

Name _____ Date _____

Kingdom bacteria

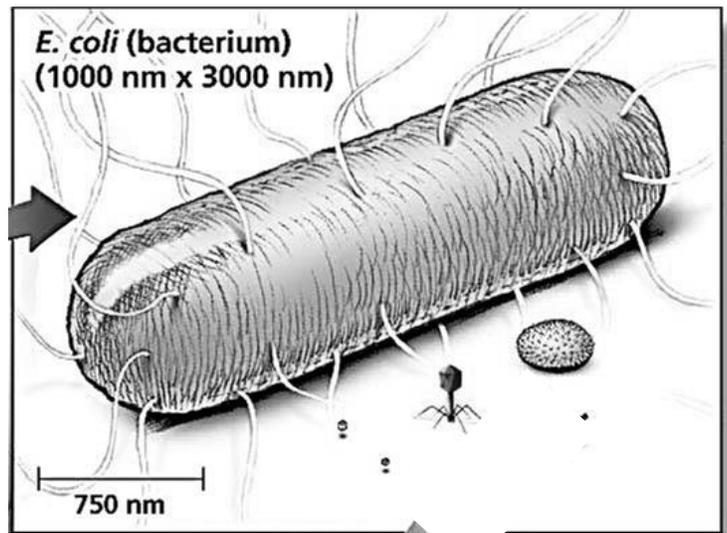
Bacteria are located _____ – air, water, land, and on/in living organisms including people.

General Characteristics:

1. All are _____ - cells that lack a _____
2. All are _____
3. All have _____ – nutrients are _____ and waste is discharged through the cell _____ and cell wall.
4. Can live in both _____ (**with O₂**) and _____ (**without O₂**) environments
5. Bacteria are much smaller than red _____ but much larger than _____.

6. Label the bacteriophage, smallpox virus and polio virus. Color the smallpox virus yellow and the poliovirus blue.

7. Label the bacteria. Add some bacterial ribosomes to the bacteria to show their size relative to the poliovirus.



8. There are millions of species of bacteria; however, they come in three basic shapes: Fill in the shape name and draw a quick sketch below:

9. What Shape? Write which shape is in each box, click to reveal the answers:

Another way we can divide Kingdom bacteria is whether they are harmful or helpful to humans.

What is a pathogen? _____

What is pathology? _____

What is the name of an expert in pathology? _____

Harmful bacteria cause disease by:

1. _____ of infected organisms by dissolving the cells as a source of food.
2. Releases _____ (poisons) which destroy the cells of an _____ organism.
3. _____ rapidly, thus spreading the cellular destruction.

Examples:

1. _____
2. _____
3. _____

Video 1:

Circle the bacterial diseases mentioned in the video:

botulism	tuberculosis	e-coli	Lyme disease
Strep throat	anthrax	gangrene	Bubonic plague

Video 2:

1. In World War I, which killed more soldiers, bombs, bullets or bacteria? _____

2. Feeling hopeless about helping his patients during the war, what did Alexander Fleming dedicated his life to?

3. In 1928, what did he observe in a petri dish, by chance?

4. What does he name his discovery? _____

The real story behind penicillin (PBS website)

5. Who is the first person to ever receive this antibiotic and did HE live?

6. Why did Dr. Florey and Dr. Heatley go to the United States in 1941?

7. In World War II, what percentage of soldiers died from bacterial pneumonia? _____

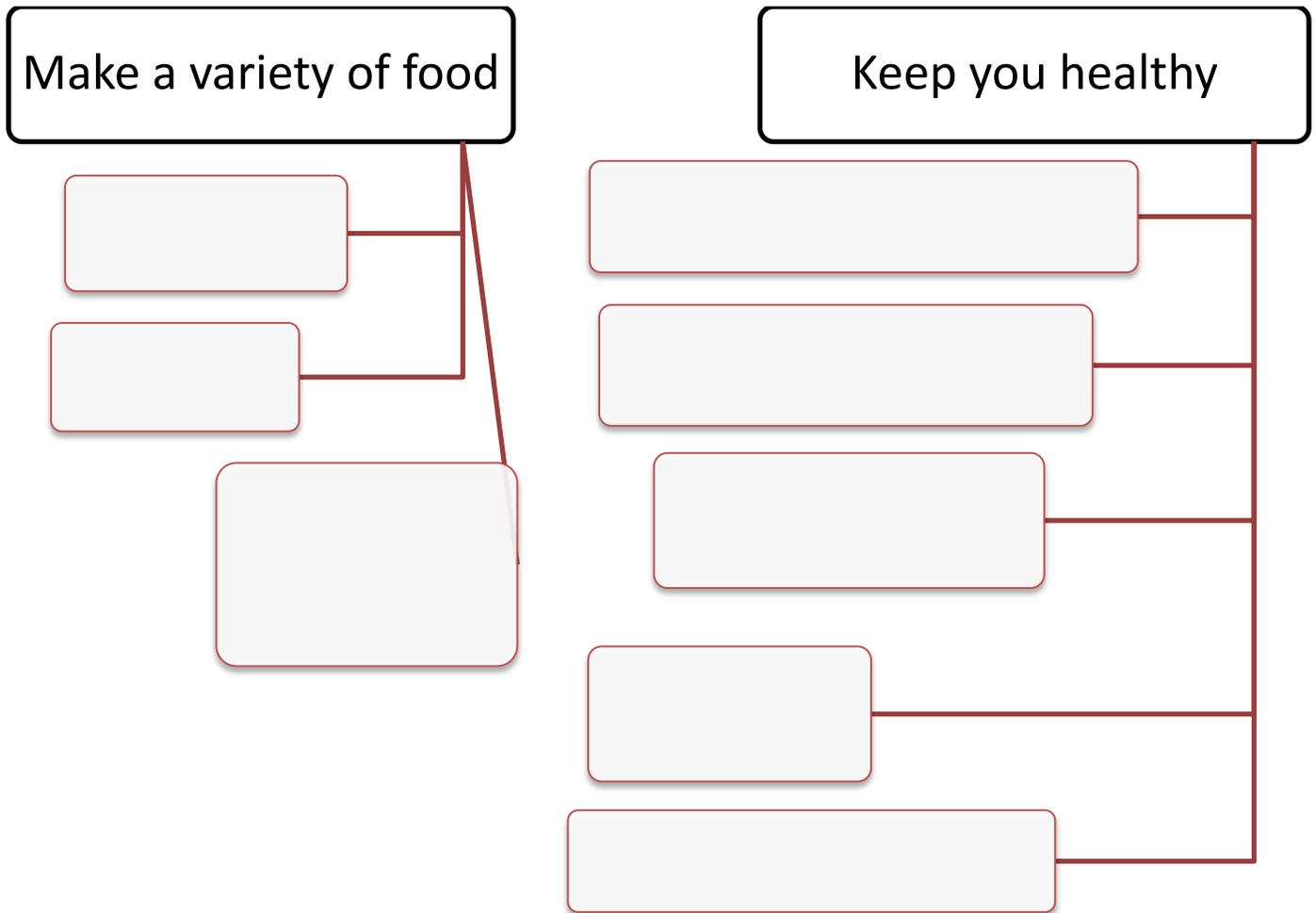
The Age of Medicines Arrives (back to slide show)

1. What is an antibiotic?

2. Do antibiotics kill viruses? _____

3. What is antibiotic resistance?

BENEFICIAL BACTERIA



How does E. coli bacterium benefit from being in your intestines? _____

How do you benefit from having E. coli in your intestines? _____

Last slide: Now that I know how important bacteria are to my health, how can I get more beneficial bacteria into my intestines? _____

What "feeds" bad bacteria? _____

DISEASE DETECTIVES ANSWER SHEET

1. Write a definition for each word based on the information in the reading:

a) Epidemiology _____

b) Epidemiologist _____

c) Epidemic _____

2. Use each of these words correctly in a complete, science-related, sentence of your own - the sentence must show you understand the meaning of the word:

d) Epidemiology _____

e) Epidemiologist _____

f) Epidemic _____

3. List the three diseases discussed in the article and the type of organism (vector) that spreads or causes each disease.

Disease name	Vector

4. Look back at the definition of pathology and pathogen. What is the difference between a pathologist and an epidemiologist?

5. Google www.cdc.gov/Features/LymeDisease/. Write two ways to the CDC recommends for protecting yourself from tick bites.

a. _____

b. _____

Disease Detectives

STACIE NEFF, A.K.A THE VECTOR VICTOR

Stacie Neff is an epidemiologist (EP-e-DEE-me-AH-Lah-jist) in the Division of Vector-Borne Infectious Diseases at the Centers for Disease Control and Prevention (CDC) in Fort Collins, Colorado. Stacie always knew that one day she'd work for the CDC. "I've been fascinated by the CDC all of my life, and I can't believe I actually work here! It's like being a real life disease detective." Stacie does everything from investigating West Nile virus outbreaks, to creating plans to defend against bio-terrorism.

Epidemiology: The facts

If you like mysteries, you'll love epidemiology! Like crime scene investigators, epidemiologists begin their case crackin' by looking for clues. They gather information about what happened—Who is sick? What are their symptoms (signs that show someone is not feeling well—headache, sore throat)? When did they get sick? Where could they have been exposed to the disease? Investigators then study the answers to these questions to find out what led to a particular health problem. Then, they use what they have learned to prevent others from getting sick.



These real life disease detectives work in many different places—some work in laboratories where they look for viruses or bacteria in blood samples, others work in cities or towns where there are diseases, and some interview people who are sick and then try to figure out how and why they got infected.

Stacie studies epidemics (unusual outbreaks of diseases). Although trackin' down diseases and crackin' the case are the most exciting parts of Stacie's job, she says that one of the most important things she does is collect background information on diseases from all across the county. These facts give the disease detectives what they need to know to figure out if an outbreak or epidemic is really happening or not, and how serious it is.

Have you ever been called in to investigate an outbreak? Yes. One summer, Stacie was part of a team from the CDC that went to Slidell, Louisiana to investigate an outbreak of the [West Nile virus \[a virus carried by mosquitoes\]](#). Stacie and her team were invited by the Louisiana state health department to conduct a study in local hospitals and health centers to learn more about West Nile. They also hoped to crack the case of West Nile fever. The question they needed to answer: Of those people who were carrying West Nile virus, how many actually got West Nile fever? Stacie and her teammates were on call around the clock, and sometimes had to go into the hospital in the middle of the night to examine the patients! They collected blood samples to learn more about the West Nile virus, traced how long it stays in the patient's body, and to find out how many people were actually sick with West Nile fever. Stacie and her teammates are still hard at work examining the information they gathered from 196 patients.

Stacie's detective work didn't stop there—she was also assigned to an outbreak case in Vernal,

Utah at Dinosaur National Monument where lots of student workers were sick. Stacie made a detour on her way to visit her family for a camping trip, and stopped in Utah to investigate. After spending a few days researching and examining the students, it turned out that a fungus called Valley Fever had made its way further north than it ever had before. Another case solved.

What's a vector? Stacie says that vectors are usually arthropods (animals with jointed arms and legs, a body with many sections and its skeleton on the outside) like ticks, fleas, mosquitoes, and other creepy crawlers. They can carry diseases from one person or animal to another—sometimes without even getting infected.

One of Stacie's biggest projects at the CDC is monitoring Lyme disease—which is carried by ticks. She says it's an interesting trail to follow. Ticks pick up Lyme disease from mice (who don't even get sick from the disease!), lay their eggs and travel around on deer, and sometimes end up on humans who can get sick if bitten. Stacie says that ticks need to be attached to a human for 1-2 days to infect them, so follow the CDC's [Tick Tactics](#) to keep ticks away while you're outside in areas where ticks live.



What do you like most about being a real life disease detective? Stacie says that the best thing about her job (besides the Colorado scenery) is that she gets to do so many different things. "One day I may work on a big project surveying diseases on a national level, and the next I might be across the country somewhere working 16 hour days on a disease outbreak. Getting to do both is so cool!"

Copied from: http://www.bam.gov/sub_diseases/diseases_detectives_2.html