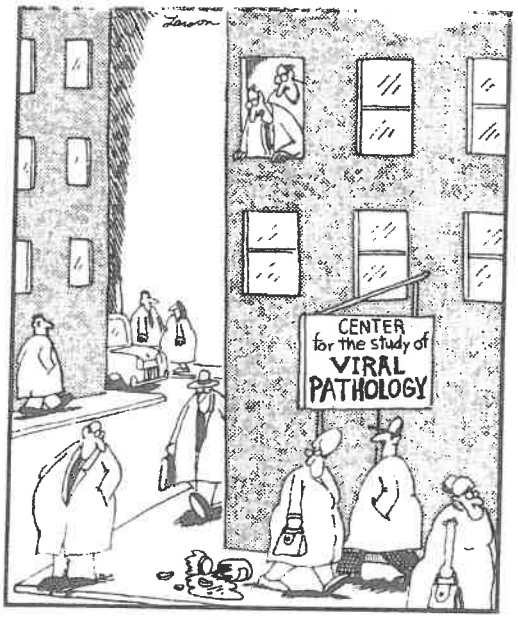
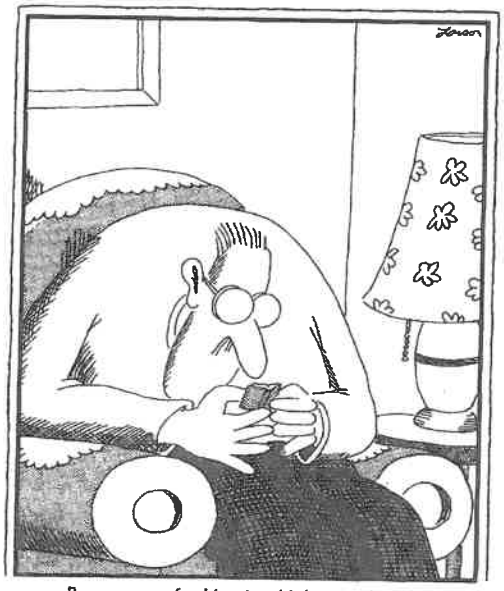
Diversity of Life:



"Uh-oh."

Scientists discover a new superbug.



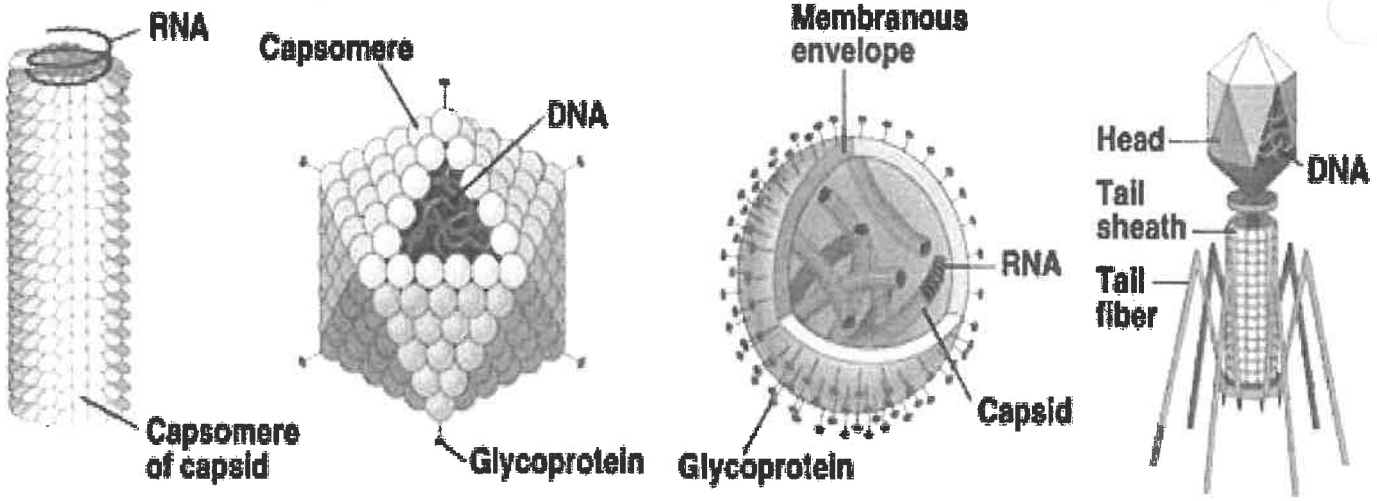
Roger crams for his microbiology midterm.

Microorganisms

VIRUSES

- are not classified into a Domain because they do not possess all of the traits of living things:
  - does not grow, respire, or respond to stimuli but it does _____
  = _____ which infect every form of life, in every kingdom
  - the word Virus comes from Latin meaning _____
  - are classified by the type of _____ they contain
  - are named after the _____they cause (ex: Rabies virus) or for the _____ they infect (ex. Meningitis)

- **Structure And Shape**
  - are very small
  - all viruses are made of at least 2 parts:
    1. an inner core of _____ (DNA or RNA)
    2. enclosed in protein shell called a _____(about 95% of the virus)
    3. some also contain a fatty _____
  - viruses **do not** contain the _____ of a cell
  - the capsid of a virus gives it its _____

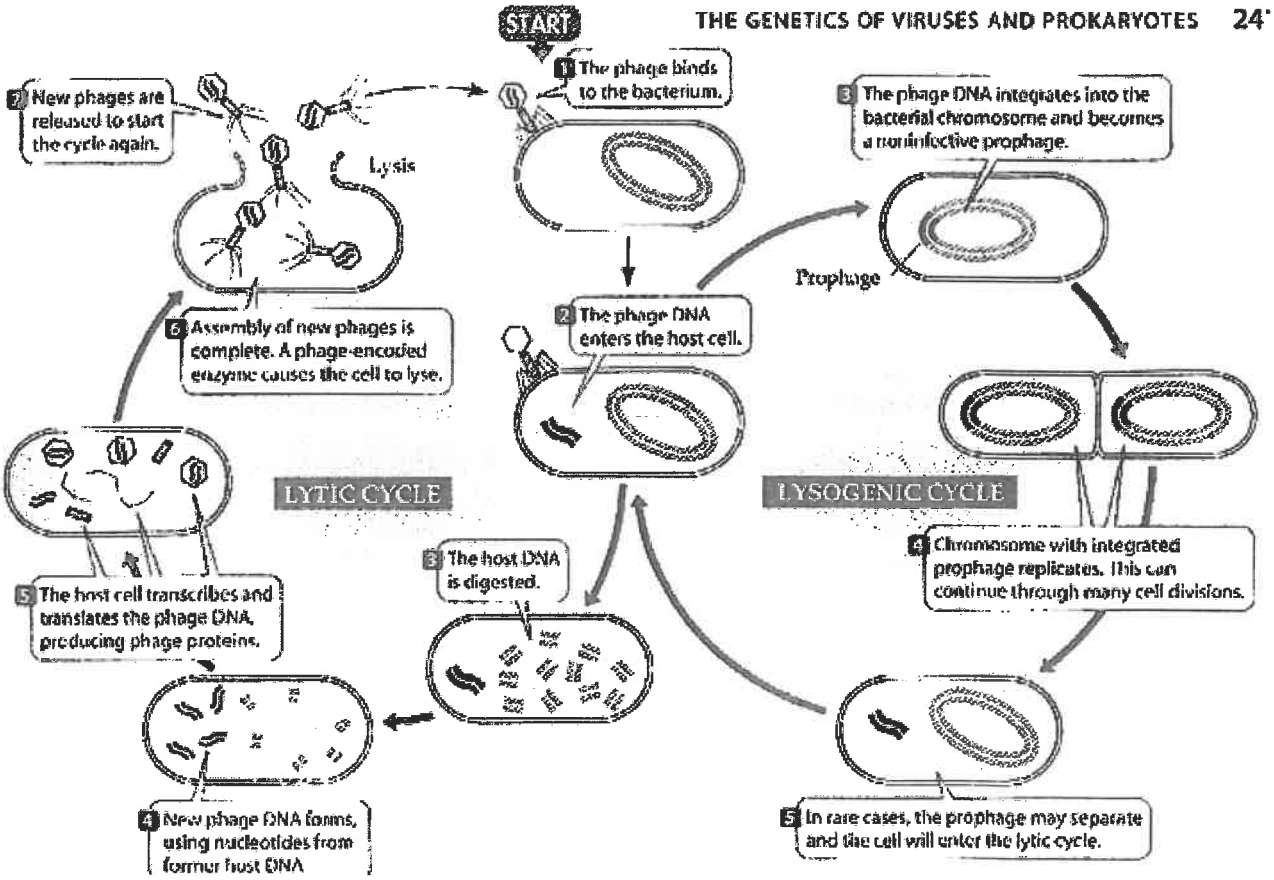


Tobacco Mosaic Virus | **Adenovirus** | **Influenza Virus** | **T4 Bacteriophage**

- **Function And Reproduction**
  - viruses are strict parasites and function only when inside a _____
  - when outside a host cell, viruses can _____ and remain _____for long periods of time
  - crystals become _____ when the viral particles they contain come in contact with and invade host cells
  - viruses are specific to the _____ and _____ they infect
    example: polio infects only human intestinal and nerve cells
  - once it enters a host cell, the virus takes over the cell's processes to produce more viral material killing the original cell and infecting others

- two types of viruses:
  a) **Virulent Virus**: reproduction starts _____ after entering the host cell
  = _____
  : example - cold, flu

  b) **Latent Virus**: after entering the host cell, the virus may go through a _____ before something triggers reproduction to begin
  = _____
  : example – AIDS, Shingles



- **Significance Of Viruses**
  - cause sickness and _____
  - cause some forms of _____
  - can be used to better our lives
    a) further our understanding of _____ & _____
    b) transmit _____to engineer cells for a specific purpose
    c) destroy _____ & control _____
    d) control pandemics through the creation _____ and _____
    e) treat _____

- **Phylogeny of Viruses**
  - there is no fossil evidence as to the origin of viruses but many theories:
    a) ancestors of viruses were _____ cells that lost their cellular components
    **b) viruses came from detached fragments of _____ belonging to other cells

- **Treatment of Viruses**
  - As viruses are nonliving they cannot be killed using antibiotic so alternate methods must be used:
    a) Prevent primary infection _____
    b) Treat _____
    c) Localize the infection _____
    d) Immunoglobulin therapy- _____used to identify and neutralize viruses

Agent	*Constituents*	*Example*	*Disease*
Viruses	DNA plus protein	Parvovirus	Hepatitis A
		Herpes simplex I, II	Herpes
		Epstein-Barr	Mononucleosis, Burkitt's lymphoma
		Smallpox virus	Smallpox
	RNA plus protein	Paramyxovirus	Measles
		Togavirus	Rubella (German measles)
		Rhinoviruses	Common cold
		Myxovirus	Influenza
		Poliovirus	Poliomyelitis
		Paramyxovirus	Mumps
		Rhabdovirus	Rabies
		Togavirus, flavivirus	Yellow fever
		Retroviruses	Cancer (some forms)
			AIDS

RETROVIRUS

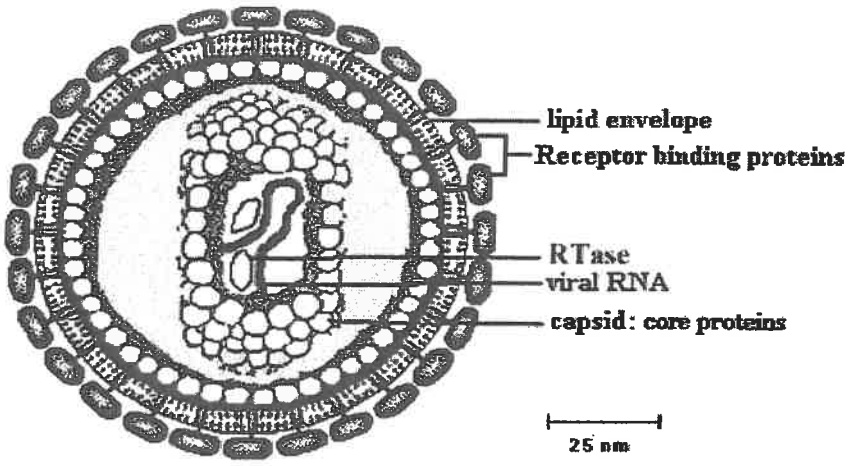


Diagram of a Retrovirus

Retroviruses are infectious particles consisting of an _____ packaged in a protein _____ surrounded by a _____. This lipid envelope contains polypeptide chains including **receptor binding proteins** which link to the membrane receptors of the host cell, initiating the process of infection.

Retroviruses contain RNA as the hereditary material in place of the more common DNA. In addition to RNA, retrovirus particles also contain the enzyme reverse transcriptase (_____), which causes synthesis of a complementary DNA molecule (cDNA) using virus RNA as a template.

When a retrovirus infects a cell, it injects its RNA into the cytoplasm of that cell along with the reverse transcriptase enzyme. The cDNA produced from the RNA template contains the virally derived genetic instructions and allows infection of the host cell to proceed.

The virus that causes AIDS (*acquired immune deficiency syndrome*) **is a retrovirus**. It is called _____.

- **Other Noncellular Agents of Disease**
  - even viruses are not the smallest infectious particles around:

a) Viroids

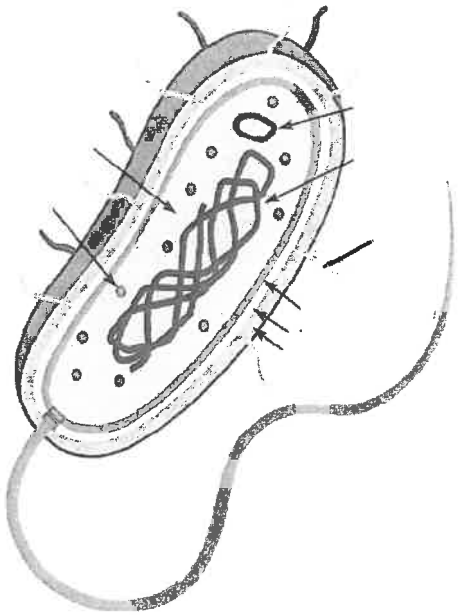
- _____ with no protein capsid or fatty envelope
- disease causing
- only infect plants
- ie. Potato spindle tuber

b) Prions

- naked pieces of _____; no nucleic acids involved
- normally exist in cells and are shaped like a coil
- when mutated prions are shaped like a piece of paper folded many times = cause disease
- ie. Mad Cow disease, Chronic Wasting Disease

PROKARYOTES

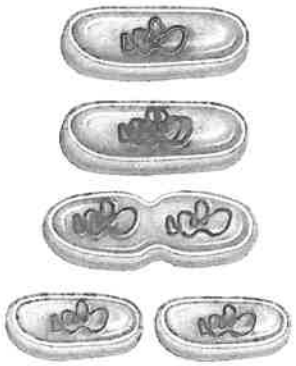
- Prokaryotes are divided into 2 Domains: Archaea & Bacteria
- are the most numerous organisms on Earth. There are more bacteria on or in your body than there are people in the world!
- Members of these domains are extremely similar, differing only in _____



- **General Characteristics & Structure:**
  1. are = _____ lack a nuclear membrane
  2. are _____ existing singly or in colonies
  3. lack a _____ and have few organelles
  4. have a single free-floating strand of DNA _____ _____ carrying the majority of the organism's genetic information
  5. have a cell wall containing _____ (Bacteria) or _____ _____ (Archaea)
- Structures that help ensure survive in hostile environments
  - **capsule** _____
    : help evade immune systems & adhere to surfaces
  - **pili**
    : hair-like structures used for _____and _____
  - **endospore**
    : _____ formed when conditions are unfavorable
  - **flagellum**
    : tail-like structure used for _____
  - **plasmid DNA**
    : small rings of extra-chromosomal DNA carrying _____ which are copied independently of the chromosome inside the cell
    : can be transferred to other prokaryotes spreading genes that are beneficial for survival _____

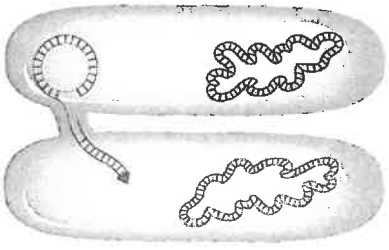
**** since prokaryotes vary, not all features will be present in every cell**

- **Reproduction**
  - as the simplest living organisms, prokaryotes can reproduce in a variety of ways



1. <u>Asexual Reproduction</u>
   - most common form of reproduction
   = _____
   :1 organism divides into 2, both genetically identical to the parent _____
   :can do this every 20 minutes if conditions of food and space are ideal
   = _____

2. <u>Sexual Reproduction</u>
   - involves the union of two cells or parts of cells

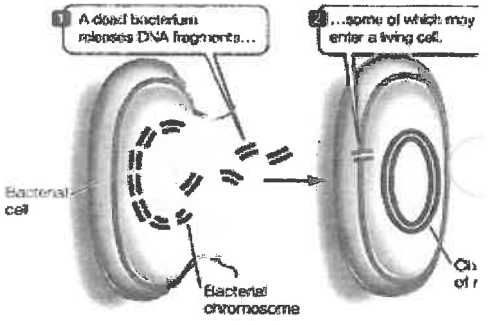


   a) Conjugation
   : 2 cells line up side by side & _____ nuclear material before dividing
   = offspring have new genes _____

b) Transformation

: living bacteria _____ genes from dead bacteria into their own DNA

= gain new characteristics

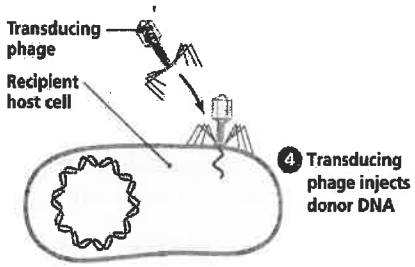


c) Transduction

: a virus _____ a bacterial cell & _____ it

: the bacterial cell incorporates the new gene the virus is carrying

: this method is used in biotechnology to create bacteria to produce valuable products (ie. insulin)



- **Classification**:
  - Currently identified using _____ but historically identified and named based on: Respiration, Nutrition, Shape and Arrangement

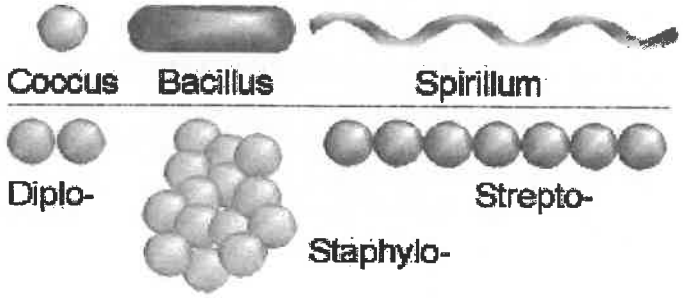
1. Respiration
   - prokaryotes can be grouped based on their need for oxygen
     a) **obligate anaerobes** = cannot live in the presence of O_2 _____
     b) **obligate aerobes** = need O_2 _____
     c) **facultative aerobes** = can live without O_2

2. Nutrition
   a) **Autotrophic** [create their own food]
      - photosynthesizers = use _____ to convert $C0_2$ & H_20 to 0_2 & glucose
      - chemosynthesizers = change _____ into organic materials

   b) **Heterotrophic** [ingest food via absorption]
      - saprophytes = feed on dead plant and animal matter _____
      - parasites = feed on living cells _____

3. Shape and Arrangement

Shape:
1. **Coccus** (plural cocci) - _____
2. **Bacillus** (plural bacilli) - _____
3. **Spirillum** (plural spirilla) – _____



Arrangement = use Prefixes
diplo = _____ eg. Dipplococcus
staphyl= _____ eg. Staphylococcus
strepto = _____ eg. Streptococcus

- **Domain / Kingdom Bacteria**
  - most are _____
  - subdivided into many groups called _____
  - all can be classified as _____or _____based on whether it absorbs Gram's Dye
    : thicker peptidoglycan cell wall will absorb the Gram's Dye
    = determines which antibiotic to use against it

  - includes the Cyanophyta Division =_____
    : have chloroplasts containing chlorophyll & phycocyanin (blue pigment)
    : large numbers may cause 0_2 depletion = kill fish

- **Domain / Kingdom Archae**
  - thought to be more ancient than bacteria and yet more closely related to _____
    = have some of the same proteins
  - live environments similar to those when life first evolved on planet Earth
  - 3 different divisions (phyla):
    a) _____
    - decompose sewage, garbage dumps, etc. producing methane gas
    = obligate anaerobes

    b) _____
    = salt loving bacteria (the Dead Sea)
    - photosynthetic

    c) _____
    = heat and acid loving bacteria (deep ocean volcanoes)
    - chemosynthetic

Benefits of Prokaryotes
- make _____ in humans
- fix _____for plants [Nitrogen cycle]
- produce _____and _____ [yogurt, cheese, vinegar]
- _____dead things and wastes [Bioremediation]
- _____ to make drugs, antibiotics and hormones

Harmful Effects of Prokaryotes
- _____ fixing bacteria
- tooth decay
- cause _____and _____in all organisms [ie. Tetanus, Food Poisoning]
- decomposers _____
- damage crops

Vaccine & Infectious Disease Organization-International Vaccine Centre (VIDO-InterVac) University of Saskatchewan, Saskatoon, Saskatchewan

Area(s) of Expertise

VIDO-InterVac is one of Canada's premier research institutes, with over 40 years of experience in infectious disease research and vaccine development for animals and humans. VIDO-InterVac has more than 150 personnel and some of the world's most advanced containment infrastructure, including containment level 2 and level 3 animal housing and laboratories, a select agent lab, an aerobiology challenge unit, and a 160-acre containment level 2 research station. The unique $140-million large animal containment level 3 laboratory (the International Vaccine Centre or InterVac) became operational in 2013. VIDO-InterVac can complete multiple stages of vaccine development including Vaccine development and testing, containment level 2 and 3 infectious disease research, large animal models of disease, preclinical trials, and regulatory trials for animals and humans.

Biosafety Level	BSL-1	BSL-2	BSL-3	BSL-4
Description	· No Containment · Defined organisms · Unlikely to cause disease	· Containment · Moderate Risk · Disease of varying severity	· High Containment · Aerosol Transmission · Serious/Potentially lethal disease	· Max Containment · "Exotic," High-Risk Agents · Life-threatening disease
Sample Organisms	E.Coli	Influenza, HIV, Lyme Disease	Tuberculosis	Ebola Virus
Pathogen Type	Agents that present minimal potential hazard to personnel & the environment.	Agents associated with human disease & pose moderate hazards to personnel & the environment.	Indigenous or exotic agents, agents that present a potential for aerosol transmission, & agents causing serious or potentially lethal disease.	Dangerous & exotic agents that pose a high risk of aerosol-transmitted laboratory infections & life-threatening disease.
Autoclave Requirements	None	None	Pass-thru autoclave with Bioseal required in laboratory room.	Pass-thru autoclave with Bioseal required in laboratory room.

Sectors of Application

•Agriculture, animal science and food

•Defense and security industries

•Fisheries and aquaculture

•Health care and social services

Research Services

Pathogenomics, proteomics, metabolomics, kinomics, antigen identification, vaccine development, vaccine formulation and delivery, animal disease models (containment 2 and 3), preclinical vaccine testing (human), regulatory vaccine testing (animals)

Virus and Bacteria Assignment

For each item in Column A, write the letter of the matching item in Column B.

Column A		Column B
_____	1. Genetic material of a virus	a. virus
_____	2. Where a virus attaches to a host cell	b. T4 phage
_____	3. Nonliving particle that replicates inside a living cell	c. DNA or RNA
_____	4. A virus's protein coat	d. capsid
_____	5. Interlocks with a molecular shape in a host cell's plasma membrane	e. receptor site
_____	6. Layer that surrounds the capsid of some viruses	f. envelope
_____	7. A virus that infects *E. coli* bacteria	g. host
_____	8. A cell in which a virus replicates	h. attachment protein

In your textbook, read about viral replication cycles.

Complete the table by checking the correct column for each statement.

Statement	Lytic Cycle	Lysogenic Cycle
9. Viral genes are expressed immediately after the virus infects the host cell		
10. Many new viruses are assembled.		
11. The viral DNA is integrated into the host cell's chromosome.		
12. Takes place after a virus enters or attaches to a host cell.		
13. The host cell divides producing more cells containing viral DNA.		
14. The host cell bursts, releasing new viral particles		
15. The host cell DNA is destroyed.		

Answer the following questions.

1. What are three types of environments in which archaebacteria are found? _____

_____

2. In what three ways do eubacteria obtain nutrients? _____

_____

3. How does a bacterium's cell wall protect it? _____

_____

4. Where is the genetic material of a bacterium found? _____

_____

5. What structure do some bacteria use to move? _____

6. What is the difference between gram-positive bacteria and gram-negative bacteria? _____

_____

_____

_____

7. What are three different shapes of bacteria? _____

8. Describe the three growth patterns of bacteria and state the prefix used to identify each growth pattern.

_____

_____

Identify the type of bacterial reproduction described. Use these choices: binary fission, conjugation.

_____ **9.** Bacterium with a new genetic makeup is produced.

_____ **10.** Circular chromosome is copied.

_____ **11.** Genetic material is transferred through a pilus.

_____ **12.** Two identical cells are produced.

_____ **13.** Sexual reproduction occurs.

Bactericides Lab

Objectives:

- Describe how bacterial cultures are grown and investigated in a laboratory
- Determine the effectiveness of antibiotics and antiseptics in inhibiting the growth of bacterial cultures.

Background:

Bacteria are prokaryotic (having no nucleus), one-celled organisms. Individual bacterial cells are visible only with the aid of a high-powered microscope. Under proper nutritional and environmental conditions, bacteria can be grown in a laboratory. They are usually cultivated in sterile petri dishes containing a gelatin-like nutrient called agar.

Bacteria reproduce rapidly. Each single cell divides about every twenty minutes. When a population of bacteria has multiplied to a thousand or more cells, a pattern of growth called a colony can be seen with the naked eye. The specific shape and color of a bacterial colony can be used to identify the species of bacteria that form it.

Bacteria are important in many ways. Some bacteria break down organic materials from dead organisms and wastes, returning nutrients to the environment. Nitrogen-fixing bacteria convert nitrogen gas from the air into forms of nitrogen that can be used by plants and animals. Some bacteria are used in making food, such as vinegar, yogurt, butter, cheese, pickles, and sauerkraut. A few bacteria cause disease and are known as pathogens. Some examples of diseases caused by bacteria include tuberculosis, pneumonia, strep throat, and ear infections.

Because bacteria multiply so rapidly, it is often necessary to control their growth in the human body, in food, and in the kitchen. Several varieties of products are used to control bacterial growth, including antibiotics, disinfectants, and antiseptics. All these products are antimicrobial agents. Different kinds of bacteria are sensitive to some chemicals and insensitive to others. Thus, different types of antimicrobial agents vary in the way they affect bacterial growth.

In this Virtual Lab you will determine the effectiveness of different antimicrobial agents by inoculating agar in a petri dish with different pathogenic bacteria, adding various antimicrobial agents, and measuring the bacterial growth around each antimicrobial agent.

Procedure:

This is a Virtual Lab Activity. Go to the **class website** and click on the "Virtual Bactericides Lab Link" or type the following into the address bar of your browser:
http://www.glencoe.com/sites/common_assets/science/virtual_labs/LS08/LS08.html

1. Click on Microbiology Book. Use it and the Background Information to answer the pre-lab questions on your Analysis sheet.

2. Inoculate the agar in the petri dish by clicking on the test tube containing the pathogenic bacterial stock culture Staphylococcus aureus.

3. Vials 1 through 7 contain filter paper disks that have been soaked in antimicrobial agents such as antibacterial soap, household bleach, household disinfectant, penicillin, amoxicillin, and erythromycin, or in sterile water (as a control). Drag a disk from each vial and place it in the petri dish.

   Note: To avoid contamination, disks should not be moved after they have been dropped into the petri dish.

4. Click the incubator to place the petri dish in it.

5. Click the red button on the incubator to turn it on. When the timer shows that 24 hours have passed, click the incubator to remove the petri dish.

6. Examine the patterns of bacterial growth. The colored area that covers most of the surface of the petri dish is the lawn culture of the bacteria-a visible layer of thousands of bacterial cells.

7. Drag the ruler to measure the diameters of the zones of inhibition around the disks (the tan areas). Some disks may be surrounded by large zones of inhibition, where no bacteria grew due to the strong inhibitory effect of the antibiotic, antiseptic, or disinfectant on the disks. Other disks may have caused little or no inhibition-meaning that the bacteria are partially or completely resistant to the antimicrobial agent on them. To find out which antimicrobial agent corresponds to a specific number, move the cursor over the number. In the Table, enter the measurement for each antimicrobial agent.

8. Click the Reset button and repeat the Virtual Lab and repeat procedure 2-7 for each of the remaining pathogenic bacteria: Hemophilus influenza and Streptococcus pneumoniae.

9. Calculate the average zone of inhibition for each of the antimicrobial agents in the chart.

10. Use the data in the Table to compare the effectiveness of different antimicrobial agents on different bacteria. Complete the Journal questions.

Name: _____
Period : _____

Bactericides Lab

Pre-Lab

Read the *Lab Background* and the *'Microbiology'* book in the lab and answer the following questions:

1. On what material are the bacteria grown in the petri dish? _____
2. When bacteria accumulate in the thousands, what is the group/mass called? _____
3. How can a scientist determine the species of bacteria growing in the petri dish?
   _____
   _____
4. Why are you using sterile filter paper disks?
   _____
5. What is Penicillin used for?
   _____
   _____
6. How is Amoxicillin different from Penicillin?
   _____
   _____
7. How does Erythromycin work?
   _____
   _____
8. What are the three chemical agents designed to kill bacteria, in this lab?
   _____
9. What does Hemophilus influenzae cause? _____
   _____
10. What can staphylococcus aurenus cause? _____
    _____
11. What does staphylococcus pneumonia cause? _____

Complete Procedure of lab and record data on the following page.

OBSERVATIONS

	Zone of Inhibition (mm)						
BACTERIA SPECIES	Sterile Filter paper	Anti-Bacterial Soap	Household Bleach	Household Disinfectant	Penicillin	Amoxicillin	Erthromyc
Hemophilus influenzae							
Staphylococcus aureus							
Streptococcus pneumoniae							
AVE. Zone of Inhibition							

Analysis Questions:
Answer the following questions using your data to **support your answer**.

1. What does a clear area around a disk indicate? _____

2. What evidence do you have that the inhibitions of the bacteria is due to the chemicals on the disks and not the disk itself?

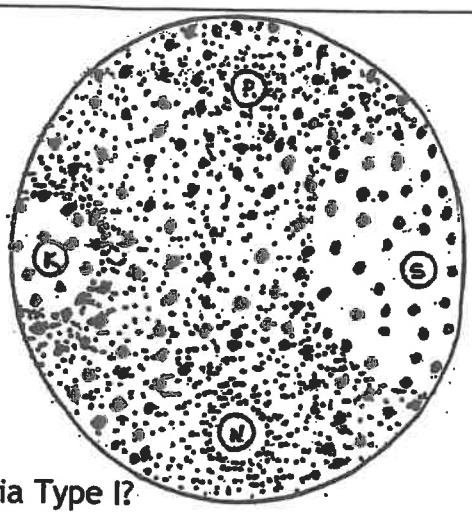
3. Which of the products was the strongest bactericide? How do you know?

4. Describe the effects of various chemical disinfectants you used. Are products which are labeled "antibacterial" really more effective at inhibiting bacterial growth? Support your answer.

5. Compare the effects of the various antibiotic drugs you used. Were they all equally effective at controlling bacterial growth? Suggest a reason for this.

6. Which of the antibiotics tested is a narrow spectrum antibiotic? How do you know?

7. Assume that the diagram to the right represents an agar plate with 2 different types of bacteria obtained from a human blood sample. Bacteria I is the large colony type; Bacteria II is the small colony type. 4 disks have been placed on this plate & represent the following antibiotics:
   P = penicillium S = streptomycin
   K = kanomycin N = Neomycin



a) Which antibiotic(s) is most effective in combating Bacteria Type I?

b) Which antibiotic(s) is most effective in combating Bacteria Type II?

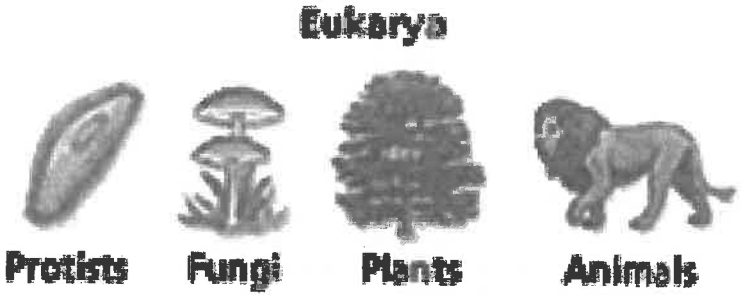
c) A patient is allergic to both Streptomycin and Neomycin. Which antibiotic(s) would you advise the doctor to prescribe to fight this patient's infection if the patient had a disease caused by Bacteria Type I? Why?

d) If the same patient had a disease caused by Bacteria Type II, which antibiotic would you suggest?

8. How might repeated exposure to antibacterial products lead to resistant strains of bacteria?

DOMAIN EUKARYA

- Kingdoms within the Domain Eukarya are include _____ _____

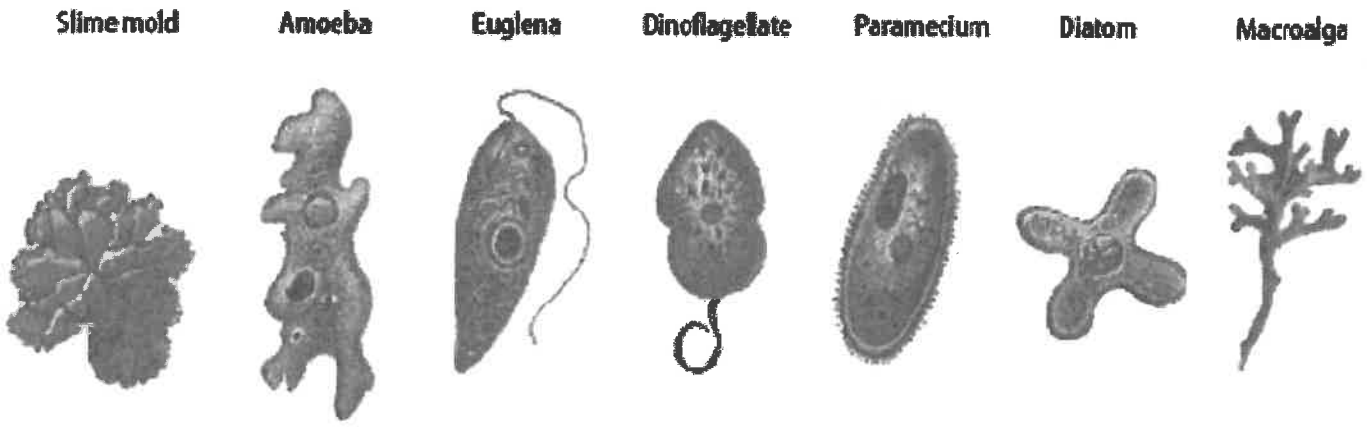


- All contain organisms composed of _____
  = cells containing an organized membrane-bound nucleus and organelles which perform a variety of functions
- Most members of this domain are multicellular and macroscopic, however there are a few unicellular, microscopic groups

PROTISTA KINGDOM

The Basics of Biology - Protists https://www.youtube.com/watch?v=-zsdYOqTbOk

- Contains "plant-like", "animal-like" and "fungi-like" organisms
  = the JUNK DRAWER of taxonomy
- General Characteristics
  - _____
  - _____
  - contain specialized _____
  - most are _____ (fresh water or marine)
  - most are_____, but may live in _____



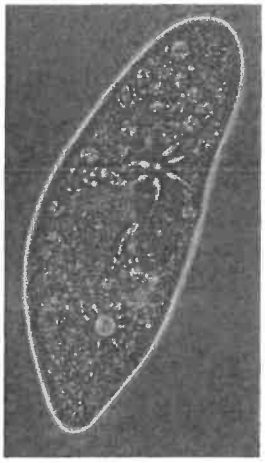
- Kingdom Protista is made up of 3 distinct groups based on nutrition
  1. **Animal-like Protists (Protozoans)**

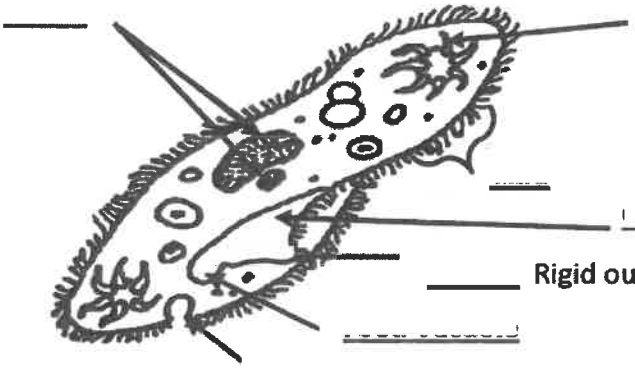
     _____ = (take in food)

     - 4 groups based on movement

a) Ciliphorans: use hair-like _____beating in unison to feed and move

- example: Paramecium





_____ Collects and removes excess H_2O (Maintains homeostasis)

_____ Used to collect food

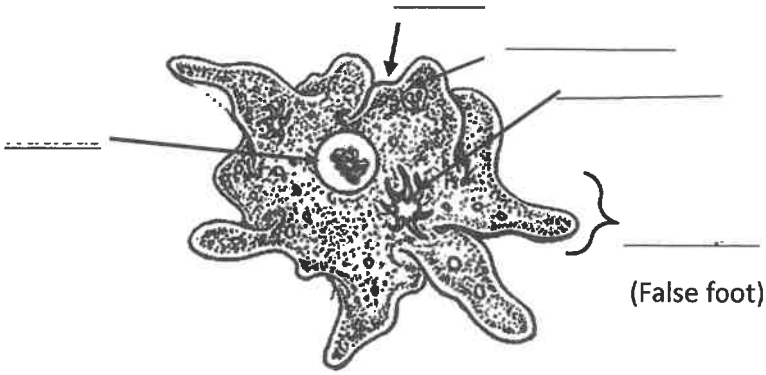
_____ Rigid outer covering for protection &maintains shape

_____ Used for removing wastes

b) Sarcodinians: move using cytoplasm pushing against cell membrane

- _____ : extension of cytoplasm used to move & obtain food
- example: Amoeba

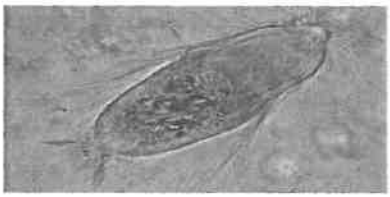
2. Amoeba:

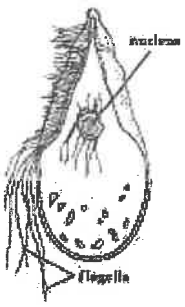


(False foot)

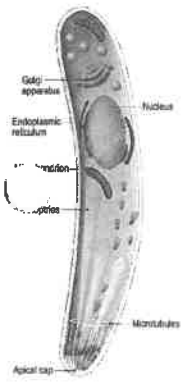
c) Zooflagllates: move using a whip-like _____

- example trichonympha





Trichonympha



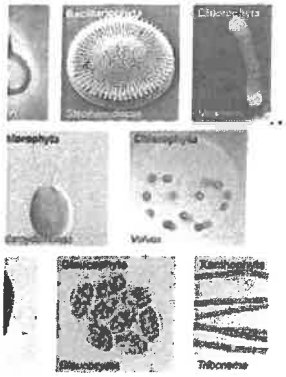
d) Sporozoans => no structure for_____, use host to survive

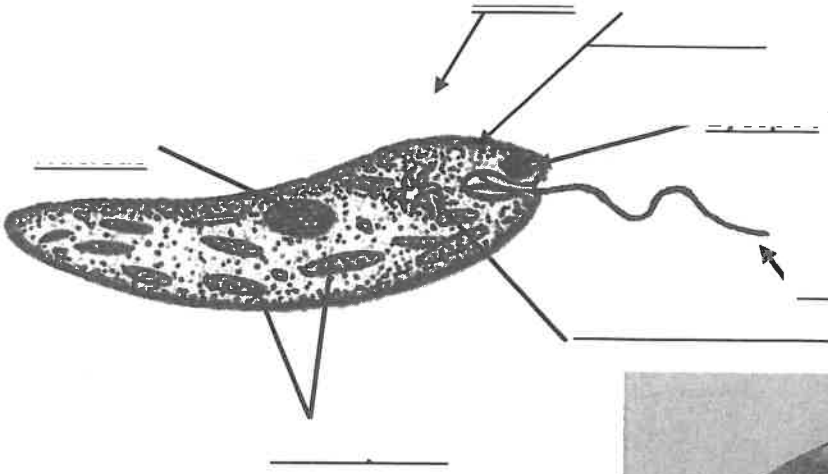
- example Plasmodium (causes malaria)

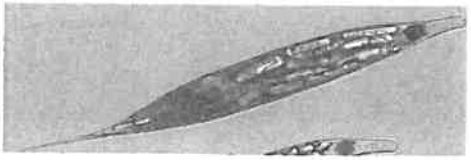
2. Plant-like Protists = autotrophs (contain chlorophyll and photosynthesize)
- includes many of the algae phyla

a) Unicellular algae

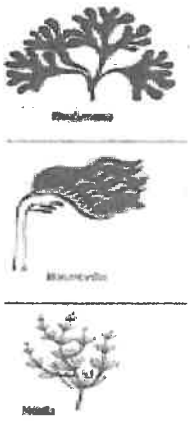
i) Dinoflagellates => algae with _____ , usually marine
ii) Diatoms => Cell walls have_____, abundant in Oceans
iii) Euglenoids => no cell walls, perform _____ **&** _____





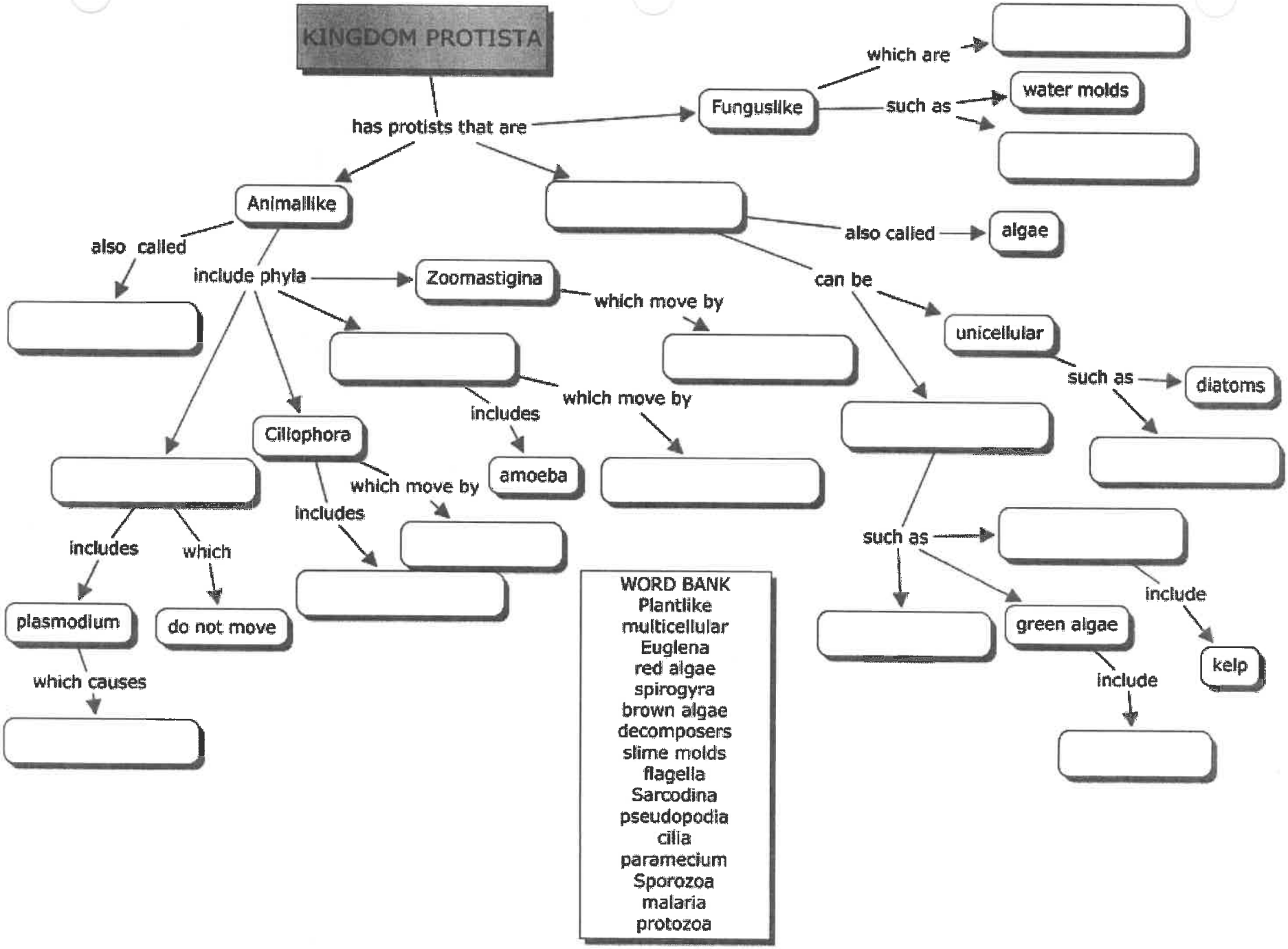


b) Multicellular Algae
: similar to land plants, but different because of its _____
: Grouped based on color
(ALL have chlorophyll, but _____affect color)
a. Green algae
b. Red algae
c. Brown Algae



3. Fungi-like Protists
= heterotrophs _____
- _____ like fungi
- example Slime Molds

- Roles of Protists
  a. _____ for others (plankton)
  b. Some eat _____
  c. Help produce _____
  d. Breakdown dead plants and animals _____
  e. Some cause _____


KINGDOM PROTISTA
has protists that are
Funguslike
which are
such as
water molds
Animallike
also called
include phyla
Zoomastigina
which move by
also called
algae
can be
unicellular
such as
diatoms
includes
which move by
amoeba
Ciliophora
which move by
includes
includes
which
plasmodium
do not move
which causes
such as
green algae
include
kelp
include
WORD BANK
Plantlike
multicellular
Euglena
red algae
spirogyra
brown algae
decomposers
slime molds
flagella
Sarcodina
pseudopodia
cilia
paramecium
Sporozoa
malaria
protozoa

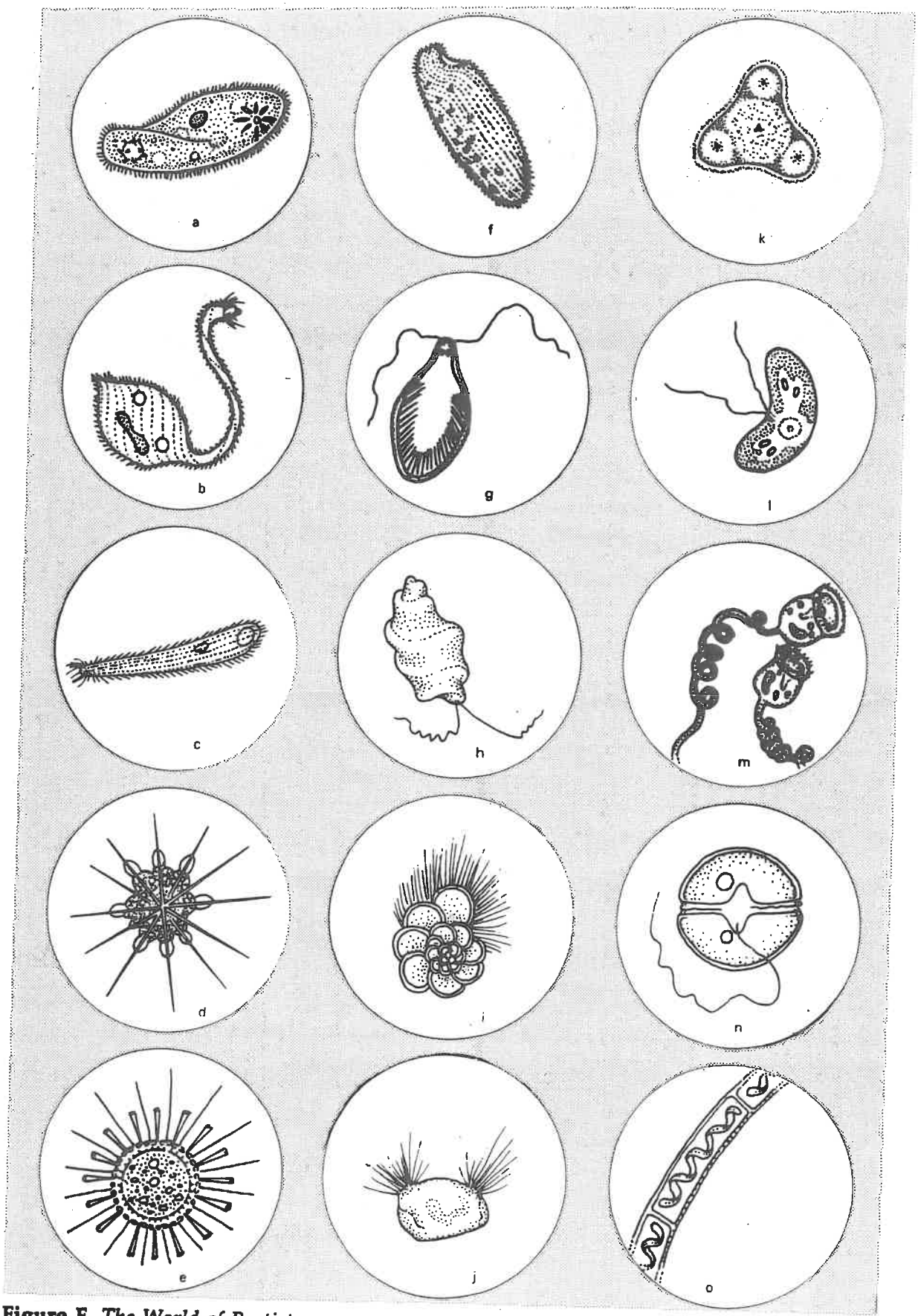


Figure F *The World of Protists.*

You are looking through a microscope... Well, not really! But imagine that you are.

Figure F on page 152 shows what you are "seeing"—15 different kinds of protists.

Anton van Leeuenhoek [AN-tun van LAY-vun-hook] was a pioneer microscope-maker. He lived more than 300 years ago. Van Leeuwenhoek was the first person to see tiny protists. Guess what he called them? "Wee beasties!" Now, they have fancy scientific names.

Can you identify these protists from their descriptions? Sure you can! It's easier than you think. BUT, there is a C-A-T-C-H. Pronouncing some of the names won't be easy. Almost everyone has trouble... even your teacher. So don't be discouraged. In fact, it should be lots of FUN!

READY...SET...GO!

Match each protist shown in Figure F to its description in the chart. Write the correct letter in the space in the chart. (Hint: You may wish to fill in and check off the ones you are sure of first.)

	Scientific Name	Looks Like	Letter
1.	diatom	a triangle	
2.	heteronema	a snail	
3.	protochrysis	a kidney bean	
4.	chlamydononas	a drop with whiskers	
5.	paramecium	a footprint	
6.	vorticella	a flower with a telephone cord for a stem	
7.	loxodes	a cucumber with a bite taken out	
8.	radiolarian	a lacy snowflake	
9.	lacrymaria	a swan	
10.	anarma	a purse with hairy corners	
11.	heliozoan	the sun	
12.	spyrogyra	a tube with coiled worms inside	
13.	forminiferan	a bunch of hairy grapes	
14.	glenodinium monensis	a hamburger	
15.	trachelocera conifer	a baseball bat	

Protist Assignment

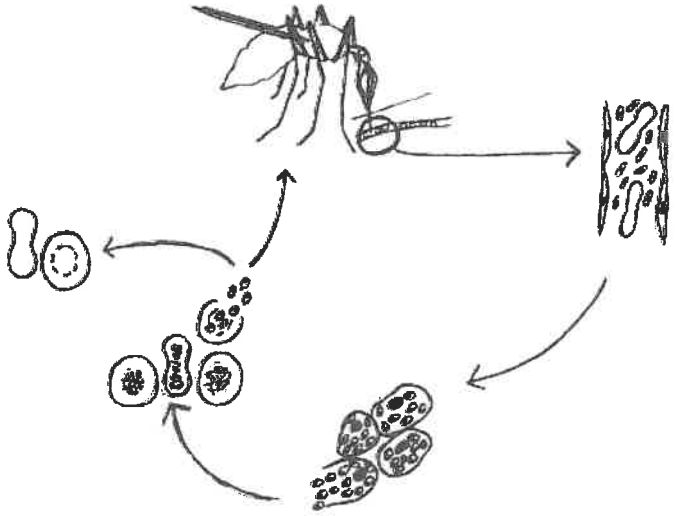
Answer the following questions.

1. Malaria

a) Sporozoans form sporozoites. What is a sporozoite?

b) What protist causes Malaria?

c) Label the following diagram its reproductive cycle using #1-5 .



1	**The female mosquito places her pointed mouthparts into the skin of her victim.**
2	**The malaria parasite moves to the liver in the bloodstream.**
3	**The parasite reproduces itself in the liver cells.**
4	**The parasite moves out of the liver cells and infects the red blood cells.**
5	**As the parasite multiplies in numbers, so more red blood cells are infected.**

d) Why are 2 hosts necessary for its survival?

e) What symptoms do people having this disease experience?

f) How many people die from Malaria each year? Give 2 reasons why this disease is becoming more common?

2. African Sleeping Sickness

a) What protist causes this disease? How is it spread?

b) How do you think this disease gets its name?

3. Red Tide

a) What is a Red Tide? What causes it?

b) How can Red Tide be dangerous to humans?

4. Slime Mold

a) What is a slime mold?

b) Why are these organisms difficult to classify?

BIOLOGY 30 REVIEW – MICROBIOLOGY

1. Prokaryotes (Monerans) are represented by the 2 Domains Archaea & Bacteria. Using a Venn diagram describe how they are similar? Different?

2. Draw and label the generalized structure of a prokaryote.

3. How can prokaryotes survive in such a variety of environmental habitats?

4. Describe the different processes of reproduction in prokaryotes. From an evolutionary standpoint, which would be the most beneficial and why?

5. How are prokaryotes classified? Named?

6. How are obligate aerobes similar to, yet different from facultative aerobes?

7. Differentiate between: autotroph and heterotroph, photosynthesis and chemosynthesis, parasite and saprophyte?

8. How would Staphylococcus bacteria differ in shape and arrangement from Streptobacillus bacteria?

9. Why could determining whether a bacterium is Gram Positive or Gram Negative be a matter of life or death?

10. List and describe the 3 Divisions of Archaea.

11. In what ways are Bacteria helpful? Harmful?

12. Explain how the use of antibiotics could result in resistant bacteria?

13. Why have viruses not been classified into a Domain or Kingdom?

14. Differentiate between viruses, viroids, prions and retroviruses. Give an example of each.

15. All viruses have similarities in structure. Color the viruses in your notes. Color the capsid blue, the genetic material red and glycoproteins green.

16. Outline the lytic pathway of viral replication. How does it differ from the lysogenic pathway?

17. How are viruses harmful? Helpful?

18. List 3 theories of viral evolution.

19. How are viruses controlled?

20. What characteristics are common to all protists?

21. What characteristics differentiate plant-like, animal-like, and fungi-like protists?

22. For each of the following organelles, state its function and give an example of a protist which possesses it:

a)pseudopodia
b) cilia
c) flagella
d) pellicle
e) gullet
f) contractile vacuole
g) chloroplast

23. Study your diagrams of Amoeba, Paramecium & Euglena and be able to label their parts.

24. What features of euglena would make this organism difficult to classify?

25. What causes 'red tide"?

26. What structure makes diatoms unique?

27. Describe the uses of pseudopodia, cilia and flagella.

28. What separates the Sporozoans from other protists?

29. Describe the life cycle of a slime mold. Define plasmodium.