

# Balancing Chemical Equations

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Beginning Chemistry/First Year Chemistry Students

Overview	The students will learn about the different types of equations and how to balance them.
Objectives	Following this lesson students will be able to: <ul style="list-style-type: none"><li>• Identify types of chemical equations</li><li>• Balance chemical equations</li></ul>
Standards	C.1.9: Describe chemical reactions with balanced chemical equations.
Materials	<ul style="list-style-type: none"><li>• Chemistry Notes</li><li>• Pens/pencils</li><li>• Computers</li><li>• Chalkboard/dry erase board</li><li>• Demonstrations of chemical reactions</li><li>• Ping and Twitter account for each student</li></ul>
Additional information	<ul style="list-style-type: none"><li>• Each student will need to get a ping.fm account and a twitter account for the in class quizzes.</li><li>• Students should log in to ping.fm to answer the questions as the lesson goes.</li><li>• Why use ping.fm? By using ping.fm the students can electronically submit their answers to the questions without having to be on Facebook or Twitter where they would be distracted by looking at profiles.</li><li>• What are the benefits for the teacher? The teacher can easily access all the answers from each student by logging into their Twitter account. On the right side of the teacher's Twitter login page there is a tool that says @teachersname and the teacher can click on this and all the tweets the teacher is tagged in will show up. One more benefit for using ping.fm connected to Twitter is instant feedback for the teacher to see if the students are understanding the concepts or not.</li><li>• How does this exactly work? Each student will tag the teacher by putting @teachersname. For my students they will put @emdinoto.</li><li>• How is this useful? In twitter you are only allowed to use 140 characters so all answers will be concise and to the point. On ping.fm there is a character counter so that helps the students know how many letters and spaces they have left.</li><li>• It is helpful that before a teacher attempts this lesson that they have a practice session with all their students so the students understand how this works as well as the teacher.</li><li>• One more important piece of information is to make sure that the students have their ping.fm account set only so Twitter gets updates or specify that these updates go only to Twitter or they will be updating their Facebook or myspace accounts with chemistry answers.</li></ul>
Procedure	<ol style="list-style-type: none"><li>1. Begin lecture talking about our base knowledge of atoms and molecules. Discuss that we know about the differences of atoms, ions, and molecules.</li></ol>

	<ul style="list-style-type: none"> <li>• Ping question 1. What is the difference between an atom and an ion? A. An atom is neutral and an ion is charged. (other answers are acceptable)</li> <li>• Ping question 2. What is the molecular formula when calcium reacts with chlorine? A. <math>\text{CaCl}_2</math></li> </ul> <p>2. We know the formula now let's take a look at the chemical equation.</p> <ul style="list-style-type: none"> <li>• <math>\text{Ca}^{2+} + \text{Cl}^- \rightarrow \text{CaCl}_2</math></li> <li>• This type of equation is called a synthesis equation.</li> <li>• Describe how to balance the equation.</li> <li>• Ping question 3. Balance this equation <math>\text{N}_2 + \text{H}_2 \rightarrow \text{NH}_3</math></li> </ul> <p>3. A decomposition reaction.</p> <ul style="list-style-type: none"> <li>• A decomposition equation is an equation that take a compound and breaks down into its components.</li> <li>• Ping question 4. Balance this equation <math>\text{HgO} \rightarrow \text{Hg} + \text{O}_2</math></li> </ul> <p>4. Single replacement reaction</p> <ul style="list-style-type: none"> <li>• This is an equation when an element or ion moves out of one compound and into another.</li> <li>• Ping question 5. Balance this equation <math>\text{AgNO}_3 + \text{Cu} \rightarrow \text{Cu}(\text{NO}_3)_2 + \text{Ag}</math></li> </ul> <p>5. Double displacement reaction.</p> <ul style="list-style-type: none"> <li>• This is a reaction where a chemical reaction between two compounds where the positive ion of one compound is exchanged with the positive ion of another compound.</li> <li>• Ping question 6. Balance this equation <math>\text{Mg}(\text{OH})_2 + \text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2\text{O}</math></li> </ul>
Evaluation	The students will have a worksheet to complete for homework and then an exam that covers this and other subjects.