

Passage

Activity 1: Paragraph Completion

Chemists (and Chemistry students) describe the world at both the **macroscopic** and the **atomic** scales. The macroscopic scale refers to those quantities that we can measure and observe. The atomic scale is based on a model of that reflects how we understand the chemical worlds to operate. While we cannot see the world of atoms, we believe that they exist because they agree with and support the observations that we make at the macroscopic level.

In this activity, you will complete two paragraphs that relate macroscopic scale quantities to atomic scale quantities. You must complete all blanks in the paragraphs before checking your answers. You will be given feedback regarding the number of correct answers and an endless number of chances to correct your mistakes.

Activity 2: Elemental Measures

Stoichiometry is the science of measuring or metering the amounts of elements involved in chemical reactions. These measurements can be made at the **atomic scale**, in which case we would be determining the amount of atoms of the various elements on both reactant and product side of the chemical reaction. But the measurements are more commonly made at the **macroscopic scale**, in which case we determine the amount of elements in terms of moles or grams.

In this activity, you will conduct both an atomic scale and a macroscopic scale analysis of three different reactions. You will begin with a reaction involving two elements, and then proceed to reactions involving three and four elements.

Activity 3: Atom and Mass Conservation

In many courses, students can become really skilled at performing stoichiometric conversions. Converting from moles to moles, converting from grams of reactant to moles of product, and converting from grams of reactant to grams of product are some of the tasks that are undertaken during a unit on stoichiometry. But the BIG underlying principle often gets lost amidst these conversions.

In this activity, you will use your conversions skills to take a look at that BIG underlying principle. When you “see it”, you’re allowed to say “Eureka”.

Activity 4: Chemistry on Planet Exwizee

It's your lucky day!! You're taking a field trip ... to Planet Exwizee. And best of all, you're going to do some stoichiometry when you get there. But don't worry; the chemistry rules are all the same. The only oddity is that there's only three elements on Planet Exwizee. They are element X, element Y, and element Z. Get out your calculator and get ready to do some stoichiometry. And while you're doing it, don't forget that BIG principle. If you finish the two problems early, you can look around and get some pictures of Planet Exwizee (or you can just continue to Activity 5).

Activity 5: Unlawful and Lawful Chemistry

Now we don't encourage breaking any laws. And we certainly don't suggest you ever violate any laws in Chemistry class. But when you do break the law, there's always a lesson to be learned. And the sooner you learn it, the better off you will be.

In this activity, you are going to solve two stoichiometry problems. In the first problem, you are going to solve a problem in which you break the law. (Gasp!) You are going to do stoichiometry without a balanced chemical equation. You probably have never done that before, but now you have our permission to do so. When you're done, observe how ugly it looks. Observe what happened to that BIG underlying principle. And vow to never do this again.

In the second problem, you are going to follow the law. (Whoo. I bet you're relieved!) You are going to do a stoichiometry problem the way you always do it ... with a balanced chemical equation. You'll notice how much more beautiful it looks. And so will your teacher.

When you finish the two problems, you are going to complete a paragraph in which you summarize your findings. Don't worry. The paragraph is already set up. You just have to fill in the blanks.