

Teacher Notes for Learning to Use Micropipettes: Making Suncatchers

This is a super fun and easy way to give your students pipetting practice while also helping them to understand what a serial dilution is. Icing on the cake...they get to practice those all-important math skills!

- Make up stock solutions of food coloring and water; red, blue, green and yellow. For a class of 24 students working in pairs, make up about 600 mL of each color and pour into 50 mL falcon tubes. Each class will only use a small portion of the 50 mL, so you can use these sets all day in all your classes, refilling as needed.
- Create a set of five falcon tubes, one of each color including a tube of plain water (no color), for each group of four students. They'll work in pairs for the most part, but having each student create a dilution set to share in a group of 4 helps reduce the quantities used. You don't need to label the falcon tubes...it's obvious what's what! A T.A. can easily do this for you. Here's the ratio that gives a fairly decent dilution set:

10 drops food (500uL) coloring to 50 mL water

You can ramp it up: 6mL food coloring in 600 mL water is enough for 12 sets

If you store them in screw cap falcon tubes you can use them year to year and just refill as needed.

- Each lab group of 2 needs 16 falcon tubes split into two racks so each student has 8. Depending on how many micropipettes you have, they will probably need to share. They'll need 1000uL and 100 or 200uL pipettes and tips to go with. Each student also needs a plastic or glass 10 mL pipette and controller.
- They'll need old 96 well plates. I use old ELISA plates, but any old 96 well plate will do. Don't use new!
- Laminating the coordinate instruction sheets makes it easy to use them year to year.
- I've written this for my class, where all their work goes into their notebook, but you could easily use it as a worksheet by eliminating that part of the instructions.

- There's all kinds of variations on this idea. You can have students create their own designs and make a key for them to use the following year or for extra credit.

Part 1

Coordinate Instructions for A

Red #1 or 2	A2	B1	C1	D2	E3	F4	G5	H6
	A3	B5	C6	D11	E10	F9	G8	H7
	A4	B8	C7					
	A9	B12	C12					
	A10							
	A11							
Red #5 or 6		B2	C2	D3	E4	F5	G6	
		B3	C5	D6	E9	F8	G7	
		B4	C8	D7				
		B9	C11	D10				
		B10						
		B11						
Blue #1 or 2			C3					
			C4					
			C9					
			C10					
Blue #3 or 4				D4				
				D5				
				D8				
				D9				
Blue #5 or 6					E5			
					E6			
					E7			
					E8			
Blue #7 or 8						F6		
						F7		

Coordinate Instructions for B

Blue #1	A1							
	A2							
	A3							
	A4							
	A5							
	A6							
	A7							
	A8							
	A9							
	A10							
	A11							
	A12							
Blue #2		B1						
		B2						
		B3						
		B4						
		B6						
		B8						
		B10						
		B11						
		B12						
Blue #3			C1					
			C2					
			C3					
			C4					
			C5					
			C9					
			C10					
			C11					
			C12					
Blue #4				D1				
				D2				
				D3				
				D4				
				D10				
				D11				
				D12				
Blue #5					E1			
					E2			
					E3			
					E4			
					E5			
					E9			
					E10			
					E11			
					E12			

Blue #6						F1		
						F2		
						F3		
						F4		
						F6		
						F8		
						F10		
						F11		
						F12		
Blue #7							G1	
							G2	
							G3	
							G4	
							G5	
							G9	
							G10	
							G11	
							G12	
Blue #8								H1
								H2
								H3
								H4
								H5
								H6
								H8
								H9
								H10
								H11
								H12
Red # 9		B5		D5		F5		
		B7		D9		F9		
		B9						
Yellow #2				D7				
Red #4			C6	D6	E6			
			C7	D8	E7			
			C8		E8			
Green #8						F7	G7	H7
Green #3							G6	
							G8	

Part 2

Coordinate Instructions for Picture #1

Purple	A5	B4	C3	D3	E3	F3	G4	H5
	A6	B5	C4	D4	E4	F4	G5	H6
	A7	B6	C5	D9	E9	F5	G6	H7
	A8	B7	C8	D10	E10	F8	G7	H8
		B8	C9			F9	G8	
		B9	C10			F10	G9	
Yellow			C6	D5	E5	F6		
			C7	D6	E6	F7		
				D7	E7			
				D8	E8			
Green					E1	F1	G1	H2
					E12	F2	G2	H3
						F11	G3	H4
						F12	G10	H9
							G11	H10
							G12	H11

Coordinate Instructions for Picture #2

Blue	A3	B2	C1	D1	E1	F1	G2	H3
	A4	B3	C2	D2	E2	F2	G3	H4
	A5	B4	C3			F3	G4	H5
Yellow	A6	B7	C8	D6	E8	F8	G7	H6
	A9	B9	C9	D7	E9	F9	G9	H9
	A12	B11	C10	D8	E10	F10	G11	H12
				D9				
				D10				
				D11				
				D12				

Coordinate Instructions for Picture #6

Green			C9					
Purple	A6	B7	C4	D4	E4	F4	G6	
			C7	D6	E7	F7	H6	
Orange	A2	B3	C3	D3	E3	F3	G3	H2
	A5	B6	C5	D5	E5	F5	G7	H5
	A7	B8	C6	D7	E6	F6	G8	H7
		B9	C8	D8	E8	F8		
			C10	D9	E9	F9		
				D10	E10			
				D11				

Coordinate Instructions for Picture #7

Orange	A2	B1	C3					
	A11	B2	C5					
		B11	C6					
		B12	C7					
			C8					
			C10					
Brown								H3
								H9
Red				D4	E3	F3	G4	
				D5	E4	F4	G5	
				D6	E5	F5	G6	
				D7	E6	F6	G7	
				D8	E7	F7	G8	
				D9	E8	F8	G9	
					E9	F9		
					E10	F10		

Coordinate Instructions for Picture #8

Brown					E4	F5	G6	H6
					E6	F6		
					E8	F7		
Green		B5	C4	D3	E3	F4		
		B6	C5	D4	E5	F8		
		B7	C6	D5	E7			
			C7	D6	E9			
			C8	D7				
				D8				
				D9				