**Learning Goals:**

Students will be able to:

* Describe what “reactants” and “products” in a chemical equation mean.
* Explain the importance of knowing the difference between “coefficients” and “subscripts”.
* Use pictures and calculations to show how the number of atoms for each product or reactant is found.
* Identify the relationship between “reactants” and “products” atoms.
* Balance a chemical equation using the relationships identified.
* Given a chemical equation, draw molecular representations of the reaction and explain how the representations were derived.
* Given a molecular drawing of a chemical reaction, write the equation and explain how the symbols were derived.

**Background:**

We will have done some labs where the reactions are given and done my activity with. My students have had extensive practice with PhET and self-driven learning strategies. They know that the learning goals will appear on the exam. This unit we will have done my activity [Reactions and Rates 1](https://phet.colorado.edu/en/contributions/view/2984)**.** This unit aligns with Chapter 3 of Chemistry Seventh Edition by Zumdahl Houghton Mifflin 2007 which includes balancing chemical reactions. See my teaching [website](http://jeffcoweb.jeffco.k12.co.us/high/evergreen/science/loeblein/index.html) for the scope and sequence for the unit.

***Balancing Chemical Equations*  Introduction:**

I don’t think there needs to be any introduction since we will have already done several labs and the interface is very simple. The game tab should serve as a self-check tool. The [Tips for Teachers](http://phet.colorado.edu/files/teachers-guide/balancing-chemical-equations-guide.pdf) for this sim may be helpful.

**Pre-Lesson:** I plan to use this as the pre-lesson for the lecture which will correspond to the text.

**Lesson:** Students will work in pairs.

**Post-Lesson:** The first 2 questions on the included slide show are meant to evoke discussion. Then, there are some clicker questions meant to be more formative assessment. There are many text book problems that I use to give students practice.

**Follow-up sims:** [**Reactants, Products, and Leftovers**](https://phet.colorado.edu/en/simulation/reactants-products-and-leftovers)This sim includes learning goals for limiting reagents. Here’s a link to my lesson: [Reactants, Products and Leftovers Activity 1 PhET](https://phet.colorado.edu/en/contributions/view/3102)