



Taking Precise Measurements Lab

Teacher's Key

Lab Preparation:

Prepare red, yellow, and blue stock solutions by adding food coloring to water. Each lab pair should have:

- 2 beakers (250mL)
- 6 test tubes
- Test tube rack
- 1 graduated cylinder (100mL)
- Masking tape
- 1 permanent marker

Each lab table should have:

- Enough red, yellow, and blue stock solutions for each lab pair to have 50 mL of each.



Introduction:

When taking measurements, it is very important to be precise. This lab will test your precision skills as you transfer colored liquids between test tubes.

Objectives:

1. Develop skills measuring liquids with a graduated cylinder.
2. Practice using the metric system.
3. Test precision and ability to follow directions.
4. Practice lab safety guidelines.

Student Materials:

- 2 beakers (250mL)
- 6 test tubes
- Test tube rack
- 1 graduated cylinder (100mL)
- Masking tape
- 1 permanent marker

Set up:

1. Use the masking tape and permanent marker to label the 6 test tubes in order: A, B, C, D, E, and F.
2. Fill one of the 250 mL beakers with water.
3. Set aside the second 250 mL beaker for contaminated waste water.
4. Using the graduated cylinder, measure 25 mL of **RED** liquid into test tube A. Use the water set aside in the first 250 mL beaker to rinse the graduated cylinder.
5. Using the graduated cylinder, measure 17mL of **YELLOW** liquid into test tube C. Use the water set aside in the first 250 mL beaker to rinse the graduated cylinder.
6. Using the graduated cylinder, measure 21 mL of **BLUE** liquid into test tube E. Use the water set aside in the first 250 mL beaker to rinse the graduated cylinder.

Procedure:

1. From test tube C, measure 4 mL into the graduated cylinder and pour into test tube D. Use the water set aside in the first 250 mL beaker to rinse the graduated cylinder.
2. From test tube E, measure 7 mL into the graduated cylinder and pour into test tube D. Swirl. Use the water set aside in the first 250 mL beaker to rinse the graduated cylinder.
3. From test tube E, measure 4mL into the graduated cylinder and pour into test tube F. Use the water set aside in the first 250 mL beaker to rinse the graduated cylinder.
4. From test tube A, measure 7mL into the graduated cylinder and pour into test tube F. Swirl. Use the water set aside in the first 250 mL beaker to rinse the graduated cylinder.
5. From test tube A, measure 8 mL into the graduated cylinder and out into test B. Use the water set aside in the first 250 mL beaker to rinse the graduated cylinder.
6. From test tube C, measure 3 mL into the graduated cylinder and pour into test tube B. Swirl. Use the water set aside in the first 250 mL beaker to rinse the graduated cylinder.
7. **SAVE** your results. **Measure** the contents of each test tube and record how many mL were found in each test tube.
8. Answer the questions.

Student chart data may vary.

Test Tube	Color of Liquid	Amount of Liquid mL
A	red	10
B	orange	11
C	yellow	10
D	green	11
E	blue	10
F	purple	11
Total Liquid Test Tubes A – F		63 mL

Analysis Questions:

1. Name the colors that you created: **orange, green, and purple**

2. How many ml of liquid were in the test tubes at the beginning of this lab?

A: **25**

C: **17**

F: **21**

3. Why is it important to follow directions exactly?

The student should note that imprecision could result in bodily harm and unsafe conditions.

4. Look at your hands. Do you have any stains on them? If so, those stains represent chemicals that would be on your skin right now! **Answers will vary**

5. How many total mL of liquid did you have at the end of your lab? **Answers will vary**

How many should you have had? **Answers will vary**

6. If you gained or lost mL in your final measurements, why do you think that happened? **If the student's final measurements differ, they should note that their measurements throughout the lab were imprecise.**