Chemical Equations

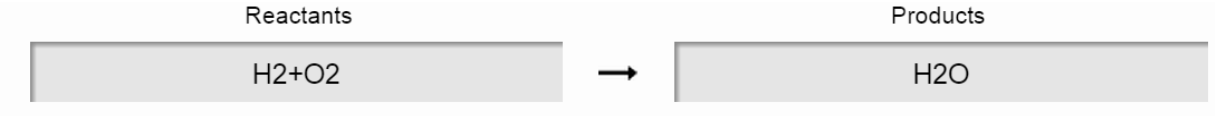
D2L → Content → Chemistry → GIZMOS

Class enrollment codes: Period 1: **ZYK2YGT4K2** Period 4: **PPXTNBMQWH**

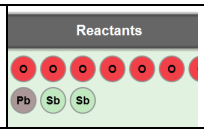
Gizmo Warm-up

Burning is an example of a **chemical reaction**. The law of **conservation of matter** states that no atoms are created or destroyed in a chemical reaction. Therefore, a balanced **chemical equation** will show the same number of each type of atom on each side of the equation.

To set up an equation in the *Chemical Equations* Gizmo, type the **chemical formulas** into the text boxes of the Gizmo. First, type in "H2+O2" in the **Reactants** box and "H2O" in the **Products** box. This represents the reaction of hydrogen and oxygen gas to form water



1. Check that the **Visual** display is chosen on each side of the Gizmo, and count the atoms.
   A. How many hydrogen atoms are on the **Reactants** side? ____ **Products** side? ____
   B. How many oxygen atoms are on the **Reactants** side? ____ **Products** side? ____
2. Based on what you see, is this equation currently balanced? _____

Activity A: **Interpreting chemical formulas**	Get the Gizmo ready: • Erase the chemical formulas in each text box. • Check that the **Visual** displays are selected.	

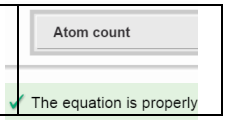
Introduction: To balance a chemical equation, you first need to be able to count how many atoms of each element are on each side of the equation. In this activity, you will practice counting the atoms that are represented in chemical formulas.

Question: How do we read chemical formulas

1. Practice: For each of the real chemical formulas below, calculate how many of each element there are. Check your answers for the first three formulas using the Gizmo.

$AgCl_3Cu_2$	Ag: _____	Cl: _____	Cu: _____	
$Ba(AsO_4)_2$	Ba: _____	As: _____	O: _____	
$(NH_4)_3PO_4$	N: _____	H: _____	P: _____	O: _____
$MnPb_8(Si_2O_7)_3$	Mn: _____	Pb: _____	Si: _____	O: _____

Activity B is on the back of this page

Activity B: **Balancing equations**	Get the Gizmo ready: • Erase the chemical formulas in each text box.	

Introduction: In a chemical reaction, the **reactants** are the substances that enter into the reaction, and the **products** are the substances that are made in the reaction. A chemical reaction is balanced if the numbers of reactant atoms match the numbers of product atoms.

1. Observe: To model how hydrogen and oxygen react to make water, type "H2+O2" into the **Reactants** box and "H2O" into the **Products** box.

   As the equation is written, which element is not in balance? _____

2. Balance: To balance a chemical equation, you are **not allowed** to change the chemical formulas of the substances involved in the reaction. You *are* allowed to change the number of **molecules** of each substance by adding **coefficients** in front of the formulas.

   A. To balance the oxygen atoms, add a "2" in front of the "H2O" in the **Products** box.

      How many oxygen atoms are found on each side of the equation now? _____

   B. To balance the hydrogen atoms, add a "2" in front of the "H2" in the **Reactants** box.

      How many hydrogen atoms are found on each side of the equation now? _____

   C. Is this equation currently balanced? _____ Click **Show if balanced** to check.

3. Apply: Now enter a more complex chemical reaction: $Ca(OH)_2 + HBr \rightarrow CaBr_2 + H_2O$. List the numbers of each element in the tables below:

Reactants

Ca	O	H	Br

Products

Ca	O	H	Br

   A. Which elements are out of balance? _____

   B. Add coefficients to balance first the bromine (Br) and then the hydrogen (H) atoms. When the equation is balanced, write the complete formula below:

      _____