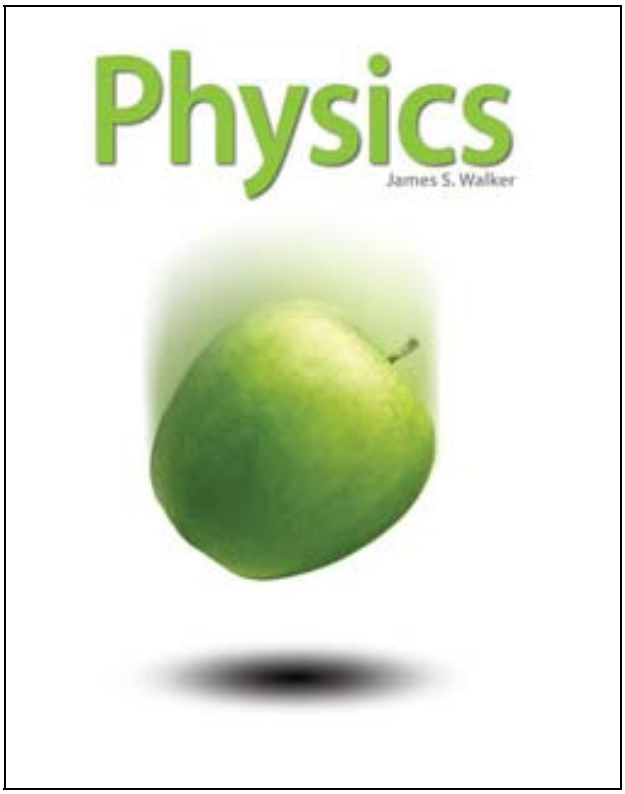
SAVVAS

A Correlation of

Savvas Physics

©2014



To the

2018 Mississippi College and Career-Readiness Standards for Physics

Savvas is proud to partner with Pearson to offer the best in AP, honors, and electives products.

2018 Mississippi College and Career-Readiness Standards for Physics	Pearson Physics ©2014
PHYSICS	
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
PHY.1.2 Interpret 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
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
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
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
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

2018 Mississippi College and Career-Readiness Standards for Physics	Pearson Physics ©2014
PHY.1.7 Design different scenarios, and predict graph shapes for distance/time, velocity/time, and acceleration/time graphs.	**SE/TE:** Physics Lab: 103 Assessment: 107
PHY.1.B Perform scenario to test the accuracy of predicted graph shapes.	For related content, please see: **SE/TE:** Physics Lab: 103
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.2.1 Identify 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
PHY.2.2 Use models such as free-body diagrams to explain and predict the motion of an object from simple to complex motions, including circular motion.	**SE/TE:** 161-169, 170-175 Lesson Check: 169, 176 Physics Lab: 178
PHY.2.3 Use 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:** 161-169, 170-175 Lesson Check: 169, 176 Physics Lab: 178
PHY.2.4 Use mathematical and computational analysis to derive simple equations of motion for various systems using Newton's second law (e.g., projectile motion).	**SE/TE:** 131-140 Lesson Check: 140 Physics Lab: 142
PHY.2.5 Use 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 Physics Lab: 178

2018 Mississippi College and Career-Readiness Standards for Physics	Pearson Physics ©2014
PHY.2.6 Analyze real-world applications to draw conclusions about Newton's three laws of motion using online simulations, probe systems, and/or laboratory experiences.	**SE/TE:** Inquiry Lab: 151 Physics Lab: 178 Physics & You: 177
PHY.2.7 Design an experiment to determine the forces acting on a stationary object on an inclined plane. Test your conclusions.	For related content, please see: **SE/TE:** Physics Lab: 103
PHY.2.8 Draw diagrams of forces applied to an object, and predict the angle of incline that will result in unbalanced forces acting on the object.	For related content, please see: **SE/TE:** 118-119, R18 Lesson Check: 120
PHY.2.9 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 fa/ling bodies).	**SE/TE:** 307-312, 313-319, 327-332 Lesson Check: 312, 319 Inquiry Lab: 307
PHY.2.10 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
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.3.1 Use mathematical and computational analysis to qualitatively and quantitatively analyze the concept of work, energy, and power; explain and apply the conservation of energy and momentum.	**SE/TE:** 189-196, 197-206, 206-210, 211-215, 242-247 Lesson Check: 196, 211, 216, 247 Assessment: 220-225 Physics Lab: 218, 258 Physics & You: 257

2018 Mississippi College and Career-Readiness Standards for Physics	Pearson Physics ©2014
PHY.3.2 Through 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
PHY.3.3 Design and conduct investigations into the principles of impulse, and 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:** 234-241, 248-256 Lesson Check: 241, 256 Physics Lab: 257 Physics & You: 257
PHY.3.4 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, 385-387, 400-401, 405-406 Inquiry Lab: 385
PHY.3.5 Design, conduct, and communicate investigations that explore how temperature and thermal energy relate to molecular motion and states of matter.	For related content, please see: **SE/TE:** 343-345, 366-374, 422 Physics Lab: 408
PHY.3.6 Use mathematical and computational analysis to analyze problems involving specific heat and heat capacity.	**SE/TE:** 358-365 Lesson Check: 366 Physics Lab: 376
PHY.3.7 Research to compare the first and second law's of thermodynamics as related to heat engines, refrigerators, and thermal efficiency.	**SE/TE:** 385-387, 389-392, 401-403 Physics Lab: 408
PHY.3.8 Explore the kinetic theory of ideal gases using digital resources.	For related content, please see: **SE/TE:** 420-422
PHY.3.9 Research the efficiency of everyday machines (e.g., automobiles, hair dryers, refrigerators, and washing machines).	For related content, please see: **SE/TE:** 390-392, 401-403 Physics & You: 217

2018 Mississippi College and Career-Readiness Standards for Physics	Pearson Physics ©2014
PHY.3.10 **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.*	Physics and You , the How Things Work feature, shows the impact physics has on our society and is a springboard to meeting this standard. See **SE/TE:** 375, Optical Pyrometer; 483, Tuned Mass Damper; 735, Faraday Cages See also **SE/TE:** 33-34, Problem Solving in Physics
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.4.1 Analyze the characteristics and properties of simple harmonic motions, sound, and light.	**SE/TE:** 478-480, 493-497, 501-506, 529, 531, 536-541 Lesson Check: 482, 501, 506, 544 Assessment: 523-524
PHY.4.2 Describe 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
PHY.4.3 Use mathematical and computational analysis to explore wave characteristics (e.g., velocity, period, frequency, amplitude, phase, and wavelength}.	**SE/TE:** 453-461, 473-474 Lesson Check: 461 Physics Lab: 484
PHY.4.4 Investigate 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.	For related content, please see: **SE/TE:** 454-455, 457, 473-474, 514 Physics Lab: 484, 521
PHY.4.5 Design, investigate, and collect data for comparison of 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:** Physics Lab: 484, 521

2018 Mississippi College and Career-Readiness Standards for Physics	Pearson Physics ©2014
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
PHY.4.7 Explain 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 Lesson Check: 605 Assessment: 629-630 Inquiry Lab: 597 Physics Lab: 627
PHY.4.8 Use 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
PHY.4.9 Research and defend conclusions among the different bands of electromagnetic radiation, including characteristics, properties, and similarities/differences, using examples of uses of each, including radio waves, microwaves, infrared, visible light, ultraviolet, and gamma rays.	For related content, please see: **SE/TE:** 536-541
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
PHY.4.1l **Enrichment:** Research digital nonfictional text to defend the wave-particle duality of light (i.e., wave model of light and particle model of light}.	For related content, please see: **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

2018 Mississippi College and Career-Readiness Standards for Physics	Pearson Physics ©2014
PHYS 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 Inquiry Lab: 817
PHY.5.2 Explore the characteristics of static charge and how a static charge is generated using simulations.	**SE/TE:** 675-676, 678-679
PHY.5.3 Use 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 Lesson Check: 717, 757, 771 Assessment: 738 Physics Lab: 773
PHY.5.4 Develop 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
PHY.S.S Design and conduct an investigation of magnetic poles, magnetic flux and field, Ampere's law, Faraday's law, and Coulomb's law using online simulations, probe systems, and/or laboratory experiences.	**SE/TE:** Inquiry Lab: 783, 817 Physics Lab: 696, 808, 842
PHY.5.6 Use 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