# Measure a Bean Lab!!!! (50 points)

OBJECTIVE:

The purpose of this lab is for you to become familiar with the _____ and _____

of the laboratory equipment.

All measurements should be placed on the _____ on _____.

DAY ONE MATERIALS PER GROUP:

1. Five beans in a paper cup

2. One sharpie marker

3. One classroom ruler

4. One beaker of water

5. One graduated cylinder

6. One paper towel

7. One electronic balance (shared among the entire class)

DAY ONE PROCEDURE:

1. Number 5 beans 1-5 with a sharpie.

2. Measure the length and width of **each bean in mm** with a metric ruler.

3. Use beaker to fill a graduated cylinder to the 10 mL mark

4. Add **all 5 beans** to the graduated cylinder. To determine the volume of the beans, see how many mL the water raised. Don't forget to subtract the 10 mL you started with!

5. Dry your beans with a paper towel. Record the mass of **all 5 beans** using an electronic balance.

6. Write your team name on the cup with a sharpie, place **all five beans** in the cup, and fill it with 50 mL of water.

7. Place your cup of beans and water on the back table.

8. Return your lab equipment where you got it and clean up your area.

9. Work on the day one lab questions.

DAY ONE QUESTIONS (2 points each):

1. Describe the difference between a beaker and a graduated cylinder.



2. A "unit" is a term that describes quantity. What are the units for mass and volume? Be sure to include units on your data table!



3. Examine your ruler. How many millimeters are in a centimeter? _____



4. If a bean measured 2 cm long, how many millimeters is it long? _____



5. Describe the difference between mass and volume.



6. What three tools used to measure volume?



7. If a beaker is filled with 200 mL of water and a goldfish is added, the water level rises to 240 mL. What is the goldfish's volume? Show your work.



8. If a beaker is filed with 400 mL of water and a tennis ball is added, the water level rises to 620 mL. What is the volume of the tennis ball? Show your work.

DAY TWO MATERIALS:

1. Your original five beans in a paper cup of water

2. One classroom ruler

3. One beaker of water

4. One graduated cylinder

5. One paper towel

8. One electronic balance (shared among the entire class)


DAY TWO PROCEDURE:

1. Remove the beans from the water and dry them off with a paper towel.

2. Measure the length and width of **each bean in mm** with a metric ruler.

3. Use beaker to fill a graduated cylinder to the 10 mL mark

4. Add **all 5 beans** to the graduated cylinder. To determine the volume of the beans, see how many mL the water raised. Don't forget to subtract the 10 mL you started with!

5. Dry your beans with a paper towel. Record the mass of **all 5 beans** using an electronic balance.

6. Discard your beans and paper cup in the trash

7. Return your lab equipment where you got it (**except ruler, beaker, and graduated cylinder!!!!**) and clean up your area.

8. Work on the day two lab questions.

DATA TABLES (20 points, 10 points each)

| | DAY ONE | | DAY TWO | |
|---|---|---|---|---|
| Bean # | Width (mm) | Length (mm) | Width (mm) | Length (mm) |
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| Mean | | | | |
| | | | | |
| Volume of all 5 beans (mL) | | | | |
| Mass of all 5 beans (g) | | | | |

DAY TWO QUESTIONS (2 points each):

1. What was the change in the **_mean_** length of the beans after soaking? Circle your answer below.


Increase                    Decrease                    Stay the same


2. What was the change in the mass of the beans after soaking? Circle your answer below.


Increase                    Decrease                    Stay the same


3. What was the change in the volume of the beans after soaking? Circle your answer below.


Increase                    Decrease                    Stay the same

4. What do you think made the beans change like they did?




5. Obtain the following items from the back table: 1 paper clip, 1 rock, and a penny. Perform the necessary procedure to obtain the following dimensions: mass (g), volume (mL), length (mm), and width (mm). Record your data in the table below (6 points):

| Item | Mass (g) | Volume (mL) | Length (mm) | Width (mm) |
|---|---|---|---|---|
| Paper clip | | | | |
| Rock | | | | |
| Penny | | | | |

# RETURN RULER AND GRADUATED CYLINDER WHERE YOU GOT THEM!!!!!