

# Jan. 4D. Gr. 8 : Molecules

Content Area: **Science**  
Course(s):  
Time Period: **January**  
Length: **1Week**  
Status: **Published**

## Unit Overview

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It takes large amounts of different kinds of molecules to make a compound. This concept will show you more about how molecules interact to create a compound.

## Enduring Understandings

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By the end of the lesson, students should be able to:

- Recognize that atoms and molecules are too small to be seen.
- Identify examples of elements, compounds, molecules, and diatomic molecules.
- Describe how the properties of a compound are different from the properties of the elements that form the compound.
- Draw atomic diagrams of elements, compounds, and diatomic molecules.
- Build models of elements, compounds, and diatomic molecules.

## Essential Questions

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- **Overarching Question**
  - How can one explain the structure, properties, and interactions of matter?
- **Focus Question**
  - How do particles combine to form the variety of matter one observes?
- **Lesson Questions**
  - What are molecules, and how are the properties of molecules different than the atoms that they come from?
  - How can you predict when atoms will combine to form a molecule?
  - What are the characteristics of ionic compounds?

- **Can You Explain?**

- How are elements, compounds, and molecules all related to one another?

## **Instructional Strategies & Learning Activities**

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- [The Five E Instructional Model](#)

Science Techbook follows the 5E instructional model. As you plan your lesson, the provided Model Lesson includes strategies for each of the 5Es.

- [Engage \(45–90 minutes\)](#)

Students are asked to consider how atoms and elements make up substances. Students begin to formulate ideas around the Can You Explain? (CYE) question.

- [Explore \(90 minutes\)](#)

Students are asked to consider the differences among molecules and atoms, and how they combine to form compounds with different characteristics by using evidence from text and media assets.

- [Explain \(45–90 minutes\)](#)

Students construct scientific explanations to the CYE question by including evidence of how atoms form molecules and how molecules combine to form different compounds.

- [Elaborate with STEM \(45–135 minutes\)](#)

Students apply their understanding of molecules as they learn about how chemists develop polymers. Students will measure properties of adhesives and study covalent bonding and common compounds.

- [Evaluate \(45–90 minutes\)](#)

Students are evaluated on the state science standards, as well as Standards in ELA/Literacy and Standards in Math standards, using Board Builder and the provided concept summative assessments.

## **Integration of Career Readiness, Life Literacies and Key Skills**

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Students will work in small groups or partnerships to conduct investigations, build models or prototypes and present findings.

WRK.9.2.8.CAP.15	<p>Present how the demand for certain skills, the job market, and credentials can determine an individual's earning power.</p> <p>Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.</p> <p>Increases in the quantity of information available through electronic means have heightened the need to check sources for possible distortion, exaggeration, or misrepresentation.</p> <p>Multiple solutions often exist to solve a problem.</p>
WRK.9.2.8.CAP.12	Assess personal strengths, talents, values, and interests to appropriate jobs and careers to maximize career potential.
WRK.9.2.8.CAP.11	Analyze potential career opportunities by considering different types of resources, including occupation databases, and state and national labor market statistics.
TECH.9.4.8.IML.1	Critically curate multiple resources to assess the credibility of sources when searching for information.
WRK.9.2.8.CAP.2	Develop a plan that includes information about career areas of interest.
TECH.9.4.8.IML.3	Create a digital visualization that effectively communicates a data set using formatting techniques such as form, position, size, color, movement, and spatial grouping (e.g., 6.SP.B.4, 7.SP.B.8b).
WRK.9.2.8.CAP	Career Awareness and Planning
WRK.9.2.8.CAP.1	Identify offerings such as high school and county career and technical school courses, apprenticeships, military programs, and dual enrollment courses that support career or occupational areas of interest.
TECH.9.4.8.IML.4	Ask insightful questions to organize different types of data and create meaningful visualizations.

## **Technology and Design Integration**

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Technology is fully integrated using Discovery Techbook.

CS.6-8.8.1.8.DA.1	<p>Organize and transform data collected using computational tools to make it usable for a specific purpose.</p> <p>People use digital devices and tools to automate the collection, use, and transformation of data. The manner in which data is collected and transformed is influenced by the type of digital device(s) available and the intended use of the data.</p>
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## **Interdisciplinary Connections**

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LA.SL.8.4	Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation.
LA.RI.8.1	Cite the textual evidence and make relevant connections that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.
LA.W.8.1	Write arguments to support claims with clear reasons and relevant evidence.
LA.RI.8.4	Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts.

LA.W.8.7	Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.
LA.RI.8.7	Evaluate the advantages and disadvantages of using different mediums (e.g., print or digital text, video, multimedia) to present a particular topic or idea.
MA.6.RP.A.3	Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
LA.W.8.2	Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
LA.RI.8.8	Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient; recognize when irrelevant evidence is introduced.
LA.RI.8.10	By the end of the year read and comprehend literary nonfiction at grade level text-complexity or above, with scaffolding as needed.
LA.SL.8.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.
MA.8.EE.A.3	Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other.

## **Differentiation**

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### Struggling Students

1. Using a three-column chart, ask students to compare and contrast molecules, atoms, and compounds.
2. As new molecules are introduced in the Core Interactive Text, place labeled diagrams of them on the classroom wall for students to refer to throughout the lesson.

### ELL

1. Assist students in identifying familiar prefixes and/or words within words for each glossary term (for example, *hydroxide* is from the Greek word *hydro*, which means “water” and the French “*oxygène*” meaning oxygen, and (*ac*)*ide* meaning “acid”).
2. Encourage students to demonstrate their understanding by drawing concepts. For example, they can draw an atom, label the nucleus and electron shell, and show the charges on particles.

### Accelerated Students

1. Challenge students to describe and illustrate the differences between an acid, base, and salt, and to present their explanation to the class.
2. During the [Hands-On Activity: Modeling Compounds](#) in Elaborate, provide time for students to construct two or three slightly larger and more complex molecular models such as propane (C<sub>3</sub>H<sub>8</sub>), butane (C<sub>4</sub>H<sub>10</sub>), and ethanol (C<sub>2</sub>H<sub>5</sub>OH).

[Differentiation in science](#) can be accomplished in several ways. Once you have given a pre-test to students, you know what information has already been mastered and what they still need to work on. Next, you design activities, discussions, lectures, and so on to teach information to students. The best way is to have two or

three groups of students divided by ability level.

While you are instructing one group, the other groups are working on activities to further their knowledge of the concepts. For example, while you are helping one group learn the planet names in order, another group is researching climate, size, and distance from the moon of each planet. Then the groups switch, and you instruct the second group on another objective from the space unit. The first group practices writing the order of the planets and drawing a diagram of them.

Here are some ideas for the classroom when you are using differentiation in science:

- Create a tic-tac-toe board that lists different activities at different ability levels. When students aren't involved in direct instruction with you, they can work on activities from their tic-tac-toe board. These boards have nine squares, like a tic-tac-toe board; and each square lists an activity that corresponds with the science unit. For example, one solar system activity for advanced science students might be to create a power point presentation about eclipses. For beginning students, an activity might be to make a poster for one of the planets and include important data such as size, order from the sun, whether it has moons, and so on.
- Find websites on the current science unit that students can explore on their own.
- Allow students to work in small groups to create a project throughout the entire unit. For example, one group might create a solar system model to scale. Another group might write a play about the solar system. This is an activity these groups can work on while they are not working directly with you.

Differentiation in science gets students excited to learn because it challenges them to expand their knowledge and skills, instead of teaching the whole group concepts they have already mastered

## **Modifications & Accommodations**

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Refer to QSAC EXCEL SMALL SPED ACCOMMODATIONS spreadsheet in this discipline.

### **Modifications and Accommodations used in this unit:**

In addition to differentiated instruction, IEP's and 504 accommodations will be utilized.

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## **Benchmark Assessments**

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**Benchmark Assessments** are given periodically (e.g., at the end of every quarter or as frequently as once per month) throughout a school year to establish baseline achievement data and measure progress toward a standard or set of academic standards and goals.

**Schoolwide Benchmark assessments:**

Aimsweb benchmarks 3X a year

Linkit Benchmarks 3X a year

**Additional Benchmarks used in this unit:**

Pre and post assessments to measure growth.

**Formative Assessments**

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Assessment allows both instructor and student to monitor progress towards achieving learning objectives, and can be approached in a variety of ways. **Formative assessment** refers to tools that identify misconceptions, struggles, and learning gaps along the way and assess how to close those gaps. It includes effective tools for helping to shape learning, and can even bolster students' abilities to take ownership of their learning when they understand that the goal is to improve learning, not apply final marks (Trumbull and Lash, 2013). It can include students assessing themselves, peers, or even the instructor, through writing, quizzes, conversation, and more. In short, formative assessment occurs throughout a class or course, and seeks to improve student achievement of learning objectives through approaches that can support specific student needs (Theal and Franklin, 2010, p. 151).

**Formative Assessments used in this unit:**

See assessments located in links above.

**Summative Assessments**

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**Summative assessments** evaluate student learning, knowledge, proficiency, or success at the conclusion of an instructional period, like a unit, course, or program. Summative assessments are almost always formally graded and often heavily weighted (though they do not need to be). Summative assessment can be used to great effect in conjunction and alignment with formative assessment, and instructors can consider a variety of ways to combine these approaches.

**Summative assessments for this unit:**

See assessments located in links above.

## Instructional Materials

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See materials located in links above.

Discovery Techbook

Teacher made materials

Additional labs are available through NJCTL on-line curriculum

## Standards

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SCI.MS.PS1.A	Structure and Properties of Matter  Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals).
SCI.MS-LS1	From Molecules to Organisms: Structures and Processes  Emphasis is on developing models of molecules that vary in complexity. Examples of simple molecules could include ammonia and methanol. Examples of extended structures could include sodium chloride or diamonds. Examples of molecular-level models could include drawings, 3D ball and stick structures, or computer representations showing different molecules with different types of atoms.  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.
SCI.MS-PS1-1	Develop models to describe the atomic composition of simple molecules and extended structures.
SCI.MS-PS1	Matter and its Interactions