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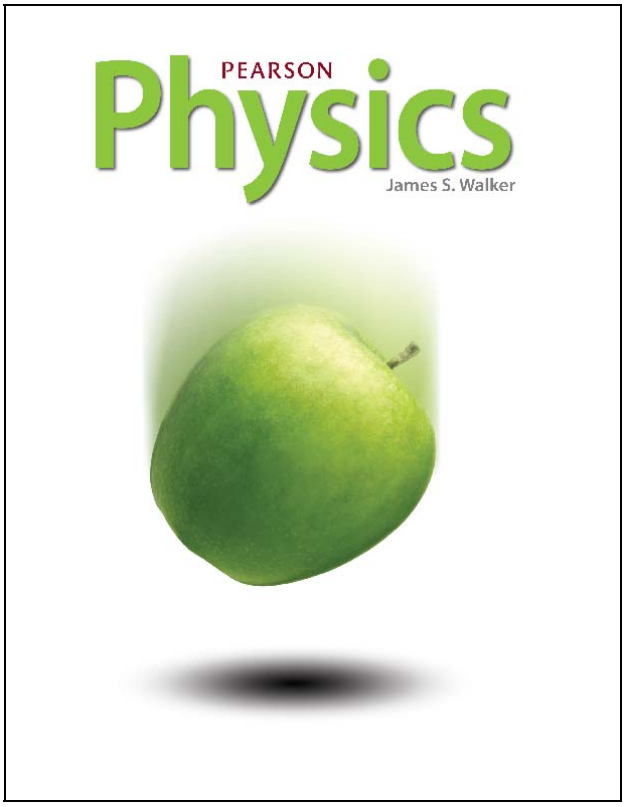
A Correlation of

Pearson Physics

1st Edition



To the

Mississippi College and Career Readiness Standards for Science

Physics

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A Correlation of Pearson Physics 1st Edition to the Mississippi College and Career Readiness Standards for Science – Physics

Mississippi College and Career Readiness Standards for Science: Physics	Pearson Physics 1st Edition
PHY.1 One-Dimensional Motion	
Conceptual Understanding: Linear motion of objects is described by displacement, velocity, and acceleration. These concepts should be introduced as computational and investigative phenomena.	
PHY.1 Students will investigate and understand how to analyze and interpret data.	
PHY.1.1 Investigate and analyze evidence gained through observation or experimental design regarding the one-dimensional (1-D) motion of objects. Design and conduct experiments to generate and interpret graphical evidence of distance, velocity, and acceleration through motion.	**SE/TE:** Inquiry Lab: 43, 73 Physics Lab: 64, 103 Laboratory Manual: 19-22, 23-24, 25-29, 31-34, 35-36
PHY.1.2Interpret and predict 1-D motion based on displacement vs. time, velocity vs. time, or acceleration vs. time graphs (e.g., free-falling objects).	**SE/TE:** 54-56, 76-77, 82-83, 86, 92-96, 97-101 Lesson Check: 96 Physics Lab: 64, 103 Laboratory Manual: 19-22, 23-24, 25-29, 31-34, 35-36
PHY.1.3 Use mathematical and computational analysis to solve problems using kinematic equations.	**SE/TE:** 58-62, 75-76, 78, 80, 82-85, 86-90, 94-95, 97-101 Lesson Check: 62, 81, 91, 96, 101 Assessment: 69, 105-110 Physics Lab: 64, 103 Laboratory Manual: 19-22, 23-24, 25-29, 31-34, 35-36
PHY.1.4 Use graphical analysis to derive kinematic equations.	**SE/TE:** 61, 84, 94-95 Lesson Check: 81, 91, 96 Assessment: 68, 70, 109-110 Physics Lab: 64, 103 Laboratory Manual: 19-22, 23-24, 25-29, 31-34, 35-36
PHY.1.5 Differentiate and give examples of motion concepts such as distance-displacement, speed- velocity, and acceleration.	**SE/TE:** 44-47, 48-53, 73-76 Lesson Check: 47, 53 Laboratory Manual: 19-22, 23-24, 25-29, 31-34, 35-36

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Mississippi College and Career Readiness Standards for Science: Physics	Pearson Physics 1st Edition
PHY.1.6 Design and mathematically/graphically analyze quantitative data to explore displacement, velocity, and acceleration of various objects. Use probe systems, video analysis, graphical analysis software, digital spreadsheets, and/or online simulations.	**SE/TE:** Inquiry Lab: 43, 73 Physics Lab: 64, 103 Laboratory Manual: 19-22, 23-24, 25-29, 31-34, 35-36
PHY.1.7 Design different scenarios, and predict graph shapes for distance/time, velocity/time, and acceleration/time graphs.	**SE/TE:** Physics Lab: 103 Laboratory Manual: 15-17, 19-22, 25-29
PHY.1.8 Given a 1D motion graph students should replicate the motion predicted by the graph.	**SE/TE:** Physics Lab: 103 Laboratory Manual: 15-17, 19-22, 25-29
PHY.2 Newton's Laws	
Conceptual Understanding: Motion and acceleration can be explained by analyzing the contact interaction of objects. This motion and acceleration can be predicted by analyzing the forces (i.e., normal, tension, gravitational, applied, and frictional) acting on the object and applying Newton's laws of motion.	
PHY.2 Students will develop an understanding of concepts related to Newtonian dynamics.	
PHY.2.1Identify forces acting on a system by applying Newton's laws mathematically and graphically (e.g., vector and scalar quantities).	**SE/TE:** 151-154, 155-160, 161-169, 170-175 Lesson Check: 160, 169, 176 Inquiry Lab: 151 Laboratory Manual: 65-69, 71-73
PHY.2.2Use models such as free-body diagrams to explain and predict the motion of an object according to Newton's law of motion, including circular motion.	**SE/TE:** 161-169, 170-175 Lesson Check: 169, 176 Physics Lab: 178 Laboratory Manual: 65-69, 71-73
PHY.2.3Use mathematical and graphical techniques to solve vector problems and find net forces acting on a body using free-body diagrams and/or online simulations.	**SE/TE:** 113-117, 118-120, 121-126, 127-130, 161-169, 170-175 Lesson Check: 120, 126, 130, 169, 176 Assessment: 144-148, 181-183 Physics Lab: 178 Laboratory Manual: 47-50, 51-55

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Mississippi College and Career Readiness Standards for Science: Physics	Pearson Physics 1st Edition
PHY.2.4Use vectors and mathematical analysis to explore the 2D motion of objects. (i.e. projectile and circular motion).	**SE/TE:** 131-140, 320-326 Lesson Check: 140 Physics Lab: 142 Laboratory Manual: 57-61, 63-64, 113-116
PHY.2.5Use mathematical and computational analysis to derive simple equations of motion for various systems using Newton's second law (e.g. net force equations).	**SE/TE:** 153-157, 162-164 Lesson Check: 160, 169 Assessment:180-181 Laboratory Manual: 75-78, 79-81
PHY.2.6Use mathematical and computational analysis to explore forces (e.g., friction, force applied, normal, and tension).	**SE/TE:** 155-159, 162-164, 167-169, 170-176 Lesson Check: 160, 169, 176 Assessment: 183-184 Physics Lab: 178 Laboratory Manual: 83-84
PHY.2.7Analyze real-world applications to draw conclusions about Newton's three laws of motion using online simulations, probe systems, and/or laboratory experiences.	**SE/TE:** 161-169 Inquiry Lab: 151 Physics Lab: 178 Laboratory Manual: 65-69, 71-73, 75-78, 79-81, 83-84
PHY.2.8Design an experiment to determine the forces acting on a stationary object on an inclined plane. Test your conclusions.	Physics Lab: 218 Laboratory Manual: 83-84
PHY.2.9Draw diagrams of forces applied to an object, and predict the angle of incline that will result in unbalanced forces acting on the object.	**SE/TE:** Physics Lab: 218 118-119, R18
PHY.2.10 Apply the effects of the universal gravitation law to generate a digital/physical graph, and interpret the forces between two masses, acceleration due to gravity, and planetary motion (e.g., situations where g is constant, as in falling bodies).	**SE/TE:** 307-312, 313-319, 327-332 Lesson Check: 312, 319 Inquiry Lab: 307 Laboratory Manual: 113-116, 121-122

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Mississippi College and Career Readiness Standards for Science: Physics	Pearson Physics 1st Edition
PHY.2.11 Explain centripetal acceleration while undergoing uniform circular motion to explore Kepler's third law using online simulations, models, and/or probe systems.	**SE/TE:** 320-326 Lesson Check: 326 Physics Lab: 334 Laboratory Manual: 117-119
PHY.3 Work and Energy	
Conceptual Understanding: Work and energy are synonymous. When investigating mechanical energy, energy is the ability to do work. The rate at which work is done is called power. Efficiency is the ratio of power input to the output of the system. In closed systems, energy is conserved.	
PHY.3 Students will develop an understanding of concepts related to work and energy.	
PHY.3.1Use mathematical and computational analysis to qualitatively and quantitatively analyze the concept of work, energy, and power to explain and apply the conservation of energy.	**SE/TE:** 189-196, 197-206, 206-210, 211-215Lesson Check: 196, 211, 216 Inquiry Lab: 189 Assessment: 220-225 Physics Lab: 218 Laboratory Manual: 85-88, 89-92, 93-94
PHY.3.2Use mathematical and computational analysis to explore conservation of momentum and impulse.	**SE/TE:** 229-233, 234-241, 242-247, 248-256 Lesson Check: 233, 241, 247, 256 Assessment: 260-264 Physics Lab: 258 Laboratory Manual: 95-98, 99-100
PHY.3.3Through real-world applications, draw conclusions about mechanical potential energy and kinetic energy using online simulations and/or laboratory experiences.	**SE/TE:** 197-206, 207-209 Lesson Check: 211 Assessment: 220-225 Inquiry Lab: 189 Laboratory Manual: 85-88
PHY.3.4Design and conduct investigations to compare conservation of momentum and conservation of kinetic energy in perfectly inelastic and elastic collisions using probe systems, online simulations, and/or laboratory experiences.	**SE/TE:** Physics Lab: 258 Laboratory Manual: 85-88, 95-98, 99-100

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Mississippi College and Career Readiness Standards for Science: Physics	Pearson Physics 1st Edition
PHY.3.5 Investigate, collect data, and summarize the principles of thermodynamics by exploring how heat energy is transferred from higher temperature to lower temperature until equilibrium is reached.	**SE/TE:** 343-345, 354-356 Physics Lab: 376 Laboratory Manual: 123-126
PHY.3.6Enrichment: Design, conduct, and communicate investigations that explore how temperature and thermal energy relate to molecular motion and states of matter.	**SE/TE:** 366-374 Laboratory Manual: 131-132
PHY.3.7Enrichment: Use mathematical and computational analysis to analyze problems involving specific heat and heat capacity.	**SE/TE:** 358-365 Lesson Check: 366 Assessment: 379-381 Physics Lab: 376 Laboratory Manual: 131-132
PHY.3.8Enrichment: Research to compare the first and second laws of thermodynamics as related to heat engines, refrigerators, and thermal efficiency.	**SE/TE:** 389-392, 400-403 Lesson Check: 392, 406 Assessment: 410-411
PHY.3.9 Explore the kinetic theory in terms of kinetic energy of ideal gases using digital resources.	**SE/TE:** 422
PHY.3.10 Enrichment: Research the efficiency of everyday machines (e.g., automobiles, hair dryers, refrigerators, and washing machines).	**SE/TE:** 390-392, 401-402 Physics & You: 217
PHY.3.11 Enrichment: Use an engineering design process to design and build a themed Rube Goldberg- type machine that has six or more steps and complete a desired task (e.g., pop a balloon, fill a bottle, shoot a projectile, or raise an object 35 cm) within an allotted time. Include a poster that demonstrates the calculations of the energy transformation or efficiency of the machine.*	This enrichment standard is beyond the scope of this program.

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Mississippi College and Career Readiness Standards for Science: Physics	Pearson Physics 1st Edition
PHY.4 Waves	
Conceptual Understanding: Wave properties are the transfer of energy from one place to another. The investigation of these interactions must include simple harmonic motion, sound, and electromagnetic radiation.	
PHY.4 Students will investigate and explore wave properties.	
PHY.4.1Analyze the characteristics and properties of simple harmonic motions, sound, and light.	**SE/TE:** 456-460, 462-467, 479-480, 493-499, 501-506, 529, 531, 534, 536-541, 545-552 Lesson Check: 482, 501, 506, 544, 553 Assessment: 488, 523-524 Physics Lab: 484, 521, 555 Laboratory Manual: 151-156, 159-163, 165-167, 171-174 Physics & You: 483
PHY.4.2Describe and model through digital or physical means the characteristics and properties of mechanical waves by simulating and investigating properties of simple harmonic motion.	**SE/TE:** Physics Lab: 484 Laboratory Manual: 151-156
PHY.4.3Use mathematical and computational analysis to explore wave characteristics (e.g., velocity, period, frequency, amplitude, phase, and wavelength).	**SE/TE:** 453-461, 462-467, 470-474 Lesson Check: 461, 469, 474 Assessment: 486-490 Physics Lab: 484 Laboratory Manual: 147-150, 151-156, 157-158
PHY.4.4Investigate and communicate the relationship between the energy of a wave in terms of amplitude and frequency using probe systems, online simulations, and/or laboratory experiences.	**SE/TE:** Physics Lab: 484, 521 Laboratory Manual: 147-150, 151-156, 159-163, 165-167
PHY.4.5Design, investigate, and collect data on standing waves and waves in specific media (e.g., stretched string, water surface, and air) using online simulations, probe systems, and/or laboratory experiences.	**SE/TE:** 471-472, 478-480, 493-494, 501-506 Inquiry Lab: 453 Physics Lab: 484, 521 Laboratory Manual: 147-150, 165-167

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Mississippi College and Career Readiness Standards for Science: Physics	Pearson Physics 1st Edition
PHY.4.6 Explore and explain the Doppler effect as it relates to a moving source and to a moving observer using online simulations, probe systems, and/or real-world experiences.	**SE/TE:** 507-512 Lesson Check: 512 Laboratory Manual: 159-163
PHY.4.7Explain the laws of reflection and refraction, and apply Snell's law to describe the relationship between the angles of incidence and refraction.	**SE/TE:** 566-569, 597-605, 606-611 Lesson Check: 569, 605, 611 Assessment: 590, 629-630 Inquiry Lab:597 Physics Lab: 627 Laboratory Manual: 179-182, 183-185, 189-193
PHY.4.8Use ray diagrams and the thin lens equations to solve real-world problems involving object distance from lenses, using a lens bench, online simulations, and/or laboratory experiences.	**SE/TE:** 613-614, 616-617, 619-625 Lesson Check: 618, 625 Assessment: 631-632 Laboratory Manual: 189-193
PHY.4.9Research the different bands of electromagnetic radiation, including characteristics, properties, and similarities/differences.	**SE/TE:** 536-541 Assessment: 558 Physics Lab: 904 Laboratory Manual: 171-174
PHY.4.10 Enrichment: Research the ways absorption and emission spectra are used to study astronomy and the formation of the universe.	**SE/TE:** 886-887, 894 Physics Lab: 904
PHY.4.11 Enrichment: Research digital nonfictional text to defend the wave-particle duality of light (i.e., wave model of light and particle model of light).	**SE/TE:** 864-866 Lesson Check: 867
PHY.4.12 Enrichment: Research uses of the electromagnetic spectrum or photoelectric effect.	**SE/TE:** 539-541, 859-863 Lesson Check: 863 Assessment: 880

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PHY.5 Electricity and Magnetism	
Conceptual Understanding: In electrical interactions, electrical energy (whether battery or circuit energy) is transformed into other forms of energy. Charged particles and magnetic fields are similar in that they store energy. Magnetic fields exert forces on moving charged particles. Changing magnetic fields cause electrons in wires to move and thus create a current.	
PHY.5 Students will investigate the key components of electricity and magnetism.	
PHY.5.1 Analyze and explain electricity and the relationship between electricity and magnetism.	**SE/TE:** 789-790, 817-818 Inquiry Lab: 817
PHY.5.2Explore the characteristics of static charge and how a static charge is generated using simulations.	**SE/TE:** 675-676, 678-679 Assessment: 702 Physics Lab: 696 Laboratory Manual: 211-214, 215-216
PHY.5.3Use mathematical and computational analysis to analyze problems dealing with electric field, electric potential, current, voltage, and resistance as related to Ohm's law.	**SE/TE:** 705-717, 745-753, 766-769 Inquiry Lab: 705 Lesson Check: 717, 757, 771 Assessment: 738 Physics Lab: 773 Laboratory Manual: 217-220, 239-240
PHY.5.4Develop and use models (e.g., circuit drawing and mathematical representation) to explain how electric circuits work by tracing the path of electrons, including concepts of energy transformation, transfer, conservation of energy, electric charge, and resistance using online simulations, probe systems, and/or laboratory experiences.	**SE/TE:** 748-754, 757-764 Lesson Check: 757, 765 Assessment: 776-778 Laboratory Manual: 225-228, 229-233, 235-237, 239-240
PHY.5.5Design and conduct an investigation of magnetic poles, magnetic flux and magnetic field using online simulations, probe systems, and/or laboratory experiences.	**SE/TE:** Inquiry Lab: 783, 817 Physics Lab: 808, 842 Laboratory Manual: 243-247, 249-252, 253256, 257-258

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PHY.5.6Use schematic diagrams to analyze the current flow in series and parallel electric circuits, given the component resistances and the imposed electric potential.	**SE/TE:** 757-762 Lesson Check: 765 Assessment: 776-778 Inquiry Lab: 745 Laboratory Manual: 235-237
PHY.5.7 Analyze and communicate the relationship between magnetic fields and electrical current by induction, generators, and electric motors (e.g., microphones, speakers, generators, and motors) using Ampere's and Faraday's laws.	**SE/TE:** 746, 805, 821-823, 828-831 Lesson Check: 831 Physics Lab: 842 Laboratory Manual: 253-256 Physics & You: 841
PHY.5.8 Enrichment: Design and construct a simple motor to develop an explanation of how the motor transforms electrical energy into mechanical energy and work.	**SE/TE:** Physics Lab: 842 Laboratory Manual: 253-256
PHY.5.9Enrichment: Design and draw a schematic of a circuit that will turn on/off a light from two locations in a room like those found in most homes.	**SE/TE:** Laboratory Manual: 225-228
PHY.6 Nuclear Energy	
Conceptual Understanding: Nuclear energy is energy stored in the nucleus of the atom. The energy holding atoms together is called binding energy. The binding energy is a huge amount of energy. So, at the subatomic scale, the conservation of energy becomes the conservation of mass-energy.	
PHY.6 Students will demonstrate an understanding of the basic principles of nuclear energy.	
PHY.6.1Analyze and explain the concepts of nuclear physics.	**SE/TE:** 911-916, 917-924, 925-935
PHY.6.2 Explore the mass number and atomic number of the nucleus of an isotope of a given chemical element.	**SE/TE:** 913-916
PHY.6.3Investigate the conservation of mass and the conservation of charge by writing and balancing nuclear decay equations for alpha and beta decay.	**SE/TE:** 918-923 Assessment: 944 Physics Lab: 942

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PHY.6.4 Simulate the process of nuclear decay using online simulations and/or laboratory experiences and using mathematical computations determine the half-life of radioactive isotopes.	**SE/TE:** Physics Lab: 942 Laboratory Manual: 267-271, 273-275