**Lab Equipment and Measurement**

EQUIPMENT IDENTIFICATION AND USE

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| **Equipment** | **Name** | **Purpose** |
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| **Equipment** | **Name** | **Purpose** |
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EQUIPMENT QUESTIONS

1. What does a balance measure?

2. List three (3) pieces of lab equipment designed to measure volume.

a.

b.

c.

3. What does a thermometer measure?

4. Which piece of laboratory equipment should you use for the following tasks?

a. Heating water without using an open flame \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

b. Measuring exactly 43 mL of water \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

c. Weighing out 120 grams of sodium chloride \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

d. Protecting your eyes from chemicals, flying objects, etc. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

e. Holding a beaker full of hot liquid \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

f. Pouring liquid into containers with small openings \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

g. Measuring out very small amounts of liquid \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

h. Holding a test tube \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

j. Hold several test tubes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

LAB SAFTEY

Rule #1:



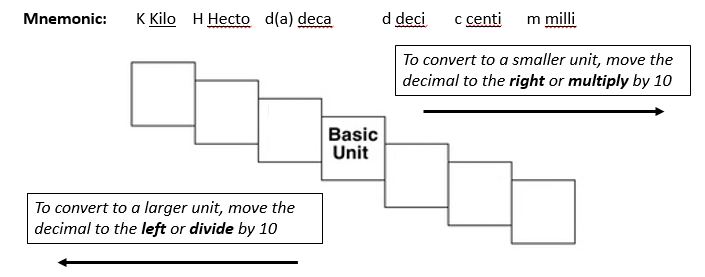
Rule #2:

Rule #3:

METRIC MEASUREMENT AND CONVERSIONS

The beauty of the metric system is that it’s based on the number \_\_\_\_\_\_\_\_\_.

Unit conversions using the stair-step method: Fill in the boxes for the stair-step diagram.

**Mnemonic:** K\_\_\_\_\_\_\_\_ H\_\_\_\_\_\_\_ d(a)\_\_\_\_\_\_\_ d\_\_\_\_\_\_\_\_ c\_\_\_\_\_\_\_\_\_ m\_\_\_\_\_\_\_\_\_

Example:

4 km = \_\_\_\_\_\_\_\_\_\_\_\_m

How many “jumps” does it take?

4.\_\_\_\_\_.\_\_\_\_\_\_.\_\_\_\_\_\_. = 4000m

How to use the stair-step method:

1. Determine your starting point
2. Count the “jumps” to your ending point
3. Move the decimal the same number of “jumps” in the same direction

TRY THESE CONVERSIONS USING THE STAIR-STEP METHOD:

1000 mg = \_\_\_\_\_\_\_\_\_\_\_ g 1 L = \_\_\_\_\_\_\_\_\_\_ mL 160 cm = \_\_\_\_\_\_\_\_\_\_\_\_ mm

14 km = \_\_\_\_\_\_\_\_\_\_\_ m 109 g = \_\_\_\_\_\_\_\_ kg 250 m = \_\_\_\_\_\_\_\_\_\_\_\_ km

COMPARE THE FOLLOWING USING <, >, or =:

**HINT! Convert one of the values to the same units as the other value *before* comparing!!!**

56 cg \_\_\_\_\_\_ 6 g 36 dm \_\_\_\_\_\_\_ 3.6 cm 5 km \_\_\_\_\_\_ 508 m

1500 mL \_\_\_\_\_\_ 15 L 7 g \_\_\_\_\_\_ 698 mg 63 cm \_\_\_\_\_\_ 6 m

LENGTH

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the measurement of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - how far one thing is from another.

The metric base unit for length is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_\_\_).

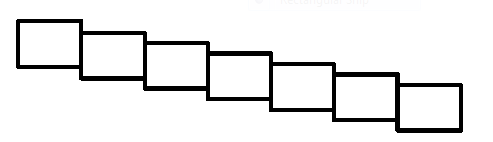
WRITE THE CORRECT ABBREVIATION FOR EACH METRIC UNIT OF LENGTH:

1. Kilometer \_\_\_\_\_\_ 5. Dekameter \_\_\_\_\_\_

2. Meter \_\_\_\_\_\_ 6. Centimeter \_\_\_\_\_\_

3. Milimeter \_\_\_\_\_\_ 7. Hectometer \_\_\_\_\_\_

4. Decimeter \_\_\_\_\_\_

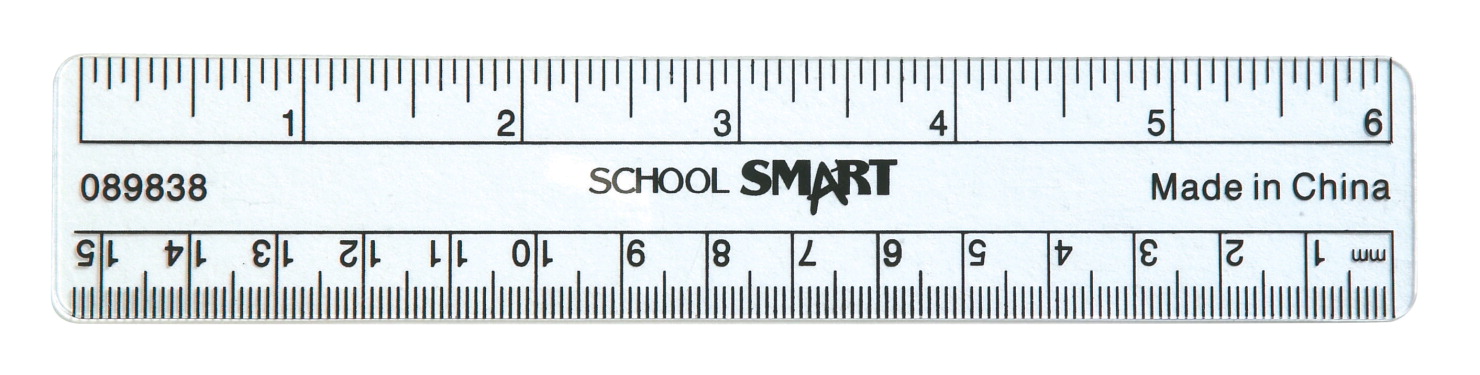
FILL IN THE STAIR-STEPS FOR LENGTH:

WHAT DOES EACH UNIT REPRESENT?

1. mm = 4. km = 7. hm =

2. cm = 5. dm =

3. m = 6. dam =



HOW MUCH DO EACH OF THESE EQUAL?

1) 1 m = \_\_\_\_\_\_\_\_\_ cm 2) 1 cm = \_\_\_\_\_\_\_\_\_ mm 3) 1 km = \_\_\_\_\_\_\_\_\_ m

WHICH MEASUREMENT IS THE LARGEST? CIRCLE YOUR ANSWER FOR EACH PAIR.

1) 14 mm or 1 cm 4) 145 m or 145 km

**HINT! Convert one of the values to the same units as the other value *before* comparing!!!**

2) 334 m or 1 km 5) 30 mm or 3.4 cm

3) 1 m or 990 cm 6) 10 km or 1000 cm

VOLUME

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the measurement of the space an object takes up.

The metric base unit for volume is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_\_\_\_).

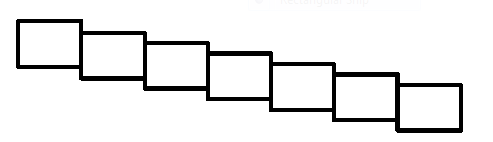
WRITE THE CORRECT ABBREVIATION FOR EACH METRIC UNIT OF VOLUME:

1. Kiloliter \_\_\_\_\_\_ 5. Dekaliter \_\_\_\_\_\_

2. Liter \_\_\_\_\_\_ 6. Centiliter \_\_\_\_\_\_

3. Milliliter \_\_\_\_\_\_ 7. Hectoliter \_\_\_\_\_\_

4. Deciliter \_\_\_\_\_\_

FILL IN THE STAIR-STEPS FOR VOLUME:

WHAT DOES EACH UNIT REPRESENT?

1. mL = 4. kL = 7. hL =

2. cL = 5. dL =

3. L = 6. daL =

HOW MUCH DO EACH OF THESE EQUAL?

1) 1L = \_\_\_\_\_\_\_\_\_ cL 2) 1 cL = \_\_\_\_\_\_\_\_\_ mL 3) 1 kL = \_\_\_\_\_\_\_\_\_ L

WHICH MEASUREMENT IS THE LARGEST? CIRCLE YOUR ANSWER FOR EACH PAIR.

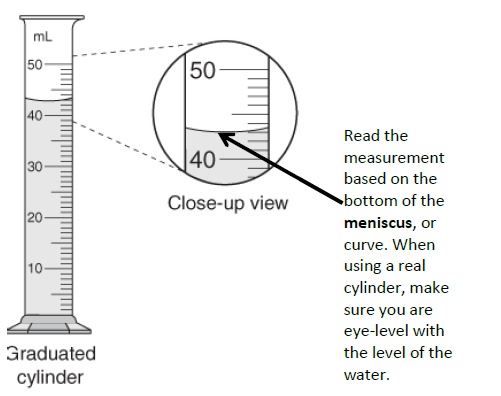
1) 14 mL or 16 cL 4) 148 L or 148 kL

**HINT! Convert one of the values to the same units as the other value *before* comparing!!!**

2) 26 L or 17 kL 5) 300 mL or 3.4 cL

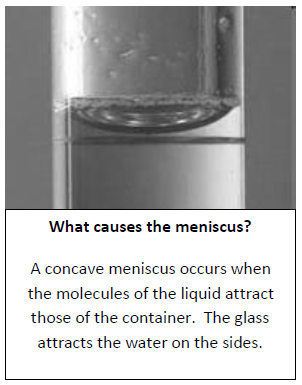
3) 11 L or 1000 cL 6) 1000 kL or 10 cL

HOW TO READ MEASURMENTS OF VOLUME ON A GRADUATED CYLINDER:



Read the measurement based on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, or curve.

To get an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ measurement, make sure you are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with the level of the water.

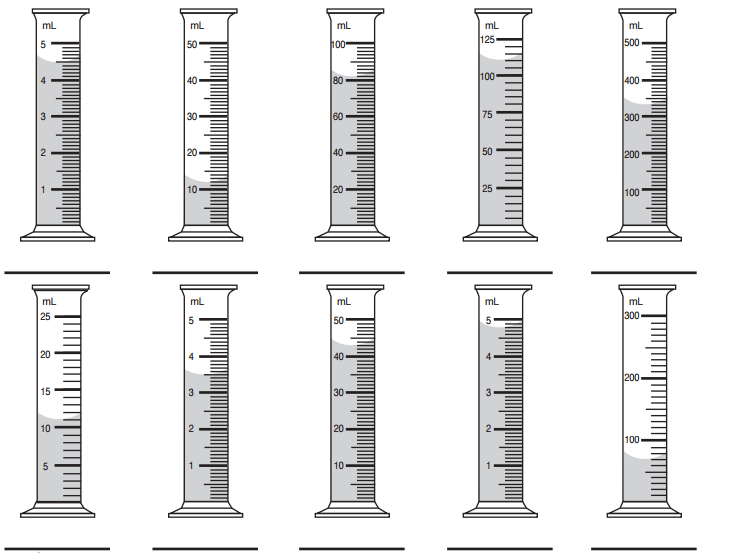


**What causes the meniscus?**

A concave meniscus occurs when the molecules of the liquid \_\_\_\_\_\_\_\_\_\_\_\_\_\_the molecules of the container.

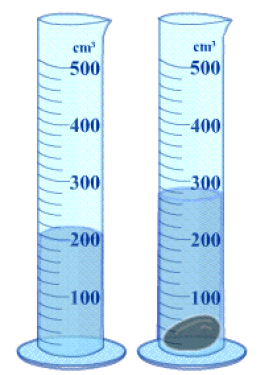
The\_\_\_\_\_\_\_\_\_\_\_\_\_ attracts the water on the sides.

This is due to a property of water called\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

READ THE MENISCUS IN THE FOLLOWING EXAMPLES AND WRITE YOUR MEASUREMENTS BELOW:

MEASURING THE VOLUME OF A SOLID IRREGULAR OBJECT:

We can measure the volume of an irregular object using \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.



(amount of H2O with object)

(amount of H2O without object)

(difference = volume)

The measure of how much the water raises equals the

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

MASS

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_is the measure of the amount of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (how much “stuff”) is in an object.

The metric base unit for mass is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_\_\_\_).

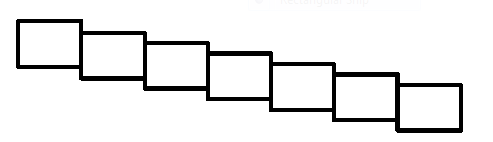
WRITE THE CORRECT ABBREVIATION FOR EACH METRIC UNIT OF MASS:

1. Kilogram \_\_\_\_\_\_ 5. Dekagram \_\_\_\_\_\_

2. Gram \_\_\_\_\_\_ 6. Centigram \_\_\_\_\_\_

3. Milligram \_\_\_\_\_\_ 7. Hectogram \_\_\_\_\_\_

4. Decigram \_\_\_\_\_\_

FILL IN THE STAIR-STEPS FOR MASS:

WHAT DOES EACH UNIT REPRESENT?

1. mg = 4. kg = 7. hg =

2. cg = 5. dg =

3. g = 6. dag =

HOW MUCH DO EACH OF THESE EQUAL?

1) 1 g = \_\_\_\_\_\_\_\_\_ hg 2) 1 mg = \_\_\_\_\_\_\_\_\_ cg 3) 1 g = \_\_\_\_\_\_\_\_\_ kg

WHICH MEASUREMENT IS THE LARGEST? CIRCLE YOUR ANSWER FOR EACH PAIR.

1) 12 mg or 3 cg 4) 12 g or 122 kg

**HINT! Convert one of the values to the same units as the other value *before* comparing!!!**

2) 210 g or 2 kg 5) 13 mg or 6.2 cg

3) 1 g or 998 mg 6) 15 kg or 1500 cg