



Micropipette Mystery!

Version 032026

Based on original activities developed by

[MassBioEd](#)

In this activity, students will each use a 2–20 μL micropipette to reveal a mystery image!

Laboratory Safety


1. Wear lab coats, gloves, and eye protection as required by district protocol.

Materials Required

Set up for 8 workstations, with students working in groups of 3

Item	Quantity needed for 8 workstations
2 - 20 μL micropipette	8
Pipette tips	250
0.65 mL microcentrifuge tubes	24
Bromothymol Blue (0.04% aqueous solution)	3 mL
Water	3 mL
Diluted white vinegar	3 mL
Parfilm® or wax paper, cut	8
Empty pipetting grid	8
Papertowels	8
Waste container	8

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Patents issued: US 10,641,731 B2, US 20110253541 A1, US 11879118-B2, US 12,384,994, US 11,879,117, US 11,879,118

Teacher Preparation

1. Dispense 300 μL of Bromothymol Blue (0.04% aqueous solution) into eight 0.65 mL microcentrifuge tubes. Labels tubes X.
2. Dispense 300 μL of water into eight 0.65 mL microcentrifuge tubes. Labels tubes W.
3. Dilute 1 part white vinegar with water to 9 parts water. Dispense 300 μL of diluted vinegar into eight 0.65 mL microcentrifuge tubes. Labels tubes Y.
4. Print student instructions on page 3-4
5. Print page 5, cut out each empty grid, 1 per workstation
6. Cut Parafilm® or wax paper to cover the empty grid

Student workstations to include:

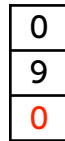
- 1 tube of tube labelled X
- 1 tube of tube labelled W
- 1 tube of tube labelled Y
- 1 20-200 μL pipette
- Pipette tips
- Print out of student instructions
- Print out of the empty grid
- Piece of Parafilm® to place over the empty grid
- Paper towel for clean up
- Container for tip trash

Student Instructions

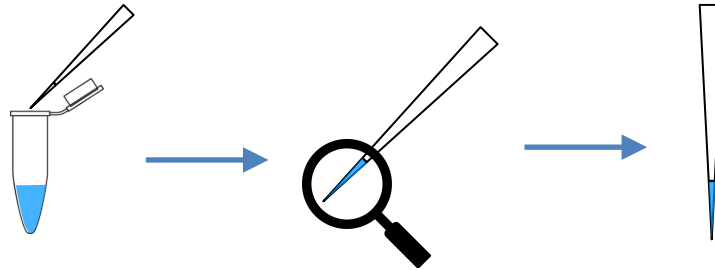
The information in the table is a guide to tell you what liquid and how much of that liquid to use. You will **combine** two liquids to make each drop. Make sure you put the drops in the center of the boxes. Don't forget to change tips!

Table	A	B	C	D	E
1	9 μ L Y	8 μ L Y	7 μ L Y	6 μ L Y	5 μ L Y
	+ 2 μ L X	+ 3 μ L W	+ 4 μ L W	+ 5 μ L W	+ 6 μ L X
2	18 μ L Y	17 μ L Y	16 μ L Y	15 μ L Y	14 μ L Y
	+ 4 μ L W	+ 5 μ L X	+ 6 μ L W	+ 7 μ L X	+ 8 μ L W
3	19 μ L Y	18 μ L Y	17 μ L Y	16 μ L Y	15 μ L Y
	+ 13 μ L W	+ 14 μ L W	+ 15 μ L X	+ 16 μ L W	+ 17 μ L W

1. Place the wax paper over the empty grid. Find box A1 (top left box)
2. Add a tip to the end of the pipette
3. Set your 2-20 μ L pipette to 9 μ L.



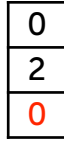
4. Draw up 9 μ L of color dye from tube Y and observe how much is in the tip.



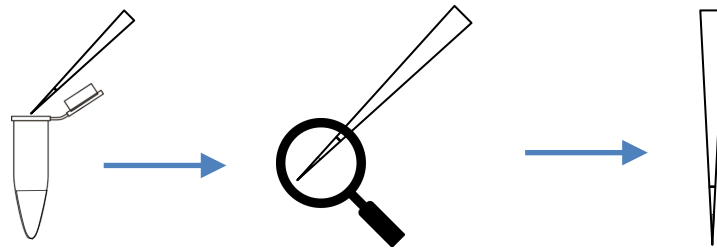
5. Dispense the Sample Y onto your wax paper over box A1.

GRID	A	B	C	D	E
1					
2					
3					

6. Eject your tip into the waste container.
7. Add a new tip to the end of the pipette
8. Set your 2-20 μL pipette to 2 μL .



9. Draw up 2 μL of color dye from tube X and observe how much is in the tip.



10. Dispense the Sample X onto your wax paper over box A1 and mix with Sample Y. What happened to your first drop?

GRID	A	B	C	D	E
1	●				
2					
3					

11. Find B1 on the table with the combinations to mix and dispense on your empty grid in position B1.
12. Continue to use the table with the combinations to dispense samples on to the wax paper over the empty grid.
13. When you have completed the entire grid, you should see a pattern - what pattern do you see?
14. Look carefully at the drops as you go right to left. Are they the same size?
15. Look carefully at the drops as you go top to bottom. Are they the same size?

Print and cut out, 1 per workstation

GRID	A	B	C	D	E
1					
2					
3					

GRID	A	B	C	D	E
1					
2					
3					

GRID	A	B	C	D	E
1					
2					
3					

GRID	A	B	C	D	E
1					
2					
3					

GRID	A	B	C	D	E
1					
2					
3					

GRID	A	B	C	D	E
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GRID	A	B	C	D	E
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GRID	A	B	C	D	E
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