

Science Standard	Correlation By Page Numbers Make all correlations using the teacher text. Identify only <i>significant</i> areas of correlation. Use each bullet of the standard in the context of the stem. Please consult the 2003 Science Curriculum Framework for further information about each standard.
PH.1 The student will investigate and understand how to plan and conduct investigations in which	
a) the components of a system are defined;	118, 208, 303–304
b) instruments are selected and used to extend observations and measurements of mass, volume, temperature, heat exchange, energy transformations, motion, fields, and electric charge;	This objective is addressed throughout. See, for example: 12, 58, 100, 162, 213, 232, 257, 308, 362, 377, 399, 446, 496, 545, 562, 612, 656, 700
c) information is recorded and presented in an organized format;	This objective is addressed throughout. See, for example: 32, 69, 137, 179, 232, 257, 308, 362, 399, 446, 496, 545, 595, 634, 684, 727
d) metric units are used in all measurements and calculations;	This objective is addressed throughout. See, for example: 12, 16, 18, 58, 100, 162, 213, 232, 257, 308, 362, 377, 399, 446, 496, 545, 562, 612, 656, 700
e) the limitations of the experimental apparatus and design are recognized;	12, 24–27, 58, 100, 162, 213, 232, 257, 308, 362, 377, 399, 446, 496, 545, 562, 612, 656, 700
f) the limitations of measured quantities through the appropriate use of significant figures or error ranges are recognized;	The opportunity to address this objective is available throughout. See the following: 12, 24–27, 58, 100, 162, 213, 232, 257, 308, 362, 377, 399, 446, 496, 545, 562, 612, 656, 700
g) data gathered from non-SI instruments are incorporated through appropriate conversions; and	12, 16, 18, 58, 100, 162, 213, 232, 257, 308, 362, 377, 399, 446, 496, 545, 562, 612, 656, 700

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h) appropriate technology, including computers, graphing calculators, and probeware is used for gathering and analyzing data and communicating results.	23, 32, 67, 69, 137, 179, 181, 210, 232, 257, 308, 362, 399, 446, 496, 535, 545, 595, 634, 684, 727
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PH.2 The student will investigate and understand how to analyze and interpret data. Key concepts include	
a) a description of a physical problem is translated into a mathematical statement in order to find a solution;	This objective is addressed throughout. See for example: 38–41, 57, 75–76, 80, 96–97, 105–106, 108–113, 194–196, 261–262, 324–325, 474–476, 638
b) relationships between physical quantities are determined using the shape of a curve passing through experimentally obtained data;	The opportunity to address this objective is available. See the following: 33, 34, 82, 83, 84, 85, 90, 157, 160, 170
c) the slope of a linear relationship is calculated and includes appropriate units;	33, 36, 38, 39, 40, 41
d) interpolated, extrapolated, and analyzed trends are used to make predictions; and	12, 16, 18, 58, 100, 162, 213, 232, 257, 308, 362, 377, 399, 446, 496, 545, 562, 612, 656, 700
e) analysis of systems employs vector quantities utilizing trigonometric and graphical methods.	64–66, 68, 69, 72–73, 74, 82–83, 84, 85–86, 87–88

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PH.3 The student will investigate and understand how to demonstrate scientific reasoning and logic. Key concepts include	
a) analysis of scientific sources to develop and refine research hypotheses;	This objective is addressed throughout. See, for example: 3, 4–7, 8, 9–10, 11, 12, 16, 18, 58, 100, 162, 213, 232, 257, 308, 362, 377, 399, 446, 496, 545, 562, 612, 656, 700
b) analysis of how science explains and predicts relationships;	3, 4–7, 8, 9–10, 11, 32, 69, 137, 179, 232, 257, 308, 362, 399, 446, 496, 545, 595, 634, 684, 727
c) evaluation of evidence for scientific theories;	3, 4–7, 8, 9–10, 12, 18, 58, 100, 162, 213, 232, 257, 308, 362, 377, 399, 446, 496, 545, 562, 612, 656, 700
d) examination of how new discoveries result in modification of existing theories or establishment of new paradigms; and	The opportunity to address this objective is available. See the following: 3, 4–7, 8, 9–10, 11, 95, 167, 178, 202, 292, 316, 378, 428, 519, 639, 663, 732
e) construction and defense of a scientific viewpoint (the nature of science).	3, 4–7, 8, 9–10, 11, 70, 266, 334, 356, 486, 587, 683

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PH.4 The student will investigate and understand how applications of physics affect the world. Key concepts include	
a) examples from the real world; and	This objective is addressed throughout. See, for example: 35, 52, 95, 142, 167, 178, 202, 240, 316, 405, 428, 453, 473, 519, 549, 565, 618, 659, 709, 732
b) exploration of the roles and contributions of science and technology.	This objective is addressed throughout. See, for example: 3, 4–7, 8, 9–10, 11, 95, 167, 178, 202, 289, 292, 316, 335, 378, 428, 493, 519, 639, 663, 732

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PH.5 The student will investigate and understand the interrelationships among mass, distance, force, and time through mathematical and experimental processes. Key concepts include	
a) linear motion;	33, 44–46, 47–51, 53–57, 59, 60–61, 64–68, 71, 72–76, 77–79, 82, 84–85, 86–89, 101, 150–154, 169–173, 201
b) uniform circular motion;	163–168, 169–173
c) projectile motion;	155–161, 162, 169–173
d) Newton's laws of motion;	122–125, 126–136, 137, 139–141, 144, 181–182, 183, 821
e) gravitation;	141, 181–182, 183, 185–188, 189–190, 191, 192
f) planetary motion; and	177, 178, 179, 180, 181–182, 183, 184, 185–186, 187, 188–192, 193–197
g) work, power, and energy.	224–231, 232, 233–239, 241–245, 248–256, 258–265, 266, 267–271

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PH.6 The student will investigate and understand that quantities including mass, energy, momentum, and charge are conserved. Key concepts include	
a) kinetic and potential energy;	224–225, 249, 250, 251, 252–253, 254, 255–256, 262–263, 264, 265
b) elastic and inelastic collisions; and	255–256, 262–263, 264, 265
c) electric power.	230–231, 508–519, 520–525, 532–541, 542–548, 549, 560–563, 582–589, 590–597, 604–611, 613–620

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PH.7 The student will investigate and understand properties of fluids. Key concepts include	
a) density and pressure;	303, 304–307, 308, 309–313
b) variation of pressure with depth;	304, 305, 306, 307
c) Archimedes' principle of buoyancy;	305, 306, 307
d) Pascal's principle;	303, 304
e) fluids in motion; and	309, 310
f) Bernoulli's principle.	309, 310

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PH.8 The student will investigate and understand that energy can be transferred and transformed to provide usable work. Key concepts include	
a) transformation of energy among forms, including mechanical, thermal, electrical, gravitational, chemical, and nuclear; and	225, 233–236, 238–239, 240, 258–265, 285–294, 507–519, 520–525, 671, 722–732
b) efficiency of systems.	238–239, 258–265, 285–294, 380, 520–525, 507–519, 671, 722–732

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PH.9 The student will investigate and understand how to use models of transverse and longitudinal waves to interpret wave phenomena. Key concepts include	
a) wave characteristics (period, wavelength, frequency, amplitude and phase);	328–329, 331, 332, 333
b) fundamental wave processes (reflection, refraction, diffraction, interference, polarization, Doppler effect); and	336, 337, 338, 340, 341, 342–343, 354–355, 386–388, 395–396, 397–398, 444, 445, 449–450
c) light and sound in terms of wave models.	333, 350–351, 359, 360, 364, 388, 408, 409, 444, 659

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PH.10 The student will investigate and understand that different frequencies and wavelengths in the electromagnetic spectrum are phenomena ranging from radio waves through visible light to gamma radiation. Key concepts include	
a) the properties and behaviors of radio, microwaves, infrared, visible light, ultraviolet, X-rays, and gamma rays; and	292, 356, 374–376, 378–381, 382–388, 615, 617, 620, 855–859
b) current applications based on the wave properties of each band.	292, 356, 374–376, 378–381, 382–388, 615, 617, 620, 855–859

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PH.11 The student will investigate and understand how light behaves in the fundamental processes of reflection, refraction, and image formation in describing optical systems. Key concepts include	
a) application of the laws of reflection and refraction;	397, 398, 399, 400, 401–402, 405, 409, 410–413, 421, 422–423, 424, 425, 427, 428, 431, 432, 433, 434, 435, 438, 439–441
b) construction and interpretation of ray diagrams;	377, 397, 398, 399, 410–413, 420, 422–423, 424, 425, 427, 428, 431, 433, 434, 439–441
c) development and use of mirror and lens equations; and	421, 422–423, 424, 425, 427, 431, 432, 434, 435, 438, 439–441
d) predictions of type, size, and position of real and virtual images.	416, 419–420, 422, 421, 423–424, 426, 429–430, 432, 433, 434, 435, 438

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PH.12 The student will investigate and understand how to use the field concept to describe the effects of gravitational, electric, and magnetic forces. Key concepts include	
a) inverse square laws (Newton’s law of universal gravitation and Coulomb’s law); and	181, 182, 183, 470–471, 472, 474, 475, 476
b) operating principles of motors, generators, transformers, and cathode ray tubes.	509–510, 572, 586, 588, 593–594, 596, 597

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PH.13 The student will investigate and understand how to diagram and construct basic electrical circuits and explain the function of various circuit components. Key concepts include	
a) Ohm's law;	512–514, 515, 519
b) series, parallel, and combined circuits; and	509, 510, 512–514, 516–517, 520, 533, 534, 535–537, 538–541, 542–544, 545
c) circuit components including resistors, batteries, generators, fuses, switches, and capacitors.	499–500, 508, 509–510, 512–513, 520–521, 522–523, 542, 549, 588–589

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PH.14 The student will investigate and understand that extremely large and extremely small quantities are not necessarily described by the same laws as those studied in Newtonian physics. Key concepts include	
a) wave/particle duality;	626–633, 635–636, 637–640, 641–643
b) wave properties of matter;	626–633, 637–640, 941–643
c) matter/energy equivalence;	670–678, 679–686, 692–699, 722–732
d) quantum mechanics and uncertainty;	626–633, 635–363, 637–639, 640, 658–664
e) relativity;	861–869
f) nuclear physics;	626–636, 637–640, 646–657, 658–664, 692–699, 701–712, 718–721, 722–732
g) solid state physics;	670–678, 679–682, 683, 684, 685–686
h) superconductivity; and	513
i) radioactivity.	694, 695, 701, 702, 703–705, 706–708, 710–712, 722–724

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Additional Criteria	Evidence Please provide information that will assist the reviewers in identifying support for the following criterion indicators.
1. Safe use of materials and equipment is encouraged.	Each of the Physics labs in the text includes safety icons-ex. page 545.
2. Materials emphasize the use of effective instructional practices and learning theories. <ul style="list-style-type: none">• Students are guided through different approaches such as the learning cycle.• Students are provided the opportunity to conduct scientific inquiry appropriate for their age, grade, and maturity.• Concepts are introduced through concrete experiences. • Students are required to use manipulative materials during investigations and activities.• Multiple opportunities are provided for students to apply concepts. • Learning activities offer opportunities for students to revise their prior knowledge and create new knowledge. • Students are encouraged to pose questions and to identify problems, as well as propose multiple solutions and design and conduct tests of inference.• Students collect and interpret data through a variety of technologies and draw conclusions based on that data.	<ul style="list-style-type: none">• Indicators include Solving Problems, page 57 and estimates, page 17• The Text has been correlated with the Science Content Standards for Grades 9-12, ex. TWE page 6T.• Throughout the text. One example is shown on pages 116-117. Other examples are included in HOW IT WORKS, ex. page 142.• These are included in The 32 Physics Labs, ex. page 496.• Besides the Applying Concepts questions in the chapter review material ex. page 13 students apply the concepts in the Physics Labs, ex. page 377 and in the Pocket Labs, ex. page 588.• These can be found in The Problem Solving Strategies, ex. page 57 and the Physics Labs, ex. page 100. They can also be found in the TWE as Uncovering Misconceptions. ex. page 6.• These can be found in the Physics Labs, ex. page 162. • Examples of this are in the Pocket Labs, ex. page 559 and The Physics Labs, ex. page 545.

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Additional Criteria	Evidence Please provide information that will assist the reviewers in identifying support for the following criterion indicators.
<p>3. Materials present content in an accurate, unbiased manner, and are based on sound science.</p> <ul style="list-style-type: none">• Materials do not contain content errors (omissions of current content, out-of-date content, overgeneralizations, etc.).• Materials do not contain production errors (misspelled words, word omissions, incorrect answers).• Diverse groups (racial, ethnic, cultural, linguistic), males and females, people with disabilities, and people of all ages are represented appropriately. • The materials are free of non-scientific explanation.	<ul style="list-style-type: none">• Besides being correlated with the National Science Education Standards, ex. TWE page 6T. The text was reviewed by consultants, teachers and editors.• Page proofs were thoroughly checked by the Editors in order to correct any production errors.• As a matter of policy, all photos were checked to assure that diverse groups, males, and females, people with disabilities and people of all ages were represented appropriately.• The materials were checked by consultants, teachers and editors to assure that non-scientific explanations were not included.

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<p>4. Materials promote student assessment as an integral part of the instructional process.</p> <ul style="list-style-type: none">• Assessment suggestions and scoring criteria for student performances on work such as lab practicals or tasks, concept maps, research projects, observation checklists, etc., are provided.• Assessment items include multiple-choice, short answer, essay and open-ended questions with charts, graphs, and diagrams imbedded within the items.• Options include techniques for assessing students' prior knowledge. • Assessment items reflect the rigor and the intent of the standards. For example, they require students to use higher order thinking skills to apply, analyze, synthesize, evaluate, and make judgments or recommendations.	<ul style="list-style-type: none">• Assessment strategies are included in the TWE on page 22T. • Included in every chapter, ex. Chapter 6, pages 38-41. • These can be found in the TWE as Knowledge Assessment, ex. page 7. Also, there is a Reviewing Concepts section in each chapter summary, ex. page 241.• Included in every chapter, ex. Critical Thinking Problems, ex. page 61 and Going Further, on page 61.

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<p>5. Materials are presented in an organized, logical manner and are appropriate for the age, grade, and maturity of the students.</p> <ul style="list-style-type: none">• Materials are organized appropriately within and among units of study.• Format design includes titles, subheadings, and appropriate cross-referencing for ease of use.• Writing style, length of sentences, and vocabulary are appropriate. • Graphics and illustrations are appropriate. • Level of abstraction is appropriate, and real life examples, including careers are provided. • Sufficient applications are provided to promote depth of understanding.	<ul style="list-style-type: none">• The material was reviewed by consultants, reviewers and Editors and found to be organized appropriately.• The design includes titles, subheadings, cross references, etc. ex. pages 176-177.• The writing style, length of sentences and vocabulary were reviewed by consultants, teachers and Editors and were found to be appropriate.• The graphics and illustrations were reviewed by consultants, teachers and editors and were found to be appropriate.• Features like How It Works. ex. page 52, Physics and Technology, ex. page 428, and Help Wanted, ex. page 543 provide real life examples and career information.• Each section of every chapter includes Example Problems and Practice Problems. Additionally, each chapter review includes Applying Concepts, ex. page 108 and Problems, ex. pages 109-115. Extra Practice Problems are also included in an Appendix, ex. pages 748-777.