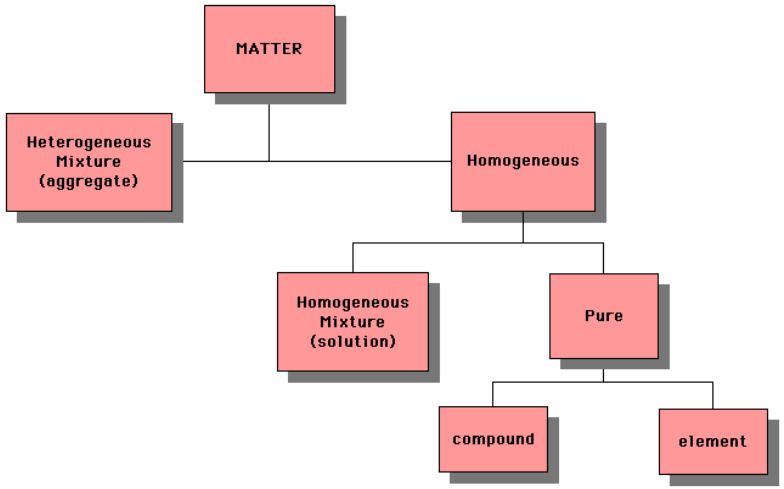
Grade Level	Eighth Grade	**Content Area**	Science
Course Title (grades 9-12 Only)	N/A		
Expected Prior Knowledge *List the knowledge/skills mastered earlier in the year that are foundational to the mastery of the Required Standard(s).*	In following the Core Knowledge sequence, scholars studied properties of matter in first grade, and were exposed to basic concepts of chemistry in fourth grade. In fifth grade, scholars studied chemistry as changes in matter, and then explored chemical bonds and reactions in seventh grade.		
Alignment to Program of Instruction *Describe how the methods of instruction found in this sequence of lessons align to the Program of Instruction described in the application package.*	The Arizona College and Career science standards form the basis for The Grande Innovation Academy's science curriculum. Scholars will learn standards using the Arizona College and Career strands building from year to year. Core Knowledge will be used along with supplemental resources to build understanding and create additional opportunities for application.		
Standard Number* and Description *The standard number and description of the Required Standard(s) being instructed and assessed to mastery in the curriculum sample.*	Strand 5: Physical Science Concept 1: Properties and Changes of Properties in Matter (Understand physical and chemical properties of matter.) PO #2 Identify different kinds of matter based on the following chemical properties: • Reactivity • pH • oxidation (corrosion) PO #4 Classify matter in terms of elements, compounds, or mixtures.		
Materials/Resources Needed *List all items the teacher and students will need for the entire sequence of instruction (excluding common consumables)*	• PowerPoint: "Elements, Compounds, and Mixtures" (Noadswood Science Resources) • "Elements, Compounds, and Mixtures" website http://www.chem.purdue.edu/gchelp/atoms/elements.html • Aluminum foil, water, trail mix (for demonstration) • Raisin Bran and Crispix cereal samples • Lab materials: tomato soup (can), vegetable soup (can), sugar & chocolate chip cookies, salt water, orange juice, cup of soil, brass object (or image), visual of the Periodic Table • Lab handout (Stephen Murray) • "Element, Compound, Mixture" worksheet (Noadswood Science Resources) • "Magnesium with water" video: https://www.youtube.com/watch?v=YKN2-B5kblw • "Corrosion and rust" video: https://www.youtube.com/watch?v=XMr4vse7Ybo • "Testing pH with cabbage" video: https://www.youtube.com/watch?v=RYp9Fnpg4rc • "Elements, Compounds, Mixtures" slides: http://www.pickerington.k12.oh.us/docs/olc/newsdocs/Elements-Mixtures-Compounds%20Notes%20-1.pdf • Cabbage juice, household acids and bases for testing		

	• "What is oxidation": http://www.wisegeek.com/what-is-oxidation.htm • Oxidation: lemon, paint brush, water, spoon, bowl, white paper, lamp

Lesson (add as needed)	**Instructional Strategies -** *List and describe teacher actions, lesson by lesson, which will provide students with opportunities to engage the grade-level rigor defined by the Required Standard(s). Indicate alignment of instructional strategies to specific component(s) or content/skill(s) of the Required Standard/component.*	**Student Activities -** *Describe the activities, lesson by lesson, in which students will engage to allow them to master the grade-level rigor defined by the Required Standard(s). Indicate alignment of student activities to specific component(s) or content/skill(s) of the Required Standard/component.*
1	**Anticipatory Set:** Teacher will (TW) ask scholars to list different ways to classify matter. After time to write, the TW lead scholars in a "Think-Pair-Share" discussion. **Objective and Purpose:** TW post on the board: I can classify matter in terms of elements, compounds, or mixtures. **Instructional Delivery: Whole Group** TW show the PowerPoint: "Elements, Compounds, and Mixtures." TW draw a Tree Map to classify matter, and instruct scholars to record it in their notebooks while explaining the key points:  **Key Points:** • Homogeneous matter is the same throughout. • Homogeneous matter can be classified as a mixture, compound,	**Anticipatory Set:** The scholars will list different ways to classify matter in their science lab notebooks. After time to write, scholars will "Think-Pair-Share" their responses. Responses may include: solid, liquid, gas, measurement, etc. **Objective and Purpose:** I can classify matter in terms of elements, compounds, or mixtures. **Instructional Delivery: Whole Group** Scholars will take notes in their science lab notebooks of the Tree Map and microscopic illustrations. **Modeling:** Scholars will create the chart of examples of classified matter in their science lab notebooks, following along with the teacher. **Check for Understanding** (CFU, using Teach Like a Champ) Scholar stands as teacher gives Check for Understanding signal of "Get Ready, Get Ready, scholar." Scholar replies with response of the correct classification. If scholar doesn't respond in five seconds, scholar still needs to be ready as there is no opt-out, and teacher will come back again. **Guided Practice: Small Groups** Scholars will engage in small groups and complete the 3 stations of a lab activity. **Independent Practice** Scholars will complete "Element, Compound, Mixture" worksheet. **Closure/Exit Ticket:** Scholars will check their answers on the worksheet as the teacher discusses the correct responses.

	or element. • A mixture is a combination of substances not chemically combined. • Compounds are a pure form of matter with more than one type of atom. • An element has only a single type of atom (pure). TW project the website, "Elements, Compounds, and Mixtures," and guide scholars in illustrating the microscopic differences in their notebooks. **Modeling:** TW list examples from the PowerPoint in each category of the map. TW show a bowl of Raisin Bran cereal and Crispix cereal to illustrate the difference between a mixture (Raisin Bran) and a compound (Crispix) – raisins and bran can be separated, while Crispix pieces would have to be broken to separate corn from rice. **Check for Understanding** (CFU, using Teach Like a Champion) TW set out objects representing different types of matter: aluminum foil (element), water (compound), and trail mix (mixture). TW circulate room and say "Get Ready, Get Ready, scholar name" to check for classification of a type of matter. "Get Ready, Get Ready, and scholar. Why type of matter is aluminum?" TW wait no more than five seconds for response. If no response, TW calls on another scholar while circulating room, then goes back to scholar with no response, and says, "What did [scholar name] say?" **Guided Practice:** TW distribute lab handout, and facilitate scholars' exploration of stations: Scholars will examine 2 soups, 2 cookies, 2 liquids, and 2 objects to identify them as elements, compounds, or mixtures. **Independent Practice:** TW provide scholars 10 minutes to answer "Element, Compound, Mixture" worksheet. **Closure/Exit Ticket:** TW discuss responses to "Element, Compound, Mixture" worksheet and record scholars' percentage scores.	

2

Anticipatory Set:
The TW create a T Chart of Acids and Bases, and call on scholars to suggest examples of each.

Objective and Purpose: TW post the objective: I can identify matter based on its pH.

Instructional Delivery: Whole Group
The TW discuss "Elements, Compounds, Mixtures" slides (website) with the class. TW illustrate a Tree Map:

Elements			Compounds (formulas)	
Metal Oxidizes or corrodes with water	Non-metal	Metalloid	Acidic React with metals to form hydrogen gas Corrosive Sour	Basic Reactive Bitter Caustic (chemical burns) Cleaners

Key Points:

- **Chemical properties** are properties that can be measured or observed only when matter undergoes a change to become an entirely different kind of matter.
- **Ph** is the measure of the acidity, or hydrogen ion (H^+) concentration, of a substance.

Modeling: TW project the website http://www.miamisci.org/ph/phpanel.html and model finding the pH levels of different items.

Check for Understanding: (CFU, using Teach Like a Champion)
TW name items that are an acid or base. TW circulate room and say "Get Ready, Get Ready, scholar name" to check for classification of pH. "Get Ready, Get Ready, and scholar. Is _ an acid or base?" TW wait no more than five seconds for response. If no response, TW calls on another scholar while circulating room, then goes back to scholar with no response, and says, "What did [scholar_name] say?"

Guided Practice: Small Groups/Pairs

Anticipatory Set:
Scholars will brainstorm examples of acids and bases.

Objective and Purpose: I can identify matter based on its pH.

Instructional Delivery: Whole Group
The scholars will take notes on definitions and classifications of chemical properties.

Modeling: Scholars will observe and make predictions of items' pH.

Check for Understanding: (CFU, using Teach Like a Champ)
Scholar stands as teacher gives Check for Understanding signal of "Get Ready, Get Ready, scholar." Scholar replies with response of the correct classification. If scholar doesn't respond in five seconds, scholar still needs to be ready as there is no opt-out, and teacher will come back again.

Guided Practice: Small Group/Pairs
The scholars will perform pH tests using cabbage juice, and record findings in their lab notebooks.

Independent Practice
The scholars will order the items according to pH on an index card. Scholars will compare answers with a partner.

Closure: Scholars will complete the quiz questions.

	TW facilitate scholars performing the Acid Test with partners or in small lab groups. See http://sciencenetlinks.com/lessons/the-acid-test/ for instructions and extension. **Independent Practice** TW project website http://www.quia.com/rd/1975.html?AP_rand=661564890 and direct scholars to order the items according to pH on an index card. Scholars will compare answers with a partner. **Closure:** TW project the quiz, and direct scholars to write answers on their index card: http://www.mcwdn.org/chemist/acidsbasesquiz/acidbasequiz.html	
3	**Anticipatory Set:** TW show the class 2 shovels (or images), one that is rusted, and one that is not. TW ask scholars to "Think-Pair-Share" why one shovel rusted, and the other didn't. **Objective and Purpose:** TW post on the board: I can classify matter according to its reactivity or oxidation. **Instructional Delivery: Whole Group** TW review previous lesson's Tree Map, focusing on key points: **Key Points** • **Reactivity** is the ability of matter to combine chemically with other substances. • **Oxidation** is the result of combining an element with oxygen (called rust when combined with some metals). • **Corrosion** is damage caused by breaking down metals, sometimes a result of oxidation or rust. **Modeling:** TW show the videos, "Magnesium with water" and "Corrosion and rust." Read-aloud "What is oxidation?" **Check for Understanding**: "Inside-Outside Circle" Gather scholars into two concentric circles, facing their opposite partner. Direct scholars to explain what they now believe to be true about the shovels from the beginning of class. After 1 minute of discussion, direct scholars to move a certain number of spaces to their right or left, and tell	**Anticipatory Set:** The scholars will "Think-Pair-Share" why one shovel rusted, and the other didn't. **Objective and Purpose:** I can classify matter according to its reactivity or oxidation. **Instructional Delivery: Whole Group** Scholars will **Modeling:** The scholars will observe the videos for key points, and follow along with the read-aloud, recording examples of each category on their Tree Maps. **Check for Understanding**: "Inside-Outside Circle" Using concentric circles, scholars share theories about identifying metals and non-metals per evidence of rust. Scholars share others' ideas and reiterate understanding. **Guided Practice: Small Group/Pairs** The scholars will work in lab groups to complete the Oxidation "Magic Ink" experiment. **Independent Practice** Scholars will analyze the data from the experiment, and explain how it illustrates the concept of oxidation in their lab notebooks.

<table>
<tr>
<td></td>
<td>them to share their previous partner's theory with the new partner. Repeat a few times.

Guided Practice: Small Groups/Pairs
TW guide scholars in completing the Oxidation "Magic Ink" experiment: http://www.education.com/science-fair/article/invisible-ink-oxidation/

Independent Practice
TW direct scholars to analyze the data from the experiment, and explain how it illustrates the concept of oxidation in their notebooks.

Closure:
TW show the video, "Sodium and Chlorine React": http://www.middleschoolchemistry.com/multimedia/chapter4/lesson5
And direct scholars to articulate why and how this experiment proves that sodium is a metal on lined paper (to be collected).</td>
<td>Closure: Scholars will articulate why and how the video experiment proves that sodium is a metal.</td>
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<tr>
<td>S.A.</td>
<td>Summative Assessment Items and Scoring: Below, provide at least three Summative Assessment Items that together accurately measure student mastery of the application of the content and/or skills as defined by the grade-level rigor in the Required Standard(s). For each assessment item, provide an answer key or scoring rubric which clearly describes how assessment items are to be scored and how points will be awarded, such that mastery of the application of the content and/or skills as defined by the grade-level rigor in the Required Standard is clearly demonstrated by an acceptable score.</td>
<td>S.A. 1
The scholar will use a worksheet to with the following information to classify the following items as either an element, compound, or mixture:

<table>
<tr><td></td><td>Symbol</td><td>Element</td><td>Molecule</td><td>Compound</td><td>Mixture</td></tr>
<tr><td>1. SODIUM</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>2. HYDROGEN</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>3. CHLORINE</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>4. SODIUM CHLORIDE</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>5. AIR</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>6. WATER</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>7. ALUMINUM</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>8. ALUMINUM CHLORIDE</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

S.A. 2
Given the following directions, "Using any of the supplies listed, (Supplies: lemon juice, vinegar, Pepto Bismal, copper penny, nail, water, baking soda) describe a test or example that demonstrates each of the properties below." the scholar will give a written or oral example of a each of the following five terms.</td>
</tr>
</table>

1. reactivity
2. acid
3. base
4. oxidation
5. corrosion

S.A. 3
Given an index card on which to write and the following directions, *"Using the properties of water (H_2O), explain where this substance fits on the pH scale (a) and how water weakens strong acid and base solutions. (b)"* the scholar will give a written explanation of the properties of water.

S. A. 1 Answer Key
In order to receive credit for a correct answer, the scholars must identify both the symbol and the correct category for classification. There are 8 points possible. Scholars must receive 6 out of 8 points to demonstrate mastery. (75%)

S.A. 1

	Symbol	Element	Molecule	Compound	Mixture
1. SODIUM	*Na*	✓			
2. HYDROGEN	H_2		✓		
3. CHLORINE	*Cl*	✓			
4. SODIUM CHLORIDE	*2NaCl*			✓	
5. AIR					✓
6. WATER	$2H_2O$			✓	
7. ALUMINUM	*Al*	✓			
8. ALUMINUM CHLORIDE	*AlCl*	✓			

S. A. 2 Answer Key
Given a list of supplies (lemon juice, vinegar, Pepto Bismal, copper penny, nail, water, baking soda), the scholars must describe (either orally or in written form) a test or example that exemplifies the following terms. There are 5 points possible. Scholars must receive 4 out of 5 points to achieve mastery at 75% or greater.

1. reactivity - vinegar and baking soda bubble and fizz when combined

	2. acid - lemon juice is sour and reactive 3. base - Pepto Bismal is bitter, and neutralizes stomach acid 4. oxidation - copper pennies turning green from water exposure 5. corrosion – a nail breaks in half after being left out in the rain ***S. A. 3 Answer Key*** *There are four possible points. Scholars will earn up to 2 points by correctly answering the first portion of the prompt (a) and scholars may receive up to 2 points for fully answering the second portion of the question (b). Scholars must receive 3 out of 4 points to achieve mastery. (75%)* a) Pure water has a pH of "7". *(2 points)* b) When water is applied to an acid or base**,** it will move the pH number closer to "7" and dilute the solution. *(2 points)*	