eukaryotic cells. Bacteria and Archaea species have prokaryotic cells.
- Eukaryotic cells have a nucleus that is contained within a membrane that keeps the genetic materials separate from the rest of the cell. Eukaryotes also have membranes covering organelles inside their cell membranes. Prokaryotic cells do not have a membrane containing their genetic material, which can be found just floating around freely inside the cell membrane. They are one-celled organisms because the entire organism consists of just one cell.
- All organisms you naturally think of as alive such as plants, mammals, birds, fish, and other creatures are all composed of many eukaryotic cells. All of these organisms can survive the death of one or even 100 of their cells because they have so many, and other cells can carry out the functions of the lost ones until more can be created as replacements. This is not true for a prokaryotic organism, like a bacterium. These organisms consist of only one cell, so if that one cell dies, then the organism dies.
- Prokaryotic and eukaryotic cells look quite different from each other. The first difference someone might notice is that they are different sizes. The average eukaryotic cell is much larger than the average prokaryotic cell. Since prokaryotes are much smaller, nutrients and chemicals can spread throughout the cell faster and without the help of specialized parts. Eukaryotic cells are so large that it is more efficient for them to have various sub-units that carry out functions like providing energy.
- The next difference is the most important one: the nuclear membrane. Eukaryotic cells have a



membrane in the middle which forms the nucleus, and all of the cell's genetic material is contained within it. It is helpful for the DNA to be in the middle of its own membrane, so that it can be protected from damage. The DNA inside prokaryotic cells is circular and has no ends, unlike the many separate straight strands of eukaryotic DNA.

- All of these differences just accentuate the variety of life existing on planet Earth, where some organisms only need one cell, while others rely on millions of different cells in order to live.

HOW DO PLANT AND ANIMAL CELLS DIFFER?

Objective: Compare plant cells and animal cells.

Vocabulary:

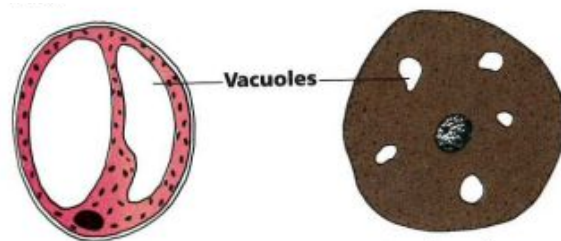
1. **Cellulose:** hard, nonliving material that makes up the cell wall of a plant cell.
2. **Cell wall:** outer,, nonliving part of a plant cell.
3. **Chlorophyll :** green material in chloroplasts that is needed for plants to make food
4. **Chloroplast:** green structure in a plant cell that contains chlorophyll

Cell Wall All plant cells have a **cell wall**. Animal cells do not have a cell wall. The cell wall surrounds the cell membrane. The cell wall is nonliving. It is made up of a hard material called cellulose. Wood is made up mostly of cellulose.

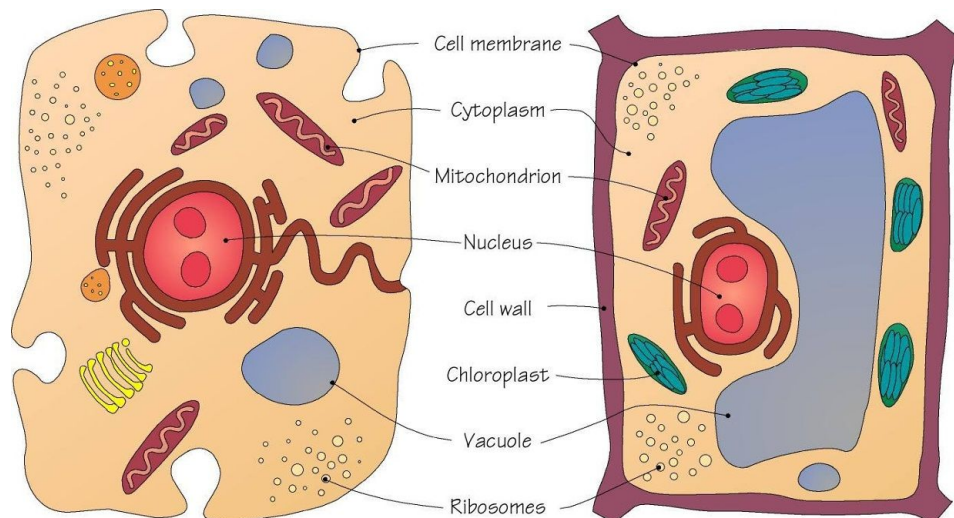
The cell wall has three jobs. It protects a plant cell and gives the cell its shape. It also gives a plant cell support. Large plants, such as trees and bushes, do not need a skeleton because each cell has support from the cell wall.

Vacuoles The number and size of vacuoles is different in plant and animal cells. Plant cells have only one or two vacuoles. The vacuoles are usually very large. Animal cells have many small

vacuoles. When vacuoles are full of water they push against the cell wall in plant cell and help maintain structure otherwise the plant will wilt.



Chloroplasts Most plant contain chloroplasts in their leaf cells. Chloroplasts are round, green structures. They contain a green material called chlorophyll. Chlorophyll gives a plant its green color. Chlorophyll is very important to plant cells. Plant cells need chlorophyll to make food. Animal cells do not have chloroplast or chlorophyll.



Check: Complete the following. Write in complete Sentences.

1. Why do large plants not need a skeleton?
2. What are the three jobs of the cell wall?
3. What are chloroplasts?
4. What is cellulose?
5. How do the vacuoles in animal cells differ from those in plant cells?
6. Why do plants need chlorophyll?

Apply: Complete the following.

7. **Compare:**
 - a. How are plant and animal cells alike.
 - b. How do plant and animal cells differ?

8. **Analyze:** Which of the following organisms contain cellulose?

Organism	Contain Cellulose (Yes or No)
Cow	
Rabbit	
Fern	
Grass	
Gold fish	
Pine tree	

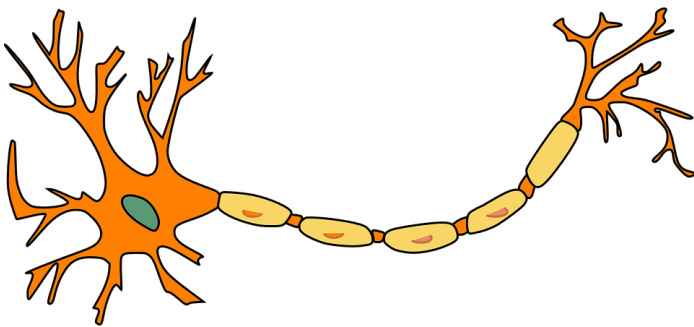
Why do Cells have Different Shapes?

Objective: Describe the structure and function of different kind of cells.

Vocabulary:

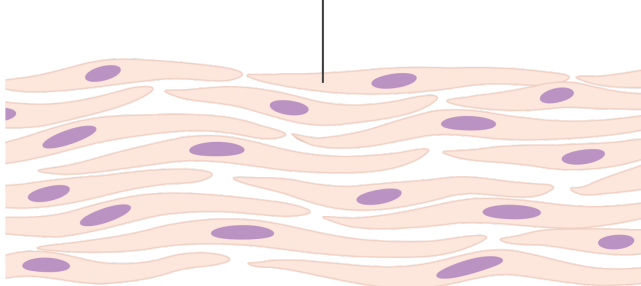
1. Guard cells: cells in plant that helps control the passage of materials into and out of the stomata.
2. Red Blood cells: blood cell that carries oxygen.
3. White blood cells: blood cell that helps destroy germs
4. Unicellular: An organism made up of one cell

Cell Size and Shape In a unicellular organisms, the one cell carries on all the life processes. Large animals and plants are multicellular, which means they have many cells. The cells are not all the same. They have different sizes and shapes. Look at the different shapes of the cells shown. Different kind so cells have different jobs. The shapes of most cells help them to do their jobs.

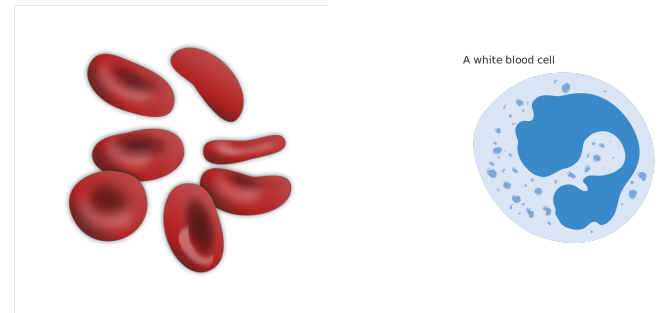


Nerve Cells Nerve cells are the “telephone Wires” of the body. They carry messages from one part of the body to another. The message carried by a nerve cell is called an impulse. Nerve cells are long and thin. Some nerve cells are the longest cells in your body. The longest cells are the nerve cells in a giraffe’s leg. They are 2 meters long.

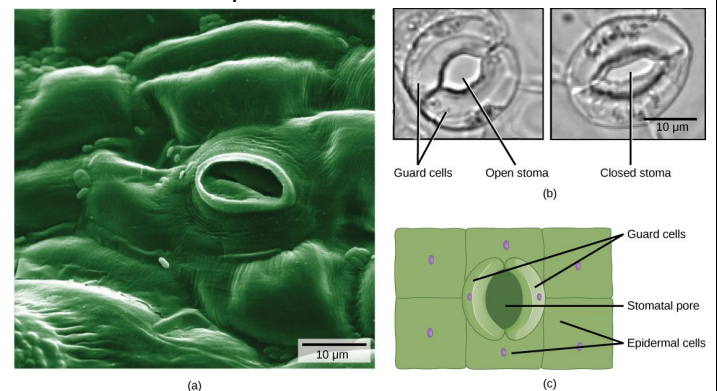
Muscle fibre cells



Muscle Cells Muscle cells are long and thin. The shape of muscle cells can change. Muscle cells can become shorter. Some muscles are attached to bone. When cells in these muscles shorten they make the bones move.



Blood cell There are two main kinds of blood cells. Red blood cells are round. They do not have a nucleus. The job of a red blood cell is to carry oxygen. White blood cells help destroy germs in the body. White blood cells are shape less or do not have definite shape.



Guard Cells A stomata is a tiny opening on the lower surface of a plant leaf. A stomata takes in carbon dioxide from the air and gives of oxygen and water. Two bean shaped cells called guard cells surround each stomata. Guard cells control the size of the stomata. When the guard cells swell, the stomata opens. When the guard cells shrink, the stomata closes.

Respond to question on this [Google Form](#).

Is it Alive?

Direction: As you watch the video check each object as living or nonliving. After we finish the video go back and explain why did you decide each object as living or nonliving.

Object	Living (Biotic)	Non Living (Abiotic)	Evidence (Provide evidence if it is living?)
Ice			
cell			
river			
seed			
cloud			
clock			
coral			
fire			
bubbles			
chick			
cars			
jellyfish			

What are Living Things?

Objective: List and describe the six characteristics of living things.

Vocabulary:

1. **cell:** basic unit of structure and function in living things
2. **organism:** any living thing
3. **response:** reaction to change

Organisms The world around you is made up of many different things. Some things, such as dogs and trees, are living. Living things are called **organisms**. Other things, such as cars and radios, are nonliving.

Characteristic of Organisms It is not always easy to decide if something is living or nonliving. Non living things may do some of the same things as organisms. For example, a robot may move and speak like a person. A robot, however is not living. Plants and animals grow, or get larger. Icicles also may seem to grow, but icicles are not living.

Biologists use **six characteristics** to classify something as a living thing. All living things have these six characteristics.

- **Organisms are made up of one or more cells.** A cell is the basic unit of structure and function in living things. In fact, cells often are called the “building blocks of life.”
- Energy is the ability to do work. **Organisms use energy.** Sunlight is the source of energy for most living things. Plants use the energy in sunlight to make food. Animals get energy from the sun by eating plants or animals that have eaten plants.



▲ Figure 1-5 A chameleon survives by changing colors to hide itself from predators.

- **Organisms are adapted, or suited, to their surroundings.** All organisms have features that help them survive in their surroundings. For example, Fishes have gills. Gills are organs that allow fishes to breathe in water.
- **Organisms react to changes in their surroundings.** Any reaction to change is called a **response**. You might respond to the honking of a car's horn by jumping. A bright light may cause you to close your eyes.
- **Organisms produce more organisms of their own kind.** Dogs produce more dogs. Pine trees produce more pine trees. The production of new organisms allows each kind of organism to continue living on the earth.
- **Organisms grow and develop.** Living things change or develop during their lifetimes. One way organisms change is by growing. Living things also may change in appearance.

Using the information from the article respond to the questions below.

Use of inaccurate spelling will cause your response to be incorrect.

1. Organisms are made up one or more _____.
2. Energy is the ability to do _____.
3. Organisms _____ to changes in their surroundings.
4. Plants use the energy in _____ to make food.
5. Organisms are suited, or _____, to their surroundings.
6. Organisms get larger, or _____.
7. Growth is one of the ways that organisms _____.
8. Apply: How does a car get energy from sunlight?

9. Hypothesize: Could an ant be the offspring of a fly?

Scientific Communication

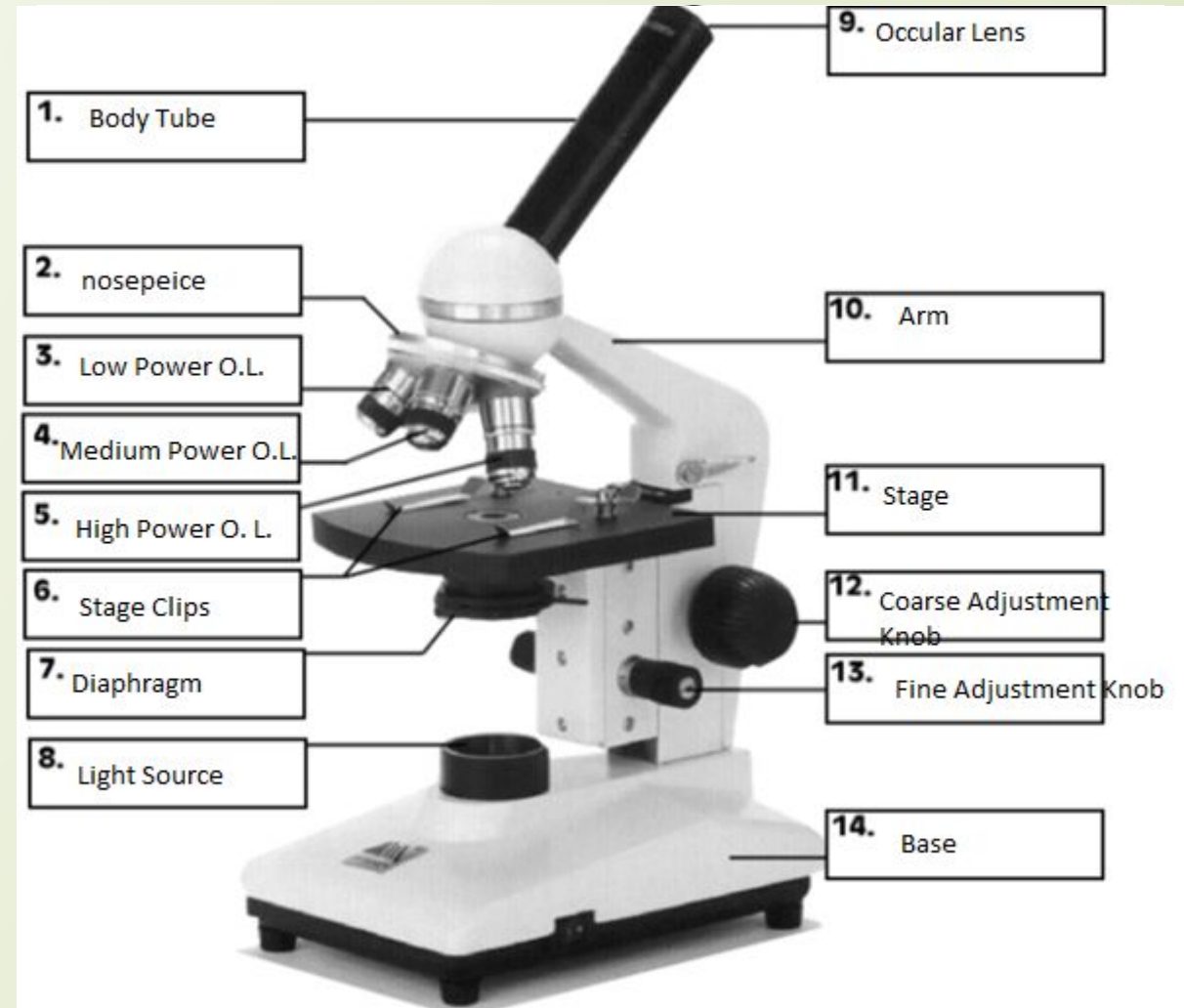
Performance Indicator	Exceeding	Meeting	Approaching	Not Meeting
SC.1 Read, synthesize and communicate scientific information Name:	I can... read complex text to determine the central ideas, and obtain scientific or technical information to describe patterns or evidence about the natural and designed worlds	I can... read texts adapted for classroom use to determine the central ideas, and obtain scientific or technical information to describe patterns or evidence about the natural and designed worlds	I can... read texts adapted for classroom use to determine the central ideas and obtain basic scientific or technical information	I can... read texts adapted for classroom use and restate the information

Warm Up

See how many parts you can label? The more you know the better you will be at the game. Who will be the class champion Labeler?

[Microscope Labeling Game](#)

- Agenda should be filled out and initialed by the Agenda Signer.



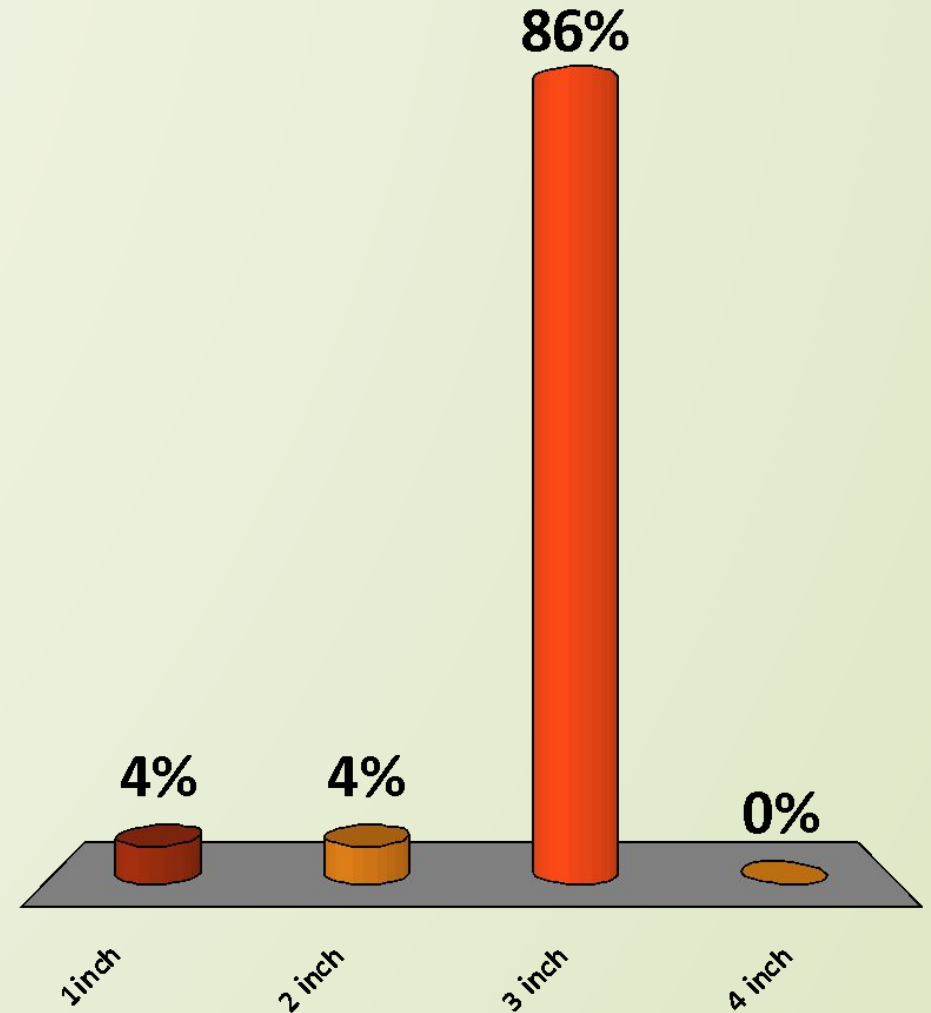


Use and Care of Microscope

How much do I really know?

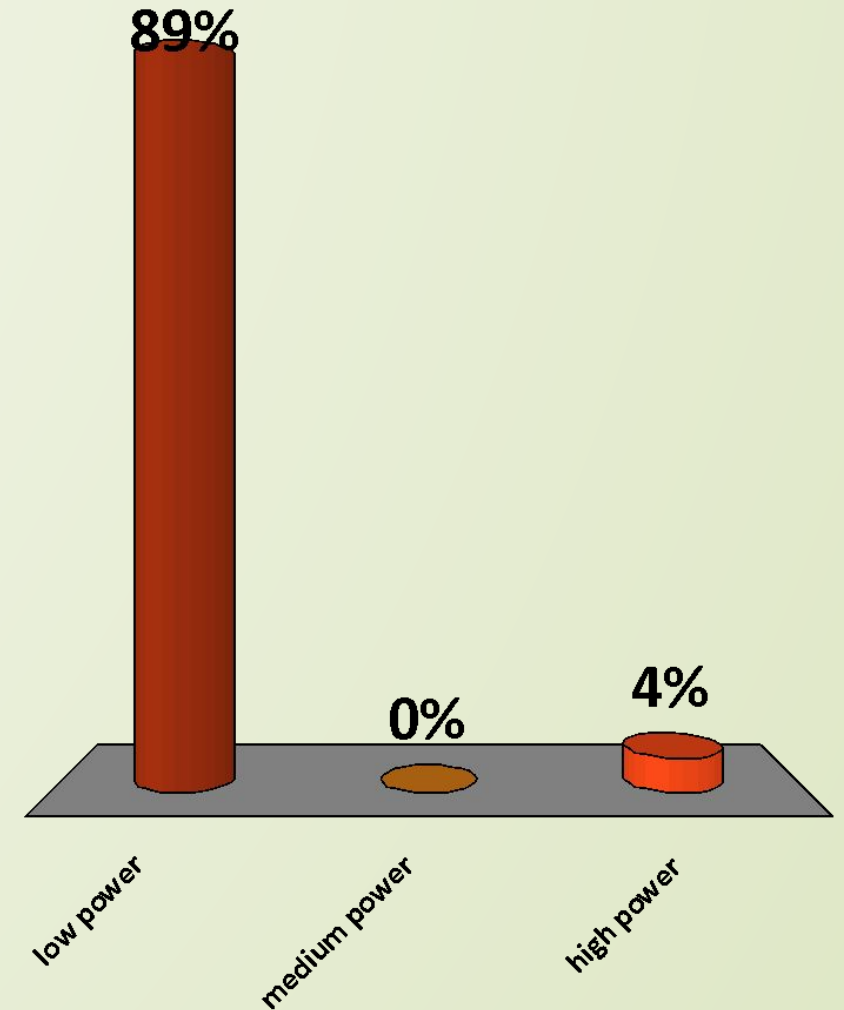
The minimum distance that the microscope should be placed from the edge of the table?

- A. 1 inch
- B. 2 inch
- C. 3 inch
- D. 4 inch



Always start focusing your microscope
at _____

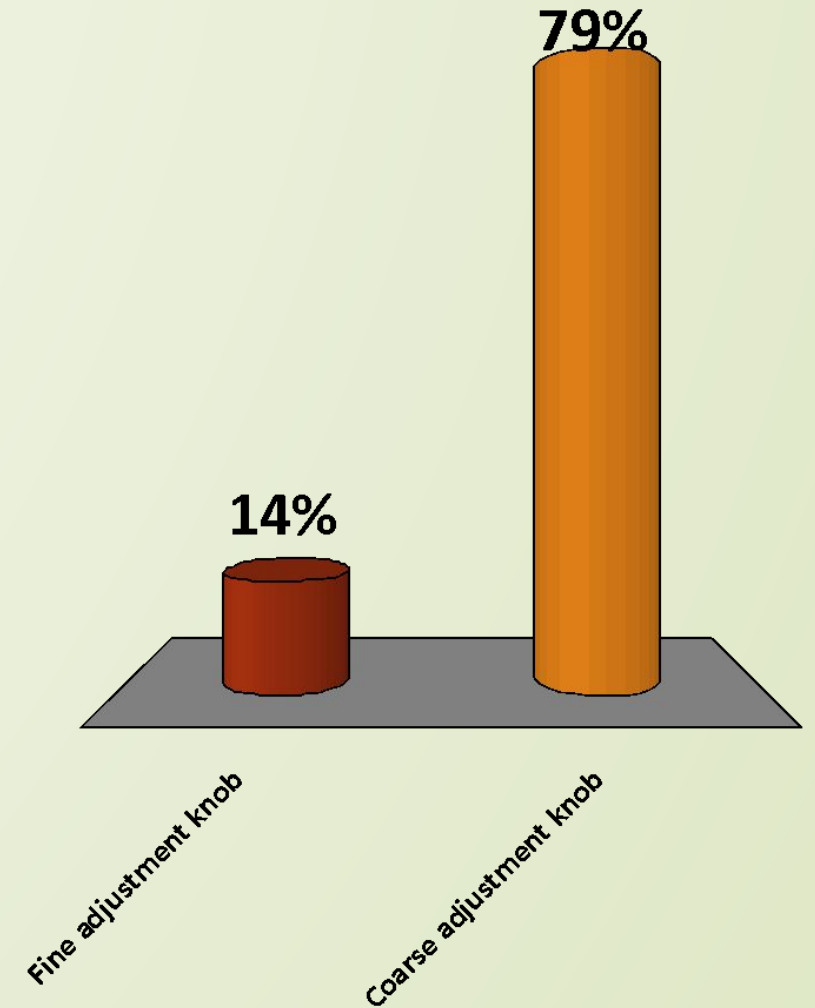
- 😊 A. low power
- B. medium power
- C. high power



Which knob should not be used on high power?

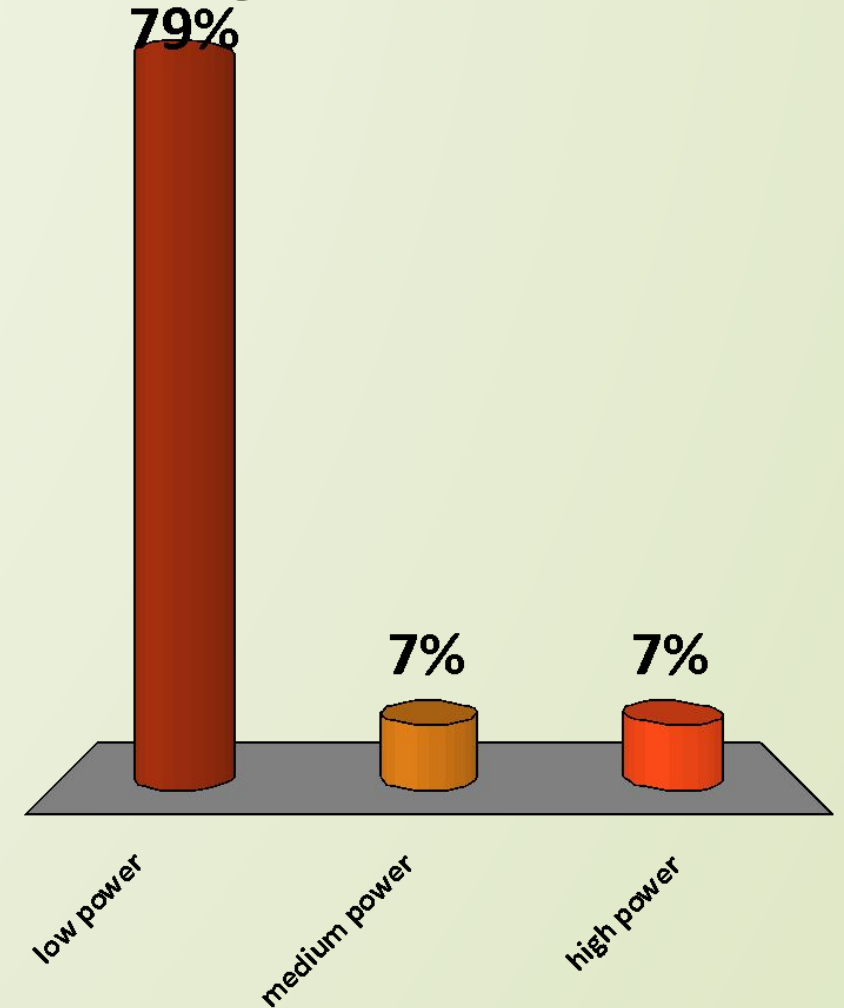
A. Fine adjustment knob

 B. Coarse adjustment knob



Always return your microscope to _____,
bring the stage all the way up, and turn your
microscope off when you are done using it.

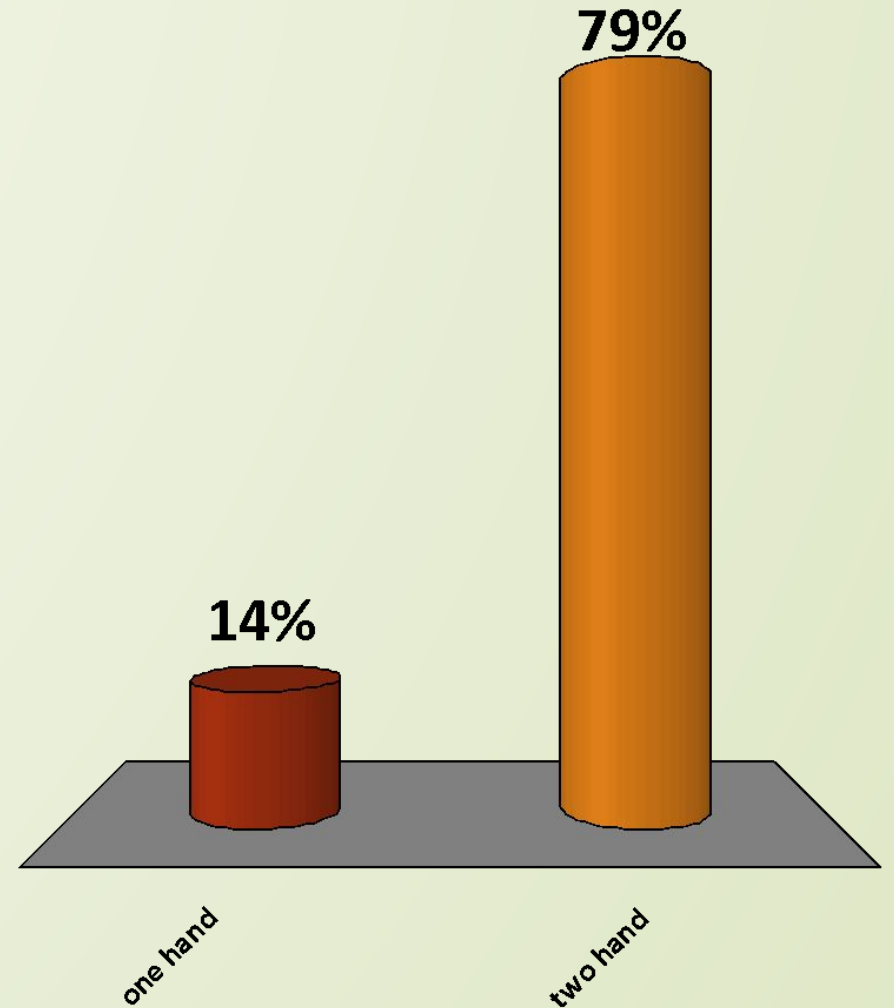
- A. low power
- B. medium power
- C. high power



In the event you need to move a microscope, you must use _____ to support your microscope.

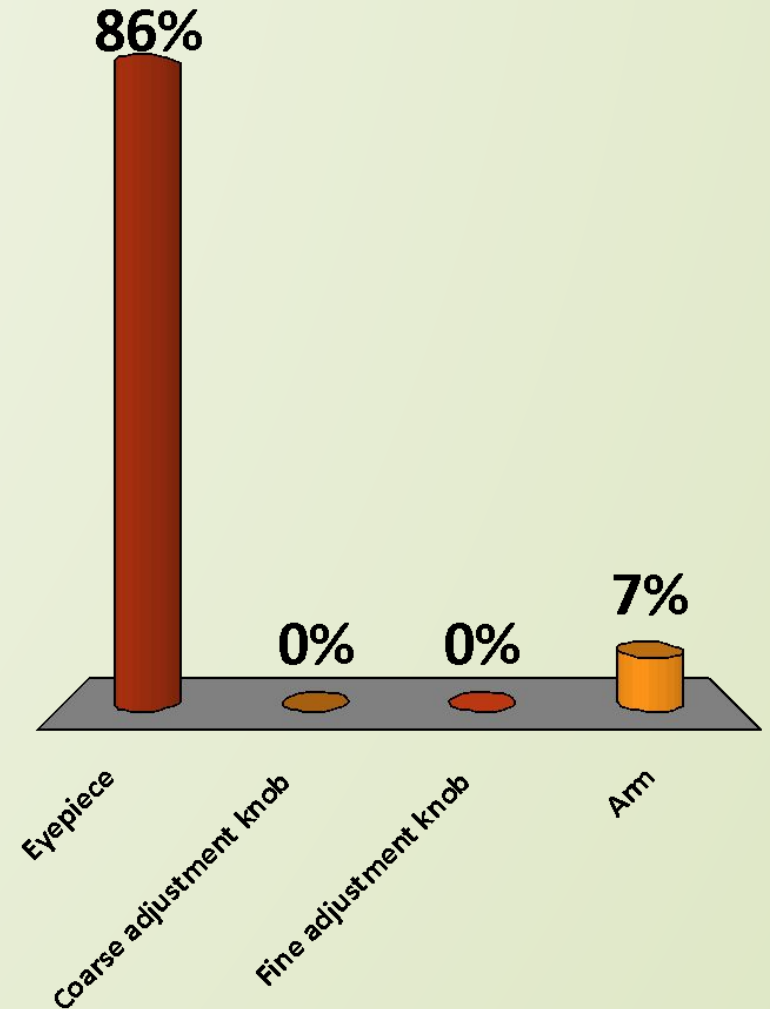
A. one hand

 B. two hand




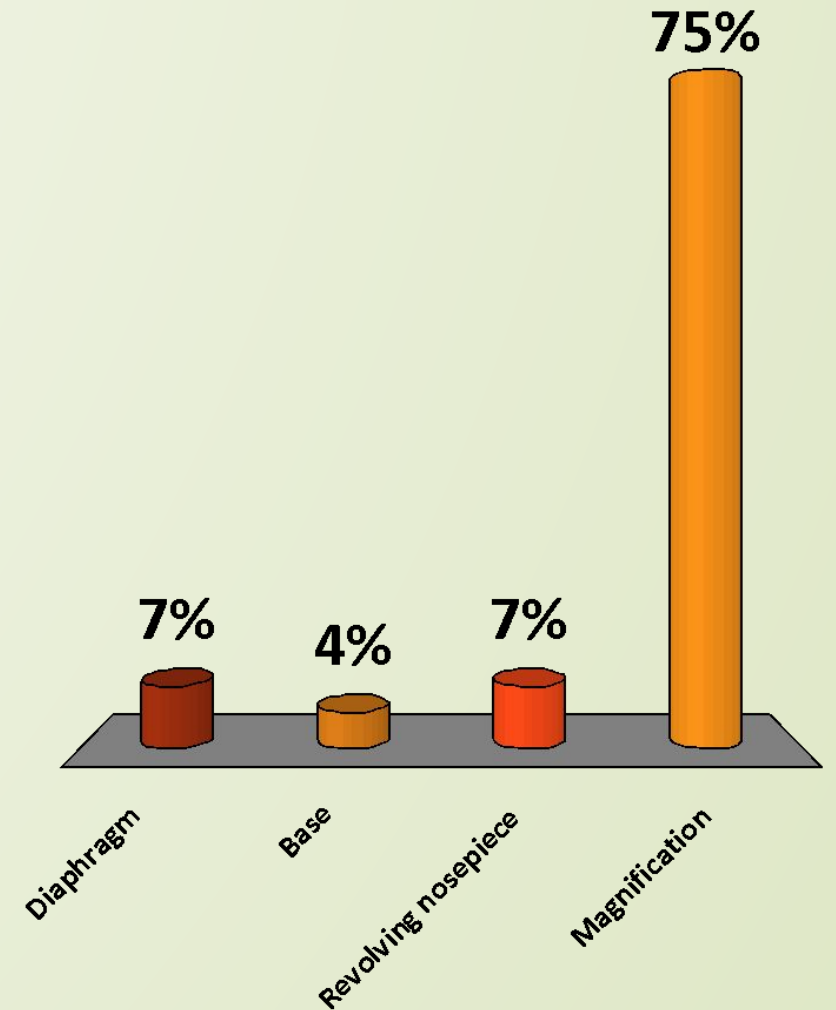
The part of the microscope you look through

- A. Eyepiece
- B. Coarse adjustment knob
- C. Fine adjustment knob
- D. Arm



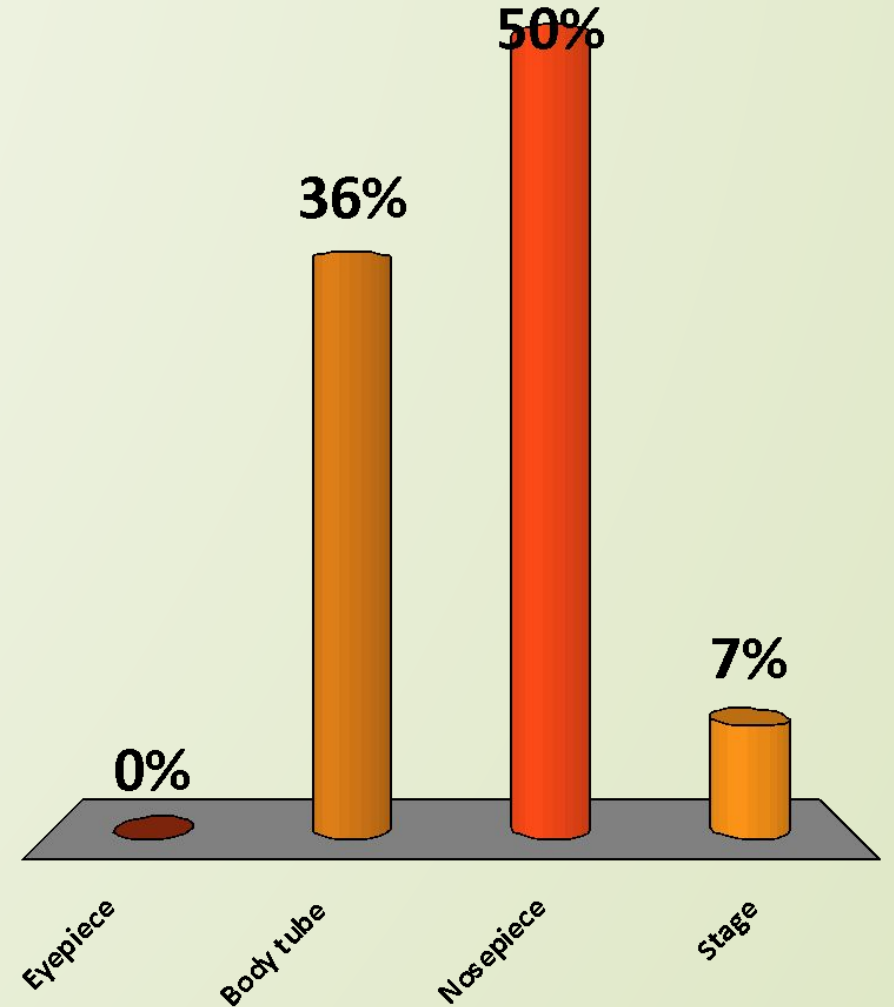
The number of times a specimen is made larger

- A. Diaphragm
- B. Base
- C. Revolving nosepiece
-  D. Magnification



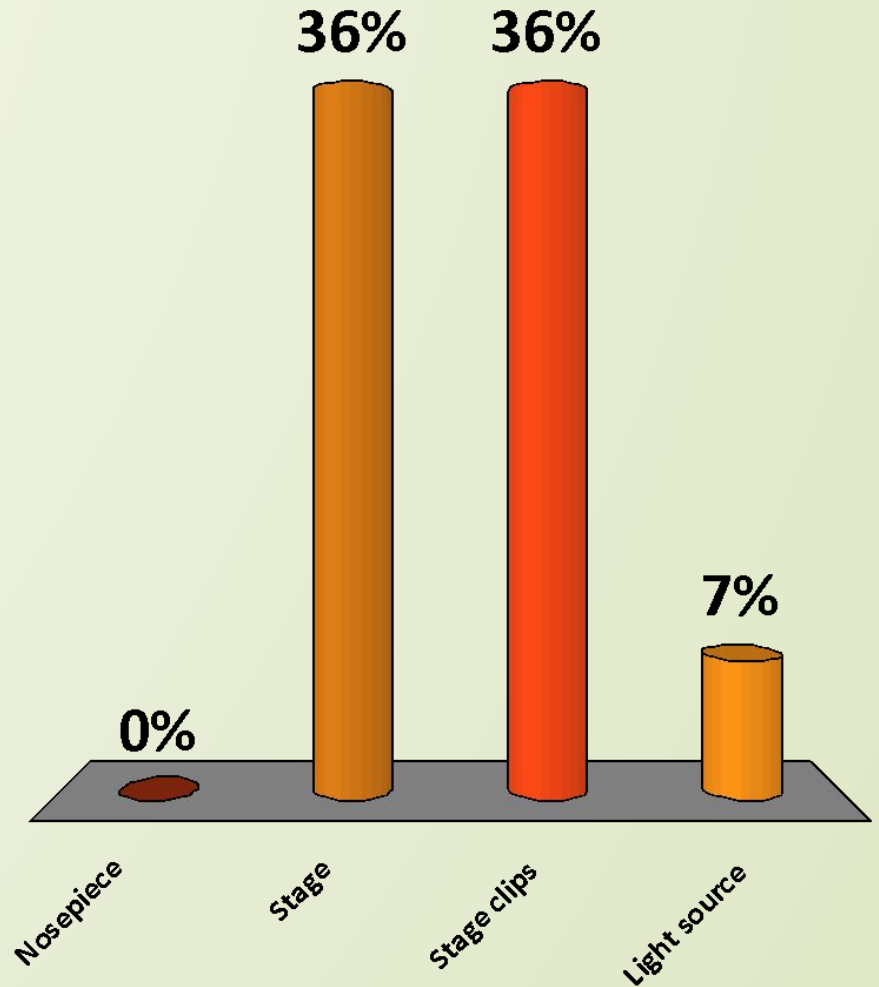
The part of the scope which holds the objective lenses

- A. Eyepiece
- B. Body tube
- C. Nosepiece
- D. Stage



The part of the scope which **supports** the slide

- A. Nosepiece
- B. Stage
- C. Stage clips
- D. Light source



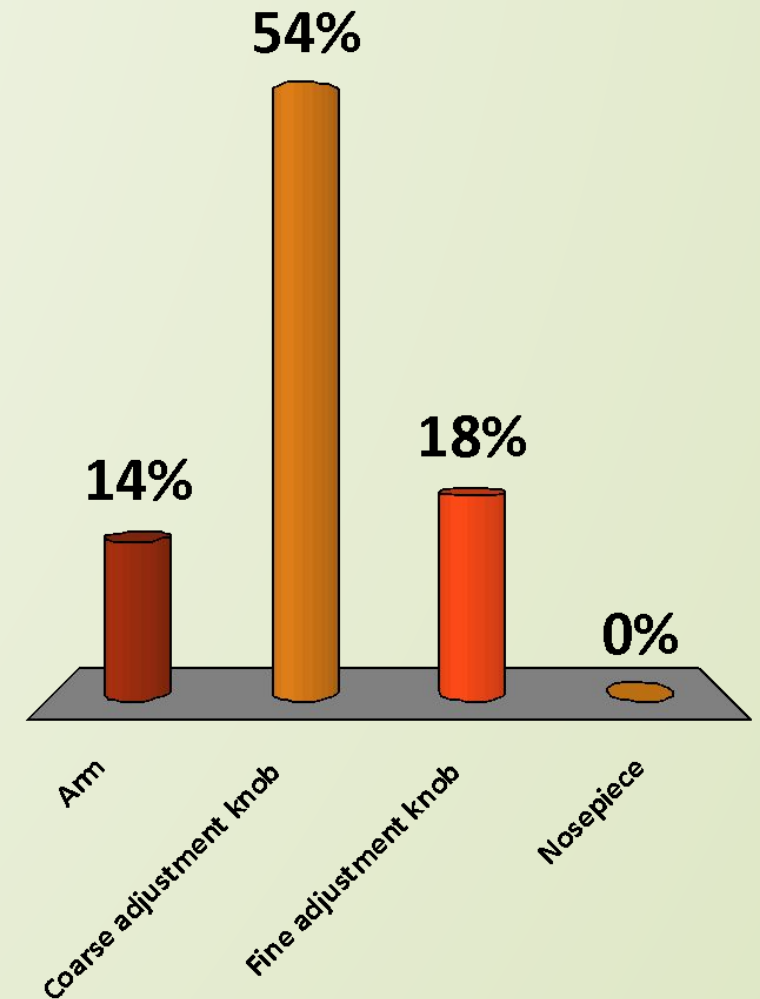
The part which visibly moves the body tube up and down.

A. Arm

 B. Coarse adjustment knob

C. Fine adjustment knob

D. Nosepiece



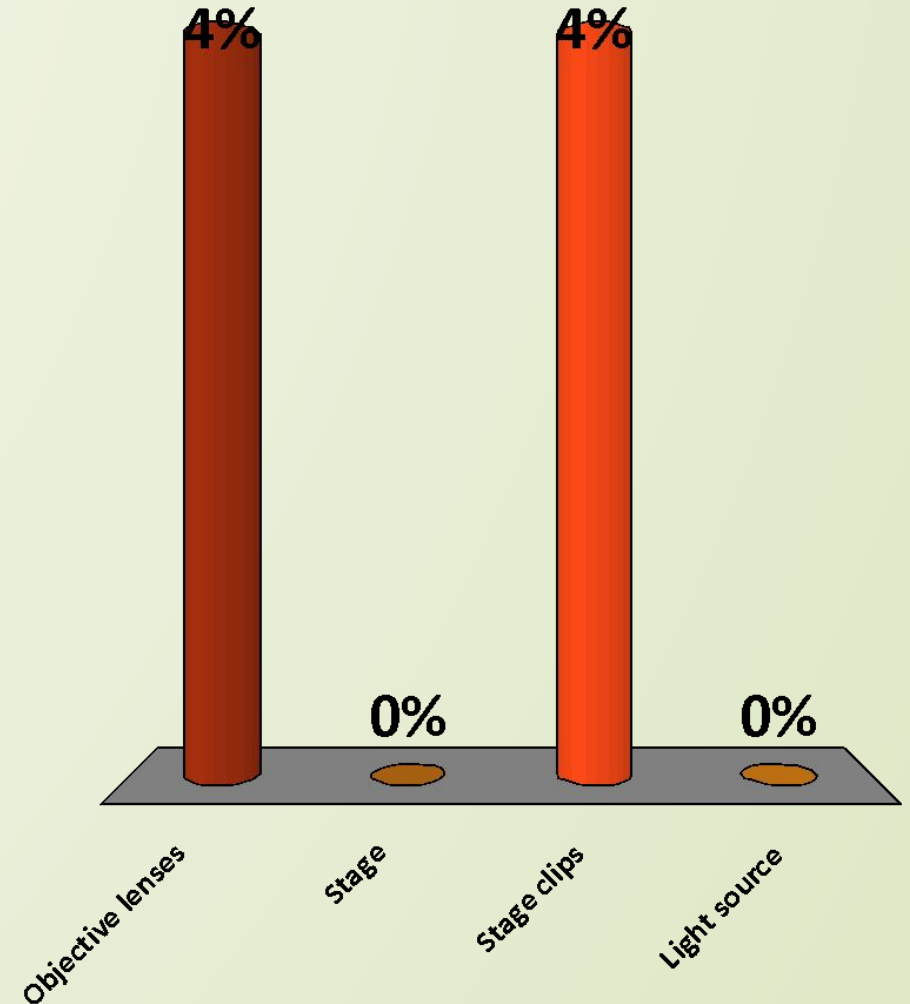
The part of the scope which holds the slide in correct position.

A. Objective lenses


B. Stage

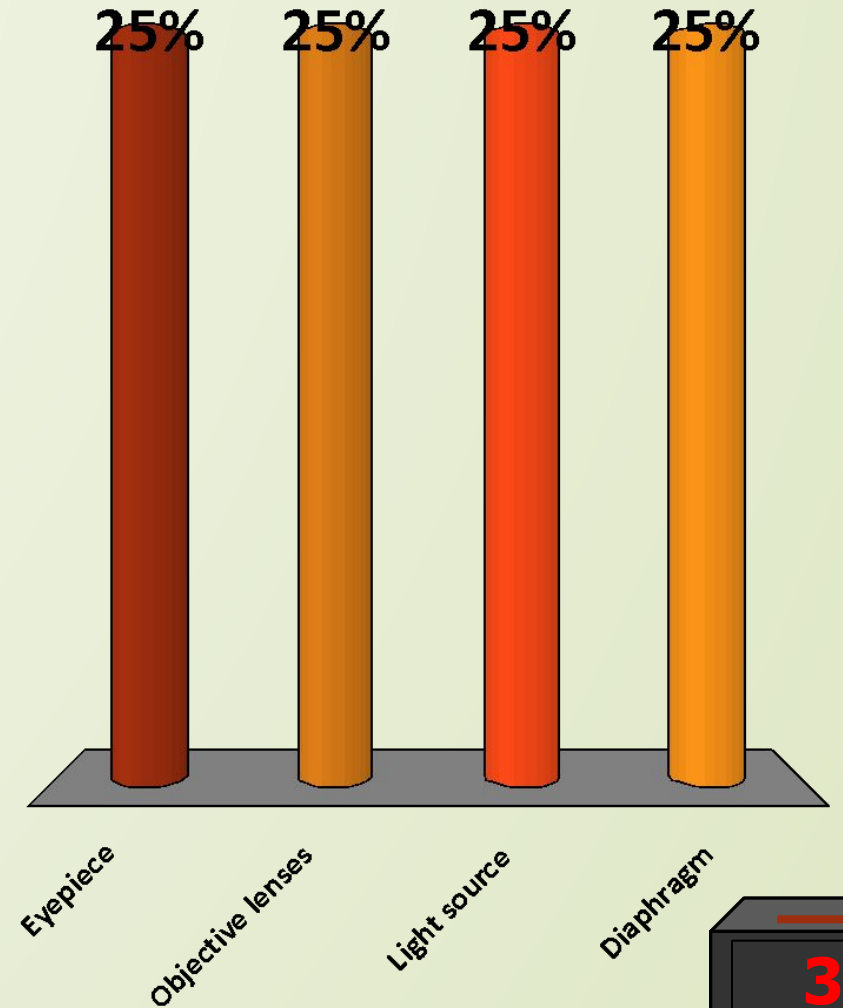
 **C. Stage clips**

D. Light source




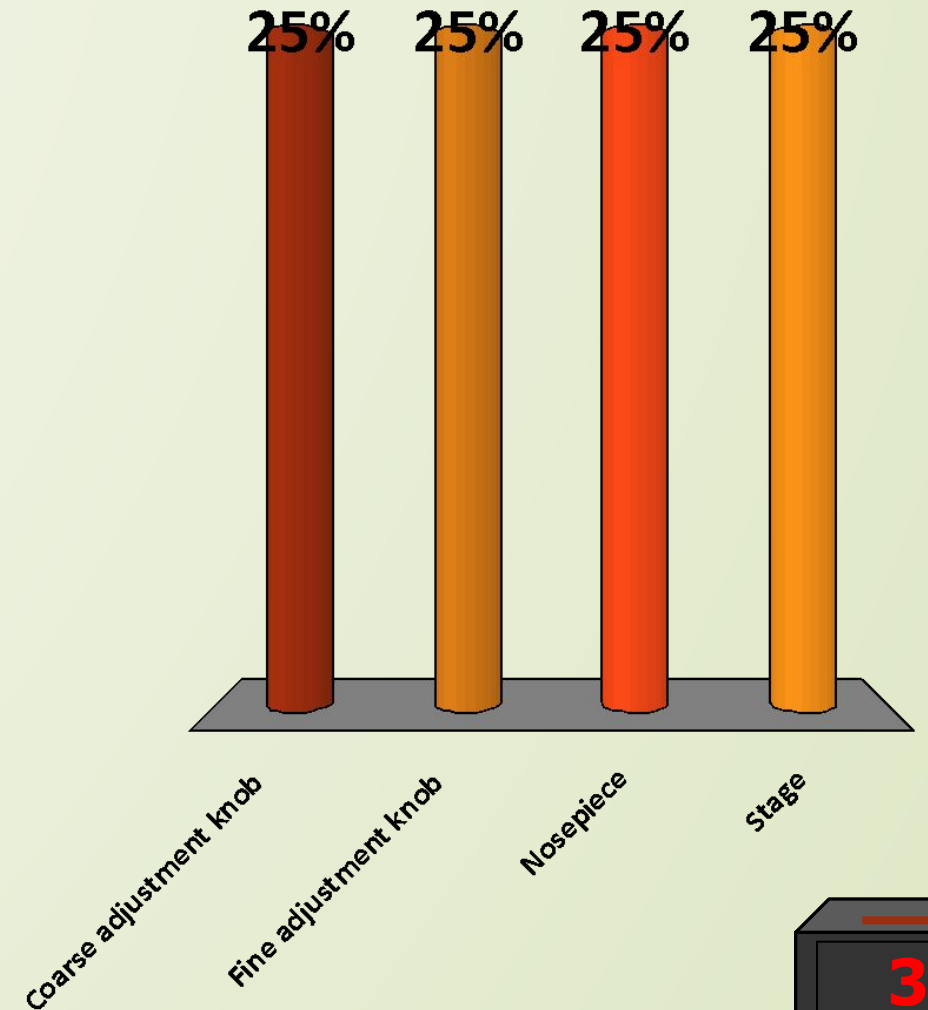
The part of the scope which controls the amount of light that is reflected.

- A. Eyepiece
- B. Objective lenses
- C. Light source
-  D. Diaphragm




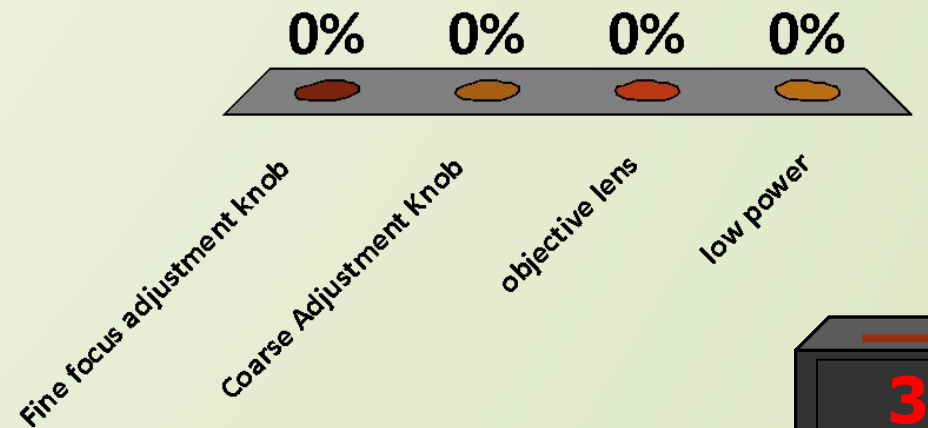
The part of the scope which moves the body tube slightly for sharp focusing.

- A. Coarse adjustment knob
-  B. Fine adjustment knob
- C. Nosepiece
- D. Stage




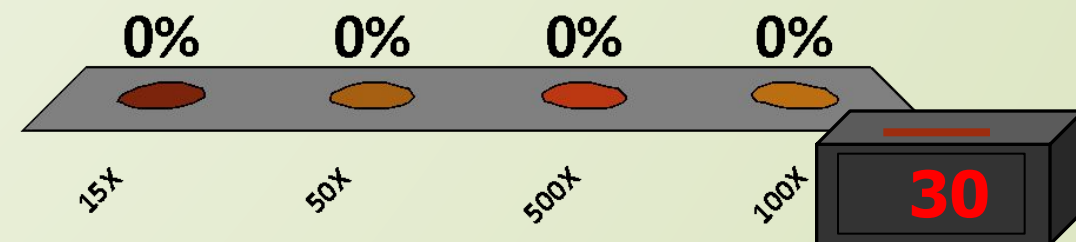
Which focusing knob do you first use when you begin looking at a slide?

- A. Fine focus adjustment knob
-  B. Coarse Adjustment Knob
- C. objective lens
- D. low power




If the objective lens can magnify an object 5X and ocular lens (eye piece) magnify an object 10X what is the total magnification of an object.

- A. 15X
-  B. 50X
- C. 500X
- D. 100X



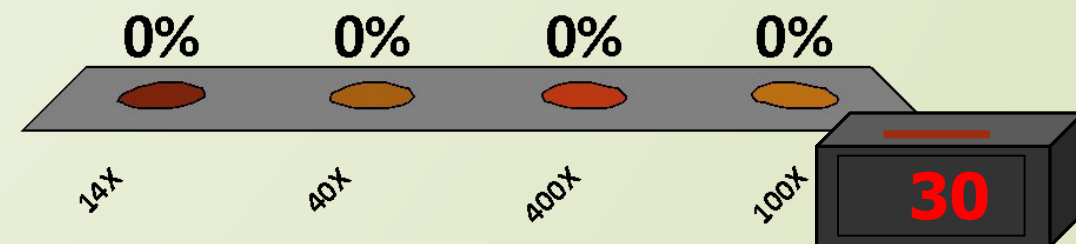
If the objective lens can magnify an object 4X and ocular lens (eye piece) magnify an object 10X what is the total magnification of an object.

A. 14X

 B. 40X

C. 400X

D. 100X



If the objective lens can magnify an object 10X and ocular lens (eye piece) magnify an object 10X what is the total magnification of an object.

- A. 20X
- B. 1000X
- C. 400X
- D. 100X

Table

0% 0% 0% 0%

20X 1000X 400X 100X

30

If the objective lens can magnify an object 40X and ocular lens (eye piece) magnify an object 10X what is the total magnification of an object.

- A. 20X
- B. 1000X
- C. 400X
- D. 100X

0% 0% 0% 0%

20X 1000X 400X 100X

Table

30

Participant Leaders

Points

Participant

Points

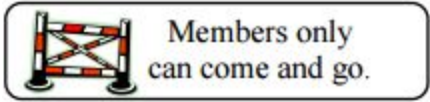
Participant

CELLS & ORGANELLES

Directions:

Match the function cards and memory items by copying the function using control x and pasting it in the "Function/Description" column next to the matching "Organelle" then do the same for the memory cards. (Cell membrane has been completed for you.)

FUNCTION CARDS		
Captures energy from the sunlight and uses it to produce food in a plant cells	Receives proteins & materials from the ER, packages them, & distributes them	Tiny strands inside the nucleus that contain the instructions for directing the cell's functions
Produces the energy a cell needs to carry out its functions	Gel-like fluid where the organelles are found	Assembles amino acids to create proteins
Control center of the cell; contains DNA	Stores food, water, wastes, and other materials	Found inside the nucleus and produces ribosomes
Rigid outer layer of a plant cell	Has passageways that carry proteins and other materials from one part of the cell to another	Uses chemicals to break down food and worn out cell parts

Organelle	Function/Description	How can I remember it?
Cell Membrane	Controls what comes into and out of a cell; found in plant and animal cells	 Members only can come and go.
Cell Wall		
Cytoplasm		
Mitochondria		
Lysosomes		
Vacuoles		
Golgi Bodies		
Chloroplasts		
Endoplasmic Reticulum		
Ribosomes		
Nucleus		
Nucleolus		
Chromatin		

MEMORY CARDS



Make me something
sweet to eat



I make "some"
nice proteins.



I'm a
"GOLden" packer.



I'm a brick wall.



I am the
little nucleus.



I'm a
transportER.



I am a "mighty"
power house.



I clean things up!
(Hint: Lysol)



I'll store anything,
(Hint: Vacuum Bags)



I'm the
control center.



I'm a "tin" of
information.



Sail through
my plasma.

Seeing the School in a Different Way

What does the cell have in common with your school? Plenty... if you think creatively! Find out by following the directions below.

DIRECTIONS: Read the functions of the parts of your school. Then read the list of cell structures. In the chart, write each cell structure next to the part of your school that does the same job.



	School Part	School Part Function	Cell Structure	Explain
1.	The Principal's Office	The place where all decisions are made to run the school.		
2.	The Storage Room	The place where all extra materials are stored until they are ready to be used.		
3.	The Cafeteria	The place where food (especially proteins) are made for the building.		
4.	The Walls	The structures that keep everything in its place		
5.	The Outside Walls of the School	The structures that protect the inside of the school. They allow things into and out of the school.		
6.	The Boiler Room	The place that provides all of the energy (heat) for the school.		
7.	The File Cabinets in the Principal's Office	The structures that neatly hold all of the information the school needs to run smoothly.		
8.	The Hallways	The structures that allow for things to move around within the school.	endoplasmic reticulum	This is similar to the hallways of the school because we use the hallways to get from one place to another the same way that materials are transported from one place to another in the cell.
9.	The Dumpsters	The structures that allow waste produced by the school to be removed from the building.		
10.	The Walls of the Principal's Office	The structures that protect the principal's office from harm, while allowing things into and out of the office.		

Cell Structures

cell membrane	cytoplasm	nucleus	chromosomes (DNA)	nuclear membrane
mitochondria	vacuoles	lysosomes	endoplasmic reticulum	ribosomes

Variety of Cells



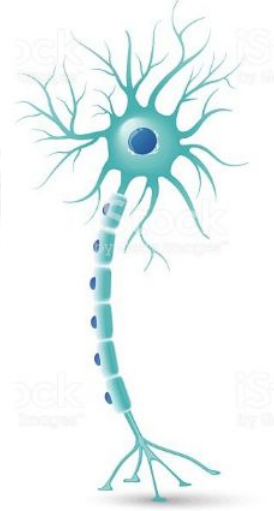
cardiac cells



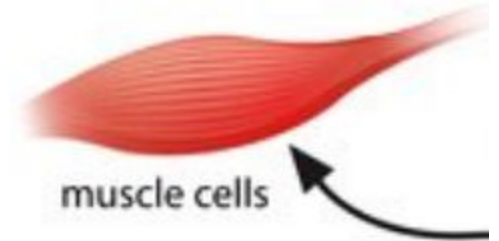
intestinal cells



nerve cell



Motor neuron



muscle cells



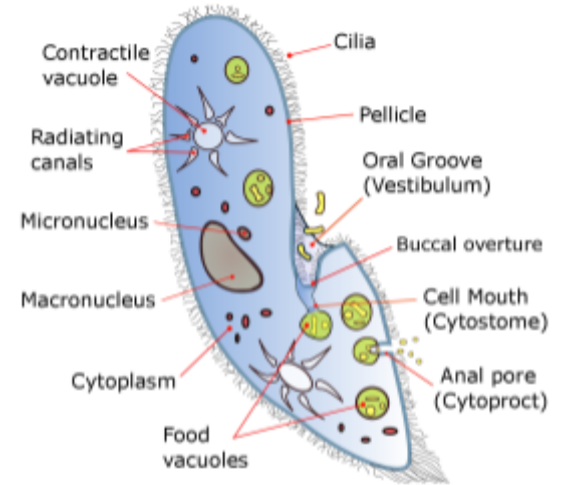
liver cells



Bone cell



White blood cell



Paramecium

Biotic or Abiotic?

Warm up - Group Activity

On a whiteboard categorize the words below as biotic or abiotic!

pencil

computer

squirrel

seed

flower

bird

dinosaur

chair

sun

wind

rocks

grass

paper

water

soil

apple

Biotic

Pencil

Flower

Paper

Bird

Squirrel

Dinosaur

Seed

Chair (wooden)

Grass

Apple

Soil (Broken down plants and animals)

Abiotic

Sun

Computer

Wind

Water

Rocks

Chair (metal)

Soil (broken down rocks)

Now divide all object identified as biotic into categories of living(Organism) and product of living.

pencil

paper

squirrel

seed

flower

bird

dinosaur

chair

sun

grass

apple

Living

Flower (If still on the plant)

Bird

Squirrel

Grass

Product of Living

Pencil

Flower (if not on the plant)

Paper

Dinosaur

Seed

Chair (wooden)

Apple

Soil (Broken down plants and animals)

The Characteristics of Living Things

- Biologists use six characteristics to classify something as a living thing.
 1. Made of Cells
 2. Use and Need Energy
 - Takes in energy
 - Produces waste
 3. Adapt to their Surroundings
 4. React to Changes
 5. Reproduce
 6. Grow and Develop

The Characteristics of Living Things

- Living things are called *organisms*.
- All living things display all six characteristics.
- Anything without one of these six characteristics is nonliving.



The Martian and the Car



Marty Martian was sent to Earth by the Martian government to find life. While on Earth, Marty captured a car and brought it back to Mars. He thought he'd found a good example of life on Earth. The Martian government does not believe that the car Marty brought back is alive. Marty must stand trial for failing to perform his Martian duties.

At the trial, Marty spoke in his defense. "I first saw these life forms rolling along roads in great numbers. They were giving off thick clouds of poisonous waste as they moved. They seemed to exhibit herding behavior, as many of the cars moved in the same direction. They appeared to have a great deal of energy, some of them moved faster than 60 kilometers per hour when one of these life forms stopped or slow down, the others behind it responded. They slowed down and gave off a reddish light from the back, and sometimes they would make honking noises. I observed that they would stop to feed on a liquid substance."

Marty makes some good points. Is Marty right? Is a car living?

Graphic Organizer

Claim:

Evidence	Reasoning

Conclusion:

Claim/Focus Statement:

(This should answer the question asked. Do not provide evidence in this statement!)

Marty the Martian came to planet Earth to get a proof of life. After making some observations, he took a car back as a sample of a living thing. Martian Government decided to prosecute him for not completing his Martian duty. Marty did not observe any characteristic of living things in the car, so he judged the car as not living. Therefore car can not be designated as living. Car may have some characteristic of living things but it does not have all six characteristic of living things therefore it is not a living thing.

Performance Indicator	Exceeding	Meeting	Approaching	Not Meeting
SC.3 Develop a claim that answers a question or is in support of a position (ELA.W.1)	I can... Incorporate background information to develop a reasonable claim that clearly answers the question or is in support of a position	I can... Construct a reasonable claim that clearly answers the question or is in support of a position	I can... Write a claim that is not fully developed	I can... Write a claim that does not relate to the question OR Write a response that does not include a claim

Evidence	Reasoning
<p>Marty saw the car using energy because some of them “moved faster than 60 km.”</p> <p>Marty saw the car give “off thick clouds of poisonous waste as they moved.”</p> <p>Marty saw the car respond to their surrounding. He said “ when one of these life forms stopped or slowed down the others behind it responded. They slowed down and gave off a reddish light from the back.</p> <p>Mart saw the car “stop to feed on a liquid substance.”</p>	<p>Marty saw that the car shows evidence of using energy because Marty saw the car moving fast. He also saw the car feeding and producing waste. He also saw the car react to changes because it slowed down when cars in front of it slowed down. This lead Marty to believe that the car is living.</p>
<p>For the car to be living it also has to be made of cells, adapt to their surroundings, reproduce, and grow.</p>	<p>Unfortunately for Marty an organism is only considered living if it has all six of the following characteristic: use energy, produce waste, reproduce, adapt to their surrounding, react to changes grow and be made of cells. Marty was unable to provide any evidence of car’s ability to grow or reproduce. Also there was no evidence car’s ability to adapt or be made up of cells.</p>

Evidence: *(List a fact or data to support your claim.)*

Performance Indicator	Exceeding	Meeting	Approaching	Not Meeting
SC.4 Support a claim with evidence	I can... Support claim(s) with comprehensive analysis or can draw logical conclusions that are not immediately obvious	I can... <i>Support claim(s) with relevant evidence demonstrating an understanding of the science concept</i>	I can... Provide evidence related to the claim or evidence is inferred	I can... Provide evidence that does not support the claim OR Evidence is missing

Reasoning: *(State how the evidence above proves your claim or focus.)*

Performance Indicator	Exceeding	Meeting	Approaching	Not Meeting
SC.5 Demonstrate understanding of scientific concepts by explaining the relationship between a claim and evidence	I can... Support/defend the relationship between claim and evidence by applying the concept in a new context	I can... Apply science concepts to accurately explain the relationship between claim and evidence	I can... Use a basic understanding of science concepts to explain the relationship between claim and evidence	I can... Attempt to connect the evidence to the claim or connection may be based on misconceptions

Conclusion

Therefore we can conclude that the car is not living. Marty jumped to an inaccurate conclusion because he saw the car exhibit some of the six characteristics. He did not understand that for something to be living it has to have all of the six characteristics.

Final Draft

Marty the Martian came to planet Earth to get a proof of life. After making some observations, he took a car back as sample of a living thing. Martian Government disagreed with Marty and decided to prosecute him for not completing his Martian duty. Marty did observe characteristic of living things in the car, but he jumped the gun by assuming that the car is living. Car may have some characteristic of living things but it does not have all six characteristic of living things therefore it is not a living thing.

Marty saw the car using energy because some of them “moved faster than 60 km.” He also saw the car give “off thick clouds of poisonous waste as they moved.” Marty saw the car respond to their surrounding because he said “when one of these life forms stopped or slowed down the others behind it responded. They slowed down and gave off a reddish light from the back. Marty thought that car was living because it was using energy when he saw the car moving fast. He also saw the car acquire energy by stopping to feed and produce waste. This lead Marty to believe that the car is living. Unfortunately for Marty an organism is only considered living if it has all six of the following characteristic: use energy, produce waste, reproduce, adapt to their surrounding, react to changes grow and be made of cells. Marty was unable to provide any evidence of car’s ability to grow or reproduce. Also there was no evidence that the car is able to adapt. There was definately zero evidence that the car is made up of cells. Therefore we can conclude that the car is not living. Marty jumped to inaccurate conclusion because he saw the car exhibit some of the six characteristic. He did not understand that for something to be living it has to have all of the six characteristics.

Performance Indicator	Exceeding	Meeting	Approaching	Not Meeting
Writing Style		<i>I can establish and maintain a formal scientific writing style</i>	<i>I inconsistently uses a formal scientific writing style</i>	<i>I use informal writing style</i>
Vocabulary	<i>I have extensive use of additional related scientific vocabulary</i>	<i>I accurately use related scientific vocabulary</i>	<i>I accurately use some related scientific vocabulary</i>	<i>I used minimal related scientific vocabulary</i>
Conventions		<i>I communicate ideas clearly (conventions do not interfere with reader's understanding)</i>	<i>I did not communicate ideas clearly (conventions may interfere with the reader's understanding)</i>	<i>My writing is incoherent</i>
Conclusion	<i>I can provide comprehensive analysis or draw logical conclusion that are not immediately obvious.</i>	<i>I can provide concluding statement that relates back to the claim(s)</i>	<i>I can provides concluding statement that is not fully developed</i>	<i>I can provides concluding statement that does not relate back to the claim(s)</i>

Closing - Practice

Claim #2:

→ More males get injured skateboarding than females.

Is there **evidence** to support this **claim**? Why or why not?

Can you think of reasons why someone would not agree with this **claim**?

Number of Skateboarding Injuries by Age and Gender

