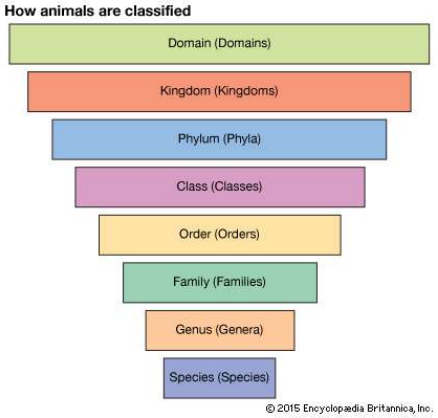
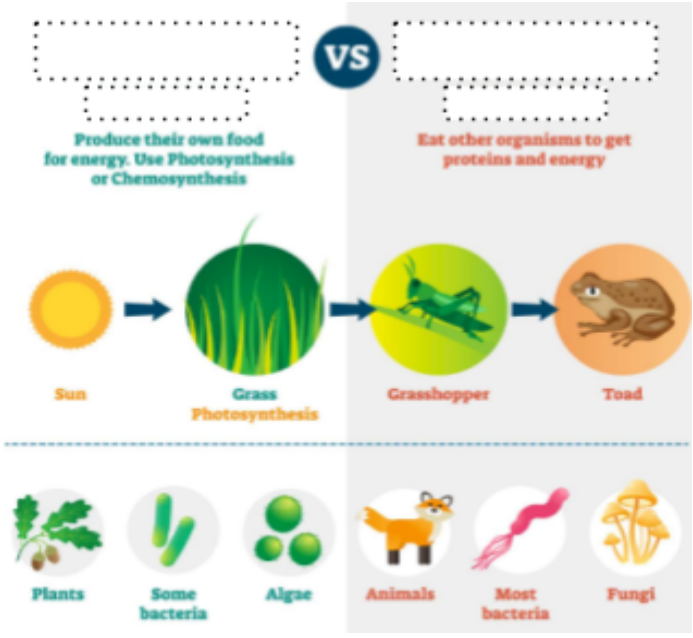
Bacteria Notes Name _____

Biology Date _____ Hour _____

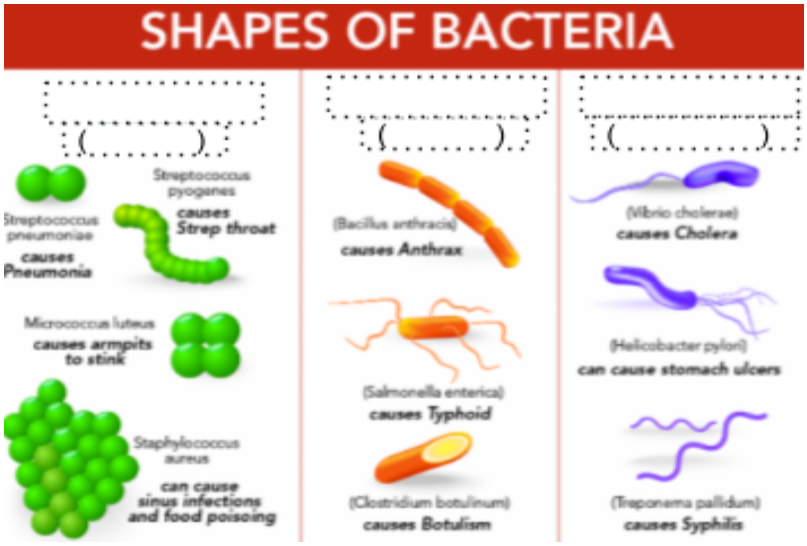
<u>Bacteria</u>



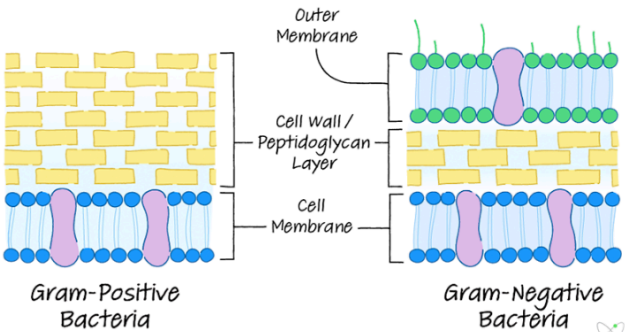
- Classification
  - Organisms are classified based on:
    - Cell _____ , Cell _____, Nutrition, Behavior, Habitat
  - There are _____ Domains and _____ Kingdoms
- 2 Bacterial Kingdoms
  - Differences
    - Archaebacteria
      - live in _____ environments (_____)
      - O_2 free environment
    - Eubacteria
      - Most common
      - Live in _____-_____ environments
  - Similarities
    - _____
    - May live in colonies
    - Prokaryotes
      - They have no _____
      - Their DNA is _____ _____ in the cell's "_____ region"
    - Autotrophs (Producers)
      - Photosynthetic - Energy from the _____
      - Chemosynthetic - Energy from _____
    - Heterotrophic (consumers)
      - Energy from eating other _____ (decomposers included!)



- Bacterial Structure
  - Basic shapes
    - _____ (bacillus)
    - _____ (coccus/ cocci)
    - _____ (spirillum)



- Bacterial Structure (continued)
  - Specialized cell extensions
    - Flagella
      - Whip-like _____ that allows some bacteria to _____
    - Pili (pilus)
      - Hair-like structures that help bacteria _____ to _____ and each other
      - Sex pili aid in _____ of _____ _____ from one bacterium to another or from the environment!
  - Plasmid
    - small _____ of DNA (a single chromosome)
    - Responsible for _____ _____ (example of _____ _____!)
  - Cell walls
    - _____, structural layer outside the cell membrane
      - Gram Positive & Gram Negative
  - Capsule
    - _____, external protective layer that keeps bacteria from being _____.
    - _____ _____ bacteria have this.



- Lots of peptidoglycan
- Stains purple

- Less peptidoglycan
- Stains light pink

Bacterial Structure *Below is an image of a typical bacteria. Color the bacteria according to the directions.*

Bacteria consist of single cells lacking a nuclear envelope, referred to as prokaryotic. Prokaryotic cells also lack all the membrane bound organelles of eukaryotic cells. Like all other cells, prokaryotic cells have a **cell membrane** (red). In nearly all prokaryotes, there is a **cell wall** (green) outside the cell membrane. Many, but not all, prokaryotic cells have a jelly-like **capsule** (purple) or slime layer outside the cell wall.

A **pilus** (blue) or pili is a projection of the cell membrane through the cell wall that serves for attachment to either a host cell or another bacteria. Some bacteria have numerous pili, others have none. A **flagellum** (pink) or flagella is a whiplike appendage that bacteria can use to propel themselves. Some bacteria have no flagella, while others can have up to 100.

The interior of the bacteria is divided into two regions: nucleoid which contains the hereditary material and the **cytoplasm** (leave white) which contains all the other cell contents. NOTE: there is no membrane that separates these parts. The nucleoid consists of a single molecule of **DNA** (yellow) that is twisted and folded on itself to fit inside the bacteria. A **plasmid** (orange) is a small piece of DNA that is separate from the DNA. As in eukaryotic cells, there are lots of **ribosomes** (brown).

Name of Structure

1.

2.

3.

4.

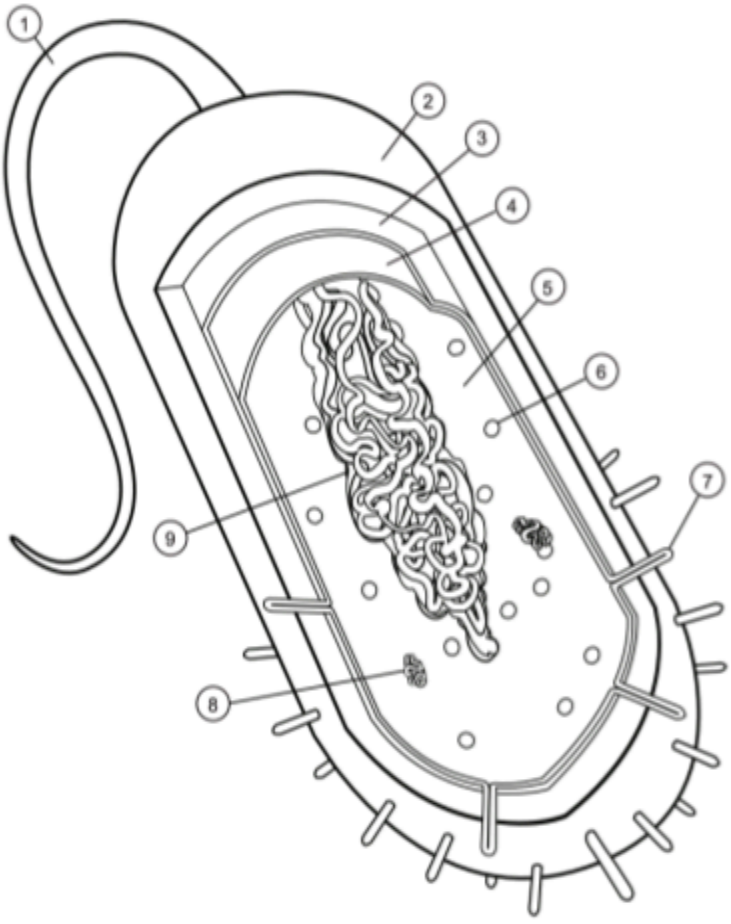
5.

6.

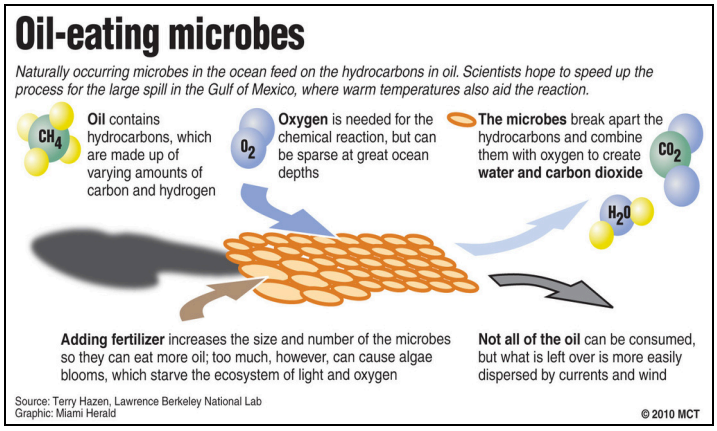
7.

8.

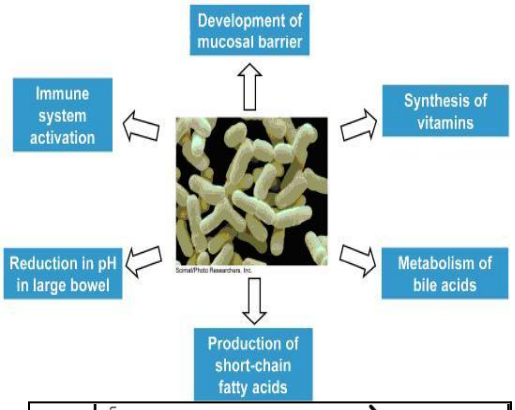
9.



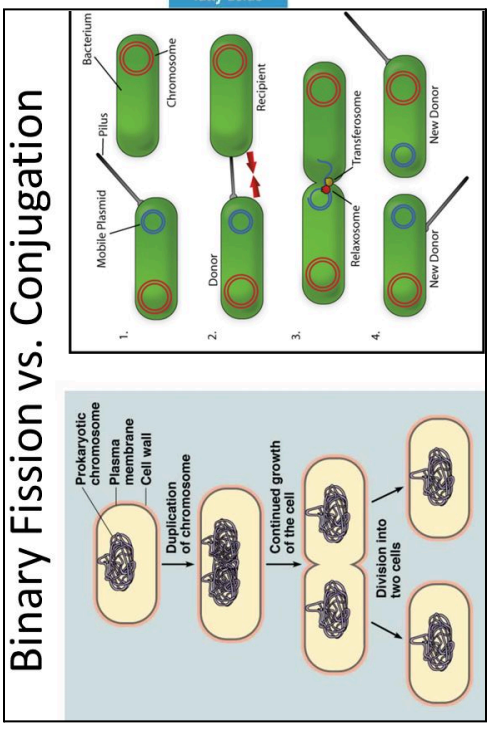
- Bacterial Adaptations
  - Live in various habitats and have several adaptations:
    - They can break down _____ matter which prevents _____ of deceased material.
    - Some can use _____ chemicals as food (ex. _____)
      - Humans have used these bacterial strains to help clean up _____ spills. This is called **bioremediation**



    - They can exist in extreme hot/cold (extremophiles)
  - High rate of mutualism
    - REVIEW: The _____ between two species with both getting _____.
    - EXAMPLE: The bacteria in your _____ help to _____ _____ food faster.

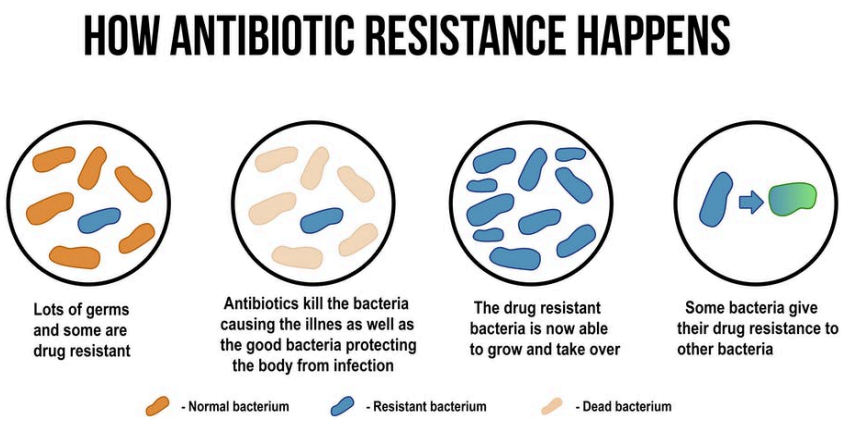


  - Aerobic Bacteria
    - Need an _____-_____ environment to survive.
    - *Example: Tuberculosis – affects lungs*
  - Anaerobic Bacteria
    - _____ survive in an oxygen-rich environment.
    - *Example: Botulism - food poisoning*
- Bacterial Reproduction & Life Cycle
  - Asexual Reproduction → _____ _____
    - Reproduce by dividing into two _____ cells.
    - Can happen very _____.
  - Sexual Reproduction → _____
    - One bacteria transfers _____ or part of its _____ (DNA) to another cell through _____ _____ that connects the two cells

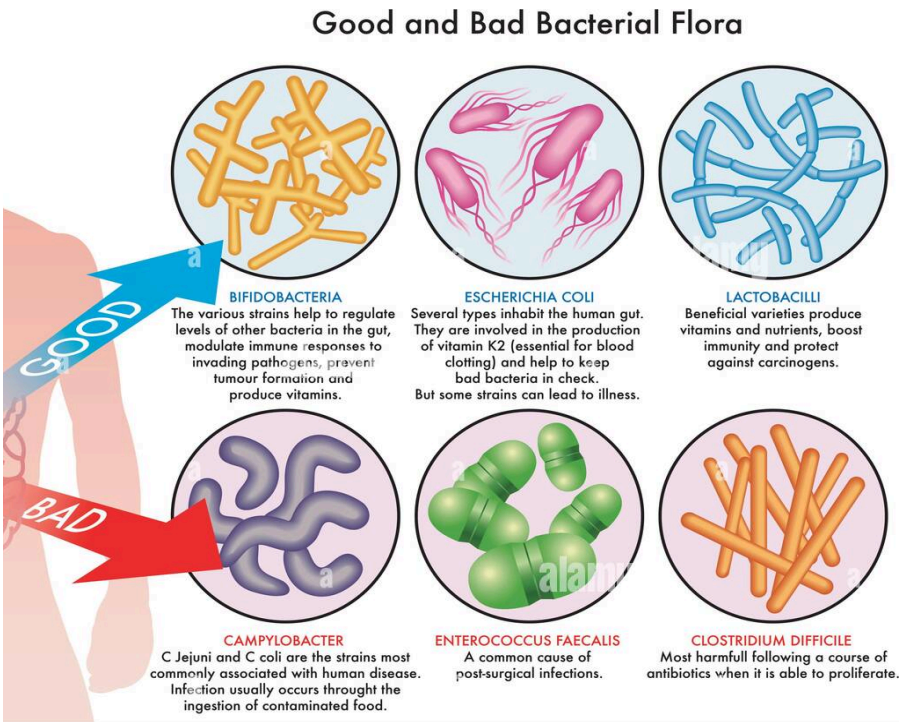


- Human Defense against Bacterial Infection
  - Antibiotics work by…
    - Stopping the creation (synthesis) of bacterial _____ _____
      - *EXAMPLE: Penicillin (antibiotic) stops the formation of cell walls.*
    - Interfering with the important functions like _____ synthesis.
    - Preventing proper synthesis of _____ or _____
  - **IMPORTANT:** _____ don't have cell walls or ribosomes, so _____ have_____ _____ on them!

- _____ _____
  - Strains of bacteria that have adapted to _____ antibiotics.
  - Bacteria are gaining resistance to antibiotics through:
    - _____ , _____ , and _____
  - A bacterium may already have an gene (DNA) for antibiotic resistance on the _____
  - A copy of the plasmid is transferred through _____.
  - Resistance _____ spreads through many bacteria.



- Good and Bad Bacteria
  - Good bacteria…
    - synthesize vitamins
    - boost _____
    - fight _____
    - create _____ (cheese, yogurt, kimchi)
    - deal with _____ (bioremediation)
    - Make up _____ of the cells in the gut (~95% of the total number of cells in the intestinal tract).
      - *EXAMPLES. Lactobacillus acidophilus, Dehalococcoides ethenogenes*



  - Bad bacteria…
    - Can cause life threatening diseases
      - Done by invading tissues or creating toxins
        - *EX. E-coli and streptococci*