

Light Up My Life Correlation to the Arkansas Standards

<p>“X” = Coverage= Secondary concept of the activity or problem. Students gain a basic understanding or introduction of the concept.</p> <p>“XX” = In-depth Coverage Primary concept that is the focus of the activity or problem. Students gain thorough understanding of the concept.</p>	Chapter 1								
	Activity 1: The Inverse Square Law	Activity 2: The Right Amount of Light	Activity 3: Light and Color	Activity 4: Light from Lamps	Activity 5: Measuring Light Quality: Color Characteristics	Activity 6: The Quality of the Visual Environment	Activity 7: The Light Bill	Activity 8: Ways to Save Energy and Money on Lighting	Activity 9: The Economics of Lighting

STRAND 1: PHYSICAL SYSTEMS

CONTENT STANDARD 1: Students will demonstrate an understanding of physical systems as a process of inquiry.

PS.1.1. Understand that science is a process based on the scientific method which leads to a deeper understanding of real world situations.	XX	XX	XX	XX	XX		X	X	
PS.1.2. Follow procedures for a scientific inquiry using step-by-step instructions, mathematical formulas, flow diagrams, and/or sketches.	XX	XX	XX	XX	XX		X	X	
PS.1.3. Develop and implement a workable scientific inquiry independently and with a group using standard safety procedures.	XX	XX	XX	XX	XX		X	X	
PS.1.4. Evaluate the process that scientists use to construct and validate scientific theory, such as data collection, prediction, experimentation (controls and variables), bias elimination, and replication.	XX		X	X	X				
PS.1.5. Make objective observations and perform error analysis on collected data.	X	X	X	X	X				
PS.1.6. Formulate valid conclusions.	XX	XX	X	X	X				
PS.1.7. Communicate and defend in writing a scientific argument.	XX	X	X	X	X				
PS.1.8. Critique and interpret scientific data on charts and graphs.	XX	XX							
PS.1.9. Recognize that theories are models and may be revised when new data is introduced.								X	
PS.1.10. Understand the criteria for the formation of scientific theory and a scientific law.	X								

CONTENT STANDARD 2

Students will explore, demonstrate, communicate, apply, and evaluate the knowledge of physical systems.

PS.2.1. Evaluate the historical and multi-cultural contributions to the scientific body of knowledge in physical systems (nature of light, falling objects, expanding universe, model of the atom, quantum physics, periodic table). Construct time lines.	X		X	X					
PS.2.11. Define the four fundamental forces in nature (gravitational, electromagnetic, weak nuclear and strong nuclear).									
PS.2.12. Analyze the aspects of motion (frame of reference, speed, velocity, acceleration, relativity, time and displacement), and distinguish between average, constant and instantaneous motion. (Demonstrate and evaluate motion graphically.)									
PS.2.13. Investigate the aspects of two-dimensional motion (circular, rotational and projectile), momentum and impulse.									

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PS.2.14. Apply the laws of conservation to interactions of matter (momentum, angular momentum, mass/energy, and electric charge).									
PS.2.15. Explain the relationship of matter and energy ($E=mc^2$).									
PS.2.16. Recognize the relationships of forces and motion, applying Newton's laws, and use diagrams to analyze the forces on a system.									
PS.2.17. Examine the types of waves (transverse, longitudinal, standing, circular, electromagnetic), properties and characteristics of waves (reflection, refraction, diffraction, interference, pitch, frequency, and velocity), and how waves transfer energy.				X					
PS.2.18. Investigate the properties and characteristics of light and different optical systems (lenses, mirrors, polarization filters, fiber optics, and lasers).	X		X	X					
PS.2.19. Evaluate the concept of the duality of light exploring contributions of scientists such as DeBroglie, Schrodinger, and Heisenberg.									
PS.2.20. Investigate the electromagnetic spectrum and the derivation of emission and absorption spectra.				XX					
PS.2.21. Examine the properties of sound (pitch, frequency, and intensity) and other related aspects (earthquakes, shock waves,									
PS.2.22. Investigate electric and magnetic interactions and fields (poles, magnetic domains, charges, field lines, potential difference, force and Coulomb's Law).									
PS.2.23. Distinguish between direct and alternating current.									
PS.2.24. Analyze and evaluate the parameters of circuits applying Ohm's Law and use appropriate data collections and calculations (current, resistance, and voltage).									
PS.2.25. Analyze the interdependent fields of electricity and magnetism (electromagnets, motors, generators, and transformers).									
CONTENT STANDARD 3									
Students will demonstrate an understanding of the connections and applications of physical science.									
PS.3.1. Analyze the role science plays in everyday life and compare different careers in the physical sciences.	X		X	X	X				
PS.3.2. Evaluate long range plans for resource use and by-product disposal in terms of environmental, economic, and political impact.						X	X	XX	XX
PS.3.3. Assess current world issues applying scientific themes (suggested issues: global changes in climate, ozone depletion, UV radiation, natural resources, use of technology, and public policy).									

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PS.3.4. Understand that mathematics is the precise language of communication and problem solving in science (conversions logarithms, inverse square law, etc.). (Measure and calculate using SI units.)	XX								XX
PS.3.5. Apply technology as appropriate tools for solving problems (electronic balances, computers, pH meters, spectrophotometers, multimeters, etc.).	X	X		X					XX
PS.3.6. Assess the connections between pure science and applied science to the world of work by performing labs and activities common to the physical sciences.	X	X	X	X	X				
PS.3.7. Understand broad themes of Project 2061. Such themes include systems, patterns of change, interactions, energy equilibrium, models, and scale (e.g., relative dimensions such as solar system size).									