

Chemistry 20 Work Plan

Units / Topics	Time Frame	Major Learning Outcomes	Resources / Possible Assessments
<p style="text-align: center;">Unit 1</p> <p style="text-align: center;">Intro to Chemistry</p>	<p style="text-align: center;">4 Hrs.</p> <p style="text-align: center;">1 week</p>	<ul style="list-style-type: none"> • Recognize and explain safe practices and explain the reasons for each practice <ul style="list-style-type: none"> ○ Appropriate lab attire / safety gear ○ Location of safety equipment in the lab ○ How to use the safety equipment ○ Disposal of hazardous chemical materials ○ WHIMS ○ Using lab equipment • Identify and explain how chemistry affects us <ul style="list-style-type: none"> ○ Chemical advances and new products ○ Societal impact on new chemical products ○ Problems or issues where chemistry is important in finding solutions ○ Advances in chemistry often led by societal needs • Develop the language of chemistry • Develop understanding of moral, social, and cultural aspects of chemistry 	<ul style="list-style-type: none"> • Pre-assessment on lab safety will be done prior to first chemistry lab • Safety information will be covered prior to each lab • Lab safety video • Lab safety quiz • Will be used to introduce the relevance of chemistry to students and why it is important to know and understand the importance of chemistry and how it affects our lives • Regular blog posts will also help to contribute to this understanding throughout the semester
<p style="text-align: center;">Unit 2</p> <p style="text-align: center;">Atoms & Elements</p>	<p style="text-align: center;">8 Hrs.</p> <p style="text-align: center;">2-3 weeks</p>	<ul style="list-style-type: none"> • Discuss the development of ideas about the structure of matter <ul style="list-style-type: none"> ○ Aristotle's ideas on the nature of matter ○ Contributions of: Early alchemists, Dalton, Lavoisier, Berzelius, Thomson, Rutherford, Milliken, Planck, Bohr, de Broglie, Schrodinger ○ What is a theory? • Relationships among parts of an atom <ul style="list-style-type: none"> ○ Parts of an atom ○ Forces holding atoms together ○ Lewis diagrams / Valence structures ○ Terminology from periodic table ○ Difference between mass & weight 	<ul style="list-style-type: none"> • MHR: Chemistry textbook and other resources will be used to go over these topics • Poster / assignment on each scientist outlining contributions to atomic theory • Refresh students on parts of the atom from science 9 / 10 • Worksheets and problems on Lewis diagrams and isotope calculations

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		<ul style="list-style-type: none"> ○ Isotopes and atomic mass ● Explain how elements are described and classified <ul style="list-style-type: none"> ○ Elemental properties ○ Patterns and trends in the periodic table ○ Correct terminology ● Use numerical data to compare and describe elements 	<ul style="list-style-type: none"> ● Students may be asked to prepare a report / PowerPoint on one of the elements from the periodic ● Lab activity ● Periodic table jeopardy ● Final unit test
Unit 3 Molecules & Compounds	8 Hrs. 2-3 weeks	<ul style="list-style-type: none"> ● Use the formulas and names of compounds fluently <ul style="list-style-type: none"> ○ Recognize the component atoms, simple or polyatomic ions in a compound ○ Be able to determine formulae for compounds using the period table ○ Recognize inorganic molecules and their given names ○ Name and recognize organic compounds using the generic formula for alkanes and alkenes ● Mechanics of bonding between atoms in a molecule <ul style="list-style-type: none"> ○ Importance of interaction of electrons between atoms in chemical bonding ○ Ionic vs. molecular compounds (exchanging vs. sharing of electrons) ○ Apply the octet / duet rule ○ Draw Lewis diagrams for molecules ○ Use VSEPR theory to predict shapes of molecules ● Examine the bonding between molecules/ atoms in a solid or liquid <ul style="list-style-type: none"> ○ Properties of ionic, metallic, covalent, network covalent and van der Waals solids ○ Properties of compounds (relate to uses) ○ Properties of alcohols as derivatives of alkanes ○ Strength of forces holding substances together 	<ul style="list-style-type: none"> ● MHR: Chemistry and other resources ● Pre-assessment to see how much they remember from science 9 / 10, as all of these were covered in prior science courses ● Review the naming rules for ionic and molecular compounds <ul style="list-style-type: none"> ○ Worksheets ● Write / present on the cracking process – How are large alkanes like crude oil broken down into simpler and smaller alkanes like propane or methane? ● Worksheets and diagrams on formation of compounds ● Using the molecular model kits be able to predict the shapes of molecules (VSEPR theory lab activity) ● Create larger-scale models of common compounds

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		<ul style="list-style-type: none"> • Factors that influence solubility <ul style="list-style-type: none"> ○ Water as a solvent, terminology, solute/solvent combinations ○ Recognize how the addition of a solute changes the properties of a solvent. 	<ul style="list-style-type: none"> • Solubility lab activity to examine how different substance dissolve • Unit Test
Unit 4 Chemical Reactions	8 Hrs. 2-3 weeks	<ul style="list-style-type: none"> • Appreciate the importance of chemical reactions <ul style="list-style-type: none"> ○ Identify evidence of chemical reactions, reactions in living organisms (good and bad), reactions that affect the environment • Communicate chemistry through chemical reactions <ul style="list-style-type: none"> ○ Write and balance chemical equations (may be given word equations) ○ Apply the law of conservation of mass ○ Develop net ionic equations ○ Energy may be included as part of an equation in endothermic and exothermic reactions 	<ul style="list-style-type: none"> • This will be assessed several times throughout the previous units, given the nature of the course this unit will largely be tied into the other units. • Worksheets, and lab activities will be used to assess this particular information • Students may be asked to prepare a poster / presentation about one important chemical reaction that exists in the environment or our bodies. This will give an overview of the importance of chemistry in our everyday lives.
Unit 5 Mole Concept & Stoichiometry	12 Hrs. 4-5 weeks	<ul style="list-style-type: none"> • Explore concepts relating to Avogadro's number <ul style="list-style-type: none"> ○ Use atomic (molar) mass to compare atoms ○ Examine how to obtain Avogadro's number ○ What is a mole? ○ Calculate number of moles in a given mass of atoms / molecules and vice versa • Apply knowledge of atomic mass to calculations dealing with molecules <ul style="list-style-type: none"> ○ Calculate: percentage composition of elements by mass, from molecular formulas and by mass measurements ○ Calculate empirical formulas for molecules from percent compositions / mass measurements 	<ul style="list-style-type: none"> • MHR: Chemistry textbook • This unit largely involves calculations and lots of practice problems • Lab activities to utilize stoichiometric calculations and determine empirical formulas by experiment.

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		<ul style="list-style-type: none"> ○ Calculate concentrations (Molarity) of solutions ● Stoichiometric calculations <ul style="list-style-type: none"> ○ Extract data from balanced chemical equations ○ Use chemical equations to determine moles or reactants / products ○ Manipulate data to solve calculations ○ Identify limiting reactants in chemical reactions 	<ul style="list-style-type: none"> ● Solution stoichiometry lab activity ● Limiting reactants lab activity if time permits ● Assignment sheets ● Unit test
Optional Unit Organic Chemistry	Remaining time	<ul style="list-style-type: none"> ● Recognize inorganic vs. organic compounds ● IUPAC Naming rules for aliphatic / aromatic hydrocarbons ● Saturated vs. unsaturated hydrocarbons ● Straight chain, branched and cyclic hydrocarbons – name and recognize ● Draw structural formulas for hydrocarbons ● Identify the important properties of hydrocarbons and their uses ● Classifying organic compounds based on their functional groups 	<ul style="list-style-type: none"> ● MHR: Chemistry ● Largely a paper and pencil unit ● Worksheets and other assignments. ● Important uses of hydrocarbons may involve an independent study or research assignment that will give students an opportunity to learn about the uses and properties of many important hydrocarbons

Marking Scheme

Chemistry in the News (Weekly blog post)	15%
Assignments/ labs/ Research	25%
Unit Tests	30%
Final Exam	25%

Term 3	35%
Term 4	40%
Final Exam	25%