



Lesson Exemplar for Science

Quarter 2 Lesson

COVERNMENT PROPERTY E

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IMPLEMENTATION OF THE MATATAG K TO 10 CURRICULUM

Lesson Exemplar for Science Grade 8 Quarter 2: Lesson 3 of 6 (Week 4) SY 2025-2026

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SCIENCE / QUARTER 2 / GRADE 8

I. CURRICULUM CONTE	ENT, STANDARDS, AND LESSON COMPETENCIES					
A. Content Standards	 The learners learn that: 1. The use of timeline and charts can illustrate scientific knowledge of the structure of the atom has evolved over time. 2. The current structure of the atom includes subatomic particles, their symbol, mass, charge, and location. 3. Elements and compounds are identified as pure substances. 4. The periodic table is a useful tool to determine the chemical properties of elements. 					
B. Performance Standards	B. Performance Standards By the end of the Quarter, learners demonstrate an understanding of the structure of the atom and understandings have changed over time. They draw models of the atom and use tables to represent the propresent understanding of the periodic table by idential elements, their symbols, their valence electrons, and their positions within the groups and periods. They design create timelines or documentaries as interesting learning tools.					
C. Learning Competencies and Objectives	 Learning Competency Describe the properties of pure substances as: having fixed chemical compositions, examples of which are elements and compounds, and that all atoms of an element have a unique number of protons. Learning Objectives Students should be able to: explain the differences among elements. differentiate pure substances, whether they are elements or compounds. identify the classification of compounds; and differentiate compounds and molecules. 					
D. Content	The following topics will be discussed: Pure substances with the following subtopics: 1. discovery and occurrence of elements; 2. compounds; and 3. molecules					
E. Integration	Integration of identified Sustainable Development Goals related issues or information SDG 7, SDG 3, SDG 6, and SDG 13.					

II. LEARNING RESOURCES

Helmenstine, A. M., PhD. (2020, February 24). What are the elements in the human body? Retrieved from: <u>https://www.thoughtco.com/elements-in-the-human-body-p2-602188</u>

Madriaga, E. (2015). Science links: Worktext for scientific and technological literacy. Rex Books Store Inc. Silberberg, M. (2013). Chemistry: The molecular nature of matter and change. McGraw-Hill Education. Zumdahl, S.S., Zumdahl, S.A, & DeCoste, D. (2018). Chemistry. 10th Ed. Cengage Learning

III. TEACHING AND LEARNING PROCEDURE				N	OTES	το τε	ACHEF	IS			
A. Activating Prior Knowledge	DAY 1. SI	1 hort Review Refer to the gures. Atomic	e periodic table a c mass should be	nd write the mi e the relative ato	ssing informati omic mass in w	on on the followin hole numbers.	Dear could work electr	teache be doi using s onic vi	r, the s ne as a slides o sual ai	short re class b or non- ds.	view oard
		Element	Ions	Atomic Number	Atomic Mass	Atomic Symbol	It can or by	be giv table i	en as s n a gro	strips (r oup.	ows),
		Au	loss of 1e-				Answ	er:			
			A 13+				Element	Ions	Atomic Number	Atomic Mass	Atomic Symbol
			Al				Au Gold	Au*	79	197	¹⁹⁷ ₇₉ Au
			133X +				Aluminum	133Cs +	55	133	27 ₁₃ AI5*
			loss of 2e-	12			Cesium Mg	Mg ²⁺	12	24	¹³³ ₅₅ Cs ⁺ ²⁴ ₁₂ Mg
			loss of 3e_		27		Co Cobalt	Cos+	27	58	⁵⁹ 27Co ³⁺
	2. F	eedback (Op This optio erformance or revious day/v	t ional) nal sub-compo products done veek or lesson. n	nent involves through homew leeds to refer to	giving qualita ork or classroo the previous ea	ative feedback to om activity from the cemplary.	o e				
B. Establishing Lesson Purpose	1. Le m cc	esson Purpos Matter can atter compos omposed of tw	e be classified a ed of one kind o or more kinds	ccording to its of atom, while of atoms that a	composition. T there are thos re chemically c	There are forms on se forms of matte combined.	r r				

To build the lesson purpose, ask the students how many types of atoms are needed to form the listed substances: a. oxygen gas b. water c. copper wire d. salt Afterward, provide the guide questions for the week's lecture: If atoms are building blocks of matter, what makes each matter unique? How do I differentiate substances?	
 2. Unlocking Content Vocabulary Ask the students to arrange the set of jumbled letters. All letters must be used to form a word. t m e e l 1 n e d o c u m o n p e 1 1 e m u c o Afterward, ask the students about what they know about the key terms. Point of discussion: Upon unlocking the terms, teachers may introduce the meanings of the terms by asking the students to use them in a sentence. After enlisting the sentences, use them to discuss the meanings of the key terms from the dictionary. Here are the dictionary meanings from the Merriam-Webster: a. Element (as a noun) a constituent part: a part of mathematical figures, a part of a distinct group within a larger group or community, one of the necessary data or values of a calculation, a subdivision of a military unit. b. compound (as a noun) a fenced or walled-in area containing a group of buildings and especially residences. 	<text><text><image/></text></text>

	<i>c. molecules</i> (as a noun) a group of atoms bonded together, representing the smallest fundamental unit of a chemical compound that can take part in a chemical reaction.	
	The main goal of this discussion is to introduce pure substance.	
	 Elements and Compounds are types of matter. To be specific, they are called pure substances. A pure substance is a matter with a fixed composition and identical properties. Elements are composed of atoms with different numbers of protons. As previously discussed, an element's identity could be determined by its atomic number. This atomic number is distinct per element and numerically equal to the number of protons within the atom. As such, differences in the number of protons within an atom make an element distinguishable from one another. Take note that elements can no longer be divided into simpler substances. As such, they can undergo chemical reactions to produce new substances. More often, the compounds have different properties compared to the elements constituting the compound. 	
C. Developing and Deepening Understanding	DAY 2 SUB-TOPIC 1: Discovery and Occurrence of Elements 1. Explicitation	
	Now students know the key terms to be used in the discussions. Ask the students to identify the subsystems of the earth.	The visual aids could be a presentation slide or cartolina.
	Upon identifying, ask them what phases of matter are present in each subsystem. Relate this to the presence of elements in the environment. Some elements naturally occur in a gas form such as oxygen, which is present in our atmosphere, while there are elements that occur in solid form found in our geosphere such as copper.	You may use this photo to present the subsystems of the earth:
	Tell them that elements are also found in life forms (biosphere), as living things are also an example of matter.	

2. Worked Example

Tell the students to identify which element is naturally occurring in each subsystem. Take note that multiple elements could be present in a subsystem.

element	subsystem
hydrogen	hydrosphere
iron	lithosphere
carbon	geosphere
helium	biosphere
silver	
phosphorous	



Image Source: ph.pinterest.com

Point of discussion:

Afterward, discuss with the students that elements could be further classified based on their structure. Elements could either be metal or non-metal. This classification may hint at whether an element will be abundant in a specific subsystem of the Earth.

Ask the question: How do we differentiate metal from nonmetal?

metal	nonmetal
Good conductor of heat and electricity	Mostly insulators
Lustrous Do not exhibit lus	
Malleable and ductile	Brittle
High tensile strength	Low tensile strength
High melting points	Low melting points
High densities	Low densities

Most of the metals are solid in form except mercury (Hg); as such, most of them are found in our geosphere. Metals are also mixed in water in the form of charged particles (ions). Though there is a variety of possible forms of nonmetals in the environment, they are primarily found in gas forms, such as noble gases like helium, neon, and argon, and halogens, such as fluorine and chlorine. Nonmetals could also be found in our geosphere as they could be in solid forms, such as sulfur, carbon, and iodine.

Activity 1.

Elements are also abundant within the living organisms. Metals can be found in our body in the form of charged particles as they partake in our metabolism; most nonmetals constitute the structure of our body, such as carbon, hydrogen, and oxygen, which are building blocks for substances within our body. Find out more in this link on the essential elements of the human body. Link: https://www.thoughtco.com/elements-in-the-human-body-p2-602188

Students can work in groups or individually. Let the students share their responses and reflections.

Wrap up for the day

All in all, with the 118 discovered elements, 90 were found to occur in nature in appreciable amounts; four (4) elements occurred in nature due to radioactive decay. At the same time, the rest are elements that were artificially discovered in the laboratory. All of them have different abundances on the Earth.

3. Lesson Activity

Activity 2.

See Learning Activity Sheet: *Activity* #2: *Elemental Story*. This could be given as homework ahead of time to give students ample time to prepare before the actual presentation.

DAY 3 SUB-TOPIC 2: Compounds

1. Explicitation

Let the students watch the video titled: What distinguishes compounds from molecules?

See Learning Activity Sheet: Activity #1: Elements and Compounds in the Body

Expected Responses:

- *Oxygen (O),* together with hydrogen, forms water, the primary solvent found in the body and is used to regulate temperature and osmotic pressure.
- *Carbon (C)* has four bonding sites for other atoms, which makes it the critical atom in living organisms. Carbon chains build carbohydrates, fats, nucleic acids, and proteins. Breaking bonds with carbon is an energy source.
- *Hydrogen (H)* is found in water and all organic molecules.
- *Nitrogen (N)* found in proteins and nucleic acids that make up the genetic code.
- *Calcium (Ca)* is the most abundant mineral in the body. It's a structural material in bones, but it is essential for protein regulation and muscle contraction.
- *Phosphorus (P)* is found in the molecule ATP, which is the primary energy carrier in

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	 Refer to the link: https://www.youtube.com/watch?v=zRiEecfWuSQ Afterward, ask the following questions: What are the substances formed when elements are chemically combined? How do you differentiate compounds and molecules? 2. Worked Example When elements are chemically combined, they form a substance called a compound. Review the substances identified during the first meeting. Ask them which is an element, compound, or molecule. a. oxygen gas b. water c. copper wire b. water d. salt Process their answers and tell the students about the chemical structure of each substance. a. Oxygen Gas is an example of a molecule. It is formed by two oxygen atoms. b. Water is an example of a molecule and a compound. It is formed by the combination of two different elements. One oxygen atom bonded to two hydrogen atoms. c. Copper Wire is an element. It is made up of copper atoms but are not chemically bonded. d. Salt is a compound. It is formed by the combination of sodium and chlorine. But is it a molecule? Point of discussion: Based on the examples cited, water and salt are both compounds. Water is formed by the combination of hydrogen atoms and oxygen atoms; to be more specific, the chemical reaction is below. 	 cells. It's also found in bones. <i>Potassium (K)</i> is an important electrolyte that transmits nerve impulses and regulates the heartbeat. <i>Sodium (Na)</i> Like potassium, it is used for nerve signaling. Sodium is one of the electrolytes that helps regulate the amount of water in the body. <i>Chlorine (Cl)</i> is an important negatively charged ion (anion) to maintain fluid balance. <i>Magnesium (Mg)</i> is involved in over 300 metabolic reactions. It's used to build the structure of muscles and bones and is an essential cofactor in enzymatic reactions. <i>Sulfur (S)</i> the bonds sulfur forms help give proteins the shape they need to perform their functions.
	$\begin{array}{c} \hline \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $	Image Source: <u>kids.britannica.com</u>

The illustration shows that the formation of compounds follows the **Law of Definite Proportion.** This means that the ratio of atoms in the reactants that produce a new substance will always be the same as that of the products. As shown, there are a total of four (4) atoms of hydrogen that react with two (2) atoms of oxygen, producing two particles of water. These two particles of water are made up of four (4) hydrogen atoms and two (2) oxygen atoms as well. Let's look closer at the structure of water. They are made up of hydrogen and oxygen.

Ask the students: What type of elements are hydrogen and oxygen? They are covalent compounds, a type of compound formed by two or more nonmetal elements.

How about the structure of salt? **Ask the students:** What type of elements are sodium and chlorine?



Image Source homework.study.com

Sodium is a metal element, while chlorine is a nonmetal. The combination of metal and nonmetals are called **ionic compounds**.

Most of the pure substances found on Earth are in the form of compounds. Compounds could also be further classified as base, acid, or salt. These could be determined by pH indicators. **Indicators** change color depending on their reactions with bases and acids, while salts are usually the result of reactions between bases and acids.

3. Lesson Activity

Activity 3.

In this activity, you will discover some compounds and molecules that are used at home. Look for three substances or materials for each category. Read its label and choose one "active ingredient"; afterward, identify whether it is a covalent or ionic compound. Do it by completing the table.

Take Note: DO NOT TASTE THE CLEANING AND PERSONAL HYGIENE SUBSTANCES.

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See Learning Activity Sheet: Activity #3. Compounds at Home

Dear teacher, feel free to use visual representation of the molecules listed so students can appreciate the discussions.

SUB-TOPIC 3: Molecules

1. Explicitation

As already shown in the previous video, elements, when chemically combined, form molecules. These are composed of two or more atoms. **Ask this question:** Are molecules a type of compound?

2. Worked Example

Tell the students to refer to the following photo and ask them to describe the structure of each photo.



Point of discussion:

Process students' responses. All covalent compounds are in the form of molecules, but not all molecules are compounds.

Some nonmetal elements naturally exist in the environment as

- A. **homonuclear diatomic molecules**. This means that the molecules are made of two similar atoms. As shown in the photo, oxygen is diatomic in our environment. Aside from oxygen (O₂), other examples are H₂, N₂, Cl₂, F₂, Br₂, and I₂; because they are composed of the same elements, sometimes they are considered diatomic elements, as they are the elemental form of hydrogen, nitrogen, oxygen, and halogens in the environment. *Homonuclear* means that the composition of the bonded atoms' nuclei is similar.
- B. Few elements' atoms could chemically combine with themselves more than once; these homonuclear polyatomic molecules are known as the element's **allotropes**. Ozone is an allotrope of oxygen, while tetra phosphorous is an allotrope of phosphorous. Among all elements, carbon has the most allotropes,

Image sources used for the Worked Example:

img.freepik.com

researchgate.net

psiberg.com

	 some of which are diamond and graphite. Take note that they are not compounds. C. When distinct nonmetal elements are combined, their structure could be heteronuclear diatomic or polyatomic molecules. The heteronuclear diatomic molecules are made of two elements, while polyatomic molecules are made of two or more elements with three or more atoms. These are compounds. Some examples of heteronuclear diatomic molecules are HCl, HF, and CO. Some examples of polyatomic molecules are H₂O, H₂S, NH₃, CO₂, and C₂H₄. As shown, even if the molecules are made of two distinct elements, the combination of these molecules is made of three or more atoms. 3. Lesson Activity A. Do the activity as directed. 	See Learning Activity Sheet: Activity #4: What am I?
D. Making Generalizations	 Learners' Takeaways Prompt: Use the new words you learned in the lessons to create a concept map that illustrates what I learned about classifying pure substances. Reflection on Learning Guide Questions: How do the things I learned this week help me in my everyday life? What topics should I still review to build mastery? What should I do to master those topics? 	

IV. EVALUATING LEARN	NOTES TO TEACHERS	
A. Evaluating Learning	 DAY 4 1. Formative Assessment Test I. Classify the following materials as elements or compounds. Put a checkmark on the appropriate column. 	Homework could be the recommended activity if time constraints affect the class session.

substance or material	element	compound
a. platinum		
b. CH ₃ COOH (vinegar)		
c. He (helium)		
d. HCl (muriatic acid)		
e. Cl ₂ (chlorine gas)		
f. AgCl (silver chloride)		
g. gold bar		

Test II. Further, the identified compounds in Test I could be classified according to their structure. List the name of the substance in the appropriate column.

covalent compound	ionic compound

Test III. Referring to Test I, which among them are molecules? Tell whether they are diatomic molecules or polyatomic molecules, which are homonuclear and heteronuclear. Put an "x" mark on the appropriate column.

	Molecules that I have identified on Test I.	Homonuclear	Heteronuclear	Diatomic	Polyatomic	
B. Teacher's Remarks	2. Homework (Option Note observations on a of the following areas:	nal) ny Effecti	ve Practices	Problems	Encountered	Homework could also be a parallel activity to the recommended activities. The teacher may take note of some observations related to
	strategies explored materials used					the effective practices and problems encountered after utilizing the different strategies, materials used, learner engagement, and other related stuff.
	learner engagement/ interaction Others	,				Teachers may also suggest ways to improve the different activities explored/lesson exemplar.

C. Teacher's ReflectionReflection guide or prompt can be on: • principles behind the teaching What principles and beliefs informed my lesson? Why did I teach the lesson the way I did?Teacher's re lesson cond essential an improve praconsider this the LAC/Co• students What roles did my students play in my lesson? What did my students learn? How did they learn?Teacher's re lesson cond essential an improve praconsider this the LAC/Co• ways forward What could I have done differently? What can I explore in the next lesson?What can I explore in the next lesson?	s reflection in every onducted/facilitated is and necessary to practice. You may also this as an input for 'Collab sessions.
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