Names: _____

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Datum Sheet for Laboratory 1
Scientific Calculations and Basic Lab Techniques

II.   Basic Laboratory Techniques (8 points total)

A.   Measuring Mass or Weight

Give the mean, variance, and standard deviation of the 10 seeds of each type which you weighed (0.5 points each, 3 points total).

seed type	mean	variance	standard deviation
pinto beans	_____	_____	_____
_____	_____	_____	_____

Use Excel to make a Bar Graph that summarizes the results shown above. **Attach a copy of your graph to this datum sheet.** (2 points)

B.   Measuring Volumes

Give the mean, variance, and standard deviation of each of the following volume measurements (0.5 points each, 5 points total).

device	volume	mean	variance	standard deviation
10 ml pipet	6.7 ml	_____	_____	_____
P-1000	460 µl	_____	_____	_____
P-100	_____	_____	_____	_____

Additional Practice Problems (20 points total; 1 point each unless otherwise indicated).
SHOW ALL OF THE STEPS IN EACH OF YOUR CALCULATIONS.

      A.   **Conversion of Units**

1.   How many µl are there in 6.7 ml? *(0.5 points)*

2.   How many ml are there in 12,678 µl? *(0.5 points)*

3.   How many µg are there in 3.56 g? *(0.5 points)*

4.   How many mg are there in 4.89 ng? *(0.5 points)*

5.   How many m are there in 3.5×10^5 mm?

6.   How many nm are there in 0.065 mm?

7.   How many kg are there in 3.5 pounds of oranges?

8.   How tall is a person (in feet and inches) who is 76 cm tall?

B.   Preparation of Solutions

9.   How many g of NaCl (FW = 58.44) is needed to make 2.5 L of a 0.4 M solution?

10.   150 g of NaCl (FW – 58.44) was dissolved in a total volume of 500 mL. What is the concentration in moles/l?

11.   A total of 100 mmoles of NaOH was added to 400 mL of a solution. What was the molarity of the solution?

12.   How many g of H_2SO_4 does 600 ml of a 1.2 M solution of H_2SO_4 contain?

13.   How much of a 10% (w/v) of NaCl can be made using 30 g of NaCl?

14.   How many g of glucose will be required to make 750 ml of a 0.5% (w/v) solution?

15.   A solution contains 15 ml of liquid ethanol in a total volume of 250 ml. What is the percent (v/v) of ethanol?

16.   What is the molarity of a 1.5% NaCl solution?

C.   Making Dilutions

17.   Suppose 500 ml of urine is diluted with 1250 ml of water. What is the dilution factor?

18.   If 150 μl of a solution of serum is added to 90 μl of water, what is the dilution factor?

19.   Suppose a sample of 200 μl of blood needs to be diluted 1/50. How much diluent should be added and what will be the final volume?

20.   Suppose that a sample of urine is diluted 1/2, 1/3, and then 1/4. What is the final dilution factor?

21   Suppose that a sample of red blood cells at a concentration of 2.69×10^6 cells/ml is serially diluted 1/10 three times and then serially diluted 1/2 two times. What is the final concentration of cells/ml?

22.   A sample of yeast cells was serially diluted 1/10 five times and then serially diluted 1/3. The number of yeasts was 338 yeasts per ml. What was the original concentration?