

Name _____ Period _____ Date _____



Stoichiometry Bridge

STEM Sims

Lesson 1: Building Your Bridge

Stoichiometry is a mathematical method used to calculate the amount of reactants and products required or used in a chemical reaction. Just as a cook requires a recipe of specific amounts of ingredients to produce a meal, chemical reactions need the correct mix of reactants to make the desired amount of product. Can you “construct” a bridge to convert from a reactant to a product?

Doing the Science

1. Open the Stoichiometry Bridge Sim.

Creating the Correct Chemical Formulas

2. Read the problem at the top of the page. Select the “New Reactant” button.
3. Use the on-screen keyboard to enter the chemical formula of one of the reactants in the problem. Select the “Done” button when you think your chemical formula is correct.
4. If the reaction has another reactant, select the “New Reactant” button and enter its chemical formula.
5. Select the “New Product” button and enter the chemical formula for each product.
6. When you have the correct chemical formulas for all reactants and products, select the “Done” button. Please note that you can select any chemical formula if you wish to change the formula.

Balancing the Chemical Equation

7. To balance the equation by adding coefficients, select one of the reactants or products and use the on-screen keyboard to enter a numerical coefficient. Select the “Enter” button to place the coefficient in the balanced equation.
8. Repeat the step 7 process until your equation is balanced.

Building Your Stoichiometry Bridge

9. Select the far left (highlighted) bridge piece. Reread the question and enter the starting known value into the bridge piece by first selecting an amount, then a unit of measurement, and lastly, the given known substance. Select the “Done” button when finished.
10. Some stoichiometric calculations require the gram formula mass to first be calculated. If this is the case, select the “Mass Converter” button and enter the number of each atom in the chemical formula for the known substance. Make sure to either remember or write down this value. Select the “Done” button when finished.
11. Select the next highlighted bridge piece. Remember that the way stoichiometry works is to move one step at a time from a known quantity to an unknown quantity. Also remember that the unit of measurement in the numerator of the bridge piece to the left is to be cancelled out by placing that same unit of measurement in the next term’s or bridge piece’s denominator. The only way to go from one substance to a different substance is by using moles and the balanced question.

12. Repeat steps 10 and 11 until all highlighted bridge pieces have been filled in.
13. Select the “Check Answer” button to see if your calculation is correct. Follow the on-screen instructions if your answer is incorrect.
14. Select the “New Problem” button if you want to try another problem.

Do You Understand?

1. Stoichiometry has a number of different methods used for solving chemical reaction problems. One such method is called the factor label method. Does the Stoichiometry Bridge simulation use this method? If so, explain how.

2. Investigate two other methods used to solve stoichiometry problems. Describe these two methods and state whether each method is or is not directly used in the Stoichiometry Bridge simulation.

3. Use the stoichiometry bridge approach to solve the following problem. 125.73 grams of iron II sulfide reacts with excess oxygen gas to form iron III oxide and sulfur dioxide. How many grams of sulfur dioxide can be produced from this reaction if the reaction goes to completion?