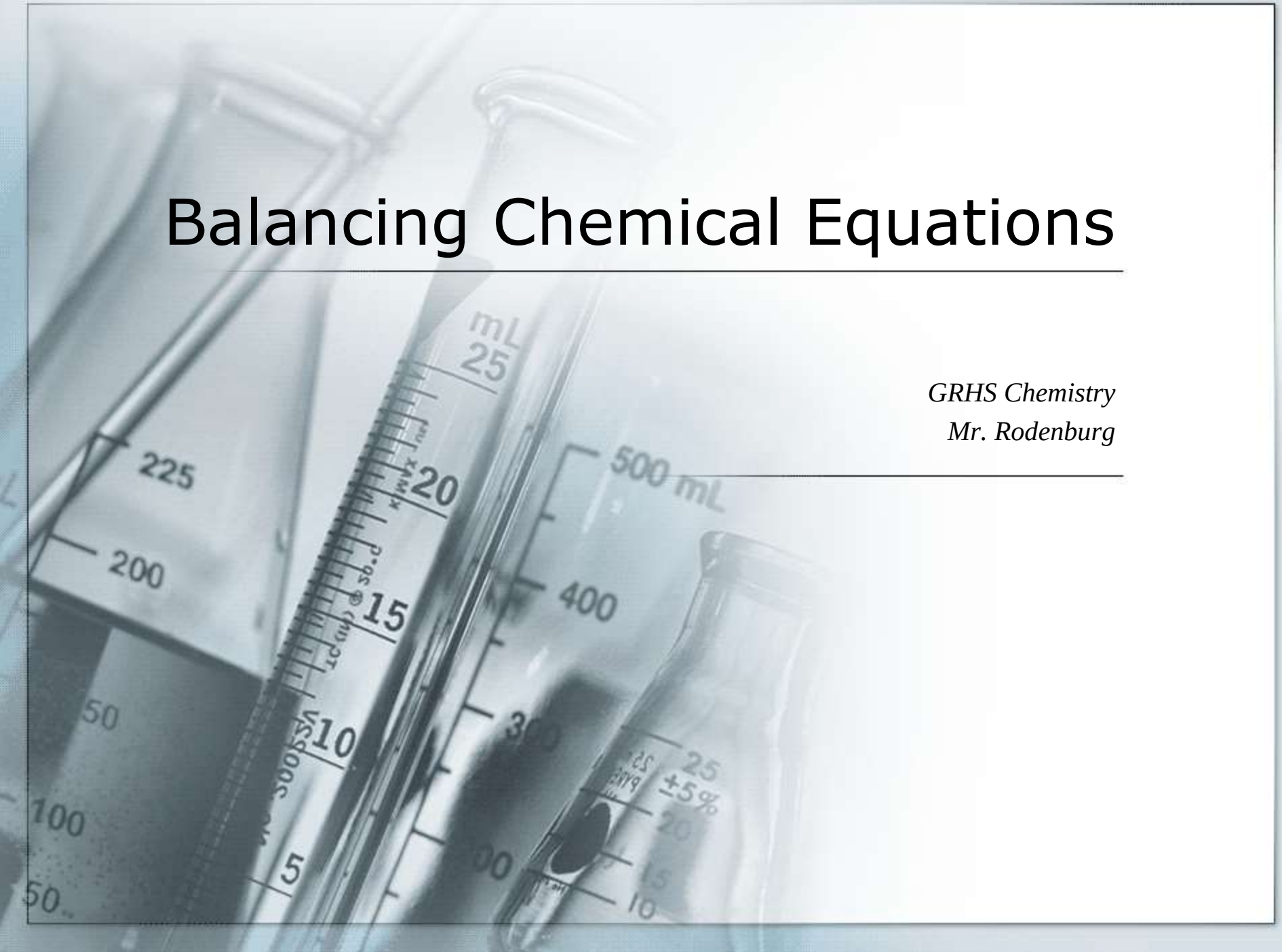
Balancing Chemical Equations



GRHS Chemistry

Mr. Rodenburg

Definitions

- Chemical reaction
  - A reaction in which a chemical change takes place.
    - One or more substances are changed into one or more new substances.
- Chemical equation
  - A shorthand notation showing a chemical reaction using formulae.
    - In its simplest form it looks like: Reactants $\longrightarrow$ Products
- Reactant
  - The substances changed in a chemical reaction. They are shown on the left side of the arrow.
- Product
  - The substances produced in a chemical reaction. They are shown on the right side of the arrow.

Balancing Equations

- Must start with the correct skeleton equation
  - What is a skeleton equation?
    - Unbalanced equations that do not show the relative amounts of reactants and products but do have all the correct chemical formulae.
- Law of Conservation of Mass
  - Matter can be neither created nor destroyed. (It just gets rearranged)
    - Therefore, we must have the same number of atoms of each element on both sides of the equation.
- Elements do not change into other elements
  - Compounds can change and elements can be rearranged, but we must have the same elements on both sides of the equation.
- Balance the equation by adding coefficients (numbers in front)
  - DO NOT CHANGE THE SUBSCRIPTS

Older Review Topics

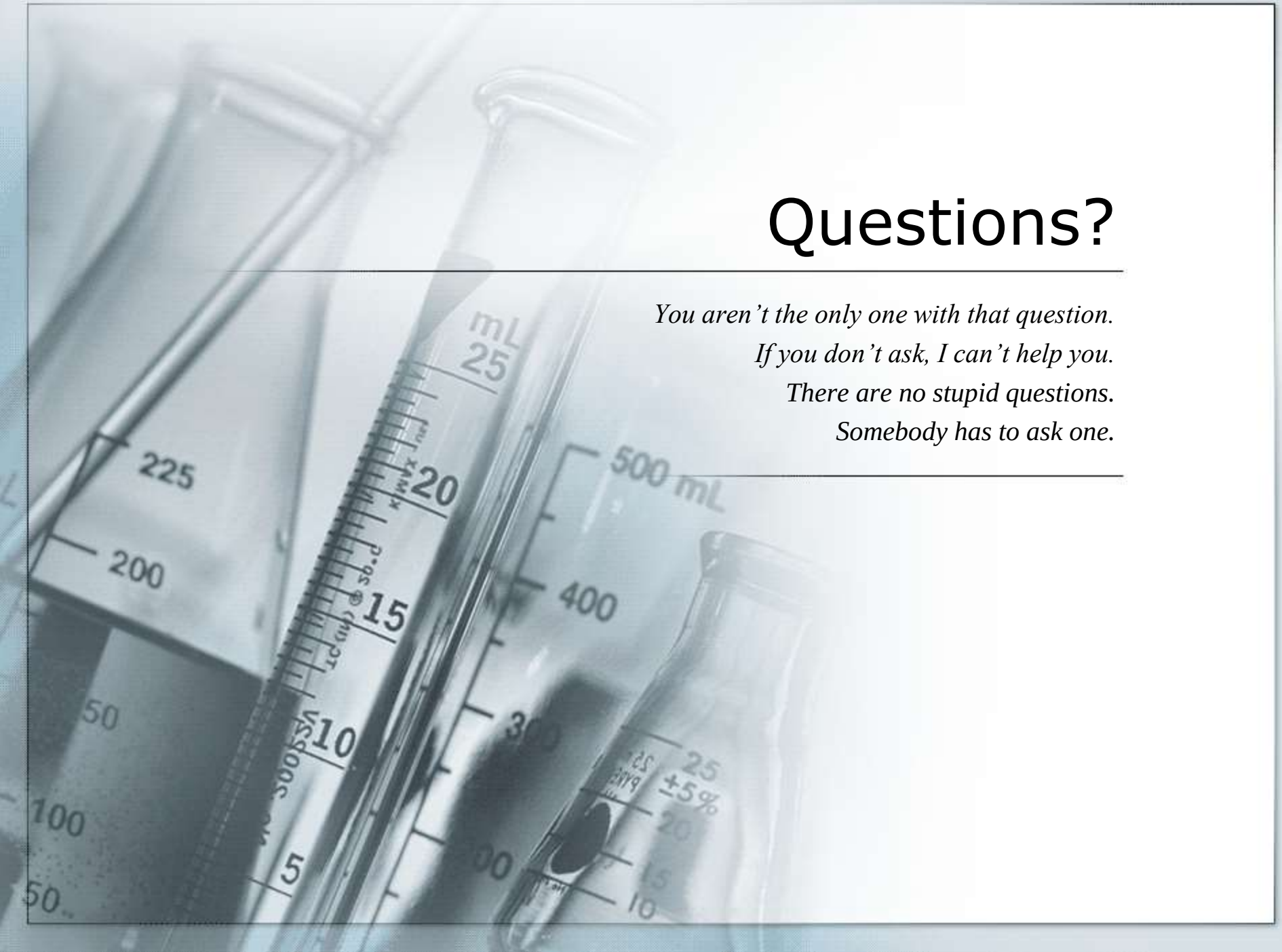
- Atoms
  - The basic building blocks of all matter.
- Molecule
  - A group of two or more atoms.
- Ion
  - An atom or group of atoms that has a positive or negative charge.
- Ionic Compound
  - The result of the bonding of a positive ion (cation) and negative ion (anion).
- Naming Ionic Compounds
  - The cation is first, the anion is second. If the cation has more than one possible charge, it must be followed by Roman numerals that indicate that charge.

Naming Ionic Compounds

- Ionic compounds are formed when ions with opposite charges bond together.
  - The cation is the positive ion. The anion is the negative ion.
  - Each compound must have the same amount of positive charge as negative charge.
    - This is accomplished by writing subscripts.
- When going from names to formulae…
  - Find the symbol that corresponds to the name of the ion
    - Look on the Periodic Table of Ions (cheat sheet) if it is just one symbol
    - Look on the list of Common Polyatomic Ions if it is more than one symbol
  - If the charges don't match, criss-cross to find the proper subscripts.
  - For example, Aluminum Chloride is $AlCl_3$

Naming Ionic Compounds, cont'd

- When going from formulae to names…
  - First, find the cation on the Periodic Table of Ions (cheat sheet)
    - If it is split up, you must determine the charge of the cation and write that charge in Roman numerals after its name. We'll come back to this soon.
    - Look on the list of Common Polyatomic Ions if it is more than one symbol for the anion.
  - To determine the Roman numeral of the cation (if necessary), do this:
    - Work backwards by first figuring out how much total negative charge you have on the anion side of the formula. Multiply the charge by the subscript to find this.
    - Once you find the total negative charge, you know that you have to have the same total positive charge.
    - Now that you have the total positive charge, divide that number by any subscript on the cation, and this will give you your charge and therefore your Roman numeral.



Questions?

You aren't the only one with that question.

If you don't ask, I can't help you.

There are no stupid questions.

Somebody has to ask one.