STEM Science Notebook

**Diversity of Life**

**Investigation 2**

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| BIG QUESTION: How do scientists use a microscope as an extension of their senses to make accurate observations, study organisms and carry out investigations? |
| **Part 1: Meet the Microscope** |
| **Focus Question: What are the parts of a microscope and how does a scientist handle, use, and observe objects through a microscope?** |
| *(Demonstration of Handling/Setup)* |
| **What I notice:** |
| **Rules:** |
| *(Demonstration of Use)* |
| **What I notice:** |
| **Rules:** |
| *(Demonstration of Cleaning)* |
| **What I notice:** |
| **Rules:** |
| Why is this important? |
| 3 |
| **Focus Question: What materials are used to support the use of a microscope and how do we organize and care for them properly?** |
| **List of Materials** | **Special Instructions/Use** |
| 1. | 1. |
| 2. | 2. |
| 3. | 3. |
| 4. | 4. |
| 5.  | 5.  |
| 6. | 6. |
| 7. | 7. |
| 8. | 8. |
| 9. | 9. |
| 10. | 10. |
| **Label the diagram below using the numbers from above.** **C:\Users\mschaut\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\5VWOFBU6\photo (2).JPG** |
| **Part 2: Using the Microscope** |
| **Focus Question: What is the relationship between the orientation and appearance of an object on the stage, and the orientation and appearance and of the object in the field of view?** |
| Plan: |
| Field of View  |
| Draw what you see. What shape is the field of view? |
| Repeat your plan with a larger letter *e* and draw what you see.* What do you notice?

  |
| **Make a claim about the field of view and orientation** |
| *I claim**I know this because* |
| **Focus Question: What is the relationship between the movement of an object on the stage, and the movement of the object in the field of view?** |
| 1. Set the objective lens to 4x2. Place the dry-mount slide of the letter e on the stage of the microscope.3. Center the image. |
| 4. Move the slide **a*way*** from you.* What direction did the image move?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* Draw an arrow in the circle to indicate the direction the image moved.

 Field of View |
| 5. Move the slide to the ***right***.* What direction did the image move?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* Draw an arrow in the circle to indicate the direction the image moved.

 Field of View |
| **Make a claim about the relationship between the movement of an object on the stage and the movement of the object in the field of view.** |
| *I claim**I know this because* |
| **Focus Question: Is it possible to determine the size of an object using the field of view?** |
| Plan: |
| Data: |
| **Explanation:** |
| Prediction: |
| **Focus Question: How do you calculate the total magnification at 4x, 10x and 40x?** |
| What I Notice: |
| Video Notes – “Wet Mount”\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Field of View and Magnification** |
| The width of one square in the nylon netting material (measured with the millimeter ruler) is\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. |
| Part 1: The 4x objective1. Place the netting and ruler slide on the stage of the

microscope.  2. Select the 4x objective.1. Draw exactly what you see in the field of view.
* What is the width of the field of view?
* What is the width of one mesh square?
* What is the total magnification with this

objective lens? * Mark 1 mm on the scale below the field of view.
 |
| **Part 2: The 10x objective**1. Select the 10x objective.
2. Draw exactly what you see in the field of view.
* What is the width of the field of view?
* Estimate the width of one mesh square to the nearest 0.1 mm.
* What is the total magnification with this

objective lens? * Mark 1 mm on the scale below the field of view.
 |
| Part 3: The 40x objective1. Select the 40x objective.
2. Draw exactly what you see in the field of view.
* What is the width of the field of view?
* Estimate the width of one mesh square to the nearest 0.1 mm.
* What is the total magnification with this

objective lens? * Mark 1 mm on the scale below the field of view.
 |
| Calculations: |
| **Explanation:** |
| **Make a claim about the field of view and size or magnification.** |
|  |
| **Focus Question: What is focal plane?** |
| Elicit: |
| Part 1: Focus on layers of ribbon1. Make a wet mount of three layers of ribbon.
2. Set the objective lens for 100x magnification.
3. Focus on the top layer of ribbon.

Then use the fine focus to focus down through the layers.* How many layers can you get into focus at one time? \_\_\_\_\_\_\_\_\_\_
* Which direction do you turn the right-hand fine focus to focus *down* through the layers?
* Use colored pencils to draw *exactly* what you see when the *middle* layer is in focus.

 **Field of view** |
| What I Notice: |
| *I think focal plane means…**I think this because…* |
| **Explanation:** |
| Part 2: Mystery ribbons1. Make a wet mount of three layers of ribbon. Keep the order a secret. Record the order of the ribbons from TOP to BOTTOM on the lines provided in the box to the left.
2. Trade mystery-ribbon slides with another team.
3. Use your microscope to determine the order of the colored ribbons used to make their mystery-ribbon slide. Record the colors and the order in the box to the right.

 Our Slide Mystery Slide

|  |
| --- |
| **Top** |
| **2** |
| **3** |

|  |
| --- |
| **Top** |
| **2** |
| **3** |

How did you figure out which ribbon was on the bottom? |
|  |
| **Microscope Practice** |
| 1. Observe the color photograph.* Make a dry mount of a piece of colored photo.
* Draw and color what you see.
* Compare the colors with and without the microscope.

Field of View |
| Observations: (focal plane, orientation, field of view, etc.)Magnifcation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ xEstimated size of what you are viewing: |
| 2. Observe the feather.* Prepare a dry mount of the feather. Use a second slide as a coverslip.
* View the feather tip using the 10x objective.
* Draw what you observe.

Field of View |
| Observations: (focal plane, orientation, field of view, etc.)Magnification: \_\_\_\_\_\_\_\_\_\_\_\_\_xEstimated size of what you are viewing: |
| **Word Bank****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  |
| **Content****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |

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| --- | --- |
| **Question** | How do scientists use a microscope as an extension of their senses to make accurate observations, study organisms and carry out investigations? |
| **Claim** |  |
| **Evidence** |  |  |
|  |  |
| **Analysis** |  |
|  | **Claim***A statement or conclusion that answers the original question/problem.* | **Evidence***Sufficient and appropriate scientific data/information and/or personal information or experiences that supports the claim.*  | **Analysis***A justification that connects the evidence to the claim by using appropriate and sufficient scientific principles and vocabulary.* |
| 0 | **Does not make a claim, or makes an inaccurate claim.** | **Does not provide evidence, or only provides inaccurate evidence or vague evidence (i.e. the data shows me it is true)** | **Does not provide an analysis, or only provides an irrelevant analysis.** |
| 1 | **Makes an accurate claim but vague or incomplete claim.** | **Makes a general statement and does not include specific data.** | **Repeats evidence and links it to the claim, but does not include scientific principles and/or vocabulary** |
| 2 | **Makes an accurate and complete claim.** | **Provides 1 piece of evidence to support their claim**  | **Connects evidence to the claim using scientific principles or vocabulary but not both.** |
| 3 | **Claim is exceptionally well done and able to be understood minus the question** | **Provides 2 or more pieces of evidence to support their claim** | **Connects evidence to the claim using scientific principles and vocabulary.** |

**7th Grade Argumentative Writing Rating Scale**

*CCSS.ELA-LITERACY.W.7.1*

*“Write arguments to support claims with clear reasons and relevant evidence.”*

|  |  |
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| **Rating** | **Description** |
| 4 | I can write arguments supported with clear, logical reasons and relevant evidence that creates cohesion and clarifies relationships among claims, reasons, and evidence. |
| 3 | I can write arguments to support claims with clear reasons and relevant evidence. |
| 2 | I can write arguments that partially support claims with reasons and evidence. |
| 1 | I can introduce a claim(s) but am unable to support them with reasons and evidence. |
| 0 | I am **unable** to write arguments and support claims with evidence.  |

**Student self-reflection:**

Date \_\_\_\_\_\_\_\_

My personal rating is a \_\_\_\_\_\_\_ because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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My goal for improvement is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Teacher Comments:**