ORANGE PUBLIC SCHOOLS			
Honors CHEMISTRY	**GRADE: 9-12**	**UNIT #: 2**	**The Periodic Table and Chemical Bonding**

SCOPE AND SEQUENCE

OVERVIEW				
Lesson	Topic	PE's and DCI's	Chapter	Suggested Pacing (Blocks)
1	The development and structure of the Periodic table	HS-PS1-1 HS-PS1-2 HS-PS1-3 HS-PS2-6	3.1, 3,2	1
2	Periodic Trends	HS-PS1-1 HS-PS1-2	3.3	4
3	Metallic Bonding, Ion Formation	HS-PS1-2 HS-PS1-4 HS-PS2-6	4.1, 4.2	1
4	Ionic Bonding, Ionic Compounds and Nomenclature	HS-PS1-2 HS-PS1-3 HS-PS1-4 HS-PS2-6	4.3,5.1, 5.2	4
5	Covalent Bonding, Covalent Compounds and Nomenclature	HS-PS1-2 HS-PS1-3 HS-PS1-4 HS-PS2-6	4.4,5.1, 5.2	3
6	Lewis Structure and Molecular Geometry	HS-PS1-2 HS-PS1-4	4.5	6

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November 2016

Mon	Tue	Wed	Thu	Fri
	unit 1	1 unit 1	2 unit 1	3 unit 1
6 unit 1	7 unit 1	8 unit 1	9	10
13 unit 1 post test	14 unit 1 post test	15 unit 2 starts Periodic table	16 unit 1 Periodic table	17 Periodic trends
20 periodic trends	21 periodic trends	22 12:30 pm dismissal	23 Thanksgiving break	24 Thanksgiving break
27 periodic trends	28 periodic trends	29 periodic trends	30 periodic trends	

December 2017

Mon	Tue	Wed	Thu	Fri
				1 Metallic bonding, ion formation
4 metallic bonding, ion formation	5 Ionic bonding, nomenclature	6 Ionic bonding, nomenclature	7 Ionic bonding, nomenclature	8 Ionic bonding, nomenclature
11 Ionic bonding, nomenclature	12 Ionic bonding, nomenclature	13 Ionic bonding, nomenclature	14 Ionic bonding, nomenclature	15 Covalent bonding, nomenclature
18 Covalent bonding, nomenclature	19 Covalent bonding, nomenclature	20 Covalent bonding, nomenclature	21 Covalent bonding, nomenclature	22 12:30 pm dismissal Covalent bonding, nomenclature

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January 2017

Mon	Tue	Wed	Thu	Fri
1 Holiday	**2 Lewis structure and MG**	**3 Lewis structure and MG**	**4 Lewis structure and MG**	**5 Lewis structure and MG**
8 Lewis structure and MG	**9 Lewis structure and MG**	**10 Lewis structure and MG**	**11 Lewis structure and MG**	**12 Lewis structure and MG**
15 Holiday ,MLK day	**16 unit 2 post test**	**17 unit 2 post test**	**18 unit 3 starts**	**19**
22	**23**	**24 12:30 pm dismissal**	**25 12:30 pm dismissal**	**26**
29	**30**	**31**		

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- ***How do particles combine to form the variety of matter one observes?***
- ***How do substances combine or change (react) to make new substances?***
- ***How does one characterize and explain these reactions and make predictions about them?***
- ***What underlying forces explain the variety of interactions observed?***

Students will use a model to predict the relationships between systems or between components of a system. The periodic table is a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. Each atom has a charged substructure consisting of a nucleus, which is made of protons and neutrons, surrounded by electrons. Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. The periodic table orders elements horizontally by the number of protons in the atom's nucleus and places those with similar chemical properties in columns. The repeating patterns of this table reflect patterns of outer electron states. Students will predict the type of bond between atoms of a molecule from the electronegativity's of those atoms. Students will summarize early attempts at organizing the elements and explain Mendeleev's basis for his organization of the elements. Students will explain the intermolecular forces between polar molecules and their relative strengths. They will explain how do, ionic bonds form in binary compounds. They will use Lewis structures to represent covalent molecules and polyatomic ions and use Lewis structures and VSEPR to predict the polarity, geometry, and bond angles of covalent molecules.

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# Blocks	STUDENT LEARNING OBJECTIVES	CORRESPONDING PE's and DCI's	CURRICULAR & SUPPLEMENTAL RESOURCES	ASSESSMENT
3	**Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.** • Properties that could be predicted from patterns could include reactivity of metals, types of bonds formed, numbers of bonds formed, and reactions with oxygen. **Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.** • Chemical reactions should include the reaction of sodium and chlorine, of carbon and oxygen, or of carbon and hydrogen. **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.** **Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.**	HS-PS1-1 HS-PS1-2 HS-PS1-3 HS-PS2-6	Science Tech Book/Chemistry: Discovery Education. Chapter 3. session 1 &2 World Of Chemistry: Zumdahl, Chapter 12 Pre test https://tools.discoveryeducation.com/assessment/viewAssessment.cfm?guidAssetID=88277214-52FD-4A68-99C2-D18FE4B176D0&student= Activity 1: Exploration: Development of the periodic table. https://gtm-media.discoveryeducation.com/videos/DSC/data/Development_of_the_Periodic_Table_StudentWorksheet.pdf Activity 2: Structure of the periodic table https://gtm-media.discoveryeducation.com/videos/DSC/data/HOAs/CHEM_PeriodicT	Pre Assessment 1 Activity 1: Exploration Development of the periodic table Activity 2: Design an inquiry lab/Model periodic table. Teacher/students will design a rubric to assess the lab and lab write up.

	• Distinguish between metals, metalloids, and nonmetals. • Recognize that the columns of the periodic table are called groups or families and contain elements that have similar properties. • Describe the location in the periodic table and the general properties of: the alkali metals, the alkaline earth metals, the halogens, transition metals, and the noble gases. • Electrical charges determine the functioning of metals, non-metals and pharmaceuticals. • Strengths of forces between particles determine the melting point and boiling point, vapor pressure, and surface tension.		able_StructureOfThePeriodicTable_HOL_FINAL.pdf	

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# Blocks	STUDENT LEARNING OBJECTIVES/ AP essential knowledge focus	CORRESPONDING Pes and DCIs	CURRICULAR & SUPPLEMENTAL RESOURCES	ASSESSMENT
3	**Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.** **AP essential knowledge focus #5** Many properties of atoms exhibit periodic trends that are reflective of the periodicity of electronic structure. **AP essential knowledge focus #6** Physical and chemical processes can be depicted symbolically; when this is done, the illustration must conserve all atoms of all type • Properties could be predicted from patterns include reactivity of metals, types of bonds formed, numbers of bonds formed, and reactions with oxygen. • Relate an element's chemical reactivity to its position on the periodic table • Explain the basis for the observed periodic trends in reactivity of the elements • Describe and explain the basis for trends in atomic radius, ionic size, metallic character, ionization energy, and electronegativity of the elements across groups and periods within the periodic table	HS-PS1-1 HS-PS1-2	Science tech Book/Chemistry: Discovery Education Chapter 3. session 3 Activity 3: Periodic trends https://gtm-media.discoveryeducation.com/videos/DSC/data/Periodic_Trends_StudentWorksheet.pdf Activity 4: Periodic trends on reactivity https://gtm-media.discoveryeducation.com/videos/DSC/data/Chem_PeriTrends_NGSS_HOL_TG_Explore_Reactivity_Final.pdf	Activity 3: Student Exploration on Periodic trends Activity 4: Lab on periodic trends on reactivity.

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3	**Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.** **Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.** **AP essential knowledge focus #7** Metallic solids are good conductors of heat and electricity, have a wide range of melting points, and are shiny malleable, ductile, and readily alloyed. • Describe metallic bonding and how it allows for electrical conductivity. • Describe how monatomic ions form. • Distinguish between cations and anions. • Explain ion formation and its relationship to the octet rule.	HS-PS1-2 HS-PS1-4 HS-PS2-6	Science tech Book/Chemistry: Discovery Education Chapter 4, session 1&2 Activity 5: Ion Formation, exploration https://gtm-media.discoveryeducation.com/videos/DSC/data/Ion_Formation_StudentWorksheet.pdf	Activity 5: Exploration activity on ion formation.

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4	**Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.** **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.** **Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.** **Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.*** **AP essential knowledge focus #8** Ionic bonding results from the net attraction between oppositely charged ions, closely packed together in a crystal lattice. **AP essential knowledge focus #9**	HS-PS1-2 HS-PS1-3 HS-PS1-4 HS-PS2-6	Science tech Book/Chemistry: Discovery Education Chapter 4. session 3 Chapter 5, session 1&2 World Of Chemistry: Zumdahl, Chapter 4 Activity 6: Exploring ionic bonds https://gtm-media.discoveryeducation.com/videos/DSC/data/Ionic_Bonding_StudentWorksheet.pdf Lab #3(AP essential focus) Activity 7: Ionic Compounds Lab file:///C:/Users/asha/Downloads/chem_names-formulas-of-ionic-compounds-lab_2009-05-13.pdf	Activity 6: Exploration activity on ionic bonding. Activity 7: Inquiry lab on ionic compounds.

	Ionic solids have high melting points, are brittle, and conduct electricity only when molten or in solution. • Illustrate how ionic bonds are formed in binary compounds. • Write names for ionic compounds.			
3	**Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.** **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.** **Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.** **Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.*** **AP essential knowledge focus #10** In covalent bonding, electrons are shared between the nuclei of two atoms to form a	HS-PS1-2 HS-PS1-3 HS-PS1-4 HS-PS2-6	Science tech Book/Chemistry: Discovery Education Chapter 4. session 4 Chapter 5, session 1&2 Activity 8: Hands on lab on bonding https://gtm-media.discoveryeducation.com/videos/DSC/data/HOAs/CHEM_ChemicalBonding_HOL_Toying_Bonds_TG.pdf Activity 9: ChemActivity 14, POGIL page 82; Bond order Bond Strength:	Activity 8: Inquiry Lab/ Covalent bonding Activity 9: Critical thinking questions

	molecule or polyatomic ion. Electronegativity differences between the two atoms account for the distribution of the shared electrons and the polarity of the bond. • Explain covalent bond formation and its relationship to the octet rule. • Write names for binary molecular compounds.			
4	**Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.** **Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.** **AP essential knowledge focus # 11**	HS-PS1-2 HS-PS1-4	Science tech Book/Chemistry: Discovery Education Chapter 4. session 5 World Of Chemistry: Zumdahl, Chapter 12 Lab #4 (AP essential focus) Activity 10: Modelling Lab file:///C:/Users/asha/Downloads/chem_molecular-geometry-lab_2014-12-17.pdf Activity 11: ChemActivity 19, POGIL page 118;	Activity 10 : Modelling activity/Inquiry lab on molecular geometry Activity 11: Critical thinking questions

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	Intermolecular forces place a key role in determining the properties of substances, including biological structures and interactions • Predict the type of bond between atoms of a molecule from the electronegativity of those atoms. • Explain the intermolecular forces between polar molecules and their relative strengths. • Use Lewis structures to represent covalent molecules and polyatomic ions. • Use Lewis structures and VSEPR to predict the polarity, geometry, and bond angles of covalent molecules. • Use Lewis structures and VSEPR to explain the unique properties of water.		Hybrid Orbitals	

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Modifications
Teacher Note: Teachers identify the modifications that they will use in the unit. • Restructure lesson using UDL principals (http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA) • Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. • Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling). • Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies). • Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences). • Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. • Use project-based science learning to connect science with observable phenomena. • Structure the learning around explaining or solving a social or community-based issue. • Provide ELL students with multiple literacy strategies. • Collaborate with after-school programs or clubs to extend learning opportunities.

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Embedded English Language Arts /Literacy and Mathematics	
English Language Arts/Literacy Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (HS-PS1-3) **RST.11-12.1** Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-PS1-2) **WHST.9-12.2** Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (HS-PS1-2),(HS-ETS1-3) **WHST.9-12.5** Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-PS1-3),(HS-ETS1-1),(HS-ETS1-3) **WHST.9-12.7** Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. (HS-PS1-3),(HS-ETS1-3),(HS-ETS1-1),(HS-ETS1-3) **WHST.11-12.8** Draw evidence from informational texts to support analysis, reflection, and research. (HS-PS1-3),(HS-ETS1-1),(HS-ETS1-3) **WHST.9-12.9** Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (HS-PS1-4) **SL.11-12.5**	*Mathematics* Reason abstractly and quantitatively. (HS-ETS1-1),(HS-ETS1-3),(HS-ETS1-4) **MP.2** Model with mathematics. (HS-ETS1-1),(HS-ETS1-2),(HS-ETS1-3),(HS-ETS1-4) **MP.4** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-PS1-2),(HS-PS1-3) **HSN-Q.A.1**

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