

Name: _____

Directions: Log into Discovery Education and open up the **Chemical Reactions and Equations** assignment. Use the following resources to answer these Essential Questions. Write down your answers and any new ideas you have. Cite evidence from what you read, hear, and see to support your answers. You do not have to use all of the resources, but the more you use, the easier it will be to answer your Essential Questions. Be prepared to share your answers and ideas in class.

Essential Questions

1. How can you tell if matter has undergone a physical or a chemical change?
2. What is the Law of Conservation of Mass?
3. How do scientists represent chemical reactions?
4. How are chemical equations written to show that mass is conserved?

Balancing Equations PhET

Go to <https://phet.colorado.edu/> and click on “Play with Simulations”, go to Chemistry, and select “Balancing Chemical Equations.” Start by clicking the “Introduction” box.

Part 1: “Make Ammonia”

Under tools, select either the balance or the bar graph. Then change the coefficient for each molecule in the equation to 1. Figure out how to balance the equation – when you get it correct a smiley face will appear. Then answer the questions below.

- 1) Write the final balanced chemical equation.
- 2) Label the reactants and products.
- 3) Draw a picture of the reaction. Use labeled circles to show the different atoms.
- 4) Explain how the equation follows the law of conservation of mass. Give specific examples from the equation, don’t just answer the question generally.

Part 2: “Separate Water”

Again start with a coefficient of 1 for each molecule. Then figure out how to balance the equation.

- 1) Write the final balanced chemical equation.
- 2) Label the reactants and products.
- 3) Draw a picture of the reaction. Use labeled circles to show the different atoms.
- 4) Explain how the equation follows the law of conservation of mass. Give specific examples from the equation, don’t just answer the question generally.

Part 3: “Combust Methane”

Again start with a coefficient of 1 for each molecule. Then figure out how to balance the equation.

- 1) Write the final balanced chemical equation.
- 2) Label the reactants and products.
- 3) Draw a picture of the reaction. Use labeled circles to show the different atoms.
- 4) Explain how the equation follows the law of conservation of mass. Give specific examples from the equation, don't just answer the question generally.

Summary Questions:

- 1) Explain your strategy for correctly balancing equations.
- 2) Why doesn't the simulation allow you to change the subscript in the formulas? What does this suggest about a general rule for balancing equations?

Part 4 Instructions: Game

1. Click the “Home” button at the very bottom of the page.
2. Click on “Game”.
3. Start with level 1 and complete the game. When you are done with level 1 go onto level 2 and level 3. You should view this as an opportunity to practice balancing equations. If you want to hide the pictures of the molecules click on the minus sign in the box.