

PASCO
Education

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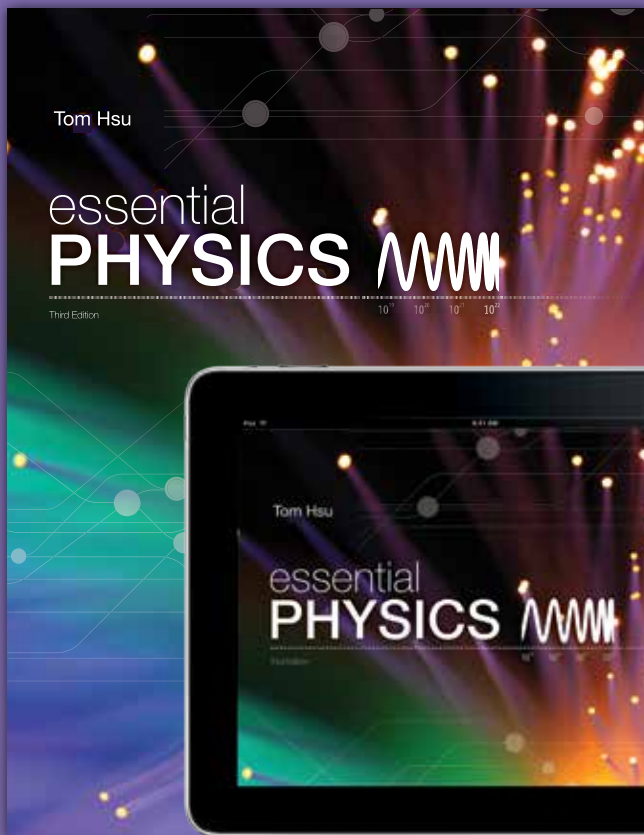
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essential PHYSICS



3rd Edition

List of Investigations



89

total investigations

Chapter 1: Science of Physics

Investigation	Page #	Number	Equipment Package*
Graphs of Motion	5	1A	B, S, C
Musical Sounds	7	1B	Simulation
RGB Color Matching	22	1C	Simulation

Chapter 2: Physical Quantities and Measurement

Investigation	Page #	Number	Equipment Package*
Indirect Measurement, Estimation & Scale	49	2A	
Graphical Relationships	58	2B	Simulation
Algebraic Relationships	61	2C	Simulation

Chapter 3: Position and Velocity

Investigation	Page #	Number	Equipment Package*
Displacement	74	3A	Simulation
Motion Graphs	85	3B	B, S, C, Simulation

Chapter 4: Acceleration

Investigation	Page #	Number	Equipment Package*
Acceleration	112	4A	B, S, C
A Model for Accelerated Motion	115	4B	B, S, C, Simulation

Chapter 5: Forces and Newton's Laws

Investigation	Page #	Number	Equipment Package*
Newton's Second Law	145	5A	B, S, C
Hooke's Law	149	5B	B, S, C
Static and Kinetic Friction	156	5C	B, S, C

Chapter 6: Motion in Two and Three Dimensions

Investigation	Page #	Number	Equipment Package*
Vector Navigation	179	6A	Simulation
Projectile Motion	187	6B	Simulation
Acceleration on an Inclined Plane	191	6C	B, S, C
Graphing Motion on an Inclined Plane	194	6D	Simulation

Chapter 7: Circular Motion

Investigation	Page #	Number	Equipment Package*
Circular Motion	209	7A	Simulation
Orbits	218	7B	Simulation
Extrasolar Planets	220	7C	Simulation

Chapter 8: Static Equilibrium and Torque

Investigation	Page #	Number	Equipment Package*
Static Equilibrium	240	8A	C, Simulation
Structural Design	247	8B	Simulation

* Equipment Packages: B = Basic Equipment Package; S = Standard Equipment Package; C = Comprehensive Equipment Package

Chapter 9: Work and Energy

Investigation	Page #	Number	Equipment Package*
Work and the Forces vs Distance Graph	261	9A	B, S, C

Chapter 10: Conservation of Energy

Investigation	Page #	Number	Equipment Package*
Inclined Plane & the Conservation of Energy	284	10A	B, S, C, Simulation
Work and Energy	289	10B	B, S, C
Springs and the Conservation of Energy	293	10C	B, S, C
Work Done Against Friction	296	10D	B, S, C

Chapter 11: Momentum and Collisions

Investigation	Page #	Number	Equipment Package*
Conservation of Momentum	315	11A	B, S, C
Inelastic Collisions	322	11B	B, S, C
Elastic Collisions	324	11C	B, S, C, Simulation

Chapter 12: Machines

Investigation	Page #	Number	Equipment Package*
Levers	336	12A	C
Pulleys	341	12B	C
Ramps and Inclined Planes	348	12C	B, S, C

Chapter 13: Angular Momentum

Investigation	Page #	Number	Equipment Package*
Rotational Inertia	368	13A	
Conservation of Angular Momentum	371	13B	Simulation
Center of Mass	373	13C	
Rolling Down an Inclined Plane	379	13D	

Chapter 14: Harmonic Motion

Investigation	Page #	Number	Equipment Package*
Oscillators	393	14A	C, Simulation
Damping and Shock Absorbers	397	14B	Simulation
Resonance	404	14C	C, Simulation

Chapter 15: Waves

Investigation	Page #	Number	Equipment Package*
Waves	413	15A	C, Simulation
Wave Interactions	421	15B	Simulation
Interference	429	15C	C
Wavelength and Standing Waves	432	15D	Simulation

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Chapter 16: Sound

Investigation	Page #	Number	Equipment Package*
Sound Waves	443	16A	Simulation
Doppler Effect	449	16B	Simulation
How Sound Carries Information	455	16C	Simulation
Resonance and Sound	460	16D	C

Chapter 17: Electricity and Circuits

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Circuits and Breadboards	476	17A	S, C
Voltage and Batteries	478	17B	S, C
Resistors and Ohm's Law	487	17C	S, C
Series and Parallel Circuits	494	17D	S, C
Electrical Power	498	17E	S, C
Compound Circuits	502	17F	S, C

Chapter 18: Electric and Magnetic Fields

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Magnetic Force Between Magnets	516	18A	S, C
Magnetic Force Around a Magnet	520	18B	Simulation
Static Electricity on Transparent Tape	526	18C	
Electric Field and Electric Force	532	18D	Simulation

Chapter 19: Electromagnetism

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Build an Electromagnet	554	19A	
Electric Motor	556	19B	Simulation
Build a Paper Clip Motor	570	19C	S, C

Chapter 20: Light and Reflection

Investigation	Page #	Number	Equipment Package*
Magnification of Mirrors and Lenses	590	20A	C
Reflection in a Plane Mirror	595	20B	C
Image Formation for Curved Mirrors	602	20C	Simulation

Chapter 21: Refraction and Lenses

Investigation	Page #	Number	Equipment Package*
Refraction of Light	611	21A	C
Creating Real and Virtual Images with Lenses	617	21B	C
Image Formation for a Convex Lens	620	21C	C, Simulation
Build a Microscope and a Telescope	626	21D	C, Simulation

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Chapter 22: Electromagnetic Radiation

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Color, Frequency, and Wavelength of Light	638	22A	Simulation
Detect Infrared Radiation with a Prism	644	22B	C
Photoelectric Effect	655	22C	Simulation

Chapter 23: Properties of Matter

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Specific Heat of Water and Steel	675	23B	
Pressure of an Ideal Gas	680	23C	Simulation

Chapter 24: Heat Transfer

Investigation	Page #	Number	Equipment Package*
Heat Transfer	708	24A	Simulation
Visualizing Convection	717	24B	

Chapter 25: Thermodynamics

Investigation	Page #	Number	Equipment Package*
Heat Engines	748	25A	Simulation

Chapter 26: Quantum Physics and the Atom

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Rutherford Scattering Experiment	759	26A	Simulation
Phosphorescence	766	26B	
Energy Levels of the Hydrogen Atom	770	26C	Simulation
Identifying Elements Using Spectroscopy	772	26D	Simulation

Chapter 27: Nuclear Physics

Investigation	Page #	Number	Equipment Package*
Controlling a Nuclear Fission Reaction	815	27A	Simulation

Design Projects/Investigations

Investigation	Page #	Project or Challenge	Equipment Package*
Solar Array	28	Design Project	Simulation
Design a Crash Barrier	11	Design Project	B, S, C
Design a Wind Turbine Power Plant	357	Design Challenge	Simulation
Design a Musical Instrument	462	Design Challenge	
Design a Lemon Battery	480	Design Challenge	S, C
Design a Rube Goldberg Machine	558	Design Challenge	
Design a Pinhole Camera	586	Design Challenge	
Design an Infrared Pulse Monitor	775	Design Challenge	

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