

Name: _____

Bacteria information sheet

Essential question: What are the major physical and functional characteristics of bacteria?

Bacterial cell characteristics

- Prokaryotic cell – lacks a nucleus:

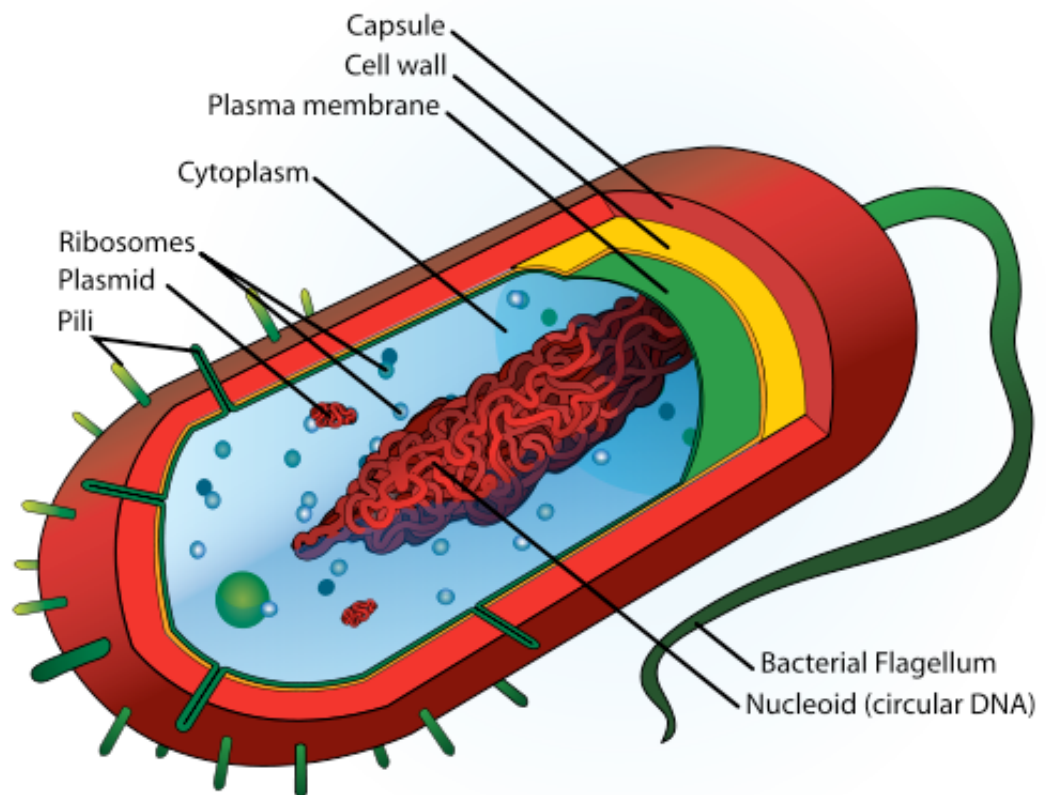
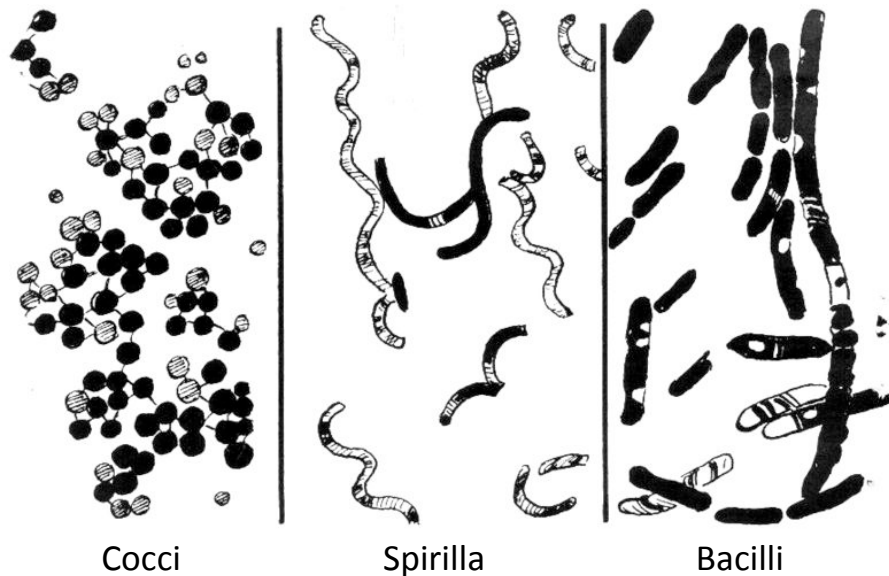


Image: http://commons.wikimedia.org/wiki/File:Average_prokaryote_cell-_en.svg

- Living cell
- Acts as decomposer in the environment
- Most abundant life on earth – there are 5 nonillion (5×10^{30}) bacteria in the world
- Multiply quickly
- Outnumber human cells 10:1 on the human body

- Bacterial cells have three basic shapes:
 - Cocci (round)
 - Spirilla (spiral)
 - Bacilli (oval)



Pros of bacteria

- Useful in the digestion of food
- Used in the production of some medicines
- Help to decompose dead material in the environment
- Used to make cheese and yogurt

Cons of bacteria

- Can be transmitted easily from one organism to another – by sick individuals or by carriers
- Can harm or kill other living organisms; bacterial infections kill over 5 million people a year – roughly 10% of the world's population
- Mutations can create “super-bacteria,” which are resistant to antibiotics

Pathogenic diseases caused by bacteria:

- Anthrax
- Botulism
- Cholera
- Dental cavities
- Diphtheria
- Dysentery
- Diphtheria
- E. Coli
- Ear infections
- Gangrene
- Gonorrhoea
- Leprosy
- Lyme disease
- Pneumonia
- Rheumatic fever
- Salmonella
- Scarlet fever
- Spinal meningitis
- Staph infections (including MRSA)
- Strep throat
- Syphilis
- Tetanus
- Tuberculosis
- Whooping cough

How do bacteria cause disease?

Bacteria are everywhere; we come in contact with millions of microscopic bacteria every day. In order for bacteria to make a person sick, first it must enter the body system. Fortunately, the body has natural defense mechanisms to prevent easy infection, including the skin and the acid conditions in the stomach. But bacteria can invade the body through cuts and insect bites on the skin and by passing through the mucus barrier in the digestive tract.

A bacterium that has entered the body may grow and spread if it is left alone. A bacterial infection simply means the bacterium has been left to grow and multiply within the body.

Fighting bacterial diseases

Antibiotics are used to fight a bacterial infection. Numerous health officials, doctors, pharmaceutical technologists, researchers, and epidemiologists tackle the spread of bacterial infections every day. The spread and mutation of bacteria keep health care workers working to find a way to stop the transmission of disease.

Microbiology lab : Testing for bacteria

Name _____

Partner _____

Purpose: To culture bacteria from the school environment.

Essential question: Which location around your school (or classroom) harbors the most bacteria?

Hypothesis:

Location my group tested: _____

Materials for the lab:

- Petri dishes
- Inoculating loops (or sterile cotton swabs)
- Sponge
- Safety goggles
- Agar
- Microwave
- Bowl with 20 mL of water
- Cardboard box
- Thermometer

Procedure

1. Pick up your petri dish and open the top carefully. (Do not touch the inside.)
2. Move to your selected location in the school (or classroom).
3. Using the inoculating loop (or cotton swab), swab the area that you will be testing and in a Z pattern spread the specimen over the surface of the nutrient agar in the dish. (Be careful not to dig into the agar!)
4. Tape the top back to the bottom and flip it over.
5. Label the bottom of the container with:
 - Your name and partner's name
 - Period #
 - Location of specimen
6. Place the petri dishes upside-down in the incubation box.
7. Make sure the sponge is sitting in water and that it is inside of the box to keep the air humid.
8. Place the box back on top of the counter.
9. Check the temperature of the box to make sure it remains at 23⁰C. (This ensures that the agar will not dry out during the culturing process.)
10. Close the box and the teacher will place the box top of a refrigerator. (The compressor produces a constant warm temperature and the height ensures the cultures will not be disturbed.)

11. Remove box after 24, 48, 72 hours and 1 week. Record colony growth. (Count using significant colony growth.)

Quantitative Data:

Dish	Colony growth: day 1	Colony growth: day 2 after 24 hours	Colony growth: day 3 after 48 hours	Colony growth: day 4 after 72 hours	Colony growth: 1 week
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Qualitative data:

Day 2

Day 3

Day 4

Day 7

Data analysis and conclusion

Using the data you collected, answer the following questions:

1. On which day did the most cultures appear?
2. Compare your findings with those of one other group and deduce from the data collected which location had the most bacteria growth.
3. Who would benefit from your research?
4. If an outbreak of MRSA (a “super bacteria”) occurred in your school, how would you alter this experiment to locate an antibiotic-resistant bacteria?

Name _____

Diseases: Who can help?

Categorize the list of diseases (pathogens) as either **bacterial** or **viral**. Use the internet or other text material for a reference.

Decide which career/profession would most likely respond and or treat the disease (symptoms).

Disease (pathogen)	Bacterial / Viral	Who would help?
Tooth decay		
Flu (Influenza)		
Cold		
Strep throat		
Cholera		
Lyme disease		
Pneumonia		
HIV / AIDS		
Gangrene		
Ear infection		