

Mechanics

Process: Tools to Know		Notes	Check Up		
Investigations	☐ I can plan and conduct investigations and design solutions. P.1(A), P.1(B), P.1(C), P.2(D)				
Tools and Equipment	☐ I can use appropriate tools and equipment. P.1(D)				
Information	☐ I can collect and record information. P.1(E), P.1(F)				

Content		Notes	Check Up		
Analyzing Motion	☐ I can analyze different types of motion by generating and interpreting: ☐ position versus time ☐ velocity versus time ☐ acceleration versus time using hand graphing and real time technology. P.5(A)				
	☐ I can describe and analyze motion in one dimension using equations with the concepts of: P.5(C) ☐ distance ☐ displacement ☐ speed velocity ☐ frames of reference ☐ acceleration				
	☐ I can define scalar and vector quantities related to one- and two-dimensional motion. P.5(B)				
	☐ I can combine vectors using both graphical vector addition and the Pythagorean theorem. P.5(B)				
	☐ I can describe and analyze acceleration in uniform circular and horizontal projectile motion in two dimensions using equations. P.5(D)				

(continued)

Mechanics (continued)

Content		Notes	Check Up		
Force Interactions	☐ I can explain and apply the concepts of equilibrium and inertia as represented by Newton's first law of motion using relevant real-world examples. P.5(E)				
	☐ I can calculate the effect of forces on objects, including tension, friction, normal, gravity, centripetal, and applied forces, using free body diagrams and the relationship between force and acceleration as represented by Newton's second law of motion. P.5(F)				
	☐ I can illustrate and analyze the simultaneous forces between two objects as represented in Newton's third law of motion using free body diagrams and in an experimental design scenario. P.5(G)				
Newton's Law of Universal Gravitation	☐ I can describe and calculate, using scientific notation, how the magnitude of force between two objects depends on their masses and the distance between their centers. P.5(H)				
	☐ I can predict the effects on objects in linear and orbiting systems using Newton's law of universal gravitation. P.5(H)				

Process: Ways to Show		Notes	Check Up		
Models/ Information	☐ I can develop and use models/information. P.1(G), P.1(H), P.2(A), P.4(A)				
Data	☐ I can analyze and interpret data. P.2(B), P.2(C)				
Explanations/ Solutions	☐ I can develop and communicate explanations/solutions. P.3(A), P.3(B), P.3(C)				
Science and the Real World	☐ I can connect science with the real world. P.4(B), P.4(C)				

The Nature of Forces

Process: Tools to Know		Notes	Check Up		
Investigations	☐ I can plan and conduct investigations and design solutions. P.1(A), P.1(B), P.1(C), P.2(D)				
Tools and Equipment	☐ I can use appropriate tools and equipment. P.1(D)				
Information	☐ I can collect and record information. P.1(E), P.1(F)				

Content		Notes	Check Up		
Electric and Magnetic Forces	☐ I can use scientific notation and predict how the magnitude of the electric force between two objects depends on their charges and the distance between their centers using Coulomb's law. P.6(A)				
	☐ I can identify and describe examples of electric and magnetic forces and fields in everyday life. P.6(B)				
Conservation of Charge	☐ I can investigate and describe conservation of charge during the processes of: ☐ induction ☐ conduction ☐ polarization using different materials such as electroscopes, balloons, rods, fur, silk, and Van de Graaf generators. P.6(C)				
Electric Circuits	☐ I can analyze, design, and construct series and parallel circuits using schematics and materials such as switches, wires, resistors, lightbulbs, batteries, voltmeters, and ammeters. P.6(D)				
	☐ I can calculate current through, potential difference across, resistance of, and power used by electric circuit elements connected in both series and parallel circuits using Ohm's law. P.6(E)				

Process: Ways to Show		Notes	Check Up		
Models/ Information	☐ I can develop and use models/information. P.1(G), P.1(H), P.2(A), P.4(A)				
Data	☐ I can analyze and interpret data. P.2(B), P.2(C)				
Explanations/ Solutions	☐ I can develop and communicate explanations/ solutions. P.3(A), P.3(B), P.3(C)				
Science and the Real World	☐ I can connect science with the real world. P.4(B), P.4(C)				

Law of Conservation of Energy and Momentum

Process: Tools to Know		Notes	Check Up		
Investigations	☐ I can plan and conduct investigations and design solutions. P.1(A), P.1(B), P.1(C), P.2(D)				
Tools and Equipment	☐ I can use appropriate tools and equipment. P.1(D)				
Information	☐ I can collect and record information. P.1(E), P.1(F)				

Content		Notes	Check Up		
Work and Power	☐ I can calculate and explain work and power in one dimension. P.7(A)				
	☐ I can identify when work is and is not being done by or on a system. P.7(A)				
Mechanical, Potential, and Kinetic Energy	☐ I can investigate and calculate mechanical, kinetic, and potential energy of a system. P.7(B)				
Conservation of Energy	☐ I can apply the concept of conservation of energy using the work-energy theorem, energy diagrams, and energy transformation equations, including transformations between kinetic, potential, and thermal energy. P.7(C)				
Momentum	☐ I can calculate and describe the impulse and momentum of objects in physical systems such as automobile safety features, athletics, and rockets. P.7(D)				
	☐ I can analyze the conservation of momentum qualitatively in inelastic and elastic collisions in one dimension using models, diagrams, and simulations. P.7(E)				

Process: Ways to Show		Notes	Check Up		
Models/Information	☐ I can develop and use models/information. P.1(G), P.1(H), P.2(A), P.4(A)				
Data	☐ I can analyze and interpret data. P.2(B), P.2(C)				
Explanations/Solutions	☐ I can develop and communicate explanations/solutions. P.3(A), P.3(B), P.3(C)				
Science and the Real World	☐ I can connect science with the real world. P.4(B), P.4(C)				

Characteristics and Behavior of Waves

Process: Tools to Know		Notes	Check Up		
Investigations	☐ I can plan and conduct investigations and design solutions. P.1(A), P.1(B), P.1(C), P.2(D)				
Tools and Equipment	☐ I can use appropriate tools and equipment. P.1(D)				
Information	☐ I can collect and record information. P.1(E), P.1(F)				

Content		Notes	Check Up		
Behavior of Waves	☐ I can investigate behaviors of waves, including reflection, refraction, diffraction, interference, standing wave, the Doppler effect and polarization and superposition. P.8(D)				
	☐ I can examine and describe simple harmonic motion such as masses on springs and pendulums and wave energy propagation in various types of media such as surface waves on a body of water and pulses in ropes. P.8(A)				
Characteristics of Waves	☐ I can investigate and analyze characteristics of waves, including velocity, frequency, amplitude, and wavelength, and calculate using the relationships between wave speed, frequency, and wavelength. P.8(C)				
Transverse and Longitudinal Waves	☐ I can compare the characteristics of transverse and longitudinal waves, including electromagnetic and sound waves. P.8(B)				

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Characteristics and Behavior of Waves (continued)

Content		Notes	Check Up		
Electromagnetic Spectrum	☐ I can compare the different applications of the electromagnetic spectrum, including radio telescopes, microwaves, and x-rays. P.8(E)				
	☐ I can investigate the emission spectra produced by various atoms and explain the relationship to the electromagnetic spectrum. P.8(F)				
Image Formation	☐ I can describe and predict image formation as a consequence of reflection from a plane mirror and refraction through a thin convex lens. P.8(G)				

Process: Ways to Show		Notes	Check Up		
Models/ Information	☐ I can develop and use models/information. P.1(G), P.1(H), P.2(A), P.4(A)				
Data	☐ I can analyze and interpret data. P.2(B), P.2(C)				
Explanations/ Solutions	☐ I can develop and communicate explanations/solutions. P.3(A), P.3(B), P.3(C)				
Science and the Real World	☐ I can connect science with the real world. P.4(B), P.4(C)				

Quantum Phenomena

Process: Tools to Know		Notes	Check Up		
Investigations	☐ I can plan and conduct investigations and design solutions. P.1(A), P.1(B), P.1(C), P.2(D)				
Tools and Equipment	☐ I can use appropriate tools and equipment. P.1(D)				
Information	☐ I can collect and record information. P.1(E), P.1(F)				

Content		Notes	Check Up		
Nature of Light	☐ I can describe the photoelectric effect and emission spectra produced by various atoms and how both are explained by the photon model for light. P.9(A)				
	☐ I can compare and explain how superposition of quantum states is related to the wave-particle duality nature of light. P.9(C)				
Malus's Law	☐ I can investigate Malus's Law and describe examples of applications of wave polarization, including 3-D movie glasses and LCD computer screens. P.9(B)				
Quantum Phenomena	☐ I can give examples of applications of quantum phenomena, including: P.9(D) ☐ the Heisenberg uncertainty principle ☐ quantum computing ☐ cybersecurity				

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Models/Information	☐ I can develop and use models/information. P.1(G), P.1(H), P.2(A), P.4(A)				
Data	☐ I can analyze and interpret data. P.2(B), P.2(C)				
Explanations/Solutions	☐ I can develop and communicate explanations/solutions. P.3(A), P.3(B), P.3(C)				
Science and the Real World	☐ I can connect science with the real world. P.4(B), P.4(C)				