

Unit 1 - Alchemy: Matter, Atomic Structure, and Bonding

Chemistry

34 Days

Topics from the NYC Scope and Sequence

Unit 1: The Physical Nature of Matter
 Unit 2: Atomic Concepts
 Unit 3: Nuclear Chemistry
 Unit 4: Chemical Bonding
 Unit 5: Periodicity

New York State Core Curriculum Alignment

I. Atomic Concepts: 3.1a, 3.1b, 3.1c, 3.1d, 3.1e, 3.1f, 3.1h, 3.1i, 3.1j, 3.1k, 3.1l, 3.1m, 3.1n
 II. Periodic Table: 3.1y, 3.1g, 3.1v, 3.1w, 3.1x, 3.1z, 3.1aa, 3.1bb
 IV. Chemical Bonding: 3.1dd, 5.2g, 5.1a, 5.2b, 5.2n, 5.2h
 V. Physical Behavior of Matter: 3.1u, 3.1oo
 X. Nuclear Chemistry: 3.1o, 5.3a, 3.1p, 4.4b, 4.4c, 5.3b, 5.3c

Pacing Guide (*This guide is based on 50-minute lesson length*)

Day	Living by Chemistry Lesson Title	Additional Resource
1	1.1 - Tools of the Trade: Lab Equipment and Safety	Two Lab Safety Video options: Lab Safety Video Lab Safety Video
2	Safety Quiz 1.2 - Penny for your Thoughts: Introduction to Chemistry <ul style="list-style-type: none"> <i>It works well to do the penny demo under a mimo and have students write down their observations. If not, it will be hard for students to see the demo. Repeat demo if needed.</i> 	Intro to alchemy video
3-4	1.3- What's the Matter?: Defining Matter <ul style="list-style-type: none"> <i>Using the matter cards helps increase student engagement and creates a more rigorous lesson</i> <i>the states of matter simulation may extend this lesson a third day but it really important to add /discuss particle diagrams</i> 	States of Matter- phet simulation Matter chart
5	Regent alignment: <ul style="list-style-type: none"> <i>An additional activity is required to address major understanding : physical ways to separate mixtures (3.1s V.5)</i> 	
6	1.4 - Mass Communication: Mass and Volume <ul style="list-style-type: none"> <i>This lab can be done using other objects: just make sure 2 of the objects have the same mass but different volumes(objects used in the past: small stones, pennies, and a small green circle toy).</i> 	
7	1.5 - All That Glitters: Density <ul style="list-style-type: none"> <i>Option 2: The coke and diet coke demo can be made into an actual lab and is very enjoyable for students</i> 	Coke vs Diet coke demo Coke Lab

8	1.6 - A New Language: Chemical Names and Symbols <ul style="list-style-type: none"> ● Explain to students that you are now focusing on the pure substance part of the Matter chart from lesson 1.3 ● Lesson works well with using picture cards(linked in additional resources) instead of setting up a bunch of different test tubes 	
9	1.7 - Now You See It: The Copper Cycle <ul style="list-style-type: none"> ● If you do not have a fume hood this lab can be left out and you can move on to lesson 8 	
10	1.8 - What Goes Around Comes Around: Conservation of Matter <ul style="list-style-type: none"> ● If you have skipped the copper cycle lab you should teach about conservation of matter using the mini lab attached in additional resources <ul style="list-style-type: none"> ○ This lab should not take more than 15 minutes: only do vinegar and baking soda lab ○ If the mass does change a bit go through the sources of error in the experiment 	Law of conservation of mass mini lab
11	1.9 - Create a Table: Properties of the Elements <ul style="list-style-type: none"> ● Make sure to print out the cards in color because students will not see patterns in the cards/trends in the periodic table (may need two days to complete the card activity) 	
12-13	1.10 - Breaking the Code: The Periodic Table <ul style="list-style-type: none"> ● Day 1: focus on the patterns and trends students saw in the card activity ● Day 2: take notes on trends in the periodic table 	Video: Alkali Metal Reactivity <ul style="list-style-type: none"> ● Great intro video when explaining the trends in reactivity
14	1.11 - Atomic Pudding: Models of the Atom <ul style="list-style-type: none"> ● Regent focus: Solid sphere model= Dalton, Plum pudding= Thomson, Gold foil experiment= Rutherford, Bohr= orbits/solar system model ● The Rutherford Scattering Phet Sim provides a great visual that can be used to help students understand how the Rutherford and Plum Pudding models of the atom were developed. 	Rutherford Scattering Phet simulation
	Regents alignment: An additional activity is required to address major understanding <ul style="list-style-type: none"> ● The wave particle model is not addressed in the previous lesson or any other Living by Chemistry lesson, so an additional activity is required to address major understanding 3.1. 	
15-16	1.12 - Atoms by the Numbers: Atomic Number and Atomic Mass	
17	1.13 - Subatomic Heavyweights: Isotopes <ul style="list-style-type: none"> ● The Isotopes and Atomic mass simulation can be used as an alternative to Subatomic Heavyweights activity ● The chem catalyst should still be used 	Isotopes Phet simulation Student Handout

	1.14 -Skip: Isotopia: Stable and Radioactive Isotopes <ul style="list-style-type: none"> We suggest you skip "Isotopia, stable and radioactive Isotope" from Living by Chemistry because it is not necessary for Regents preparation. 	
18	1.15 - Nuclear Quest: Nuclear Reactions <ul style="list-style-type: none"> Great game! The game takes a long time to create and prepare but it is a very creative and fun way to introduce nuclear chemistry If you want to teach nuclear chemistry at the end of the year (Skip lesson 14-16: days 18-22 - for now). These lessons will be included again in unit 6. The reason for skipping these lessons is because the regents only includes a few questions on nuclear chemistry. 	
19	1.16 - Old Gold: Formation of Elements	nuclear fission video nuclear fusion video
20-22	Regents alignment - An additional activity is required to address the following topics: <ul style="list-style-type: none"> Positron decay Half lifes Benefits and risks of radioactive isotopes / common radioactive isotopes (ex: C-14, U-238..) Explain differences between natural and artificial transmutation 	M&M half life lab <ul style="list-style-type: none"> It is helpful to have the students collect the data on a shared excel document. It is recommended to add regents questions to the end of this lab
23	1.17 - Technicolor Atoms: Flame Tests <ul style="list-style-type: none"> For safety precautions: Should be done as a demo and not a lab. 	Why are fireworks colorful: Link <ul style="list-style-type: none"> Great intro article to flame tests Can also be used as a review after the bright line spectrum is taught
24-25	1.18 - Life on the Edge: Valence and Core Electrons	Video: Bright line spectrums
	Regents alignment: An additional activity is required to address the following topics: <ul style="list-style-type: none"> Bright line spectrum Electron configurations in excited state 	
26-27	1.19- Noble Gas Envy: Ion Project <ul style="list-style-type: none"> Divide students into groups and have them paste their cards to a poster board organized like the periodic table. 	Video: Intro to ions Ion Poster Example Ion Poster Rubric
	Regents alignment: An additional activity is required to address major understanding <ul style="list-style-type: none"> Relative size of atoms and their ions is not addressed in this lesson or any other Living by Chemistry lesson, so an additional activity is required to address major understanding 5.2c 	

28	1.20 -Getting Connected: Ionic Compounds	
29	1.21 - Salty Eights: Formulas for Ionic Compounds <ul style="list-style-type: none"> • Great game but can be skipped if in a time crunch • Cards should be printed out in color 	
30	1.22-Isn't It Ionic?: Polyatomic Ions	
31	1.23 - Alchemy of Paint: Transition Metal Chemistry <ul style="list-style-type: none"> • <i>Great activity. Might be easier to demo the paint creation for the students and have them paint with the transition metals in the last 5-10 minutes of class</i> 	
	1.24 - Shell Game: Electron Configurations <ul style="list-style-type: none"> • <i>We suggest you skip "Shell game: Electron Configurations " from Living by Chemistry because it is not necessary for Regents preparation.</i> 	
32	1.25- You Light Up My Life: Classifying Substances <ul style="list-style-type: none"> • <i>Great lab: Make sure you have all the material in advance</i> • <i>The student love seeing how powerade actually conducts electricity</i> 	
33	1.26 - Electron Glue: Bonding	
34	1.27 - Electrons on the move: Electroplating Metals <ul style="list-style-type: none"> • <i>Refer back to Matter chart and explain that electroplating is a way to chemically separate substances</i> • <i>Can also be taught when students learn about redox reactions and voltaic cells</i> 	Matter chart