

Microbiology
Unit 2 Test Review

Name: KEY Date: _____ Hour: _____ Test #: _____

1. Define the following terms:

- a. Microscope: any tool with a lens to magnify and observe tiny details of specimens
 - b. Simple Microscope: a microscope with a single lens
 - c. Compound Microscope: a tool that magnifies using two lenses, one mounted on each end of a tube
 - d. Light Microscope: a compound microscope that uses ordinary visible light to illuminate the image of a specimen
 - e. Electron Microscope: microscope using a beam of electrons to illuminate a specimen, yielding greater magnification and
 - f. UV Microscope: greater resolving power because it uses ^{resolution} UV light to illuminate the specimen
 - g. Fluorescence Microscope: uses UV light and fluorescent dyes to stain specimens
 - h. Dark Field Microscope: condenser reflects light away from the objective, light waves touching the specimen will be
 - i. Phase Contrast Microscope: translates the phase difference into a difference in the brightness of the light that can be
 - j. Staining Bacteria: coloring microorganisms with chemical ^{seen} dye to make them easier to see
 - k. Smear: small amt. of bacterial culture spread on a slide and heat fixed to the slide
 - l. Simple Stain: using a basic dye to stain a bacterial smear; bacteria will be colored against the white background
 - m. Gram Stain: differential staining procedure used to classify bacteria based on their cell wall structure
 - n. Gram Positive: PURPLE - organisms with thick cell walls adhere to crystal violet, easily killed with penicillin
 - o. Gram Negative: PINK - organisms with thin, lipid filled cell walls, appear pink adhere to safranin, easily killed with
 - p. Colony: visible growth of bacteria on medium, ^{streptomycin} all the progeny of a single pre-existing bacterium
 - q. Autoclave: steam pressure sterilizer that raises the boiling point of H₂O to a T° which all forms of life are killed
2. How do you calculate total magnification? TM = Eyepiece power x objective power
 3. Why do basic dyes adhere to bacteria? chromophore has a (+) charge
 4. Why do acidic dyes repel o bacteria? chromophore has a (-) charge
 5. What conditions are needed for microbial growth? Food, water, proper T°, proper pH, darkness

directed through the objective

But you should use the pictures in the notes

6. Define the following terms used to classify bacteria by oxygen requirement. Be able to recognize a picture to show bacterial growth for each of the following scenarios.

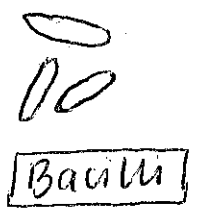
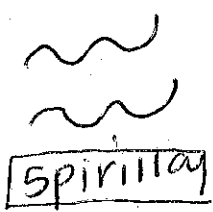
- a. Strict Aerobe: require free oxygen to grow, at least the 20% found in the air
- b. Strict Anaerobe: will not grow or may be killed in the presence of oxygen
- c. Microaerophilic: grow best in the presence of low levels of oxygen (2-10%)
- d. Facultative Anaerobe: grow in the absence of oxygen but do not normally do so (Facultative = sometimes)
- e. Aerotolerant: grow in the presence of oxygen but will only perform fermentation

7. Describe the four main steps used in Gram Stain and the purpose.

- a. Crystal violet - used to stain bacteria cells with thick cell walls (a lot of peptidoglycan)
- b. Iodine - used to bind to crystal violet to trap it in so it cannot be washed away
- c. Ethyl Alcohol - Decolorization of bacteria that have thin, lipid filled cell walls of the crystal violet
- d. Safranin - counterstain for bacteria that have thin, lipid filled cell walls

8. What substance do you use between each step of a Gram stain? water

9. Be able to recognize a picture of three main shapes of bacteria. In the space below, draw those three shapes.



10. Explain how the resolution of a microscope works. The resolving power of a light microscope is limited by the wavelength of light. It is the ability of a microscope to distinguish

11. Be familiar with how to properly handle and use a microscope. 2 objects, as being separate. (ROY G BIV)

12. Be familiar with the correct steps in simple staining and gram staining.

13. Be able to label a microscope.

$$\text{Resolving Power} = \frac{1}{2} \text{ wavelength of light}$$

wavelength of visible light = 400 - 800 nm
 (blue) (red)

Resolving power of light microscope = 200 nm
 ^ why the light source has a blue tint, to improve resolution