Book Title: PHYSICS IN CONTEXT **Subject/Course:** PHYSICS/PT 1

Publisher: CCI PUBLISHING **Grade Level:** 9-12

SCIENCE AS INQUIRY

The benchmarks from this strand should be interwoven with all content – not just taught as a separate unit.

STANDARD: The students will do science by engaging impartial and full inquiries that are within their developmental capabilities.

As students in grades 9-12 extend and refine their knowledge, what they know and are able to do includes:

A. THE ABILITIES NECESSARY TO DO SCIENTIFIC INQUIRY

Benchmarks	***Correlation Notations***
SI-H-A1 identifying questions and concepts that guide scientific investigations;	Embedded in Student Text, Teachers Guide, Lab Manuals, CD-ROM & Web: www.learningincontext.com.
SI-H-A2 designing and conducting scientific investigations;	Embedded in Student Text, Teachers Guide, Lab Manuals, CD-ROM & Web: www.learningincontext.com.
SI-H-A3 using technology and mathematics to improve investigations and communications;	Embedded in Student Text, Teachers Guide, Lab Manuals, CD-ROM & Web: www.learningincontext.com.
SI-H-A4 formulating and revising scientific explanations and models using logic and evidence;	Embedded in Student Text, Teachers Guide, Lab Manuals, CD-ROM & Web: www.learningincontext.com.
SI-H-A5 recognizing and analyzing alternative explanations and models;	Embedded in Student Text, Teachers Guide, Lab Manuals, CD-ROM & Web: www.learningincontext.com.
SI-H-A6 communicating and defending a scientific argument; and	Embedded in Student Text, Teachers Guide, Lab Manuals, CD-ROM & Web: www.learningincontext.com.
S1-H-A7 utilizing science safety procedures during scientific investigations.	Embedded in Student Text, Teachers Guide, Lab Manuals, CD-ROM & Web: www.learningincontext.com.

B. UNDERSTANDING SCIENTIFIC INQUIRY

Benchmarks	*Correlation Notations*
SI-H-B1 communicating that scientists usually base their investigations on existing models, explanations, and theories	Embedded in Student Text, Teachers Guide, Lab Manuals, CD-ROM & Web: www.learningincontext.com.
SI-H-B2 communicating that scientists conduct investigations for a variety of reasons, such as exploration of new areas, discovery of new aspects of the natural world, confirmation of prior investigations, evaluation of current theories, and comparison of models and theories;	Embedded in Student Text, Teachers Guide, Lab Manuals, CD-ROM & Web: www.learningincontext.com.
SI-H-B3 communicating that scientists rely on technology to enhance the gathering and manipulation of data;	Embedded in Student Text, Teachers Guide, Lab Manuals, CD-ROM & Web: www.learningincontext.com.
SI-H-B4 analyzing a proposed explanation of scientific evidence according to the following criteria: following a logical structure, following rules of evidence, allowing for questions and modifications, and basing it on historical and current scientific knowledge; and	Embedded in Student Text, Teachers Guide, Lab Manuals, CD-ROM & Web: www.learningincontext.com.
SI-H-B5 communicating that the results of scientific inquiry new knowledge, and methods emerge from different types of investigations and public communication among scientists.	Embedded in Student Text, Teachers Guide, Lab Manuals, CD-ROM & Web: www.learningincontext.com.

PHYSICAL SCIENCE

STANDARD: Students will develop an understanding of the characteristics and interrelationships of matter and energy in the physical world.

As students in grades 9-12 extend and refine their knowledge, what they know and are able to do includes:

A. MEASUREMENT AND SYMBOLIC REPRESENTATION

Benchmarks	*Correlation Notations*
PS-H-A1 manipulating and analyzing quantitative data using the SI system; and	Embedded in Student Text, Teachers Guide, Lab Manuals, CD-ROM & Web: www.learningincontext.com.
PS-H-A2 understanding the language of chemistry (formulas, equations, symbols) and its relationship to molecules, atoms, ions, and subatomic particles.	Embedded in Student Text, Teachers Guide, Lab Manuals, CD-ROM & Web: www.learningincontext.com.

B. ATOMIC STRUCTURE

Benchmarks	*Correlation Notations*
PS-H-B1 describing the structure of the atom plus identifying and characterizing the particles that compose it (including the structure and properties of isotopes);	ST: 49-50, 404-407 TG: corresponding ST pgs. LM: 9.13-9.30
PS-H-B2 describing the nature and importance of radioactive isotopes and nuclear reactions (fission, fusion, radioactive decay); and	ST: 407-420 TG: corresponding ST pgs. LM: 9.13-9.30
PS-H-B3 understanding that an atom's electron configuration, particularly that of the outermost electrons, determines the chemical properties of that atom.	Chemistry course material

C. THE STRUCTURE AND PROPERTIES OF MATTER

Benchmarks	*Correlation Notations*
PS-H-C1 distinguishing among elements, compounds, and/or mixtures;	Chemistry course material
PS-H-C2 discovering the patterns of physical and chemical properties found on the periodic table of the elements;	Chemistry course material
PS-H-C3 understanding that physical properties of substances reflect the nature of interactions among its particles;	ST: 27-28, 47-56, 64-68, 107-108, 152, 158-163, 200-202, 277-279, 355, 361-364, 386-388, 393, 398-400, 404-420, 468-480
PS-H-C4 separating mixtures based upon the physical properties of their components;	Chemistry course material
PS-H-C5 understanding that chemical bonds are formed between atoms when the outermost electrons are transferred or shared to produce ionic and covalent compounds;	Chemistry course material
PS-H-C6 recognizing that carbon atoms can bond to one another in chains, rings, and branching networks to form a variety of structures; and	Chemistry course material
PS-H-C7 using the kinetic theory to describe the behavior of atoms and molecules during phase changes and to describe the behavior of matter in its different phases.	ST: 27-43, 64-73 TG: corresponding ST pgs. LM: 1.1-1.25

D. CHEMICAL REACTIONS

Benchmarks	*Correlation Notations*
PS-H-D1 observing and describing changes in matter and citing evidence of chemical change;	Chemistry course material
PS-H-D2 comparing, contrasting, and measuring the pH of acids and bases using a variety of indicators;	Chemistry course material
PS-H-D3 writing balanced equations to represent a variety of chemical reactions (acid/base, oxidation/reduction, etc.);	Chemistry course material
PS-H-D4 analyzing the factors that affect the rate and equilibrium of a chemical reaction;	Chemistry course material
PS-H-D5 applying the law of conservation of matter to chemical reactions;	Chemistry course material
PS-H-D6 comparing and contrasting the energy changes that accompany changes in matter; and	ST: 27-46, 230-294, 404-420 TG: corresponding ST pgs. LM: 1.1-1.11, 5.1-5.39, 9.1-9.30
PS-H-D7 identifying important chemical reactions that occur in living systems, the home, industry, and the environment.	Chemistry course material

E. FORCES AND MOTION

Benchmarks	*Correlation Notations*
PS-H-E1 recognizing the characteristics and relative strengths of the forces of nature (gravitational, electrical, magnetic, nuclear);	ST: 47-63, 106-117, 244-247, 262-276, 316-323, 388-390 TG: corresponding ST pgs. LM: 1.1-1.11, 1.17-1.29, 2.27-2.33, 5.19-5.32, 6.3-6.11, 6.25-6.29
PS-H-E2 understanding the relationship of displacement, time, rate of motion, and rate of change of motion; representing rate and changes of motion mathematically and graphically;	ST: 12-26, 122-137, 170-183, 326-350 TG: corresponding ST pgs. LM: 3.3-3.7
PS-H-E3 understanding effects of forces on changes in motion as explained by Newtonian mechanics; and	ST: 1-23, 47-63, 170-179, 326-346 TG: corresponding ST pgs. LM: 1.1-1.17, 4.1-4.8, 7.1-7.11
PS-H-E4 illustrating how frame of reference affects our ability to judge motion.	N/A

F. ENERGY

Benchmarks	*Correlation Notations*
PS-H-F1 describing and representing relationships among energy, work, power, and efficiency; and	ST: 82-118, 230-253, 258-261, 298-315 TG: corresponding ST pgs. LM: 2.27-2.33, 5.11-5.16, 5.19-5.32, 6.3-6.10, 2.1-2.26, 6.1-6.30
PS-H-F2 applying the universal law of conservation of matter, energy, and momentum, and recognizing their implications.	ST: 230-294, 326-353 TG: corresponding ST pgs. LM: 5.3-5.10, 7.1-7.11

G. INTERACTIONS OF ENERGY AND MATTER

Benchmarks	*Correlation Notations*
PS-H-G1 giving examples of the transport of energy through wave action;	ST: 352-382 TG: corresponding ST pgs. LM: 8.1-8.28
PS-H-G2 analyzing the relationship and interaction of magnetic and electrical fields and the forces they produce;	ST: 47-60, 82-103, 266-274, 386-388 TG: corresponding ST pgs. LM: 1.1-1.17, 2.1-2.31, 5.1-5.32
PS-H-G3 characterizing and differentiating electro-magnetic and mechanical waves and their effects on objects as well as humans; and	ST: 384-421 TG: corresponding ST pgs. LM: 9.1-9.30
PS-H-G4 explaining the possible hazards of exposure to various forms and amounts of energy.	ST: 396, 397, 490 TG: corresponding ST pgs.