

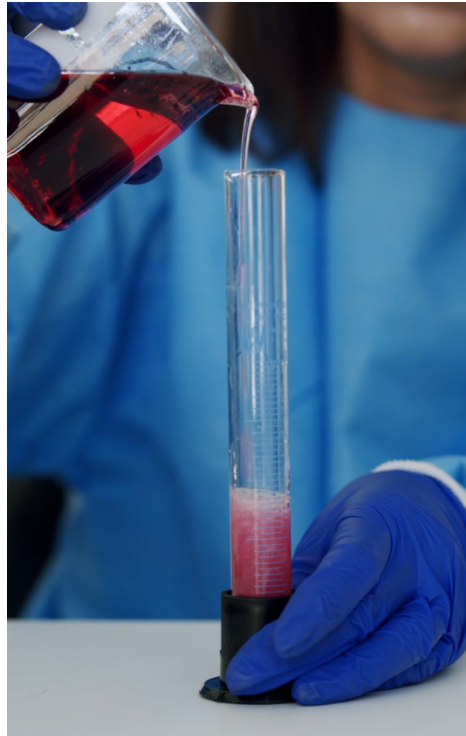
Lab Procedures

Laboratory Activity – Teacher Edition

Equipment Measurement Lab

Background Information:

There are many skills that scientists use in order to investigate the world around them. For instance, scientists make observations by gathering information with their senses such as figuring out the color using the eyes or recognizing the texture of an object using the sense of touch. However, if a scientist needs more information about the substance, a measurement has to be taken. Measurement is perhaps one of the most fundamental concepts in science. Without the ability to measure, it would be difficult for scientists to conduct experiments or form theories. Not only is measurement important in science and the chemical industry, it is also essential in farming, engineering, construction, manufacturing, commerce, and numerous other occupations and activities.



Measurements require tools and provide scientists with a quantity. A quantity describes how much of something there is or how many there are. A good example of measurement is using a ruler to find the length of an object. The object is whatever you are measuring, the property you are trying to determine is the object's length, and the standard you are comparing the object's length to is the ruler. In this laboratory activity, you will explore different laboratory measuring tools in order to gain proficiency.

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Laboratory Activity – Teacher Edition

Learning Objectives:

At the end of this laboratory activity, students are expected to:

- Be familiar with the use of graduated cylinder, metric ruler, and triple beam balance scale.
- Measure physical quantities such as length, volume, and mass using different lab equipment.
- Describe the process of measuring the length, volume, and mass of an object.

Pre-lab Questions:

1. Identify the physical quantity being measured by each measuring tool.

- a. beaker – _____
- b. thermometer – _____
- c. stopwatch – _____
- d. platform balance – _____
- e. spring scale – _____

2. Encircle the **most** appropriate unit that can be used to express the following measurements.

- a. distance between cities mm cm m km
- b. thickness of notebook cm m mi km
- c. mass of small amounts of powder mg g kg lb
- d. volume of blood sample qt gal mL L
- e. mass of barrel of grains mg g oz tn

Laboratory Proper:

Materials:

- metric ruler – 30 cm
- triple beam balance scale
- small plastic cup
- graduated cylinder
- salt (NaCl)
- spoon
- sheet of paper

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Laboratory Activity – Teacher Edition

Note: Work with your groupmates in doing this activity. Make sure to take turns in exploring the use of each measuring equipment in this activity.

Procedure:

- Using the metric side of the ruler, measure to the nearest **mm** the length and height of this laboratory activity sheet. Based on the length and height that you got, determine the width of this sheet of paper. Record all measurements in Table 1.
- Look around the classroom and get any rectangular object. Use the metric side of the ruler to measure its length, width, and height in **cm**. Record all measurements in Table 1.
- Using a triple beam balance, measure the mass of the plastic cup provided by your teacher in **g**. Then, fill half of it with water and measure its mass again. Determine the mass of the water based on the measurements you got. Record all measurements in Table 2.
- Get a sheet of paper and fold it into half. Weigh the paper using the triple beam balance.
- Add 5 grams of table salt (NaCl) on the sheet of paper placed on top of the triple beam balance. Make sure to consider the weight of the sheet of paper as you measure the table salt.
- Get a graduated cylinder and fill it with water up to a certain amount. Measure the volume occupied by the water you placed in the graduated cylinder in **mL**. Repeat this step three times and get the average of the volume of water you added in the graduated cylinder. Record all the measurements in Table 3.

Observations:

Table 1: Measuring Length, Width, and Height in mm.

Object	Length	Width	Height
Laboratory activity sheet			
Any rectangular object			

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Table 2: Measuring mass of an object in g.

Object	Mass
Plastic cup	
Plastic cup with water	
Water only	
Sheet of paper	
Sheet of paper with 5 grams of salt	
Salt only	

Table 3: Measuring volume of water in mL.

Trial 1	Trial 2	Trial 3	Average Volume

Post-lab Questions:

1. Describe your procedure in measuring the width of paper.

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2. How did you figure the mass of water?

3. Why is it necessary to measure the salt on a piece of paper and not directly on the stage of the triple beam balance?

4. What are some important considerations that you have learned in using different measuring equipment?

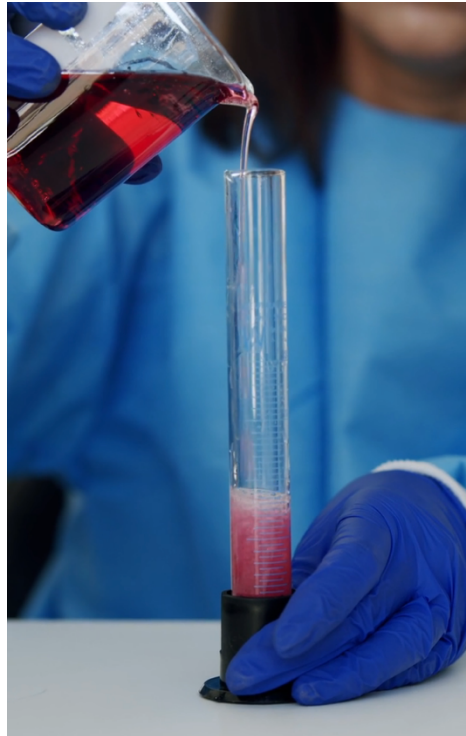
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1. Identify the physical quantity being measured by each measuring tool.

- a. beaker – volume
- b. thermometer – temperature
- c. stopwatch – time
- d. platform balance – mass
- e. spring scale – mass and weight

2. Encircle the **most** appropriate unit that can be used to express the following measurements.

- | | | | | |
|------------------------------------|----|-----|----|----|
| a. distance between cities | mm | cm | m | km |
| b. thickness of notebook | cm | m | mi | km |
| c. mass of small amounts of powder | mg | g | kg | lb |
| d. volume of blood sample | qt | gal | mL | L |
| e. mass of barrel of grains | mg | g | oz | tn |

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Observations:

Table 1: Measuring Length, Width, and Height in mm.

Object	Length	Width	Height
Laboratory activity sheet	Answer may vary	Answer may vary	Answer may vary
Any rectangular object	Answer may vary	Answer may vary	Answer may vary

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Table 2: Measuring mass of an object in g.

Object	Mass
Plastic cup	Answer may vary
Plastic cup with water	Answer may vary
Water only	Answer may vary
Sheet of paper	Answer may vary
Sheet of paper with 5 grams of salt	Weight of the paper + 5 grams
Salt only	5 grams

Table 3: Measuring volume of water in mL.

Trial 1	Trial 2	Trial 3	Average Volume
Answer may vary	Answer may vary	Answer may vary	Answer may vary

Post-lab Questions:

- Describe your procedure in measuring the width of paper.

Answers may vary. Possible answer is fold the paper into a square to get its volume, then multiply the obtained length and height. Divide the volume of the sheet of paper by the product of the length and height to get the width.

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2. How did you figure the mass of water?

By subtracting the mass of cup from the mass of cup with water.

3. Why is it necessary to measure the salt on a piece of paper and not directly on the stage of the triple beam balance?

So that it is easier to transfer the salt to another container and the stage of the triple beam balance will not be messy.

4. What are some important considerations that you have learned in using different measuring equipment?

Answers here may vary