Good Morning

- Please get your sand sample from the chem hood.
- Mass it and calculate the mass of sand.
- Finish all of the calculations and questions.
- You have the first 10 minutes.

Finished???

- Take out the homework from Wednesday.
- Check your answers with the ones that I have posted. We can go over any that you would like.

Requested Homework

Today

- Mixtures and materials. Elements and compounds.
- Intro to Significant Figures.
- Continue dimensional analysis and scientific notation.

Tonight

- From 3.1. Questions 11-14.
- From 3.2. Questions 21-25.

Mixtures 2.2

- A physical blend of two or more components.
- 2 classifications:
  - Homogeneous
  - Heterogeneous

Homogeneous

- Composition is uniform throughout.
- Examples:
  - Oil
  - Vinegar
  - Other Solutions

What's a Solution

- When something (a chemical) is dissolved into a liquid.
- That liquid is usually water.
- The chemical that dissolves breaks apart on the molecular level.
- The chemical still retains it's chemical properties in solution.

Heterogeneous

- Different concentrations throughout the mixture.
- If there are "chunks" or **any** color difference, it is a heterogeneous mixture.

Heterogeneous or Homogeneous?

Heterogeneous or Homogeneous?

Heterogeneous or Homogeneous?

Heterogeneous or Homogeneous?

From your lab

- Identify one heterogeneous mixture.

- Identify one homogeneous mixture.

Elements

- Element: the simplest form of matter.
- Only one kind of atom.
- Examples: anything in the periodic table.

Compounds

- Contains two or more elements.
- Still a pure substance.
- These are combined (bonded) in the same proportion all the time.
- During chemical reactions (changes), elements and compounds rearrange.

Forming Compounds

- Nature is lazy. It wants to be at the lowest energy level possible.

- In most cases, it's easier for atoms to combine with other atoms and share electrons (we will study this later in the course).

Breaking Down Compounds

- In general, energy has to be put into the compound to "pull off" an atom or group of atoms.
- Heating sugar produces carbon and water.
- Running electricity through water produces hydrogen and oxygen gas.

Unit Conversion & Significant Figures: Crash Course Chemistry #2

Measurement Precision

$$60\ \text{mph} = \frac{60\ \text{miles}}{1\ \text{hour}} \left(\frac{1\ \text{hour}}{60\ \text{min}}\right) \left(\frac{1\ \text{min}}{60\ \text{s}}\right) \left(\frac{1\ \text{ly}}{5.9 \times 10^{12}\ \text{miles}}\right)$$

$$= \frac{60}{1} \quad \frac{1}{60} \quad \frac{1}{60\ \text{s}} \quad \frac{1\ \text{ly}}{5.9 \times 10^{12}}$$

$$\approx 9.3 \times 10^{-12}\ \text{ly/s}$$

Is that the right answer?

Significant Figures

- The precision that a number was measured.
- The numerical values that you actually know.
- Warning: Your calculator does not know sig figs. It assumes that whole numbers are exact measurements.

How Much Precision?

- 0.00730
- 24.010
- 87,000
- 142370
- 1.000000

Rules

- Do the computation as you see it. Preserve the least number of sig figs.
  - 2.5+3+7.04=12.54
  - There are no decimal places after the 3, so the answer is 13.

Other Examples

- 13.2x97=128.40
- There are only 2 dig figs in 97, so the answer is 130.
- 57.3923/35.0=1.63978.
- There are 3 sig figs in 35.0, so the answer is 1.64.

32.0 x 61 x 100

- Calculator answer:
- Least number of sig figs:
- Rounded answer:

5.793 x 24 / 5

- Calculator answer:
- Least number of sig figs:
- Rounded answer: