**You Should KNOW:**

**SI system**

begins with **seven fundamental units** from which all other units are derived:

* **meter (m) - distance**
* **kilogram (kg) - mass**
* **second (s) - time**
* **ampere (A) – electric current**
* **kelvin (K) - temperature**
* **mole (mol) – amount of substance**
* **candela (cd)** **– intensity of light**

In addition to the standard fundamental there are **derived units** of the SI system:

* hertz (Hz) – unit of frequency defined as
* newton (N) – unit of force defined as
* Pascal (Pa) – unit of pressure defined as
* joule (J) – unit of energy or work defined as
* watt (W) – unit of power defined as
* coulomb (C) – unit of electric charge defined as
* volt (V) – unit of electric potential defined as
* ohm (Ω) – unit of electric resistance defined as
* degree Celsius (C°) – unit of temperature defined as

You should also have an understanding of metric prefixes to be combined with the fundamental units:

yotta- (Y-) 1024 1 septillion

zetta- (Z-) 1021 1 sextillion

exa- (E-) 1018 1 quintillion

peta- (P-) 1015 1 quadrillion

tera- (T-) 1012 1 trillion

giga- (G-) 109 1 billion

**These we covered in class however we can continue moving decimals up & down the ladder further to yotta and yocto.**

mega- (M-) 106 1 million

**kilo- (k-) 103 1 thousand**

**hecto- (h-) 102 1 hundred**

**deka- (da-) 10 1 ten**

**deci- (d-) 10-1 1 tenth**

**centi- (c-) 10-2 1 hundredth**

**milli- (m-) 10-3 1 thousandth**

micro- (µ-) 10-6 1 millionth

nano- (n-) 10-9 1 billionth

pico- (p-) 10-12 1 trillionth

femto- (f-) 10-15 1 quadrillionth

atto- (a-) 10-18 1 quintillionth

zepto- (z-) 10-21 1 sextillionth

yocto- (y-) 10-24 1 septillionth

**Unit Conversion**:

* is the conversion between different units (**ex. Kilograms to milligrams or miles to kilometers**) of measurement for the **same quantity**, typically through multiplicative (**cross multiplying** to cancel the **given units** leaving the **desired unit**) conversion factors.

**Scientific Notation:**

* a way of writing numbers that are too big or too small to be conveniently written in decimal form.

**Significant Figures:**

* digits that carry meaning contributing to its precision.
* Remember “**P**acific (decimal **p**oint) and Atlantic” method

**Graphical Analysis**:

* The slope of a graph tells us about motion. A graph may go up or down in a straight line. A graph may go up or down in a curved line (parabola).
* Linear Relationship: both axes are **proportional** to one another meaning that as one changes the other changes the same amount.
* Inverse Relationship: as one axis goes up the other goes down.
* Inverse-square Relationship: as one axis goes up the other goes up but to the second power (x2)

**You should BE ABLE TO DO:**

**Unit Conversion**

* Convert one unit into another unit using the formula:

Example: How many seconds are in one day?

**Scientific Notation**:  
Put the following number into scientific notation: 24,345,000,000

Put the following number into scientific notation: 0.000056879

Write the following number out: 5.67 x 1023

567,000,000,000,000,000,000,000

Examples:

|  |  |
| --- | --- |
| 10000 = 1 x 104 | 24327 = 2.4327 x 104 |
| 1000 = 1 x 103 | 7354 = 7.354 x 103 |
| 100 = 1 x 102 | 482 = 4.82 x 102 |
| 10 = 1 x 101 | 89 = 8.9 x 101 (not usually done) |
| 1 = 100 |  |

**Significant Figures**:

* Always remember the Pacific-Atlantic Rule!
* Think of the U.S. in a map. The Atlantic Ocean is to the right. Pacific to left.
* If a decimal is present, start counting from the "Pacific" (left).
* If absent, count from "Atlantic" (right).
* So, what are we counting? We count the first **nonzero digit we encounter**; and all following digits.
* Ex. 432.30 gram has 5 sig figs.
* 6,000 has 1 sig fig.

**Graphical Analysis**:

|  |  |
| --- | --- |
| **Constant Velocity Positive Velocity** |  |
| http://www.physicsclassroom.com/class/1dkin/U1L3a5.gif |  |

Describe what is happening in the graph above as the objects position moves over time.

|  |
| --- |
| **Positive Velocity Changing Velocity (acceleration)** |
| http://www.physicsclassroom.com/class/1dkin/U1L3a10.gif |  |

Describe what is happening in the graph above as the objects position moves over time.