Active Chemistry Correlation with Alabama

Correlation Key: **"X" Coverage = Secondary concept of the activity or problem. Students gain a basic understanding or introduction of the concept.**	***Movie Special Effects***	***Periodic Table***	***Cool Chemistry***
"XX"In-depth Coverage = Primary concept that is the focus of the activity or problem. Students gain thorough understanding of the concept.	**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**
· Concern with natural phenomena	**XX**	**XX**	**XX**
· Discoverable and understandable operation of the universe	**XX**	**XX**	**XX**
· Linking of natural causes with natural effects	**XX**	**XX**	**XX**
· Consistent and predictable operation of the universe	**XX**	**XX**	**XX**
2. Discuss science as a body of knowledge and an investigative process.	**XX**	**XX**	**XX**
· Unified, open-ended structure of observations set in a testable framework of ideas	**XX**	**XX**	**XX**
· Common purpose and philosophy among the science disciplines	**XX**	**XX**	**XX**
· Limited scope and certainty	**XX**	**XX**	**XX**

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· Simple solutions, comprehensive results, clearest and reliable explanations, accurate basis for predictions	**XX**	**XX**	**XX**
3. Conduct scientific investigations systematically.	**XX**	**XX**	**XX**
· Identifying and framing the question carefully	**XX**	**XX**	**XX**
· Forming a hypothesis	**XX**	**XX**	**XX**
· Identifying and managing variables effectively	**XX**	**XX**	**XX**
· Developing a practical and logical procedure	**XX**	**XX**	**XX**
· Presenting conclusions based on investigation/previous research	**XX**	**XX**	**XX**
4. Exhibit behaviors appropriate to the scientific enterprise consistently.	**XX**	**XX**	**XX**
Examples: curiosity, creativity, integrity, patience, skepticism, logical reasoning, attention to detail, openness to new ideas	**XX**	**XX**	**XX**

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5. Demonstrate correct care and safe use of instruments, equipment, and chemicals.	**XX**	**XX**	**XX**
6. Demonstrate the ability to choose, construct, and/or assemble appropriate equipment for scientific investigations.	**XX**	**XX**	**XX**
7. Apply critical and integrated science-thinking skills.	**XX**	**XX**	**XX**
· Observing	**XX**	**XX**	**XX**
· Classifying	**XX**	**XX**	**XX**
· Measuring with appropriate units and significant figures	**XX**	**XX**	**XX**
· Inferring	**XX**	**XX**	**XX**
· Predicting	**XX**	**XX**	**XX**
· Solving problems	**XX**	**XX**	**XX**
· Interpreting data	**XX**	**XX**	**XX**
· Designing experiments	**XX**	**XX**	**XX**
· Formulating hypotheses	**XX**	**XX**	**XX**
· Communicating	**XX**	**XX**	**XX**

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8. Use mathematical models, simple statistical models, and graphical models to express patterns and relationships determined from sets of scientific data.	**XX**	**XX**	**XX**
Example: calculate mean, median, and mode from sample data			
9. Solve for unknown quantities by manipulating variables.	**X**	**X**	**X**
Examples: stoichiometry, gas laws, ionization constants		**X**	**X**
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**
Examples: laboratory reports, journal entries, computer-based slide show presentations, daily log reports, student project presentations	**XX**	**XX**	**XX**

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11. Choose appropriate technology to retrieve relevant information from the Internet such as electronic encyclopedias, indices, and databases.	**X**	**X**	**X**
12. Analyze the advantages and disadvantages of widespread use of and reliance on technology.	**X**	**X**	**X**
13. Practice responsible use of technology systems, information, and software such as following copyright laws.	**X**	**X**	**X**
14. Evaluate technology-based options for lifelong learning.	**X**	**X**	**X**
Examples: Internet usage, online/distance learning	**X**	**X**	**X**
15. Identify the uses of technology in scientific applications.	**X**	**X**	**X**
Examples: metal spectroscopy, gas chromatography, crystallography in microgravity			

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16. Collect data and construct and analyze graphs, tables, and charts using tools such as computer-based or calculator-based probeware.	**X**	**X**	**X**
Properties and Changes in Matter			
17. Differentiate the classifications of matter.			
· Pure substances	**XX**	**XX**	**XX**
Examples: elements, compounds	**XX**	**XX**	**XX**
· Mixtures	**XX**		**X**
Examples: homogeneous, heterogeneous	**XX**		**X**
18. Differentiate between physical and chemical properties/changes.	**XX**	**XX**	**XX**
19. Use the kinetic theory to explain the states and properties (microscopic and macroscopic) of matter.	**XX**		**X**
Example: change in interparticle distance and attractive forces	**XX**		

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Structure of Atoms			
20. Use the periodic table to determine the number of protons, electrons, and neutrons in isotopes of elements.		**XX**	
21. Summarize benchmark discoveries in the historical development of the atomic theory.			
Examples: Thomson's cathode ray, results of Rutherford's gold foil and Millikan's oil-drop experiments, photoelectric effect, absorption and emission spectra of elements		**XX**	
22. Describe atoms using different electron notations.		**XX**	**X**
· Electron configuration		**XX**	
· Orbital notation		**XX**	
· Electron dot notation		**XX**	
Example: Lewis symbol		**XX**	

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Periodic Table			
23. Use the periodic table for specific purposes.	**X**	**XX**	**X**
· Predicting patterns of change of properties by groups and periods	**X**	**XX**	
· Classifying elements as metals, nonmetals, metalloids, noble gases	**X**	**XX**	
· Predicting bond types		**XX**	
· Assigning valences/oxidation numbers based on electron configuration		**XX**	
Solutions			
24. Describe the preparation and properties of solutions.			**XX**
· Components	**X**		**XX**
· Classifications	**X**		**XX**
· Solubility and concentrations			**XX**
· Conductivity			
· Colligative properties			**X**

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25. Relate certain factors to solubility and rate of solution.			**XX**
· Nature of solute and solvent			**XX**
· Temperature			**X**
· Agitation			**XX**
· Surface area			**XX**
· Pressure of gases			**X**
26. Understand the nature and interactions of acids and bases.			
· Proton donors or acceptors			**X**
· Physical properties			**X**
Examples: taste, conductivity	**X**		**X**
· Effects on indicators			**XX**
· Neutralization reactions			**X**
· Degree of ionization			**X**
Examples: weak or strong, diluted or concentrated, pH			**X**
Nuclear			

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27. Compare characteristics of isotopes of the same element.			
· Nuclear composition	**X**		
· Stability	**XX**		
· Physical properties	**X**		
· Chemical properties			
28. Demonstrate an understanding of basic nuclear concepts and issues.		**X**	
· Distinguishing between nuclear and chemical changes			
· Identifying three types of nuclear radiation (alpha, beta, gamma)			
· Applying half-life to dating techniques			
· Differentiating fission and fusion		**X**	
· Evaluating environmental issues associated with nuclear waste			
Interactions of Matter and Energy			
29. Compare and contrast bond types.		**XX**	**X**

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· Ionic		**X**	**X**
· Covalent		**X**	**X**
Examples: inorganic–water, organic–glucose		**X**	
· Metallic			
30. Apply rules of nomenclature and formula writing.			**XX**
Examples: carbon dioxide–CO2, calcium carbonate–CaCO3			**XX**
31. Demonstrate an understanding of matter interactions.			
· Writing balanced chemical equations			**X**
· Identifying chemical reactions		**X**	**XX**
· Analyzing stoichiometric relationships		**X**	**XX**
Examples: particles, masses, moles, volumes		**X**	**X**
32. Apply quantitative relationships among pressure, volume, temperature, and number of particles in ideal gases.			

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33. Analyze factors affecting reaction rates in relation to the kinetic theory.			
· Temperature			**X**
· Surface area			**X**
· Catalyst			**X**
· Concentration			**X**
· Nature of reactants			**X**
34. Explain physical and chemical changes as endothermic and exothermic energy changes.			
· Specific heat calculations			
· Heats of fusion and vaporization			
· Heats of solution			
· Heats of reaction			
35. Apply LeChatelier's principle to explain a variety of changes in physical and chemical equilibria.			