LESSON THREE

What's different between an atom and a molecule?

SCIENCE

Constructing Explanations, Communicating Information

ENGLISH LANGUAGE ARTS

Reading Informational Text, Writing an Explanation

GRADE 8

45 - 60 minutes

PURPOSE

In this lesson, students begin to develop the understanding that molecules are made up of atoms. Students document their learning as they gather information from one video source and previous texts, and participate in discussions about the relationship between atoms and molecules. Students use their understanding to create a visual representation of atomic composition and write an explanation of the difference between an atom and a molecule.

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

- **Next Generation Science Standards**
  - Develop models to describe the atomic composition of simple molecules, and extended structures. MS-PS-1-1
  - 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.
- **Science and Engineering Practices**
  - Constructing explanations and designing solutions
  - Obtaining, evaluating, and communicating information

LEARNING GOALS

- Understand the distinctions between an atom and a molecule.

SUCCESS CRITERIA

1. Describe the difference between an atom and a molecule.
2. Reference relevant and appropriate evidence from text(s) and discussions to support explanation of the differences between an atom and a molecule.

SUMMARY OF LESSON TASKS

1. Begin Triple Entry Journal in Science Notebooks.
2. Watch video: How Atoms Bond.
3. Revise Triple Entry Journal and discuss.
4. Create a visual representation.
5. Write explanation.

CULMINATING TASK

Write a one to two-paragraph explanation describing how an atom and a molecule differ. Using information from the video, discussions, and previous readings, explain how atoms and molecules differ from one another. Support your claim with evidence. Cite your sources.

PART I: INTRODUCTION

PART II: GUIDED PRACTICE

REVISE TRIPLE ENTRY JOURNAL AND DISCUSS Provide students with time to add to their Triple Entry Journals after they have viewed the video. Allow students to discuss their Triple Entry Journals in pairs or small groups, comparing responses to their questions, evidence for their responses, and reasoning.

SUCCESS CRITERION EVIDENCE-GATHERING OPPORTUNITY

- Describe the difference between an atom and a molecule.
- Reference relevant and appropriate evidence from text(s) and discussions.

While students are adding to their Triple Entry Journal, conduct spot checks as a way to gather evidence of students' ability to identify and record evidence. You can also observe and listen to students' use of the Triple Entry Journal as an aid in pair and small group discussions.

DISCUSS AS A WHOLE CLASS Students use their Triple Entry Journals to support them in participating in a whole class discussion about the question, "What is the difference between an atom and a molecule?".

- Summarize understanding of electric charge in atoms.
- Describe the difference between an atom and a molecule.
- Reference relevant and appropriate evidence from text(s) and discussions.

During the whole class discussion, check students' developing understanding of the distinctions between atoms and molecules. Note the language students are using to describe the differences, such as key vocabulary (e.g., element, bonds). Take this opportunity to assess the degree to which students are citing information from the video, or other readings, to support their discussion. You may choose to chart students' ideas during discussion. Charting is a useful strategy that can be used to document students' emerging understandings. It is a way to track student misconceptions, making explicit to students the points that require clarification. Use these points to guide instruction throughout the lessons in

the unit and to model how students can revise their thinking and keep track of it in their own Triple Entry Journals during and after discussion.

If students are having difficulty expressing their ideas during discussion, use probes to elicit student thinking. Suggested probes may include:

- What did you observe? What evidence do you have?
- What do we need to learn more about?

CREATE A VISUAL REPRESENTATION Ask students to visually represent their understanding of the differences between atoms and molecules. These are preliminary representations that will be refined over the course of the unit.

If students are having difficulty understanding that molecules are made up of atoms and are held together by chemical bonds, or the difference between elements and compounds, try using manipulatives to support students in physically modeling their preliminary understandings of the relationship or have them consult another resource. If you charted student responses during discussion, refer students to the chart and invite them to think about how a specific student response might be visually or physically represented.

PEER AND SELF-ASSESSMENT

After students complete their visual representation, they share the visual and explain it to a partner or small group. While students are explaining, listen to the language descriptors that students use to differentiate between atoms and molecules. You are looking for evidence that students understand the difference.

PART III: CULMINATING TASK

ADDITIONAL LESSON RESOURCES

Videos

- What's all the matter? Atoms and Molecules - https://www.khanacademy.org/partner-content/mit-k12/mit-k12-materials/v/atoms-and-molecules

TRIPLE ENTRY JOURNAL

What is the difference between an atom and a molecule?	How do you know? Record your evidence and include source.	Why do you think that? Include your reasoning.