CORRELATION TO THE GEORGIA PERFORMANCE STANDARDS

Subject Area: Physical Science **State-Funded Course:**

Textbook Title: Physics in Context: An Integrated Approach

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Standard (Cite Number)	**Standard** (Cite specific standard)	**Where Taught** (Page numbers in text)
SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.	a. Exhibit the above traits in their own scientific activities.	Embedded in lab activities.
	b. Recognize that different explanations often can be given for the same evidence.	Embedded in lab activities.
	c. Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations.	Embedded in lab activities.
SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.	a. Follow correct procedures for use of scientific apparatus.	Embedded in lab activities.
	b. Demonstrate appropriate techniques in all laboratory situations.	Embedded in lab activities.
	c. Follow correct protocol for identifying and reporting safety problems and violations.	Embedded in lab activities.
SCSh3. Students will identify and investigate problems scientifically.	a. Suggest reasonable hypotheses for identified problems.	Embedded in lab activities.
	b. Develop procedures for solving scientific problems.	Embedded in lab activities.
	c. Collect, organize and record appropriate data.	Embedded in lab activities.
	d. Graphically compare and analyze data points and/or summary statistics.	Embedded in lab activities.
	e. Develop reasonable conclusions based on data collected.	Embedded in lab activities.
	f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.	Embedded in lab activities.
SCSh4. Students will use tools and instruments for observing, measuring, and manipulating	a. Develop and use systematic procedures for recording and organizing information.	Embedded in lab activities.
	b. Use technology to produce tables and graphs.	Depends on classroom resources.

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scientific equipment and materials.	c. Use technology to develop, test, and revise experimental or mathematical models.	Depends on classroom resources.
SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.	a. Trace the source on any large disparity between estimated and calculated answers to problems.	Embedded in lab activities.
	b. Consider possible effects of measurement errors on calculations.	Embedded in text and lab activities.
	c. Recognize the relationship between accuracy and precision.	Embedded in text and lab activities.
	d. Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.	Embedded in text and lab activities.
	e. Solve scientific problems by substituting quantitative values, using dimensional analysis, and/or simple algebraic formulas as appropriate.	Embedded in text and lab activities.
SCSh6. Students will communicate scientific investigations and information clearly.	a. Write clear, coherent laboratory reports related to scientific investigations.	Embedded in lab activities.
	b. Write clear, coherent accounts of current scientific issues, including possible alternative interpretations of the data.	Embedded in lab activities.
	c. Use data as evidence to support scientific arguments and claims in written or oral presentations.	Embedded in lab activities.
	d. Participate in group discussions of scientific investigation and current scientific issues.	Embedded in lab activities.
SCSh7. Students will analyze how scientific knowledge is developed.	a. Students will recognize that: The universe is a vast single system in which the basic principles are the same everywhere.	Embedded in text and lab activities.
	b. Students will recognize that: Universal principles are discovered through observation and experimental verification.	Embedded in text and lab activities.
	c. Students will recognize that: From time to time, major shifts occur in the scientific view of how the world works. More often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. Major shifts in scientific views typically occur after the observation of a	Embedded in text and lab activities.

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	new phenomenon or an insightful interpretation of existing data by an individual or research group.	
	d. Students will recognize that: Hypotheses often cause scientists to develop new experiments that produce additional data.	Embedded in text and lab activities.
	e. Students will recognize that: Testing, revising, and occasionally rejecting new and old theories never ends.	Embedded in text and lab activities.
SCSh8. Students will understand important features of the process of scientific inquiry.	a. Students will recognize that: Scientific investigators control the conditions of their experiments in order to produce valuable data.	Embedded in text and lab activities.
	b. Students will recognize that: Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.	Embedded in text and lab activities.
	c. Students will recognize that: Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.	Embedded in text and lab activities.
	d. Students will recognize that: The merit of a new theory is judged by how well scientific data are explained by the new theory.	Embedded in text and lab activities.
	e. Students will recognize that: The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.	Embedded in text and lab activities.
	f. Students will recognize that: Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.	Embedded in text and lab activities.
SCSh9. Students will enhance reading in all curriculum areas by:	a. Reading in All Curriculum Areas • Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas. • Read both informational and fictional texts in a variety of genres and modes of discourse. • Read technical texts related to various subject areas.	Depends on classroom resources and teacher direction.

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	b. Discussing books • Discuss messages and themes from books in all subject areas. • Respond to a variety of texts in multiple modes of discourse. • Relate messages and themes from one subject area to messages and themes in another area. • Evaluate the merit of texts in every subject discipline. • Examine author's purpose in writing. • Recognize the features of disciplinary texts.	Depends on classroom resources and teacher direction.
	c. Building vocabulary knowledge • Demonstrate an understanding of contextual vocabulary in various subjects. • Use content vocabulary in writing and speaking. • Explore understanding of new words found in subject area texts.	Embedded in text and lab activities.
	d. Establishing context • Explore life experiences related to subject area content. • Discuss in both writing and speaking how certain words are subject area related. • Determine strategies for finding content and contextual meaning for unknown words.	Embedded in text and lab activities.
SPS1. Students will investigate our current understanding of the atom.	a. Examine the structure of the atom in terms of • proton, electron, and neutron locations. • atomic mass and atomic number. • atoms with different numbers of neutrons (isotopes). • explain the relationship of the proton number to the element's identity.	27-28, 50, 52, 404-420, 469-470; *learningincontext.com* web site
	b. Compare and contrast ionic and covalent bonds in terms of electron movement.	152, 19, 169, 201, 385, 399

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SPS2. Students will explore the nature of matter, its classifications, and its system for naming types of matter.	a. Calculate density when given a means to determine a substance's mass and volume.	29-3, 43-44
	b. Predict formulas for stable binary ionic compounds based on balance of charges.	
	c. Use IUPAC nomenclature for transition between chemical names and chemical formulas of • binary ionic compounds (containing representative elements). • binary covalent compounds (i.e. carbon dioxide, carbon tetrachloride).	
	d. Demonstrate the Law of Conservation of Matter in a chemical reaction.	
	e. Apply the Law of Conservation of Matter by balancing the following types of chemical equations: • Synthesis • Decomposition • Single Replacement • Double Replacement	
SPS3. Students will distinguish the characteristics and components of radioactivity.	a. Differentiate among alpha and beta particles and gamma radiation.	385, 404, 410-413; Lab 9.2; *learningincontext.com* web site
	b. Differentiate between fission and fusion.	385, 413-421; *learningincontext.com* web site
	c. Explain the process half-life as related to radioactive decay.	Web site
	d. Describe nuclear energy, its practical application as an alternative energy source, and its potential problems.	415; *learningincontext.com* web site

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SPS4. Students will investigate the arrangement of the Periodic Table.	a. Determine the trends of the following: • Number of valence electrons • Types of ions formed by representative elements • Location of metals, nonmetals, and metalloids • Phases at room temperature	
	b. Use the Periodic Table to predict the above properties for representative elements.	40-407, 411-412; *learningincontext.com* web site
SPS5. Students will compare and contrast the phases of matter as they relate to atomic and molecular motion.	a. Compare and contrast the atomic/molecular motion of solids, liquids, gases and plasmas.	27-28, 44
	b. Relate temperature, pressure, and volume of gases to the behavior of gases.	29, 38-41, 44-45, 83, 98, 102, 281-282, 292-293, 309; *learningincontext.com* web site
SPS6. Students will investigate the properties of solutions.	a. Describe solutions in terms of	
	• solute/solvent	
	• conductivity	
	• concentration	
	b. Observe factors affecting the rate a solute dissolves in a specific solvent.	
	c. Demonstrate that solubility is related to temperature by constructing a solubility curve.	
	d. Compare and contrast the components and properties of acids and bases.	
	e. Determine whether common household substances are acidic, basic, or neutral.	
SPS7. Students will relate transformations and flow of energy within a system.	a. Identify energy transformations within a system (e.g. lighting of a match).	107, 113-116, 238-239, 251-252, 278-294, 301-302, 311-322, 353-354, 409, 413-421; Lab 2.2, 2.3, 3.3, 3.4, 5.1, 6.1, 6.2; *learningincontext.com* web site

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	b. Investigate molecular motion as it relates to thermal energy changes in terms of conduction, convection, and radiation.	69-70, 157-165: Lab 3.4, 4.4; *learningincontext.com* web site
	c. Determine the heat capacity of a substance using mass, specific heat, and temperature.	71-73, 79; Lab 1.4; *learningincontext.com* web site
	d. Explain the flow of energy in phase changes through the use of a phase diagram.	73-76, 165, 284-287
SPS8. Students will determine relationships among force, mass, and motion.	a. Calculate velocity and acceleration.	121-137, 172, 471; Lab 3.1, 3.2; *learningincontext.com* web site
	b. Apply Newton's three laws to everyday situations by explaining the following: • Inertia • Relationship between force, mass and acceleration • Equal and opposite forces	12-26, 170-174, 176, 180-183, 326-338l; Lab 1.1; *learningincontext.com* web site
	c. Relate falling objects to gravitational force	7, 10-12, 48-49, 86, 93, 170, 173-174, 180-181, 189-190, 232, 244-247, 252-253, 258-260, 300; Lab 2.1, 2.3, 4.1, 5.2, 6.1, 6.2; *learningincontext.com* web site
	d. Explain the difference in mass and weight.	7, 17; Lab 2.1, 2.3, 4.1, 5.2, 6.1, 6.2; *learningincontext.com* web site
	e. Calculate amounts of work and mechanical advantage using simple machines.	84-119; Lab 2.1, 2.3; *learningincontext.com* web site
SPS9. Students will investigate the properties of waves.	a. Recognize that all waves transfer energy.	354-356, 364; Lab 8.2; *learningincontext.com* web site
	b. Relate frequency and wavelength to the energy of different types of electromagnetic waves and mechanical waves.	356-366, 388-403, 473-476; Lab 8.2; *learningincontext.com* web site
	c. Compare and contrast the characteristics of electromagnetic and mechanical (sound) waves.	355-366, 388-403; *learningincontext.com* web site
	d. Investigate the phenomena of reflection, refraction, interference,	369-380, 450-467; Lab 10.1, 10.2;

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	and diffraction.	*learningincontext.com* web site
	e. Relate the speed of sound to different mediums.	360-363, 365-366; *learningincontext.com* web site
	f. Explain the Doppler Effect in terms of everyday interactions.	Web site
SPS10. Students will investigate the properties of electricity and magnetism.	a. Investigate static electricity in terms of • friction • induction • conduction	49-51
	b. Explain the flow of electrons in terms of • alternating and direct current. • the relationship among voltage, resistance and current. • simple series and parallel circuits.	57-63, 149-156, 200-215, 317-322; Lab 1.3, 2.3, 3.3, 3.4, 5.3, 6.3; *learningincontext.com* web site
	c. Investigate applications of magnetism and/or its relationship to the movement of electrical charge as it relates to • electromagnets • simple motors • permanent magnets	266-272, 274, 276; Lab 5.3, 6.3; *learningincontext.com* web site