

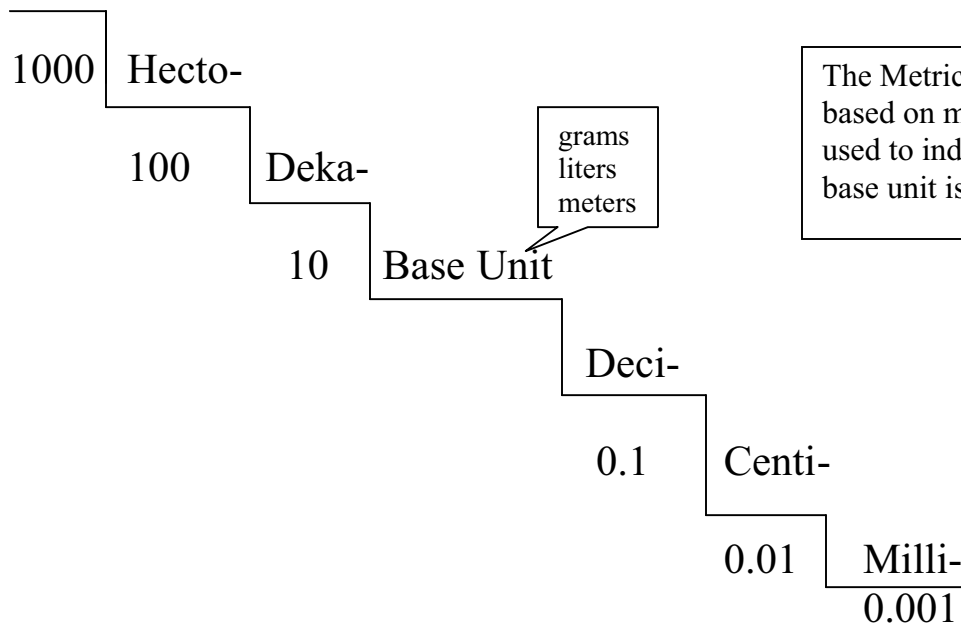
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 Chemistry for Life: \_\_\_\_\_  
 Date: \_\_\_\_\_

Unit I  
 The Nature of Science  
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I

## Metric Conversion: Stair-Step Method

Kilo-



The prefix Kilo (k) - means 1000 times.  
 The prefix Hecto (h) - means 100 times  
 The prefix Deka (dk) - means 10 times.  
 The prefix Deci (d) - means 0.1 times.  
 The prefix Centi (c) - means 0.01 times.  
 The prefix Milli (m) - means 0.001 times.

Base Units will include the gram (g),  
 liter (L), and meter (m) and will have no  
 prefix.

To use the Stair-Step method, find the prefix the original measurement starts with. (ex. *milligram*) If there is no prefix, then you are starting with a base unit. Find the step which you wish to make the conversion to. (ex. *decigram*) Count the number of steps you moved, and determine in which direction you moved (left or right). The decimal in your original measurement moves the same number of places as steps you moved and in the same direction. (ex. *milligram* to *decigram* is 2 steps to the left, so 40 *milligrams* = .40 *decigrams*) If the number of steps you move is larger than the number you have, you will have to add zeros to hold the places. (ex. *kilometers* to meters is three steps to the right, so 10 *kilometers* would be equal to 10,000 meters)

That's all there is to it! You need to be able to count to 6, and know your left from your right!

1) Write the equivalent measurement: (.5 pt each)

- |                                    |                      |                                  |
|------------------------------------|----------------------|----------------------------------|
| a) 5 dm = _____ m                  | b) 4 mL = _____ L    | c) 8 g = _____ mg                |
| d) 9 mg = _____ g                  | e) 2 mL = _____ L    | f) 6 kg = _____ g                |
| g) 4 cm = _____ m                  | h) 12 mg = _____ g   | i) 6.5 cm <sup>3</sup> = _____ L |
| j) 7.02 mL = _____ cm <sup>3</sup> | k) .03 hg = _____ dg | l) 6035 mm = _____ cm            |
| m) .32 m = _____ cm                | n) 38.2 g = _____ kg |                                  |

2. One cereal bar has a mass of 37 g. What is the mass of 6 cereal bars? Is that more than or less than 1 kg? Explain your answer. (2 pts)
3. Wanda needs to move 110 kg of rocks. She can carry 10 hg each trip. How many trips must she make? Explain your answer. (2 pts)
4. Dr. O is playing in her garden again She needs 1 kg of potting soil for her plants. She has 750 g. How much more does she need? Explain your answer. (2pts)
5. Weather satellites orbit Earth at an altitude of 1,400,000 meters. What is this altitude in kilometers? (2 pts)
6. Which unit would you use to measure the capacity? Write milliliter or liter. (.5 pt each)
- |                         |       |
|-------------------------|-------|
| a) a bucket             | _____ |
| b) a thimble            | _____ |
| c) a water storage tank | _____ |
| d) a carton of juice    | _____ |
7. Circle the more reasonable measure: (.5 pt each)
- |                             |                    |
|-----------------------------|--------------------|
| a) length of an ant         | 5mm or 5cm         |
| b) length of an automobile  | 5 m or 50 m        |
| c) distance from NY to LA   | 450 km or 4,500 km |
| d) height of a dining table | 75 mm or 75 cm     |
8. Will a tablecloth that is 155 cm long cover a table that is 1.6 m long? Explain your answer (2 pts)
9. A dollar bill is 15.6 cm long. If 200 dollar bills were laid end to end, how many meters long would the line be? (2 pts)
10. The ceiling in Jan’s living room is 2.5 m high. She has a hanging lamp that hangs down 41 cm. Her husband is exactly 2 m tall. Will he hit his head on the hanging lamp? Why or why not? (2 pts)

## Using SI Units

Match the terms in Column II with the descriptions in Column I. Write the letters of the correct term in the blank on the left.

Column I	Column II
_____ 1. distance between two points	a. time
_____ 2. SI unit of length	b. volume
_____ 3. tool used to measure length	c. mass
_____ 4. units obtained by combining other units	d. density
_____ 5. amount of space occupied by an object	e. meter
_____ 6. unit used to express volume	f. kilogram
_____ 7. SI unit of mass	g. derived
_____ 8. amount of matter in an object	h. liter
_____ 9. mass per unit of volume	i. second
_____ 10. temperature scale of most laboratory thermometers	j. Kelvin
_____ 11. instrument used to measure mass	k. length
_____ 12. interval between two events	l. balance
_____ 13. SI unit of temperature	m. meterstick
_____ 14. SI unit of time	n. thermometer
_____ 15. instrument used to measure temperature	o. Celsius

Circle the two terms in each group that are related. Explain how the terms are related.

16. Celsius degree, mass, Kelvin \_\_\_\_\_

\_\_\_\_\_

17. balance, second, mass \_\_\_\_\_

\_\_\_\_\_

18. kilogram, liter, cubic centimeter \_\_\_\_\_

\_\_\_\_\_

19. time, second, distance \_\_\_\_\_

\_\_\_\_\_

20. decimeter, kilometer, Kelvin \_\_\_\_\_

\_\_\_\_\_

## Standards of Measurement

Some prefixes used in SI are listed in the table below. Use the information in the table to answer questions 1–5.

SI Prefix	Meaning
kilo-	thousand (1000)
hecto-	hundred (100)
deka-	ten (10)
deci-	tenth (0.10)
centi-	hundredth (0.01)
milli-	thousandth (0.001)

- How many meters are in one kilometer? \_\_\_\_\_
- What part of a liter is one milliliter? \_\_\_\_\_
- How many grams are in two *dekagrams*? \_\_\_\_\_
- If one gram of water has a volume of one milliliter, what would the mass of one liter of water be in *kilograms*? \_\_\_\_\_
- What part of a meter is a decimeter? \_\_\_\_\_

In the blank at the left, write the term that correctly completes each statement. Choose from the terms listed below.

Metric	standard	prefixes
SI	ten	tenth

- An exact quantity that people agree to use for comparison is a \_\_\_\_\_ .
- The system of measurement used worldwide in science is \_\_\_\_\_ .
- SI is based on units of \_\_\_\_\_ .
- The first system of measurement that was based on units of ten was the \_\_\_\_\_ system.
- In SI, \_\_\_\_\_ are used with the names of the base unit to indicate the multiple of ten that is being used with the base unit.
- The prefix *deci-* means \_\_\_\_\_ .

## Standards of Measurement

Fill in the missing information in the table below.

SI prefixes and their meanings	
Prefix	Meaning
	0.001
	0.01
deci-	0.1
	10
hecto-	100
	1000

Circle the larger unit in each pair of units.

1. millimeter, kilometer

4. centimeter, millimeter

2. decimeter, dekameter

5. hectogram, kilogram

3. hectogram, decigram

6. In SI, the base unit of length is the meter. Use this information to arrange the following units of measurement in the correct order from smallest to largest. Write the number 1 (smallest) through 7 (largest) in the spaces provided.

\_\_\_\_\_ a. kilometer

\_\_\_\_\_ e. hectometer

\_\_\_\_\_ b. centimeter

\_\_\_\_\_ f. millimeter

\_\_\_\_\_ c. meter

\_\_\_\_\_ g. decimeter

\_\_\_\_\_ d. dekameter

Use your knowledge of the prefixes used in SI to answer the following questions in the spaces provided.

7. One part of the Olympic games involves an activity called the decathlon. How many events do you think make up the decathlon? \_\_\_\_\_

8. How many years make up a decade? \_\_\_\_\_

9. How many years make up a century? \_\_\_\_\_

10. What part of a second do you think a millisecond is? \_\_\_\_\_