

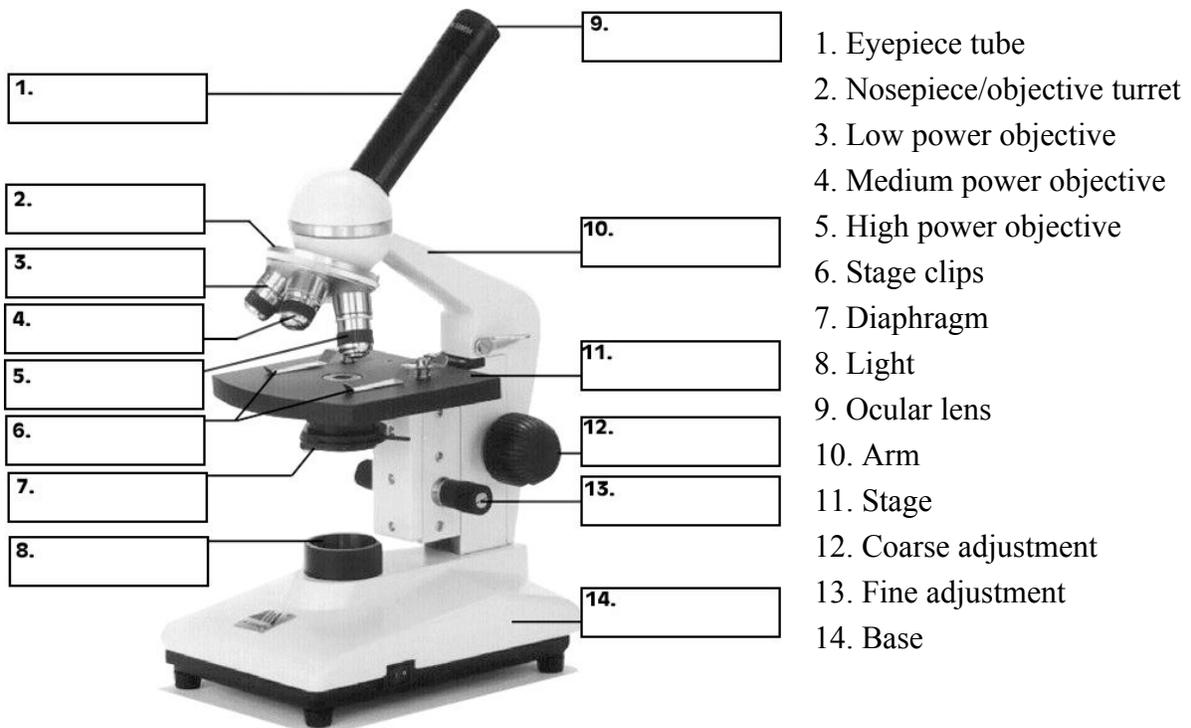
Name: **Answer Key**

Date:

You may not return to previous stations. However, you can move to another station early if you want to do so. I won't judge you for your grammar/writing on free responses, just show you know the answer.

Station 1: Microscopes (10 min)

Label the parts of the microscope below:



15. What is a transmission electron microscope? When would you use it? (1 pt)

Beam e- through specimen, see interior of small structures

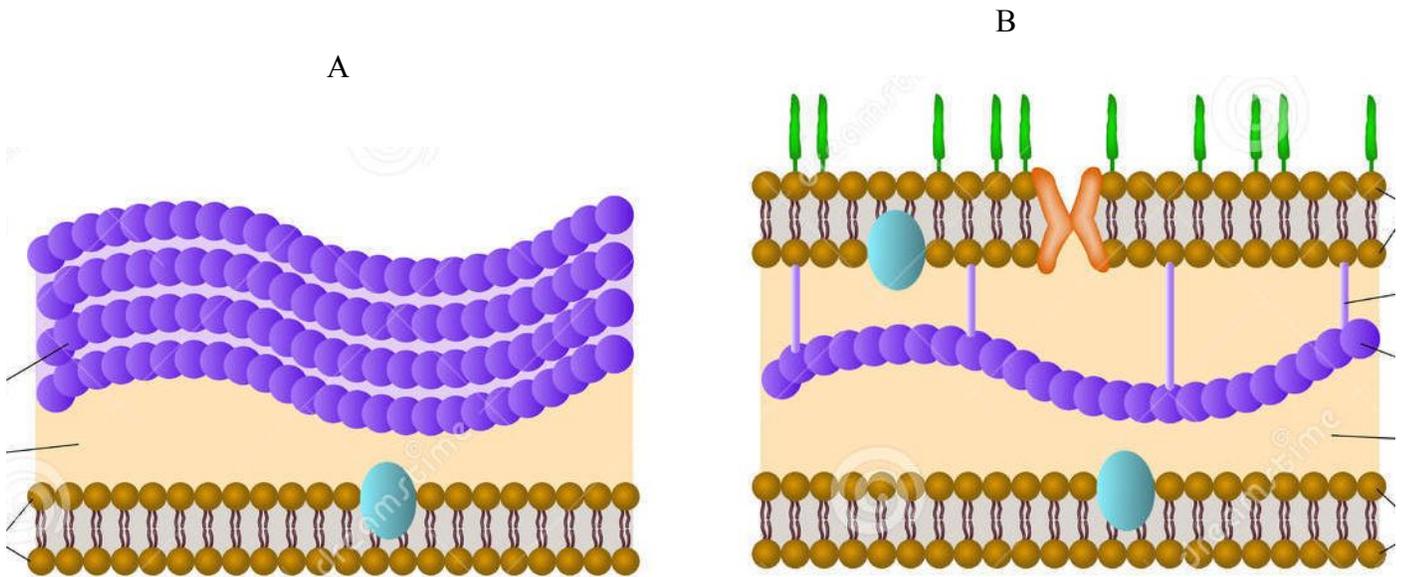
16. What is a scanning electron microscope? When would you use it? (1 pt)

Scanning focused e- beam, shows surface of small structures

17. What is a confocal laser scanning microscope? When would you use it? (1 pt)

3D laser imaging at different depths.

Station 2: Bacteria (10 min)



Above are photos of two different bacterial

cell walls, from cells A and B.

18. Which of the above cells is gram positive? (1 pt) **A**

19. Which of the above cells is gram negative? (1 pt) **B**

20. What is the name of the the compound that makes up the green things on the surface of cell B that look like pine trees? (1 pt)

lipopolysaccharide

21. What is the compound that makes up the polymer that looks like a purple snake?

Peptidoglycan

22. What type of stain is used to make certain bacteria appear dark purple in a gram stain? (1 pt)

Crystal Violet

23. What type of stain is used to make certain bacteria appear red or pink in a gram stain? (1 pt)

Counterstain

24. What is the name of the structure that looks like a red X? (1 pt)

Porin

25. Are gram positive or gram negative bacteria more likely to form spores? (1 pt)

Positive

26. Those things that look like pine trees are pretty dangerous. Are they endotoxins or exotoxins? (1 pt) **endotoxins**

Station 3: Viruses (10 min)

27 - 33: List the 7 baltimore classifications of viruses. (7 pts)

dsDNA, ssDNA, dsRNA, ssRNA+, ssRNA-, ssRNA-RT, dsRNA-RT

34. What was the first virus identified? (1 pt)

Tobacco Mosaic

35. What do you call a virus that infects a bacterium? (1 pt)

Bacteriophage

36. What type of viral life cycle causes the host cell to rupture? (1 pt)

Lytic

37. What type of viral life cycle involved the integration of the viral DNA into the host genome?

(1 pt)

Lysogenic

38. What would you call a viral genome integrated into a circular bacterial DNA chromosome?

(1 pt)

Prophage

Station 4: Other weird microbes (5 min)

39. What are hyphae? (1 pt)

Fungi projections, thin

40. Do fungi prefer an acidic or basic environment? (1 pt)

Acidic

41. What is unique about the nuclei of ciliates like paramecia? What do we call them? (3 pts)

2 nuclei, micronucleus and macronucleus

42. Which of the following has an oral groove? (1 pt)

E. coli **b. Paramecium** c. Amoeba d. Slime mold

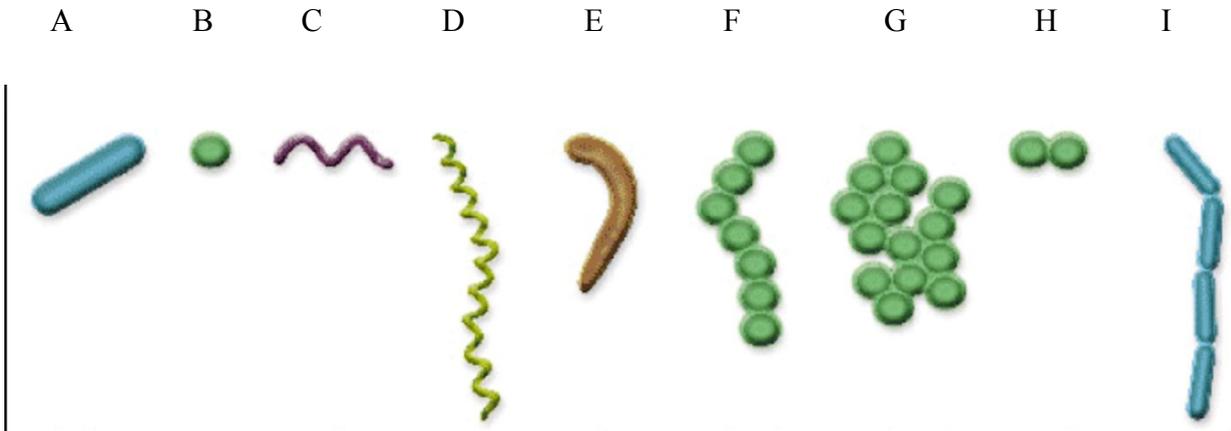
43. What is a prion? (1 pt)

Rogue protein

45. What type of structure do amoeba use to move? (1 pt)

Pseudopodia

Station 5: Bacteria types (10 min)



Match the above bacteria shapes with their names (1 pt each)

46. Vibrio **E** 47. Staphylococcus **G** 48. Diplococcus **H** 49. Bacillus **A** 50. Spirilli **C**

51. Spirochete **D** 52. Coccus **B** 53. Streptococcus **F** 54. Streptobacillus **I**

55. Which of the above shapes is cholera? What symptoms does it cause? (2 pts)
E, diarrhea, vomiting, muscle cramps.

56. Which of the above shapes is anthrax? What symptoms does it cause? (2 pts)
I, necrotic ulcer (skin), cold (lungs), or Blood vomit (GI)

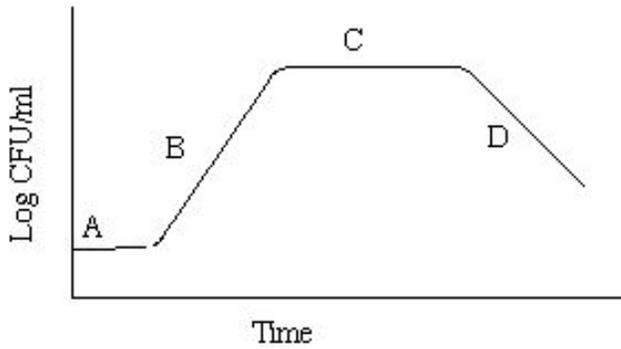
57. Which of the above shapes is strep throat? What symptoms does it cause? (2 pts)
F, large lymph nodes, fever, sore throat

58. Name a bacteria that forms spores. (1 pt)
Anthrax

Station 6: Microbiology foundations (10 min)

58. Label the growth stages in the graph below. (4 pts)

- a. lag
- b. exponential
- c. stationary
- d. death



Match the following diseases with their type of microbe. (1 pt each)

- 59. MRSA **b**
- 61. Potato blight **d**
- 62. Kuru **c**
- 63. Yellow fever **a**
- 64. Giardiasis **e**
- 65. Tetanus **b**
- 66. Syphilis **b**
- 67. Ringworm **d**
- 68. Fatal familial insomnia **c**
- 69. Mononucleosis **a**
- 70. Pertussis **b**

a. virus b. bacteria c. prion d. fungus e. other

Station 7: Cell Bio (5 min)

71. In the lac operon, Allolactose acts as a(n):
- a. corepressor
 - b. operator
 - c. inducer**
 - d. activator
72. Which of the following is not found in plants or animals?
- a. Centriole
 - b. Contractile vacuole**
 - c. Centrosome
 - d. Peroxisome
73. Which structure allows bacteria to exchange genetic information?
- a. Fimbriae
 - b. Capsule
 - c. Pili**
 - d. Ribosome
74. Which of the following organelles is inherited maternally?
- a. Lysosome
 - b. Vacuole
 - c. Mitochondrion**
 - d. Nucleus
75. Fermentation:
- a. creates ATP by adding a phosphate to ADP
 - b. regenerates NAD⁺ from NADH**
 - c. creates ethanol for DNA synthesis
 - d. helps science olympiad students win
76. Which of the following is **not** a difference between Eukaryotes and Prokaryotes?
- a. Prokaryote flagella rotate while Eukaryote flagella undulate
 - b. Prokaryotes cannot perform photosynthesis**
 - c. Histones are not found in Prokaryote DNA
 - d. Prokaryotes have no telomeres

Station 8: Microbes can be good (5 min)

77. Why do we add yeast when making bread? What compound does it make? (2 pts)

Create CO₂ to make bread rise

78. What product do bacteria in yogurt produce through fermentation? (1 pt)

Lactic Acid

79. Why are probiotics good? (2 pts)

They promote growth of good bacteria that make vitamins and outcompete dangerous bacteria

80. Which of the following is **not** a beneficial role microbes can perform? (1 pt)

- a. Oil spill remediation
- b. Nitrogen fixation
- c. Water and waste treatment
- d. Red tides increase oxygen in the ocean**

81. Explain endosymbiotic theory (2 pts)

Idea that bacteria merged into archaea to make eukaryotes. Now these bacteria are mitochondria and chloroplasts.