

OVERVIEW of INFECTIOUS DISEASES

Everyone in the class will work through the stations on *Microbial Evolution*, *Where are They?* *Global Burden of Disease*, and *Public Health*. The following questions will guide you through these first four stations. Feel free to start at any station - you need not answer questions in any specific order.

MICROBIAL EVOLUTION

1. Watch the microbial evolution video and pay close attention to the graph as time passes. Which colored line best represents a strain of bacteria that is resistant to more than one drug?

2. Look at the tubes containing marbles, representing bacterial growth. How many hours does it take to generate 65,536 bacteria from 1 original bacterium?

3. What two factors combined lead to microbial evolution?

_____ + _____ = Evolution

4. Antibiotics can kill bacteria, yet bacteria may continue to spread. Why is that? Given your answers above, circle the best response to the two questions below.
 - A. Microbes generally multiply **FASTER** -or- **SLOWER** than humans. (Circle one)
 - B. Microbes generally have **HIGHER** -or- **LOWER** mutation rates than humans. (Circle one)

WHERE ARE THEY?

5. Use the sliding screen and side panel to discover how **bacteria, viruses, fungi and parasites** differ as you complete the following chart:

Source	Fungus	Parasite	Bacteria	Virus
Associated Disease				
Disease Location on Body				
Pathogenic? Commensal? Harmless? Unknown?				
Typical Size (From side panel)	micrometers	micrometers	micrometers	micrometers

GLOBAL VIEW

6. Using the "Developing Stories in Infectious Disease" interactive, identify one emerging disease hotspot and the disease outbreak that occurred there.

Disease _____ Hotspot Location _____

7. Using the "Global Distribution of Infectious Diseases" interactive, choose one disease and describe where in the world it is most widespread.

Disease _____ Where is it most widespread? _____

PUBLIC HEALTH

Looking at the two public health graphs, notice that **both** life expectancy (blue) and mortality rates (yellow) have **improved** in the United States from 1900 to 2000. Life expectancy at birth has increased (people live longer) and mortality rates have decreased (less people are dying from infectious diseases).

8. Gather data on the change in mortality rate over two 40 year periods:

Mortality Rate	Drop in Mortality Rate
1900: _____/100,000	1900-1940 = _____/100,000
1940: _____/100,000	
1980: _____/100,000	1940-1980 = _____/100,000

9. Based on the data you gathered in question #8, did mortality rates drop most **before** or **after** antibiotics and vaccines were first used (around 1940)?

Before antibiotics and vaccines (1900-1940) - or - After antibiotics and vaccines (1940-1980)
(CIRCLE ONE)

10. List two public health measures that resulted in improved life expectancy in the U.S. before 1940. (Many answers are possible.)

11. What disease caused a large "spike" in the graphs prior to 1920?

12. Not all countries enjoy the same level of public health as the U.S.

How many people worldwide lack clean water? _____

How many people worldwide lack basic sanitation? _____