**Learning Goals:**

Students will be able to:

* Explain how subscripts and coefficients are used to solve limiting reactant problems.
* Predict the amounts of products and leftovers after reaction using the concept of limiting reactant
* Predict the initial amounts of reactants given the amount of products and leftovers using the concept of limiting reactant
* Translate from symbolic (chemical formula) to molecular (pictorial) representations of matter

**Background:**  This activity will be part of the stoichiometry unit. Also, I will do a lab where the students make Smore’s Lab to help reinforce this important concept (I have included my version of the lab with the activity). I will have done the activity linked below as an introduction to limiting reactions. Also we will have used [Balancing Chemical Reactions-Inquiry Based Introduction](http://phet.colorado.edu/en/contributions/view/3422) . In addition, in physics, my students use particle models in second semester, so this activity is meant to expand their thinking on a molecular level about macroscopic phenomena. See my [course syllabus](http://jeffcoweb.jeffco.k12.co.us/high/evergreen/science/loeblein/chem_syl/syllabus_c.html) for more information about integration of PhET sims.

**Learning goals from** [**Reactants, Products, and Leftovers Activity 1**](http://phet.colorado.edu/en/contributions/view/3102)**:** (which we did in September)

* Relate the real-world example of making sandwiches to chemical reactions
* Describe what “limiting reactant” means using examples of sandwiches and chemicals at a particle level.
* Identify the limiting reactant in a chemical reaction

***Reactants, Products, and Leftovers* Introduction:**

This sim shouldn’t require any introduction. Check the [Teaching Tips](http://phet.colorado.edu/admin/get-teachers-guide.php?teachers_guide_id=76) from the design team for some helpful information.

**Lesson:** My students use this as homework or in class depending on availability of computers.

**Post lesson:** I will the clicker questions on my website for students to use or we may use them as a class activity.