Unit Plan Template

Subject Area	Science
Grade Level	9
Topic	Matter and Chemical Change
Length of Unit (days)	March 9 - March 31

Desired Results

Established Goals – GLO(s):

Matter and Chemical Change

SLO 1 - Investigate materials, and describe them in terms of their physical and chemical properties
SLO 2 - Describe and interpret patterns in chemical reactions
SLO 3 - Describe ideas used in interpreting the chemical nature of matter, both in the past and present, and identify example evidence that has contributed to the development of these ideas
SLO 4 - Apply simplified chemical nomenclature in describing elements, compounds and chemical reactions

Understandings:

Students will understand …

- How to work safely with chemicals and in a lab setting
- Different properties of materials and how to classify them by their properties
- How to identify a chemical reaction versus a physical reaction
- How the periodic table was set up
- How to use the periodic table to determine information about atoms
- Molecular vs Ionic compounds
- Naming of compounds
- How to use ion charges to predict compounds
- How compounds can be drawn or modelled
- How to properly represent chemical reactions in word equations and chemical formulas

Essential Questions:

How do we determine the properties of a variety of different substances?
How do different substances interact?
How do we know when a chemical reaction has taken place?
How do we represent chemical compounds – pictorially and symbolically?
What is the periodic table?
How can we use the periodic table to determine important information about elements?
Can we predict compound formation using the periodic table?
How can we represent a chemical reaction?
What is a compound?
Can we alter how fast a chemical reaction occurs?

Key Concepts:

- Workplace Hazardous Materials Information System (WHMIS) and safety
- substances and properties
- endothermic and exothermic reactions
- reactants and products
- conservation of mass
- factors affecting reaction rates
- periodic table
- elements, compounds and atomic theory
- chemical nomenclature (introductory treatment)

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Prior understandings…

- Grade 8 Science, Unit A: Mix and Flow of Matter

Where does this lead?

- Science 10, Unit A: Energy and Matter in Chemical Change

Students will be able to…

1.1 - investigate and describe properties of materials *(e.g., investigate and describe the melting point, solubility and conductivity of materials observed)*
1.2 - describe and apply different ways of classifying materials based on their composition and properties, including:

- distinguishing between pure substances, solutions and mechanical mixtures
- distinguishing between metals and nonmetals *[Note: Metalloids may also be introduced at this level but are not required.]*
- identifying and applying other methods of classification

1.3 - identify conditions under which properties of a material are changed, and critically evaluate if a new substance has been produced

2.1 - identify and evaluate dangers of caustic materials and potentially explosive reactions
2.2 - observe and describe evidence of chemical change in reactions between familiar materials, by:

- describing combustion, corrosion and other reactions involving oxygen
- observing and inferring evidence of chemical reactions between familiar household materials

2.3 - distinguish between materials that react readily and those that do not *(e.g., compare reactions of different metals to a dilute corrosive solution)*
2.4 - observe and describe patterns of chemical change, by:

- observing heat generated or absorbed in chemical reactions, and identifying examples of exothermic and endothermic reactions
- identifying conditions that affect rates of reactions *(e.g., investigate and describe how factors such as heat, concentration, surface area and electrical energy can affect a chemical reaction)*
- identifying evidence for conservation of mass in chemical reactions, and demonstrating and describing techniques by which that evidence is gathered

3.1 - demonstrate understanding of the origins of the periodic table, and relate patterns in the physical and chemical properties of elements to their positions in the periodic table—focusing on the first 18 elements
3.2 - distinguish between observation and theory, and provide examples of how models and theoretical ideas are used in explaining observations *(e.g., describe how observations of electrical properties of materials led to ideas about electrons and protons; describe how observed differences in the densities of materials are explained, in part, using ideas about the mass of individual atoms)*

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	3.3 - use the periodic table to identify the number of protons, electrons and other information about each atom; and describe, in general terms, the relationship between the structure of atoms in each group and the properties of elements in that group *(e.g., use the periodic table to determine that sodium has 11 electrons and protons and, on average, about 12 neutrons; infer that different rows (periods) on the table reflect differences in atomic structure; interpret information on ion charges provided in some periodic tables) [Note: Knowledge of specific orbital structures for elements and groups of elements is not required at this grade level.]* **3.4** - distinguish between ionic and molecular compounds, and describe the properties of some common examples of each **4.1** - read and interpret chemical formulas for compounds of two elements, and give the IUPAC (International Union of Pure and Applied Chemistry) name and common name of these compounds *(e.g., give, verbally and in writing, the name for $NaCl_{(s)}$ (sodium chloride), $CO_{2(g)}$ (carbon dioxide), $MgO_{(s)}$ (magnesium oxide), $NH_{3(g)}$ (nitrogen trihydride or ammonia), $CH_{4(g)}$ (carbon tetrahydride or methane), $FeCl_{2(s)}$ (iron(II) chloride), $FeCl_{3(s)}$(iron(III) chloride)* **4.2** - Identify/describe chemicals commonly found in the home, and write the chemical symbols *(e.g., table salt [$NaCl_{(s)}$], water [$H_2O_{(l)}$], sodium hydroxide [$NaOH_{(aq)}$] used in household cleaning supplies)* **4.3** - identify examples of combining ratios/number of atoms per molecule found in some common materials, and use information on ion charges to predict combining ratios in ionic compounds of two elements *(e.g., identify the number of atoms per molecule signified by the chemical formulas for $CO_{(g)}$ and $CO_{2(g)}$; predict combining ratios of iron and oxygen based on information on ion charges of iron and oxygen)* **4.4** - assemble or draw simple models of molecular and ionic compounds *(e.g., construct models of some carbon compounds using toothpicks, peas and cubes of potato) [Note: Diagrams and models should show the relative positions of atoms. Diagrams of orbital structures are not required at this grade level.]* **4.5** - describe familiar chemical reactions, and represent these reactions by using word equations and chemical formulas and by constructing models of reactants and products *(e.g., describe combustion reactions, such as: carbon + oxygen → carbon dioxide [$C_{(s)} + O_{2(g)} \rightarrow CO_{2(g)}$]; describe corrosion reactions, such as: iron + oxygen→ iron(II) oxide [$Fe_{(s)} + O_{2(g)} \rightarrow FeO_{(s)}$]; describe replacement reactions, such as the following: zinc + copper(II) sulfate→ zinc sulfate + copper [$Zn_{(s)} + CuSO_{4(aq)} \rightarrow ZnSO_{4(aq)} + Cu_{(s)}$]) [Note 1: This outcome does not require students to explain the formation of polyatomic ions. Some chemicals with polyatomic ions may nevertheless be introduced; e.g., a brief introduction to $CuSO_{4(s)}$, $ZnSO_{4(s)}$ and $H_2SO_{4(aq)}$ can help prepare students for further study of these materials in units C and D.] [Note 2: At this grade level, students are not required to balance reactants and products in chemical equations. Teachers may want to inform students about opportunities for further study of chemistry in Science 10 and in Science 14-24.]*

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Resources Needed:

- Sciencefocus 9
- Matching game
- Jeopardy game
- Science focus in action resource pack

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Learning Outcomes	**Assessments**									
	Title	Types of Change WS	Exit Slip Qs	M/NM WS	Who;s Who - Timeline	Combustion vs Corrosion Venn Diagrams	Topic Review Crosswords	Topic 1/2 Quiz	Topic 3/4 Quiz	Chapter test
	Type (Formative/Summative)	F	F	F	F	F	F	S	S	S
SO 1 - Investigate materials, and describe them in terms of their physical and chemical properties		X	X	X	X	X	X	X	X	X
SO2 - Describe and interpret patterns in chemical reactions			X			X	X		X	X
SO 3 - Describe ideas used in interpreting the chemical nature of matter, both in the past and present, and identify example evidence that has contributed to the development of these ideas			X		X		X	X	X	X
SO 4 - Apply simplified chemical nomenclature in describing elements, compounds and chemical reactions			X				X	X	X	X

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Assessment Tool Title	**Brief Description**	For	AS	OF
Types of Change WS	Students were given a worksheet outlining different changes (physical or chemical) and were asked to identify and explain the reactions.	X	X	
Exit Slip Qs	Formative assessment to gear what I review/how much I review the following class - students reflect on their understanding of the class and answer my questions. Sometimes they are referencing the material and sometimes it is a "On a scale of 1-5"	X	X	
Metal/Non-Metal Worksheet	Students are given properties of different elements/objects and are asked to determine if they are metal or non-metal.	X	X	
Who's Who Timeline	Students are compiling the knowledge of the past few classes to create a comprehensive timeline of the theorists and chemists that laid the foundation for chemical study. This was a cheat sheet that they could use on their quiz and hand in for a bonus mark.	X	X	X
Topic Quizzes	Topic quizzes were shorter summative quizzes assessing the students' knowledge prior to a day of review. I would use the outcome of the quizzes to tailor our review class to the topics they needed more review on		X	X
Chapter Test	Cumulative summative assessment Unit B: Matter and Chemical Change.		X	X
Review Crosswords	Definition based review where the students are given the definition of important/key terms and the answer is the term in the crossword. Students are self-checking their answers by determining if it fits and solves the puzzle		X	

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Monday March 9, 2026 03/09/26	Block #1 - Review of Lab Safety - WHMIS & HHPS Block #2 - Study block for Unit A Test
Tuesday March 10, 2026	Unit A Test - both blocks
Wednesday March 11, 2026 03/11/26 - Science 1 03/11/26 - Science 2	Block #1 -**SO 1 -** Investigate materials, and describe them in terms of their physical and chemical properties **Types of Change - Formative** Block #2 - **SO 1 -** Investigate materials, and describe them in terms of their physical and chemical properties - Specifically types of mixtures **Exit Slip (Mixture based) - formative**
Thursday March 12, 2026 03/12/26 Science 1 03/12/26 Science 2	Block #1 **SO 1 -** Investigate materials, and describe them in terms of their physical and chemical properties - Metals vs Nonmetals Block #2 **SO 3 -** Describe ideas used in interpreting the chemical nature of matter, both in the past and present, and identify example evidence that has contributed to the development of these ideas **Exit Slip - formative**
Monday March 17, 2026 03/17/26 Science 03/17/26 Science	**SO3** - Describe ideas used in interpreting the chemical nature of matter, both in the past and present, and identify example evidence that has contributed to the development of these ideas - Periodic table organization - Continuation of the timeline of scientists and theorists - Periodic table battleship to familiarize with the periodic table **Who's who in Chemistry timeline - Formative**
Tuesday March 18, 2026 03/18 Science 9	**SO 4 -** Apply simplified chemical nomenclature in describing elements, compounds and chemical reactions - Focus on Ionic compounds (naming and identifying) - Study for Topic 1/2 Quiz tomorrow **Topic 1/2 Review Crossword**
Wednesday March 19, 2026 03/19 Science 9	**Topic 1/2 Quiz - Summative**

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	SO 4 - Apply simplified chemical nomenclature in describing elements, compounds and chemical reactions - Focusing on molecular compounds (naming, identifying, distinguishing from ionic) **Compound Bingo - formative**
Monday March 23, 2026 03/23 Science 9	**SO 2 -** Describe and interpret patterns in chemical reactions **SO 4** - Apply simplified chemical nomenclature in describing elements, compounds and chemical reactions - Comparing ionic and molecular compounds - Endo vs Exothermic reactions - Combustion, corrosion, cellular respiration **Exit Slip Qs**
Tuesday March 24, 2026 03/24 Science 9	**SO 2 -** Describe and interpret patterns in chemical reactions **SO 4** - Apply simplified chemical nomenclature in describing elements, compounds and chemical reactions - **Combustion vs Corrosion venn diagrams - Formative** - Law of Conservation of mass - Rate of Reaction demonstration **Exit Slip Qs - Formative**
Wednesday March 25, 2026 *alternate schedule day* 03/25 Science 9	**SO 2 -** Describe and interpret patterns in chemical reactions **SO 4** - Apply simplified chemical nomenclature in describing elements, compounds and chemical reactions **Jeopardy Review - formative** **Build a whiteboard wall of important terms to remember** **Ionic/Molecular matching game**
Thursday March 26, 2026	**Topic 3/4 Quiz - Summative** When done - give the Unit B review package - Cheat sheet work time (single sided 1 page)
Monday March 30, 2026 03/30 Science 9	Topic 1/2 and Topic 3/4 Quiz Review

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	- Focus on the Reaction questions - had the most errors on quiz
Tuesday March 31, 2026	**Unit B: Matter and Chemical Change Test**