**CHEMISTRY – UNIT #1 – LAB ACTIVITY**

**Measurement**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_ Lab Partner(s): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

When you record a measurement, you record all the digits you can read directly from the measuring device PLUS 1 digit that you estimate. **(**0 right on the line, 2 just above the line, 4 almost halfway, 6 a little more than halfway, 8 nearly to the next line.)

1. **Measuring Length –** Measure the width of the paper container on your table using a “10 cm ruler”, a “1 cm ruler” and a regular ruler or meter stick. **(Hint: If the ruler has a mark for every 10 cm, you estimate the ones. Your value should read something like 31 cm. If the ruler has a mark for every cm, you estimate the tenth. Your value should read something like this: 24.7 cm. If the ruler has a mark for every tenth of a cm, you estimate the hundredth. Your value should read something like this: 53.85 cm.)**

1. “10 cm ruler” : \_\_\_\_\_\_\_\_ “1 cm ruler”: \_\_\_\_\_\_\_\_\_\_\_\_ 12” ruler or Meter stick: \_\_\_\_\_\_\_\_\_\_\_\_\_

2. Use the 12 inch ruler or meter stick to measure the length and width (in cm) of a file card.

Length: \_\_\_\_\_\_\_\_\_\_\_\_ Width: \_\_\_\_\_\_\_\_\_\_\_\_

1. **Measuring Mass** – Measure the mass of a “large paper binder”, a crucible with lid, and a 50 mL beaker using as many methods as you can below. . **(Hint: Zero the electronic balance before you begin. For the triple beam balance, record the reading when the “large paper binder” is off and the pointer is level. Place the binder on the pan, and take a second reading. The mass of the binder is the difference in these two readings. If the spring balance doesn’t read zero when hanging, adjust with nut at top.)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Spring Balance** | **Triple Beam Balance** | **Electronic Balance** |
| **50 mL beaker** |  |  |  |
| **Crucible and lid** |  |  |  |
| **Binder** |  |  |  |

1. **Measuring Liquid Volume** – Record the volume of water in each of the graduated cylinders. (**Hint 1: If the graduated cylinder has marks for each whole mL, your measurement should read to the tenth of a mL, such as 48.2 mL. That means the bottom of the meniscus was between 48 and 49 mL and just a bit above the 48 mark. You are estimating that it is just a little more than 48 mL.)(Hint 2: If the graduated cylinder has marks for every half of a mL, your measurement should also read to the tenth of a mL. The estimated digits are then 0 right on the unit line, 1 just above the unit line, 2 almost halfway to half line, 3 a little more than halfway to half line, 4 just below the half line, 5 on the half line, 6 just above the half line, 7 almost halfway to unit line, 8 a little more than halfway to unit line, 9 just below the unit line.)**
2. Fill a 50 ml beaker with ~20 mL of water. Then pour this water into a 25 mL graduated cylinder and measure the actual volume of water. 25 mL cylinder = \_\_\_\_\_\_\_\_\_\_\_\_
3. Fill a 150 mL beaker with ~80 mL of water. Then pour this water into a 100 mL graduated cylinder and measure the actual volume of water. 100 mL cylinder = \_\_\_\_\_\_\_\_\_\_\_\_
4. Should you use beakers or graduated cylinders to measure volume? Explain. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Record the volumes of the colored solutions as accurately as possible. **(Hint: Eye level, bottom of meniscus, estimate *between* gradations.)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Liquid 1** | **Liquid 2** | **Liquid 3** | **Liquid 4** |
| **Color** |  |  |  |  |
| **Glassware**  **e.g 300 mL Beaker** |  |  |  |  |
| **Measurement** |  |  |  |  |

1. **Measuring Volume of an Irregular Solid Object.**
2. Use your ruler to determine the volume of a piece of wood with a hole through it. **(Hint: the volume of a block is V = length \* width\* height. And the volume of a cylinder is π \* radius2 \* height. Remember to pay attention to significant figures when doing calculations with a measured quantity.)**

Length: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Volume of Block: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Width: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Volume of Hole: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Height: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Volume of Wood: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Diameter of Hole: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. **Finding volume by water displacement:** Find the volume of a bean by measuring the volume of a sample of water before and after submerging a number of beans to create a change in the water level. Add the beans one at a time and count them as you do. **(Remember to pay attention to significant figures when doing calculations.)**

a) Initial level of water: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ d) Volume of N beans: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) Number of beans submerged: \_\_\_\_\_\_\_\_\_\_ e) Volume of one bean: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

c) Final level of water: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_