Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period\_\_\_\_

**LAB: #1 Use & Care of the Microscope**

**Purpose:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Data & Observations:**

* Make your drawings at the magnification specified for each organism
* USE **COLORED PENCILS**
* Draw a few representative cells of each organism’s **RELATIVE size** compared to the field of view, to enable size comparisons between the different groups of organisms.
* **Then** draw a **“balloon” or area of enlargement** to clearly show shape & color (especially needed for yeast & bacteria)

**FUNGI:**

|  |  |  |
| --- | --- | --- |
| #1 *Aspergillus*  High Dry | #2 *Penicillium*  High Dry | #3 Yeast  Oil |
| Total Magnification: \_\_\_\_\_x | Total Magnification: \_\_\_\_\_x | Total Magnification: \_\_\_\_\_x |

|  |  |
| --- | --- |
| #4 *Rhizopus*  Low | #4 *Rhizopus*  Oil |
| Total Magnification: \_\_\_\_\_x | Total Magnification: \_\_\_\_\_x |

**\*\*\*\*Look at the next fungus, *Rhizopus* Slide #4, under both low and oil objectives to answer the following question:**

* What advantages does the low-power objective have over the oil immersion objective for fungi?

**BACTERIA**

* Bacteria are ALWAYS viewed under Oil Immersion.
* Draw relative to field of view, to allow comparison to Fungi in previous section
* **Then** draw a **“balloon” or area of enlargement** to clearly show **color & morphology & arrangment**
* For ALL slides in the Bacteria Section include the following
  + Gram reaction (GN or GP)
    - NOTE – Gram reaction ONLY applies to bacteria. Gram reaction is based on the amount of peptidoglycan in the cell wall and ONLY bacteria have peptidoglycan.
  + Morphology (Bacillus, Cocci, Spiral)
  + Arrangement - See last page of lab for possible arrangements for the morphology you listed

|  |  |  |
| --- | --- | --- |
| #5 *Spirillum*  Oil |  | #6 *E. coli*  Oil |
| Gram reaction:  Morphology:  Abbreviation for reaction & shape:  Arrangement: |  | Gram reaction:  Morphology:  Abbreviation for reaction & shape:  Arrangement: |

|  |  |  |
| --- | --- | --- |
| #7 GC (*N. gonorrhoeae)*  Oil |  | #8 *Staphylococcus*  Oil |
| Gram reaction:  Morphology:  Abbreviation for reaction & shape:  Arrangement: |  | Gram reaction:  Morphology:  Abbreviation for reaction & shape:  Arrangement: |

**Completion:** Complete the following table with regard to YOUR microscope.

|  |  |  |  |
| --- | --- | --- | --- |
| **Objective** | **Objective**  **Magnification** | **Ocular**  **Magnification** | **Total**  **Magnification** |
| 1. **Scanning** |  |  |  |
| 1. **Low** |  |  |  |
| 1. **High-Dry** |  |  |  |
| 1. **Oil Immersion** |  |  |  |

**List the 3 main morphological groupings of bacteria:**

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. What does it mean when a microscope is parfocal? (See background info)
5. Which objective focuses closest to the slide?
6. What controls the amount of light in the microscope?
7. **Resolution:**
   1. What is the general equation for resolution?
   2. What are 2 ways to improve the resolving power of the microscope? Be specific.
   3. What would occur if water were accidentally used in place of immersion oil? Explain.

**TRUE or FALSE:** Circle the correct response.

|  |  |  |
| --- | --- | --- |
| **T** | **F** | 1. When swinging the oil immersion into position after using the high-dry, one should always lower the stage a little first to avoid damaging the oil immersion lens. |
| **T** | **F** | 1. If two objectives are parfocal, it means that when one is in sharp focus the other will be in approximate focus. |
| **T** | **F** | 1. The size of the microscopic field (area of slide observed) remains constant regardless of the magnification of the objective you are using. |
| **T** | **F** | 1. Magnification seen by your eye (total magnification) equals the magnification of the objective multiplied by the magnification of the ocular. |
| **T** | **F** | 1. It is safe to use Kleenex to clean microscope lenses. |
| **T** | **F** | 1. For a given slide, the diaphragm adjustment and the amount of light required for best clarity will be the same no matter which objective is used. |
| **T** | **F** | 1. Yeast cells are smaller than bacterial cells. (You observed both, how did their size compare?) |

**Multiple Choice:** Select the best answer for the following statements.

1. The most commonly used ocular is:
   1. 5x
   2. 10x
   3. 15x
   4. 20x
2. If the total magnification with a 45x high-dry objective is 224x, what would be the magnification of the ocular?
   1. 5x
   2. 10x
   3. 20x
   4. 180x
3. The resolution of a microscope is enhanced by:
   1. Using a shorter wavelength of light
   2. Decreasing the amount of light with the diaphragm
   3. Using a condenser with a low numerical aperture
   4. Choices a and c

**Matching:** Match the parts of the microscope with their functions.

|  |  |  |
| --- | --- | --- |
| \_\_\_\_\_\_ | 1. Ocular | 1. Adjusted by observer to control the amount of light striking the object 2. Lens that usually magnifies 10x 3. Condenses light waves into a cone, thereby preventing escape of light waves 4. Raised and lowered to bring object into focus 5. Set of 3-4 lenses with differing magnifications 6. Supports the upper portion of the microscope 7. Rotates to change from one objective to another 8. Moves stage up and down rapidly to bring object into quick and approximate focus 9. Allows the slide to be moved, so multiple areas of the slide can be viewed 10. Supports the entire microscope 11. Moves the stage up and down slowly to bring object into sharp focus |
| \_\_\_\_\_\_ | 1. Revolving nosepiece |
| \_\_\_\_\_\_ | 1. Objectives |
| \_\_\_\_\_\_ | 1. Diaphragm |
| \_\_\_\_\_\_ | 1. Condenser |
| \_\_\_\_\_\_ | 1. Stage |
| \_\_\_\_\_\_ | 1. Mechanical Stage |
| \_\_\_\_\_\_ | 1. Base |
| \_\_\_\_\_\_ | 1. Arm |
| \_\_\_\_\_\_ | 1. Coarse adjustment |
| \_\_\_\_\_\_ | 1. Fine adjustment |