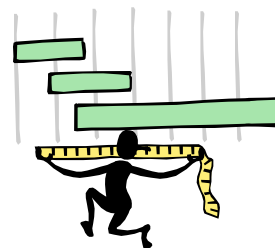


# Honors Chemistry Kudo's

## Chapter 2 - Measurements



What you need to KNOW, UNDERSTAND and be able to DO!

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### Section 2.1 Scientific Method

**Know (terms in italics):** *hypothesis, model, theory, inference, observation*

**Understand:**

- The scientific method is a method scientists use to answer questions or solve problems by making observations of the world around them and seeking to explain these observations in a systematic manner.
- Once multiple experiments provide the same data about a specific phenomenon a theory can be made as to the reason. Theories remain in place until proof is found to refute the theory.
- Models are often used in science to represent phenomena that are difficult to understand (possibly too large or too small to see) in a more concrete or tangible manner. For example a life sized model of an atom or the solar system.

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#### Learning Goals (Do!)

1a. Describe the steps of the scientific method.

SRQ: 1.3

1b. Classify a statement as an observation or an interpretation (inference).

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### Section 2.2 Units of Measurement

**Know (terms in italics):** *quantity, density, volume, conversion factor, dimensional analysis*, Know the standard SI base units, know the volume 1 milliliter (ml) is equal to 1 centimeter cubed ( $1\text{cm}^3$ )

**Understand:**

- Since measurements of quantities are made in many different units in different locations around the world it is necessary to be able to convert to different units within the metric system and between the metric system and other systems.
- Density expresses the mass of a substance compared to its volume. Liquids of different densities will layer themselves so that the more dense substance will sink to the bottom and the least dense substance will float to the top.
- The magnitude of the metric prefixes for 1000 times larger to 1000 times smaller, focusing especially on kilo-, centi- and milli (For mass, volume and length).

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#### Learning goals (Do!)

2a. Utilize the density equation to calculate density, mass or volume of a substance.

SRQ: 1  
CRQ: 6.11

2b. Convert between units within the same system (ex: metric) or between different systems (ex: metric to American) using dimensional analysis (or another suitable method).

2c. Predict the most appropriate metric units to measure the length, volume or mass of an object.

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## Section 2.3 Using Scientific Measurements

**Know (terms in italics):** Accuracy, precision, significant figures, scientific notation, percent error, direct proportion, indirect(inverse) proportion, experimental value, accepted/theoretical value

**Understand:**

- All measurements made in the lab have some degree of uncertainty due to the fact that instruments cannot read to an infinite number of decimal places. Measurements of quantities is central to the study of chemistry therefore it is necessary to be able to read amounts on laboratory equipment to the appropriate decimal place.
- When graphing experimental data, the lines formed will never be perfectly straight or perfectly curved because the error associated with measurements, therefore a best fit smooth line is drawn touching as many data points as possible with equal points above and below the line.
- When variables are on the same side of an equation in the same location (example both in the numerator), they exhibit an indirect relationship, whereas if one variable is in the numerator and one in the denominator the relationship is direct.

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**Learning goals (Do!)**

3a. Measure the accuracy of experimentally determined values using percent error calculations.

CRQ:  
24.25.30

3b. Determine the number of significant figures in a measurement or for an answer from a mathematical calculation.

3c. Convert numbers between scientific notation and standard number form.

3d. Graph two data variables to Ms. Quirarte's specifications (by hand or with a graphing program) as indicated on the graphing guidelines handout.

**Prior Knowledge (you must be able to do this already!):**

Rearrange an equation to solve for any variable.

**In the Lab:**

L1. Read an amount on a graduated instrument (graduated cylinder, thermometer, ruler etc.) to the appropriate significant figures.

L2. Utilize the scientific method to design an experiment to solve a problem.

*Chapter 1-2 test is tentatively scheduled for September \_\_\_\_\_, 2012.*

**Vocabulary: Due the day all reading assignments are due!**

Define all vocabulary terms listed in the chapter highlights. **No assignments will be accepted for credit after the test.**

**Test Review: Due the day before the test!**

Chapter review 8.14.17.19.23.29ab.38ab-44ab.51 Test Prep 1-9,11.13 pages 59-63 in text.

**Extra Credit: Due test day!**

Chapter Review Question 52 (Pick one element) and/or 53 (WATCH SIG FIGS!!). They are 5 points each and you may complete one or both.