

Lab Members: ¹ _____; ² _____**Purpose:** Practice measuring with significant figures, calculating with significant figures, and calculating percent error with real data. Explore the terms of accuracy and precision using real data.**Materials:**

Meter stick, dart board, ruler, and markers.

Procedure:

1. Place the paper dartboard flat on the floor.
2. Stand 30 cm away from the edge of the board with marker in hand.
3. Have one of the group members measure 1 meter above the dartboard and hold a ruler horizontally at this height.
4. You must hold the dart at the height of the ruler and aim for the center of the dartboard.
5. Drop the dart—**Do not throw the dart.**
6. Use a ruler to measure the distance from where the dart landed to the center of the bull's-eye. * **Remember sig figs!!!!**
7. Record this value in the second column of the data table below.
8. Repeat 4 more times
9. Repeat this process for each group member.
10. Then, add the measured distance to the value of the bulls eye, 10.00. **~use sig figs**
11. Record the TOTAL distance in the third column of the data table.
12. Calculate the average total distance from the center for each student **~use sig figs**
13. Record the averages in the data table below.
14. Calculate the group average and record in data table. **~use sig figs**

Trial #	Measured Distance from center (cm)	Total Distance from Bulls Eye (10.00 cm plus the measured distance)
1		
2		
3		
4		
5		
Your Average		
Lab Partner Average		
Lab Partner Average		
Group Average		

Post-Lab Questions:

1. What does **precise** mean? Draw a dartboard to explain.

2. What does **accurate** mean? Draw a dart board to explain.

3. Were your results precise? Were they accurate? Explain.

4. The accepted value is 15.63 g. Analyze the data below, was the student accurate, precise, neither, or both. Explain.

Trial	Measurement
1	12.84 g
2	13.02 g
3	12.96 g

5. A student measures the mass of a piece of copper three times and records the results in the data table: The actual mass of the copper is 28.7 grams. Analyze the data as being accurate, precise, neither, or both. Explain.

Trial	Mass (grams)
1	26.5
2	26.4
3	26.5

6. Analyze the table and determine which student reported the more precise data. Explain.

Trial	Student A Data (Mass in grams)	Student B Data (Mass in grams)
1	5.43	5.43
2	5.45	5.47
3	5.44	5.50
4	5.43	5.53

7. What is the formula for % error:

8. Determine the % error for your average. The accepted value is bull eye value of 10.00 cm. **Show your work.**

9. Determine the % error for your group average. The accepted value is bull eye value of 10.00 cm. **Show your work.**