

Feb. 4B Gr.8: Characteristic Properties of Matter

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

Unit Overview

All objects maintain a certain color, odor, density, and reactivity regardless of their sample size. This concept will show you how an objects physical and chemical properties make up its everyday traits.

Enduring Understandings

Lesson Objectives

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

- Define matter.
- Identify the characteristic physical properties of matter.
- Identify the characteristic chemical properties of matter.

Essential Questions

- **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**
 - Why are certain physical properties of matter characteristic properties?
 - How do scientists investigate the characteristic chemical properties of a substance?
 - How are characteristic properties of matter used to differentiate matter?
- **Can You Explain?**

- How are characteristic chemical and physical properties alike, and how are they different?

Instructional Strategies & Learning Activities

- [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 presented with some examples of matter and an explanation of what matter is. Students begin to formulate ideas around the Can You Explain? (CYE) question.

- [Explore \(225 minutes\)](#)

Students investigate questions about different types of matter, such as how characteristic properties of matter can be used to differentiate matter, students complete a Hands-On Activity and conduct digital experiments to identify substances.

- [Explain \(45–90 minutes\)](#)

Students construct scientific explanations to the CYE question using examples of matter and comparing their characteristic physical properties to their chemical properties.

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

Students apply their understanding of characteristic physical properties as they learn about forensic science, investigate the relationship between solubility and temperature, and research how the physical property of the melting of water can affect wa

- [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 21st Century Themes and Career Exploration

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

CRP.K-12.CRP2

Apply appropriate academic and technical skills.

CRP.K-12.CRP5

Consider the environmental, social and economic impacts of decisions.

CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP11	Use technology to enhance productivity.
CRP.K-12.CRP9	Model integrity, ethical leadership and effective management.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP10	Plan education and career paths aligned to personal goals.
CRP.K-12.CRP12	Work productively in teams while using cultural global competence.
CRP.K-12.CRP3	Attend to personal health and financial well-being.

Technology Integration

Technology is fully integrated using Discovery Techbook.

Interdisciplinary Connections

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.6.SP.B.4

Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

MA.6.SP.B.5

Summarize numerical data sets in relation to their context, such as by:

Differentiation

Struggling Students ELL

1. Have the students compare and contrast the three states of matter.
2. Have the student summarize the process of examining a substance's chemical properties.

1. Assist students in identifying familiar prefixes and/or words within words (e.g. "composition" within "decomposition") for each term.
2. Discuss the definition of these prefixes and words, using this information to help define the terms.
3. Print and copy the [Scientific Explanation](#) before class. Have students use the printed document as they progress through the lesson. The Scientific Explanation handout is chunked. Chunking is an effective strategy to make the learning progression through the Scientific Explanation easier for students who are struggling or who are English Language Learners.

Accelerated Students

1. Using their previous knowledge of chemical properties and physical properties, ask students to brainstorm further S.T.E.M. connections to other disciplines.

[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

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

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

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

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

See materials located in links above.

Discovery Techbook

Teacher made materials

Additional labs are available through NJCTL on-line curriculum

Standards

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 the reactants.

Analyze and interpret data to determine similarities and differences in findings.

Analyzing data in 6–8 builds on K–5 and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.

Analyzing and Interpreting Data

Patterns

SCI.MS.PS1.A

Structure and Properties of Matter

SCI.MS-PS1-2

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

SCI.MS-PS1

Matter and its Interactions

Examples of reactions could include burning sugar or steel wool, fat reacting with sodium hydroxide, and mixing zinc with hydrogen chloride.

SCI.MS.PS1.B

Chemical Reactions

Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it.

6-8.MS-PS1-1.PS1.A

Structure and Properties of Matter

6-8.MS-PS1-1.PS1.A.1

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.

6-8.MS-PS1-2

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

6-8.MS-PS1-2.PS1.B

Chemical Reactions

6-8.MS-PS1-2.PS1.B.1

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 the reactants.

6-8.MS-PS1-1.PS1.A.2

Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals).