Name: _____ Unit I
Mr. Willis The Nature of Science
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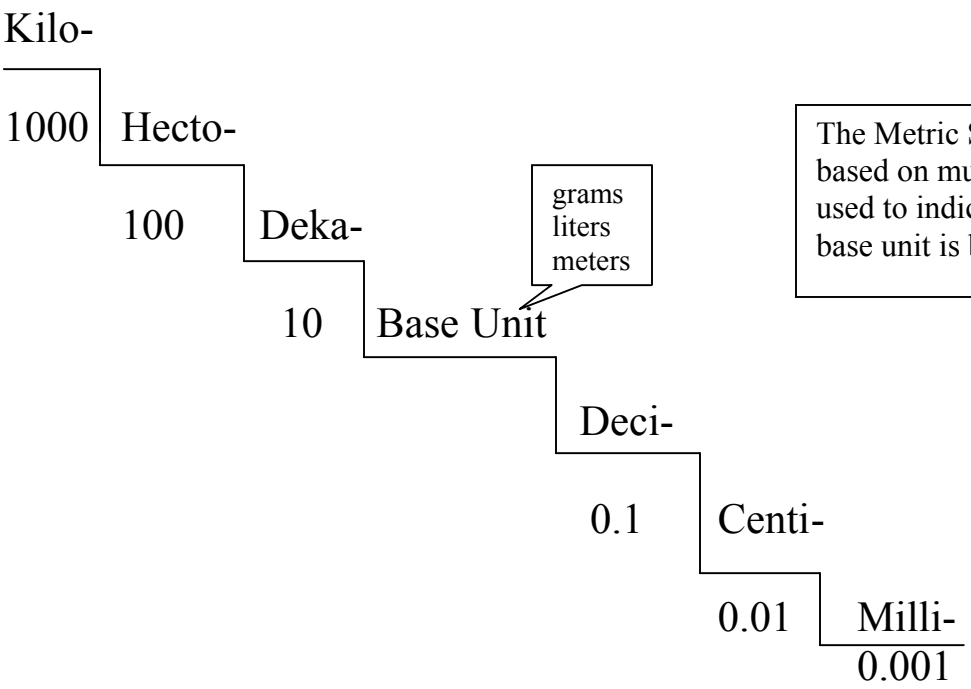
**I**

# Metric Conversion: Stair-Step Method




The Metric System of measurement is based on multiples of 10. Prefixes are used to indicate what multiple of 10 the base unit is being multiplied by.

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. *milli*gram) 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. *deci*gram) 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. *milli*gram to *deci*gram is 2 steps to the left, so 40 *milli*grams = .40 *deci*grams) 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. *kilo*meters to meters is three steps to the right, so 10 *kilo*meters 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 $cm^3$ = _____L
j) 7.02 mL = _____$cm^3$
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 l0 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 or5cm
   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 | 1. 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) |

1. How many meters are in one kilometer? _____

2. What part of a liter is one milliliter? _____

3. How many grams are in two *dekagrams?* _____

4. If one gram of water has a volume of one milliliter, what would the mass of one liter of water be in *kilograms?*_____

5. 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 |

6. An exact quantity that people agree to use for comparison is a _____ .

7. The system of measurement used worldwide in science is _____ .

8. SI is based on units of _____ .

9. The first system of measurement that was based on units of ten was the _____ system.

10. 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.

11. 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

2. decimeter, dekameter

3. hectogram, decigram

4. centimeter, millimeter

5. hectogram, kilogram

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

_____ b. centimeter

_____ c. meter

_____ d. dekameter

_____ e. hectometer

_____ f. millimeter

_____ g. decimeter

*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? _____