

Georgia Physics Standards Correlation

Georgia Performance Standards for Physics

	Physics for Scientists and Engineers	Principles of Physics	Conceptual Physics	Virtual Physics Labs
SP1 Students will analyze the relationships between force, mass, gravity, and the motion of objects.				
a. Calculate average velocity, instantaneous velocity, and acceleration in a given frame of reference.	2.3 – 2.5, 2.10 – 2.13	2.3 – 2.5, 2.10 – 2.12	2.3 – 2.5, 2.8 – 2.10	·Skee-Ball
b. Compare and contrast scalar and vector quantities.	3.1 – 3.2	3.1 – 3.2	3.1 – 3.2	
c. Compare graphically and algebraically the relationships among position, velocity, acceleration, and time.	Chapter 2	Chapter 2	Chapter 2	·Skee-Ball
d. Measure and calculate the magnitude of frictional forces and Newton’s three Laws of Motion.	Chapters 5 and 6	Chapters 5 and 6	Chapter 5	·Helicopters in flight
e. Measure and calculate the magnitude of gravitational forces.	5.4, 13.1	5.4, 13.1	5.4, 12.1	·Helicopters in flight ·Orbiting satellites
f. Measure and calculate two-dimensional motion (projectile and circular) by using component vectors.	4.8, Chapters 3, 4, 9 and 10	4.7, Chapters 3, 4, 9 and 10	4.3, Chapters 3, 4, 8 and 9	·Firing a cannon ·Juggling objects ·Navigating race tracks
g. Measure and calculate centripetal force.	9.7 – 9.14	9.6 - 9.13	8.5 - 8.7	·Navigating race tracks
h. Determine the conditions required to maintain a body in a state of static equilibrium.	12.1, Chapter 12	12.1, Chapter 12	11.1, Chapter 11	
SP2 Students will evaluate the significance of energy in understanding the structure of matter and the universe.				
a. Relate the energy produced through fission and fusion by stars as a driving force in the universe.	44.13 – 44.14	43.13 – 43.14	38.13 – 38.14	
b. Explain how the instability of radioactive isotopes results in spontaneous nuclear reactions.	44.8 – 44.12, 44.15 – 44.21	43.8 – 43.12, 43.15 – 43.21	38.8 - 38.12, 38.15 - 38.18	

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SP3 Students will evaluate the forms and transformations of energy.				
a. Analyze, evaluate, and apply the principle of conservation of energy and measure the components of work-energy theorem by				
• describing total energy in a closed system.	Chapter 7	Chapter 7	Chapter 6	
• identifying different types of potential energy.	7.7, 7.16, 15.20	7.5, 7.13, 15.18	6.3, 6.10	
• calculating kinetic energy given mass and velocity.	7.8	7.6	6.4	
• relating transformations between potential and kinetic energy.	7.7, 7.20, 7.22, 7.26, 15.21	7.5, 7.17, 7.19, 15.19	6.3, 6.14, 6.16	
b. Explain the relationship between matter and energy.	41.23 – 41.24, 44.9	40.16 - 40.17, 43.9	35.12, 38.9	
c. Measure and calculate the vector nature of momentum.	8.1	8.1	7.1	
d. Compare and contrast elastic and inelastic collisions.	8.11 – 8.21	8.10 - 8.19	7.8 - 7.13	
e. Demonstrate the factors required to produce a change in momentum.	8.2 – 8.6	8.2 - 8.5	7.2 - 7.4	
f. Analyze the relationship between temperature, internal energy, and work done in a physical system.	20.10, Chapter 21	20.10, Chapter 21	19.9, Chapter 20	
g. Analyze and measure power.	7.15, 7.18, 7.19	7.12, 7.15, 7.16	6.9, 6.12, 6.13	
SP4 Students will analyze the properties and applications of waves.				
a. Explain the processes that results in the production and energy transfer of electromagnetic waves.	35.2, 35.7, 35.8, 35.20	34.2, 34.4, 34.5, 34.16	30.2, 30.4, 30.5, 30.7	
b. Experimentally determine the behavior of waves in various media in terms of reflection, refraction, and diffraction of waves.	Chapters 36, 37, and 40	Chapters 35, 36, and 39	Chapters 31, 32, and 34	·Helicopters versus submarines
c. Explain the relationship between the phenomena of interference and the principle of superposition.	18.1, 39.1, Chapters 18 and 39	18.1, 38.1, Chapters 18 and 38	17.1, 34.1, Chapters 17 and 34	·Playing Beethoven's Fifth Symphony

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d. Demonstrate the transfer of energy through different mediums by mechanical waves.	16.19, 17.10	17.8	16.4	·Birds on a wire
e. Determine the location and nature of images formed by the reflection or refraction of light.	Chapters 36, 37 and 38	Chapters 35, 36 and 37	Chapters 31, 32 and 33	
SP5 Students will evaluate relationships between electrical and magnetic forces.				
a. Describe the transformation of mechanical energy into electrical energy and the transmission of electrical energy.	32.17 – 32.20, 32.23, 27.18	32.14 - 32.17, 32.20, 27.13	29.10, 29.15, 25.11	·Generators and transformers
b. Determine the relationship among potential difference, current, and resistance in a direct current circuit.	27.6 – 27.7	27.3 - 27.4	25.3 - 25.4	
c. Determine equivalent resistances in series and parallel circuits.	29.7, 29.11, Chapter 29	29.7, 29.11, Chapter 29	27.6, 27.10, Chapter 27	
d. Determine the relationship between moving electric charges and magnetic fields.	Chapters 30 and 31	Chapters 30 and 31	Chapter 28	·Generators and transformers
SP6 The student will describe the corrections to Newtonian physics given by quantum mechanics and relativity when matter is very small, moving fast compared to the speed of light, or very large.				
a. Explain matter as a particle and as a wave.	43.0, 43.4 – 43.10	42.0, 42.4 - 42.9	37.0, 37.2 - 37.5	
b. Describe the Uncertainty Principle.	43.11 – 43.12	42.10 - 42.11	37.6	
c. Explain the differences in time, space, and mass measurements by two observers when one is in a frame of reference moving at constant velocity parallel to one of the coordinate axes of the other observer's frame of reference if the constant velocity is greater than one tenth the speed of light.	Chapter 41	Chapter 40	Chapter 35	·Jump into Einstein's shoes
d. Describe the gravitational field surrounding a large mass and its effect on a ray of light.				