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Correlated to:

Tennessee Science Curriculum Standards: Physics (Grades 9-12)

TENNESSEE SCIENCE CURRICULUM STANDARDS: PHYSICS	PAGE(S) WHERE TAUGHT (If submission is not a book, cite appropriate location(s))
1.0 Mechanics	
Standard: The student will investigate the laws and properties of mechanics. The student will:	
1.1 investigate fundamental physical quantities of mass and time.	<p>SE/TE: How Fast, 17-19; Graphs of Motion, 21-24; Mass—A Measure of Inertia, 48-51; Impulse, 87-90; Units of Measurement, 645-646; Graphing, 649-651; see also Special Relativity, 212-231, 232-242</p> <p>TE: Sections: 2.5, 2.7, 4.5, 7.2; see also Ch. 15-16</p> <p>LM: Activities and Experiments: 2, 3, 4, 5, 6, 11, 12, 13, 14, 17, 20, 221 36, 37, 40</p> <p>TR: Concept-Development Practice: 2-1; Problem-Solving Exercises: 4-1; Transparencies: 1, 2, 3, 11; Videodisc 1:7, 10, 33</p>
1.2 analyze and apply Newton’s three laws of motion.	<p>SE/TE: Newton's First Law of Motion—Inertia, 43-58; Newton's Second Law of Motion—Force and Acceleration, 59-73; Newton's Third Law of Motion—Action and Reaction, 74-85</p> <p>TE: Sections: 4.1-4.9, 5.1-5.7, 6.1-6.7</p> <p>LM: Activities and Experiments: 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 29</p> <p>TR: Concept-Development Practice: 4-1, 4-2, 4-3, 5-1, 5-2, 5-3, 5-4, 5-5, 6-1; Problem-Solving Exercises: 3-1, 3-2, 3-3, 3-4; Transparencies: 4, 5, 6, 9, 10; Next-Time Questions: 3-1, 3-2, 3-3, 5-1, 5-2, 5-3, 5-4, 5-5, 5-6, 5-7, 6-1, 6-2, 6-3, 6-4, 6-5, 6-6</p> <p>TECH: Probeware Labs: 4, 5; Interactive Physics Simulations: 4, 5, 6, 7, 8, 9, 10, 11, 12, 14; Videodisc 1:16-31; Videotapes: Newton’s Laws</p>
1.3 understand work, energy, and power.	<p>SE/TE: Work, 103-104; Power, 104-105; Mechanical Energy, 105-106; Potential Energy, 106-107; Kinetic Energy, 108-109; Conservation of Energy, 109-111; Machines, 111-114; Efficiency, 114-117; Energy for Life, 117</p> <p>TE: Sections: 8.1-8.9</p> <p>LM: Activities and Experiments: 21, 22, 23, 24, 25, 26, 28</p> <p>TR: Concept-Development Practice: 5-1, 8-1, 8-2, 8-3; Problem-Solving Exercises: 5-2, 5-3; Transparencies: 13, 14; Next-Time Questions: 8-1</p>

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<p align="right">(Continued)</p> <p>1.3 understand work, energy, and power.</p>	<p align="right">(Continued)</p> <p>TECH: Probeware Labs: 7, 8; Interactive Physics Simulations: 17, 18, 19; Videodisc 1:35-37; Videotape: Energy</p>
<p>1.4 investigate kinematics and dynamics.</p>	<p>SE/TE: Linear Motion, 10-27; Projectile Motion, 28-42; Momentum, 86-102; Circular Motion, 122-135; Center of Gravity, 136-149; Rotational Mechanics, 150-167; Universal Gravitation, 168-181; Gravitational Interactions, 182-198; Satellite Motion, 199-213</p> <p>TE: Sections: 2.1-2.9, 3.1-3.6, 7.1-7.6, 9.1-9.6, 10.1-10.6, 11.1-11.7, 12.1-12.6, 13.1-13.6, 14.1-14.5</p> <p>LM: Activities and Experiments: 2, 3, 4, 5, 6, 7, 19-20, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39-40</p> <p>TR: Concept-Development Practice: 2-1, 2-2, 3-1, 3-2, 7-1, 9-1, 9-2, 9-3, 10-1, 11-1, 11-2, 12-1, 13-1, 13-2, 13-3, 14-1; Problem-Solving Exercises: 1-1, 1-2, 2-1, 2-2, 4-1, 4-2, 6-1, 6-2, 6-3, 7-1, 7-2, 7-3; Transparencies: 1, 2, 3, 4, 5, 6, 11, 12, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25; Next-Time Questions: 2-1, 2-2, 3-1, 3-2, 3-3, 7-1, 9-1, 10-1, 10-2, 11-1, 11-2, 11-3, 12-1, 12-2, 13-1, 14-1, 14-2</p> <p>TECH: Probeware Labs: 1, 2, 3, 6; Interactive Physics Simulations: 1, 12, 13, 14, 16, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32; Videodisc 1:35-37; Videotapes: Linear Motion, Vectors and Projectiles, Momentum, Rotation, Center of Gravity, Gravity I, Gravity II, Satellite Motion</p>
<p>1.0 Mechanics—Performance Indicators</p>	
<p>At Level 1, the student is able to:</p>	
<ul style="list-style-type: none"> distinguish between mass and weight using base units in the standard international (SI) system. 	<p>SE/TE: Mass—A Measure of Inertia, 48-51; Free Fall Explained, 66-68; Weight and Weightlessness, 186-187</p> <p>TE: Sections: 4.5, 5.6, 13.3</p> <p>LM: Activities and Experiments: 11</p> <p>TR: Concept-Development Practice: 4-1; Transparencies: 9; Next-Time Questions: 5-3, 5-4</p> <p>TECH: Videodisc: 1:25, 2:11, 12; Videotape: Gravity II</p>

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TENNESSEE SCIENCE CURRICULUM STANDARDS: PHYSICS	PAGE(S) WHERE TAUGHT (If submission is not a book, cite appropriate location(s))
<ul style="list-style-type: none"> relate time in the (SI) system to the independent experimental variable in most situations. 	<p>SE/TE: Speed, 11-14; Velocity, 13-14; Acceleration, 15-16; How Fast, 17-19; Graphs of Motion, 21-24; Impulse, 87-90; Graphing, 649-651; see also Special Relativity—Space and Time, 212-231</p> <p>TE: Sections: 2.2-2.5, 7.2; see also Chapter 15</p> <p>LM: Activities and Experiments: 2, 3, 4, 5, 6, 11, 12, 13, 14, 17, 20, 22, 36, 37, 40</p> <p>TR: Concept-Development Practice: 2-1, 15-1; Problem-Solving Exercises: 1-1, 1-2, 4-1, 8-1; Transparencies: 1, 2, 3, 11; Next-Time Questions: 2-1, 2-2, 15-1</p> <p>TECH: Probeware Labs: 2; Interactive Physics Simulations: 1, 2; Videodisc: 1:1-10, 33; Videotape: Linear Motion, Momentum</p>
<ul style="list-style-type: none"> relate inertia, force or action-reaction forces to Newton’s three laws of motion and distinguish between the three laws in various scenarios. 	<p>SE/TE: Newton's First Law of Motion—Inertia, 43-58; Newton's Second Law of Motion—Force and Acceleration, 59-73; Newton's Third Law of Motion—Action and Reaction, 74-85</p> <p>TE: Sections: 4.1-4.9, 5.1-5.7, 6.1-6.7</p> <p>LM: Activities and Experiments: 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 29</p> <p>TR: Concept-Development Practice: 4-1, 4-2, 4-3, 5-1, 5-2, 5-3, 5-4, 5-5, 6-1; Problem-Solving Exercises: 3-1, 3-2, 3-3, 3-4; Transparencies: 4, 5, 6, 9, 10; Next-Time Questions: 3-1, 3-2, 3-3, 5-1, 5-2, 5-3, 5-4, 5-5, 5-6, 5-7, 6-1, 6-2, 6-3, 6-4, 6-5, 6-6</p> <p>TECH: Probeware Labs: 4, 5; Interactive Physics Simulations: 4, 5, 6, 7, 8, 9, 10, 11, 12, 14; Videodisc 1:16-31; Videotapes: Newton’s Laws</p>
<ul style="list-style-type: none"> compare and contrast characteristic properties of scalar and vector quantities. 	<p>SE/TE: Vector and Scalar Quantities, 28-29; Velocity Vectors, 29-31; Components of Vectors, 31-32</p> <p>TE: Section: 3.1, 3.2, 3.3</p> <p>TR: Problem-Solving Exercises: 2-1; Transparency: 4; Next-Time Questions: 3-2</p> <p>TECH: Interactive Physics Simulations: 12, 14; Videodisc: 1:12, 13; Videotape: Vectors and Projectiles</p>
<ul style="list-style-type: none"> investigate the definitions of force, work, power, kinetic energy, and potential energy. 	<p>SE/TE: Force, 44-45, 49-51, 59-60; Work, 103-104; Power, 104-105; Mechanical Energy, 105-106; Potential Energy, 106-107; Kinetic Energy, 108-109</p> <p>TE: Sections: 4.3, 4.5, 4.6, 8.1-8.5</p> <p>LM: Activities and Experiments: 21, 26</p>

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TENNESSEE SCIENCE CURRICULUM STANDARDS: PHYSICS	PAGE(S) WHERE TAUGHT (If submission is not a book, cite appropriate location(s))
(Continued)	(Continued)
<ul style="list-style-type: none"> investigate the definitions of force, work, power, kinetic energy, and potential energy. 	TR: Concept-Development Practice: 5-1; Transparency: 7; Next-Time Questions: 4-1, 8-1 TECH: Probeware Lab: 7; Videodisc: 1:17, 18; Videotapes: Newton's First Law, Energy
<ul style="list-style-type: none"> explore velocity and acceleration. 	SE/TE: Velocity, 13-14; Acceleration, 15-16 TE: Sections: 2.3, 2.4 LM: Activities and Experiments: 3, 4 TR: Problem-Solving Exercises: 1-1 TECH: Probeware Labs: 1; Interactive Physics Simulation: 2; Videodisc: 1:2, 4, 5, 6; Videotape: Linear Motion
At Level 2, the student is able to:	
<ul style="list-style-type: none"> analyze vector diagrams (addition, subtraction and scaling) and solve composition and resolution problems for force and momentum. 	SE/TE: Vector Addition of Forces, 53-54; Momentum Vectors, 98-99; Vector Applications, 652-653 TE: Sections: 4.8, 7.8, Appendix D LM: Activities and Experiments: 10 TR: Concept-Development Practice: 4-2, 4-3; Transparencies: 8 TECH: Interactive Physics Simulations: 12, 14; Videotapes: Newton's First Law, Momentum
<ul style="list-style-type: none"> explore characteristics of rectilinear motion and analyze distance-time graphs (velocity), velocity-time graphs (acceleration and distance). 	SE/TE: Linear Motion: Motion is Relative, 10-11; Speed, 11-14; Velocity, 13-14; Acceleration, 15-16; Free Fall: How Fast, 17-19; Free Fall: How Far, 19-21; Graphs of Motion, 21-24; Air Resistance and Falling Objects, 24; How Fast, How Far, How Quickly How Fast Changes, 24 TE: Sections: 2.1-2.9 LM: Activities and Experiments: 2, 3, 4, 5, 6 TR: Concept-Development Practice: 2-1, 2-2; Problem-Solving Exercises: 1-1, 1-2; Transparencies: 1, 2, 3; Next-Time Questions: 2-1, 2-2 TECH: Probeware Labs: 1, 2; Interactive Physics Simulation: 1; Videodisc: 1:1-11; Videotape: Linear Motion
<ul style="list-style-type: none"> investigate the characteristics of centripetal motion and centripetal acceleration. 	SE/TE: Rotation and Revolution, 123; Rotational Speed, 123-126; Centripetal Force, 126-127; Centripetal and Centrifugal Forces, 127-128; Centrifugal Force in a Rotating Reference Frame, 129-131; Simulated Gravity, 131-132 TE: Sections: 9.1-9.6 LM: Activities and Experiments: 30

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<p align="center">TENNESSEE SCIENCE CURRICULUM STANDARDS: PHYSICS</p>	<p align="center">PAGE(S) WHERE TAUGHT (If submission is not a book, cite appropriate location(s))</p>
<p align="right">(Continued)</p> <ul style="list-style-type: none"> investigate the characteristics of centripetal motion and centripetal acceleration. 	<p align="right">(Continued)</p> <p>TR: Concept-Development Practice: 9-1, 9-2, 9-3; Problem-Solving Exercises: 6-1; Transparencies: 15; Next-Time Questions: 9-1</p> <p>TECH: Interactive Physics Simulations: 20, 21; Videodisc: 1:38-40, 2:1; Videotape: Rotation</p>
<ul style="list-style-type: none"> evaluate the dynamics of systems in motion including friction, gravity, impulse and momentum, change in momentum, and conservation of momentum. 	<p>SE/TE: Galileo on Motion, 44-46; Friction, 63-64; Momentum, 86-87; Impulse Changes Momentum, 87-90; Bouncing, 91-92; Conservation of Momentum, 92-94; Collisions, 94-98; Momentum Vectors, 98-99; Center of Gravity, 136-149; Universal Gravitation, 168-181</p> <p>TE: Sections: 4.3, 5.4, 7.1-7.6, 10.1-10.6, 12.1-12.6</p> <p>LM: Activities and Experiments: 19-20, 29, 31</p> <p>TR: Concept-Development Practice: 5-4, 7-1, 10-1, 12-1; Problem-Solving Exercises: 3-2, 4-1, 4-2, 7-1, 7-2; Transparencies: 11, 12, 16, 19, 20; Next-Time Questions: 7-1, 10-1, 10-2, 12-1, 12-2</p> <p>TECH: Probeware Labs: 6; Interactive Physics Simulations: 16, 22, 23, 24, 25, 28, 29; Videodiscs: 1:26, 32-34; 2:2, 3, 9, 10; Videotapes: Newton's Laws, Momentum, Center of Gravity, Gravity I</p>
<ul style="list-style-type: none"> analyze the characteristics of energy, and conservation of energy including friction, and gravitational potential energy. 	<p>SE/TE: Mechanical Energy, 105-106; Potential Energy, 106-107; Kinetic Energy, 108-109; Conservation of Energy, 109-111; Efficiency, 114-117; Energy for Life, 117</p> <p>TE: Sections: 8.3-8.6, 8.8, 8.9</p> <p>LM: Activities and Experiments: 21, 23, 24, 25, 26, 28</p> <p>TR: Concept-Development Practice: 5-1, 8-1; Problem-Solving Exercises: 5-2, 5-3</p> <p>TECH: Probeware Labs: 7, 8; Interactive Physics Simulations: 18, 19; Videodisc: 1:37; Videotape: Energy</p>
<ul style="list-style-type: none"> relate work and power to various simple machines, mechanical advantage of different machines and recognize simple machines utilized in compound machines. 	<p>SE/TE: Machines, 111-114; Efficiency, 114-116</p> <p>TE: Sections: 8.7, 8.8</p> <p>LM: Activities and Experiments: 22, 25</p> <p>TR: Concept-Development Practice: 8-2, 8-3; Problem-Solving Exercises: 5-3; Transparencies: 13, 14</p> <p>TECH: Probeware Labs: 8; Interactive Physics Simulations: 17; Videodisc: 1:35, 36; Videotape: Energy</p>

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<ul style="list-style-type: none"> describe rotational equilibrium and relate to torque. 	SE/TE: Torque, 150-152; Balanced Torques, 152; Torque and Center of Gravity, 152-154; Rotational Inertia, 154-158; Rotational Inertia and Gymnastics, 159-160; Angular Momentum, 161-162; Conservation of Angular Momentum, 163-164 TE: Sections: 11.1-11.7 LM: Activities and Experiments: 32, 33, 34, 35 TR: Concept-Development Practice: 11-1, 11-2; Problem-Solving Exercises: 6-2, 6-3; Transparencies: 17, 18; Next-Time Questions: 11-1, 11-2, 11-3 TECH: Interactive Physics Simulations: 26, 27; Videodisc: 2:4-8
<ul style="list-style-type: none"> investigate projectile motion. 	SE/TE: Projectile Motion, 33-34; Upwardly Launched Projectiles, 35-38; Fast-Moving Projectiles—Satellites, 39 TE: Sections: 3.4-3.6 LM: Activities and Experiments: 7 TR: Concept-Development Practice: 3-1, 3-2; Problem-Solving Exercises: 2-2; Transparencies: 5, 6; Next-Time Questions: 3-1, 3-3 TECH: Probeware Labs: 3; Interactive Physics Simulations: 13; Videodisc: 1:15; Videotape: Vectors and Projectiles
<ul style="list-style-type: none"> utilize trigonometry and vector analysis to solve force and momentum problems. 	SE/TE: Vector Addition of Forces, 53-54; Momentum Vectors, 98-99; Vector Applications, 652-653 TE: Sections: 4.8, 7.6, Appendix D LM: Activities and Experiments: 10 TR: Concept-Development Practice: 4-2, 4-3; Transparencies: 8 TECH: Interactive Physics Simulations: 12, 14; Videotapes: Newton's First Law, Momentum
At Level 3, the student is able to:	
<ul style="list-style-type: none"> apply elementary calculus to solve motion problems. 	SE/TE: (preparation) Momentum Vectors, 98-99; Vector Applications, 652-653 TE: Sections: 7.6, Appendix D
<ul style="list-style-type: none"> experiment with elastic and inelastic collisions. 	SE/TE: Collisions, 94-98 TE: Section: 7.5 LM: Activities and Experiments: 19, 20 TR: Concept-Development Practice: 7-1; Problem-Solving Exercises: 4-2; Transparencies: 12 TECH: Videodisc: 1:34; Videotape: Momentum

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2.0 Thermodynamics		
Standard: The student will examine the properties and laws of thermodynamics. The student will:		
2.1	develop an understanding of heat and internal energy.	SE/TE: Temperature, Heat, and Expansion, 307-324 TE: Sections: 21.1-21.9 LM: Activities and Experiments: 49, 50, 51, 53 TR: Concept-Development Practice: 21-1, 21-2; Problem-Solving Exercises: 10-1, 10-2; Transparencies: 40, 41; Next-Time Questions: 21-1, 21-2, 21-3, 21-4 TECH: Videodisc: 3:1-3; Videotape: Heat, Temperature, and Expansion
2.2	compare Celsius, Kelvin and the Absolute temperature scales.	SE/TE: Temperature, 307-309; Absolute Zero, 354-355 TE: Sections: 21.1, 24.1 LM: Activities and Experiments: 63 TR: Concept-Development Practice: 21-1; Next-Time Questions: 21-1, 24-1 TECH: Videodisc: 3:1; Videotape: Heat, Temperature, and Expansion
2.3	investigate exchanges in internal energy.	SE/TE: Heat Transfer, 325-338; Change of Phase, 339-353; Thermodynamics, 354-371 TE: Sections: 22.1-22.7, 23.1-23.8, 24.1-24.7 LM: Activities and Experiments: 52, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63 TR: Concept-Development Practice: 22-1, 23-1, 23-2, 24-1; Transparencies: 42, 43, 44, 45, 47, 48, 49; Next-Time Questions: 22-1, 22-2, 22-3, 23-1, 23-2, 24-1 TECH: Probeware Labs: 10, 11, 12; Videodisc: 3:4-9; Videotapes: Heat Transfer, Heat Radiation, Heat: Change of State
2.0 Thermodynamics—Performance Indicators		
At Level 1, the student is able to:		
•	investigate temperature in relationship to kinetic energy.	SE/TE: Temperature and Kinetic Energy, 308; Heat, 309; Evaporation, 339-340 TE: Sections: 21.1, 21.2, 23.1 TR: Concept-Development Practice: 21-1, 21-2; Next-Time Questions: 21-1 TECH: Videodisc: 3:1; Videotape: Heat, Temperature, and Expansion; Heat: Change of State

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<ul style="list-style-type: none"> recognize that absolute zero is the absence of molecular kinetic energy. 	SE/TE: Absolute Zero, 354-355 TE: Section: 24.1 LM: Activities and Experiments: 63 TR: Transparencies: 47
At Level 2, the student is able to:	
<ul style="list-style-type: none"> identify the characteristics of internal energy and temperature/heat (joules/calories). 	SE/TE: Internal Energy, 310; Measurement of Heat, 311-312 TE: Sections: 21.4, 21.5 TECH: Videotape: Heat, Temperature, and Expansion
<ul style="list-style-type: none"> relate the First Law of Thermodynamics as an application of the Law of Conservation of Energy (hot to cold) and heat transfer through conduction, convection and radiation. 	SE/TE: Conduction, 325-327; Convection, 327-331; Radiation, 330-331; Absorption of Radiant Energy, 331-332; Emission of Radiant Energy, 332-334; Newton's Law of Cooling, 334; First Law of Thermodynamics, 355-357 TE: Sections: 22.1, 22.2, 22.3, 22.4, 22.5, 22.6, 24.2 LM: Activities and Experiments: 52, 54, 55 TR: Concept-Development Practice: 22-1, 24-1; Transparencies: 42; Next-Time Questions: 22-1, 22-2, 22-3, 24-1 TECH: Probeware Labs: 10; Videodisc: 3:4, 5; Videotape: Heat, Temperature, and Expansion; Heat Transfer, Heat Radiation
<ul style="list-style-type: none"> relate change in heat content (quantity of thermal energy) to kinetic energy and specific heat ($Q=mcDT$). 	SE/TE: Specific Heat Capacity, 313-314; The High Specific Heat Capacity of Water, 314-315 TE: Sections: 21.6, 21.7 LM: Activities and Experiments: 49, 50, 51, 53 TECH: Videotape: Heat, Temperature, and Expansion
<ul style="list-style-type: none"> investigate potential energy changes (phase changes) of heat of fusion, heat of vaporization, and heat of sublimation. 	SE/TE: Evaporation, 339-340; Condensation, 341-342; Evaporation and Condensation Rates, 343; Boiling, 343-345; Freezing, 345; Boiling and Freezing at the Same Time, 345; Regelation, 346; Energy and Changes of Phase, 347-350 TE: Sections: 23.1-23.8 LM: Activities and Experiments: 57, 58, 59, 60, 61, 62 TR: Concept-Development Practice: 23-1, 23-2; Transparencies: 44, 45; Next-Time Questions: 23-1, 23-2 TECH: Probeware Labs: 11, 12; Videodisc: 3:6-8; Videotape: Heat: Changes of State

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At Level 3, the student is able to:	
<ul style="list-style-type: none"> explore thermal expansion and contraction. 	SE/TE: Thermal Expansion, 315-318; Expansion of Water, 319-321 TE: Sections: 21.8, 21.9 LM: Activities and Experiments: 53 TR: Concept-Development Practice: 21-2; Problem-Solving Exercises: 10-1; Transparencies: 40, 41; Next-Time Questions: 21-3, 21-4 TECH: Videodisc: 3:2, 3; Videotape: Heat, Temperature, and Expansion
<ul style="list-style-type: none"> apply the second law of thermodynamics to the Carnot engine. 	SE/TE: Heat Engines and the Second Law, 361-363 TE: Section: 24.5 TR: OT 48
3.0 Waves and Sound	
Standard: The student will investigate the properties of waves and sound. The student will:	
3.1 explore conditions associated with simple harmonic motion.	SE/TE: Vibration of a Pendulum, 372-373 TE: Sections: 25.1 LM: Activities and Experiments: 64, 65 TR: Problem-Solving Exercises: 11-1, 11-2 TECH: Probeware Labs: 13
3.2 investigate Hooke's law.	SE/TE: Elasticity, 263-264; Vibration of a Pendulum, 372-373 TE: Sections: 18.3, 25.1 LM: Activities and Experiments: 43, 64, 65 TR: Problem-Solving Exercises: 11-1, 11-2 TECH: Probeware Labs: 13
3.3 understand wave mechanics.	SE/TE: Wave Description, 373-375; Wave Motion, 375-376; Wave Speed, 376-378; Transverse Waves, 378; Longitudinal Waves, 378-379; Interference, 379-380; Standing Waves, 380-382; Bow Waves, 384-385; Shock Waves, 385-386 Reflection, 442-443; Refraction, 448-449; Diffraction, 483-486; Interference, 486-487 TE: Sections: 25.2-25.8, 25.10-25.11, 29.1, 29.6, 31.2, 31.3 LM: Activities and Experiments: 67 TR: Concept-Development Practice: 25-1, 25-2, 25-3, 31-1; Problem-Solving Exercises: 12-1, 12-3; Transparencies: 50, 51, 52, 53, 74; Next-Time Questions: 25-1, 25-2

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3.3 understand wave mechanics. (Continued)	(Continued) TECH: Videodisc: 3:10, 12; Videotape: Reflection and Refraction
3.4 examine the Doppler Effect.	SE/TE: The Doppler Effect, 382-384 TE: Section: 25.9 LM: Activities and Experiments: 66 TR: Concept-Development Practice: 25-1; Problem-Solving Exercises: 12-2 TECH: Videodisc: 3:12
3.5 explore the characteristics and properties of sound.	SE/TE: The Origin of Sound, 390-391; The Nature of Sound in Air, 391-392; Media That Transmit Sound, 392; The Speed of Sound, 393; Loudness, 393-394; Forced Vibration, 394; Natural Frequency, 395; Resonance, 395-396; Interference, 397-398; Beats, 398-400; Reflection of Sound, 447-448; Refraction of Sound, 449-450 TE: Sections: 26.1-26.10, 29.5, 29.7 LM: Activities and Experiments: 68, 69 TR: Concept-Development Practice: 26-1; Problem-Solving Exercises: 13-2; Transparencies: 54, 55; Next-Time Questions: 26-1 TECH: Videodisc: 3:11, 13-15, 24; Videotapes: Vibrations and Sound I and II; Reflection and Refraction
3.0 Waves and Sound—Performance Indicators	
At Level 1, the student is able to:	
<ul style="list-style-type: none"> describe and investigate simple harmonic motion. 	SE/TE: Vibration of a Pendulum, 372-373 TE: Sections: 25.1 LM: Activities and Experiments: 64, 65 TR: Problem-Solving Exercises: 11-1, 11-2 TECH: Probeware Labs: 13
<ul style="list-style-type: none"> investigate and analyze wavelength, frequency and amplitude of longitudinal and transverse waves. 	SE/TE: Wave Description, 373-375; Wave Motion, 375-376; Wave Speed, 376-378; Transverse Waves, 378; Longitudinal Waves, 378-379 TE: Sections: 25.2-25.6 TR: Problem-Solving Exercises: 12-1; Transparencies: 50, 51 TECH: Videodisc: 3:10, 12; Videotape: Reflection and Refraction

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TENNESSEE SCIENCE CURRICULUM STANDARDS: PHYSICS	PAGE(S) WHERE TAUGHT (If submission is not a book, cite appropriate location(s))
<ul style="list-style-type: none"> identify a wave interaction as reflection, refraction, diffraction, and interference. 	SE/TE: Interference, 379-380; Standing Waves, 380-382; Reflection, 442-443; Refraction, 448-449; Reflection of Sound, 447-448; Refraction of Sound, 449-450; Diffraction, 483-486; Interference, 486-487 TE: Sections: 25.7, 25.8, 29.1, 29.5, 29.6, 29.7, 31.2, 31.3 LM: Activities and Experiments: 67 TR: Concept-Development Practice: 31-1; Problem-Solving Exercises: 12-3, 13-2; Transparencies: 52, 68, 70, 74; Next-Time Questions: 25-1 TECH: Videodisc: 3:24; Videotape: Reflection and Refraction
At Level 2, the student is able to:	
<ul style="list-style-type: none"> compare mechanical and electromagnetic waves. 	SE/TE: Radiation, 330-331; Wave Motion, 375-376, Electromagnetic Waves, 408-409, 589-591 TE: Sections: 22.3, 25.3, 27.3, 37.8 TR: Problem-Solving Exercises: 12-1; Transparencies: 57, 90, 91; Next-Time Questions: 27-1, 27-2 TECH: Videotapes: Heat Radiation, Light Waves
<ul style="list-style-type: none"> explore Hooke's Law. 	SE/TE: Elasticity, 263-264; Vibration of a Pendulum, 372-373 TE: Sections: 18.3, 25.1 LM: Activities and Experiments: 43, 64, 65 TR: Problem-Solving Exercises: 11-1, 11-2 TECH: Probeware Labs: 13
<ul style="list-style-type: none"> investigate reflection, refraction, diffraction, and interference of waves. 	SE/TE: Interference, 379-380; Standing Waves, 380-382; Reflection, 442-443; Refraction, 448-449; Reflection of Sound, 447-448; Refraction of Sound, 449-450; Diffraction, 483-486; Interference, 486-487 TE: Sections: 25.7, 25.8, 29.1, 29.5, 29.6, 29.7, 31.2, 31.3 LM: Activities and Experiments: 67 TR: Concept-Development Practice: 31-1; Problem-Solving Exercises: 12-3, 13-2; Transparencies: 52, 68, 70, 74; Next-Time Questions: 25-1 TECH: Videodisc: 3:24; Videotape: Reflection and Refraction

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<ul style="list-style-type: none"> demonstrate and explain the Doppler Effect. 	SE/TE: The Doppler Effect, 382-384 TE: Section: 25.9 LM: Activities and Experiments: 66 TR: Concept-Development Practice: 25-1; Problem-Solving Exercises: 12-2 TECH: Videodisc: 3:12
<ul style="list-style-type: none"> experiment with reflection, refraction, diffraction, and interference of waves and sound. 	SE/TE: Interference, 379-380; Standing Waves, 380-382; Reflection, 442-443; Refraction, 448-449; Reflection of Sound, 447-448; Refraction of Sound, 449-450; Diffraction, 483-486; Interference, 486-487 TE: Sections: 25.7, 25.8, 29.1, 29.5, 29.6, 29.7, 31.2, 31.3 LM: Activities and Experiments: 67 TR: Concept-Development Practice: 31-1; Problem-Solving Exercises: 12-3, 13-2; Transparencies: 52, 68, 70, 74; Next-Time Questions: 25-1 TECH: Videodisc: 3:24; Videotape: Reflection and Refraction
<ul style="list-style-type: none"> compare wave characteristics to natural auditory phenomena. 	SE/TE: The Origin of Sound, 390-391; The Nature of Sound in Air, 391-392; Media That Transmit Sound, 392; The Speed of Sound, 393; Loudness, 393-394; Forced Vibration, 394; Natural Frequency, 395; Resonance, 395-396; Interference, 397-398; Beats, 398-400; Reflection of Sound, 447-448; Refraction of Sound, 449-450 TE: Sections: 26.1-26.10, 29.5, 29.7 LM: Activities and Experiments: 68, 69 TR: Concept-Development Practice: 26-1; Problem-Solving Exercises: 13-2; Transparencies: 54, 55; Next-Time Questions: 26-1 TECH: Videodisc: 3:11, 13-15, 24; Videotapes: Vibrations and Sound I and II; Reflection and Refraction
At Level 3, the student is able to:	
<ul style="list-style-type: none"> determine the speed of sound experimentally using various materials and temperatures. 	SE/TE: Wave Speed, 376-378; The Speed of Sound, 393 TE: Sections: 25.4, 26.4 LM: Activities and Experiments: 69 TR: Concept-Development Practice: 26-1; Next-Time Questions: 26-1 TECH: Videotapes: Vibrations and Sound I and II

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TENNESSEE SCIENCE CURRICULUM STANDARDS: PHYSICS	PAGE(S) WHERE TAUGHT (If submission is not a book, cite appropriate location(s))
<ul style="list-style-type: none"> measure spring constants. 	SE/TE: Elasticity, 263-264 TE: Sections: 18.3 LM: Activities and Experiments: 43
4.0 Light and Optics	
Standard: The student will examine the properties of light and optics. The student will:	
4.1 describe the characteristics of the electromagnetic spectrum.	SE/TE: Electromagnetic Waves, 408-409; The Color Spectrum, 421-422; The Atomic Color Code—Atomic Spectra, 436-438 TE: Sections: 27.3, 28.1, 28.11 LM: Activities and Experiments: 73 TR: Problem-Solving Exercises: 12-1; Transparencies: 57, 90, 91; Next-Time Questions: 27-1, 27-2 TECH: Videotapes: Light Waves, Light and Color
4.2 investigate the interaction of light waves.	SE/TE: Huygen's Principle, 480-482; Diffraction, 483-486; Interference, 486-487; Young's Interference Experiment, 487-490; Single-Color Interference from Thin Films, 490; Iridescence from Thin Films, 491-493; Laser Light, 493-494; The Hologram, 495-496 TE: Sections: 31.1-31.8 LM: Activities and Experiments: 85 TR: Concept-Development Practice: 31-1; Problem-Solving Exercises: 14-3; Transparencies: 74; Next-Time Questions: 31-1 TECH: Videodisc: 3:25
4.3 analyze the optics of mirrors.	SE/TE: Mirrors, 444-446 TE: Section: 29.3 LM: Activities and Experiments: 75, 76, 77, 78 TR: Concept-Development Practice: 29-1, 29-2; Transparencies: 69; Next-Time Questions: 29-1, 29-2 TECH: Videodisc: 3:22; Videotape: Reflection and Refraction
4.4 explore the optics of lenses.	SE/TE: Converging and Diverging Lenses, 463-465; Image Formation by a Lens, 465-466; Constructing Images Through Ray Diagrams, 467-470; Image Formation Summarized, 470-471; Some Common Optical Instruments, 471-473; The Eye, 473-474; Some Defects in Vision, 474-475; Some Defects of Lenses, 475-476

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TENNESSEE SCIENCE CURRICULUM STANDARDS: PHYSICS	PAGE(S) WHERE TAUGHT (If submission is not a book, cite appropriate location(s))
4.4 explore the optics of lenses. (Continued)	(Continued) TE: Sections: 30.1-30.8 LM: Activities and Experiments: 79, 80, 81, 82, 83, 84 TR: Concept-Development Practice: 30-1, 30-2; Problem-Solving Exercises: 14-1, 14-2; Transparencies: 72, 73; Next-Time Questions: 30-1
4.5 investigate the phenomenon of color.	SE/TE: The Color Spectrum, 421-422; Color by Reflection, 422-424; Color by Transmission, 424-425; Sunlight, 425-426; Mixing Colored Light, 426-427; Complementary Colors, 427-429; Mixing Colored Pigments, 429-431; Why the Sky is Blue, 432-433; Why Sunsets Are Red, 433-435; Why Water is Greenish Blue, 435-436; The Atomic Color Code—Atomic Spectra, 436-438 TE: Sections: 28.1-28.11 LM: Activities and Experiments: 73 TR: Concept-Development Practice: 28-1; Transparencies: 60, 61, 62, 63, 64, 65, 66, 67; Next-Time Questions: 28-1 TECH: Videodisc: 3:18, 19, 21; Videotape: Light and Color
4.0 Light and Optics—Performance Indicators	
At Level 1, the student is able to:	
<ul style="list-style-type: none"> explore properties of electromagnetic radiation. 	SE/TE: Electromagnetic Waves, 408-409; The Color Spectrum, 421-422; The Atomic Color Code—Atomic Spectra, 436-438 TE: Sections: 27.3, 28.1, 28.11 LM: Activities and Experiments: 73 TR: Problem-Solving Exercises: 12-1; Transparencies: 57, 90, 91; Next-Time Questions: 27-1, 27-2 TECH: Videotapes: Light Waves, Light and Color
<ul style="list-style-type: none"> examine properties of light waves. 	SE/TE: Light and Transparent Materials, 409-411; Opaque Materials, 411-412; Shadows, 412-413; Polarization, 414-415; Polarized Light and 3-D Viewing, 416-418; Reflection and Refraction, 442-462; Diffraction and Interference, 480-498; The Vector Nature of Light, 653-655 TE: Sections: 27.4-27.8, 29.1-29.4, 29.6, 29.8-29.12, 31.1-31.8

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<p align="right">(Continued)</p> <ul style="list-style-type: none"> examine properties of light waves. 	<p align="right">(Continued)</p> <p>LM: Activities and Experiments: 70, 71, 72, 74-78, 85</p> <p>TR: Concept-Development Practice: 27-1, 29-1, 29-2, 29-3, 29-4, 31-1; Problem-Solving Exercises: 13-3, 14-3; Transparencies: 58, 59, 68, 69, 70, 71, 74; Next-Time Questions: 27-3, 29-1, 29-2, 29-3, 29-4, 29-5, 29-6, 29-7, 29-8, 29-9, 31-1</p> <p>TECH: Probeware Labs: 14; Videodisc: 3:17, 25; Videotape: Light Waves; Reflection and Refraction</p>
<p>At Level 2, the student is able to:</p>	
<ul style="list-style-type: none"> differentiate among transmission, reflection, refraction, diffraction, and interference of light waves. 	<p>SE/TE: Light and Transparent Materials, 409-411; Reflection, 442-443; Refraction of Light, 451-452; Huygen's Principle, 480-482; Diffraction, 483-486; Interference, 486-487; Young's Interference Experiment, 487-490; Single-Color Interference from Thin Films, 490; Iridescence from Thin Films, 491-493; Laser Light, 493-494; The Hologram, 495-496</p> <p>TE: Sections: 27.4, 29.1, 29.8, 31.1-31.8</p> <p>LM: Activities and Experiments: 85</p> <p>TR: Concept-Development Practice: 29-3, 29-4, 31-1; Problem-Solving Exercises: 14-3; Transparencies: 68, 70, 74; Next-Time Questions: 29-5, 29-6, 31-1</p> <p>TECH: Videodisc: 3:16, 25; Videotapes: LightWaves, Reflection and Refraction</p>
<ul style="list-style-type: none"> investigate the optical properties of plane and curved mirrors. 	<p>SE/TE: Mirrors, 444-446</p> <p>TE: Section: 29.3</p> <p>LM: Activities and Experiments: 75, 76, 77, 78</p> <p>TR: Concept-Development Practice: 29-1, 29-2; Transparencies: 69; Next-Time Questions: 29-1, 29-2</p> <p>TECH: Videodisc: 3:22; Videotape: Reflection and Refraction</p>
<ul style="list-style-type: none"> solve problems related to Snell's law. 	<p>SE/TE: Refraction of Light, 451-452</p> <p>TE: Sections: 29.8</p> <p>TR: Concept-Development Practice: 29-3, 29-4; Transparencies: 70; Next-Time Questions: 29-5, 29-6</p> <p>TECH: Videotape: Reflection and Refraction</p>

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TENNESSEE SCIENCE CURRICULUM STANDARDS: PHYSICS	PAGE(S) WHERE TAUGHT (If submission is not a book, cite appropriate location(s))
<ul style="list-style-type: none"> explore the formation of color. 	<p>SE/TE: The Color Spectrum, 421-422; Color by Reflection, 422-424; Color by Transmission, 424-425; Sunlight, 425-426; Mixing Colored Light, 426-427; Complementary Colors, 427-429; Mixing Colored Pigments, 429-431; Why the Sky is Blue, 432-433; Why Sunsets Are Red, 433-435; Why Water is Greenish Blue, 435-436; The Atomic Color Code—Atomic Spectra, 436-438</p> <p>TE: Sections: 28.1-28.11</p> <p>LM: Activities and Experiments: 73</p> <p>TR: Concept-Development Practice: 28-1; Transparencies: 60, 61, 62, 63, 64, 65, 66, 67; Next-Time Questions: 28-1</p> <p>TECH: Videodisc: 3:18, 19, 21; Videotape: Light and Color</p>
At Level 3, the student is able to:	
<ul style="list-style-type: none"> draw, explain, and solve problems for the optics of mirrors and lenses. 	<p>SE/TE: Mirrors, 444-446; Converging and Diverging Lenses, 463-465; Image Formation by a Lens, 465-466; Constructing Images Through Ray Diagrams, 467-470; Image Formation Summarized, 470-471; Some Common Optical Instruments, 471-473; The Eye, 473-474; Some Defects in Vision, 474-475; Some Defects of Lenses, 475-476</p> <p>TE: Sections: 29.3, 30.1-30.8</p> <p>LM: Activities and Experiments: 75, 76, 77, 78, 79, 80, 81, 82, 83, 84</p> <p>TR: Concept-Development Practice: 29-1, 29-2, 30-1, 30-2; Problem-Solving Exercises: 14-1, 14-2; Transparencies: 69, 72, 73; Next-Time Questions: 29-1, 29-2, 30-1</p> <p>TECH: Videodisc: 3:22; Videotape: Reflection and Refraction</p>
<ul style="list-style-type: none"> investigate optical phenomena (i.e., the Puddle Effect, optical illusions, and polarization). 	<p>SE/TE: Polarized Light and 3-D Viewing, 416-418; Why the Sky is Blue, 432-433; Why Sunsets Are Red, 433-435; Why Water is Greenish Blue, 435-436; Atmospheric Refraction, 452-454; The Rainbow, 455-457; The Hologram, 495-496; The Vector Nature of Light, 653-655</p> <p>TE: Sections: 27.8, 28.8-28.10, 29.9, 29.11, 31.8</p> <p>LM: Activities and Experiments: 71</p> <p>TR: Transparencies: 59, 67, 71; Next-Time Questions: 29-7, 29-8, 29-9</p> <p>TECH: Probeware Labs: 14; Videodisc: 3:17, 19, 20, 21, 26; Videotape: Light Waves, Light and Color, Reflection and Refraction</p>

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5.0 Electricity and Magnetism	
Standard: The student will investigate electricity and magnetism. The student will:	
5.1 examine properties of electric forces, electric charges, and electric fields.	SE/TE: Electrical Forces and Charges, 500-502; Conservation of Charge, 502-504; Coulomb's Law, 504-507; Conductors and Insulators, 508-509; Charging by Friction and Contact, 509; Charging by Induction, 510-512; Charge Polarization, 512-514; Electric Fields, 517-518; Electric Field Lines, 519-521; Electric Shielding, 521-523; Electric Potential Energy, 523-524; Electric Energy Storage, 526-527; The Van de Graaff Generator, 527-528 TE: Sections: 32.1-32.7, 33.1-33.7 LM: Activities and Experiments: 86, 88 TR: Concept-Development Practice: 32-1, 32-2, 33-1, 33-2; Problem-Solving Exercises: 15-1, 15-2, 15-3; Transparencies: 76, 77, 78, 79; Next-Time Questions: 32-1, 32-2, 32-3, 33-1, 33-2 TECH: Probeware Labs: 15; Videodisc: 4:1, 2; Videotape: Electrostatics
5.2 explore the flow of charge and electric currents.	SE/TE: Flow of Charge, 531-532; Electric Current, 532-533; Voltage Sources, 533-534; Electrical Resistance, 534-535; Direct Current and Alternating Current, 539-540; Converting AC to DC, 540; The Speed of Electrons in a Circuit, 541-542; The Source of Electrons in a Circuit, 542-543 TE: Sections: 34.1-34.4, 34.7-34.10 LM: Activities and Experiments: 89 TR: Problem-Solving Exercises: 16-1; Transparencies: 80; Next-Time Questions: 34-1 TECH: Videodisc: 4:3, 4, 6; Videotape: Electric Current
5.3 investigate Ohm's Law.	SE/TE: Ohm's Law, 535-536; Ohm's Law and Electric Shock, 537-539 TE: Sections: 34.5, 34.5 LM: Activities and Experiments: 89 TR: Concept-Development Practice: 34-1 TECH: Videodisc: 4:5; Videotape: Electric Current

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5.4	compare and contrast series and parallel circuits.	SE/TE: A Battery and a Bulb, 548-549; Electric Currents, 549-550; Electric Currents, 549-550; Series Circuits, 550-551; Parallel Circuits, 552-554 TE: Sections: 35.1, 35.2, 35.3, 35.4 LM: Activities and Experiments: 87, 90, 91 TR: Concept-Development Practice: 35-1; Problem-Solving Exercises: 16-4; Transparencies: 81, 82; Next-Time Questions: 35-1, 35-2 TECH: Videodisc: 4:7
5.5	analyze schematic diagrams.	SE/TE: Schematic Diagrams, 554; Combining Resistors in a Compound Circuit, 555-557 TE: Sections: 35.5, 35.6 LM: Activities and Experiments: 87 TR: Concept-Development Practice: 35-2; Transparencies: 83, 84; Next-Time Questions: 35-3 TECH: Videodisc: 4:7
5.6	understand magnetic poles, magnetic fields, and investigate electromagnetic induction.	SE/TE: Magnetic Poles, 563-564; Magnetic Fields, 564-565; The Nature of a Magnetic Field, 565-566; Magnetic Domains, 566-567; Electric Currents and Magnetic Fields, 568-569; Magnetic Forces on Moving Charged Particles, 570; Magnetic Forces on Current-Carrying Wires, 571; Meters to Motors, 572-573; The Earth's Magnetic Field, 574 TE: Sections: 36.1-36.9 LM: Activities and Experiments: 93, 94 TR: Concept-Development Practice: 36-1; Problem-Solving Exercises: 17-1; Transparencies: 85, 86; Next-Time Questions: 36-1, 36-2, 36-3 TECH: Videodisc: 4:8, 9; Videotape: Magnetism and Induction
5.0 Electricity and Magnetism—Performance Indicators		
At Level 1, the student is able to:		
•	analyze a given group of charges for repulsion and attraction.	SE/TE: Electrical Forces and Charges, 500-502; Conservation of Charge, 502-504; Coulomb's Law, 504-507; Charging by Induction, 510-512; Charge Polarization, 512-514 TE: Sections: 32.1-32.3, 32.6, 32.7 LM: Activities and Experiments: 86

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<p align="right">(Continued)</p> <ul style="list-style-type: none"> analyze a given group of charges for repulsion and attraction. 	<p align="right">(Continued)</p> <p>TR: Concept-Development Practice: 32-1, 32-2; Problem-Solving Exercises: 15-1; Transparencies: 76, 77; Next-Time Questions: 32-1</p> <p>TECH: Videotape: Electrostatics</p>
<ul style="list-style-type: none"> distinguish between charged particles related to repulsion and attraction. 	<p>SE/TE: Electrical Forces and Charges, 500-502; Conservation of Charge, 502-504; Coulomb's Law, 504-507; Charging by Induction, 510-512; Charge Polarization, 512-514</p> <p>TE: Sections: 32.1-32.3, 32.6, 32.7</p> <p>LM: Activities and Experiments: 86</p> <p>TR: Concept-Development Practice: 32-1, 32-2; Problem-Solving Exercises: 15-1; Transparencies: 76, 77; Next-Time Questions: 32-1</p> <p>TECH: Videotape: Electrostatics</p>
<ul style="list-style-type: none"> create a simple electromagnet. 	<p>SE/TE: Electric Currents and Magnetic Fields, 568-569</p> <p>TE: Sections: 36.5</p> <p>LM: Activities and Experiments: 94</p> <p>TR: Transparencies: 86; Next-Time Questions: 36-3</p> <p>TECH: Videodisc: 4:9; Videotape: Magnetism and Induction</p>
At Level 2, the student is able to:	
<ul style="list-style-type: none"> describe the electric field that fills the space around a charged particle or group of charges. 	<p>SE/TE: Electric Fields, 517-518; Electric Field Lines, 519-521; Electric Shielding, 521-523</p> <p>TE: Sections: 33.1-33.3</p> <p>TR: Concept-Development Practice: 33-1; Problem-Solving Exercises: 15-2; Transparencies: 78, 79</p>
<ul style="list-style-type: none"> draw an electric field, given a scenario of charged particles. 	<p>SE/TE: Electric Fields, 517-518; Electric Field Lines, 519-521; Electric Shielding, 521-523</p> <p>TE: Sections: 33.1-33.3</p> <p>TR: Concept-Development Practice: 33-1; Problem-Solving Exercises: 15-2; Transparencies: 78, 79</p>
<ul style="list-style-type: none"> solve problems of resistance using Ohm's law. 	<p>SE/TE: Electrical Resistance, 534-535; Ohm's Law, 535-536; Ohm's Law and Electric Shock, 537-539</p> <p>TE: Sections: 34.4-34.6</p> <p>LM: Activities and Experiments: 89</p>

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(Continued)	(Continued)
<ul style="list-style-type: none"> • solve problems of resistance using Ohm's law. 	TR: Concept-Development Practice: 34-1; Problem-Solving Exercises: 16-1; Transparencies: 80 TECH: Videodisc: 4:4, 5; Videotape: Electric Current
<ul style="list-style-type: none"> • draw and explain series and parallel circuits. 	SE/TE: Electric Currents, 549-550; Electric Currents, 549-550; Series Circuits, 550-551; Parallel Circuits, 552-554; Schematic Diagrams, 554 TE: Sections: 35.2-35.5 LM: Activities and Experiments: 87, 90, 91 TR: Concept-Development Practice: 35-1; Problem-Solving Exercises: 16-4; Transparencies: 81, 82, 83; Next-Time Questions: 35-1, 35-2 TECH: Videodisc: 4:7
<ul style="list-style-type: none"> • identify components of series and parallel circuits and solve problems related to voltage, amperage, and resistance. 	SE/TE: Electric Currents, 549-550; Series Circuits, 550-551; Parallel Circuits, 552-554; Schematic Diagrams, 554; Combining Resistors in a Compound Circuit, 555-557; Parallel Circuits and Overloading, 557-558 TE: Sections: 35.3-35.7 LM: Activities and Experiments: 87, 90, 91, 92 TR: Concept-Development Practice: 35-1; Problem-Solving Exercises: 16-4; Transparencies: 81, 82, 83; Next-Time Questions: 35-1, 35-2 TECH: Videodisc: 4:7
<ul style="list-style-type: none"> • build series and parallel circuits and demonstrate how they function. 	SE/TE: Electric Currents, 549-550; Series Circuits, 550-551; Parallel Circuits, 552-554; Schematic Diagrams, 554; Combining Resistors in a Compound Circuit, 555-557; Parallel Circuits and Overloading, 557-558 TE: Sections: 35.3-35.7 LM: Activities and Experiments: 87, 90, 91, 92 TR: Concept-Development Practice: 35-1; Problem-Solving Exercises: 16-4; Transparencies: 81, 82, 83; Next-Time Questions: 35-1, 35-2 TECH: Videodisc: 4:7
<ul style="list-style-type: none"> • demonstrate a generated current by electromagnetic induction. 	SE/TE: Electric Currents and Magnetic Fields, 568-569; Magnetic Forces on Current-Carrying Wires, 571; Meters to Motors, 572-573 TE: Sections: 36.5, 36.7, 36.8 LM: Activities and Experiments: 94 TR: Transparencies: 86; Next-Time Questions: 36-3

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(Continued)	(Continued)
<ul style="list-style-type: none"> demonstrate a generated current by electromagnetic induction. 	TECH: Videodisc: 4:9; Videotape: Magnetism and Induction
At Level 3, the student is able to:	
<ul style="list-style-type: none"> describe how current is generated by electromagnetic induction. 	SE/TE: Electric Currents and Magnetic Fields, 568-569 TE: Sections: 36.5 LM: Activities and Experiments: 94 TR: Transparencies: 86; Next-Time Questions: 36-3 TECH: Videodisc: 4:9; Videotape: Magnetism and Induction
<ul style="list-style-type: none"> design a lab that demonstrates the flow of charged particles and an electric current. 	SE/TE: Ohm's Law, 535-536; Magnetic Forces on Current-Carrying Wires, 571 TE: Sections: 34.3, 36.7 LM: Activities and Experiments: 89, 94 TR: Concept-Development Practice: 34-1, 36-1 TECH: Videodisc: 4:4, 5, 9; Videotapes: Electric Current, Magnetism and Induction
6.0 Nuclear Physics	
Standard: The student will investigate the laws and properties of nuclear physics. The student will:	
6.1 investigate the properties and structure of the atom.	SE/TE: Elements, 244-245; Atoms Are Recyclable, 246; Atoms Are Small, 246-247; Evidence for Atoms, 248; Molecules, 249; Compounds, 250; The Atomic Nucleus, 250-252; Electrons in the Atom, 252-253; The Atomic Nucleus, 609-610 TE: Sections: 17.1-17.8, 39.1 LM: Activities and Experiments: 41, 42, 97 TR: Concept-Development Practice: 17-1; Transparencies: 26, 27, 28; Next-Time Questions: 17-1, 17-2 TECH: Videotapes: Atoms, Radioactivity
6.2 compare and contrast the Bohr model and the quantum model of the atom.	SE/TE: Models, 596-597; Electron Waves, 601-603; Relative Sizes of Atoms, 603-604 TE: Sections: 38.1, 38.6, 38.7 TR: Problem-Solving Exercises: 18-3; Transparencies: 92; Next-Time Questions: 38-2 TECH: Videodisc: 4:12; Videotape: Atoms

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Tennessee Science Curriculum Standards: Physics, (Grades 9-12)

TENNESSEE SCIENCE CURRICULUM STANDARDS: PHYSICS		PAGE(S) WHERE TAUGHT (If submission is not a book, cite appropriate location(s))
6.3	explore the dynamics of the nucleus: radioactivity, nuclear decay, radiocarbon/uranium dating and half-life.	SE/TE: The Atomic Nucleus, 609-610; Radioactive Decay, 610-611; Radiation Penetrating Power, 612; Radioactive Isotopes, 613-614; Radioactive Half Life, 615-616; Natural Transmutation of Elements, 617-619; Artificial Transmutation of Elements, 620; Carbon Dating, 621-622; Uranium Dating, 623; Radioactive Tracers, 623-624; Radiation and You, 624-625; Exponential Growth and Doubling Time, 656-658 TE: Sections: 39.1-39.11 LM: Activities and Experiments: 97, 98 TR: Concept-Development Practice: 39-1, 39-2; Problem-Solving Exercises: 18-4; Transparencies: 93, 94, 95, 96, 97; Next-Time Questions: 39-1, 39-2 TECH: Videodisc: 4:13-15; Videotape: Radioactivity
6.4	compare and contrast nuclear fission and nuclear fusion.	SE/TE: Nuclear Fission, 630-632; The Nuclear Fission Reactor, 633-634; Plutonium, 634-635; The Breeder Reactor, 635-636; Mass-Energy Equivalence, 636-639; Nuclear Fusion, 639-640; Controlling Nuclear Fusion, 641-642 TE: Sections: 40.1-40.7 LM: Activities and Experiments: 99 TR: Concept-Development Practice: 40-1; Transparencies: 98, 99, 100; Next-Time Questions: 40-1, 40-2 TECH: Videodisc: 4:16-20; Videotape: Fission and Fusion
6.5	investigate the quantum theory.	SE/TE: Early Concepts of Light, 404-405; Light Quanta, 597; The Photoelectric Effect, 598-599; Waves as Particles, 599; Particles as Waves, 600-601; Electron Waves, 601-603; Relative Sizes of Atoms, 603-604; Quantum Physics, 605-606; Predictability and Chaos, 606 TE: Sections: 27.1, 38.2-38.9 LM: Activities and Experiments: 96 TR: Concept-Development Practice: 38-1; Problem-Solving Exercises: 18-1, 18-2, 18-3; Transparencies: 92; Next-Time Questions: 38-2 TECH: Videodisc: 4:12; Videotapes: Light Waves, Atoms

SE = Student Edition TE = Teacher's Edition LM = Lab Manual
TR = Teaching Resources TECH = Tech Resources

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TENNESSEE SCIENCE CURRICULUM STANDARDS: PHYSICS	PAGE(S) WHERE TAUGHT (If submission is not a book, cite appropriate location(s))
6.0 Nuclear Physics—Performance Indicators	
At Level 1, the student is able to:	
<ul style="list-style-type: none"> identify the parts of an atom. 	SE/TE: The Atomic Nucleus, 250-252; Electrons in the Atom, 252-253; The Atomic Nucleus, 609-610 TE: Sections: 17.7, 17.8, 39.1 LM: Activities and Experiments: 97 TR: Concept-Development Practice: 17-1; Transparencies: 26, 27, 28; Next-Time Questions: 17-1, 17-2 TECH: Videotapes: Atoms, Radioactivity
<ul style="list-style-type: none"> describe the properties and location of subatomic particles. 	SE/TE: The Atomic Nucleus, 250-252; Electrons in the Atom, 252-253; The Atomic Nucleus, 609-610 TE: Sections: 17.7, 17.8, 39.1 LM: Activities and Experiments: 97 TR: Concept-Development Practice: 17-1; Transparencies: 26, 27, 28; Next-Time Questions: 17-1, 17-2 TECH: Videotapes: Atoms, Radioactivity
<ul style="list-style-type: none"> describe three forms of radioactivity. 	SE/TE: Radioactive Decay, 610-611 TE: Section: 39.2 TR: Concept-Development Practice: 39-1; Transparencies: 93 TECH: Videodisc: 4:13; Videotape: Radioactivity
<ul style="list-style-type: none"> distinguish between nuclear fission and nuclear fusion. 	SE/TE: Nuclear Fission, 630-632; Nuclear Fusion, 639-640 TE: Sections: 40.1, 40.6 LM: Activities and Experiments: 99 TR: Concept-Development Practice: 40-1; Transparencies: 98, 100; Next-Time Questions: 40-1, 40-2 TECH: Videodisc: 4:16, 19; Videotape: Fission and Fusion
At Level 2, the student is able to:	
<ul style="list-style-type: none"> distinguish between the Bohr model and the quantum model of an atom. 	SE/TE: Models, 596-597; Electron Waves, 601-603; Relative Sizes of Atoms, 603-604 TE: Sections: 38.1, 38.6, 38.7 TR: Problem-Solving Exercises: 18-3; Transparencies: 92; Next-Time Questions: 38-2 TECH: Videodisc: 4:12; Videotape: Atoms

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TENNESSEE SCIENCE CURRICULUM STANDARDS: PHYSICS	PAGE(S) WHERE TAUGHT (If submission is not a book, cite appropriate location(s))
<ul style="list-style-type: none"> explain the changes in atomic number or mass number for each form of radioactivity. 	SE/TE: Radioactive Isotopes, 613-614; Natural Transmutation of Elements, 617-619; Artificial Transmutation of Elements, 620 TE: Section: 39.4, 39.6, 39.7 TR: Concept-Development Practice: 39-1, 39-2; Transparencies: 95, 96 TECH: Videotape: Radioactivity
<ul style="list-style-type: none"> write and balance equations for the three forms of radioactive decay. 	SE/TE: Radioactive Decay, 610-611 TE: Section: 39.2 TR: Concept-Development Practice: 39-1; Transparencies: 93 TECH: Videodisc: 4:13; Videotape: Radioactivity
<ul style="list-style-type: none"> solve half-life problems. 	SE/TE: Radioactive Half Life, 615-616; Exponential Growth and Doubling Time, 656-658 TE: Section: 39.5 LM: Activities and Experiments: 98 TR: Concept-Development Practice: 39-1 TECH: Videodisc: 4:14; Videotape: Radioactivity
<ul style="list-style-type: none"> explain dating methods using carbon-14 or uranium. 	SE/TE: Carbon Dating, 621-622; Uranium Dating, 623 TE: Sections: 39.8, 39.9 TECH: Videodisc: 4:15; Videotape: Radioactivity
<ul style="list-style-type: none"> explain how particles behave like waves. 	SE/TE: Waves as Particles, 599; Particles as Waves, 600-601 TE: Sections: 38.4, 38.5 TECH: Videodisc: 4:12; Videotape: Atoms
<ul style="list-style-type: none"> distinguish between coherent and incoherent light. 	SE/TE: Laser Light, 493-494; The Hologram, 495-496 TE: Sections: 31.7, 31.8
<ul style="list-style-type: none"> describe how a laser is produced. 	SE/TE: Laser Light, 493-494 TE: Section: 31.7
At Level 3, the student is able to:	
<ul style="list-style-type: none"> recognize how the quantum theory explains the photoelectric effect. 	SE/TE: Early Concepts of Light, 404-405; Light Quanta, 597; The Photoelectric Effect, 598-599 TE: Sections: 27.1, 38.2, 38.3 LM: Activities and Experiments: 96 TR: Problem-Solving Exercises: 18-1, 18-2 TECH: Videotapes: Light Waves, Atoms

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TENNESSEE SCIENCE CURRICULUM STANDARDS: PHYSICS	PAGE(S) WHERE TAUGHT (If submission is not a book, cite appropriate location(s))
<ul style="list-style-type: none">• solve problems related to the photoelectric effect.	SE/TE: The Photoelectric Effect, 598-599 TE: Section: 38.3 LM: Activities and Experiments: 96 TR: Problem-Solving Exercises: 18-2 TECH: Videotape: Atoms