



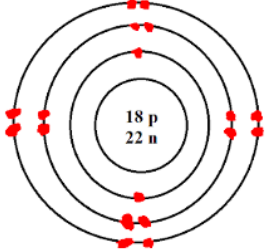
## Essential Standards Document

**Collaborative Team:**

**Unit #: 2**

**Essential Standard (# and full standard):**

- **HS-PS1-1.** 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.
- **HS-PS3-2.** Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motion of particles (objects) and energy associated with the relative position of particles (objects).
- **HS-PS1-2.** 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.

<b>What is the Learning Target or Essential Question?</b> <i>In student/parent-friendly terms (i.e. "I can..."). There should be multiple targets from 1 standard. There could just be 1 essential question.</i>	<b>What Level of Thinking Does it Involve?</b> <i>Depth of Knowledge (DOK 1-4)</i>	<b>How will you formatively assess this learning target or response to your essential question?</b> <i>Provide or link to a <b>specific</b> formative assessment that shows how you're evaluating students' specific knowledge or skills.</i>																
· Determine the identity of an atom based on the # of protons	2	<div style="text-align: center;">  </div> <table border="1" style="margin-left: auto; margin-right: auto; width: 80%;"> <tr><td># p+</td><td></td></tr> <tr><td># n0</td><td></td></tr> <tr><td># e-</td><td></td></tr> <tr><td>Mass</td><td></td></tr> <tr><td>Charge</td><td></td></tr> <tr><td>Element</td><td></td></tr> <tr><td>Atom/ion?</td><td></td></tr> <tr><td>Most common isotope?</td><td></td></tr> </table>	# p+		# n0		# e-		Mass		Charge		Element		Atom/ion?		Most common isotope?	
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· Determine the charge of an ion based on # of protons and electrons	2																	
· Describe the general structure of an atom	3	${}_{17}^{36}\text{Cl}^{1-}$ Draw a diagram of this ion of chlorine.																

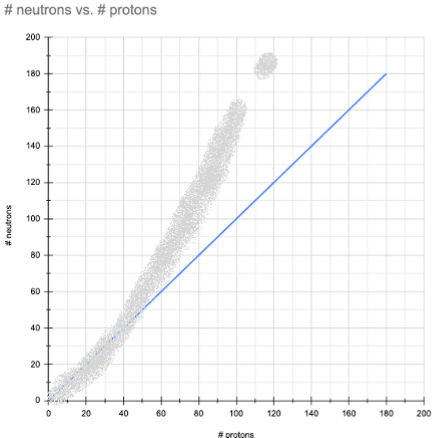
## Essential Standards Document

**Collaborative Team:**

**Unit #: 3**

**Essential Standard (# and full standard):**

- **HS-PS1-8. Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.**
- **HS-PS1-1. 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.**

<p><b>What is the Learning Target or Essential Question?</b> <i>In student/parent-friendly terms (i.e. "I can..."). There should be multiple targets from 1 standard. There could just be 1 essential question.</i></p>	<p><b>What Level of Thinking Does it Involve?</b> <i>Depth of Knowledge (DOK 1-4)</i></p>	<p><b>How will you formatively assess this learning target or response to your essential question?</b> <i>Provide or link to a <b>specific</b> formative assessment that shows how you're evaluating students' specific knowledge or skills.</i></p>
<p>· Identify how an atom changes when numbers of protons and/or neutrons change.</p>	<p>1</p>	<p>Write the nuclear equation showing what happens when <math>^{210}\text{Po}</math> goes through two consecutive alpha decays then a beta decay then another alpha decay.</p>
<p>· Explain what makes an isotope stable.</p>	<p>3</p>	<div style="display: flex; align-items: flex-start;"> <div style="flex: 1;">  </div> <div style="flex: 1; padding-left: 10px;"> <p><b><u>Tennessee-302 vs Tennessee-312</u></b></p> <p>How many protons in each and how do you know?</p> <p>How many neutrons in each and how do you know?</p> <p>What's the same?</p> <p>What's different?</p> <p>Which isotope is stable and how do you know?</p> <p>Which isotope is not stable (radioactive) and how do you know?</p> <p>What will likely happen to the radioactive isotope and why?</p> </div> </div>
<p>· Explain why radioactive isotopes decay.</p>	<p>3</p>	

## Essential Standards Document

**Collaborative Team:**

**Unit #: 4**

**Essential Standard (# and full standard):**

- **HS-PS1-1.** 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.
- **HS-PS1-2.** 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.

<b>What is the Learning Target or Essential Question?</b> <i>In student/parent-friendly terms (i.e. "I can..."). There should be multiple targets from 1 standard. There could just be 1 essential question.</i>	<b>What Level of Thinking Does it Involve?</b> <i>Depth of Knowledge (DOK 1-4)</i>	<b>How will you formatively assess this learning target or response to your essential question?</b> <i>Provide or link to a <b>specific</b> formative assessment that shows how you're evaluating students' specific knowledge or skills.</i>																																	
· Identify the properties of the major groups in the periodic table.	1	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">ELEMENT</th> <th style="width: 35%;">Sodium</th> <th style="width: 35%;">Strontium</th> </tr> </thead> <tbody> <tr> <td>Group #</td> <td></td> <td></td> </tr> <tr> <td>Period #</td> <td></td> <td></td> </tr> <tr> <td>M, NM, or Metalloid?</td> <td></td> <td></td> </tr> <tr> <td>Periodic Table Family Name</td> <td></td> <td></td> </tr> <tr> <td>Full e- Configuration</td> <td></td> <td></td> </tr> <tr> <td>Orbital Notation Configuration</td> <td></td> <td></td> </tr> <tr> <td>Noble Gas Configuration</td> <td></td> <td></td> </tr> <tr> <td># Valence e-</td> <td></td> <td></td> </tr> <tr> <td>Lewis Dot Structure</td> <td></td> <td></td> </tr> <tr> <td># of e- to gain or lose</td> <td></td> <td></td> </tr> </tbody> </table>	ELEMENT	Sodium	Strontium	Group #			Period #			M, NM, or Metalloid?			Periodic Table Family Name			Full e- Configuration			Orbital Notation Configuration			Noble Gas Configuration			# Valence e-			Lewis Dot Structure			# of e- to gain or lose		
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· Determine the number of valence electrons for an element based on the placement of the element on the periodic table.	2																																		

## Essential Standards Document

**Collaborative Team:**

**Unit #: 5**

**Essential Standard (# and full standard):**

- **HS-PS1-1.** 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.
- **HS-PS1-2.** 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.

What is the Learning Target or Essential Question? <i>In student/parent-friendly terms (i.e. "I can..."). There should be multiple targets from 1 standard. There could just be 1 essential question.</i>	What Level of Thinking Does it Involve? <i>Depth of Knowledge (DOK 1-4)</i>	How will you formatively assess this learning target or response to your essential question? <i>Provide or link to a <b>specific</b> formative assessment that shows how you're evaluating students' specific knowledge or skills.</i>																								
· Explain why some atoms form cations and others form anions.	3	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">NAME</th> <th style="width: 15%;">IONIC OR COVALENT?</th> <th style="width: 20%;">FORMULA</th> <th style="width: 15%;">...was there a transition metal??</th> <th style="width: 30%;">...was there a polyatomic ion??</th> </tr> </thead> <tbody> <tr> <td>Dinitrogen tetrabromide</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Copper (II) bromide</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Ammonium bromide</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	NAME	IONIC OR COVALENT?	FORMULA	...was there a transition metal??	...was there a polyatomic ion??	Dinitrogen tetrabromide					Copper (II) bromide					Ammonium bromide								
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· Determine the charge of an ion from the position of the atom on the periodic table.	2	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">Metal/Polyatomic</th> <th style="width: 15%;">Nonmetal/Polyatomic</th> <th style="width: 15%;">Cation charge</th> <th style="width: 15%;">Anion charge</th> <th style="width: 15%;">Formula</th> <th style="width: 20%;">Name</th> </tr> </thead> <tbody> <tr> <td>Copper (III)</td> <td>Hydroxide</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Manganese (IV)</td> <td>Sulfate</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Ammonium</td> <td>Phosphorus</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Metal/Polyatomic	Nonmetal/Polyatomic	Cation charge	Anion charge	Formula	Name	Copper (III)	Hydroxide					Manganese (IV)	Sulfate					Ammonium	Phosphorus				
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Ammonium	Phosphorus																									
· Write formulas for ionic compounds based on the charge of the ions and properly name them.	2																									
· Write formulas for covalent molecules using Greek prefixes and properly name them.	2	What's the difference between lithium sulfide and carbon disulfide? Write the formulas for each.																								

## Essential Standards Document

**Collaborative Team:**

**Unit #: 6**

**Essential Standard (# and full standard):**

- **HS-PS1-7. Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.**

<p><b>What is the Learning Target or Essential Question?</b> <i>In student/parent-friendly terms (i.e. "I can..."). There should be multiple targets from 1 standard. There could just be 1 essential question.</i></p>	<p><b>What Level of Thinking Does it Involve?</b> <i>Depth of Knowledge (DOK 1-4)</i></p>	<p><b>How will you formatively assess this learning target or response to your essential question?</b> <i>Provide or link to a <b>specific</b> formative assessment that shows how you're evaluating students' specific knowledge or skills.</i></p>																								
<p>· Use conversion factors to change units.</p>	<p>3</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;"><u>SUBSTANCE</u></th> <th style="text-align: center;"><u>ELEMENT or COMPOUND?</u></th> <th style="text-align: center;"><u>MOLAR MASS</u></th> <th style="text-align: center;"><u>HOW MANY ATOMS or MOLECULES in 578 grams?</u></th> <th style="text-align: center;"><u>HOW MANY GRAMS in <math>5.78 \times 10^{22}</math> atoms or molecules?</u></th> </tr> </thead> <tbody> <tr> <td>Silver</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Silver Oxide</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Silver Nitrate</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>					<u>SUBSTANCE</u>	<u>ELEMENT or COMPOUND?</u>	<u>MOLAR MASS</u>	<u>HOW MANY ATOMS or MOLECULES in 578 grams?</u>	<u>HOW MANY GRAMS in <math>5.78 \times 10^{22}</math> atoms or molecules?</u>	Silver					Silver Oxide					Silver Nitrate				
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<p>· Apply the concept of mole ratios to chemical formulas.</p>	<p>4</p>	<p>What is the mole ratio of copper to oxygen in copper (III) oxide?</p>																								

## Essential Standards Document

**Collaborative Team:**

**Unit #: 7**

**Essential Standard (# and full standard):**

- **HS-PS1-2. 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.**
- **HS-PS1-7. Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.**

<b>What is the Learning Target or Essential Question?</b> <i>In student/parent-friendly terms (i.e. "I can..."). There should be multiple targets from 1 standard. There could just be 1 essential question.</i>	<b>What Level of Thinking Does it Involve?</b> <i>Depth of Knowledge (DOK 1-4)</i>	<b>How will you formatively assess this learning target or response to your essential question?</b> <i>Provide or link to a <b>specific</b> formative assessment that shows how you're evaluating students' specific knowledge or skills.</i>																																				
· Balance a simple chemical equation by adjusting coefficients.	2	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Reaction #5</td> <td style="width: 35%; text-align: center;">Iron</td> <td style="width: 5%; text-align: center;">+</td> <td style="width: 35%; text-align: center;">Oxygen gas</td> <td style="width: 10%; text-align: center;">→</td> <td style="width: 10%; text-align: center;">Iron (III) Oxide</td> </tr> <tr> <td>Balanced Equation (include state symbols)</td> <td></td> <td style="text-align: center;">+</td> <td></td> <td style="text-align: center;">→</td> <td></td> </tr> <tr> <td>Qualitative Observations</td> <td colspan="5"></td> </tr> <tr> <td>Reaction Type</td> <td colspan="5"> <input type="checkbox"/>Synthesis   <input type="checkbox"/>Decomposition   <input type="checkbox"/>Single Replacement   <input type="checkbox"/>Double Replacement   <input type="checkbox"/>Combustion                 </td> </tr> <tr> <td></td> <td colspan="2">Mass of Watch Glass and Iron: _____</td> <td colspan="3">Mass of Watch Glass and Iron (III) Oxide: _____</td> </tr> <tr> <td colspan="6">Provide a short explanation for the change in mass:</td> </tr> </table>	Reaction #5	Iron	+	Oxygen gas	→	Iron (III) Oxide	Balanced Equation (include state symbols)		+		→		Qualitative Observations						Reaction Type	<input type="checkbox"/> Synthesis <input type="checkbox"/> Decomposition <input type="checkbox"/> Single Replacement <input type="checkbox"/> Double Replacement <input type="checkbox"/> Combustion						Mass of Watch Glass and Iron: _____		Mass of Watch Glass and Iron (III) Oxide: _____			Provide a short explanation for the change in mass:					
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· Identify five signs of a chemical reaction through experimental observation.	4	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Reaction Type</td> <td colspan="5"> <input type="checkbox"/>Synthesis   <input type="checkbox"/>Decomposition   <input type="checkbox"/>Single Replacement   <input type="checkbox"/>Double Replacement   <input type="checkbox"/>Combustion                 </td> </tr> <tr> <td></td> <td colspan="2">Mass of Watch Glass and Iron: _____</td> <td colspan="3">Mass of Watch Glass and Iron (III) Oxide: _____</td> </tr> <tr> <td colspan="6">Provide a short explanation for the change in mass:</td> </tr> </table>	Reaction Type	<input type="checkbox"/> Synthesis <input type="checkbox"/> Decomposition <input type="checkbox"/> Single Replacement <input type="checkbox"/> Double Replacement <input type="checkbox"/> Combustion						Mass of Watch Glass and Iron: _____		Mass of Watch Glass and Iron (III) Oxide: _____			Provide a short explanation for the change in mass:																							
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· Determine mole ratios of reactants and products from a balanced chemical equation.	2	$2 \text{ Al(s)} + 3 \text{ CuO(s)} \rightarrow 1 \text{ Al}_2\text{O}_3\text{(s)} + 3 \text{ Cu(s)}$ <p>The balanced equation tells us that for every 2 mole of aluminum and 3 moles of copper (II) oxide that react, 1 mole of aluminum oxide and 3 moles of copper will be produced. If you react 2 moles of aluminum,</p> <ol style="list-style-type: none"> <li>a) how many moles of copper (II) oxide will be used?</li> <li>b) how many moles of aluminum oxide will be produced?</li> <li>c) how many moles of solid copper will form?</li> </ol>																																				

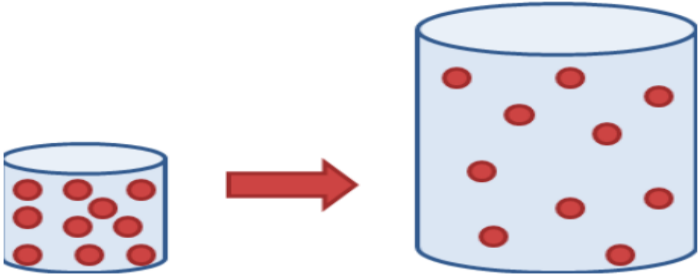
## Essential Standards Document

**Collaborative Team:**

**Unit #: 8**

**Essential Standard (# and full standard):**

- **HS-PS3-2. Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motion of particles (objects) and energy associated with the relative position of particles (objects).**

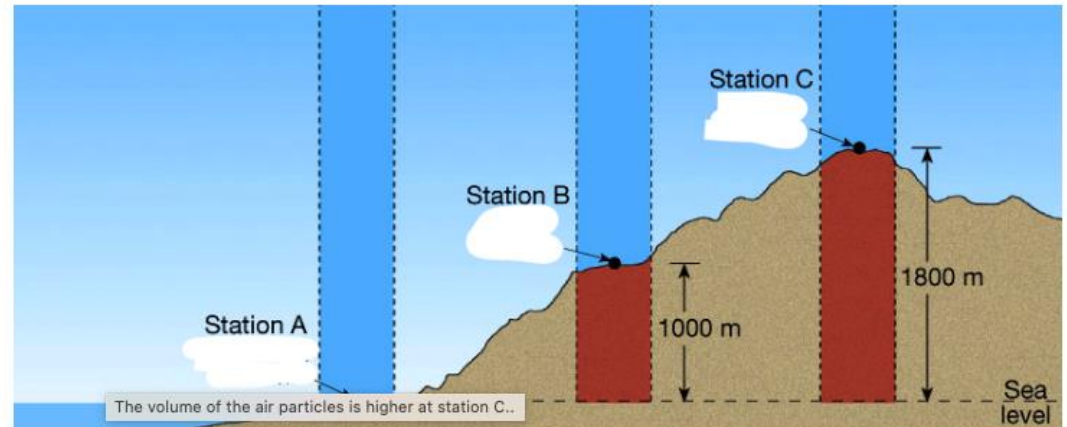
<p><b>What is the Learning Target or Essential Question? In student/parent-friendly terms (i.e. "I can..."). There should be multiple targets from 1 standard. There could just be 1 essential question.</b></p>	<p><b>What Level of Thinking Does it Involve? Depth of Knowledge (DOK 1-4)</b></p>	<p><b>How will you formatively assess this learning target or response to your essential question? Provide or link to a <i>specific</i> formative assessment that shows how you're evaluating students' specific knowledge or skills.</b></p>
<p>· Describe how particles exert pressure</p>	<p>2</p>	<p>Which of the following statements is true about the two containers below?</p>  <p> <input type="radio"/> The pressure is the same in both containers.  <input type="radio"/> The pressure in the smaller container is higher.  <input type="radio"/> The pressure in the larger container is higher.         </p>



· Explain what causes atmospheric pressure

3

Which of the following statements best explains why it is harder to breathe at Station C in the diagram below?



- There are fewer air particles at Station C.
- The volume of the air particles is higher at station C.
- The temperature of the air particles is lower at station C.

· Describe how atmospheric pressure causes everyday phenomena

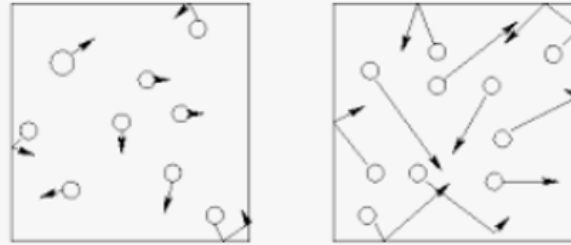
3

Mrs. Sixta always says "there is no sucking in science." So why does a straw work when you drink out of it?

- The pressure inside the straw is higher than the atmospheric pressure outside the straw.
- The pressure inside the straw is lower than the atmospheric pressure outside the straw.
- The pressure inside the straw and the atmospheric pressure outside the straw are the same. Mrs. Sixta just "sucks" at science.

· Explain how changing volume, temperature, or the number of particles affects pressure

3



2.

<b>What's the same in each box?</b>	<b>What's different in each box?</b>	<b>Which box has a higher pressure?</b>	<b>Why? Explain at the particle level.</b>
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