

Microscope Assignment

Micr-22, C. Briggs, revised Spring 2018

Grading scheme: Check-minus, check, check-plus.

Expectations: Same as for earlier assignments.

Materials needed

- One to two hours of your time
- Access to outside resources (textbook, or web). Consider checking out these:
 - <https://www.youtube.com/watch?v=b4WOsYktdn4> (watch 1.5x speed)
 - <http://www.cas.miamioh.edu/mbiws/microscopes/types.html> (some links broken)
 - <http://www.microbehunter.com/electron-microscopes-vs-optical-light-microscopes/>
 - https://www.thermofisher.com/content/dam/LifeTech/global/life-sciences/cellanalysis/Images/0914/figure_scopes_resolving.jpg
 - <http://studylib.net/doc/8591351/types-of-microscopes-chart>

Objectives

- Learn to describe the features, uses, and limitations of these types of microscope: brightfield, darkfield, phase contrast, fluorescence, confocal, transmission electron, and scanning electron. Consider level of visible detail, living or nonliving cells, cost, and complexity.
- Learn to describe the purpose of various stains: simple vs. differential, Gram, acid-fast, negative, endospore, and flagella stains.
- Have some fun, maybe.

Assignment prompts

1. Please complete a chart in the following format (on next page). Cite your source, at least briefly, for each item. Always use your own words.

2. What makes a "differential stain" different from a "simple stain"?

3. What can each of the following stain types teach us about an organism's cell wall? Also, draw and label your own example of each.

Gram stain

Acid-fast stain

Negative stain (hint: not "gram-negative")

Endospore stain

Flagella stain

4. Finally, for fun, check out this beautiful compilation, here

(<http://www.theatlantic.com/video/index/420099/nikon-small-world/>), and consider browsing more, here

(<http://www.nikonsmallworld.com/galleries/swim>).

Type of microscope	Unique feature of how microscope works	Best (smallest) resolution	Unique object or feature that could be imaged	Can it image living cells?	Cost (high? low?)	Complexity (high? low?)	Your own drawing of an example image. Label whatever is unique.
Brightfield (this row is all from Tortora 2012)	Light travels directly through specimen	~0.2 μm	Living, unstained cells, but all transparent materials look the same.	Yes	Low (compared with other types)	Low (compared with other types)	
Darkfield							
Phase contrast							
Fluorescence							
Confocal							
Transmission electron							
Scanning electron							