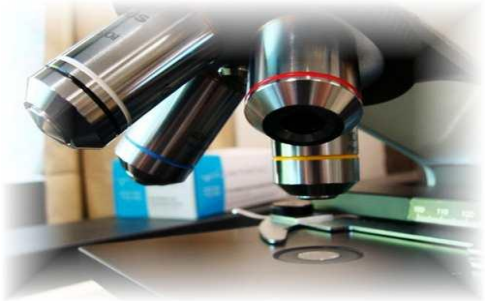

About Science Prof Online PowerPoint Resources

• Science Prof Online (SPO) is a free science education website that provides fully-developed Virtual Science Classrooms, science-related PowerPoints, articles and images. The site is designed to be a helpful resource for students, educators, and anyone interested in learning about science.

• The SPO Virtual Classrooms offer many educational resources, including practice test questions, review questions, lecture PowerPoints, video tutorials, sample assignments and course syllabi. New materials are continually being developed, so check back frequently, or follow us on Facebook (Science Prof Online) or Twitter (ScienceProfSPO) for updates.

• Many SPO PowerPoints are available in a variety of formats, such as fully editable PowerPoint files, as well as uneditable versions in smaller file sizes, such as PowerPoint Shows and Portable Document Format (.pdf), for ease of printing.

• Images used on this resource, and on the SPO website are, wherever possible, credited and linked to their source. Any words underlined and appearing in blue are links that can be clicked on for more information. PowerPoints must be viewed in *slide show mode* to use the hyperlinks directly.

• Several helpful links to fun and interactive learning tools are included throughout the PPT and on the Smart Links slide, near the end of each presentation. You must be in *slide show mode* to utilize hyperlinks and animations.

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Image: Compound microscope objectives, T. Port

Laboratory
Project 1

Introduction to Microbiology Laboratory

Microscopy & Photomicroscopy

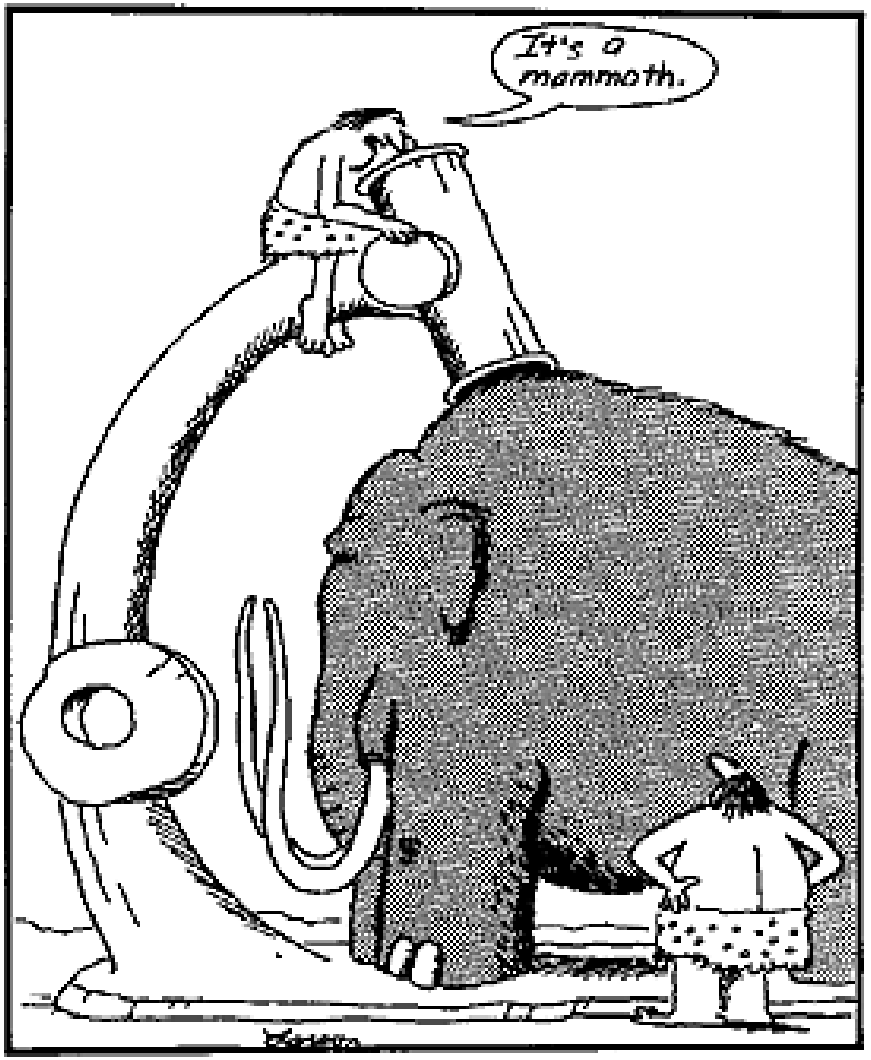


Image: The Far Side by Gary Larson

Compound Light Microscope

The "Compound" Part

- **Simple microscopes** have single magnifying lens (like a magnifying glass).
- **Compound microscopes** have *two sets of lenses* for magnification.
- Lens closer to the eye = **ocular lens** (magnifying power of 10x).
- Lenses closer to the object being viewed = **objective lens**. (Most light microscopes used in biology have three or four objective lenses).

The "Light" Part

- **Bright-field light** microscopes produce a dark image against brighter, backlit background.
- Provide a 2-D image.
- Commonly used to view stained cells.

Image: Magnifying lamp use to look for part defects, US Navy; Compound light microscope, Moisey

Your Microscope

Take Care of Your Scope:

- It is **your responsibility** to take care of your scope and learn to use it properly.
- I randomly check scopes to see if they are put away correctly. If yours is not, I may subtract points from your lab grade.

Microscope Log:

- If you get your scope out and find that it has not been put away properly, make an entry in the **microscope log**.

Getting Scope Out:

- The scope that you use is numbered to correspond to your seat number, on edge of lab bench in front of you.
- When transporting your scope, always hold it with one hand under the **base**, and one hand around the **arm**.

Putting Scope Away:

- Clean stage if it is oily, and use lens paper to clean lenses.
- **Shortest objective lens** (the one with the red band) should be pointing down toward stage.
- Use course focus to position stage **as low as it can go**.
- Always put scope back in numbered parking spot in scope cabinet.

**** Now everyone get out their scope ****

Image: Compound light microscope, Moisey

Parts of a Compound Light Microscope

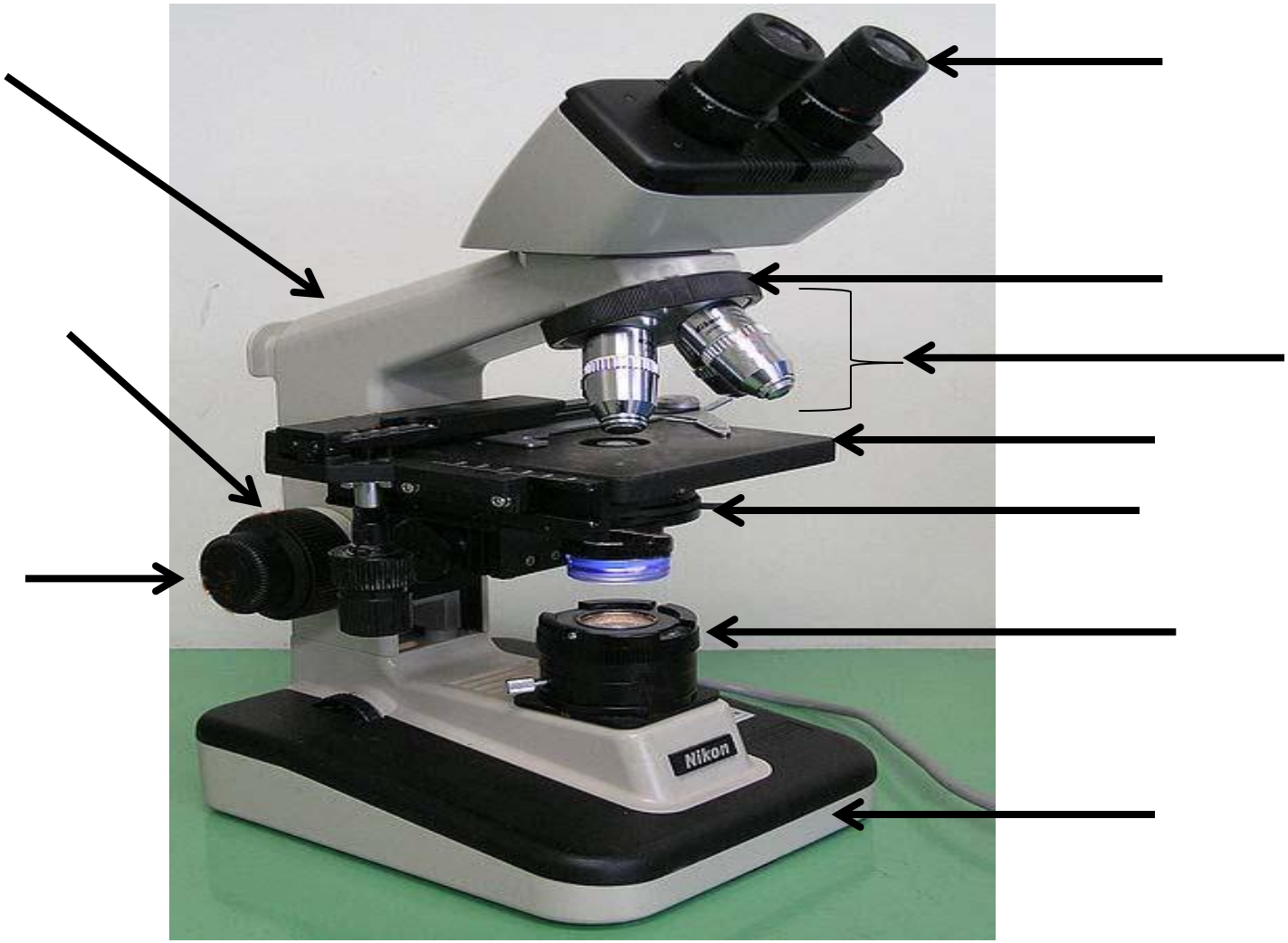


Image: Compound light microscope, Moisey

Magnification & The Objective Lenses

- Ocular lens magnifies the specimen 10x.
- You will always be looking through the ocular and objective lens simultaneously, so multiply ocular magnification x objective power to calculate the Total Magnification (xTM).
- Rotary nosepiece of your microscope has four objective lenses attached.
- Shortest lens (red band) should have been pointing down when your scopes were last put away.

Image: Microscope objective lenses, T. Port

Scanning Power Objective Lens

- Red band around it.
- Magnifies objects 4x.
- ***Q:*** *What is the Total Magnification?* ____ TM
- We will only use this lens in today's lab. It is not useful for looking at bacteria.

Image: Microscope objective lenses, T. Port

Low Power Objective Lens

- Has yellow band around it.
- Magnifies objects 10x.
- ***Q:*** *What is the Total Magnification?* _____ TM
- Start with this lens when looking at a bacterial smear.
- ***Q:*** *What does the term* ***parfocal*** *mean?*

Image: Microscope objective lenses, T. Port

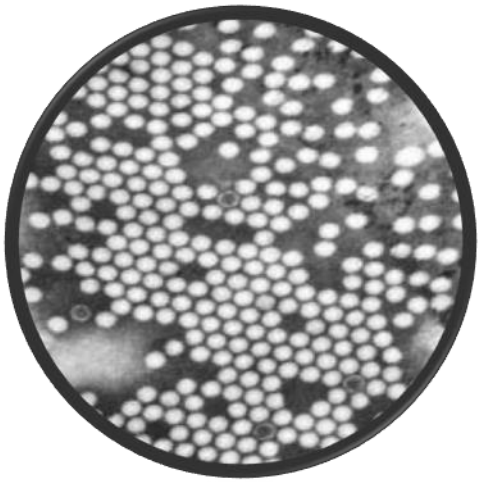
High Dry Objective Lens

- Has blue band around it.
- Magnifies objects 40x.
- ***Q:*** *What is the Total Magnification?* ____ TM
- Switch to this lens after getting your specimen in focus at 100xTM.

Image: Microscope objective lenses, T. Port

Microscopy: Electron Microscopes

- Many microscopic images in your textbook were obtained using electron microscopes.
- Electron beam wavelengths are shorter than light wavelengths, so better resolving power.
- ***Q:*** *What is* ***resolution****, in the context of microscopy?*
- **Transmission Electron Microscope (TEM):** 2-D image
- **Scanning Electron Microscope (SEM):** 3-D image

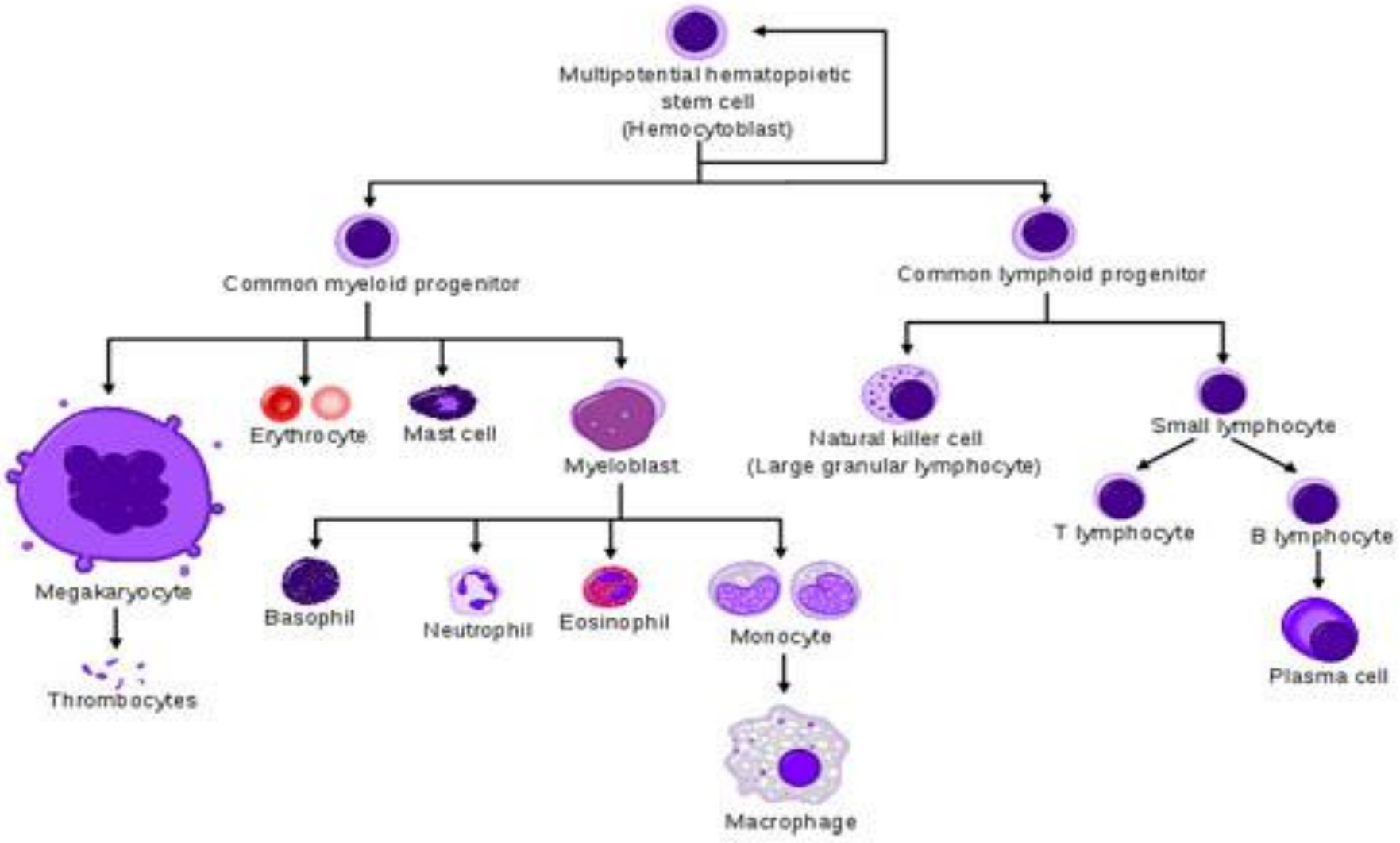


Images: Poliovirus, taken with TEM, PHIL #1875, Blood cells, taken with SEM, National Cancer Institute; Scanning electron microscope, Geological Survey of Israel laboratory.

You can use your scope to take photos of microscopic specimens!

Image: Leica microscope with camera, LAS EZ Main Screen, LAS EZ Icon, T. Port

Hematopoiesis of Formed Elements



Images Hematopoiesis, Mikael Häggström

Confused?

Here are links to fun resources that further explain use of the microscope & the Wright stain:

- **Microscopy Laboratory** Main Page on the Virtual Microbiology Classroom of Science Prof Online.
- White Blood Cell Count & Differential, eNotes
- Blood Components, Dennis O'Neil
- Staining & Commonly Used Stains, Histology Learning Systems
- Examining a Mammalian Blood Smear, Experimental Biosciences
- White Blood Cell Count from Lab Tests Online
- Microscope Mania crossword puzzle.

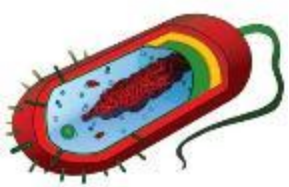
(You must be in PPT slideshow view to click on links.)

Are microbes intimidating you?

Do yourself a favor. Use the…

Virtual Microbiology Classroom *(VMC)* !

The VMC is full of resources to help you succeed, including:



- practice test questions
- review questions
- study guides and learning objectives

You can access the VMC by going to the Science Prof Online website
www.ScienceProfOnline.com

Images: White blood cell, Giant Microbes; Prokaryotic cell, Mariana Ruiz