

Active Chemistry and Active Physics correlation for Alabama Physical Science



"X" Coverage in Student Edition and/or Teacher Edition supports the development of the concept. "XX" Indepth coverage of concept in Student Edition	Active Chemistry			Predictions			Sports			Home			Transportation			Medicine			Communication		
	Movie Special Effects	Periodic Table	Cool Chemistry	Chapter 1	Chapter 2	Chapter 3	Chapter 1	Chapter 2	Chapter 3	Chapter 1	Chapter 2	Chapter 3	Chapter 1	Chapter 2	Chapter 3	Chapter 1	Chapter 2	Chapter 3	Chapter 1	Chapter 2	Chapter 3
PROCESS AND APPLICATION																					
Students will:																					
1. Understand fundamental assumptions about the universe upon which the scientific enterprise is based.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
· Concern with natural phenomena	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
· Discoverable and understandable operation of the universe	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
· Linking of natural causes with natural effects	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
· Consistent and predictable operation of the universe	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
2. Discuss science as a body of knowledge and an investigative process.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
· Unified, open-ended structure of observations set in a testable framework of ideas	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
· Common purpose and philosophy among the science disciplines	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
· Limited scope and certainty	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
· Simple solutions, comprehensive results, clearest and reliable explanations, accurate basis for predictions	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
3. Conduct scientific investigations systematically.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
· Identifying and framing the question carefully	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
· Forming a hypothesis	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
· Identifying and managing variables effectively	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
· Developing a practical and logical procedure	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
· Presenting conclusions based on investigation/previous research	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX



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4. Exhibit behaviors appropriate to the scientific enterprise consistently.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Examples: curiosity, creativity, integrity, patience, skepticism, logical reasoning, attention to detail, openness to new ideas	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
5. Demonstrate correct care and safe use of instruments, equipment, and chemicals.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
6. Demonstrate the ability to choose, construct, and/or assemble appropriate equipment for scientific investigations.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
7. Apply critical and integrated science-thinking skills.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
• Observing	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
• Classifying	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
• Measuring with appropriate units and significant figures	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
• Inferring	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
• Predicting	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
• Solving problems	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
• Interpreting data	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
• Designing experiments	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
• Formulating hypotheses	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
• Communicating	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
8. Use mathematical models, simple statistical models, and graphical models to express patterns and relationships determined from sets of scientific data.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Example: calculate mean, median, and mode from sample data																					
9. Solve for unknown quantities by manipulating variables simultaneously.	X	X	X		XX	XX	XX	XX	XX		X		XX	X	X		X	X	XX		X



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10. Use written and oral communication skills to present and explain scientific phenomena and concepts individually or in collaborative groups using technical and non-technical language.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Examples: laboratory reports, journal entries, computer-based slide show presentations, daily log reports, student presentations	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
11. Choose appropriate technology to retrieve relevant information from the Internet such as electronic encyclopedias, indices, and databases.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12. Analyze the advantages and disadvantages of widespread use of and reliance on technology.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
13. Practice responsible use of technology systems, information, and software such as following copyright laws.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
14. Evaluate technology-based options for lifelong learning.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Examples: Internet usage, online/distance learning	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
15. Identify the effects of technology on daily life.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Examples: cellular phones, fiber optics, microwaves, lasers	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
16. Collect data and construct and analyze graphs, tables, and charts using tools such as computer-based or calculator-based probeware.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Properties and Changes in Matter																						
17. Trace the changing model of the atom from that of Democritus to the present quantum model.	XX																					
18. Demonstrate use of the Bohr model.	XX																					



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· Describing the electron configuration of elements in the periodic table	XX																				
· Relating electron configuration to valence and oxidation number	X		X																		
· Comparing the roles of electrons in covalent, ionic, and metallic bonding	X		X																		
19. Differentiate between physical and chemical properties/changes.	X	XX	X																		
20. Demonstrate use of the periodic table for key purposes.																					
· Determining number of protons, electrons, and neutrons	XX																				
· Classifying elements	XX		X																		
· Determining reactivity	XX		X																		
· Writing formulas	XX		X																		
· Identifying types of compounds formed	XX		X																		
21. Classify matter according to characteristic properties.	X	X	X																		
Examples: metals, nonmetals and metalloids, covalent and ionic compounds; solutions and suspensions	X	XX	X																		
22. Explain the formation of unsaturated, saturated, and supersaturated solutions.			X																		
23. Describe the effects of factors that influence solubility and rate of solution.																					
· Nature of solute and solvent			X																		
· Temperature			X																		
· Agitation			X																		
· Surface area			X																		
· Pressure of gases		X																			
24. Write simple formula and chemical word equations for the four basic types of reactions.																					



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• Synthesis			X																		
• Decomposition			X																		
• Single replacement	X		X																		
• Double replacement	X		X																		
25. Illustrate the Law of Conservation of Mass by balancing simple chemical equations.	X		X																		
26. Describe factors that affect rates of reaction.			X																		
• Temperature			X																		
• Concentration			X																		
• Surface area			X																		
• Catalysts			X																		
• Nature of reactants			X																		
27. Analyze the properties and interactions of acids and bases.			X																		
Forces and Motions																					
28. Identify the basic natural forces.																					
• Gravitational					X	X	X	X	XX				X		X						
• Electromagnetic						X						X							X	XX	X
• Strong nuclear																					
• Weak nuclear																					
29. Apply quantitative relationships and associated graphical representations among position, displacement, distance, time, speed, velocity, and acceleration.					X	X	XX	X					XX		X				X		
30. Add parallel vector quantities (in the same or opposite directions) to determine a resultant.								X													
Example: effect of tailwind/headwind on an airplane																					
31. Describe relationships between force and motion in Newton's laws.					XX			XX						X	X						



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· Inertia					XX			XX						XX	XX						
· Acceleration					XX			XX						XX	XX						
· Action/reaction					XX			XX						X	X						
32. Apply the quantitative relationships among force, distance, work, time, and power.					X			X			X	X		X							
33. Analyze the nature of simple machines.																					
· Mechanical advantage																					
· Efficiency																					
34. Explain tradeoffs in the use of simple machines to do work. Examples: ramp—increased distance traded for decreased effort force; bicycle—increased speed exchanged for greater effort force																					
35. Apply quantitative relationships among force, area, and pressure in fluids. Examples: buoyancy, hydraulics (Pascal's law), Bernoulli effects																	X				
36. Explain the relationships among mass, velocity, force, and momentum.					X			XX	X					XX							
Interactions of Energy and Matter																					
37. Describe mathematically the relationships among potential energy, kinetic energy, and work.								X	XX			X									
38. Explain phase changes in terms of the effect of energy on particle motion. Examples: ice changing from water and then to steam, slow particle movement changing to medium and then to fast	X																				
39. Illustrate the Law of Conservation of Energy. · Potential energy to kinetic energy Example: falling object	X							X	XX	X		X									



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<ul style="list-style-type: none"> Transformation of energy forms 										X											
Example: hairdryer transforming electrical energy to heat energy										X											
40. Explain methods of heat transfer.									X												
<ul style="list-style-type: none"> Conduction 									XX												
<ul style="list-style-type: none"> Radiation 									XX												
<ul style="list-style-type: none"> Convection 									XX												
41. Describe the transfer of energy through waves.					X				X	X	X			X	X		X	X	X	X	X
<ul style="list-style-type: none"> Mechanical energy (energy content as it relates to amplitude) 														X		X	X				
<ul style="list-style-type: none"> Electromagnetic energy (energy content as it relates to frequency) 	X																				
<ul style="list-style-type: none"> Transverse waves 	X				X								X				X	X			
<ul style="list-style-type: none"> Longitudinal waves 					X								X	X		X	X	X			
42. Identify wave characteristics.	X				X								X	X	X	X	X	X	X	X	X
<ul style="list-style-type: none"> Wavelength 	X				X									X			X	X	X		
<ul style="list-style-type: none"> Frequency 	X				X									X			X	X	X		
<ul style="list-style-type: none"> Period 														X			X				
<ul style="list-style-type: none"> Amplitude 					X									X			X				
<ul style="list-style-type: none"> Speed 	X												X			X	X	X	X	X	X
43. Relate physical properties of sound and light to wave characteristics.	X				X								X	X			X				
Examples: loudness to amplitude, pitch to frequency, color to wavelength and frequency	X				X									X			X				
44. Analyze interactions of light and matter.	X															X		X			X
<ul style="list-style-type: none"> Prisms 																					
<ul style="list-style-type: none"> Concave/convex mirrors 																		X			
<ul style="list-style-type: none"> Concave/convex lenses 																X		X			X
45. Describe characteristics and behavior of static charge.																					
<ul style="list-style-type: none"> Creating charge 																					



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· Transferring charge through induction and conduction																						
46. Explain the relationship between electricity and magnetism.												X										
Examples: a moving charge creates a magnetic field, a moving magnetic field may induce a current in a closed wire loop												X										
47. Apply Ohm's law to electrical circuits.										X												
48. Understand basic nuclear concepts.				X																		
· Identifying three types of nuclear emissions (alpha particle, beta particle, gamma radiation)				X																		
· Differentiating between fission and fusion	X																					