### HMH SCIENCE DIMENSIONS 2018 Alignment TEMPLATE

#### **GRADE 8**

## **EPSD Unit 1: Structure and Properties of Matter First Marking Period**

Overview: Students build understandings of what occurs at the atomic and molecular scale. Students apply their understanding that pure substances have characteristic properties and are made from a single type of atom or molecule. They also provide a molecular level accounts to explain states of matter and changes between states. The crosscutting concepts of cause and effect, scale, proportion and quantity, structure and function, interdependence of science, engineering, and technology, and the influence of science, engineering and technology on society and the natural world provide a framework for understanding the disciplinary core ideas. Students demonstrate grade appropriate proficiency in developing and using models, and obtaining, evaluating, and communicating information. Students are also expected to use the scientific and engineering practices to demonstrate understanding of the core ideas.

Standards: (MS-PS1-1) Develop models to describe the atomic composition of simple molecules and extended structures. (MS-PS1-2) Analyze and interpret data on the properties of substances before and after the substances Instructional Days: 15-20

#### **Science Dimensions Program Resources Module J**

#### **Unit 1: The Structure of Matter**

Unit Video (the Eagle Nebula photographed by the Hubble Space Telescope); Why it Matters p. 2; Unit Starter p. 3; Vocabulary p. 3G; Unit Project p. 3I; Unit Connections p. 62; Unit Review pp. 63-66; Unit Performance Task pp. 67-68

**Standard for all Units:** (D) Interactive Multilingual Glossary; (D/P) Unit Pretest; (D) Lesson Quizzes; (D/P) Unit Tests

**Note:** Refer to the Curriculum Alignment Common Language (CACL) Guide to decipher acronyms.

Lesson 1: The Properties
of Matter pp. 4-21

D/P- WIM Questions p. 2

D/P- CYEI (digital picture) Students identify how they can tell the difference between the materials in two rocks? p. 5

P- ENB (prompt) As students explore the lesson, they consider ways in which two similar**Lesson 2:** Atoms and Elements pp. 22-39

D/P- WIM Questions p. 2

D/P- CYEI (digital picture) Why do silver and copper have similar properties? p. 23

P- ENB (prompt) Gather evidence to help explain how objects made of different materials can **Lesson 3:** Molecules and Extended Structures pp. 40-61

D/P- WIM Questions p. 2

D/P- CYEI (digital picture) How can both of these samples be pure phosphorus? p. 41

P- ENB (prompt) Gather evidence to help explain how the two samples can

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interact to determine if a chemical reaction has occurred.

**Objectives:** Students will: Develop a model of a simple molecule and describe its atomic composition. Analyze and interpret data to determine similarities and differences from results of chemical reactions between substances before and after they undergo a chemical process.

**Topics:** Describing Matter Changes in Matter Twenty-First Century Themes and Skills include: ● The Four C's ● Life and Career Skills Information and Media literacy.

**Essential Questions**: How is it that everything is made of stardust? What is the universe made of? Is it possible to tell if two substances mixed or if they reacted with each other?

looking objects could be distinguished from one another, p. 5 D/P- DTM Calculate Weight and Mass (Students explore and practice how to calculate the mass of an object if they know the weight in Newtons and the acceleration due to gravity. Students also rearrange the mathematical formula to solve for weight.) p. 8 P- ENB (prompt) Can a substance be identified by only its mass or weight? Students record evidence in their ENB. p. 9 D/P- Measure Volume with a Formula (Students find the volume of the box using the formula for a rectangular prism.) pp. 10-11 D/P- Measure Volume **Using Displacement** (Students explore images online to see how volume can be measured using displacement; students find the volume of the

have similar properties p. 23 D/P- HOL Activity Compare **Densities (Students** measure the mass and volume of several objects in order to calculate their density; students use density values to help determine the identities of the objects.) pp. 25-26 P- ENB (prompt) Students identify whether the two bowls they saw in the pictures earlier in the lesson could be made of two different elements. Students identify how they could identify the two different elements and record their evidence. p. 27 D/P- DTM Model the Scale of an Atom (Students compare numbers expressed in the form of a single digit times an integer power of 10 to understand the small size of atoms.) p. 28 D/P- Model Atoms and Elements (Students make

a sketch of the ring, using

both be pure phosphorus. p. 41 D/P- Describing the Composition of Matter (Students observe the arrangement of the atoms in the particle structure of three pure substances and record their observations in the table.) pp. 42-43 D/P- Atoms and Molecules (Students identify which of the models show atoms that have joined together.) p. 43 D/P- Compounds (Students observe each molecule model to determine which molecules are made up of the same types of atoms and which are made up of different types of atoms.) p. 43 P- ENB (prompt) Both white phosphorus and red phosphorus are made up only of phosphorus atoms. Does this mean they are both pure substances? Could they be compounds? Students answer questions and

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rock in the images by the amount of water that is displaces.) p. 11 D/P- HOL Activity Measure Density (Students measure the mass and volume of several objects in order to calculate density; students use both the formula method and the displacement method to determine the volume of the object.) pp. 12-13 P- ENB (prompt) Students think about the rocks at the beginning of the lesson and explain how they think their densities might differ. Students record evidence. p. 13 D/P- States of Matter (Students match the following states of matter to the image that best fits that state.) p. 14 P- ENB (prompt) How do the physical properties of the rocks at the beginning of the lesson differ? Are there physical properties that might differ, but that cannot be observed in the

patterns or colors to label which parts of the ring are composed of which types of atoms.) p. 28 D/P- LS Organize Items by **Properties (Students** develop a model for organizing sport balls by hollowness and mass: students should consider all the required criteria when they organize the various ball types in the table.) p. 30 D/P- The Periodic Table of the Elements (Students explore hotspots online, provided in the periodic table, to observe how elements are organized by their atomic number.) pp. 32-33 D/P- ENGIT Select an Element (Students analyze properties of elements to recommend the best choice for a thermoacoustic generator.) p. 34 P- ENB (prompt) The materials that were used to make the bowls are similar in many ways.

record evidence in their ENB. p. 44 D/P- DTM Identify Ratios (Students use ratios to describe the number of atoms in molecules of different substances.) p. 44 D/P- Analyzing the Structure of Matter (Students explore online to learn more about molecular structures.) p. 46-47 D/P- HOL Activity Model Molecules (Students develop models of substances that are made up of the same types of atoms but have different properties.) pp. 48-49 D/P- LS Evaluate Molecule Models (Students use diagrams to compare two models of DNA to determine how the models are alike and different; students also identify what they can learn about the structure of DNA from each model.) p. 51

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photos? Record evidence in ENB. p. 15 P- ENB (prompt) Students identify whether they think the rocks from the beginning of the lesson have different chemical properties and identify how they could test their claim. p. 16 P- LS On a separate sheet of paper, students make a graphic organizer to show the relationship among physical properties, chemical properties, and properties that depend on the amount of a substance present. p. 16 D/P- ENGIT Recommend Materials for a Design Problem (Students design a refrigerator using the materials in the table: students should analyze the substances' properties when making design choices.) p. 16

D/P- TIF (enrich)
Applications of Density pp.
17-18

Students identify what this might tell them about the relationship between the two elements. Students record evidence in their ENB. p. 34

D/P- TIF (enrich) People in Science: Henry Moseley, Physicist pp. 35-36 D- Hands-On Labs; Exploring Uses of Elements; Propose Your Own Path

D/P- Lesson Self Check pp. 37-39 D- Lesson Quiz D-Make Your Own Study

Guide

P- DI (ELL/RTI) p. 3G P- Extension p. 3G P- COLLAB p. 3H P- Connections to Other Disciplines p. 3H

D-Science Safety HB
D- CCC-Hb
D- ELA-HB
D- M-HB
D- SFP-HB

D/P- Relate Atom Type to **Properties (Students** explore images online to learn more about substances made up of atoms from the same group of elements in the periodic table.) p. 53 D/P- Different Structures from the Same Types of Atoms (Students explore online to learn more about the molecular structure of: oxygen, ozone, diamond and graphite.) pp. 54-55 P- ENB (prompt) How can the arrangement of atoms help explain how the white phosphorus and red phosphorus can both be pure phosphorus substances? Students record evidence in their ENB. p. 55 D/P- ENGIT Evaluate Cost vs. Performance (Students analyze the pros and cons of two different materials relative to the criteria and constraints.) p. 56 D/P- TIF (enrich) People in Science: Joseph Proust, Chemist pp. 57-58

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D- Hands-On Labs; Exploring Properties of Matter; Propose Your Own Path	D-ScienceSaurus Reference HB  D- VL How Are Atoms Structured?	D- Hands-On Labs; Molecules and Your Sense of Smell; Propose Your Own Path
D/P- Lesson Self Check pp. 19-21 D- Lesson Quiz D-Make Your Own Study Guide	D- VL What Trend Can You See in the Periodic Table?	D/P- Lesson Self Check pp. 59-61 D- Lesson Quiz D-Make Your Own Study Guide
P- DI (ELL/RTI) p. 3G P- Extension p. 3G P- COLLAB p. 3H P- Connections to Other Disciplines p. 3H		P- DI (ELL/RTI) p. 3G P- Extension p. 3G P- COLLAB p. 3H P- Connections to Other Disciplines p. 3H
D-Science Safety HB D- CCC-HB D- ELA-HB D- M-HB D- SEP-HB D-ScienceSaurus Reference HB		D-Science Safety HB D- CCC-HB D- ELA-HB D- M-HB D- SEP-HB D-ScienceSaurus Reference HB
D- VL The Properties of Matter		

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	Curriculum Alignment Common Language (CACL) Guide 6-8				
Acronym	Word/Phrase	Description			
CER	Claims Evidence Reasoning	Students make a claim and gather evidence along the way (during EXPLORATORY activities) to support claim.			
ССС-НВ	Crosscutting Handbook	Students who need extra support in grasping concepts or to refresh student knowledge of skills.			
CYEI	Can You Explain It	Lesson phenomenon used to ENGAGE students in learning at the beginning of the lesson.			
CYSI	Can You Solve It	Lesson phenomenon used to ENGAGE students in learning at the beginning of the lesson.			
D	Digital	Program resources and features in interactive digital form.			
DI (ELL/RTI)	Differentiated Instruction (English Language				
Extension	Learner/Response to Intervention)	A page that lists all learning activities used to			
COLLAB	Collaboration	differentiate learning, engage students in collaborative			
Connections	Connections to Other Disciplines	activities and connect learning to other subjects.			
to Other					
Disciplines					
DTM	Do the Math	Integrated subject learning.			
ENB	Evidence Notebook	Student notebook or journal used to gather evidence during EXPLORATORY learning activities to support their claims.			
ENGIT	Engineer It	Integrated subject learning.			
ELA-HB	English Language Arts Handbook	Students who need extra support in grasping concepts or to refresh student knowledge of skills.			
HOL	Hands-On Lab	Activities or experiments that enable students to demonstrate scientific procedures and analysis.			
LS	Language SmArts	Integrated subject learning.			

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M-HB	Math Handbook	Students who need extra support in grasping concepts or to refresh student knowledge of skills.
Р	Print	Program resources and features in print form.
SEP-HB	Science and Engineer Practices Handbook	Students who need extra support in grasping concepts or to refresh student knowledge of skills.
TIF	Take It Further (enrich)	Enrichment activities for students in digital or print.
VBP	Video Based Project	Real life videos related to science and/or engineering that enable students to demonstrate mastery of performance expectations.
VL	Virtual Lab	Fully interactive simulations in which students perform experiments, collect data and answer questions.
WIM	Why It Matters	Questions related to lessons within each unit that asks students to consider how science affects the world around them.
YSI	You Solve It (Simulation)	Open-ended simulation-based learning with multiple answer options.