**STUDY GUIDE INTRODUCTION TO MICROSCOPY**

**VOCABULARY**

Light microscope Condenser Iris diaphragm Turret nosepiece

Swing-in condenser Magnification Resolution

Refractive index Ocular Bright Field

Objective lens Phase contrast Projector lens

Resolving power Numerical aperture

**OBJECTIVES AND QUESTIONS**

1. Know the basic parts of the microscope and understand how each of these is involved in forming the final image.
2. Understand what is meant by refractive index and its implications to microscopy. Relate this to the importance of numerical aperture (NA) vs. magnification. (Hint: refractive index refers to how light rays are slowed and therefore bent in different media and is related to density. Think about what happens to the image of your hand as it is placed in water at an angle to the surface. Because light rays are bent, the numerical aperture of the lens is more powerful in resolving the image than the magnification. Very powerful magnifying lenses may form terrible images if the NA is poor.) Diamonds are very dense and therefore have a high refractive index. Would a diamond lens be better than glass? (Hint: yes). Why would we use oil on high mag? (Hint: Oil and glass have a similar refractive index – much higher than air. Therefore, the light is essentially unbent as it passes through the glass of the coverslip, oil, and glass of the objective lens). Where does the light go when you don’t use oil on the oil emersion lens? What do you see? Can you resolve anything?
3. Understand what is meant by resolution. (Hint: the ability to define two distinct points of light). As light passes through a wide slit, light is bent minimally, and it is easy to distinguish points whereas if light passes through a narrow slit it is bent severely. Think of your tissue sample as being zillions of slits each of which contributes to the final image formation. Now do you see why the lens has to have a high numerical aperture to collect all this refracted light to form an image that will allow your eyes to resolve points and give you an appreciation of fine detail?)
4. How is final magnification by you microscope determined? (Hint: power of objective lens times power of lens in eyepiece).