1) Precision and numbers of decimal places in calculated answers (see notes for Feb. 7th)

2) Units of measurement for length, mass, area, volume, time, and temperature (pg 574)
Memorize unit names and abbreviations.

3) Metric prefixes and scientific notation are methods to avoid writing lost of zeros.

a) Each prefix specifies a certain power of ten (e.g., centi = 10^{-2}, kilo = 10^{3}).
These are described on page 575

b) Converting between prefixes.

Example:	25 cm to ? km	374 Mg to ? g
Exponents	c: 10^{-2} k:10^{3}	M: 10^{6} _: 10^{0}
Subtract the starting exponent from the ending one.	3 - (-2) = 5	0 - 6 = - 6
move the decimal place that many places: to the left if positive to the right if negative	25. –> 0.00025	374 –> 374 000 000
Answer	0.00025 km	374 000 000 g

It is important to realize with units containing exponents (such as cm^3 and m^3 in question 6) that both the units ***and*** prefix are affected by the exponent. 1 m = 100 cm
$1\ m^3 = (100\ cm)^3 = 1\ 000\ 000\ cm^3$

To avoid this sort of confusion, use simple units when possible rather than the equivalent complex unit (1 mL rather than 1 cm^3). This way, the conversion between prefixes is a simpler matter.

c) Complex conversions.
Multiply your measurement by fractions that allow unwanted units to cancel out, but for which the numerator and denominator are the same value, so the fraction equals 1
Example: 37 km/h —> ? m/s

$$37\ \frac{km}{hr} \times \frac{1000\ m}{1\ km} \times \frac{1\ hr}{60\ min} \times \frac{1\ min}{60\ s} = 37\ \frac{\cancel{km}}{\cancel{hr}} \times \frac{1000\ m}{1\ \cancel{km}} \times \frac{1\ \cancel{hr}}{60\ \cancel{min}} \times \frac{1\ \cancel{min}}{60\ s}$$

$$= 37 \times 1000 / 60 / 60 \ m/s$$

$$= 10.3\ m/s$$

This method is cumbersome, but it always works.

c) Scientific notation accomplishes the same thing as the prefix, but uses the exponent itself rather than a prefix.

Numbers in scientific notation always have one number to the left of the decimal place.
The exponent tells you how to move the decimal place to convert it back to standard notation.

negative exponent: move to the left
positive exponent: move to the right

Standard Notation	Scientific Notation
0.000245	2.45×10^{-4}
8754000	8.754×10^{6}

4) **The Particle Theory of Matter**

The particle theory of matter is an early theory of matter. It was fairly good at explaining some of the physical properties of matter, but explained only the simplest aspects of chemistry. We will examine the theory and see how it explains the following:

1) The three common states of matter and their physical properties.
2) The transition between these states as the temperature changes.
3) The difference between pure substances and mixtures.
4) The differences between different types of pure substances: elements and compounds
   The differences between different types of mixtures: solutions, suspensions, and mechanical mixtures

Copy into your notes, from page 156 of the text, the 5 statements of the particle theory of matter.