Micropipette Challenge

Helping Gee, Roy and Biv with their science lab

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Name:	

Observation

Gee, Roy and Biv are having problems with their science lab. Their teacher has asked them to create a spectrum – but none of them have a clue as to how to make one.

They learned in class that a spectrum is a display of light or other form of radiation separated by properties—most often people think of the electromagnetic spectrum that is the entire range of light. The visible spectrum, the part of the spectrum that we can see with our eyes, is only a small part of the entire electromagnetic spectrum.

Making the spectrum

Gee, Roy and Biv have been given red, blue and yellow solutions, and six test tubes to make their spectrum. The red, blue and yellow solutions will be mixed together in the six test tubes to make the spectrum.

They have also been given a micropipette. A micropipette is an accurate and precise instrument used to measure very small amounts of liquid—frequently millionths of a liter. One millionth of a liter is equal to one microliter, abbreviated 1 µL.

Gee, Roy and Biv will need to use the metric system. Use the following equation to convert microliters (µL) to milliliters (mL) or liters (L):

$$1\ L = 1{,}000\ mL = 1{,}000{,}000\ \mu L$$

Use the directions to help Gee, Roy and Biv by constructing your own spectrum. It is important that you follow the directions, check off each step as you complete it, and use the best pipette technique possible.

Record the volumes you add or remove from each tube in the table.

- ☐ 1. Label the six test tubes at your station, 1 – 6.
- ☐ 2. Put 1,900 µL of red liquid into test tube number 1. Write how much you add or remove from any test tube in the table. The amount is already written in the table for you.
- ☐ 3. Put 2,200 µL of yellow liquid into test tube number 3. **Write it down!**
- ☐ 4. Put 2,500 µL of blue liquid into test tube number 5. **Write it down!**
- ☐ 5. Take 400 µL from test tube number 1 and put it into test tube number 2. The amount is already written in the table for you.
- ☐ 6. Take 400 µL from test tube number 1 and put it into test tube number 6. **Write it down!**
- ☐ 7. Take 400 µL from test tube number 3 and put it into test tube number 4. **Write it down!**
- ☐ 8. Take 700 µL from test tube number 3 and put it into test tube number 2. **Write it down!**
- ☐ 9. Take 700 µL from test tube number 5 and put it into test tube number 4. **Write it down!**
- ☐ 10. Take 700 µL from test tube number 5 and put it into test tube number 6. **Write it down!**
- ☐ 11. Use your data table to find the total volume in each tube and record your answer in the table. Use the conversion factor to convert your units from microliters (µL) to milliliters (mL).

.001 L = 1 mL = 1,000 µL

Test Tube Number	Volume added or subtracted (µL)	Volume added or subtracted (µL)	Volume added or subtracted (µL)	Total Volume in microliters (µL)	Total volume in milliliters (mL)	Color of liquid in tube
Tube 1	+1900	-400				
Tube 2	+400					
Tube 3						
Tube 4						
Tube 5						
Tube 6						

- ☐ 12. Compare the amount of liquid in your tubes with another group's tubes. Is it the same or different? If the amounts are different, try to figure out why. Watch each other pipette and check each other's technique. Ask an instructor for help if you have questions about using the micropipette properly.