

LESSON EIGHT

What are characteristics of chemical reactions?

SCIENCE

Constructing Explanations, Engaging in Argument and
Obtaining, Evaluating, and Communicating Information

ENGLISH LANGUAGE ARTS

Reading Informational Text, Writing an Explanation

GRADE 8

45-60
minutes



PURPOSE

In this lesson, students learn about the characteristics of chemical reactions, which include change in color, state, and temperature. Students gather information from text and work with peers to understand chemical reactions.



STANDARDS

● Common Core State Standards

- Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples. CCSS.ELA-LITERACY.WHST.6-8.2.B
- Use precise language and domain-specific vocabulary to inform about or explain the topic. CCSS.ELA-LITERACY.WHST.6-8.2.D
- Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. CCSS.ELA-LITERACY.WHST.6-8.8
- Draw evidence from informational texts to support analysis, reflection, and research. CCSS.ELA-LITERACY.WHST.6-8.9



STANDARDS CONTINUED

● Common Core State Standards

- Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion. CCSS.ELA-LITERACY.SL.8.1.A

● Next Generation Science Standards

- Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. MS-PS-1-2

- Structures and Properties of Matter. PS1.A

Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms.

- Chemical Reactions. PS1.B

Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of reactants.

● Science and Engineering Practices

- Constructing explanations and designing solutions
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information



LEARNING GOALS

- Understand that substances react chemically in characteristic ways.
- Explain the characteristic ways in which substances react.



SUCCESS CRITERIA

- 1 Describe characteristics of chemical reactions.
- 2 Construct an explanation of chemical reaction characteristics.
- 3 Use appropriate content vocabulary.
- 4 Reference relevant and appropriate evidence to support explanation of the chemical reaction characteristics.



SUMMARY OF LESSON TASKS

- 1 Record and discuss initial thinking.
- 2 Read and annotate: [Middle School Chemistry Chapter 6](#).
- 3 Complete Double Entry Journal and discuss.
- 4 Write explanation.



CULMINATING TASK

Write a one to two-paragraph explanation in response to the question, “What are characteristics of chemical reactions?” Include information that demonstrates your understanding of these characteristics. Support your explanation with evidence from the demonstration, texts, discussions, and other sources. Cite your sources.

PART I: INTRODUCTION

ACTIVATE PRIOR KNOWLEDGE Ask students to think about what they have learned about chemical reactions thus far. Refer to the whole class chart constructed in Lesson Seven if necessary.

INTRODUCE THE TOPIC Explain that in today’s lesson, students will learn about characteristics of chemical reactions. Ask students, “What are characteristics of chemical reactions?” Give students time to consider the question and then ask them to create a list of possible characteristics of chemical reactions in their Science Notebooks. You might want to begin the list together to support student thinking before giving them time to complete this task on their own.



ANTICIPATED RESPONSE PEDAGOGICAL ACTION

If you notice that students have difficulty with the word characteristics, provide a definition and example of the word. Help students connect the definition of characteristics to chemistry. You may choose to use the periodic table as an example, discussing the characteristics of different elements.

RECORD AND DISCUSS INITIAL THINKING Give students time to work with a partner to discuss and compare their lists of characteristics of chemical reactions. Bring students together and create a group list of characteristics. Explain that you will refine the list at the end of the lesson.

PART II: GUIDED PRACTICE

READ AND ANNOTATE Ask students to locate their copy of [Middle School Chemistry Chapter 6](#) (http://www.middleschoolchemistry.com/pdf/chapter6/chapter6_student_reading.pdf). Today students read the second half of the chapter, pages 684 – 686. The text provides information describing the ways that substances react chemically in characteristic ways. Remind students to consider the question, “What are characteristics of chemical reactions?” as they read and annotate.



SUCCESS CRITERION EVIDENCE-GATHERING OPPORTUNITY

- Identify main ideas and supporting details.

As students read and annotate the text, gather evidence of learning by looking at student annotations. Check that students are accurately identifying the main ideas and supporting details in the text.

COMPLETE DOUBLE ENTRY JOURNAL AND DISCUSS After students read and annotate text, they work with a partner or two to record main ideas and supporting details in a Double Entry Journal. Bring the class together and first lead a discussion of the main ideas and supporting details in the text students recorded in their Double Entry Journals. Then, discuss the opening question, “What is a chemical reaction?”

Return to the list you created together at the beginning of the class period and revise the listed characteristics using the information students gathered from the text.



SUCCESS CRITERION

EVIDENCE-GATHERING OPPORTUNITY

- Identify and paraphrase main ideas and supporting details.

Gather evidence of learning by checking Double Entry Journals as students work to paraphrase main ideas and supporting details. During the whole class discussion, check students' developing understanding of chemical reactions. Pay attention to the language students use to describe chemical reactions and listen for ways students incorporate content vocabulary. Finally, note the degree to which students refer to information from the text or other sources to support them during discussion.



ANTICIPATED RESPONSE

PEDAGOGICAL ACTION

If during discussion you notice that students do not reference the text to support their responses, you might press for evidence and support by asking the following questions:

- What in the text makes you say that?
- How did you arrive at that conclusion?

PART III: CULMINATING TASK

WRITE EXPLANATION

In the final task, students construct an explanation of the characteristics of chemical reactions. Students use information from the text, discussion, and prior knowledge, to support their explanation. The explanation:

- provides an accurate description of the characteristics of chemical reactions (color change, change in state, precipitate, temperature change)
- demonstrates conceptual understanding of the characteristics of chemical reactions
- includes appropriate use of key content vocabulary
- references relevant and appropriate evidence to support explanation



ADDITIONAL LESSON RESOURCES

Background

- [Middle School Chemistry Teacher Guide](http://www.middleschoolchemistry.com/lessonplans/chapter6/lesson3) -
<http://www.middleschoolchemistry.com/lessonplans/chapter6/lesson3>

DOUBLE ENTRY JOURNAL: MIDDLE SCHOOL CHEMISTRY

Main ideas	Supporting details