



**Lafayette Parish School System**  
**2016---2017 Curriculum Map**  
**Physical Science: Unit 2: Atomic Structure**  
**Reg Schedule – 5 Weeks Oct 3- Nov 9**

**Unit Description and Student Understandings:**

Utilizing inquiry process and modeling techniques, students explore current atomic theory. Emphasis will be placed on utilizing the periodic table as a tool to understand periodic trends and chemical nomenclature. Knowledge of atomic structure includes identifying subatomic particles and comprehending various models of the structure of the atoms. Students will draw Bohr models, identify implications of the arrangement of the periodic table and explain periodic trends. Students will learn to name compounds and identify ionic and covalent compounds.

**Guiding Questions:**

1. Can students interpret models of atoms (Thomson's Plum Pudding Model, Rutherford's Model, Bohr Model, and Electron Cloud Model)?
2. Can students list the major components of an atom and provide the charge for each?
3. Can students recognize and explain patterns, simple periodic tendencies, and the relationship between placement on the periodic table and bonding?
4. Can students diagram a Bohr model for a given atom?
5. Can students use and interpret simple chemical symbols and formulas that scientists use to represent matter?
6. Can student describe the effects of various factors on the rate of a chemical reaction?
7. Can students describe radioactivity?
8. Can students differentiate between atomic fission and fusion?

**Key Concepts**

- The properties of an element are determined by the structure of its atoms.
- Protons and neutrons form the nucleus of an atom, and electrons occupy a space surrounding the nucleus.
- Atoms of elements that are in the same group on the periodic table have similar physical and chemical properties.
- Elements are classified into three main types—metals, nonmetals, and metalloids
- Metals are located on the left side of the periodic table and are generally shiny, malleable, ductile, and good conductors
- Some groups on the periodic table contain metalloids-elements that have some properties of metals and some properties of nonmetals
- Gases respond to a changes in pressure, temperature, and volume in predictable ways
- Fluids flow and exert forces on objects

**Vocabulary List:**

atom, nucleus, proton, neutron, electron, quark, electron cloud, atomic number, mass number, isotope, average atomic mass, periodic table, period, group, electron dot diagram, metal, malleable, ductile, metallic bonding, radioactive element, transition element, nonmetal, diatomic molecule, metalloid, allotrope, semiconductor, transuranium element



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GLEs	CCSS Literacy Standards NGSS Practices	Instructional Strategies (Activity directions are found in the Physical Science Unit folder in Science documents on LPSS Blackboard)	Differentiation (Enrichment/Remediation Strategies)
<p><b>SI GLEs: 2 (E)</b>  Describe how investigations can be observation, description, literature survey, classification, or experimentation (SI-H-A2)</p>		<p><b>Glencoe <u>Textbook Correlation:</u> Units IV and V</b></p> <p><b>Chapter 18—Chemical Bonds--pp 550- 575</b></p> <p><b>Chapter- 19—Chemical Reactions—pp 580- 613</b></p> <p>Chapter 20—Radioactivity and Nuclear Reactions—pp. 614- 641</p> <p>See detailed units for activities, textbook correlations, GLEs and websites</p> <p><b>Activity 1- Rutherford’s Simulation</b></p> <p><b><u>Focus:</u></b></p> <p>To introduce modern atomic theory through reviewing the evolution of the model of the atom</p> <p>Learning Logs</p> <p>Evidence of Atoms</p> <p><b>Activity 6- Bonding, Nomenclature, and Chemical Compounds</b></p> <p><b><u>Focus:</u></b></p> <p>Students will utilize the periodic table and Bohr diagrams to predict ion formation, while incorporating their knowledge of valence electrons, the octet rule, and the periodic table to (1) predict the bonding tendencies (i.e., ionic bond or covalent bond) between two stated elements; and (2) draw the formation of the bond between the elements.</p>	<p><b><u>Content Literacy Strategies</u></b></p> <p><i>brainstorm</i> (<a href="#">view literacy strategy descriptions</a>)</p> <p><i>vocabulary cards</i> (<a href="#">view literacy strategy descriptions</a>)</p> <p><i>learning logs</i> (<a href="#">view literacy strategy descriptions</a>)</p> <p><i>vocabulary self-awareness chart</i> (<a href="#">view literacy strategy descriptions</a>)</p> <p>Computer Simulation: PHET</p> <p><a href="http://phet.colorado.edu/simulations/sims.php?sim=Rutherford_Scattering">http://phet.colorado.edu/simulations/sims.php?sim=Rutherford_Scattering</a></p> <p>RAFT</p>



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<p><b>SI 4.(E)</b></p> <p>Conduct an investigation that includes multiple trials and record, organize, and display data appropriately (SI-H-A2)</p>		<p><b>Activity 1- Rutherford’s Simulation</b></p> <p><b>Focus:</b></p> <p>To introduce modern atomic theory through reviewing the evolution of the model of the atom</p>	<p><b>Content Literacy Strategies</b></p> <p>Learning Logs</p> <p>Evidence of Atoms</p> <p>RAFT</p> <p>Computer Simulation: PHET</p> <p><a href="http://phet.colorado.edu/simulations/sims.php?sim=Rutherford_Scattering">http://phet.colorado.edu/simulations/sims.php?sim=Rutherford_Scattering</a></p> <p><i>anticipation guide</i> (<a href="#">view literacy strategy descriptions</a>)</p> <p><i>vocabulary cards</i> (<a href="#">view literacy strategy descriptions</a>)</p>
<p><b>SI-5 (E)</b></p> <p>Utilize mathematics, organizational tools, and graphing skills to solve problems (SI-H-A3)</p>		<p><b>Activity 4- Chemical Families and Their Properties</b></p> <p><b>Focus:</b></p> <p>To enable students to construct understandings of the connections between (1) valence electrons and groups/families, (2) number of electron energy levels and periods or series, (3) valence electrons and chemical and physical properties, and (4) valence electrons, position on periodic table, and metallic/nonmetallic properties.</p> <p><b>Content Literacy Strategies</b></p> <p>Word grid</p> <p>Learning Logs</p> <p>BLM-Families of the Periodic Table</p>	<p><a href="http://education.ti.com/educationportal/activityexchange/Activity.do?cid=US&amp;aId=6379">http://education.ti.com/educationportal/activityexchange/Activity.do?cid=US&amp;aId=6379</a></p>



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		<p><b>Activity 5- Names and Formulas</b></p> <p><b><u>Focus:</u></b></p> <p>Students should understand the use of subscripts in formulas and obtain practice writing compound formulas and names.</p> <p><b><u>Content Learning Strategies:</u></b></p> <p>BLM-Writing Chemical Formulas</p> <p>Copy of Periodic Chart</p> <p><b>Activity 6- Bonding, Nomenclature, and Chemical Compounds</b></p> <p><b><u>Focus:</u></b></p> <p>Students will utilize the periodic table and Bohr diagrams to predict ion formation, while incorporating their knowledge of valence electrons, the octet rule, and the periodic table to (1) predict the bonding tendencies (i.e., ionic bond or covalent bond) between two stated elements; and (2) draw the formation of the bond between the elements.</p> <p><b><u>Content Learning Strategies:</u></b></p> <p>Vocabulary self-awareness chart</p>	
<p><b>SI-7 (E)</b></p> <p>Choose appropriate models to explain scientific knowledge or experimental results (e.g. objects, mathematical relationships, plans,</p>	<p>Choose appropriate models to explain scientific knowledge or experimental results (e.g., objects, mathematical relationships, plans, schemes, examples,</p>	<p><b>Activity 1- Rutherford’s Simulation</b></p> <p><b><u>Focus:</u></b></p> <p>To introduce modern atomic theory through reviewing the evolution of the model of the atom</p> <p><b><u>Content Literacy Strategies</u></b></p>	<p><a href="http://education.ti.com/educationportal/activityexchange/Activity.do?cid=US&amp;aid=6379">http://education.ti.com/educationportal/activityexchange/Activity.do?cid=US&amp;aid=6379</a></p>



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<p>schemes, examples, role-playing, computer simulations)(SI-H-A4)</p>	<p>role-playing, computer simulations) (SI-H-A4)</p>	<p>Learning Logs</p> <p>Evidence of Atoms</p> <p>RAFT</p> <p>Computer Simulation: PHET</p> <p><a href="http://phet.colorado.edu/simulations/sims.php?sim=Rutherford_Scattering">http://phet.colorado.edu/simulations/sims.php?sim=Rutherford_Scattering</a></p> <p><b>Activity 2- Atoms and the Periodic Table</b></p> <p><b><u>Focus:</u></b></p> <p>Students will explore the arrangement of the Periodic Table through utilizing scientific readings and direct instruction to learn how to “read” a square from the periodic table.</p> <p><b><u>Content Literacy Strategies</u></b></p> <p>Vocabulary self-awareness chart</p> <p><b>Activity 3- Atomic Modeling and Families of the Periodic Table</b></p> <p><b><u>Focus:</u></b></p> <p>Students will use information from the periodic table in diagram development and identify the valence electrons in their Bohr model diagrams.</p> <p><b><u>Content Learning Strategies:</u></b></p> <p>Copy of the Periodic Table</p> <p><b>Activity 4- Chemical Families and Their Properties</b></p>	
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**Focus:**

To enable students to construct understandings of the connections between (1) valence electrons and groups/families, (2) number of electron energy levels and periods or series, (3) valence electrons and chemical and physical properties, and (4) valence electrons, position on periodic table, and metallic/nonmetallic properties.

**Content Literacy Strategies**

Word grid

Learning Logs

BLM-Families of the Periodic Table

**Activity 6- Bonding, Nomenclature, and Chemical Compounds**

**Focus:**

Students will utilize the periodic table and Bohr diagrams to predict ion formation, while incorporating their knowledge of valence electrons, the octet rule, and the periodic table to (1) predict the bonding tendencies (i.e., ionic bond or covalent bond) between two stated elements; and (2) draw the formation of the bond between the elements.

**Content Learning Strategies:**

Vocabulary self-awareness chart

**Activity 7- Hydrocarbons**

**Focus:**

Students will work on building models representing the different molecular



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		<p>formulas incorporating the tetrahedral bond angle and some compounds with double and triple covalent bonds.</p> <p style="text-align: center;"><b><u>Content Learning Strategies:</u></b></p> <p>BLM-Hydrocarbons</p>	
<p>SI-8(I) Give an example of how new scientific data can cause an existing scientific explanation to be supported, revised, or rejected (SI-H-A5)</p>		<p><b>Activity 1- Rutherford’s Simulation</b></p> <p style="text-align: center;"><b><u>Focus:</u></b></p> <p>To introduce modern atomic theory through reviewing the evolution of the model of the atom</p> <p style="text-align: center;"><b><u>Content Literacy Strategies</u></b></p> <p>Learning Logs</p> <p>Evidence of Atoms</p> <p>RAFT</p> <p>Computer Simulation: PHET</p> <p><a href="http://phet.colorado.edu/simulations/sims.php?sim=Rutherford_Scattering">http://phet.colorado.edu/simulations/sims.php?sim=Rutherford_Scattering</a></p>	
<p>SI-11.(I)</p> <p>Evaluate selected theories based on supporting scientific evidence (SI-H-A5)</p>		<p><b>Activity 1- Rutherford’s Simulation</b></p> <p style="text-align: center;"><b><u>Focus:</u></b></p> <p>To introduce modern atomic theory through reviewing the evolution of the model of the atom</p> <p style="text-align: center;"><b><u>Content Literacy Strategies</u></b></p> <p>Learning Logs</p>	<p><i>learning logs</i> (<a href="#">view literacy strategy descriptions</a>)</p>



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		<p>Evidence of Atoms</p> <p>RAFT</p> <p>Computer Simulation: PHET</p> <p><a href="http://phet.colorado.edu/simulations/sims.php?sim=Rutherford_Scattering">http://phet.colorado.edu/simulations/sims.php?sim=Rutherford_Scattering</a></p>	
<p>SI-13 (I) Identify scientific evidence that has caused modifications in previously accepted theories (SI-H-B2)</p>		<p><b>Activity 1- Rutherford’s Simulation</b></p> <p><b>Focus:</b></p> <p>To introduce modern atomic theory through reviewing the evolution of the model of the atom</p> <p><b>Content Literacy Strategies</b></p> <p>Learning Logs</p> <p>Evidence of Atoms</p> <p>RAFT</p> <p>Computer Simulation: PHET</p> <p><a href="http://phet.colorado.edu/simulations/sims.php?sim=Rutherford_Scattering">http://phet.colorado.edu/simulations/sims.php?sim=Rutherford_Scattering</a></p>	<p><a href="http://education.ti.com/educationportal/activityexchange/Activity.do?cid=US&amp;aId=6379">http://education.ti.com/educationportal/activityexchange/Activity.do?cid=US&amp;aId=6379</a></p> <p><i>anticipation guide</i> (<a href="#">view literacy strategy descriptions</a>)</p>
<p><b>PS GLE: 3 (E)</b> Distinguish among symbols for atoms, ions, molecules, and equations for chemical reactions (PS-H-A2)</p>		<p><b>Activity 2- Atoms and the Periodic Table</b></p> <p><b>Focus:</b> Students will explore the arrangement of the Periodic Table through utilizing scientific readings and direct instruction to learn how to “read” a square from the periodic table.</p> <p><b>Content Literacy Strategies</b></p> <p>Vocabulary self-awareness chart</p>	





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		<p><b>Activity 3- Atomic Modeling and Families of the Periodic Table</b></p> <p><b>Focus:</b> Students will use information from the periodic table in diagram development and identify the valence electrons in their Bohr model diagrams.</p> <p><b>Content Learning Strategies:</b></p> <p>Copy of the Periodic Table</p> <p><b>Activity 5- Names and Formulas</b></p> <p><b>Focus:</b></p> <p>Students should understand the use of subscripts in formulas and obtain practice writing compound formulas and names.</p> <p><b>Content Learning Strategies:</b></p> <p>BLM-Writing Chemical Formulas</p> <p>Copy of Periodic Chart</p>	
<p>PS-4 (E) Name and write chemical formulas using symbols and subscripts (PS-H-A2)</p>		<p><b>Activity 5- Names and Formulas</b></p> <p><b>Focus:</b></p> <p>Students should understand the use of subscripts in formulas and obtain practice writing compound formulas and names.</p> <p><b>Content Learning Strategies:</b></p> <p>BLM-Writing Chemical Formulas</p> <p>Copy of Periodic Chart</p>	



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		<p><b>Activity 6- Bonding, Nomenclature, and Chemical Compounds</b></p> <p><b><u>Focus:</u></b></p> <p>Students will utilize the periodic table and Bohr diagrams to predict ion formation, while incorporating their knowledge of valence electrons, the octet rule, and the periodic table to (1) predict the bonding tendencies (i.e., ionic bond or covalent bond) between two stated elements; and (2) draw the formation of the bond between the elements.</p> <p><b><u>Content Learning Strategies:</u></b></p> <p>Vocabulary self-awareness chart</p>	
<p><b>PS-5 (I)</b> Identify the three subatomic particles of an atom by location, charge, and relative mass (PS-H-B1)</p>		<p><b>Activity 1- Rutherford’s Simulation</b></p> <p><b><u>Focus:</u></b></p> <p>To introduce modern atomic theory through reviewing the evolution of the model of the atom</p> <p><b><u>Content Literacy Strategies</u></b></p> <p>Learning Logs</p> <p>Evidence of Atoms</p> <p>RAFT</p> <p>Computer Simulation: PHET</p> <p><a href="http://phet.colorado.edu/simulations/sims.php?sim=Rutherford_Scattering">http://phet.colorado.edu/simulations/sims.php?sim=Rutherford_Scattering</a></p>	



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		<p><b>Activity 2-</b> Atoms and the Periodic Table</p> <p><b>Focus:</b> Students will explore the arrangement of the Periodic Table through utilizing scientific readings and direct instruction to learn how to “read” a square from the periodic table.</p> <p><b>Content Literacy Strategies</b></p> <p>Vocabulary self-awareness chart</p> <p><b>Activity 3-</b> Atomic Modeling and Families of the Periodic Table</p> <p><b>Focus:</b> Students will use information from the periodic table in diagram development and identify the valence electrons in their Bohr model diagrams.</p> <p><b>Content Learning Strategies:</b></p> <p>Copy of the Periodic Table</p>	
<p>SI-6.(I) Determine the number of protons, neutrons, and electrons of elements by using the atomic number and atomic mass from the periodic table (PS-H-B1)</p>		<p><b>Activity 2-</b> Atoms and the Periodic Table</p> <p><b>Focus:</b> Students will explore the arrangement of the Periodic Table through utilizing scientific readings and direct instruction to learn how to “read” a square from the periodic table.</p> <p><b>Content Literacy Strategies</b></p> <p>Vocabulary self-awareness chart</p> <p><b>Activity 3-</b> Atomic Modeling and Families of the Periodic Table</p> <p><b>Focus:</b> Students will use information from the periodic table in diagram development and identify the valence electrons in their Bohr model diagrams.</p>	<p><i>learning logs</i> (<a href="#">view literacy strategy descriptions</a>)</p> <p><i>anticipation guide</i> (<a href="#">view literacy strategy descriptions</a>)</p>



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		<p style="text-align: center;"><b><u>Content Learning Strategies:</u></b></p> <p>Copy of the Periodic Table</p>	
<p><b>PS-7. (I)</b> Describe the results of the loss/gain of electrons on charges of atoms (PS-H-C5)</p>		<p><b>Activity 6- Bonding, Nomenclature, and Chemical Compounds</b></p> <p><b>Focus:</b> Students will utilize the periodic table and Bohr diagrams to predict ion formation, while incorporating their knowledge of valence electrons, the octet rule, and the periodic table to (1) predict the bonding tendencies (i.e., ionic bond or covalent bond) between two stated elements; and (2) draw the formation of the bond between the elements.</p> <p><b><u>Content Learning Strategies:</u></b></p> <p>Vocabulary self-awareness chart</p>	
<p><b>PS-10. (I)</b> Identify the number of valence electrons of the first 20 elements based on their positions in the periodic table (PS-H-B3)</p>		<p><b>Activity 3- Atomic Modeling and Families of the Periodic Table</b></p> <p><b>Focus:</b> Students will use information from the periodic table in diagram development and identify the valence electrons in their Bohr model diagrams.</p> <p><b><u>Content Learning Strategies:</u></b></p> <p>Copy of the Periodic Table</p> <p><b>Activity 4- Chemical Families and Their Properties</b></p> <p><b>Focus:</b> To enable students to construct understandings of the connections between (1) valence electrons and groups/families, (2) number of electron energy levels and periods or series, (3) valence electrons and chemical and physical properties, and (4) valence electrons, position on periodic table, and metallic/nonmetallic properties.</p> <p><b><u>Content Literacy Strategies</u></b></p> <p>Word grid</p>	



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		<p>Learning Logs</p> <p>BLM-Families of the Periodic Table</p>	
<p><b>PS-12 (I)</b> Classify elements as <i>metals</i> or <i>nonmetals</i> based on their position in the periodic table (PS-H-C2)</p>		<p><b>Activity 4- Chemical Families and Their Properties</b></p> <p><b>Focus:</b> To enable students to construct understandings of the connections between (1) valence electrons and groups/families, (2) number of electron energy levels and periods or series, (3) valence electrons and chemical and physical properties, and (4) valence electrons, position on periodic table, and metallic/nonmetallic properties.</p> <p><b>Content Literacy Strategies</b></p> <p>Word grid</p> <p>Learning Logs</p> <p>BLM-Families of the Periodic Table</p>	
<p><b>PS-15 (I)</b> Using selected elements from atomic numbers 1-20, draw Bohr models (PS-H-C5)</p>		<p><b>Activity 3- Atomic Modeling and Families of the Periodic Table</b></p> <p><b>Focus:</b> <i>Students will use information from the periodic table in diagram development and identify the valence electrons in their Bohr model diagrams.</i></p> <p><b>Content Learning Strategies:</b></p> <p>Copy of the Periodic Table</p> <p><b>Activity 6- Bonding, Nomenclature, and Chemical Compounds</b></p> <p><b>Focus:</b> Students will utilize the periodic table and Bohr diagrams to predict ion formation, while incorporating their knowledge of valence electrons, the octet rule, and the periodic table to (1) predict the bonding tendencies (i.e., ionic</p>	



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		<p>bond or covalent bond) between two stated elements; and (2) draw the formation of the bond between the elements.</p> <p><b><u>Content Learning Strategies:</u></b></p> <p>Vocabulary self-awareness chart</p>	
<p><b>PS-16 (I)</b> Name and write the formulas for simple ionic and covalent compounds (PS-H-C5)</p>		<p><b>Activity 6- Bonding, Nomenclature, and Chemical Compounds</b></p> <p><b><u>Focus:</u></b></p> <p>Students will utilize the periodic table and Bohr diagrams to predict ion formation, while incorporating their knowledge of valence electrons, the octet rule, and the periodic table to (1) predict the bonding tendencies (i.e., ionic bond or covalent bond) between two stated elements; and (2) draw the formation of the bond between the elements.</p> <p><b><u>Content Learning Strategies:</u></b></p> <p>Vocabulary self-awareness chart</p>	
<p><b>PS-17 (I)</b> Name and predict the bond type formed between selected elements based on their locations in the periodic table (PS-H-C5)</p>		<p><b>Activity 6- Bonding, Nomenclature, and Chemical Compounds</b></p> <p><b><u>Focus:</u></b></p> <p>Students will utilize the periodic table and Bohr diagrams to predict ion formation, while incorporating their knowledge of valence electrons, the octet rule, and the periodic table to (1) predict the bonding tendencies (i.e., ionic bond or covalent bond) between two stated elements; and (2) draw the formation of the bond between the elements.</p> <p><b><u>Content Learning Strategies:</u></b></p> <p>Vocabulary self-awareness chart</p>	



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<p><b>PS-18 (I)</b> Diagram or construct models of simple hydrocarbons (four or fewer carbons) with single, double, or triple bonds (PS-H-C6)</p>		<p><b>Activity 7- Hydrocarbons</b></p> <p><b>Focus:</b> Students will work on building models representing the different molecular formulas incorporating the tetrahedral bond angle and some compounds with double and triple covalent bonds.</p> <p><b>Content Learning Strategies:</b></p> <p>BLM-Hydrocarbons</p>	