



Discussion Guide for

REACTIONS: THE CHEMISTRY OF CHANGE

OBJECTIVES

After viewing this program, students will be able to:

- Identify the reactants and products in a chemical reaction.
- Write a chemical reaction using subscripts and coefficients.
- Describe what happens in a synthesis reaction.
- State what element all organic molecules have in common.
- Describe what happens in a decomposition reaction.
- Explain the effects of a catalyst.
- Describe what happens in a replacement reaction.
- Describe what happens in a neutralization reaction.

This program is part of the AIMS Interactive Science Essentials Series. This twenty-four part series covers four subject areas- Earth Science, Biology, Physics, and Chemistry. There are six programs in each subject area. The individual programs are divided into randomly accessible sections.

A glossary provides written definitions of terms used in the program, and in most cases will run a section of the video where the word is used in context. A script of the narration is accessible, as well as a bulletin board containing a general introduction to the subject. A quiz allows the student to test their knowledge and the results are recorded for you. In the teacher's section you can view each student's test responses and edit or create your own quiz and test questions.

OVERVIEW

Reactions: The Chemistry of Change is part five of the Chemistry Essentials series which examines modern day chemistry. The program looks at various types of reactions-exothermic and endothermic, spontaneous and non-spontaneous-and how variables such as temperature, concentration, and the presence of a catalyst affect the rate of chemical reactions. The concepts of chemical equilibrium and the reversibility of reactions are introduced, and the importance of chemical reactions in biological processes such as photosynthesis and in industrial applications are also examined.

TEACHER'S PREPARATION

- Before the student uses the program set up the computer so that they can easily reach the mouse and the keyboard.
- Load the CD-ROM into the computer so that it is ready for the student to begin using.
- While students are able to work at their own pace, some students may benefit from using the program more than once.

SUGGESTED DISCUSSION QUESTIONS

1. Identify the reactants and products in this chemical reaction: $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
2. Can the products in a chemical reaction ever have more mass than the reactants? Explain.
3. Can the products in a chemical reaction ever have less energy than the reactants? Explain.
4. Write a chemical reaction using subscripts and coefficients for the following reaction: Two molecules of water (H_2O) are split yielding two molecules of hydrogen gas (H_2) and one molecule of oxygen gas (O_2). What will be the ratio of hydrogen gas to oxygen gas?

5. Describe what happens in a synthesis reaction and give an example. Why is the photosynthesis reaction so critical to animal life?

6. State what element all organic molecules have in common.

7. Describe what happens in a decomposition reaction and give an example.

8. Explain the effects of a catalyst. What is the advantage of using a catalyst in living organisms rather than thermal or electrical energy?

9. Describe what happens in a replacement reaction and give an example.

10. In a neutralization reaction specify what type of compounds make up the reactants and what type make up the products.

11. Analyze why some reactions start spontaneously while others are non-spontaneous.

12. Account for the changes in the rate of a chemical reaction due to changes in temperature or concentration.

13. Evaluate the effects of acid rain on the environment.

14. Explain how the effects of acid rain may be dependent on the chemistry of the soil and water on which it falls.



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VOCABULARY

Acid	Catalysts
Coefficients	decomposition
Endothermic	Energy
Enzymes	Exothermic
Ions	Matter
Polymers	Products
Reactant	Reactions
Replacement reactions	Single
Spontaneous reactions	Subscripts
Synthesis reactions	

ADDITIONAL BENEFITS

Students will be able to:

- Analyze why some reactions start spontaneously while others are non-spontaneous.
- Account for the changes in the rate of a chemical reaction due to changes in temperature or concentration.
- Evaluate the effects of acid rain on the environment.
- Explain how the effects of acid rain may be dependent on the chemistry of the soil and water on which it falls.

PROGRAMS DETAILS

LENGTH:

28 minutes

SUBJECT AREAS:

Chemistry

AUDIENCE LEVELS:

Junior/Senior High

ORDER NUMBER:

1-9091SG

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