**NAME: DATE:**

**CLASS: PERIOD:**

SI UNITS WORKSHEET: METRIC CONVERSIONS:

BACKGROUND:

Scientists use the international system of measurements (S.I. units) when making measurements. This is a modern adaptation of the metric system (using meters, kilograms, and liters), and it is used by nearly all of the people in the world in their everyday lives. S.I. units are based on multiples of 10 and therefore it is much easier to convert between units than if you use the English System that people in the United States are more familiar with (using feet, pounds, and quarts). In this activity, you will practice changing units to larger or smaller units, and you will learn to use common laboratory measuring equipment.

|  |  |  |  |
| --- | --- | --- | --- |
| **giga** | **G** | **One billion** | **1,000,000,000** |
| **mega** | **M** | **One million** | **1,000,000** |
| **kilo** | **k** | **One thousand** | **1,000** |
| **hecto** | **h** | **One hundred** | **100** |
| **deka** | **da** | **ten** | **10** |
| **deci** | **d** | **One tenth** | **.1** |
| **centi** | **c** | **One hundredeth** | **.01** |
| **milli** | **m** | **One thousandth** | **.001** |
| **micro** | **u** | **One millionth** | **.000001** |
| **nano** | **n** | **One billionth** | **.000000001** |
|  |  |  |  |

**KWL ON SI UNITS**

|  |  |  |
| --- | --- | --- |
| **K** | **W** | **L** |
| **What do you already know about SI units:** | **What do you want to know about SI units?** | **What did you learn about SI units?** |
|  |  |  |

**COMMON SI UNITS**

|  |  |  |
| --- | --- | --- |
| **LENGTHC:\Users\Sunada\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\P0VEPXU4\MC900290924[1].wmf** | METER(M)  kilometer (km)  decimeter(dm)  Centimerter (cm)  Millimeter(mm)  Micrometer (um) |  |
| **VOLUMEC:\Users\Sunada\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\P0VEPXU4\MC900351957[1].wmf** | **Cubic meter (cm3)**  **Liters (L)**  **Milliliter (ml)** |  |
| **MASS C:\Users\Sunada\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\E5X48Q4I\MC900391156[1].wmf** | **Grams (g)**  **Kilograms (kg)**  **Milligram(mg)** |  |
| **TEMPERATUREC:\Users\Sunada\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\G3NR5KJ4\MC900149862[1].wmf** | **Celsius( c)**  **Kelvin(K)** |  |

BIG VS LITTLE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| FULL NAME OF UNIT | SYMBOL | VS | FULL NAME OF UNIT | SYMBOL |
| 1. |  |  |  |  |
| 2. |  |  |  |  |
| 3. |  |  |  |  |
| 4. |  |  |  |  |

**Part II. Converting S.I. Units:**

* To convert S.I. units, you simply need to move the decimal point the proper number of places. This is easiest done by writing out the units from largest to smallest.
* When you wish to convert units, look at the direction and number of spaces moved on the grid above. This will tell you the direction and number of spaces that the decimal point should move.
* For example, to convert from Mg to dg the decimal would move to the

right seven spaces. This procedure will work for any S.I. units, not only for grams.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Gg |  |  | Mg |  |  | kg | hg | dag | g | dg | cg | mg |  |  | ug |  |  | ng |

**2. Convert the S.I. units below. The first one has been done for you:**

1. 0.00028 mg = \_\_\_\_ug 14. 00034 mg=\_\_\_\_\_\_\_ug

2. 226 cg = \_\_\_\_\_\_\_\_\_\_ g 15. 982 cg=\_\_\_\_\_\_\_\_\_g

3. 9.4 kg = \_\_\_\_\_\_\_\_\_\_\_ dag 16. 2.68 kg=\_\_\_\_\_\_\_\_\_dag

4. 5400 mL = \_\_\_\_\_\_\_\_\_ L 17. 3400 ml=\_\_\_\_\_\_\_\_\_L

5. 2.73 hL = \_\_\_\_\_\_\_\_\_\_ dL 18. 987.5 hl=\_\_\_\_\_\_\_\_\_dl

6. 436 mm = \_\_\_\_\_\_\_\_\_\_ m 19. 487mm=\_\_\_\_\_\_\_\_\_\_\_m

7. 32.8 Mm \_\_\_\_\_\_\_\_\_\_ cm 20 74.8 dm=\_\_\_\_\_\_\_\_\_mm

8. 28 mg=\_\_\_\_\_\_\_\_\_\_\_\_ug

9. 330 cm=\_\_\_\_\_\_\_\_\_\_\_\_g

10. 7.4kg=\_\_\_\_\_\_\_\_\_\_\_\_\_dag

11. 3400 ml=\_\_\_\_\_\_\_\_\_\_\_L

12. 5.73 hl=\_\_\_\_\_\_\_\_\_\_\_\_dl

13. 536 mm=\_\_\_\_\_\_\_\_\_\_m

Temperature Conversions

|  |  |
| --- | --- |
| Celsius to kelvin | C + 273 |
| Celsius to Fahrenheit | F=9/5 C+32 |
| Fahrenheit to Celsius | C=5/9 (F-32) |

|  |  |  |  |
| --- | --- | --- | --- |
| Temp.of | F | C | k |
| boils |  | 100 |  |
| freezes |  | 0 |  |
| Avg. body temp. | 98.6 |  |  |
| Rm temp |  | 20 |  |
| Rm temp. |  | 25 |  |
|  | 35 |  |  |
|  | 20 |  |  |
|  | 80 |  |  |

LAB MINI-ACTIVITY:

MEASURING LENGTH IN SI UNITS:

1. Use a meter stick to measure the items in data table 1 in the space provided below. Record measurements to the nearest millimeter.
2. Complete Data table 1 by converting your measurements to the other units given. Fractions are never used in S.I. –answers should use decimals.

**Centimeters(cm)** **millimeters (mm**) **meters (m)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Object: | |  |  |  | | --- | --- | --- | | Length  L | Width  W | Height  H | | |  |  |  | | --- | --- | --- | | Length  L | Width  W | Height  H | | |  |  |  | | --- | --- | --- | | Length  L | Width  W | Height  H | |
| 1. | |  |  |  | | --- | --- | --- | | Length | Width | Height | | |  |  |  | | --- | --- | --- | | Length | Width | Height | | |  |  |  | | --- | --- | --- | | Length | Width | Height | |
| 2. | |  |  |  | | --- | --- | --- | | Length | Width | Height | | |  |  |  | | --- | --- | --- | | Length | Width | Height | | |  |  |  | | --- | --- | --- | | Length | Width | Height | |
| 3. | |  |  |  | | --- | --- | --- | | Length | Width | Height | | |  |  |  | | --- | --- | --- | | Length | Width | Height | | |  |  |  | | --- | --- | --- | | Length | Width | Height | |
| 4. | |  |  |  | | --- | --- | --- | | Length | Width | Height | | |  |  |  | | --- | --- | --- | | Length | Width | Height | | |  |  |  | | --- | --- | --- | | Length | Width | Height | |
| 5. | |  |  |  | | --- | --- | --- | | Length | Width | Height | | |  |  |  | | --- | --- | --- | | Length | Width | Height | | |  |  |  | | --- | --- | --- | | Length | Width | Height | |

PROCEDURE PART II: Measuring Volume with S.I. Units

1. Look at bottle A and determine which size graduated cylinder you should use.
2. Pour the contents of bottle A into the appropriate size graduated cylinder and measure the volume of the colored liquid
3. Be sure to read at the bottom of the meniscus
4. Record the volume of the liquid in your data table
5. Repeat steps 1-3 for the other bottles and test tubes.

|  |  |  |
| --- | --- | --- |
| Item: | Milliliters (ml) | Liters (l) |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

PROCEDURE PART III: MEASURING MASS WITH S.I. UNITS

1. Use a balance to find the mass of the objects listed in data table 3
2. Record the measurements in the data table below in grams first.
3. Complete data table 3 by converting your measurements to the other units in the table using the step or conversion method.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ITEMS: | GRAMS(g) | Kilograms(kg) | Milligrams(mg) | Micrograms(ug\_) | Other: |
| 1. |  |  |  |  |  |
| 2. |  |  |  |  |  |
| 3. |  |  |  |  |  |
| 4. |  |  |  |  |  |
| 5. |  |  |  |  |  |