

# Scientific and Engineering Notation

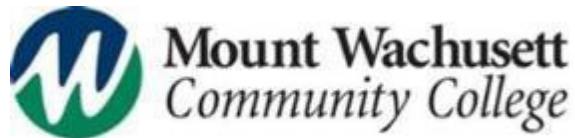
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The AMMQC program is an Equal Opportunity program.  
Adaptive equipment is available upon request for individuals with disabilities.

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# Prefixes and Conversions

- Prefixes : Are used to eliminate zeros from a given value.
- Conversions : Changes the numeric value of a measurement from one prefix's value to another prefix's value.

# Prefixes and Conversions #1

<b>PREFIX</b>	<b>SYMBOL</b>	<b>POWER OF TEN</b>	<b>VALUE</b>
<b>Tera</b>	<b>T</b>	$10^{12}$	1,000,000,000,000
<b>Giga</b>	<b>G</b>	$10^9$	1,000,000,000
<b>Mega</b>	<b>M</b>	$10^6$	1,000,000
<b>Kilo</b>	<b>K</b>	$10^3$	1,000
<b>milli</b>	<b>m</b>	$10^{-3}$	0.001
<b>micro</b>	<b>μ</b>	$10^{-6}$	0.000001
<b>nano</b>	<b>n</b>	$10^{-9}$	0.000000001
<b>pico</b>	<b>p</b>	$10^{-12}$	0.000000000001

# Prefixes and Conversions #2

Whole Values are: VOLTS, AMPS, OHMS, FARAD, HERTZ etc.

Whole Values have all of the zeros or decimal places in their number value:

3000 volts

1000 amps

5,000,000 ohms

0.000001 farads

560,000 hertz

Prefixes are added to whole value electrical measurements to eliminate zeros or decimal places:

3 K volts


1 K amps



5 M ohms

1 u farad


560 K Hertz





# Prefixes and *Whole Values*



	Prefix	Symbol	Move decimal	Value
+ 6	<b>Mega= 1,000,000</b> 	<b>M</b>	<b>+ 6 places</b>	<b>1 M</b>
+ 3	<b>Kilo= 1,000</b> 	<b>K</b>	<b>+ 3 places</b>	<b>1 K</b>

**"whole values"** **Amp, Volt, Ohm, Farad, Hertz**



- 3	<b>milli= 0.001</b> 	<b>m</b>	<b>- 3 places</b>	<b>1 m</b>
- 6	<b>micro= 0.000001</b> 	<b>u</b>	<b>- 6 places</b>	<b>1 u</b>
- 9	<b>nano = 0.000000001</b> 	<b>n</b>	<b>- 9 places</b>	<b>1 n</b>
- 12	<b>pico= 0.000000000001</b> 	<b>p</b>	<b>- 12 laces</b>	<b>1 p</b>

# Conversions: Example 1


Prefixes:	Symbol:
Mega = + 6	M
Kilo = + 3	K
Whole values = 0	
milli = - 3	m
micro = -6	u
nano = -9	n
pico = -12	p

**Convert the following:**

$$5,000,000 \text{ ohms} = \text{??} \text{ M ohms}$$

1. Determine the decimal places of each
2. Which prefix is larger ? **M**
3. Which number will be **larger** / **smaller**?  
**Ohms** / **M ohms**
4. Move the decimal to produce the correct answer.

6 places left

$$5,000,000. = 5 \text{ M ohms}$$


# Conversions: Example 2

Convert the following:

$$0.000001 \text{ fd} = \underline{\quad?} \text{ u fd}$$

1. Determine the decimal places of each
2. Which prefix is larger ? farad
3. Which number will be **larger** / **smaller**?  
**u farad** / **farad**
4. Move the decimal to produce the correct answer.

6 places to right

$$\underline{.000001} \text{ fd} = \mathbf{1} \text{ u fd}$$

Prefixes:	Symbol:
Mega = + 6	M
Kilo = + 3	K
Whole values = 0	
milli = - 3	m
micro = -6	u
nano = -9	n
pico = -12	p