

Microbe Mission

Casa Grande Science Olympiad
Invitational
2011

Station 1: Parts of a Microscope

1. Label the parts of the microscope. (A-K)
2. What is the greatest magnification, or power, available on this scope?
3. What type of microscope is it?

Station 2: Microscope Observations

Examine the slide and use the information provided below to answer the following questions.

4. The diameter of the field of view is ____ millimeters.
5. What power of the microscope is appropriate for observing these Microbes?
6. What is the diameter of this field of view in millimeters?
7. What is the size of this microbe in millimeters?
8. Using the fine adjustment knob, carefully focus up and down through the specimen to determine its 3-dimensional shape.

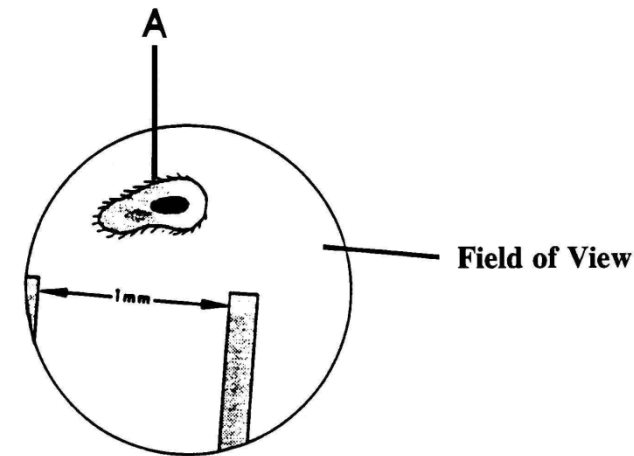
Draw the microbe.

Station 3:

PROPERTIES OF MICROSCOPY

9. A student prepares a slide of the letter "d" and positions the slide on the stage of the microscope so the letter is in the normal reading position. Draw how the "d" will appear when viewed.

10. How many millimeters is the field of view containing critter A? (diagram)
How many micrometers is it?



11. What is the approximate length of critter A in micrometers?

12. When viewing critter A, if it appears to be moving toward 8 o'clock, what direction is it actually moving?
(Use the numbers on the clock as directions for the field of view)

13. Assuming critter A is observed under low power, how will the appearance of critter change when he is observed under high power as to size, detail, and brightness?

Station 4: Microbes and Diseases

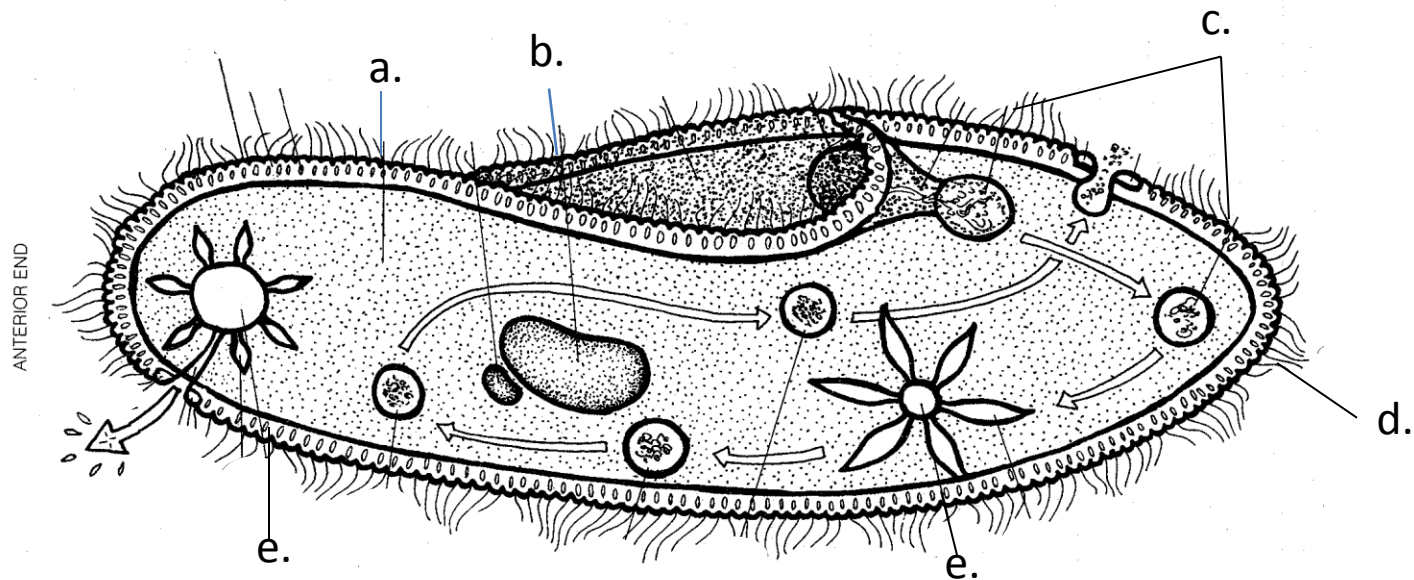
- Match the microbe type with the disease.
- Fill in the chart on your answer sheet.
- Then answer the following question:

14. Of the microbes and diseases listed above, which two are the most difficult to treat and why?

Station 5: Organelles and Cells

Part A

15. Label each organelle in the cell below.



16. Is this microbe a fungus or a bacteria?

Station 5: Organelles and Cells

Part B

17. Set up the microscope to view the slide.
Make a quick sketch of what you see.

18. Identify the sample as a protozoa or a
fungus.

19. What organelles are visible?

Station 6: Positive Uses of Microbes

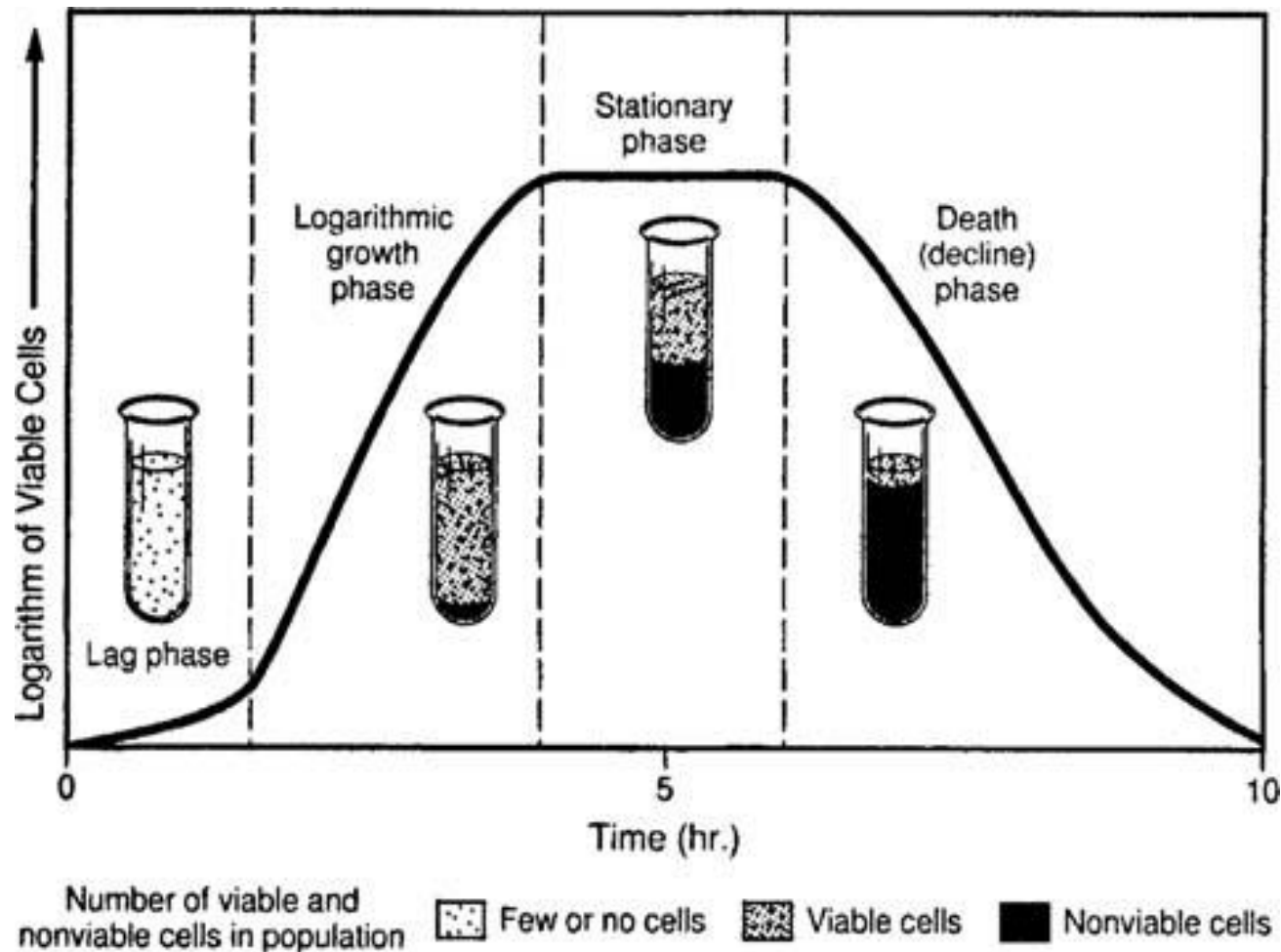
Part A

19. Using the flash cards, indicate how microbes are involved – are they involved in the production of the food, are they a risk to rapid food spoilage, or are they involved in both? Write down your answers on your sheet.

Part B

20. Why do people taking antibiotics often feel nauseous?
21. What organelle found in all human cells is thought to have evolved from a symbiotic relationship between host cells and a bacteria?
22. When BP applied oil-eating microbes to the recent Gulf Oil Spill, what were scientists concerned about? Were these microbes aerobic or anaerobic?

Station 7: MICROBIAL GROWTH CURVE



Station 7:

MICROBIAL GROWTH CURVE

23. What is the independent variable for this growth graph? In what units is it measured?
24. What is the dependent variable for this growth graph? In what units is it measured?
25. What is a viable cell?
26. What is a nonviable cell?
27. What is happening during the stationary phase?
28. What is happening during the death phase?
29. What environmental factors could cause the death of these microbes?
30. If a colony of 100 bacteria doubles in number every half hour, how many bacteria will be present after 5 hours?

Station 8:

DISEASE CAUSING MICROBES

Use the key to the right to identify the type of microbe which causes each of the following diseases.

- | | |
|---------------------------------|--------------|
| 31. chicken pox | a. Virus |
| 32. Ebola Hemorrhagic Fever | b. Bacteria |
| 33. botulism | c. Protozoan |
| 34. mumps | d. Fungus |
| 35. ringworm | |
| 36. syphilis | |
| 37. tetanus | |
| 38. shingles | |
| 39. dental caries (tooth decay) | |
| 40. typhus | |
| 41. Legionnaire's disease | |
| 42. cholera | |
| 43. measles | |
| 44. rabies | |
| 45. AIDS/HIV disease | |
| 46. strep throat | |

Station 9:

Eukaryotic and Prokaryotic cells

46. Identify each the two drawings below as eukaryotic or prokaryotic cells. Label each part. (*images from www.phschool.com. Copyright Prentice Hall 2010.*)

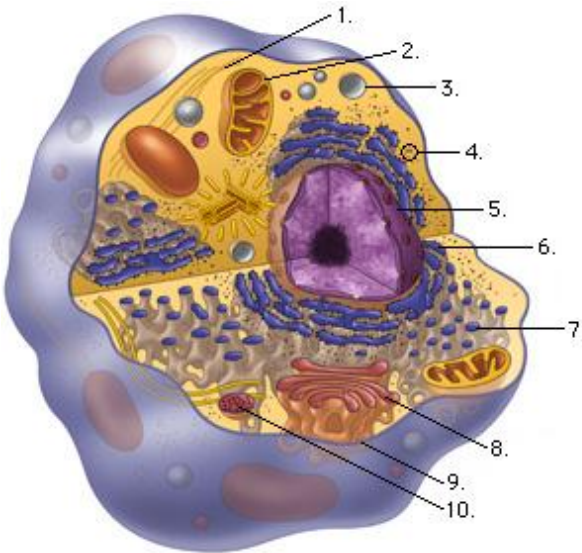


Illustration 1: Cell A

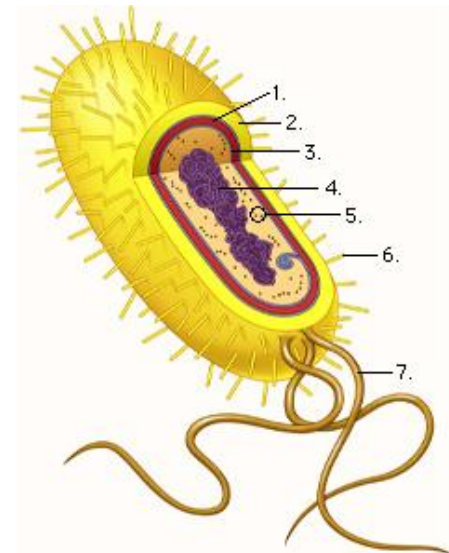


Illustration 2: Cell B

47. Give one example of a eukaryotic cell, and one example of a prokaryotic cell. Explain how the two are different.