





American Association of **Physics Teachers**



catalog for the 2008-2009 academic year

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American Association of Physics Teachers

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2008–2009 Catalog

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The American Association of Physics Teachers is a nonprofit organization whose mission is to enhance the understanding and appreciation of physics through teaching.

Strengthening Physics Education Supporting Physics Educators



Apparatus for Teaching Physics (0P-65)



Members: \$30.50

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Demonstration Experiments in Physics (0P-70)

A reprint of the classic work by Richard Manliffe Sutton, this book is a must-have for anyone who does physics demonstrations. Illustrations and explanations of each demonstration are done in an easy-to-understand format. Each can be used as a demonstration or as a hands-on experiment. Most are easily upgraded to modern equipment and uses. A "cookbook" for teachers of physics, with recipes for the preparation of demonstration experiments to illustrate the principles that make physics so fascinating. (545 pp.) ISBN 1-931024-05-7 @2003

"I hope this 2003 reprint initiated by PIRA and carried out by AAPT of the 1938 classic work sparks a trend in getting these texts into the hands of new teachers."

— John L. Hubisz

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A Demonstration Handbook for Physics (0P-40)

Members: \$25

Created as a guide for high school and college physics teachers, this handbook contains hundreds of apparatus demonstrations that require only low-cost, everyday materials. Edited by G.D. Freier and F. J. Anderson. (320 pp.) ISBN 0-917853-32-6 ©1981

Members: \$30.50

Nonmembers: \$38

Nonmembers: \$30



Hands-On Physics Activities (NB-36)

This comprehensive collection of nearly 200 investigations, demonstrations, mini-labs, and other activities uses everyday examples to make physics concepts easy to understand. Units of study include: measurement, energy and momentum, motion, force, pressure, light, waves, and electromagnetism. Easy-to-follow lesson format comes with complete answer keys and detailed explanations suitable for new physics teachers. Written by James Cunningham and Norman Herr. (657 pp.) ISBN 0-87628-845-X ©1994



Best Seller!

Members: \$26

Nonmembers: \$32.95

Demonstrations & Experiments



Best Seller!

Interactive Physics Demonstrations (0P-66)

This book contains 46 free-standing fun physics experiments you can try with your class. Compiled from columns in *The Physics Teacher*, the demonstrations, suitable for a school hallway or corner of your classroom, will help students understand physics through the active exploration of specific physics concepts, from mechanics and heat, vibrations and waves, electrostatics, to optics and chaos. Edited by Joe Pizzo. (152 pp.) ISBN 1-931024-00-6 ©2001

Members: **\$24**

Nonmembers: \$31

AAPT Press



AAPT Member-Only Item

Kinetic Books' Virtual Physics Labs (NVT-11)

This DVD contains virtual labs covering topics ranging from one-dimensional motion to special relativity and will augment any physics teacher's toolkit. Students can discover the principles of orbits and conduct a mission to Mars, see wave superposition and create stringed instruments and more. Contains 16 virtual labs, each one taking 45 to 60 minutes to complete.

Member Only Price: \$29.95 **\$23.95** (Save \$6)

Nonmembers: Contact Kinetic Books at www.kineticbooks.com for pricing information.

Optics Demonstrations with the Overhead Projector (NB-19)

From the Optical Society of America, this book guides instructors in how to use a commonplace, inexpensive overhead projector to demonstrate principles of optics. Demonstration topics include: monochromatic and polychromatic ray optics, radiometry and photometry, moire, scattering, fluorescence, interference colors, the grating, the spectroscope, color. (350 pp.) ISBN 1-55752-650-8 ©2000

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Members: **\$20**

Nonmembers: \$25

Best Seller!

Physics Demonstrations: A Sourcebook for Teachers (NB-47)

Comes with 2 DVDs! Julien Clinton Sprott, physics professor at the University of Wisconsin, shares demonstrations tested by years of teaching in his popular lecture series, "The Wonders of Physics." Physics teachers at all levels will find a wealth of detail showing how to present these demonstrations to students with flair. Organized to teach the six major areas of classical physics. Includes 85 demonstrations. (290 pp.) hardcover ISBN: 0-299-21580-6 ©2006

Members: **\$36**

Nonmembers: \$45









Best Seller!

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String and Sticky Tape Experiments (0P-58)

Members: \$33



This handbook describes physics experiments that are constructed with only the simplest and least expensive materials: rubber bands, tape, paper clips, chalk, etc. The experiments, though simple, demonstrate fundamental physics laws in a practical way. The experiments are divided into 11 sections: mechanics, properties of matter, hydrodynamics, heat, wave motion, light, sound, atomic and nuclear physics, solid state and crystallography, electrostatics, and magnetism. Each experiment is rated by difficulty level (elementary, high school, and university), and includes illustrations. Edited by Ronald Edge. (448 pp.) ISBN 0-917853-28-8 ©1987

Nonmembers: \$42.50



Turning the World Inside Out and 174 Other Simple Physics Demonstrations (NB-13)

Robert Ehrlich gives us a collection of physics demonstrations that illustrate key concepts in physics in simple and playful ways yet cost little to produce. They use everyday items: for example, raw eggs thrown with full force at a sheet but not breaking illustrates Newton's second law, f = ma. The reflection off a glass Christmas tree ball is the focus of an explanation on "turning the world inside out." Each demo gives the objective, equipment needed, and procedures. (216 pp.) ISBN 0-691-02395-6 ©1990

"Dipping into this collection is much like opening a holiday gift and discovering a marvelous little toy that then holds your attention by some curious performance.... This book precisely reflects the way science education should be, especially at the introductory level." —*Jearl Walker*, author of *The Flying Circus of Physics*



Why Toast Lands Jelly-Side Down: Zen and the Art of Physics Demonstrations (NB-03)

Robert Ehrlich recognizes that physics is often perceived as being highly abstract, userunfriendly, and remote from everyday life. In this book, he provides a collection of simple physics demonstrations and experiments that will be extraordinarily useful to teachers and extremely instructive to students. Filled with learning opportunities, the book is an essential resource for teachers and students. (196 pp.) ISBN 0-691-02887-7 ©1997



Members: **\$16**

Members: \$19

Nonmembers: \$19.95

Nonmembers: **\$ 23.95**



200 Puzzling Physics Problems (NB-39)

Why do the bubbles in champagne accelerate? Find out in *200 Puzzling Physics Problems*—It is problem number 200! Including helpful hints and solutions, the book is intended for physics teachers and students in intermediate or advanced physics classes. Written by P. Gnädig, G. Honyek, and K.F. Riley, *200 Puzzling Physics Problems* will give students practice in applying the laws of physics to practical situations. The mathematical prerequisites do not go beyond elementary calculus. Even some physics professors will find the more difficult questions challenging. (257 pp.) ISBN 0-521-77480-2 ©2002



Members: **\$38**

Nonmembers: \$48

Back-of-the-Envelope Physics (NB-33)

This compilation of 101 examples of back-of-the-envelope calculations celebrates a quantitative approach to solving physics problems. Drawing on a lifetime of physics research and nearly three decades as the editor of The Physics Teacher, Clifford Swartz provides simple, approximate solutions to physics problems that span a broad range of topics. What note do you get when you blow across the top of a Coke bottle? Could you lose weight on a diet of ice cubes? (155 pp.) ISBN 0-8018-7263-4 ©2007

"This book is a treasure trove of fascinating calculations covering a wide range of physical principles, distance scales, and numerical orders of magnitude. Everyone with some curiosity about the natural world, from novice students to seasoned veterans, will find a variety of interesting cases in this wonderful collection."

-Gregory N. Derry, author of What Science Is and How It Works

Members: \$19 Nonmembers: \$23

About the Author

Clifford E. Swartz, emeritus physics professor at Stony Brook University in New York, was editor of *The Physics Teacher* for 30 years and winner of the Melba Newell Phillips Award from AAPT in 2007. His book, *Used Math*, is our best seller for teachers and their students. A prolific author and poet, Swartz's books are scattered throughout this catalog—all of them very popular.

Brainteaser Physics: Challenging Physics Puzzlers (NB-54)

Does a glass of ice water filled to the brim overflow when the ice melts? Does the energy inside a sauna increase when you heat it up? What's the best way to cool your coffee—adding the creamer first or last? These and other challenging puzzlers provide a fresh—and fun—approach to learn-ing real physics. Presenting both classic and new problems, *Brainteaser Physics* challenges readers to use imagination and basic physics principles to find the answers. Göran Grimvall, professor of physics at the Royal Institute of Technology in Stockholm, provides detailed and accessible explanations of the solutions, sometimes correcting the standard explanations, sometimes putting a new twist on them. (176 pp.) ISBN 978-0-8018-8512-9 ©2003

Quantoons (NB-45)

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This book is a compilation of 58 contest problems that were published in *Quantum* magazine between 1991 and 2001. NSTA's publication of *Quantum* was co-sponsored by AAPT. Enjoy this fun book with illustrations by Tomas Bunk and physics explanations by AAPT Past President Larry Kirkpatrick and Arthur Eisenkraft. *Quantoons* combines challenging physics problems with wild illustrations, mixing Isaac Newton and Marie Antoinette with Romeo, Juliet, and Einstein. *Quantoons* is a one-of-a-kind source of brain-teasing challenges and hours of entertainment for scientists, students, and yourself. (243 pp.) ISBN: 978-0-87355-265-3 ©2005



Members: \$22

Members: \$19

Nonmembers: \$27.95

Nonmembers: \$23



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Best Seller!

Amusement Park Physics (0P-62)



Edited by Carole Escobar. The AAPT Amusement Park Physics Handbook Committee collected the various educational materials written and circulated by individual teachers and created this complete handbook for amusement park physics. Amusement Park Physics presents all the information you need both to plan a trip to a park and to use the physics of amusement park rides in your classes. Includes a teacher's guide, practice problems, information on accelerometers, a measurement reference, laboratory exercises, reproducible student worksheets, and reprinted resource articles. Answer key provided. (112 pp.) ISBN 0-917853-53-9 ©1994

The Flying Circus of Physics with Answers, 2nd Ed. (NB-50)

Completely updated and expanded, this second edition of Jearl Walker's best-selling text features more than 700 intriguing questions about relevant, fun, and completely real phenomena-like Frisbees, sound of thunder, rainbows, sand dunes, and soap bubbles. And they involve familiar objects considered in imaginative, unconventional ways—rubber bands, ski goggles, water pipes, eggs, teapots, and Coke bottles. (323 pp.) ISBN 0-471-76273-3 ©2006



Members: \$20

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Nonmembers: \$34

The Physics of Football (NB-42)

Written by Timothy Gay, this fascinating book uses football's legendary plays to illustrate the dynamics of blocking and tackling, kicking and passing and more. Your students will learn about the struggle at the line of scrimmage, the role of padding, artificial turf, and the decibels of sound from the home crowd. (290 pp.) ISBN 1-57954-911-X ©2004

"The Physics of Football is great fun. It taught me more about football than 50 years of watching the game."- Robert Adair, author The Physics of Baseball

Members: \$11

Nonmembers: \$13.95



The Physics of Baseball, 3rd ed. (NB-37)

In this popular book, Robert Adair examines what a baseball or a baseball player in motion does-and why. How fast can a batted ball go? What effect do the stitch patterns have on wind resistance? How far does a curveball break? This third edition considers recent developments in the science of the sport. Faster pitchers, longer hitters, and enclosed stadiums are all examined. (169 pp.) ISBN 0-06-008436-7 ©2002

"An absolutely wonderful compendium."- George Plimpton



Members: \$10

Nonmembers: \$12.95



The Physics of Basketball (NB-53)

Drain three pointers, slam dunk easily, and sink that buzzer beater from half court with the help of simple science. Physicist John J. Fontanella makes physics come alive as you see how Kobe Bryant, Wilt "the Stilt" Chamberlain, Michael Jordan, Becky Hammon, and J.J. Reddick do naturally the things that Isaac Newton says they should. With photographs and simple high school formulas, U.S. Naval Academy physics professor Fontanella reveals the key pieces of physics that underscore basketball. (168 pp.) hardcover. ISBN 978-0-8018-8513-6 ©2006



Members: **\$20**

Nonmembers: \$25

The Physics of Hockey (NB-48)

What do Wayne Gretzky and thermodynamics have in common? A lot more than you might think. The game the National Hockey League calls "the coolest game on Earth" is also a fast-paced, dynamic display of physics in action. In *The Physics of Hockey*, physicist and amateur hockey player Alain Haché examines some of the physical principles behind this popular winter sport. What makes ice so slippery you can skate on it? Haché investigates the properties of the ice, the science of skating and skates, the odds of winning and losing streaks, and the principles behind shooting, hitting, and goaltending. (184 pp.) hardcover. ISBN: 0-8018-7071-2 ©2002

Members: \$21.95

Nonmembers: **\$26.95**

First Time in Our Catalog!

The Physics of NASCAR (NB-71)

In this fast-paced investigation into the adrenaline-pumping world of NASCAR, a physicist with a passion uncovers what happens when the rubber hits the road and 800-horsepower vehicles compete at 190 miles per hour only inches from one another. Diandra Leslie-Pelecky, an AAPT member, reveals how and why drivers trust the engineering and science their teams literally build around them not only to get them across the finish line in first place, but also to keep them alive. (286 pp.) hardcover. ISBN: 978-0525950530 © 2008

Members: \$19.50

Nonmembers: \$25.95

Float Your Boat! The Evolution and Science of Sailing (NB-65)

Boaters and students alike will find intelligent and understandable answers to such questions as: How do you increase the speed of a boat? How do sailboats travel into the wind? Why are so many explanations of sailing so wrong? Sailing enthusiast and physicist Mark Denny traces the evolution of the sailing craft, from prehistoric coracles made of animal skins and antlers to the sailboat's reinvention as a pleasure craft during the Industrial Revolution. (224 pp.) hardcover. ISBN: 978-0801890093 © 2008 (Available in mid-October 2008)



Members: \$20.50

Nonmembers: \$26.95











How Everything Works: Making Physics Out of the Ordinary (NB-55)

A user's manual for our everyday world. Louis Bloomfield explains the physics behind the ordinary objects and natural phenomena all around us, and unravels the mysteries of how things work. Topics include how do microwave ovens cook food, how does an iPod use numbers to represent music, how do CDs and DVDs use light to convey information and why are they so colorful, how can a CT or MRI image show a cross-sectional view of a person without actually entering the body, why is the Sun red at sunset and sunrise? (736 pp.) ISBN 978-0-470-17066-3 ©2007



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Members: \$19.95

Nonmembers: \$24.95

Nonmembers: \$28

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How Things Work (0P-60)

Beginning in 1983, Dick Crane told readers "How Things Work" in his monthly column in *The Physics Teacher*. In this collection of 70 of his column articles, Crane deals with topics from toys to spider webs, gasoline pumps to traffic lights. In doing so, he simplifies for us the complex physics principles of devices and phenomena found in everyday life. Many photographs and sketches are found throughout the book. (114 pp.) ISBN 0-917853-44-X ©1994



The Isaac Newton School of Driving (NB-34)

Members: \$22

At the Isaac Newton school of driving every car is a laboratory on wheels and every drive an exciting journey into the world of physics. The author's first lesson describes the basic physics of driving: speed and acceleration; why you get thrown forward while braking or outward while turning; and why car advertisements boast about horsepower and torque. Whether you or your students drive a Pacer or a Porsche, *The Isaac Newton School of Driving* offers better—and better informed—driving through physics. Written by Barry Parker, professor emeritus of physics. (250 pp.) ISBN 0-8018-7417-3 ©2003

Members: \$21.95

Nonmembers: \$26.95



Physics of Sports (NB-48)

This collection of reprinted articles and accompanying resource letters takes a look at today's popular sports—tennis, basketball, and track and field—and presents the physics involved. Edited by C. Frohlich. (124 pp.) ISBN 0-917853-24-5 ©1986

Members: \$21

Nonmembers: \$26.95



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First Time in Our Catalog!

Don't Try This at Home—The Physics of Hollywood Movies (NB-72)

Here comes a fresh look at the basics of physics through the filmmaker's lens. Written by physics teacher Adam Weiner, the book deconstructs, demystifies, and debunks popular Hollywood films through the scientific explanations of the action genre's most dynamic and unforgettable scenes. (272 pp.) ISBN: 978-1419594069 © 2007

Sample movie sequence and related physics concepts: In "Speed," a city bus going more than 50 mph jumps over a 50-foot chasm—successfully. An examination of force, acceleration, Newton's Laws, impulse, momentum, and projectile motion follows.

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The Numbers Behind NUMB3RS: Solving Crime with Mathematics (NB-64)

Using the popular CBS prime-time TV crime series "Numb3rs" as a springboard, Keith Devlin (known as "the Math Guy" on NPR's Weekend) and Gary Lorden (the principal math adviser to "Numb3rs") explain real-life mathematical techniques used by the FBI and other law enforcement agencies to catch and convict criminals. Devlin and Lorden present compelling cases that illustrate how advanced mathematics can be used in state-of-the-art criminal investigations. (256 pp.) ISBN: 978-0452288577 © 2007

Global Warming (RB-66)

This collection of reprinted articles, edited by John W. Firor, probes the varied theories behind the gradual increase in global temperature. Topics covered include the increase of CO_2 in the atmosphere, the relationship between the air and the sea, and the repercussions of the prehistoric ice ages. (162 pp.) ISBN 0-917853-59-8 ©1995



Members: **\$12**

Nonmembers: **\$15**

Nonmembers: \$14

Musical Acoustics (RB-51)

This second volume of *Musical Acoustics* will be welcomed by readers who enjoyed the popular first version. Reprint articles included in this volume cover the perception of musical tones, and string, percussion, wind, and electronic musical instruments, along with chapters on the physics of organ pipes and formant technique in a professional female singer. Digital audio sound is also covered. Edited by Thomas D. Rossing. (227 pp.) ISBN 0-917853-30-X ©1988

Members: \$14

Nonmembers: \$18











AAPT Press





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First Time in Our Catalog!



The Quantum World: Quantum Physics for Everyone (NB-70)

As AAPT member Kenneth W. Ford shows us in *The Quantum World*, the laws governing the very small and the very swift defy common sense and stretch our minds to the limit. Drawing on a deep familiarity with the discoveries of the 20th century, Ford gives an appealing account of quantum physics that will help the serious reader make sense of a science that, for all its successes, remains mysterious. With strikingly clear writing, and with engaging illustrations by Paul Hewitt, *The Quantum World* imparts a sense of wonder and a knowledge of the strange laws governing the atoms, nuclei, and fundamental particles that inhabit the quantum world. (304 pp.) ISBN: 978-0674018327 © 2005

Members: **\$13.50**

Nonmembers: **\$17.95**

Nonmembers: \$29.95



The Road to Reality—A Complete Guide to the Laws of the Universe (NB-62)

Noted scientist Roger Penrose presents a comprehensive and comprehensible account of the physics of the universe. From the very first attempts by the Greeks to grapple with the complexities of our known world to the latest application of infinity in physics, *The Road to Reality* carefully explores the movement of the smallest atomic particles and reaches into the vastness of intergalactic space. Here, he examines the mathematical foundations of the physical universe, exposing the underlying beauty of physics and giving us one of the most important works in modern science writing. Roger Penrose is Emeritus Rouse Ball Professor of Mathematics at Oxford University. (1,136 pp.) ISBN 978-0-679-77631-4 © 2000



The Interplay Between Classical and Quantum Mechanics (RB-73)

Members: \$25.95

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The articles in this collection give an idea of the recent work in the basic problems of mechanics, particularly when a judicious combination of classical and quantum mechanics can help us understand and work out the solutions. This approach is new when the behavior of the system is chaotic in the classical regime, and leads directly to the idea of quantum chaos. Many problems in nuclear, atomic, and molecular physics are treated in this way, but also resonances in optical, electromagnetic, and acoustic cavities as well as in mesoscopic devices. Edited by Martin C. Gutzwiller. (162 pp.) ISBN 0-917853-98-9 ©2001



Members: **\$20**

Nonmembers: \$25



Powers of Ten: The Films of Charles and Ray Eames, Vol.1 (NVT-01-DVD)

This cinematic classic by Charles & Ray Eames opens at a lakeside picnic in Chicago and draws back in perspective by order of magnitudes of ten, every ten seconds, until the Milky Way is a dot of light lost amidst an unimaginably large universe, then reverses the journey, ending inside the proton of a carbon atom. The film, narrated by Phil Morrison, starts with a set of pictures of two picnickers in a park. The area of each frame is one-tenth the size of the one before. Starting from a view of the entire known universe, the camera gradually zooms in until we are viewing the subatomic particles on a man's hand. DVD



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First Time in Our Catalog!

Physics of the Impossible (NB-69)

A fascinating exploration of the science of the impossible—from death rays and force fields to invisibility cloaks—revealing to what extent such technologies might be achievable decades or millennia into the future. One hundred years ago, scientists would have said that lasers, televisions, and the atomic bomb were beyond the realm of physical possibility. In *Physics of the Impossible*, Michio Kaku, a renowned physicist and AAPT's 2008 Klopsteg Award winner, explores to what extent the technologies and devices of science fiction that are deemed equally impossible today might well become commonplace in the future. (352 pp.) hardcover. ISBN 978-0-385-52069-0 © 2008

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Very Special Relativity: An Illustrated Guide (NB-68)

Einstein's Special Theory of Relativity radically changed our understanding of the world. In 1905. Our struggle with Einstein's counterintuitive explanation of these concepts was under way. In this book Sander Bais has found an original and uniquely effective way to convey the fundamental ideas of Einstein's Special Theory. Using a series of easy-to-follow diagrams and employing only elementary high school geometry, Bais conducts readers through the quirks and quandaries of such fundamental concepts as simultaneity, causality, and time dilation. (144 pp.) hardcover. ISBN: 978-0674026117 © 2007

Members: **\$15.95** Nonme

Nonmembers: \$20.95

Bang! The Complete History of the Universe (NB-66)

Written by the founding guitarist from Queen, Brian May, astronomer Patrick Moore, and astrophysicist Chris Lintott, *Bang!* considers the history of the universe from the Big Bang to Heat Death. Space, time, and matter were birthed 13.7 billion years ago and will continue on longer than we are able to comprehend. *Bang!* explains how it all started, takes you on a tour of what is known about the evolution of the universe, and posits how the end of time will come about. This fascinating book includes photographs, short biographies of key figures, an at-a-glance timeline, a glossary of terms, and suggested resources for further exploration. (170 pp.) hardcover. ISBN: 978-0801889851 © 2008

Members: **\$22.50**

Nonmembers: **\$29.95**

Guesstimation: Solving the World's Problems on the Back of a Cocktail Napkin (NB-63)

TPT Fermi Questions column editor Larry Weinstein and John A. Adam present an eclectic array of estimation problems ranging from the devilishly simple to the sophisticated, from serious world concerns to the downright silly. Example: How long would it take a running faucet to fill the inverted dome of the Capitol? (320 pp.) ISBN: 978-0691129495 © 2008

"*Guesstimation* is a delightful book that, page after page, gleams with insight into the measure of all things—from house pets to lottery tickets and from the kitchen to the cosmos. Meanwhile, the authors cleverly teach you some fundamental chemistry, physics, and biology, leaving you enlightened and curiously comfortable with all that once seemed intractable in the world."

-Neil deGrasse Tyson, Hayden Planetarium and Department of Astrophysics



Members: **\$15**

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History of Physics (RB-50)



Thirteen articles by leading historians of science provide a sampling of contemporary historical studies of major discoveries and theories in physics from Galileo to Einstein. This reprint book includes an annotated bibliography of more than 200 publications (with indications of those articles suitable for student reading). Edited by Stephen G. Brush. (235 pp.) ISBN 0-917853-29-6 ©1988

Members: **\$22.50**

Nonmembers: **\$28.50**



Physics History from AAPT Journals I (0P-54)

Edited by Melba Phillips. Articles of historical significance are taken from 50 years of the *American Journal of Physics* and *The Physics Teacher* to compile this physics history collection. The book contains 27 articles of interest to physics teachers and students at the high school or college level. All the articles contain references for further reading. (240 pp.) ISBN 0-917853-14-8 ©1985



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Members: **\$19.50**

Nonmembers: \$24.50



Physics History from AAPT Journals II (0P-64)

Dedicated to Melba Phillips, this book is the second volume of selected articles from the *American Journal of Physics* and *The Physics Teacher*. It contains 36 articles of particular interest to teachers and students at the high school or introductory college level, and also includes an appendix listing all articles of historical interest published in *AJP* and *TPT* from the journals' beginnings through 1994. Edited by A.P. French and Thomas B. Greenslade, Jr. (238 pp.) ISBN 0-917853-58-X ©1995

Members: **\$19.50**

Nonmembers: \$24.50



What's the Matter? Readings in Physics (NB-56)

Physics in the words of the great physicists themselves, with a foreword by Alan Lightman, author of *Einstein Dreams*. The latest in the Great Books Foundation's series of science anthologies, *What's the Matter* will engage your students in lively classroom discussions about the big ideas that underlie textbook concepts. With 31 primary source selections, writings include those from Albert Einstein, Richard Feynman, Galileo, Stephen Hawking, James Clerk Maxwell, and Isaac Newton. Each selection is accompanied with notes that place the writer's work in its historical context, and also suggested questions for discussion. (560 pp.) ISBN 1-880323-91-5 ©2007



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Members: \$29.95

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First Time in Our Catalog!

Stephen Hawking: A Biography (NB-67)

Stephen Hawking is arguably the most famous physicist since Albert Einstein. His decades-long struggle with ALS (Lou Gehrig's disease), combined with his singular brilliance as a cosmologist, has fascinated both the public and his colleagues in science. In this biography, physicist and astronomer Kristine Larsen presents a candid and insightful portrait of Hawking's personal and professional life. Avoiding the hero-worship sometimes found in popular works on Hawking, Larsen emphasizes that Hawking is first and foremost a scientist whose work has made significant contributions to our understanding of the nature and origins of the universe. (215 pp.) ISBN: 978-1591025740 © 2005

Members: \$12.50 Nonme

Nonmembers: **\$16.95**

AAPT Exclusive!

The World of Enrico Fermi (NVT-12)

The World of Enrico Fermi: People and Particles DVD contains rare footage of eminent physicist Enrico Fermi and his research teams and colleagues. This recording has been produced in a limited edition and is distributed exclusively by AAPT in arrangement with Project Physics, Inc. All proceeds from the sale of this DVD will go to support the F. James Rutherford Endowment. (No volume discounts.)

Members: \$15.99

Nonmembers: \$19.99





Best Seller!

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Used Math (OP-59)



Nonmembers: \$34

AAPT Press

Used Math, by Clifford E. Swartz, is a reference work for the college science instructor or student in search of a quick explanation of the mathematics found in the first two years of the college science curriculum. The book provides numerous examples that are drawn from actual situations encountered in science courses. The book covers a broad range of subjects, including reporting and analyzing uncertainty, units and dimensions, graphs, the simple functions of applied math, statistics, quadratic and high power equations, and simultaneous equations. Other chapters are devoted to determinants, vectors, complex numbers, calculus-differentiation, integration, series and approximations, common differential equations, and differential operators. The book contains many useful reference tables and summaries of formulas and techniques. (264 pp.) ISBN 0-917853-50-4 ©1993

What the Best College Teachers Do (NB-61)

Members: \$27

What makes a great teacher great? Who are the professors students remember long after graduation? This book, the conclusion of a 15-year study of nearly 100 college teachers in a wide variety of fields and universities, offers valuable answers for all educators. The short answer is—it's not what teachers do, it's what they understand. In stories both humorous and touching, Bain describes examples of ingenuity and compassion, of students' discoveries of new ideas and the depth of their own potential. *What the Best College Teachers Do* is a treasure trove of insight and inspiration for first-year teachers and seasoned educators. Ken Bain is director of the Teaching and Learning Resource Center of Montclair University. (224 pp.) hardcover. ISBN 978-0-674-01325-4 ©2004



Members: \$17

Nonmembers: \$21.95



Five Easy Lessons: Strategies for Successful Physics Teaching (NB-35)

This book is packed with creative tips on how instructors can enhance and improve their physics class instruction techniques. Includes a chapter on Physics Education Research and specific suggestions for 23 physics topics. Author Randy Knight has been teaching introductory physics for more than 20 years and is now a professor of physics at California Polytechnic University, San Luis Obispo. (330 pp.) ISBN 0-8053-8702-1 ©2004

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Members: \$17

Nonmembers: \$19.95



Teaching Introductory Physics (NB-23)

Arnold B. Arons gives us a guide to teaching introductory physics, from high school to calculusbased college courses. This instructional tool presents systematic observations based upon research into how physics students come to learn and understand physical concepts, models, and lines of reasoning. Includes many test questions and homework problems. (816 pp.) paperback. ISBN 0-471-13707-3 ©1997

Members: \$71.95

Nonmembers: \$83.95





Frames of Reference (D00917)

Clearly demonstrates and explains inertial and accelerated frames of reference. There are 10 lessons for each of the three levels: middle school, high school, and college. Includes a Barcode & Chapter Guide on CD. The film may be played from the beginning, or it may be started at any one of 21 points using a remote control or barcode reader. Produced by Ztek.

Members Only: \$199 \$159 (Save \$40)

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Physics Single-Concept Film Collection 1 (D00913)

DVD series created by transferring materials from Project Physics film loops. The 35 segments cover motion, motion in the heavens, modern physics, momentum and energy, waves, and collisions. With an audio track, sound effects, and a teacher's guide on the DVD. Grade level: 9+. Produced by Ztek.



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Physics Single-Concept Film Collection 2 (D00915)

DVD series created from materials transferred from Ealing film loops (produced by Harold Daw at New Mexico State University). Topics covered include: mechanics, collision, behavior of gases, light, and electricity and magnetism. One complete section is devoted to the study of heat and thermodynamic concepts. With an audio track, sound effects, and a teacher's guide on the DVD. Grade level: 9+. Produced by Ztek.



Members Only: **\$199 \$159** (Save \$40)

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Physics Single-Concept Films: The Miller Collection (D00911)

This collection is a DVD series created by Franklin Miller, Jr. from his 19 short single-concept films originally produced in 1963 and transcribed to videotape in 1993. The films were originally designed to be silent, encouraging use of the same material in classrooms of students with varying skill levels. The 21 segments cover waves, mechanics, molecular, atomic, and nuclear physics, with an audio track written by Franklin Miller, and a teacher's guide on the DVD also written by Miller. Grade level: 12+. Produced by Ztek.



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AAPT and Ztek have produced a set of DVDs using the compilation of more than 245 "classic" physics experiments. These videos, called Physics: Cinema Classics, provide convenient access to material from Physical Science Study Committee 16mm films, Project Physics 8mm film loops, Ealing 8mm film loops, and many others. The video and still images on the DVDs are accompanied by instructor's hints and two separate audio tracks: an inquiry track and an explanation track. Experiments can be accessed using the DVD player remote control, a barcode reader, and the bar-code directory included on the accompanying CD-ROM. Each DVD is accompanied by a CD of ancillary materials, including a comprehensive teacher's guide and other useful references. The CD contains a 2,000-page Teacher's Guide with discussion guides, question-and-answer sheets, student worksheets, and more. The CD is Macintosh and Windows compatible, and information may be selected and printed from the CD-ROM without any additional software. Grade level: 7+. ©2003



Purchase the entire set and save! Select one or any combination of Physics: Cinema Classics



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Best Seller!





Twin Views of the Tacoma Narrows Bridge Collapse (NVT-13)

NOW ON DVD! This newly edited disc contains two video segments: 1) Tacoma Narrows Bridge Collapse by Franklin Miller, Jr. (1963). This three-minute, 20-second segment is taken from the original 8mm silent film loop by Franklin Miller, Jr. and he has added an audio narration. 2) The Puzzle of the Tacoma Narrows Bridge Collapse by R.G. Fuller, D.A. Zollman, & T.C. Campbell (1979). This seven-minute, 40-second segment is taken from the 1979 videodisc by Fuller, Zollman and Campbell. It has an audio track with people reading parts from the official reports and newspaper accounts of the collapse of the bridge. A printed User's Guide contains background information about the bridge's collapse, educational activities for students at various levels K-16, and recommended references on the subject. Edited by Robert G. Fuller, Charles R. Lang, and Roberta H. Lang. (User's Guide: 27 pp.) © 1998



Members: \$48.95

Nonmembers: \$61

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AAPT Press

AAPT Press

Cliff's Nodes: Editorials from The Physics Teacher (NB-46)

From the pages of *The Physics Teacher* comes a collection of editorials by its longtime editor, Cliff Swartz. Professor of Physics Emeritus at Stony Brook University, Cliff Swartz is a passionate advocate of better physics teaching, based on a curriculum that is quantitative and includes experiments "with a purpose." In this collection of editorials, plus a few new ones, he cajoles, chides, preaches, and provides a good swift kick in the intellectual pants for those who are working to share physics with the next generation. (338 pp.) ISBN: 0-8018-8307-5 ©2006



Members: **\$21**

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Best Seller!

Insights into the Universe (0P-69)

This book is a collection of *AstroNotes* columns and related articles from *The Physics Teacher*. *AstroNotes* was started to give physics and astronomy teachers insightful approaches to engage their students. This book continues that tradition. Timeless ideas and classroom-proven strategies will help the novice teacher and the seasoned pro find more effective ways to teach astronomy. Many of the articles focus on a single concept. Nearly all embody a new slant on teaching a topic. Use this book to help invigorate your astronomy class. Edited by Timothy F. Slater and Michael Zeilik. (151 pp.) ISBN 1-931024-04-9 ©2003





Members: \$20.50

Nonmembers: \$25.50

AAPT Member-Only Item

Paul Hewitt's Conceptual Physics Workshop for Teachers (NVT-10)

Paul Hewitt gave a special workshop for physics teachers in Vancouver, British Columbia, in 1998. The workshop was professionally videotaped and edited and now is available in a 9-DVD set, featuring 15 hours of material. It will take you through his High School Edition of *Conceptual Physics* giving you teaching tips Paul has developed over his many years as a physics teacher. Each DVD has simple demonstrations, equations, approaches to problem solving, and Paul's personal stories that use physics principles to examine the world around us.

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The Powerful Ideas course model is intended for faculty who teach college students who aspire to be tomorrow's elementary educators. The course content focuses on those physical science concepts that are initially introduced in elementary science curricula. In addition, the flexible materials can be modified to build an introductory physical science course for nonscience majors. Easy-to-use worksheets and a structured questioning pattern guide future teachers through a hands-on, inquiry-based course that models the way science should be taught. The college instructor's materials parallel student activities and provide important insights and instructional background. Assessment strategies are included to assist faculty in developing techniques that assess meaningful learning. The six volumes: Light and Color, Electricity, Heat and Conservation of Energy, Nature of Matter, Force, and Motion can be used chronologically or in optional sections. To offer a course constructed on Powerful Ideas in Physical Science, the department needs only one set of course development materials per faculty member. The course includes student materials, rights to copy and distribute student materials, and access to a networking list of current users. No other textbook is necessary.

A single CD-ROM contains all six volumes.

Vol. 1: Light and Color (CTCD-L)

Vol. 2: *Electricity* (CTCD-E)

Vol. 3: Heat and Conservation of Energy (CTCD-H) Vol. 6: Force (CTCD-F)



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(No shipping charges added)

Vol. 4: *Nature of Matter* (CTCD-N) Vol. 5: Motion (CTCD-M)

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AAPT Press



Safety in Physics Education (0P-67)



Members: \$21.95

Nonmembers: \$27.50

AAPT Press

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First Time in Our Catalog!

Teaching Physics for the First Time (0P-71)

This book is designed to be a quick and easy resource for anyone teaching physics for the first time. Written after extensive research by AAPT members Jan Mader and Mary Winn, it is filled with reliable labs, demos and activities that work well in the classroom. Also included are lesson plans, diagrams, and teacher notes for every activity. The book is not the end—it is just a beginning, a bag of tricks teachers can build upon. Soon you and your students will realize that a day without physics does not exist and that physics is a "phun" adventure. (396 pp.) ISBN 978-1-931024-10-5 ©2008

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Nonmembers: \$20



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Color

Best Seller!

Teaching Light & Color (RB-74)

This collection of scientific papers, articles, and brief excerpts from books is intended to provide teachers with source material for teaching light and color. It also contains references to some 281 books, papers and websites. Edited by Thomas D. Rossing and Christopher J. Chiaverina. (250 pp.) ISBN 1-931024-02-2 ©2001



Members: **\$15**



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www.thephysicsstore.com

The Mechanical Universe: High School Adaptation (NK-03)

This noncalculus physics series was designed under the direction of Richard P. Olenick and a council of 12 prominent high school teachers. Twenty-eight broadcast-quality lessons address such physics subjects as the law of gravitation, waves, electric fields and forces, and relativity. All DVD lessons are supported by carefully designed Instructor's Guides to support student understanding. The series is available as a 28-DVD complete set or as individual DVDs. Conversion to DVD was made possible by a grant from the NSF.



Complete 28-DVD Set:Members: \$475Nonmembers: \$600Individual DVDs:Members: \$45Nonmembers: \$60

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Conservation of Energy (15:06) (NK-03/M5) Conservation of Momentum (8:20) (NK-03/M6)

Kinematics and Scientific Methods

The Law of Falling Bodies (13:49) (NK-03/M9) The Law of Inertia (18:41) (NK-03/M10)

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Physics Teaching Resource Agents (PTRA) Publications

AAPT started the Physics Teaching Resource Agents program in 1985-with support from the NSF and APS—with the mission of improving the teaching and learning of physics and physical science for all teachers and students in the United States.AAPT/PTRA is the leading in-service professional development program. Customized workshops provide the right approach by building on decades of experience and tapping into a large network of master teachers who are continually engaged in physics studies.



(Visit www.aapt.org/ptra)

Best Seller!

Role of Toys in Teaching Physics (WSP-10)

This AAPT/PTRA resource book written by Jodi and Roy McCullough contains experiments, demonstrations, and displays involving toys that can be used to introduce most of the major topics covered in a typical introductory physics class. These activities provide a sense that everyday objects are closely related to the topics studied in physics. Using toys in teaching physics will certainly add excitement and enthusiasm to your classroom. (292 pp.) ISBN 0-917853-97-0 ©2000

Members: **\$28**

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Role of the Laboratory in Teaching Intro. Physics (WSP-03)

This AAPT/PTRA resource book written by Jim and Jane Nelson contains an introduction to the philosophy and rationale for including a laboratory component in an introductory physics course. Camera-ready student directions are enclosed for more than 30 sample laboratory activities. Topics include: speed, centripetal force, motion of a pendulum, heating and cooling, lenses, Ohm's law, magnetic fields, induced EMF, and more. (126 pp.) ISBN 0-917853-61-X ©1995



Members: **\$28**

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AAPT/PTRA Workshop Manual

Teaching about Electrostatics

Best Seller!

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Teaching About Electrostatics (WSP-01)

This AAPT/PTRA resource book written by Robert A. Morse describes construction of reliable electrostatics equipment from inexpensive materials. *Appendix A*: Electrostatics Activities for Students is a sequence of activities designed to help students build an initial understanding of electrostatics. *Appendix B*: Ben Franklin's Electrostatics Experiments. (148 pp.) ISBN 0-917853-51-2 ©1992

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Teaching About Color and Color Vision (WSP-06)

This AAPT/PTRA resource book written by Bill Franklin deals with how the human eye perceives color and how that color perception is triggered by the light sources and objects of our world. The colors of soap bubbles and other thin films are used to explain the colors of transparent materials sandwiched between polarizers. A tonic for lagging interest in the spring semester, the workshop incorporates many laboratory activities and demonstrations, commercially important applications, sample questions, and Physics Olympiad events. (182 pp.) ISBN 0-917853-68-7 ©1997



Nonmembers: \$35

Teaching About Cosmology: A Programmed Guide for AAPT Press High School Teaching and Learning (WSP-09)

This AAPT/PTRA resource book written by Lawrence M. Krauss and Glenn D. Starkman explores concepts ranging from the origins of the universe and the big-bang theory to aspects of the universe such as age, weight, and expansion. (106 pp.) ISBN 0-917853-92-X ©1999



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Teaching About D.C. Electric Circuits (WSP-02)



AAPT Press

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From mapping electric fields to investigating an integrated timer circuit, this AAPT/PTRA resource book written by Earl R. Feltyberger, et. al gives students and teachers a chance to explore the behavior of devices that form the basis for modern electronic circuits. Hands-on experiments are featured; some require computer equipment to collect and display data, some are qualitative, some quantitative. Requires purchase of a \$30 digital multimeter. (166 pp.) ISBN 0-917853-56-3 ©1995

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Teaching About Impulse and Momentum (WSP-11) AAPT Press

This AAPT/PTRA resource book written by Bill Franklin features labs and demos physics teachers can use to give students hands-on opportunities to learn about impulse and momentum. "Make-and-take activities" include AAPT Apparatus Contest winners "An Air Impulse Rocket," "A Fan Driven Sailcart," "An Elastic/Inelastic Collision Cart," and others. Among the topics treated are automobile safety, wing lift, water nozzle reaction, and spacecraft use of gravity "slingshots." (112 pp.) ISBN 1-931024-06-5 ©2004

Members: \$28

Nonmembers: \$35





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Best Seller!

Exploring Physics in the Classroom (WSP-12)

Members: \$28

The key to learning is student involvement! This AAPT/PTRA resource book written by George Amann presents examples of two techniques that are proven to increase student involvement in the classroom. Based on the "5E" model of learning, exploratories are designed to get your students excited about the material they will explore with you. Practicums are a unique method for measuring a class's learning in an "authentic" manner that will ensure the whole class is excited and totally immersed in the process. (98 pp.) ISBN 1-931024-07-3 ©2005

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Teaching About Lightwave Communications (WSP-05) AAPT Press

This AAPT/PTRA resource book written by Mark Davids, et al. features the historical and theoretical background information necessary to understand the mysteries of modern lightwave communication. The workshop has a twofold philosophy. First, students should have maximum hands-on learning. This is achieved through laboratory activities beginning with experiments from those done by Alexander Graham Bell in the 1880s to modern activities. Second, the equipment should be simple, rugged, inexpensive—and still reliable. (116 pp.) ISBN 0-917853-63-6 ©1995

Members: \$28

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Teaching About Magnetism (WSP-07)

This AAPT/PTRA resource book written by Robert J. Reiland suggests creative, safe, inexpensive classroom materials to use in the laboratory. Magnetism is a physics topic often glossed over due to limited time in the school year. The activities encourage students to write down anticipated results and help boost students' curiosity before they actually perform the laboratory activities. This collection of demonstrations and hands-on activities is an effective tool for displaying the basic concept of magnetism. (136 pp.) ISBN 0-917853-65-2 ©1996

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Role of Graphing Calculators in Teaching Physics (WSP-08)

This AAPT/PTRA resource book written by Cheri Bibo Lehman, Linda J. Antinone, and John E. Gastineau starts with the very basic features of graphing calculators and gradually builds up to the graphing and data analysis features of the TI-83. Many functions of the TI-83 are highlighted in demonstrations, laboratories, and classroom activities. (114 pp.) ISBN 0-917853-91-1 ©1999



Members: \$28

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Guidelines for Physics Education



Guidelines for High School Physics Programs (G-1) — AAPT developed this document as a resource for high school administrators, parents, and teachers who are interested in developing guidelines for physics curriculum and instruction in their school(s).

Guidelines for Self-Study and External Evaluation of Undergraduate Physics Programs (G-10) — These guidelines were prepared by AAPT in 2005 in cooperation with the American Physical Society to guide physics departments in evaluating a program of undergraduate physics education. Completely updated, this content was significantly influenced by the Strategic Programs for Innovations in Undergraduate Physics (or SPIN-UP). SPIN-UP, sponsored by ExxonMobil, AAPT, APS, and AIP, organized site visits and surveys of colleges with thriving physics programs.

Guidelines for Two-Year College Physics Programs (G-2) — The guidelines were prepared to serve as a guide for institutional self-studies and program reviews; a resource for regional accrediting groups when revising self-study guidelines and conducting visitations for assessment of programs; and a guide to assist two-year college presidents, deans, and physics professors in developing reasonable standards to assure quality physics instruction in two-year college physics departments.

Planning for Graduate Studies in Physics and Related Fields (G-9) — Edited by Dennis Henry and recently updated, this was written for students considering graduate work in physics or related fields. It will help each student decide whether to pursue a graduate degree, and if so, how to prepare for this path while still an undergraduate. It addresses mechanics of the application process, types of financial aid, and the final selection of a graduate school.

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Albert Einstein (TY-01)

Dressed for intense classroom action, this 5" tall, hard plastic Albert Einstein stands with a piece of chalk in his hand, poised to explain relativity or do battle with the forces of entropy. Features realistic disheveled hair.



Ben Franklin (TY-03)

Franklin's many accomplishments include inventing swimming fins and bifocals, establishing the University of Pennsylvania, publishing the *Poor Richard's Almanac.* This 5-1/4" tall hard plastic action figure has moveable arms and legs and comes with a plastic kite and key so you can reenact his famous electricity experiment.

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Member Favorites!

Don't DRINK and Derive . . .

$$\begin{split} \mathbf{E} &= \mathbf{m} \mathbf{C}^{2} \quad \sum_{i=1}^{N} u = i f_{ii}^{i} \quad u \approx \frac{5}{6} \sum_{i=1}^{N} \sum_{j \in \mathcal{N}_{i}} (\lambda_{j}) \\ & r = \cos \left(\frac{j_{i}}{\sqrt{m_{i}}} - \tan \theta = \sqrt{\frac{\lambda_{i}}{\lambda_{i}}} \right) \quad u = u_{i} f_{i} \sum_{i=1}^{N} v_{i} u_{i}^{i} v_{i}^{i} \\ & s = b_{i}^{i} \left(\frac{u_{i}}{u_{i}} - \frac{u_{i}}{u_{i}} \right) \quad d = \frac{\Delta_{i}}{\Delta_{i}} \quad u = u_{i} f_{i} \sum_{i=1}^{N} \frac{u_{i}^{i} u_{i}^{i} v_{i}^{i}}{\sqrt{n}} \\ & r = b_{i}^{i} \left(\frac{u_{i}}{u_{i}} - \frac{u_{i}}{u_{i}} \right) \quad d = \frac{\Delta_{i}}{\Delta_{i}} \quad u = u_{i} \frac{u_{i}^{i} (u_{i} - \theta)}{\sqrt{n}} \\ & \frac{21}{n} \sum_{i=1}^{N} \frac{(\lambda_{i} + u_{i})}{(u_{i} - u_{i})} \quad u = \frac{u_{i}^{i} (u_{i} - \theta)}{\sqrt{n}} \end{split}$$



 $u = \frac{\sin \left[\frac{1}{2} (\mu - \theta) \right]}{1 + 1}$

 $v = Rg \biggl(\frac{m}{m} - \frac{1}{n'} \biggr) \quad \ \ \sigma \equiv \frac{\Delta t}{\Delta \nu}$

 $\frac{21}{n}\sum \sqrt{2}\pm ||x-x||$

Don't DRINK and Derive (TS-7)

"Don't DRINK and Derive..." and many incorrect physics formulas printed on the back. AAPT logo printed on front in blue. (L or XL) Black shirt has white logos. (M, L, XL, XXL) Specify color and size. Members: \$10 Nonmembers: \$15

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Nonmembers \$22 Members \$17



Sport one or all of these Einstein ties

Show your love of physics with these Einstein $E=mc^2$ ties in black or white and different styles. Made of polyester. Please specify style number. Members: \$8 Nonmembers: \$12



Bubble Rope (TY-04)

Uses ordinary liquid dish soap. Even beginners can create 5- to 10-foot bubbles. Create giant donuts, corkscrews, snake tubes and more. Just dip loop into a bucket of soap and water, adjust the rope to the size you want, and wave through the air.

Members \$8 Nonmembers \$9.95



Equilateral Prism (TY-05)

High-tech base allows for positioning of equilateral prism on a window sill or table to produce a multi-color spectrum display on walls, floor or ceiling from sunlight. The prism must be balanced on the peak of the triangle's roof. Glass equilateral prism is 2" long with 1" faces. Black plastic mount is 3" L x 1 3/8" W x 1 3/8" H.

Members \$9 Nonmembers \$10.95



Kinetic Mobile (TY-06)

Red and blue holographic disks on either side of the mobile use diffraction gratings to create special motion effects. Start with just the push of the pendulum/ mobile will run on a single 9-volt battery (not included). Sturdy plastic base and sides support free-moving mobile. Members \$10 Nonmembers \$12.95

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