

Unit 5: Fire

Chemistry

22 Days

Topics from the NYC Scope and Sequence

Kinetics/ Equilibrium
Oxidation & Reduction
Chemical Bonding
Physical Behavior of Matter

New York State Core Curriculum Alignment

Kinetics/ Equilibrium: 3.4d, 3.4f, 4.1c, 4.1d, 3.4g, 3.1l, 3.1mm
Oxidation & Reduction: 3.2d, 3.2e, 3.2f, 3.2g, 3.2h, 3.3b, 3.2i, 3.2j, 3.2k, 3.2l
Chemical Bonding: 5.2i
Physical Behavior of Matter: 4.1a, 4.2a, 4.2b, 4.2c, 4.1b

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

Day	Living by Chemistry Lesson Title	Additional Resource
1	5.1- Fired Up! Energy Changes: <ul style="list-style-type: none">Highly recommended to do the Jet Engine demoSugar sparks demo is like the dancing gummy bear demo if you rather just show a video clipIf you can't do all of them live choose 3-4 and create your own observation sheet- see linked document	Observation Document
2-3	5.2- Not so Hot: Exothermic and Endothermic	
4	5.3- Point of View: First and Second Law <ul style="list-style-type: none">Although students do not need to know the first and second law of thermodynamics for the Regents I have found that this is an exciting lesson that really teaches students about heat transfer in a hands on mannerYou should just have students focus on a few questions for each station to make sure that the lesson can be completed in a day	
5	5.4- Heat vs Temperature: Heat Transfer <ul style="list-style-type: none">This lab focuses on specific heat capacity = 1 calorie. However students must know that this is interchangeable with 4.18 J (specific heat capacity of water) on table B	
6-7	5.5- The Heat is on: Specific Heat Capacity <ul style="list-style-type: none">Because 5.4, 5.5, and 5.6 are all labs it is recommended to teach some of these topics without a lab to make sure that you do not feel a time pressure	fire water balloon demo <ul style="list-style-type: none">Great demo to explain specific heat capacity
8-9	5.6- Where's the Heat? Heat and Phase Changes <ul style="list-style-type: none">Students must know the endothermic and exothermic phase change diagrams for the regents.<ul style="list-style-type: none">They need to be able to understand where there are changes in kinetic and potential energyThey should be able to complete calculations involving heat of fusion and heat	Kinetic and Potential Energy: Phet Simulation <ul style="list-style-type: none">Can be used as an introduction for students before they relate kinetic and potential energy to the phase diagram Phase Change Curves

	<p><i>of vaporization and understand how they relate to the phase change diagram</i></p>	<ul style="list-style-type: none"> ● Can be used as a note taking sheet for students to add in the extra information they need to know for the regents
	<p>We suggest you skip the following lessons from Living by Chemistry because they are not necessary for Regents preparation. Please read the important bullet points below!</p> <ul style="list-style-type: none"> ● 5.7-You're Fired!: Combustion <ul style="list-style-type: none"> ○ For the regents: students just need to know the definition, chemical equation, and that combustion is an organic reaction ● 5.8- Now We're Cooking: Calorimetry ● 5.9- Counting Calories: Calorimetry Calculations <ul style="list-style-type: none"> ○ Although lessons 5.8 & 5.9 have some Regents alignment they are placed in this category because students already had a few labs to practice specific heat capacity calculations ○ If you find that your students need more practice doing specific heat capacity problems feel free to complete lessons 5.8-5.9 ● 5.10- Fuelish Choices: Heat of Combustion 	<p>B-A-R-F</p> <ul style="list-style-type: none"> ● Acronym to help students remember: <ul style="list-style-type: none"> ○ B- Broken bonds ○ A- Absorb energy ○ R- Release energy ○ F- Formed bonds
10	<p>5.11- Make It or Break It: Bond Energy</p> <ul style="list-style-type: none"> ○ Students just need to know that breaking bonds absorb energy and forming bonds releases energy 	
11	<p>5.12- Over the Hill: Reversing Reactions</p> <ul style="list-style-type: none"> ● Relate this back to phase the endothermic and exothermic phase diagrams and how they relate to the energy diagrams ● Bring in table I here: Lesson 5.16 will discuss the concepts in table I in more detail 	
12-13	<p>5.13- Speed Things Up: Rate of Reaction</p> <ul style="list-style-type: none"> ● Include how to calculate heat of reaction(change in H) using energy diagrams 	<p>Video</p> <ul style="list-style-type: none"> ● Great intro video for collision theory
	<p>We suggest you skip the following lesson from Living by Chemistry because it is not necessary for Regents preparation:</p> <ul style="list-style-type: none"> ● 5.14: Make It Work: Work 	
14	<p>5.15- Metal Magic: Oxidation</p> <ul style="list-style-type: none"> ● There is an alternative suggestion in lesson 5.17. If you would rather introduce redox reactions using the alternative suggestion, feel free to skip this lesson. 	

15	5.16- Pumping Iron: Heat of Formation <ul style="list-style-type: none"> ● <i>Make sure to relate this lesson back to the important concepts students must know from table I</i> ● <i>Discuss entropy and enthalpy</i> 	
16-17	5.17- Electron Cravings: Oxidation-Reduction <ul style="list-style-type: none"> ● <i>Alternative suggestion: To introduce Redox reactions you can discuss with students why the statue of liberty is green?</i> <ul style="list-style-type: none"> ○ <i>This article will segway into the concepts addressed in redox reactions</i> ● <i>If you skipped lesson 5.15 make sure to define and explain the basic concepts of redox before moving into the explore section of this lesson</i> 	Article: Why is the Statue of Liberty Green? Video: Redox Reactions
	Regents alignment: <i>An additional activity is required to address major understanding: Oxidation Number Rules</i>	
18	5.18- The Active Life: Activity of Metals <ul style="list-style-type: none"> ● <i>Explain how to read/use table J</i> 	
19-20	5.19- Current Events: Electrochemical Cell <ul style="list-style-type: none"> ● Students will not need to calculate overall voltage for the regents ● They will need to label the anode, cathode, places of oxidation & reduction, electron flow, ion flow, and write the half reactions that take place. 	Battery Simulation <ul style="list-style-type: none"> ● This simulation required a CK-12 account. ● You can sign up for free Voltaic Cell Video
	Regents alignment: <i>An additional activity is required to address major understanding:</i> <ul style="list-style-type: none"> ● The difference between a voltaic and electrolytic cell and that electroplating is a type of electrolytic cell 	Phet Simulation <ul style="list-style-type: none"> ● This circuit simulation is helpful to use to explain electrolytic cells and electron flow
21-22	5.20- Ashes to Ashes: Unit Review <ul style="list-style-type: none"> ● <i>Recommended to create your own unit review, especially if lessons were skipped</i> 	