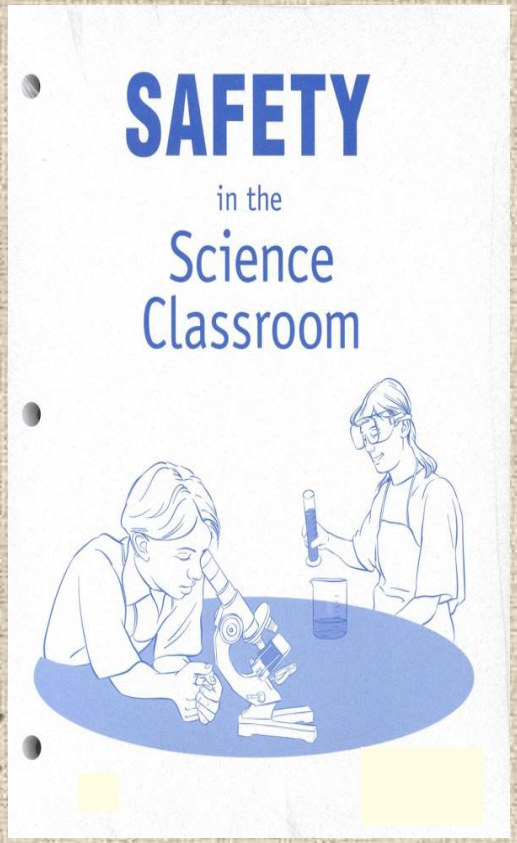
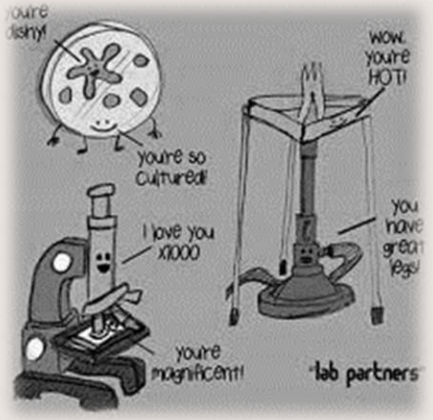



# Orientation to laboratory and Microscopically techniques

Ass. Lec. Suliman A. Al-Qaesi

# *What is a microbiology laboratory ?*

- It is the place that most of the testing, culturing, and research that they do occurs. This location contains the supplies and equipment needed for these activities.
- As well as provide an extremely clean, and sterile place to work.

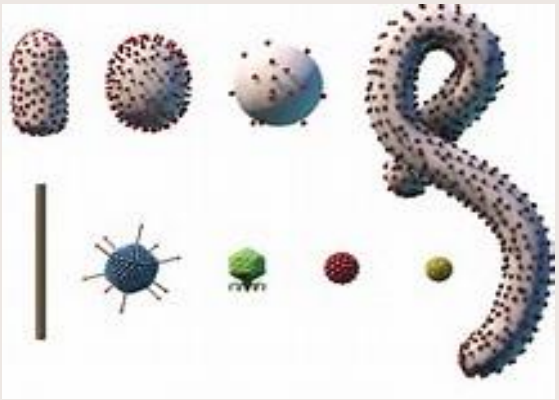


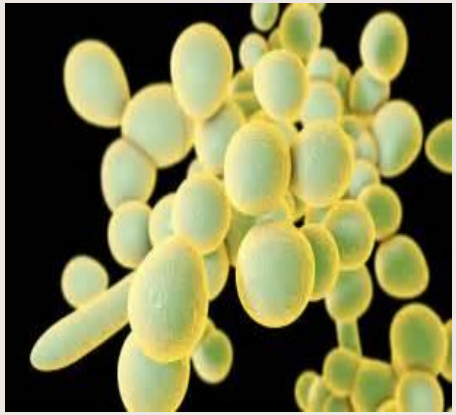
# *What does a microbiologist studies?*

**A microbiologist studies very small life forms, including.**

**bacteria**

**viruses**





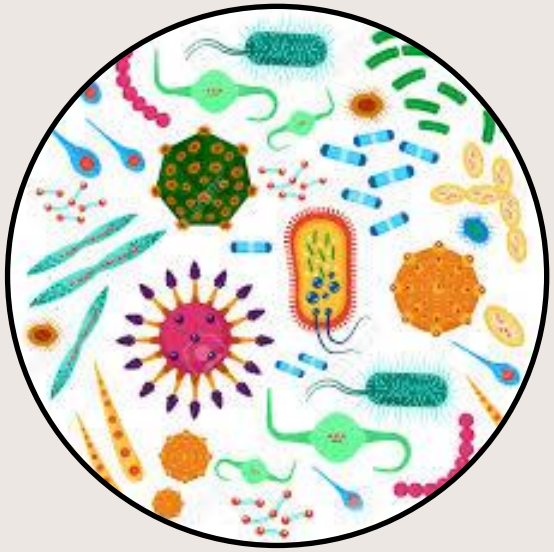
**fungi**

# *Where are they found?*

Water

Soil

Air

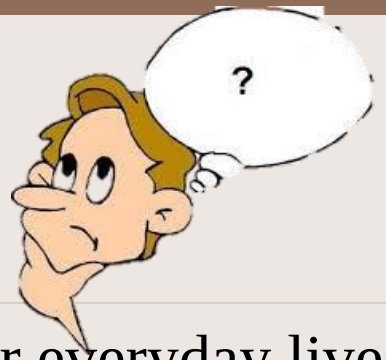


plants

Human

Animals

# *Why are we study microbiology?*



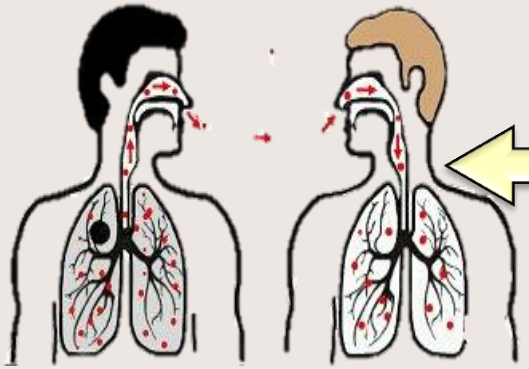

Microorganisms are extremely important in our everyday lives. Applications of microorganisms include biotechnology, agriculture, medicine, food microbiology and bioremediation.

- ✓ In medicine, microbiology has helped to treat and prevent diseases that are caused by viruses, bacteria, and fungi.
- ✓ microbiologists provide services to aid the diagnosis and management of infectious diseases.
- ✓ In the pharmaceutical industry, microorganisms are used to produce antibiotics, vaccines, and medically-useful enzymes
- ✓ Pharmacists and microbiologists work synergistically to ensure that drug therapies target the opportunistic microbes without harming its human host.

# *Rules of conduct and general safety*

**Laboratorians working with microorganisms potential risks including:**

**ingestion**



**inhalation**

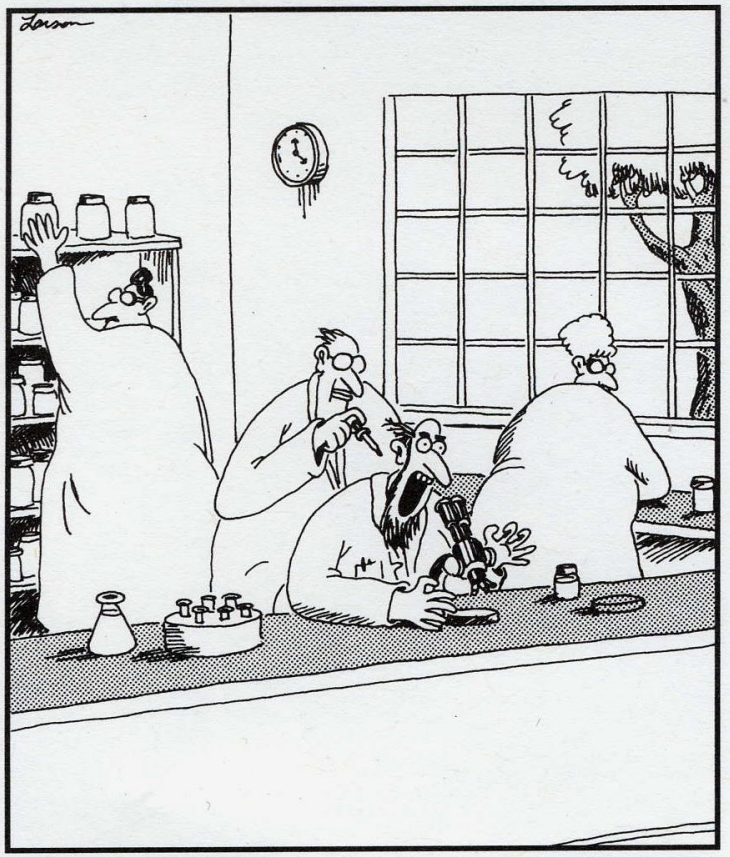
**or skin penetration by infective pathogens.**

# *Safety and Rules of the Lab*

**These risks can be minimized by adopting universal precautions**


**as well as standard microbiological laboratory practices. These include:**


# *Use Your Head*

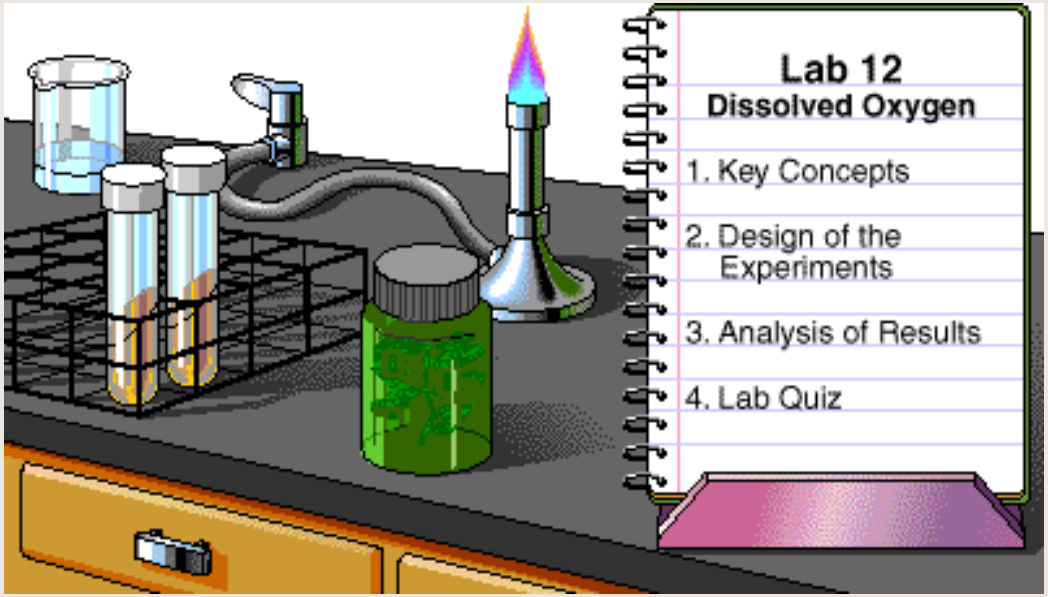



Professor Glickman, the lab practical joker, deftly places a single drop of hydrochloric acid on the back of Professor Bingham's neck.

- Exercise Caution and Good Judgment
- Follow all instructions given by the teacher
- Notify the teacher immediately regarding any accident or unsafe areas


# *Use Your Head*


- Read lab instructions ahead of time
- Always follow lab procedures exactly
- Never do an unauthorized experiment



# *Protect Yourself*
# *Eye Safety*

- Wear safety glesses when working with chemicals, flames, or heating devices
- or if possibility of flying debris

- If you wear contact lenses let your teacher know

# *Protect Yourself*

**Wear protective safety gloves and laboratory coat when processing specimens.**

# *Protect Yourself*

**Keep fingers, pencils, bacteriological loops, etc. out of your mouth**


# *You Should Never…*

## make uncontrolled activities


**These lead to….**

- Accidents
- Distract other
- Promote contamination


The favourite practical joke amongst Big Bang theorists.

# *You Should Never…*

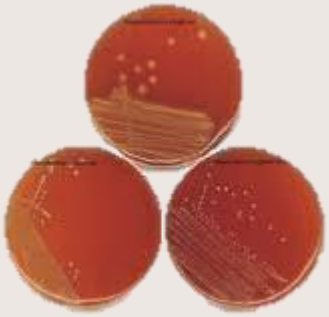

- Eat or drink in the lab

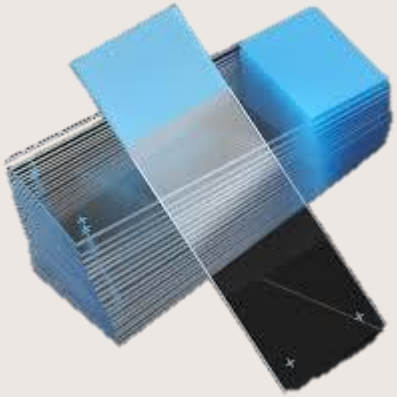

# *Protect Yourself*

- **Use biological safety cabinets as needed.**

# *Do not……*

- **discard contaminated culture, glass ware, pipettes, tubes or slides in wastepaper basket.**
- **dispersal of infectious materials.**



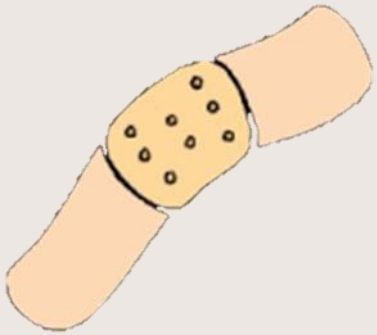


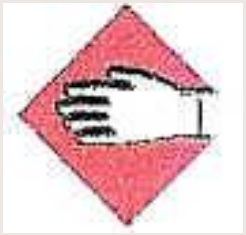
# *Chemical Safety*

- Transfer chemicals carefully!
- Keep lids on chemical containers when not in use
- Consider **all** chemicals dangerous


# *Protect Yourself*

- **If you have cuts or abrasions on the skin of your hands, cover them with adhesive dressing.**

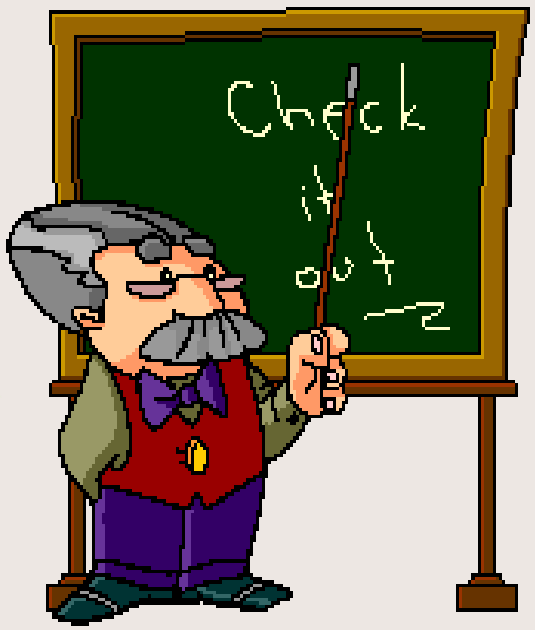




# *Protect Yourself Hand Safety*

- **Remove gloves and wash your hands after completing any task involving the handling of Pathological specimens.**

# *Remember to…*

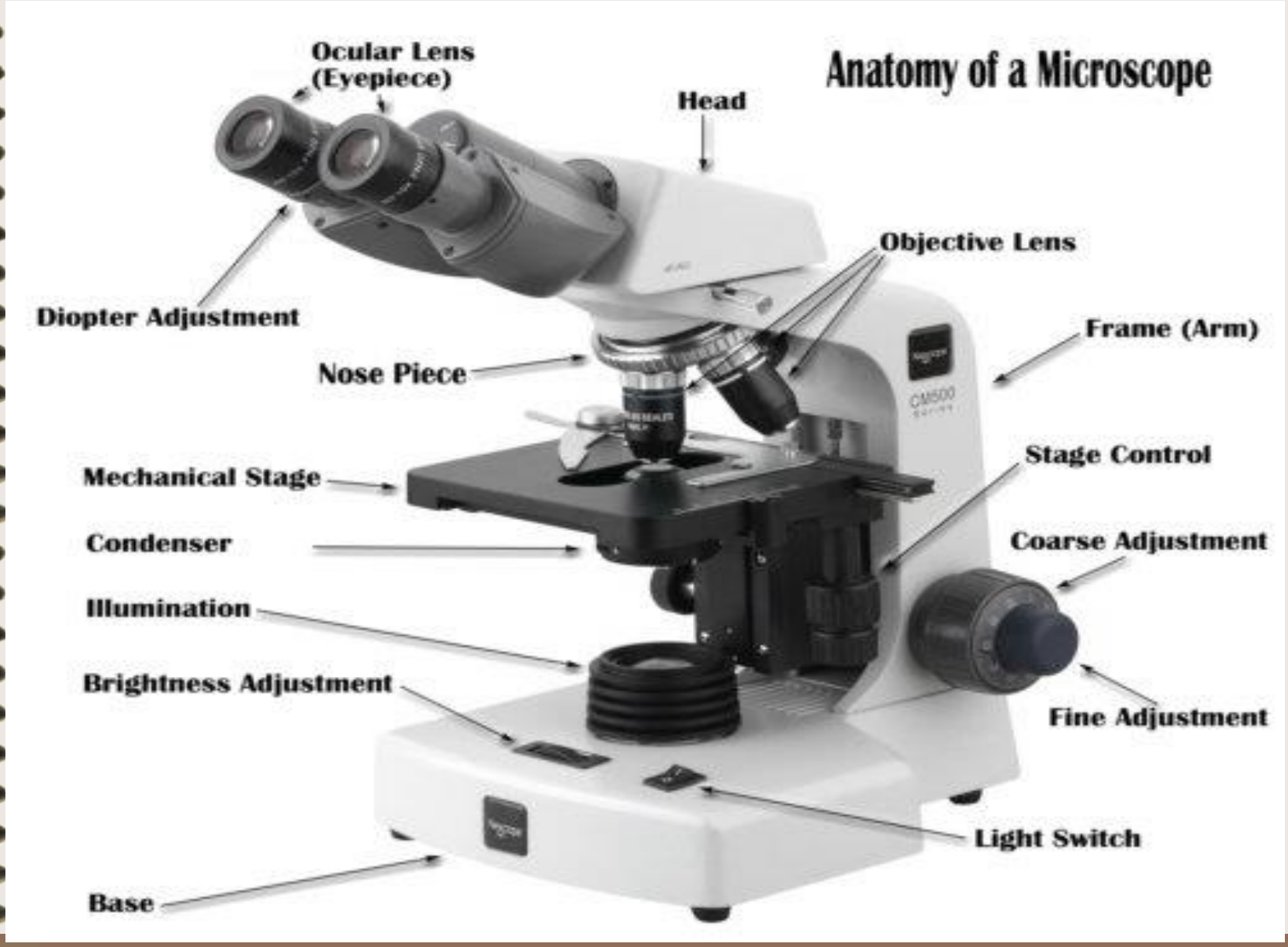



- Stay at your work station
- Maintain a clean work area
- Read and follow all directions
- Report any spills, accidents, or injury to the teacher immediately
- Clean and put away all equipment at the end of the lab period
- Dispose of waste products according to instruction

# *Microscope*

- **Microscope was invented by Antony Van Leuwenhoek (1632-1723).**
- **Microscope is an essential optical instrument of microbiology laboratory. It consists of combination of lenses which will give a magnified image of minute objects or microorganisms like bacteria, fungi, and protozoa.**

# *Parts of compound microscope:*



**Eyepiece (Ocular):** The lens the viewer looks through to see the specimen. The eyepiece usually contains a 10X or 15X power lens.

**Diopter Adjustment:** Useful as a means to change focus on one eyepiece so as to correct for any difference in vision between your two eyes.

**Objective lenses:** One of the most important parts of a compound microscope, as they are the lenses closest to the specimen.

**Nosepiece:** A rotating turret that houses the objective lenses. The viewer spins the nosepiece to select different objective lenses.

**Body tube (Head):** The body tube connects the eyepiece to the objective lenses.

**Arm:** The arm connects the body tube to the base of the microscope.

**Coarse adjustment:** Brings the specimen into general focus.

**Fine adjustment**: Fine tunes the focus and increases the detail of the specimen

**Height adjustment**: These knobs move the stage left and right or up and down.

**Stage:** The flat platform where the slide is placed.

**Stage clips:** Metal clips that hold the slide in place.

**Aperture:** The hole in the middle of the stage that allows light from the illuminator to reach the specimen.

**Condenser:** Focuses light from the illuminator onto the specimen being viewed.

**Iris diaphragm:** Adjusts the amount of light that reaches the specimen.

**Illumination:** The light source for a microscope.

**On/off switch:** This switch on the base of the microscope turns the illuminator off and on.

**Base:** The base supports the microscope and it's where illuminator is located.

# Magnification

**Magnification is the ability to view an object as larger. In order to a calculate the total magnification when viewing an image with a compound light microscope, take the power of the objective lens which is at :**

- Scanning objective (4x).
- Low power objective (10x).
- High power objective (40x).
- Oil immersion objective (100x)

# *How to calculate the magnification of microscope !!*

magnification of microscope

=

power of the objective lens × power of the eyepiece

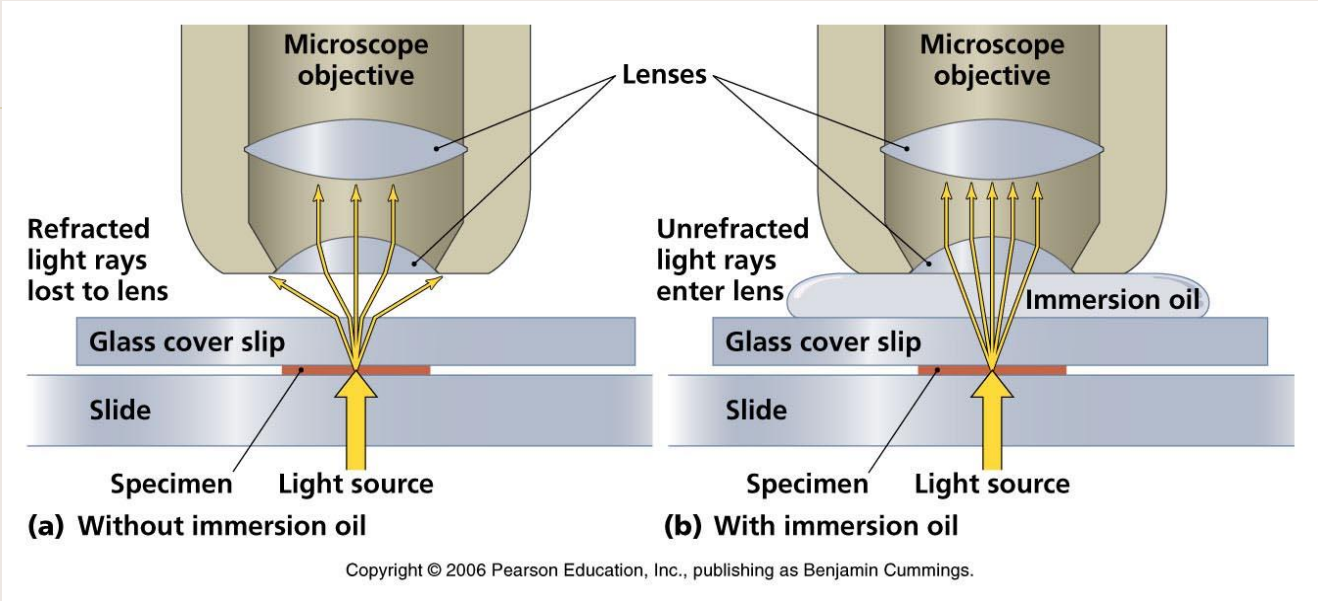
**The power of the eyepiece is typically 10x. Therefore:**

**10 x 40 = 400**

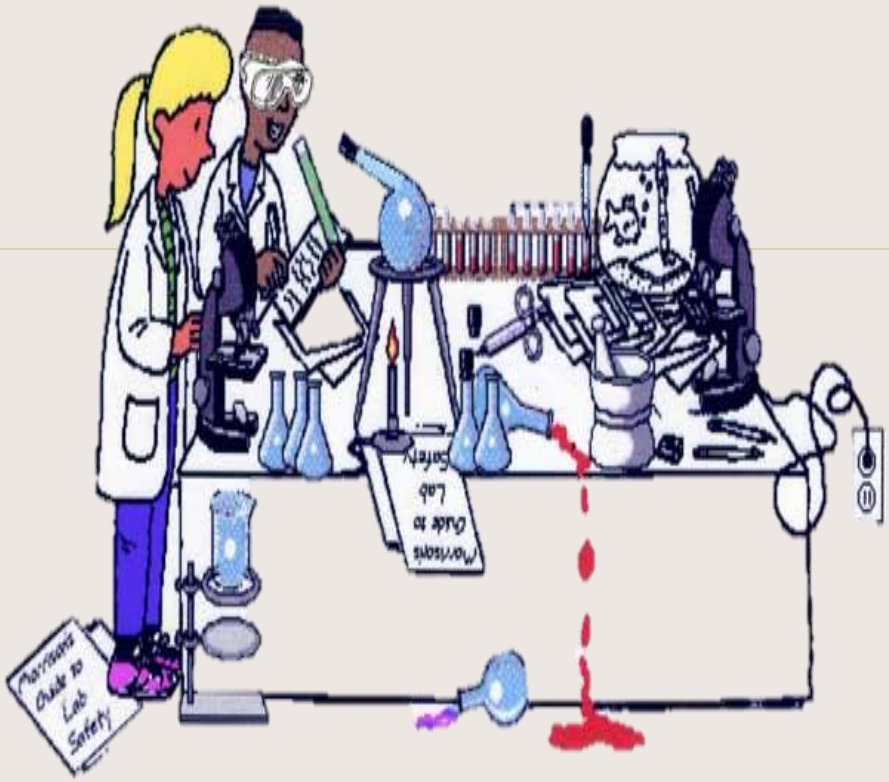
# *The oil immersion lens :*

**The oil immersion lens is required for viewing individual bacteria. In order to clearly see an object with this lens, immersion oil must be placed directly on the sample being viewed.**


# *Why use of oil immersion !?*




**Cedar wood oil used with oil immersion lens. It has same refractive index as that of glass, addition of oil in the gap between objective and object prevent refraction of light rays in order to get a bright image of the object.**





# So Do It Right!