

## BPS Science Department Chemistry – Unit 2

### Chemistry Unit 2 – Physical Behavior of Matter (Introduction)

**Unit Overview:** In this unit, students will be able to explain and draw particle diagrams of the three properties of matter: solid, liquid and gas. Students will be able to describe the difference between a substance and a mixture, distinguishing between heterogeneous mixtures and homogeneous mixtures.

#### Essential Questions:

- What is matter and how is it classified?
- What is the difference between an element, compound, and mixture?
- How does the arrangement and properties of atoms determine the properties of matter?
- How are particle diagrams drawn for the three phases of matter?
- How are homogeneous and heterogeneous mixtures different?
- How is a mixture separated?
- How do differences in properties allow for physical separation of components of a mixture?

#### MST Standard 4 - Science

**Key Idea 3: Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity**

#### New York State Science Learning Standards Performance Expectations:

**HS-PS 1-3 Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.**

**HS-PS 2-6 Communicate scientific and technical information about why the particulate-level structure is important in the functioning of designed materials**

**HS-PS 1-10 Use evidence to support claims regarding the formation, properties and behaviors of solutions at bulk scales.**

**HS-PS 1-5 Apply scientific principles and evidence to explain how the rate of a physical or chemical change is affected when conditions are varied.**

**HS-PS 3-2 Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative position of particles (objects).**

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Time Frame	Skills, Practices or Expectations	Specific Standards / Performance Indicators	Resources	Content Vocabulary	Measurement of Student Learning
09.26.2022 - 10.07.2022	<p><b>Classification of Matter</b> List the properties of solids, liquids and gases. Explain the difference between elements, compounds, and mixtures. Distinguish between homogeneous and heterogeneous matter Use the physical properties of a substance in a process to be able to separate a mixture</p>	<p><b>MST Standard 4 Science</b> <b>Key Idea 3</b> <b>3.1</b> - Explain the properties of matter in terms of the arrangement and properties of the atoms that compose them. <b>3.1q</b> - Matter is classified as a pure substance or as a mixture of substances. <b>3.1r</b> - A pure substance (element or compound) has a constant composition and constant properties throughout a given sample, and from sample to sample. <b>3.1s</b> - Mixtures are composed of two or more different substances that can be separated by physical means. When different substances are mixed together, a homogeneous or heterogeneous mixture is formed. <b>3.1t</b> - The proportions of components in a mixture can be varied. Each component in a mixture retains its original properties. <b>3.1u</b> - Elements are substances that are composed of atoms that have the same atomic number. Elements cannot be broken down by chemical change. <b>3.1jj</b> - The structure and arrangement of particles and their interactions determine the physical state of a substance at a given temperature and pressure. <b>3.1kk</b> - The three phases of matter (solids, liquids, and gases) have different properties. <b>3.1nn</b> - Differences in properties such as density, particle size, molecular polarity, boiling and</p>	<p>Castle Learning- Access through Clever <a href="#">BPS Science Department Recommended Virtual Labs</a> – must be logged into BPS google document account through BPS Gmail account to access <i>Holt NY Chemistry</i> Textbook Chapters 1, 2, 13 <a href="#">Regents Chemistry Reference Tables</a> - Table S <a href="#">Dynamic Periodic Table</a> BPS Science K-12 Schoology Folder 9-12 Resources Chemistry Resources <b>PhET Interactives:</b> <a href="#">States of Matter Basics</a>  <ul style="list-style-type: none"> <li><a href="#">States</a> - How particles move in solids, liquids, gases &amp; when heated/ cooled</li> <li><a href="#">Phase Changes</a> - (click phase diagram on right) - When particles of various substances change phase due to temp &amp; pressure change</li> </ul> <a href="#">States of Matter</a> - basics plus:           <ul style="list-style-type: none"> <li><a href="#">Interaction</a> - View potential energy / forces between atoms in Ne &amp; Ar</li> </ul> <b>Virtual PPTs:</b> <ul style="list-style-type: none"> <li><a href="#">Heterogeneous Mixtures</a> -Examines suspensions / colloids</li> </ul> <b>CK12</b> (include real world connections)           <ul style="list-style-type: none"> <li><a href="#">States of Matter</a> – Simulation - Identify matter as a physical property; Identify shape / volume of matter as fixed or not fixed</li> <li><a href="#">Air Matters</a> - Interactive - Distinguish atoms, molecules, and mixtures</li> </ul> </p>	<ul style="list-style-type: none"> <li>chromatography</li> <li>condensation</li> <li>deposition</li> <li>distillation</li> <li>evaporation</li> <li>filtration</li> <li>homogeneous</li> <li>heterogeneous</li> <li>sublimation</li> <li>vaporization</li> </ul>	<ul style="list-style-type: none"> <li>Ticket Out</li> <li>Think-Pair –Share</li> <li>Formative Assessment</li> <li>Weekly Quiz</li> <li>Unit Test</li> <li>Homework</li> <li>Review Questions</li> <li>DDI process using data from Edoctrina &amp; Castle learning to generate data</li> </ul> <p><b>Higher Level Questions:</b> Regents Exam: <a href="#">January 2020</a> Question 54, 55 <a href="#">January 2019</a> Question 66</p>

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		freezing points, and solubility permit physical separation of components of a mixture.	<ul style="list-style-type: none"><li>● <a href="#">Camping</a> – Simulation - Distinguish physical and chemical changes; Observe physical equilibrium; Observe chemical changes at macro and micro level</li></ul> <p><b>Molecular Workbench</b> <a href="#">States of matter</a> – Interactive - Students are able to create a report to print or share</p> <p><b>PBS Learning Media</b> <a href="#">States of Matter</a> – Tutorial - Vocabulary videos - Students can take notes, view animations, and can share a link to their work</p> <p><b><a href="#">Alma LeVant Hayden's Contributions to Regulatory Science*</a></b></p> <ul style="list-style-type: none"><li>● Article: Alma LeVant Hayden played a pivotal role in advancing FDA's drug analysis capabilities. An expert in spectrophotometry and chromatography, she helped to implement these techniques in FDA's drug review and enforcement work.</li></ul> <p><b>Z Space Activities (code)</b> <b>States of Matter (A333)</b> Compare the states of matter Identify which elements exist in each state at standard temperature and pressure also the effect of bonding on properties <a href="#">Teacher Resource pdf</a> <a href="#">Student Resource pdf</a></p>		
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### Resources

<http://ngss.nsta.org/Classroom-Resources.aspx> - Searchable NYSSLS/NGSS aligned resources curated by NSTA

[Buffalo Public Schools Science Department Chemistry Webpage](#) – BPS chemistry curriculum resource hub

[BPS Science Department Recommended Virtual Labs](#) – Virtual lab resources with embedded links to virtual labs and student sheets. Must be logged into BPS google document account through BPS Gmail account to access.

[NYS Regents Chemistry Exams 2012-2020](#) NYSED's Office of State Assessment webpage for released Regents Chemistry Examinations

[NYS MST Science Learning Standards Physical Setting/Chemistry](#) – Current NYS Physical Setting/Chemistry Standards

[NYS P-12 Science Learning Standards \(HS\)](#) – NYSSLS High School Standards

[Regents Chemistry Reference Tables](#) – Reference Tables for Regents Chemistry

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<p><b>ELL Enhancements</b></p> <p>To access <a href="#">hyperlinked</a> material, you must be logged into your BPS Google Drive</p>	<p><b>Listening</b></p> <ul style="list-style-type: none"> <li>● <b><u>Cross- Linguistic Practices:</u></b> Gives students opportunities to make connections between what they hear and their home language (For example, allow students to listen to a passage and identify cognates.)</li> <li>● <b><u>Build background knowledge</u></b></li> <li>● <b><u>Activating Prior Knowledge</u></b> Activating prior knowledge means both eliciting from students what they already know and building initial knowledge that they need in order to access upcoming content</li> <li>● <b><u>Activating Prior Knowledge</u></b></li> <li>● <b><u>Visuals</u></b> - GIFs, pictures- will assist students in understanding what they are listening to. Use <a href="#">visual thinking strategies</a> to set the lens for learning.</li> <li>● Video to review or introduce a topic – use <a href="#">closed captioning</a> to help students see the words and pronunciations while they listen to the content.</li> <li>● <b><u>Word stretching / Vowel stretching</u></b> when instructing allows student to listen closely to the pronunciation of the word</li> <li>● <b><u>Performance Level Descriptors</u></b> this document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of listening Scroll for grades 9-12.</li> </ul>	<p><b>Speaking</b></p> <ul style="list-style-type: none"> <li>● <b><u>Sentence Frames</u></b> - to begin a sentence - such as <i>Evolution is...</i> or <i>I think that evolution is...</i></li> <li>● <b><u>Academic Conversation Starters:</u></b> Have a visual of a list of academic sentence starters that students can refer to in a discussion. Examples include- I expect ____ to happen. My data shows that... This helps students have a more science focused dialogue.</li> <li>● <b><u>Choral Reading</u></b> - To build fluency, self-confidence and motivation with <a href="#">reading/speaking</a></li> <li>● Create <b><u>movement</u></b> to go with the word. Movement can be a motivating factor, as well as a kinesthetic tool for conceptualizing the rhythm and flow of fluent reading while triggering brain function for optimal learning</li> <li>● <b><u>Performance Level Descriptors</u></b> This document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of speaking. Scroll for grades 9-12</li> </ul>	<p><b>Reading</b></p> <ul style="list-style-type: none"> <li>● <b><u>Supplementary Text</u></b> to help reinforce concepts. If necessarily, use lower Lexile levels to ensure comprehension.</li> <li>● <b><u>Visual Aids</u></b> - Pictures or models to support vocabulary words and concepts</li> <li>● Video to review or introduce a topic - use <a href="#">closed captioning</a> to help students read along while they listen to the content</li> <li>● <b><u>4 Square / Frayer models</u></b> to help students gain a deeper understanding of vocabulary.</li> <li>● <b><u>Highlighting</u></b> important text to assist students in answering questions after the reading.</li> <li>● <b><u>Chunking</u></b>-Break reading of text into chunks or paragraphs</li> <li>● <b><u>Vocabulary Morphology</u></b>- Morphology relates to the segmenting of words into affixes (prefixes and suffixes) and roots or base words, and the origins of words. Understanding that words connected by meaning can be connected by spelling can be critical to expanding a student’s vocabulary</li> <li>● <b><u>Performance Level Descriptors</u></b> this document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of reading. Scroll for grades 9-12.</li> </ul>	<p><b>Writing</b></p> <ul style="list-style-type: none"> <li>● <b><u>Sentence Frames</u></b> - to begin a sentence- such as <i>Biodiversity is...</i> or <i>An example of competition is....</i></li> <li>● <b><u>Cloze passages</u></b> with word banks</li> <li>● <b><u>Word banks</u></b></li> <li>● <b><u>Graphic Organizers</u></b> to help break down the writing process and organize thoughts</li> <li>● <b><u>Standards-based sentence stems</u></b></li> <li>● <b><u>Performance Level Descriptors</u></b> this document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of writing. Scroll for grades 9-12.</li> </ul>	<p><b>Instructional Accommodations (depending on the student’s needs)</b></p> <ul style="list-style-type: none"> <li>● <b>Extended time</b> for tests in class, projects and assignments</li> <li>● <b>Directions read.</b> Broken down as necessary</li> <li>● <b>Model</b> how to complete the activity in the lesson</li> <li>● <b>Oral simplification</b> of directions or questions</li> <li>● <b>Translated version</b> of test when available. Student may have both version English and native language version</li> <li>● Use of <a href="#">approved bilingual glossaries</a> from NYS in each subject</li> </ul>
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<p><b>Special Education Modifications</b></p> <p>Special Education students must have accommodations as per Individual Educational Plan (IEP)</p>	<p><b><u>Instructional</u></b></p> <ul style="list-style-type: none"> <li>● <b>Pre-teach</b> vocabulary</li> <li>● Use <b>picture vocabulary</b></li> <li>● Scaffold <b>Depth of Knowledge</b> questions</li> <li>● Provide copy of notes/<b>notes in “cloze”</b> form</li> <li>● Use of <b>Think, Pair, and Share</b> strategy to help process information</li> <li>● <b>Scaffold</b> written assignments with the use of <b>graphic organizers</b></li> <li>● Allow for <b>multiple ways to respond</b> (verbal, written, response board)</li> <li>● Provide <b>model of performance task</b></li> <li>● <b>Modify informational text</b> to fit the needs of the students</li> <li>● Provide a digital or paper <b>interactive notebook</b></li> <li>● Present complex <b>tasks in multiple ways</b></li> <li>● Provide <b>mnemonic strategies</b> for Chemistry concept</li> </ul>	<p><b><u>Technology:</u></b></p> <ul style="list-style-type: none"> <li>● <b>Audio</b> reading of text</li> <li>● <b>Text to type</b> functions</li> <li>● <b>Videos</b> to clarify/visualize Chemistry concepts</li> <li>● <b>Record class lecture/discussions</b> and make accessible to student</li> <li>● <b>Nearpod-</b> interactive presentations of notes</li> <li>● <b>Playposit</b> - show a video clip about the topic and add your own questions for them to answer as they watch</li> <li>● Allow students to type answers in chat on <b>Teams</b></li> </ul> <p><b><u>Other:</u></b></p> <ul style="list-style-type: none"> <li>● Arrange seating for maximum engagement and minimum distraction</li> <li>● Accessible lab space (counter level)</li> </ul>	<p><b><u>In Class Assessments</u></b></p> <ul style="list-style-type: none"> <li>● Provide <b>review packet or review sheet</b> of concepts covered on the test</li> <li>● Practice similar questions prior to the test</li> <li>● Provide <b>multiple options</b> for projects</li> <li>● Give a <b>timeline</b> of when things are due and remind them of the process often.</li> <li>● <b>Use of timer</b> in class</li> <li>● Break all complex tasks into chunks</li> </ul>
<p><b>Step Up to Writing</b></p> <p>Step Up to Writing materials can be found in BPS Science K-12 Schoology Folder 9-12 Resources Chemistry Resources Curriculum Materials</p>	<p><b><u>SUTW Strategy</u></b></p> <ul style="list-style-type: none"> <li>● Informal Outline</li> <li>● Color-Coding – Informative/Explanatory Text</li> <li>● Two-column notes</li> <li>● I-V-F Topic Sentence progressing to Four Step Summary Paragraph</li> <li>● CUPS – Capitalization, Usage, Punctuation, Spelling</li> <li>● Transitions</li> </ul>		
<p><b>Culturally and Linguistically Responsive Teaching (CLRT) in the Science Classroom</b></p>	<p>Materials, resources, and/or discussions address diverse cultural backgrounds and real-world applications</p> <ul style="list-style-type: none"> <li>● Artifacts (posters, charts, etc.) in the science classroom are representative of the cultures of the student population</li> <li>● All students are given an opportunity to engage in science discourse</li> <li>● Teacher demonstrates high expectations for all students</li> </ul> <p>CLRT resources which align to Science content are denoted with a *</p>		