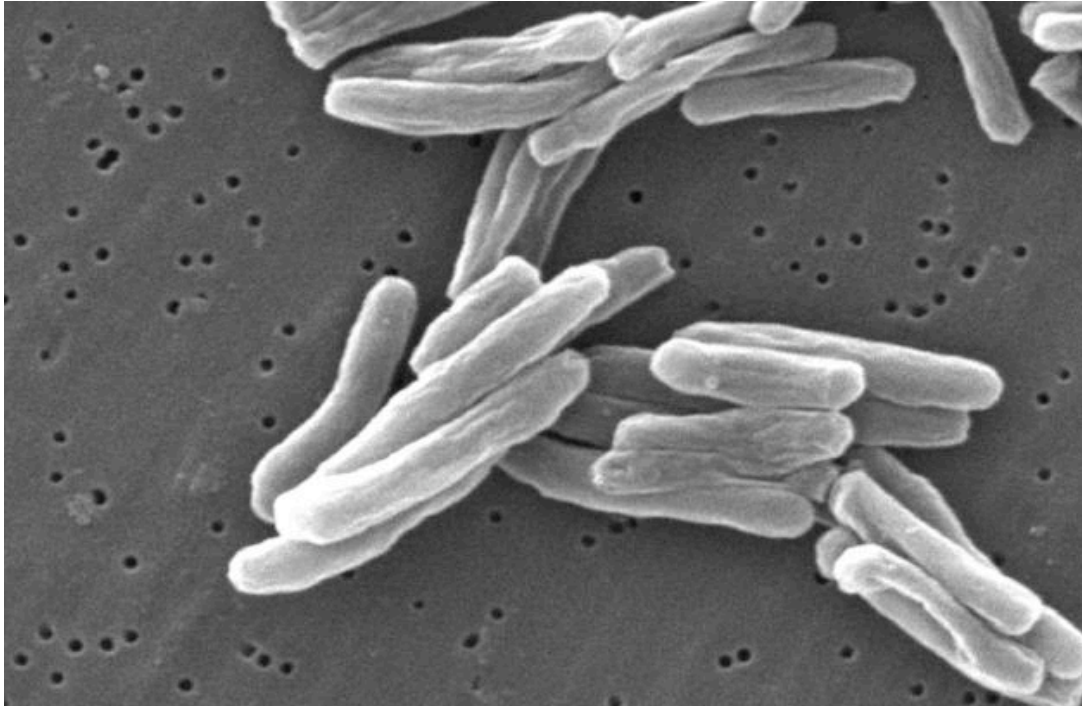


Name \_\_\_\_\_

## **Infectious Disease:**

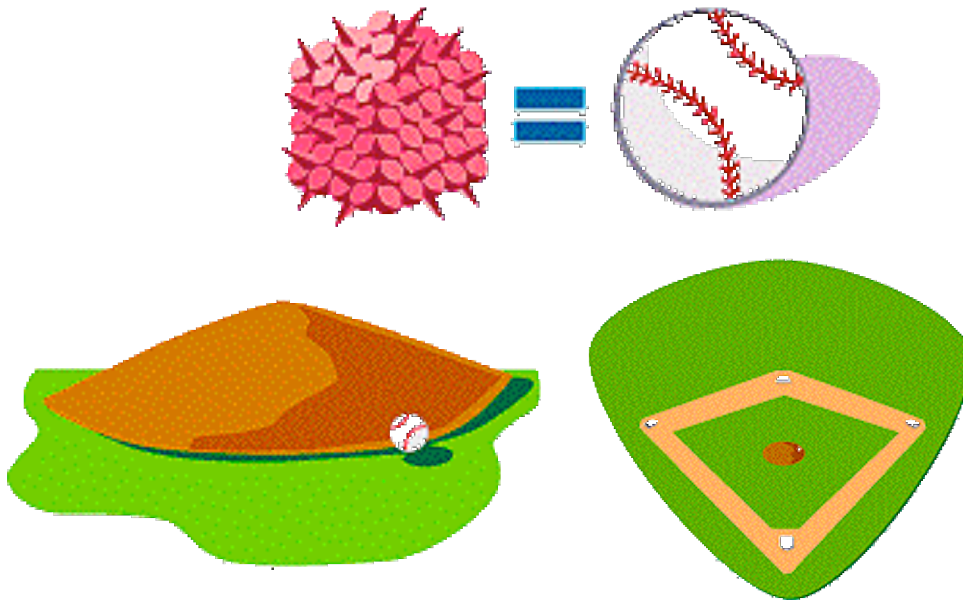
### **What are Microbes?**



**Objective #2: The student will be able to label and identify the main types of infectious disease causing agents, describe their properties, and give examples of them.**

1. Your class has just finished discussing **microbes**.

“How small are microbes? Well, let’s say we could enlarge an average virus, the smallest of the microbes, to the size of a baseball. An average bacterium would then be the average size of the pitcher’s mound. Just one of the millions of cells that make up your body would be the size of the ballpark!”



2. There are three types of microbes that your teacher discussed. These three

types of microbes are: bacteria,

fungi, and

viruses.

3. Carefully read the “Microbe Informational Sheet” on the next two pages.

Following these two pages are pictures of bacteria, fungi, and viruses that you can use with your students.

## Microbe Informational Sheet

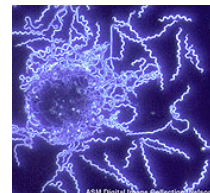
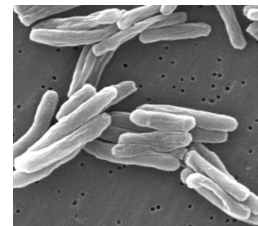
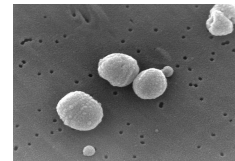
### Main Types of microbes

#### i. Bacteria

- a. Where do they live? Bacteria consist of only a single cell, but don't let their small size fool you. They're an amazingly complex and fascinating group of creatures. Bacteria have been found that can live in temperatures above the boiling point and in cold that would freeze your blood.
- b. What do they eat? Bacteria eat everything from sugar and starch to sunlight, sulfur and iron.

- c. What do they look like? Although there are thousands of species of bacteria, all of them are basically one of three different shapes.

- i. Cocci (cox-eye) are shaped like little balls (show kick ball)
- ii. Bacilli (buh-sill-eye) are rod or stick shaped (like a baseball bat)
- iii. Spirochetes are spiral in shape (like a telephone cord or a slinky)



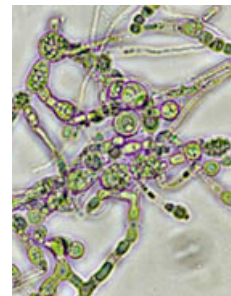
#### ii. Fungi

- a. Biggest living Thing on Earth

- b. Where do they live? Fungi grow very well in environments that are slightly acidic. They can grow on substances with very low moisture. They can live in the soil, on your body, in your house, and on plants and animals in freshwater and seawater. A single spoonful of soil contains about 120,000 fungi.

- c. What do they eat? Fungi absorb nutrients from living or dead organic matter (plant or animal stuff) that they grow on.

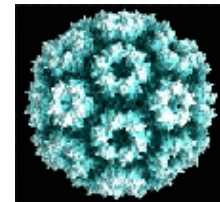
- d. What do they look like? Fungi include molds and mushrooms. Fungi can be made up of a single cell or



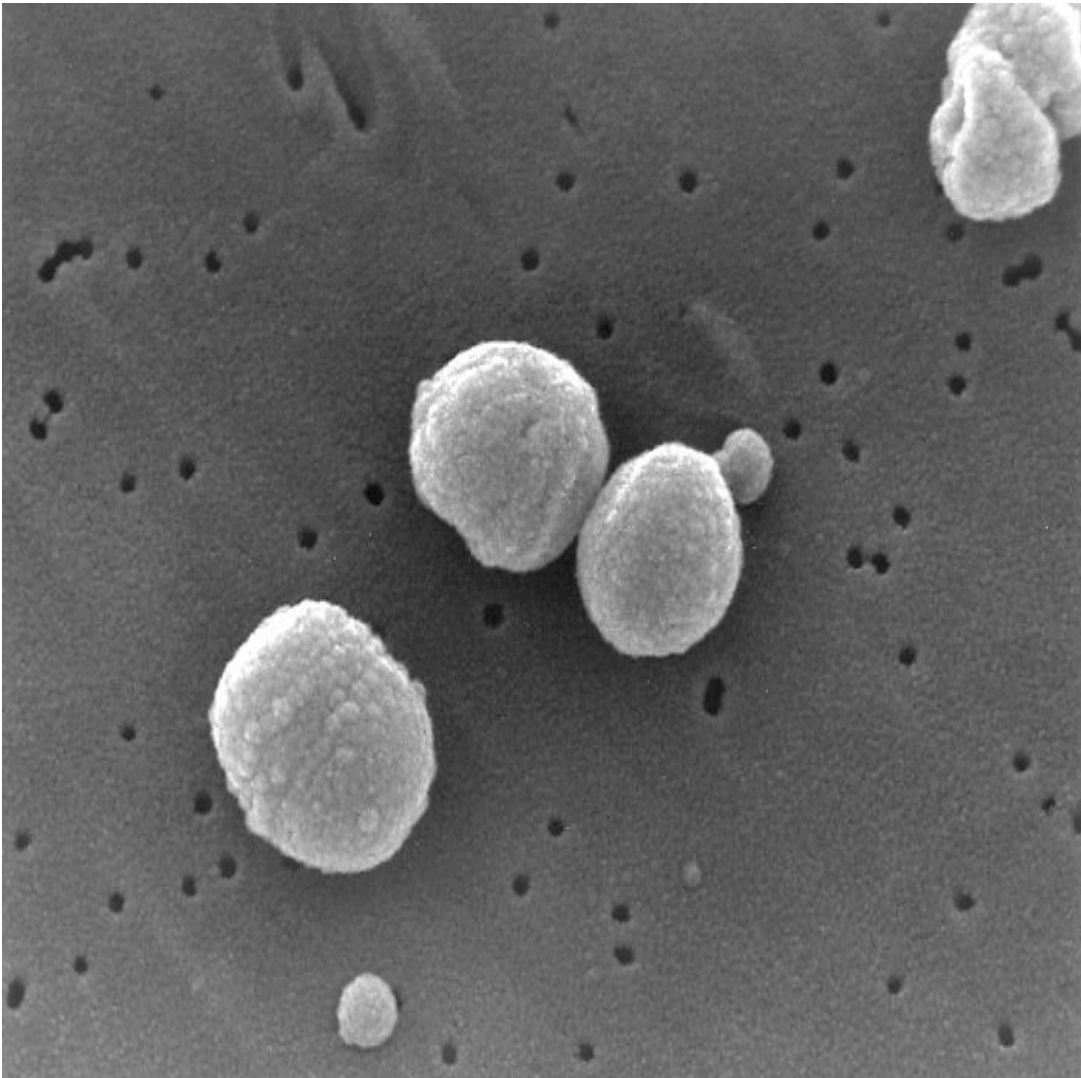
multi cells. They are too tiny to see as individuals, but you can see large clusters of them as a white powdery coating on fruits and leaves.

iii. Viruses

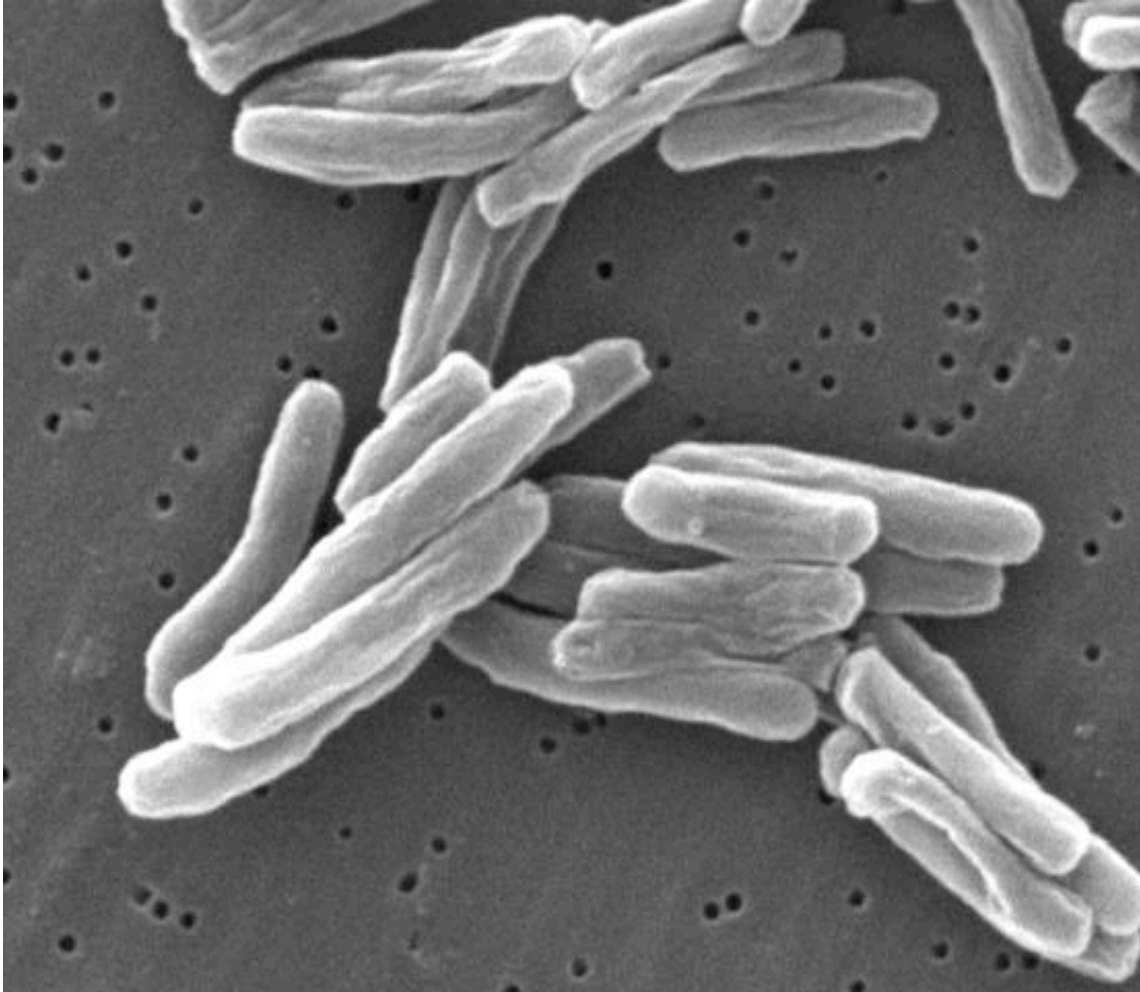
- a. When is a life form not a life form? When it's a virus. Viruses are strange things that straddle the fence between living and non-living. On the one hand, if they're floating around in the air or sitting on a doorknob, they're inert. They're about as alive as a rock. But if they come into contact with a suitable plant, animal or bacterial cell, they spring into action. They infect and take over the cell like pirates hijacking a ship.
- b. Where do they live? Viruses are found on or in just about every material and environment on Earth from soil to water to air. They're basically found anywhere there are cells to infect. Viruses have evolved to infect every form of life, from animal to plant and from fungi to bacteria. However, viruses tend to be somewhat picky about what type of cells they infect. Plant viruses are not equipped to infect animal cells, for example, though a certain plant virus could infect a number of related plants.
- c. What do they eat? Viruses do not eat anything! Viruses exist for one purpose only: to reproduce and make more copies of themselves to spread to other living things. To do that, they have to take over the reproductive machinery of suitable host cells.
- d. What do they look like? There are thousands of different viruses that come in a variety of shapes. Many are polyhedral (polly-hee-drul), or multi-sided. If you've ever looked closely at a cut gem, like the diamond in an engagement ring, you've seen an example of a polyhedral shape. (Unlike the diamond in a ring, however, a virus does not taper to a point, but is shaped similarly all around.) Other viruses are shaped like spiky ovals or bricks with rounded corners. Some are like skinny sticks while others look like bits of looped string. Some are more complex and shaped like little lunar landing pods.



# Bacteria Cocci



# Bacteria Bacilli



# Bacteria Spirochete

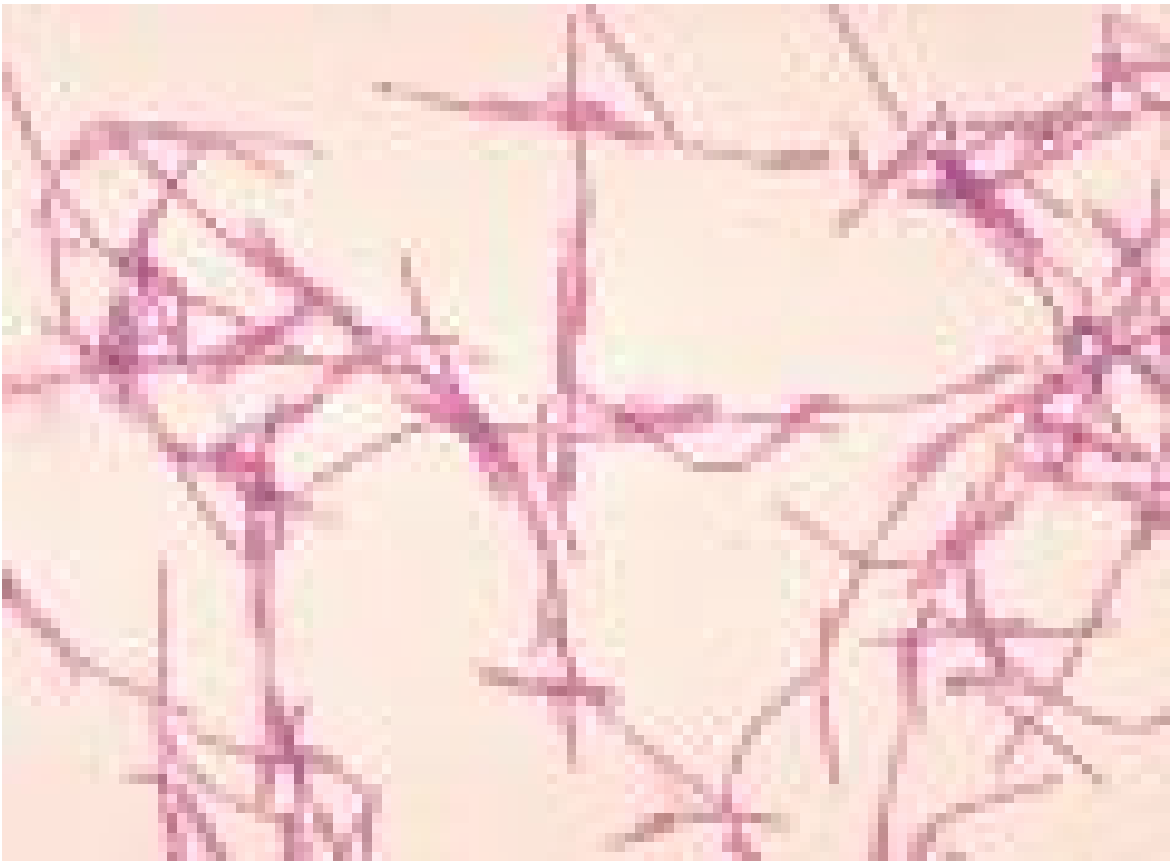


# Virus





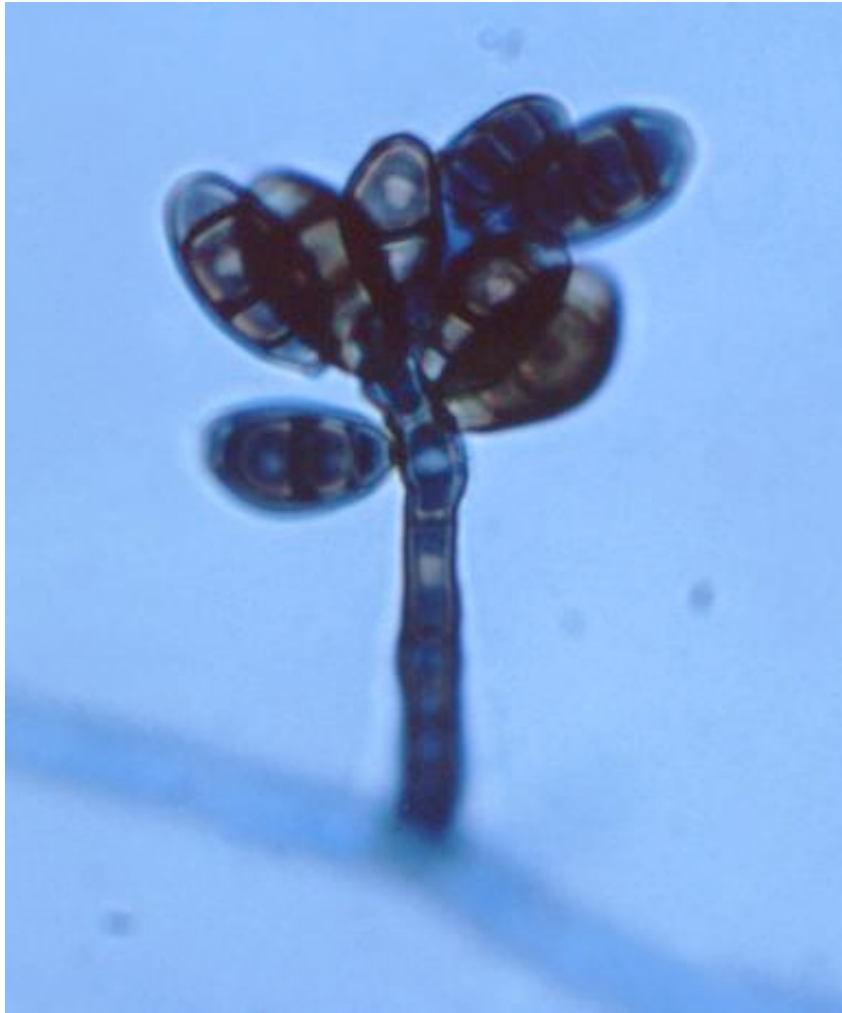
# Bacteria Bacilli



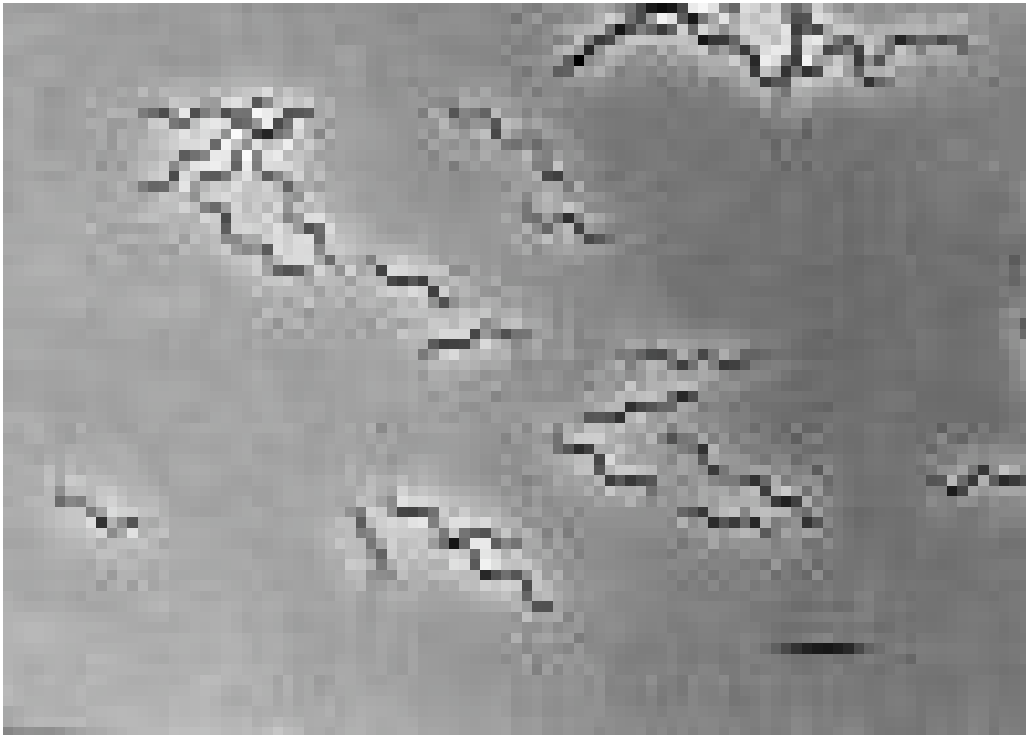
# Virus



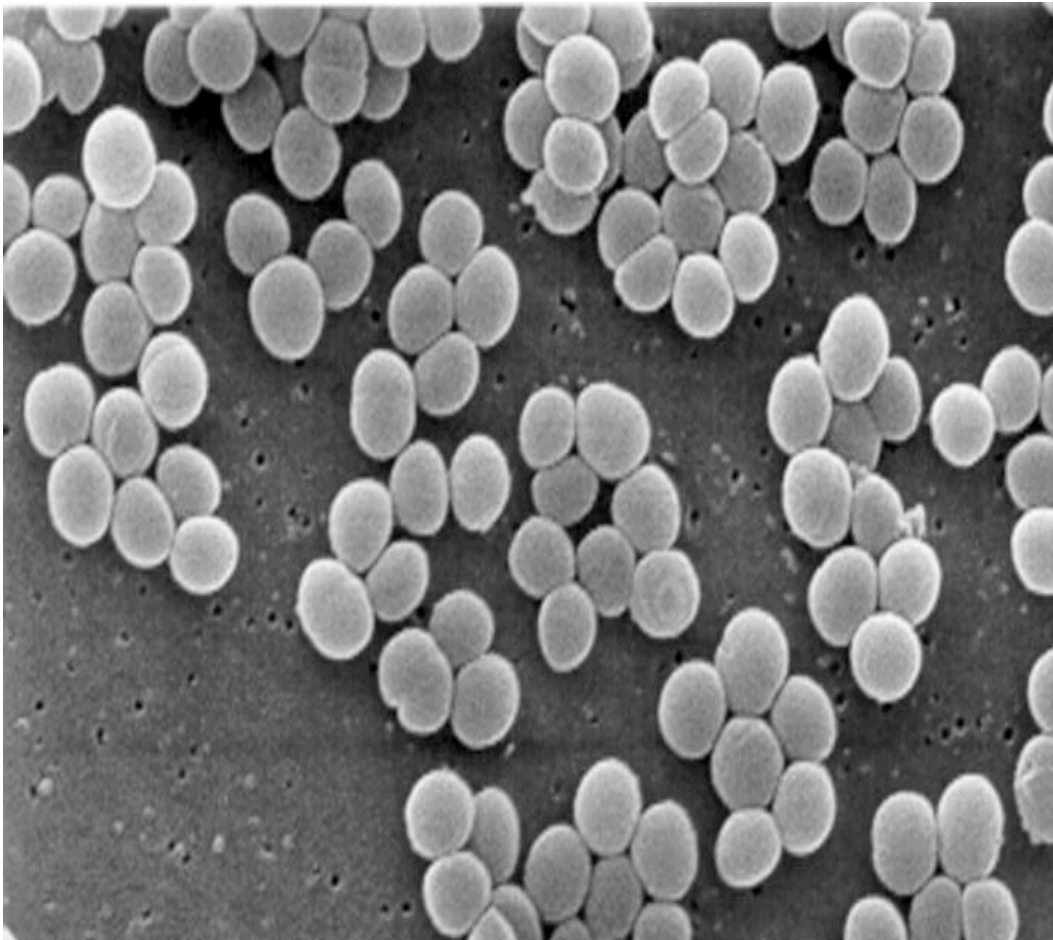
# Fungi



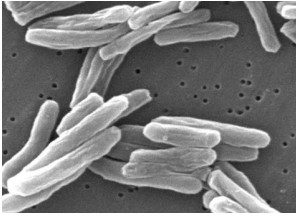
# Bacteria Spirochete



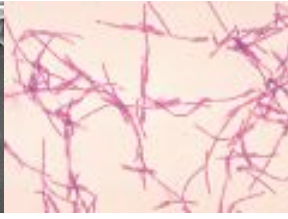
# Bacteria Cocci



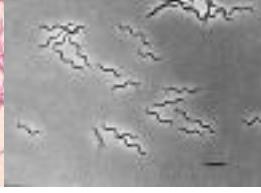
**TEACHER KEY**



*Mycobacterium tuberculosis*  
(bacteria)



*Bacillus anthracis*  
(bacteria)



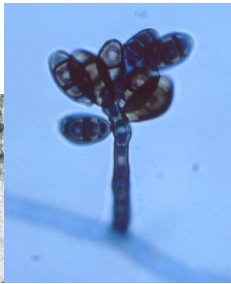
*Borrelia burgdorferi*  
(bacteria)



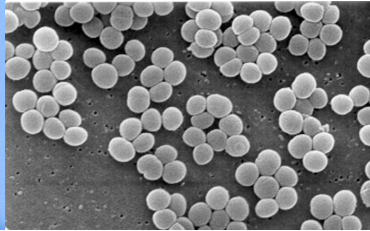
Ebola virus



Herpes Simplex Virus

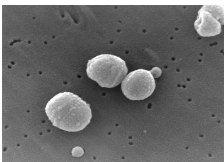


Fungi  
*Curvularia geniculata*.



*Staphylococcus aureus* (bacteria)

*Streptococcus pyogenes*  
(bacteria)



*Borrelia burgdorferi*  
(bacteria)



4. Make your microbe in the “**Wanted Poster**” below. Be **sure** to spell the name of your microbe carefully and correctly on the black line at the bottom of the poster. Be **creative** with your drawing and reflect the **characteristics** of that microbe. **Do your best!** Use your colored pencils to give good details. After everyone is done you will be able to share yours with the class!

NOTE: Teachers may wish to divide their class into 7 groups. Each group would have a different “Most Wanted” microbe card. Each group would use their card for information about the microbe as well as an example as to how to draw it. Encourage students to be creative with their drawing as long as their drawings reflect the characteristics of that microbe. After all drawings are done, they can be shared with classmates and then displayed.





**Lactobacillus acidophilus (lack-toe-bah-sill-us acid-off-ill-us): one of the bacteria gang wanted for turning milk into yogurt.**





**Bacillus thuringiensis (bah-sill-us ther-in-gee-in-sis): a.k.a "Bt", a common soil bacterium. Wanted as a natural pest-killer in gardens and on crops.**



**Saccharomyces cerevisiae (sack-arrow-my-seas sair-uh-vis-ee-ay): a.k.a. baker's yeast. Wanted for making bread rise.**



**Streptomyces (strep-toe-my-seas): soil bacteria wanted for making streptomycin, an antibiotic used to treat infections.**



**Pseudomonas putida (sue-doe-moan-us poo-tea-dah): one of many microbes wanted for cleaning wastes from sewage water at water treatment plants.**



**Escherichia coli (Esh-er-ish-e-ah coal-eye): one of many kinds of microbes that live in your gut. Wanted for helping you digest your food every day.**



**Arbuscular mycorrhizas (ar-bus-que-ler my-kuh-rye-zuh): one of a soil-living fungus family. Wanted for helping crops take up nutrients from the soil.**

## Infectious Disease Learning Packet 2

5. After your discussions with your teacher, you should now know what the 3 main types of microbes are and be able to explain a little about them. Below is a “WORD BANK”, which you will use for the “Fill in the Blank” assignment on what you have just learned. Be sure to use your “Microbe Informational Sheet” as a reference to help you.

Fill in the blanks with the proper words from the word bank above. (You may use a word once, more than once, or not at all).

### WORD BANK

anything shapes disease virus temperatures bacilli soil molds  
balls environment bacteria single spirochetes mushrooms boiling  
spiral body fungi freeze cocci organic matter infect doorknob

### Bacteria:

Bacteria consist of only a single cell. They can live in temperatures above the boiling point. Bacteria eat organic matter from sugar and starch to sunlight, sulfur and iron.

Although there are thousands of shapes of bacteria, all of them are basically one of three shapes. The shapes are

cocci which are shaped like little balls (like a kick ball); the rod or stick shaped (like a baseball

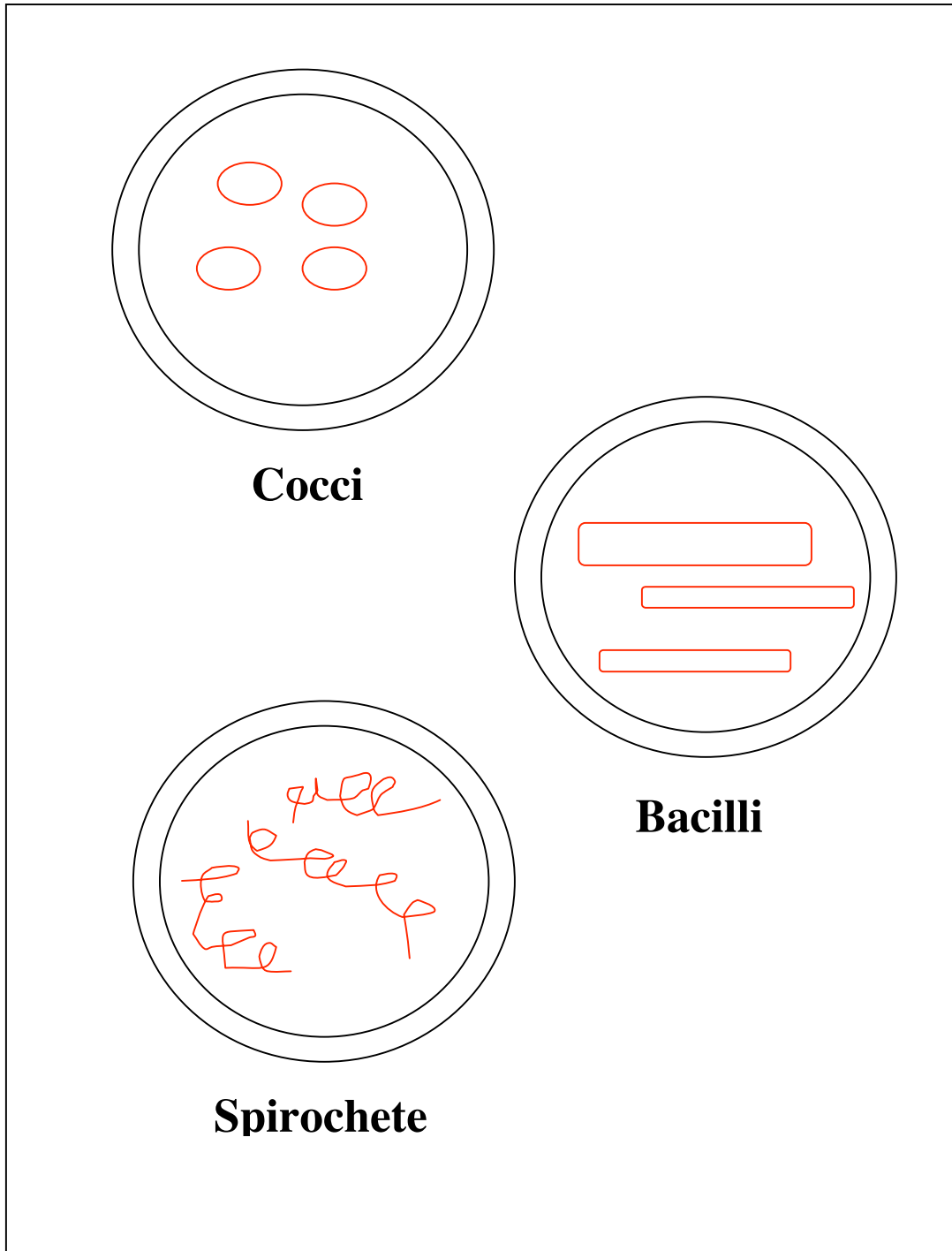
bat) called bacilli; and the

spirochetes which are bacteria in

shape like a telephone cord or a slinky.

Infectious Disease Learning Packet 2

Draw a picture of the three types of bacteria. Use the circles on the next page to help you. (Be sure to put ONLY one type of bacteria in each circle). You may color them with your colored pencils if you wish.





**WORD BANK**

anything shapes disease virus temperatures bacilli soil molds  
balls environment bacteria single spirochetes mushrooms boiling  
spiral body fungi freeze cocci organic matter infect doorknob

**Fungi:**

Fungi are the biggest living things on earth. They can live in the environment, on your body, in your house, and on plants and animals in freshwater and seawater. They absorb nutrients (food) from living or dead organic matter (plant or animal stuff) that they grow on. Fungi include mushrooms and molds.

Draw **Fungi** in the space below. Label it “**Fungi**”. You may color it with your colored pencils if you wish.



**WORD BANK**

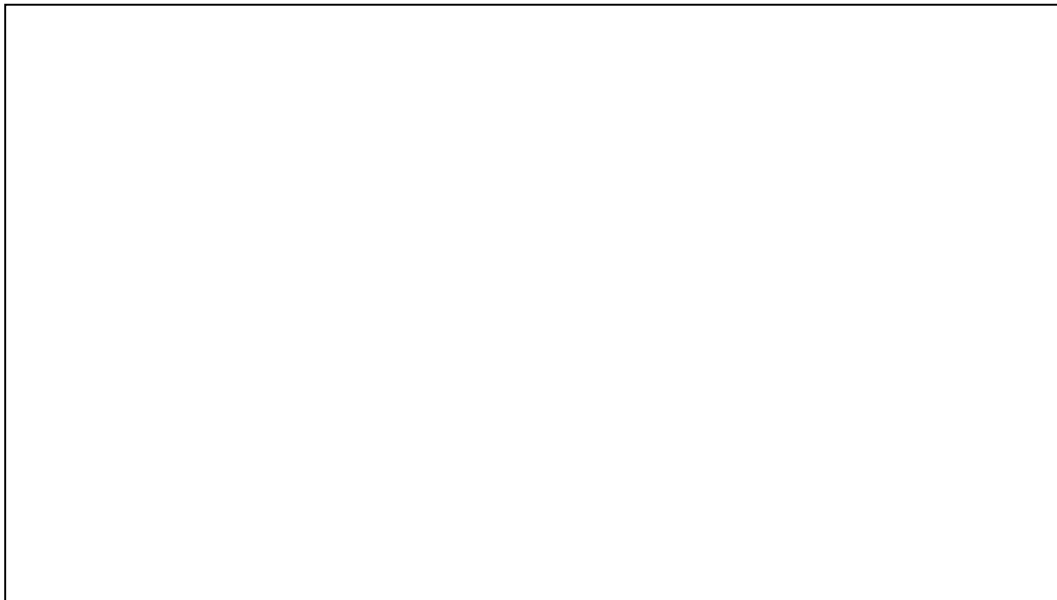
anything shapes disease virus temperatures bacilli soil molds  
balls environment bacteria single spirochetes mushrooms boiling  
spiral body fungi freeze cocci organic matter infect doorknob

**Viruses:**

When is a life form not a life form? When it is a

virus. They infect and take over the cell like pirates hijacking a ship. **Viruses** are found on or in just about every material and environment/body/organic matter on Earth from soil to water to air. Viruses come in a variety of shapes.

Draw a virus in the space below. Label it “**Virus**”. You may color it with your colored pencils if you wish.



## **Marvelous Microbe Activities**

Your teacher will tell you which of the following activities are required and which ones are extra credit. Have Fun!!

1. Do the Infectious Disease Word Find #1.
2. Do the Infectious Disease Crossword Puzzle #1.
3. Make a newspaper ad for a virus, bacteria, and/or fungi in which you can “advertise” all their good/bad properties.
4. Write a rap song about a virus, bacteria, and/or fungi.
5. Write a poem or acrostic about a virus, bacteria, and/or fungi.
6. Make a cartoon using viruses, bacteria, and/or fungi as your main characters.
7. Write a play using viruses, bacteria, and/or fungi as your main characters.
8. If you have a splendid idea of some other project that you would like to do on bacteria, viruses, or fungi, see your teacher to discuss it and get his/her comments, input, and approval.

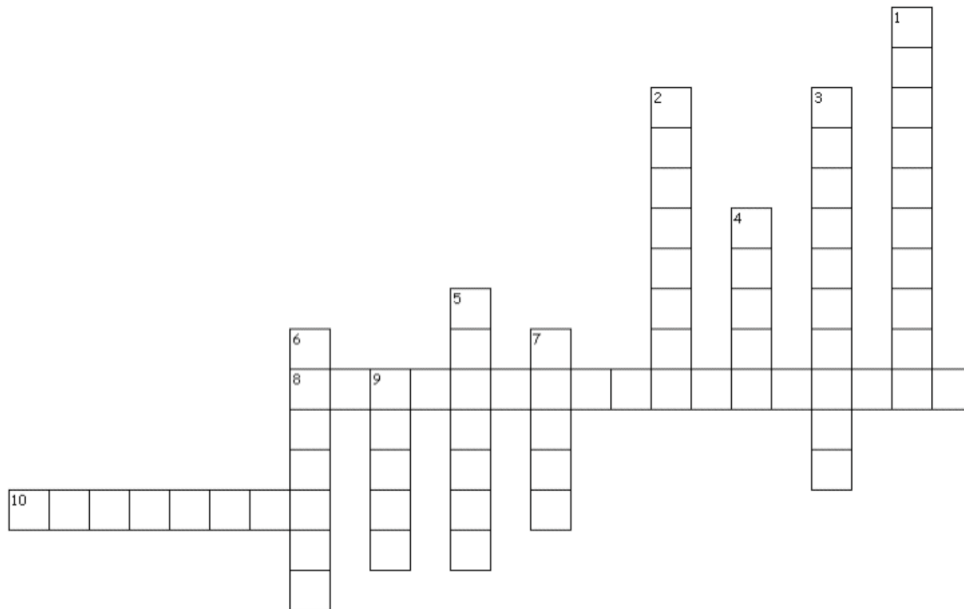
**Word Find #1**

**B** G T E **I** A J **D S S** F P Q E A  
U **A** R **C** R A **I** R **U** M U E W J U  
L O **C** A U **S** R **O R** H R H B X A  
Z **O** X **T E** Q **I** J **I** U F T T K J  
**C** S F **A E T** M X **V** W L W Z H M  
A **I S** R **C R** B A Y P L N A D U  
V **E G E** J K **I** B B M T N T R M  
K A **F N** L W H **A** E N **M** H L R K  
S **N** I C **U** G G Q L T **I** L I U L  
**I** D D D I **F** A D K K **C** N N S Z  
M B E Q N D O Z M Q **R** I H B R  
C N V W D T L Q G J **O** A X T D  
**S P I R O C H E T E B** X X Z B  
**I L L I C A B** Q L Q **E** S B D U  
S X F W N K I D K F **S** Q Y T U

**BACILLI**  
**BACTERIA**  
**COCCI**  
**DISEASE**  
**FUNGI**  
**INFECTIOUS**  
**MICROBES**  
**SPIROCHETE**  
**VIRUS**

## Crossword Puzzle #1

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### Across

8. harmful conditions that impair normal body function by infections that can be spread **Infectious disease**
10. a single-celled microorganism without distinct nuclei or organized cell structures **Bacteria**

### Down

1. capability of causing and spreading infection **Infectious**
2. a microscopic organism especially one that transmits a disease
3. a coil-shaped bacterium **Spirochete**
4. a spherically-shaped bacterium **Cocci**
5. a rod-shaped bacterium **Bacilli**
6. a harmful condition that impairs (damages) normal functioning **Disease**
7. an infectious particle that lives like a parasite and consists of a nucleic acid core within a protein sheath **Virus**
9. a single-celled or multi-cellular organism without chlorophyll that reproduces by spores and lives by absorbing nutrients from organic matter **Fungi**

## Infectious Disease Glossary

- 1. Infectious = capability of causing and spreading infection**
- 2. Disease = a harmful condition that impairs (damages) normal functioning**
- 3. Infectious Disease = harmful conditions that impair normal body function by infections that can be spread**
- 4. Bacteria = a single-celled microorganism without distinct nuclei or organize cell structures**
- 5. Fungi = a single-celled or multi-cellular organism without chlorophyll that reproduces by spores and lives by absorbing nutrients from organic matter**
- 6. Virus = an infectious particle that lives like a parasite and consists of a nucleic acid core within a protein sheath**
- 7. cocci = a spherically-shaped bacterium**
- 8. spirochete = a coil-shaped bacterium**
- 9. bacilli = a rod-shaped bacterium**
- 10. microbes = a microscopic organism especially one that transmits a disease**
- 11. germs = a microorganism that may or may not cause disease**
- 12. inoculations = injection or introduction a weakened or dead form of a disease-producing pathogen into somebody's body in order to create immunity to the disease**
- 13. vaccinations = inoculation with a vaccine to produce immunity**
- 14. vector = something that transmits disease-causing microorganisms from an infected organisms to another organism**

15. **pathogen = something that causes disease**
16. **Lyme Disease = a disease caused by *Borrelia burgdorferi***
17. **Strep Throat = a disease caused by *Streptococcus pyogenes***
18. **HIV = Human Immunodeficiency Virus**
19. **Influenza = a disease caused by the Influenza Virus**
20. **Host = an organism in which a pathogenic microorganism is commonly found**
21. **antibiotics = a substance that is able to kill or inactivate bacteria**
22. **transmit = to pass or spread something**
23. **deer tick = a tick that carries and transmits the bacterium causing Lyme disease**
24. **bull's eye rash = a target-shaped Lyme disease rash**
25. **symptoms = signs or indications of the presence of something (a disease)**
26. **tuberculosis = a disease caused by *Mycobacterium tuberculosis***
27. **contagious = easily and quickly spread (a disease from person to person)**
28. **vaccine = inject or introduce a weakened or dead form of a disease-producing pathogen into somebody's body in order to create immunity to the disease**
29. **AIDS = Acquired Immunodeficiency Syndrome**
30. **chickenpox = a disease caused by the Varicella-zoster virus**
31. **immune = protected from infection or disease**

## Infectious Disease Learning Packet 2