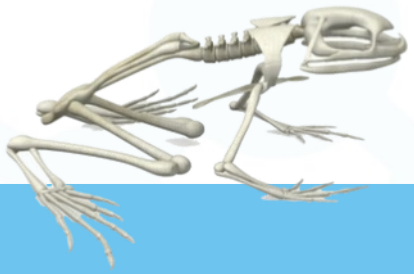
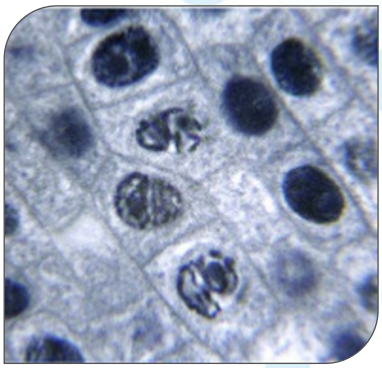
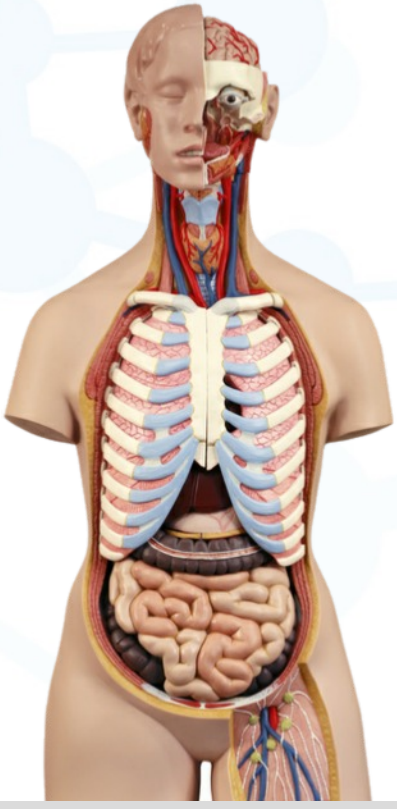


# HIGH SCHOOL SCIENCE

## 2017/18 CATALOGUE





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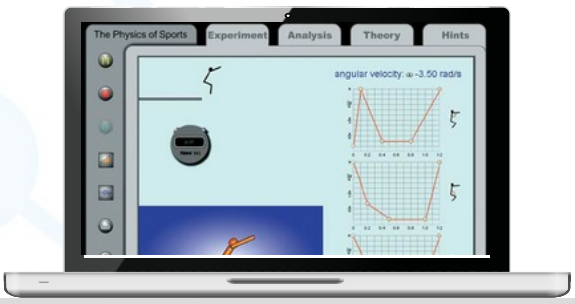


Telephone: (02) 9675-7750 www.msmedia.com.au

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CONTENTS




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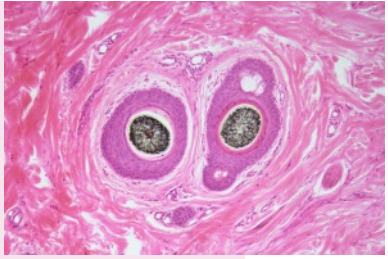
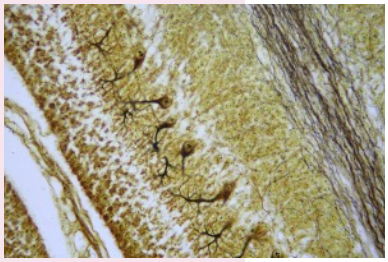
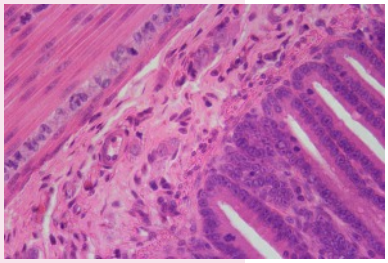
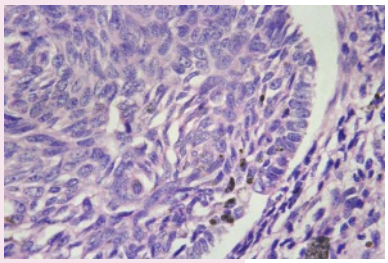
Prices are in Australian dollars









# MICROSCOPE SLIDES

Following is a selection of microscope slides that you will find useful for teaching physiology, both human and animal, biology courses covering cellular biology, zoology, genetics, parasitology, bacteriology, and botany. There is also a section on human pathology. Finally there is a small selection of slides that will be useful in teaching forensics in the miscellaneous slides section. If you require other slides not listed here please contact us.

## HUMAN HISTOLOGY

| Cat.# | Slide Description | Price |
|---|---|---|
| HE-HSI4H | Skin of human (show hair follicle) t.s. | $ 6.38 |
| HE-HSI2H | Skin of human (show sweat gland) sec. | $ 6.38 |
| HE-HDI23H | Small intestine of human t.s. | $ 6.06 |
| HE-HDI31H | Large intestine of human t.s. | $ 6.06 |
| HE-HRC12H | Human lung sec. | $ 6.50 |
| HE-HRC9H | Blood of human smear (H&E) | $ 4.82 |
| HE-HEX4H | Kidney of human through renal cortex t.s. | $ 6.50 |
| HE-HRC2H | Cardiac muscle of human sec. | $ 5.75 |
| HE-HMU1H | Smooth muscle isolated of human sec. | $ 5.24 |
| HE-HEC12H | Human bone grinding w.m. | $ 10.22 |
| HE-HRC4H | Human medium-sized artery and vein sec. | $ 5.04 |
| HE-HDI21H | Liver of human sec. | $ 6.38 |

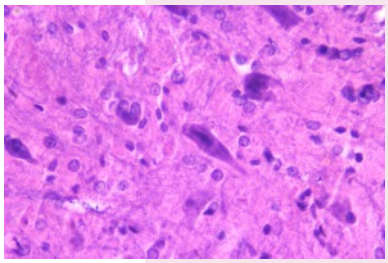
## HUMAN PATHOLOGY

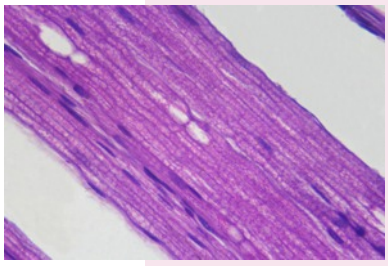
| Cat.# | Slide Description | Price |
|---|---|---|
| HE-HPC20H | Melanoma sec. | $ 8.88 |
| HE-HPS25H | Smoker's lung l.s. | $ 8.57 |
| HE-HPD34H | Alcoholic hepatitis sec. | $ 7.94 |
| HE-HPC18H | Basal cell carcinoma sec. | $ 8.57 |

Quantity Slide Discounts: 6 slides to 20 slides: 6%,, 21 slides to 30 slides: 8%, 31 slides to 50 slides: 10%, 51 plus: 14%

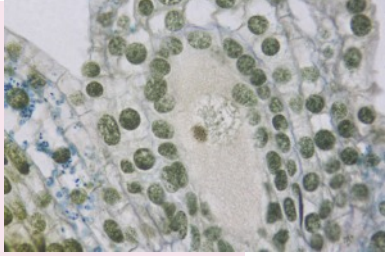
## COMPARATIVE HISTOLOGY

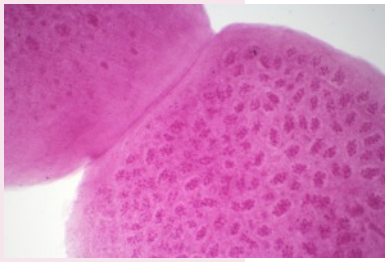
| Cat.# | Slide Description | Price |
|---|---|---|
| HE-CRC7H | Medium-sized artery and vein and nerves t.s. | $ 3.54 |
| HE-CMS16H | Skeletal muscle of cat l.s. and t.s. (hematoxylin staining) | $ 4.07 |
| HE-CNE22H | Sciatic nerve of pig t.s. and l.s. | $ 5.12 |
| HE-CNE5H | Spinal cord of rabbit t.s. (H&E) | $ 3.75 |
| HE-CDI29H | Small intestine of cat sec. | $ 3.85 |
| HE-CRE2H | Testis of rat sec. | $ 4.80 |
| HE-CRE13H | Ovary of rat sec. | $ 5.43 |
| HE-CMS19H | Smooth muscle of stomach of cat sec. | $ 3.75 |
| HE-CEC23H | Tail of mouse (showing many tissue types) t.s. | $ 3.66 |
| HE-CNE35H | Brain of rabbit l.s. (silver staining) | $ 8.30 |

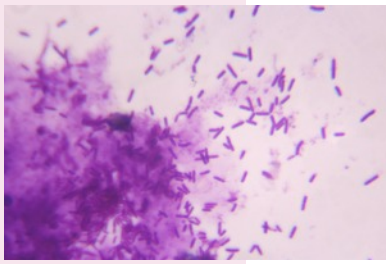


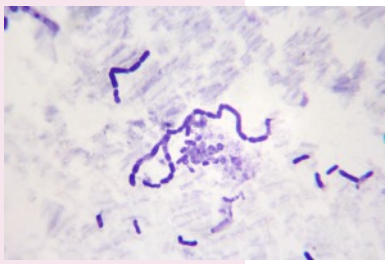


Prices do not include GST









## CYTOLOGY & GENETICS

| Cat.# | Slide Description | Price |
|---|---|---|
| HE-GA4H | Testis of grasshopper meiosis sec. | $ 5.85 |
| HE-GP52H | Meiosis of plant sections (Lilium anther) | $ 8.42 |
| HE-GP1H | Root tip of allium cepa l.s. (showing mitotic division) | $ 5.97 |
| HE-GA1H | Mitosis of animal sec. (Parascaris equorum) | $ 10.34 |
| HE-GA27H | Salivary chromosome of drosophila w.m. | $ 8.64 |
| HE-GA28H | Chromosome of normal man w.m. | $ 10.46 |
| HE-GP3H | Chromosome of allium w.m. | $ 4.80 |
| HE-CNE2H | Neurocytes islolated w.m. | $ 3.54 |

## BACTERIOLOGY

| Cat.# | Slide Description | Price |
|---|---|---|
| DN-BA4H | Bacteria type (coccus, bacillus, spirillum), smear | $ 7.35 |
| DN-BA20H | Escherichia coli, gram negative, smear | $ 7.35 |
| DN-BA36H | Bacillus megaterium, smear * | $ 9.64 |
| DN-BA38H | Azotobacter, gram negative, smear * | $ 7.35 |

To view these slides you will require a 100x eyepiece, preferably with oil, except those slides marked with an *

## PARASITOLOGY

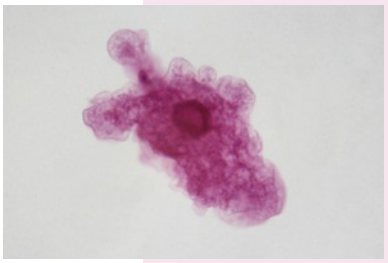
| Cat.# | Slide Description | Price |
|---|---|---|
| HE-PAR3H | Ascaris lumbricoides, female and male t.s. (roundworm) | $ 4.48 |
| HE-PFT4H | Immature proglottids of Taenia solium or Dipylidium caninum w.m. | $ 10.22 |
| HE-PFT15H | Mature proglottid of Dipylidium caninum w.m. | $ 10.68 |
| HE-PFT13H | Echinococcus granulosus adult w.m. (tapeworm) | $ 11.34 |
| HE-PFF2H | Fasciola hepatica t.s. (fluke) | $ 8.64 |
| HE-PFT3H | Scolex of Taenia solium or Moniezia expansa w.m. | $ 8.57 |
| HE-PFF17H | Cercaria of Schistosoma japonicum w.m | $ 8.64 |
| HE-PAE7H | Pulex, (flea) w.m. | $ 10.22 |

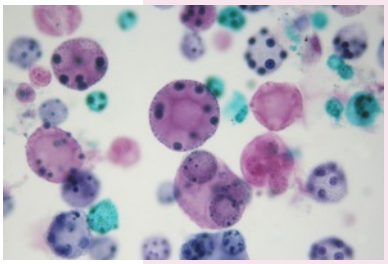
## ZOOLOGY

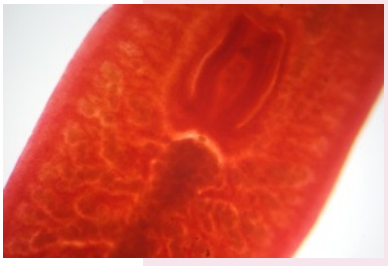
| Cat.# | Slide Description | Price |
|---|---|---|
| HE-IZP4H | Hydra w.m. | $ 3.85 |
| DN-IZO14H | Euglena viridis, w.m. | $ 6.02 |
| DN-IZO1H | Planarian, w.m. | $ 9.06 |
| DN-IZO12H | Amoeba proteus, w.m. | $ 9.64 |
| HE-IZC6H | Cyclops (female) w.m | $ 4.39 |
| HE-IZI80H | Drosophila melanogaster w.m. female | $ 3.88 |
| VS-INZ01H | Paramecium w.m. | $ 4.18 |
| HE-IZO9H | Freshwater plankton w.m. | $ 3.73 |

## BOTANY

| Cat.# | Slide Description | Price |
|---|---|---|
| HE-BFL7H | Peziza l.s. | $ 3.75 |
| HE-BTR5H | Root of zea mays t.s. | $ 3.34 |
| HE-BTL10H | Leaf of zea mays t.s. | $ 3.44 |
| HE-BTA24H | Conjugation of spirogyra w.m. | $ 3.88 |
| HE-BTL31H | Epidermis of allium cepa w.m. | $ 4.17 |
| HE-BTB6H | Sporophyte of marchantia l.s. | $ 4.82 |
| HE-BTF10H | Ovary of lilium t.s. (shows ovule structure) | $ 4.70 |
| HE-BTS9H | Stem of zea mays t.s. (intergeniculum) | $ 3.54 |
| HE-BTF41H | Pollen of triticum aestivum w.m. | $ 3.34 |
| HE-BTA12H | Volvox w.m. | $ 3.75 |
| DN-BTA20H | Mixed blue-green algae w.m. | $ 7.35 |
| HE-BTF6H | Young anther of lilium t.s. | $ 4.70 |





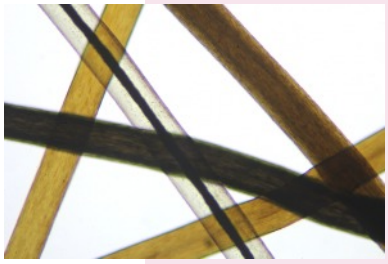


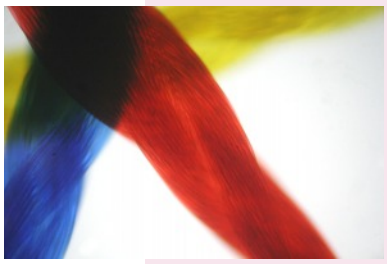
Prices do not include GST

## MISCELLANEOUS

| Cat.# | Slide Description | Price |
|---|---|---|
| DN-MS07H | 1 centimetre square lattice (have 10 one millimetre lattice) w.m. | $ 6.02 |
| DN-MS02H | Coloured thread w.m. | $ 7.16 |
| DN-MS04H | Fingerprint three types w.m. ** | $ 7.92 |
| DN-MS06H | Hair combination w.m. | $ 7.35 |

** A microscope is not required to view this slide. A low power eye lupe, or magnifying glass is all that is required.





# PHYSICS SOFTWARE

## FUNDAMENTAL SCIENCE SKILLS

*Windows & Macintosh*

*Self-Guided Interactive Learning Modules for Windows & Macintosh*

***Fundamental Science Skills*** is a unique program that utilizes the computer as an instructional tool to its fullest extent. The program contains interactive learning modules that teach vital skills students need early-on in a physics or physical science course. Each module presents an interactive self-guided lesson providing virtual one-on-one instruction.

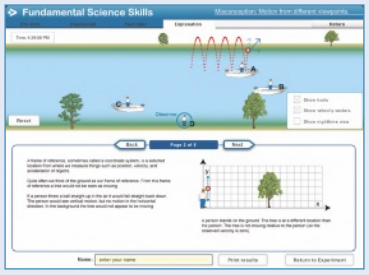
**Topics include**: measurement apparatus used in the lab, graphing skills, interpreting graphs, error analysis, understanding the process by which a scientific model is formulated, developing an intuitive sense for the magnitude of various physical quantities when powers of 10 are involved, and common student misconceptions. The topics were selected based upon instructor input of basic skills students were in most need of improving and basic areas where students lacked understanding. Each learning module is comprised of the following components:

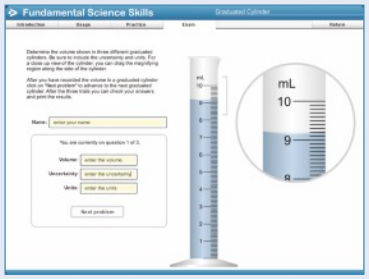
1) Introduction Screen: A thorough introduction to the topic is given so that no prior instruction is necessary.

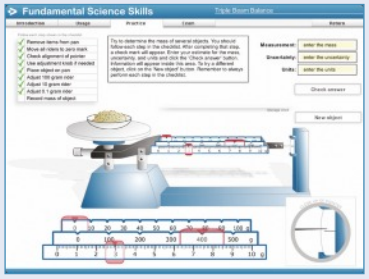
2) Usage Screen: Students are taught the skills required to meet the learning objective along with information on how to use the interactive simulations.

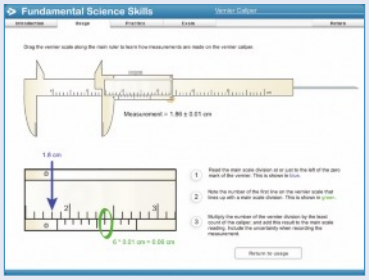
3) Practice Screen: Students practice with graphic-rich interactive simulations that provide immediate feedback on how well the student is performing. Students are presented with many different practice opportunities allowing as much practice as necessary to master the objective.

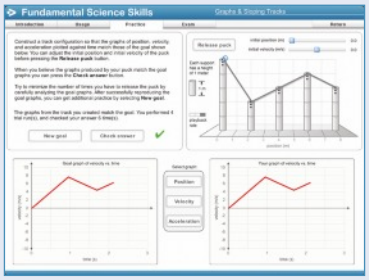
4) Exam Screen: The on-screen exam tests if the student fully understands and has mastered the learning objective. The exam is automatically scored with the results shown on-screen along with the option to print-out the results for submitting to the instructor. Exams use randomized data so the instructor can be assured the student's work is not plagiarized.




## LEARNING MODULES

**Measurement Apparatus**
- Triple-Beam Balance
- Graduated Cylinder
- Vernier Caliper
- Micrometer
- Meter Stick

**Interpreting Graphs**
- Graphs & Inclined Tracks Game

**Error Analysis**
- Mean and Standard Deviation

**Graphing Skills**
- Graphing Data Points
- Linear Graphs

**Formulating a Scientific Model**
- Ring Challenge Game

**Order of Magnitude (Powers of 10)**
- Order of Magnitude: Mass
- Order of Magnitude: Distance
- Order of Magnitude: Speed

**Common Student Misconceptions**
- Motion from Different Viewpoints
- What is Your Weight in Space?
- Weight in a Moving Elevator
- Are Heavier Sleds Faster?
- Are Shorter Paths Faster? (Crossing a Flowing River)
- Motion of a Thrown Object
- Heavier Objects in Collisions

**System Requirements:** Windows XP/Vista/7/8/10 and Mac OSX 10.6 - 10.11

| Cat.# | Licences | Price |
|---|---|---|
| PCI-8H | Single User | $ 246.11 |
| PCI-8L1H | 10 User Licence | $ 516.42 |
| PCI-8L2H | 30 User Licence | $ 763.95 |
| PCI-8L3H | Unlimited Licence | $ 995.34 |

## EXPLORATION OF PHYSICAL SCIENCES - Simulations Volume 1

*Windows & Macintosh*

Comprehensive software library of physics simulations and labs covering a full year of introductory physics — Mechanics, Waves, Heat, Fluids, Optics, and Electricity & Magnetism. ***Exploration of Physics: Simulation Library Volume I, Version 3.1*** has earned the reputation of being the most comprehensive and in-depth physics simulation software package available! The 64 highly interactive stand-alone simulations and labs cover a full year of introductory physics — mechanics, waves, heat, fluids, electricity & magnetism, and optics are all given extensive treatment. The software program utilizes a simulated lab approach allowing students to perform in-depth investigations. Each simulation employs its own powerful engine that accurately re-creates the physical world. Experimental parameters are easily manipulated using an assortment of slider controls; physical behaviours are brought to life using animated graphics that respond to user input; and physical quantities are displayed using digital readouts, graphs, and histograms. Each simulation also has a readily accessible detailed student lab-guide that provides specific direction for carrying out the lab investigation. The vast collection of simulations and labs may be used in a variety of ways: (1) as an instructor lecture aid for demonstration purposes in front of the classroom, (2) for student use as a computer-based lab activity.

Exploration of Physics simulations can be used to introduce a physics concept, or serve nicely to reinforce and extend a lab (involving apparatus) that has already been performed. The ready-to-run simulations and highly intuitive interface allows first time users to immediately use the simulations and begin exploring with no preliminary time investment,

### LIST OF SIMULATIONS VOLUME 1

**Mechanics**
- Motion Graphs
- Vector Properties
- Free Fall Laboratory
- Projectile Motion
- Force Table
- Inclined Plane
- Connected Masses on Two Inclines
- Centripetal Force
- Gravitational Orbits
- Cavendish Experiment
- Center of Mass
- Air Track
- 2D Collisions
- Basic Torque
- Spring & Pendulum
- Damped Oscillator
- Two Mass Oscillator
- 2D Oscillator

**Heat**
- Microscopic Heat
- Thermal Conduction
- Calorimetry
- Gas Flow
- 1st Law

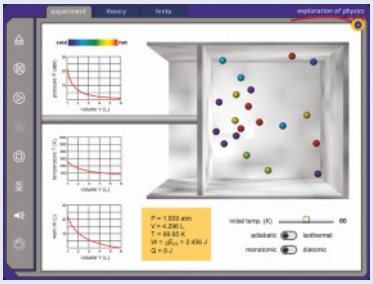
**Thermodynamics**
- Ideal Gas
- Adiabatic/Isothermal Compression
- Carnot Cycle

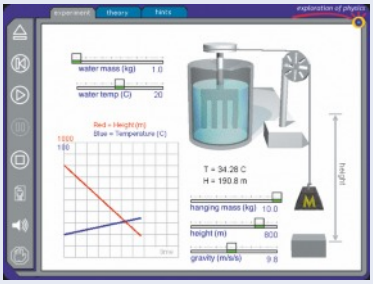
**Fluids**
- Density Lab
- Buoyancy Lab
- Pressure & Depth
- U Tube
- Bernoulli's Equation
- Torricelli's Law
- Flow Around a Wing

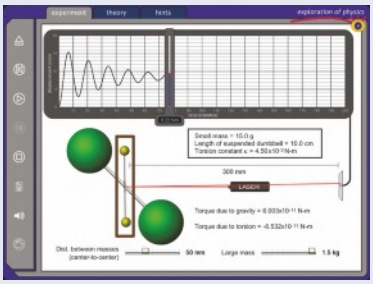
**Waves**
- Wave Addition
- Waves on a Rope
- Standing Waves
- Interference Patterns
- Thin Film Interference
- Multiple-Slit Interference
- Resolution: Diffraction at a Circular Aperture
- Intensity of Sound
- Tone Beats
- Doppler Shift 1
- Doppler Shift 2
- Lissajous Figures

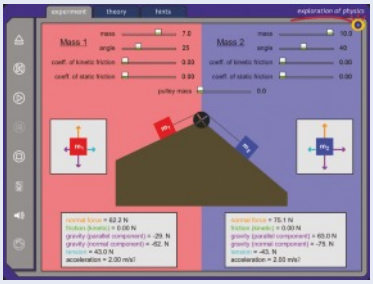
**Electricity & Magnetism**
- Coulomb Forces
- Electric Fields
- Magnetic Fields
- Trajectory in E & B Fields
- Cathode-Ray Tube
- Lenz's Law
- Motion of Charge Carriers through Conducting Wire
- Capacitor Properties
- Resistive Circuits
- Capacitor Circuits
- RC Circuits

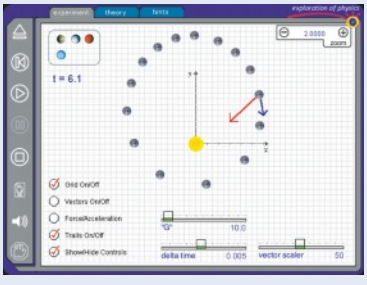
**Optics**
- Colour Addition
- Colour Subtraction
- Basic Prism
- Snell's Law
- Lenses
- Fermat's Principle
- Polarization











**System Requirements**: Windows XP/Vista/7/8/10 and Mac OSX 10.6 - 10.11

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| PCI-2L1H | 10 User Licence | $ 516.42 |
| PCI-2L2H | 30 User Licence | $ 763.95 |
| PCI-2L3H | Unlimited Licence | $ 995.34 |

## EXPLORATION OF PHYSICAL SCIENCES - Simulations Volume 2

*Windows & Macintosh*

***Exploration of Physical Science: Simulations Volume II*** is a vast collection of over 100 computer simulations and labs encompassing a full-range of physical science topics. Designed to be highly interactive and highly visual, the software program utilizes a simulated lab approach to teach physical science principles. The simulations are categorized into three learning levels:

1) Introductory, 2) Intermediate, 3) Advanced; addressing the needs of introductory physical science, high school physics, and college physics courses. The multi-level learning feature gives the software package a great deal of flexibility to meet a wide range of student needs.

The Volume II collection is designed to complement and work along with the Volume I collection found on the preceding two pages. Each simulation re-creates a real world physical event, with the student given full control over the relevant experimental variables. Experimental parameters are easily manipulated using an assortment of slider controls; physical behaviours are brought to life using animated graphics that respond to user input; and physical quantities are displayed using digital readouts, graphs, and histograms. Each simulation has a readily accessible help screen providing information on using the simulation.

The vast collection of simulations and labs may be used in a variety of ways:

(1) as an instructor lecture aid for demonstration purposes in front of the classroom, (2) for student use as a computer-based lab activity. Exploration of Physical Science simulations can be used to introduce a physical science concept, or serve nicely to reinforce and extend a lab (involving apparatus) that has already been performed. The ready-to-run simulations and highly intuitive interface allows first time users to immediately use the simulations and begin exploring with no preliminary time investment — essentially providing a ready-to-go lab experience.

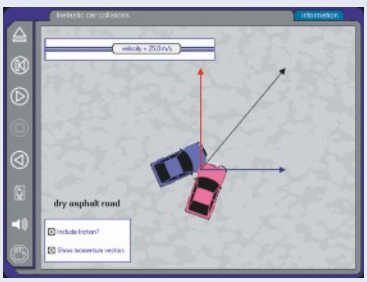
### LIST OF SIMULATIONS VOLUME 2

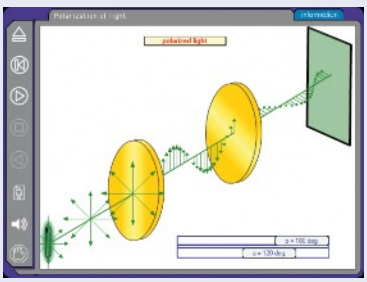
**Forces and Motion**
A car's linear velocity and acceleration graphs
Racing cars: Distance, velocity, and acceleration
Galileo's experiment: Falling and air resistance
Velocity and acceleration of a falling ball
Falling balls with air resistance
Time of free fall: Independence of velocity components
Throwing a banana to a falling monkey
Projectile motion: Horizontal and vertical motion
Projectile motion and acceleration
Trajectory of a ball with air resistance
Newton's 1st law: Inertia of puck on moving ice sheet
Newton's 2nd law: A dogsled race
Static and kinetic friction
Skidding cars and stopping distances
Air resistance with one parachute
Air resistance with two racing parachutes
Newton's 3rd law: Two astronauts playing catch
Newton's 3rd law: Rocket propulsion
Centre of mass of a drawn figure
Balancing people on a seesaw
Circular motion of a car on a race track
Circular motion of a sling: Tension and gravity
Angular momentum on a merry-go-round

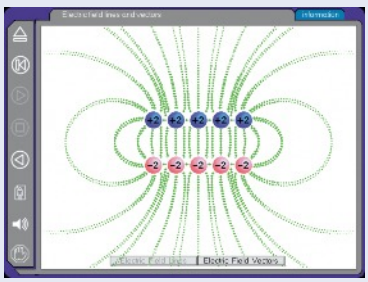
**Momentum and Energy**
Jumping from a cart: The conservation of momentum
Inelastic car crash in two-dimensions
Energy conservation of a falling ball
Energy conservation on a loop-the-loop
Energy conservation of a pendulum
Energy conservation of a mass on a spring
Bouncing balls and the coefficient of restitution
Elastic & inelastic colliding balls in one-dimension
Colliding balls in two-dimensions
Energy conservation of a bungee jumper
Effect of friction on a car rolling on inclined surfaces
Effects of friction & air resistance on a skiing snowman

**Fluids**
Measuring pressure in liquids
Mass, volume, density, and buoyancy

**Electricity and Magnetism**
Static electric charges on a hanging pith ball
Charging and discharging an electroscope
Electric field lines and vectors
Trajectory of a test charge in an electric field
A light bulb and battery
Electric circuits and Ohm's law





Measurements of series and parallel circuits
The magnetic field of bar magnets
The magnetic field of a wire and solenoid
A proton in the Earth's magnetic field
Magnetic force on a current-carrying wire
Electric dipole radiation

**Thermodynamics**
The three phases of water and latent heat
The ideal gas law
Temperature, speed, and kinetic energy
The distribution of molecular speeds in a gas
Mixing in a box of gas particles
Entropy and the 2nd law of thermodynamics

**Vibrations, Waves, and Sound**
Simple harmonic motion and the sine function
Simple harmonic and circular motion
Resonance of a damped, driven mass on a spring
Normal modes of two masses connected by springs
Wave addition: Frequency, phase, and amplitude
The superposition of waves on a rope
Standing waves & harmonics: Strings and organ pipes
The superposition of sound waves
The Doppler effect and sonic booms
Ripple tank interference

**Light and Optics**
Fizeau's experiment and the speed of light
The polarization of light and polarizing filters
The refraction of waves at a boundary
The refraction of light by prisms and raindrops
Additive and subtractive mixing of colors
Light rays and the formation of a real image
Ray tracing: Lenses and mirrors (5 simulations)
Single-slit diffraction of light
Interference of light waves from two slits
Double-slit interference and diffraction patterns

**Relativity**
The Michelson-Morley experiment
Relativity and simultaneity for a moving train
Length contraction
Time dilation
Racing trains: Newton's vs. Einstein's mechanics

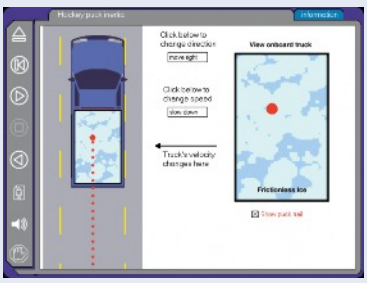
**Modern Physics**
Radioactive decay
The photoelectric effect: Measuring 5 metals
Double-slit electron interference
Three models of the atom
The atomic nucleus and Rutherford's experiment
Measurements of the quantum atom
The structure of matter: A salt crystal
The chemical bond

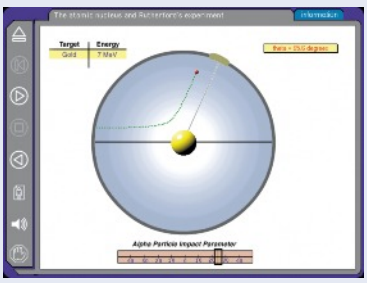
**Astronomy**
Retrograde motion in geocentric & heliocentric systems
Planetary motion: Kepler's laws
The motion of a satellite orbiting Earth

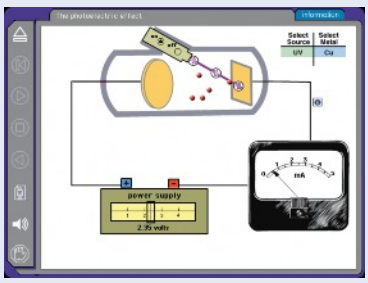
**Chaos and Fractals**
Motion of a chaotic pendulum
Sierpinski triangle
Pythagorean Tree

**System Requirements**: Windows XP/Vista/7/8/10 and Mac OSX 10.6 - 10.11

| Cat.# | Licences | Price |
|---|---|---|
| PCI-3H | Single User | $ 246.11 |
| PCI-3L1H | 10 User Licence | $ 516.42 |
| PCI-3L2H | 30 User Licence | $ 763.95 |
| PCI-3L3H | Unlimited Licence | $ 995.34 |





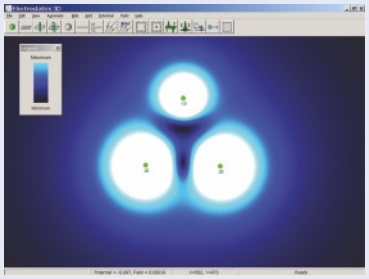


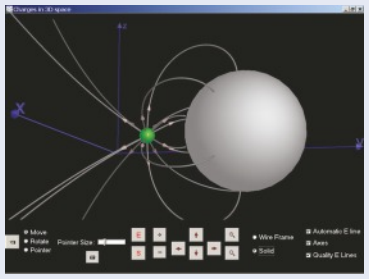
## ELECTROSTATICS 3D

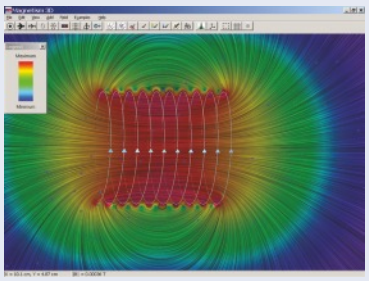
*Windows*

***Electrostatics 3D*** is an interactive software program that allows students to study electrostatics in a visually spectacular fashion! It utilizes colourful two-dimensional and three-dimensional graphics to display electric potential and electric field lines for various types of charged objects. The stunning imagery brings a deeper understanding to electrostatics that has never before been achieved by other software visualization methods. In addition to displaying charges, electric field lines and equipotential surfaces in 3D space, three-dimensional topographical mapping is also utilized providing a highly-informative perspective. All the various types of three-dimensional graphics can be rotated in space about multiple axes for a true 3D perspective! The user is provided with a wide variety of simple to use tools that permit any desired charge configuration to be created on-screen. Simply click the desired object from the toolbar, input the chosen parameters, and position the object on-screen. Software features include:

- View 2D & 3D electric field lines and equipotential surfaces.
- Choose from a variety of charged objects that may be used in any combination including: point charges, linear charges, plane charges with limited or unlimited length, grounded or isolated conductive spheres, conductive planes and di-electric boundaries.
- View options include: 2D surface, 3D space, 3D topographic mapping, 2D colour-coded mapping & linear integral convolution.
- Option to display on-screen electric field vectors indicating individual charge contributions and net electric field for any location.
- Numeric display indicates strength of electric field and electric potential at any ocation.
- Option to display the path of a charged particle as it moves under the influence of the electric field.
- Option to use right-handed or left-handed coordinate system in 3D environment.







**System Requirements:** Windows 98/2000/XP/Vista/7.

| Cat.# | Licences | Price |
|---|---|---|
| PCI-6H | Single User | $ 84.90 |
| PCI-6L1H | 10 User Licence | $ 331.91 |
| PCI-6L2H | 30 User Licence | $ 516.42 |
| PCI-6L3H | Unlimited Licence | $ 741.44 |

## MAGNETISM 3D

*Windows*

***Magnetism 3D*** is an interactive software program that allows students to study magnetic fields using a variety of stunning visualization methods. It utilizes colourful two-dimensional and three-dimensional graphics to display magnetic field lines for current-carrying straight wires, current carrying wire loops, solenoids, and permanent magnets. The three-dimensional graphics can be rotated in space about multiple axes for a true 3D perspective! The user is provided with a wide variety of simple to use tools that permit any desired configuration comprised of any number of objects to be created on-screen. Simply click the desired object from the toolbar, input the chosen parameters, and position the object onscreen. Software features include:

- View 2D & 3D magnetic field lines.
- Choose from a variety of magnetic field generating objects that may be used inany combination including: current-carrying straight wires, current-carrying wire loops, solenoids (with or without an iron core), and permanent magnets.
- All objects can be customized by inputting values such as current, length, radius, loops per centimetre . . .
- View options include: 3D space, 3D topographic mapping, 2D surface, 2D colour-coded mapping & linear integral convolution, and 2D iron filings.
- Option to display on-screen magnetic field vectors indicating individual contributions from various objects and net magnetic field for any location.
- Numeric display indicates strength of magnetic field at any location.
- Option to display the path of a charged particle as it moves under the influence of the magnetic field.
- Option to use right-handed or left-handed coordinate system in 3D environment.
- Capability to explore Ampere's law.

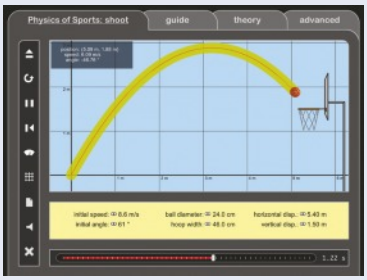
**System Requirements:** Windows 98/2000/XP/Vista/7.

| Cat.# | Licences | Price |
|---|---|---|
| PCI-9H | Single User | $ 84.90 |
| PCI-9L1H | 10 User Licence | $ 331.91 |
| PCI-9L2H | 30 User Licence | $ 516.42 |
| PCI-9L3H | Unlimited Licence | $ 741.44 |

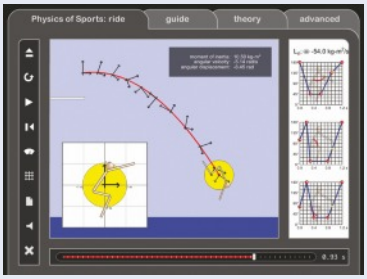
***Physics of Sports*** is a collection of computer simulations that illustrate the role played by physics principles in many popular sports. Each simulation models a particular sport with the student given full control over the relevant variables, creating a highly interactive tool to perform in-depth studies. With a high-degree of physical accuracy and versatility built into each simulation, students can explore the answer to such questions as: how is the velocity of a batted ball influenced by the mass of the bat and the contact point along the bat, how does body configuration affect the rotation of a platform diver, what is the most forgiving angle at which to shoot a basketball, or how does top-spin or back-spin affect the way a ball bounces?

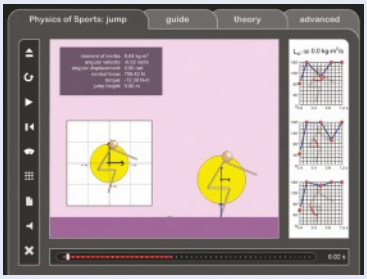
Developed with the goal of capturing student interest, the program contains 15 stand-alone simulations that model physics principles from a variety of sports: Basketball, Baseball, Gymnastics, Diving, Biking, Downhill Skiing, Race Car Driving, Weight Lifting, Vertical Jump, Hammer Throw.

Each simulation contains four components: (1) *experiment* screen where input parameters are varied and the resulting motion is animated; (2) *advanced* screen where results can be analyzed with the aid of graphs; (3) *theory* screen that details the physics principles and equations governing the sport; (4) *guide* screen that provides detailed student guidance for performing the investigation.






## PHYSICS OF SPORT SIMULATIONS

1. Baseball: Swinging a Bat (Conservation of Linear and Angular Momentum)
2. Baseball: Batted Ball's Trajectory (Projectile Motion, Air Resistance)
3. Baseball: Pitching a Curveball (Projectile Motion, Magnus Force)
4. Basketball: Bounce Pass with Rotation (Impulse, Kinetic Friction)
5. Basketball: Variables in Shooting a Basket (Projectile Motion)
6. High Dive: Diver Rotation and Body Configuration (Conservation of Angular Momentum, Moment of Inertia, Center of Mass)
7. Downhill Skiing (Newton's Second Law, Kinetic Friction, Mechanical Energy)
8. Race Car: Travelling on a Banked Curve (Newton's Second Law, Centripetal Acceleration, Static Friction)
9. Gymnastics: High Bar Analysis (Torque, Angular Momentum)
10. Bicycling: Pedaling Uphill with Varying Gear Ratios (Force, Torque, Mechanical Energy)
11. Weightlifting: Biceps Curl (Torque, Work, Power)
12. Vertical Jump: Attaining Maximum Height (Force, Torque, Moment of Inertia, Angular Velocity)
13. Billiard Balls: Collisions with Friction & Angular Velocity (Conservation of Momentum, Impulse, Kinetic Friction, Rolling Motion)
14. Bungee Jump: Force and Acceleration Analysis (Free-Fall Motion, Drag Force, Simple Harmonic Motion)
15. Circular Hammer Throw (Rotational Motion, Centripetal and Tangential Acceleration)

**System Requirements:** Windows XP/Vista/7/8/10 and Mac OSX 10.6 - 10.11.

| Cat.# | Licences | Price |
|---|---|---|
| PCI-4H | Single User | $ 246.11 |
| PCI-4L1H | 10 User Licence | $ 516.42 |
| PCI-4L2H | 30 User Licence | $ 763.95 |
| PCI-4L3H | Unlimited Licence | $ 995.34 |

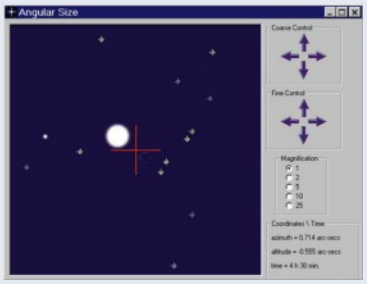
## VIRTUAL ASTRONOMY LABORATORY

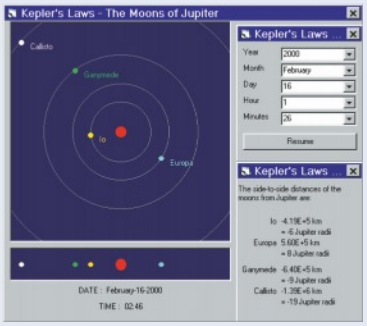
*Windows*

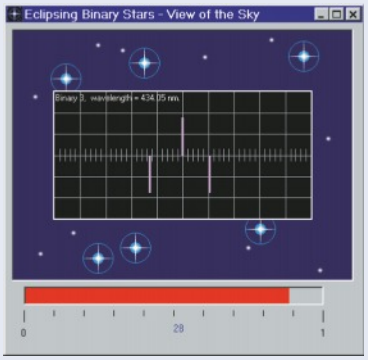
Many of the astronomical observations and measurements which are of interest in intro astronomy labs are not practical for a variety of reasons, including equipment restrictions, complexity, and night time viewing requirements. The 25 computer-based labs contained in ***Virtual Astronomy Laboratory*** are designed to give students a simulated view of the sky, allow them to make measurements on the computer, and analyze the data they have collected.

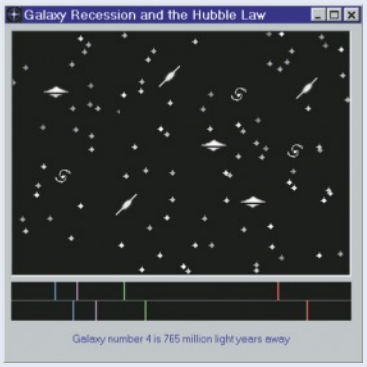
***Virtual Astronomy Laboratory*** brings a hands-on experimental lab component to astronomy courses, and requiring only basic math skills on the student's part, the carefully selected collection of labs are appropriate for introductory astronomy courses at the high school and college level.

***Virtual Astronomy Laboratory*** puts some of astronomy's most useful instruments into the hands of students - precise telescope controls to measure angular size; a photometer to measure light intensity; and a spectrograph to measure Doppler-shifted spectral lines. Time-lapse and time-exposure photographic observing methods are also simulated. Each lab activity provides everything required to perform a thorough investigation from start to finish - (1) Lab manual which includes background information and step-by-step instructions, (2) interactive simulations for hands-on data collection, and (3) on-screen assistance including input fields allowing students to enter and check their results.




**Astronomy Lab Topics:**

1. Scientific & Decimal Notation Conversion
2. Scale of the Universe
3. Graphs, Slopes, and Rate of Change
4. Latitude, Axial Tilt, and Length of Day
5. Celestial Coordinates
6. Angular Size
7. Measuring Planet Size
8. Kepler's Laws
9. Lunar Motion
10. Planetary Motion
11. Measurement of Saturn's Rings
12. Stellar Occultation
13. Circumpolar Stars
14. Stellar Parallax
15. Proper Motion of Stars
16. Radial Motion of Stars
17. Visual Binary Stars
18. Eclipsing Binary Stars
19. Cepheid Variable Stars
20. Temperature of Stars
21. Hertzsprung-Russell Diagram
22. Spectroscopic Parallax
23. Galactic Speeds and Hubble's Law
24. Galactic Rotation
25. Distribution of Mass in a Galaxy
26. Constellation Identification
27. Constellations of the Zodiac
28. Orbital Motion of the Moon
29. Speed of the Moon & Kepler's 2nd Law
30. Celestial Sphere & Length of Year

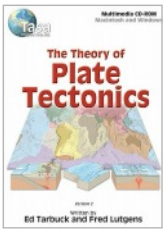
**System Requirements:** Windows 95/98/NT/2000/Me/XP, 486 or Pentium class processor, 16MB RAM.

| Cat.# | Licences | Price |
|---|---|---|
| PCI-1H | Single User | $ 246.11 |
| PCI-1L1H | 10 User Licence | $ 516.42 |
| PCI-1L2H | 30 User Licence | $ 763.95 |
| PCI-1L3H | Unlimited Licence | $ 995.34 |

# EARTH SCIENCE SOFTWARE

## THE THEORY OF PLATE TECTONICS

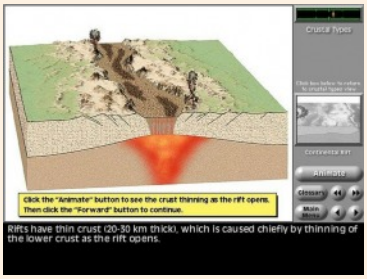
*Windows & Macintosh*



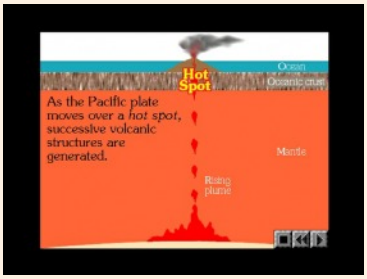

***The Theory of Plate Tectonics*** is a dynamic, interactive exploration of how Earth's lithospheric plates change through time. Detailed animations, which are easily manipulated by the user, enhance understanding. Features include an illustrated glossary with audio pronunciations, an index, easy navigation, and scored review activities that may be printed for easy teacher assessment. This excellent learning tool is appropriate for self-directed study by students and for classroom demonstrations by instructors. Version 2.2 appears in a resizable window on the desktop. This CD-ROM includes two levels: Intermediate and Advanced. Levels 7 through 12 and College.

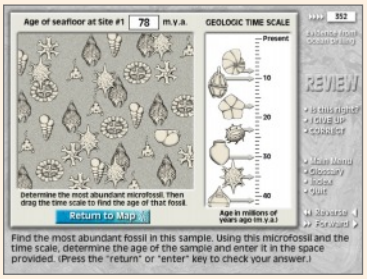
Here are some of the fascinating interactive explorations you and your students will encounter:

1. Move and rotate a globe to observe the movement of continents over the past 200 million years.
2. Study the history, development, and evidence for the theory of plate tectonics.
3. Move and rotate the continents of Africa and South America to see how they fit together.
4. Move the continents to study the changes in climate through time.
5. Build the super continent of Pangaea.
6. Study the movement of the continents through time and answer questions about specific events that occurred in different locations on the globe.
7. Study the evidence of paleo-magnetism by tracking the positions of the magnetic and rotational poles.
8. Calculate water depth using echo travel time, then plot data on a graph to construct a profile of the ocean floor.
9. Find out what causes sea floor spreading.
10. Assemble the plate tectonics "puzzle."
11. Experience the major interactions along plate boundaries and study the differences between convergent, divergent, and transform fault boundaries.
12. Rotate the globe to view the oceanic ridge system and see oceanic lithosphere being created.
13. Study continental rifts and explore current examples of the initial breakup of a continent.
14. Examine how extensional forces in the Basin and Range region of the U.S. created fault block mountains.








**System Requirements:** Macintosh® PowerPC™ G5 or Intel® Core™ Duo 1.33GHz or faster; RAM: 1 GB; Mac OS® X 10.4.11 or later. Windows® Intel® Pentium® 4 or faster processor (or equivalent); RAM: 1 GB; Windows® XP, Windows Vista®, or Windows® 7. Version 2.2 also runs on Mac OS® X Lion (10.7) and Mountain Lion (10.8).

| Cat.# | Licences | Price |
|---|---|---|
| TG-3H | Single User | $ 109.14 |
| TG-3MUH | Multi-User (up to 20 computers) | $ 239.28 |

## PLATE TECTONICS AND HOW THE EARTH WORKS

*Windows & Macintosh*

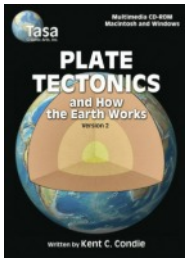
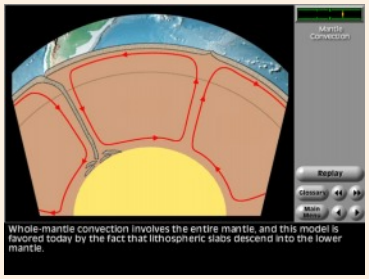
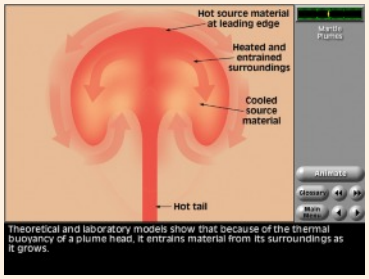


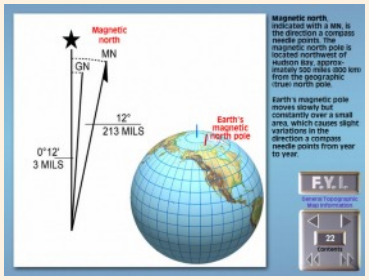

***Plate Tectonics and How the Earth Works*** is designed to aid advanced students in the geological sciences in visualizing and learning about processes within Earth and how these processes are related to plate tectonics. This interactive program includes a chapter entitled "Crustal and Mantle Evolution" which delves into the origin and evolution of continents and the early history of the Earth. Using animations, interactive diagrams, and colour photos, new and exciting developments are reviewed relating to plate reconstructions in the past, hotspots, mantle plumes, seismic discontinuities in the mantle, and super-continent cycles. Also included is a graphic portrayal of the crust (both oceanic and continental), mantle, and core, as well as recent ideas as to how Earth systems interact with each other. In addition, the student can examine each of the major tectonic settings on Earth as well as track these settings into the past, some as far back as 4 Ga. Level: College.

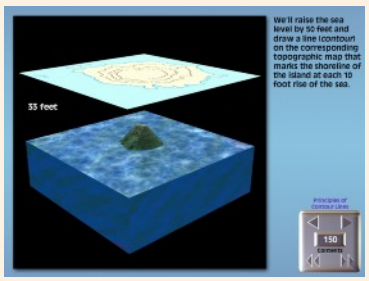
**Table of Contents:**





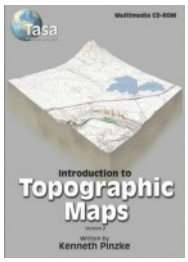




**System Requirements:** Macintosh® PowerPC™ G4, G5 or Intel® processor; RAM: 512 MBytes; Mac OS® X 10.4.11 or later (including QuickTime). Windows® Intel® Pentium® 4 or faster processor (or equivalent); RAM: 512 MBytes; Windows® XP Service Pack 2 or Windows Vista®. Windows 7 and Vista users click here. QuickTime required. Version 2.1. This technical upgrade also runs on Mac OS® X Lion (10.7) and Mountain Lion (10.8).

| Cat.# | Licences | Price |
|---|---|---|
| TG-7H | Single User | $ 134.24 |
| TG-7MUH | Multi-User (up to 20 computers) | $ 288.76 |

## INTRODUCTION TO TOPOGRAPHIC MAPS

*Windows & Macintosh*




With ***Introduction to Topographic Maps***, you will learn how to use these maps to determine elevations, landform types, principles of scale, location, and much more. You will read, draw, and print contour lines based on points of known elevations, construct topographic profiles, and determine slope relief. This CD-ROM includes full colour photos, animations, as well as related topics on map projections, U.S. Geological Survey, and using a compass and map. A scored review section can be printed for easy teacher assessment. Version 2.0 appears in a resizable window on the desktop. Years 7 to 12 and College.

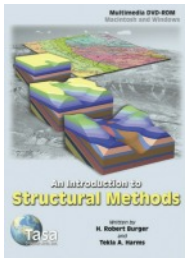
1. General topographic map information including symbols and map scales 2. How to understand latitude and longitude 3. Principles of contour lines, and how to draw a contour map 4. How to make topographic profiles 5. How topographic maps are made, including aerial photographs and satellite images 6. Other topics include: the Public Land Survey and the the Universal Transverse Mercator

**System Requirements:** Macintosh® PowerPC™ G3 500 MHz or Intel Core™ Duo 1.33GHz; 256 MBytes RAM; Mac OS® X (10.3 for PowerPC, 10.4 for Intel); Universal application; 1024 x 768 screen resolution. Windows® Intel® Pentium® II 450MHz or faster processor; 256 MBytes RAM; Windows XP® (32-bit only); Windows Vista® (32-bit only); Windows 7®; 1024 x 768 screen resolution. Version 2.0 also runs on Mac OS® X Lion (10.7) and Mountain Lion (10.8).

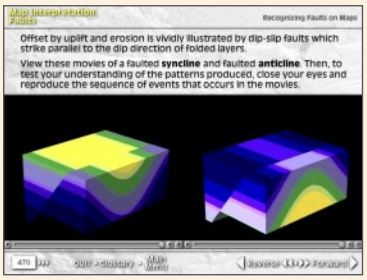
| Cat.# | Licences | Price |
|---|---|---|
| TG-2H | Single User | $ 109.14 |
| TG-2MUH | Multi-User (up to 20 computers) | $ 239.28 |

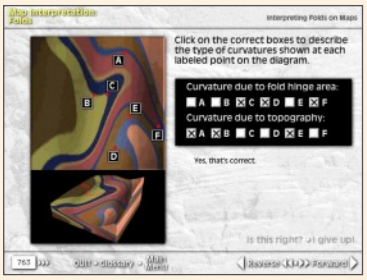
## AN INTRODUCTION TO STRUCTURAL

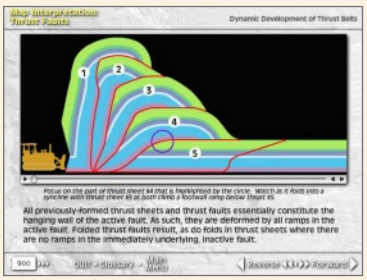
*Windows & Macintosh*




***An Introduction to Structural Methods DVD-ROM*,** narrated by the authors, is richly illustrated with 3-D diagrams, geologic maps, animations, and photographs all in full colour offering a new approach to teaching structural geology. A useful tool for your classroom, this DVD-ROM improves students' spatial reasoning skills while applying structural concepts and techniques. It also provides interactive quizzes that test students' comprehension of key concepts and terminology while encouraging their mastery of techniques working with the types of problems they will likely confront as practicing geologists. College level.





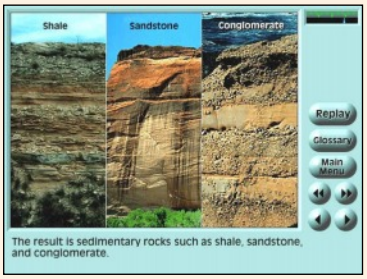



**Table of Contents:**

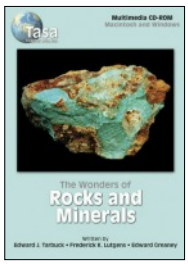
Elements of Lines and Planes, Map Interpretation: Simple Planar Surfaces, Stereographic Projection I, Constructing Geologic Sections Map Interpretation: Faults, Stereographic Projection II, Map Interpretation: Folds, Map Interpretation: Unconformities, Intrusions, Map Interpretation: Thrust Faults, Fold Analysis, Stress, Fracture, and Fault Analysis, Strain: Basic Principles.

**System Requirements:** Macintosh® PowerPC™ G4, G5 or Intel® processor; RAM: 512 MBytes; Mac OS® X 10.4.11 or later (including QuickTime); DVD-ROM drive. Windows® Intel® Pentium® 4 or faster processor (or equivalent); RAM: 512 MBytes; Windows® XP Service Pack 2 or Windows Vista®; Windows 7®; QuickTime required; DVD-ROM drive. This technical upgrade also runs on Mac OS® X Lion (10.7) and Mountain Lion (10.8).

| Cat.# | Licences | Price |
|---|---|---|
| TG-8H | Single User | $ 134.24 |
| TG-8MUH | Multi-User (up to 20 computers) | $ 288.76 |

## THE WONDERS OF ROCKS AND MINERALS

*Windows & Macintosh*




***The Wonders of Rocks and Minerals*** explores the world of geology in an exciting and highly interactive way. What are minerals and how are they different from rocks? What are the three groups of rocks and the geological processes involved in the formation of each? You will learn to identify and name minerals and rocks, just like a geologist does on a field trip. Includes stunning photographs, full colour animated sequences, a glossary, interactive exercises, and an illustrated database of over 50 minerals. Includes two levels of study: Years 3 through 6 and 7 through 12 (Two separate levels included on CD-ROM.).

**Table of Contents:**

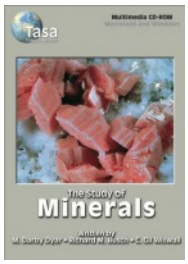
1. Minerals: How are Minerals and Rocks Different?, Important Mineral Properties, How to Identify Minerals, A Mineral Identification Key, Important Mineral
2. Groups, Reviewing Minerals, Basic Facts About Common Minerals
3. The Rock Cycle
4. Igneous Rocks: How Igneous Rocks Form, Textures of Igneous Rocks, Minerals in Igneous Rocks, Naming Igneous Rocks
5. Sedimentary Rocks: How Sedimentary Rocks Form, Conglomerate, Sandstone, and Shale, Limestone, Chert, and Other Chemical Sedimentary Rocks
6. Reviewing Sedimentary Rocks, Interpreting Past Environments
7. Metamorphic Rocks: Metamorphic Rocks are Changed Rocks, What Causes Metamorphism?, How Metamorphic Rocks are Different, Common Metamorphic Rocks
8. The Rock Review Challenge

**System Requirements:** Macintosh® PowerPC™ G4, G5 or Intel® processor; RAM: 512 MBytes; Mac OS® X 10.4.11 or later. Windows® Intel® Pentium® 4 or faster processor (or equivalent); RAM: 512 MBytes; Windows® XP (32-bit only) Service Pack 2 or Windows Vista® (32-bit only); Windows 7®. This technical upgrade also runs on Mac OS® X Lion (10.7) and Mountain Lion (10.8).

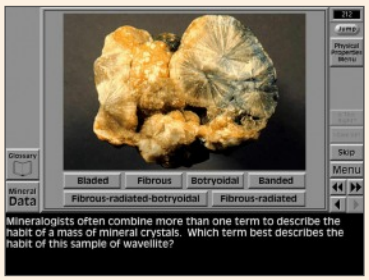
| Cat.# | Licences | Price |
|---|---|---|
| TG-4H | Single User | $ 109.14 |
| TG-4MUH | Multi-User (up to 20 computers) | $ 239.28 |

## THE STUDY OF MINERALS

*Windows & Macintosh*




Learn what minerals are, how crystals form, and explore their symmetry, chemical compositions and properties through 3-D graphics and animated sequences. The learning process is enhanced by interactive activities, abundant photographs, video clips, a glossary, and a database of mineral properties. The illustrated database of over 150 minerals includes photographs, microscopic thin sections, with mineral shapes and molecular structures you can rotate 360°. Level: College.



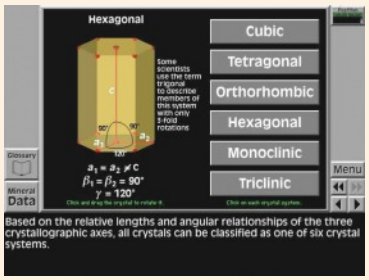





**Table of Contents:**

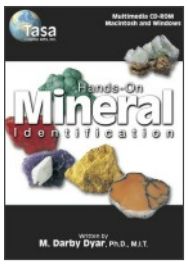


**System Requirements:** Macintosh® PowerPC™ G4, G5 or Intel® processor; RAM: 512 MBytes; Mac OS® X 10.4.11 or later. Windows® Intel® Pentium® 4 or faster processor (or equivalent); RAM: 512 MBytes; Windows® XP (32 bit only) Service Pack 2 or Windows Vista® (32 bit only). Version 1.2. This technical upgrade also runs on Mac OS® X Lion (10.7) and Mountain Lion (10.8).

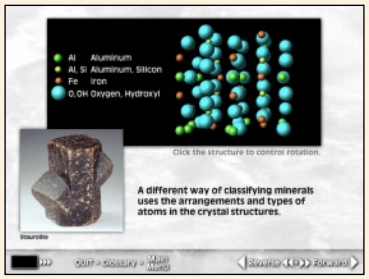
| Cat.# | Licences | Price |
|---|---|---|
| TG-5H | Single User | $ 134.24 |
| TG-5MUH | Multi-User (up to 20 computers) | $ 288.76 |

## HANDS-ON MINERAL IDENTIFICATION

*Windows & Macintosh*




This multimedia "field guide" helps you to identify over 14,500 mineral names and synonyms for both beginners and serious collectors. ***Hands-On Mineral Identification*** provides detailed identification information on 500 of the most common mineral species, full colour animations, background information, and photographs on physical characteristics of minerals. Watch actual video demonstrations of physical property tests and read a detailed explanation of crystal classification systems - all narrated by the author! The searchable database includes physical properties, rotatable 3-D crystal shapes, colour photographs, worldwide localities, crystal class, and mineral associations for each species. Levels 7 to 12 and College.





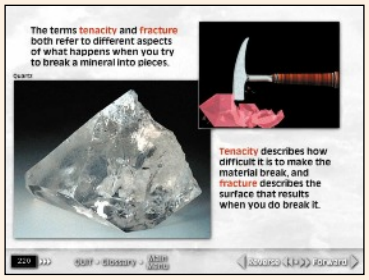



**Table of Contents:**

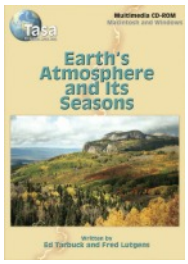


**System Requirements:** Macintosh® PowerPC™ G4, G5 or Intel® processor; RAM: 512 MBytes; Mac OS® X 10.4.11 or later (including QuickTime). Windows® Intel® Pentium® 4 or faster processor (or equivalent); RAM: 512 MBytes; Windows® XP (32-bit only) Service Pack 2 or Windows Vista® (32-bit only). Windows 7®. Quicktime required. The Version 1.2. upgrade also runs on Mac OS® X Lion (10.7) and Mountain Lion (10.8).

| Cat.# | Licences | Price |
|---|---|---|
| TG-10H | Single User | $ 72.67 |
| TG-10MUH | Multi-User (up to 20 computers) | $ 418.59 |

## EARTH'S ATMOSPHERE AND IT'S SEASONS

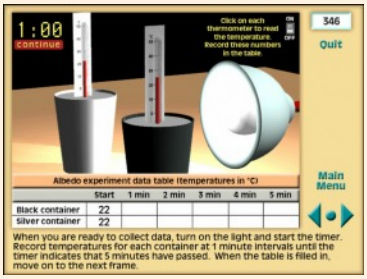
*Windows & Macintosh*

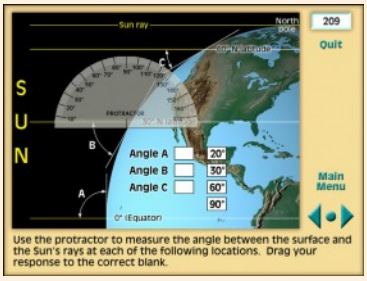



***Earth's Atmosphere and Its Seasons*** helps students investigate and understand the causes of the seasons, Earth-Sun relationships, the composition of the atmosphere, Sun's role as the main source of energy that drives weather and climate, the greenhouse effect, and more. Clear, narrated explanations along with thought-provoking review questions and lab activities, a visual index, clickable glossary, colourful animations, and video clips provide a fun way to learn many important lessons about weather and climate. Version 1.1 adds student quiz scoring that can be used to generate a printed record of the student's responses to the quizzes. You may print the record, save it to file, or email it through your computer's print dialog or document viewer.

**Table of Contents:**

1. The Importance of Weather
2. Weather and Climate
3. Composition of the Atmosphere
4. Understanding Seasons
5. Earth-Sun Relationships
6. In the Lab: Sun Angle and the Seasons
7. Solar Radiation
8. What Happens to Incoming Solar Radiation?
9. The Greenhouse Effect
10. In the Lab: The Influence of Colour on Albedo
11. Basic Temperature Data
12. Controls of Temperature.



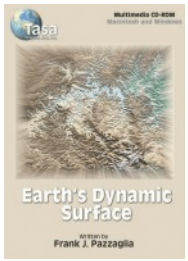




**System Requirements:** Macintosh® PowerPC™ G4, G5 or Intel® processor; RAM: 512 MBytes; Mac OS® X 10.4.11 or later (including QuickTime). Windows® Intel® Pentium® 4 or faster processor (or equivalent); RAM: 512 MBytes; Windows® XP (32-bit only) Service Pack 2 or Windows Vista® (32-bit only), Windows 7®; QuickTime required. New Version 1.1 also runs on Mac OS® X Lion (10.7) and Mountain Lion (10.8).

| Cat.# | Licences | Price |
|---|---|---|
| TG-15H | Single User | $ 109.14 |
| TG-15MUH | Multi-User (up to 20 computers) | $ 239.28 |

## EARTH'S DYNAMIC SURFACE

*Windows & Macintosh*




***Earth's Dynamic Surface*** is a useful tool for developing an understanding of the processes that shape Earth's surface. In this exciting CD-ROM, you are guided through each concept with full color animations, illustrations, and photographs while listening to the author's narration. Review sections at the end of each chapter will reinforce the concepts covered. Interactive activities encourage participation and problem solving. In addition, the animated Physiographic Province Tour enables you to travel to destinations across the U.S. The tour stops at 42 national parks, monuments, and points of interest demonstrating examples of each process of change introduced in the program. Grades 7 to 12 and college. Explore the following topics illustrated with full colour photographs, graphics, and animations.


**Table of Contents:**

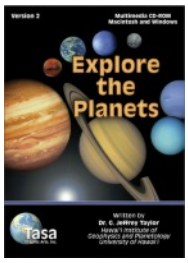
1. Weathering and Soils-examines the two types of weathering processes and soil development throughout a landscape.
2. Hillslopes-covers the interaction of rock-type and climate in the erosion of a landscape.
3. Rivers-discusses flowing water as a process for erosion, transportation, and deposition of Earth's surface materials.
4. Coastlines-examines the power of wind, waves, tides, and currents to shape unique landforms.
5. Groundwater-covers the development of landforms due to flowing water below Earth's surface.
6. Deserts and Winds-discusses changing landscapes due to the erosion, transportation, and deposition of surface material by wind.
7. Glaciers and Climate-examines the process of flowing ice in the development of landforms.
8. Physiographic Province Tour-takes students on a trip across the U.S. with stops at 42 National Parks and points of interest, including website links to each National Park appearing in the tour.

**System Requirements:** Macintosh® PowerPC™ G4, G5 or Intel® processor; RAM: 512 MBytes; Mac OS® X 10.4.11 or later. Windows® Intel® Pentium® 4 or faster processor (or equivalent); RAM: 512 MBytes; Windows® XP (32 bit only) Service Pack 2 or Windows Vista® (32 bit only). Version 1.2. This technical upgrade also runs on Mac OS® X Lion (10.7) and Mountain Lion (10.8).

| Cat.# | Licences | Price |
|---|---|---|
| TG-9H | Single User | $ 109.14 |
| TG-9MUH | Multi-User (up to 20 computers) | $ 239.28 |

## EXPLORE THE PLANETS

*Windows & Macintosh*




***Explore the Planets*** helps students investigate the planets and their satellites and understand the processes that shape them: volcanism, impact cratering, tectonics, landslides, flowing water, and wind. They will study the planets the way planetary scientists do, by comparing, for example, why some volcanoes on Mars are so much larger than their counterparts on Earth. They'll discover why impact craters are so widespread and much more. The program is fully narrated and contains new data and images from recent discoveries and missions into space. The program aids learning with scored review questions. You may print the record, save it to file, or email it through your computer's print dialog or document viewer.

Also included is a visual index, an illustrated glossary, colourful animations, video clips, and a planet database. Students can even pilot a spaceship through the solar system and test their knowledge of planetary bodies. Version 2.1 appears in a window that can be moved and resized.. Levels: Years 5 to 12.

**Table of Contents:**

- Introduction
- Tour the Planets: Mercury, Venus, Earth, The Moon, Mars, Asteroids & Comets, Jupiter, Saturn, Uranus, Neptune, Pluto
- Planet Processes: Landslides, Volcanism, Flowing Water, Wind, Impact cratering, Tectonics, Atmosphere
- Planet Explorer Game
- Planet Database

**Features in Version 2.1:**

1. New images and information for Tour of the Planets sections: Mercury, The Moon, Mars, Saturn, and Pluto

2. Interactive panoramas and videos on Mars and asteroids

3. Updated data and images in Planetary Database

4. Fully narrated

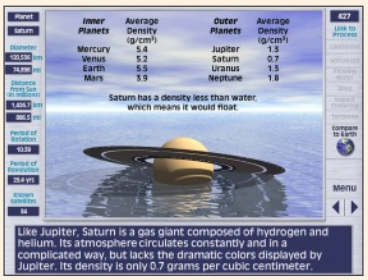
5. Visual index

6. Interactive illustrated glossary

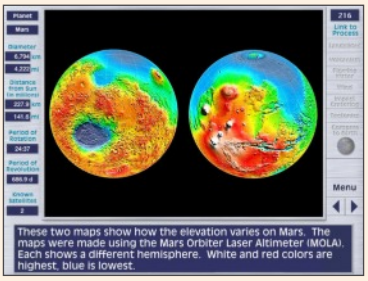
7. Easy navigation including page numbers and a jump box on every frame

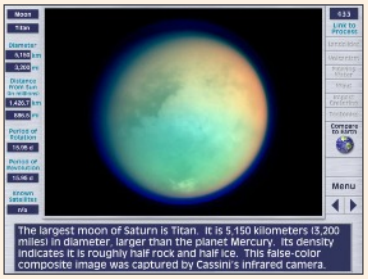
8. Scored review questions that can be printed, saved to file, or emailed through your computer's print dialog or document viewer.

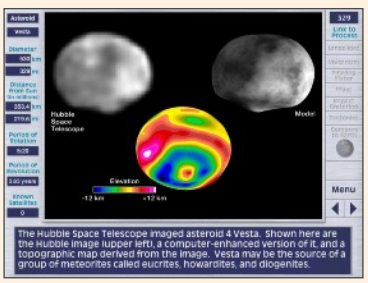
**System Requirements:** Macintosh® PowerPC™ G5 or Intel® Core™ Duo 1.33GHz or faster; RAM: 1 GB; Mac OS® X 10.4.11 or later. Windows® Intel® Pentium® 4 or faster processor (or equivalent); RAM: 1 GB; Windows® XP, Windows Vista®, or Windows® 7. The Version 2.1 upgrade also runs on Mac OS® X Lion (10.7) and Mountain Lion (10.8).





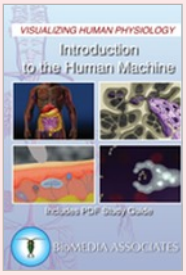



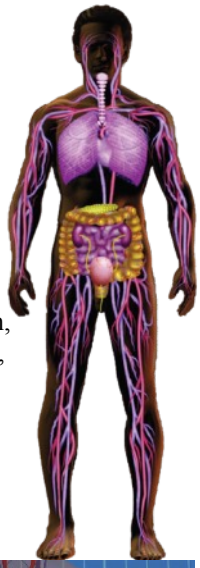




| Cat.# | Licences | Price |
|---|---|---|
| TG-1H | Single User | $ 109.14 |
| TG-1MUH | Multi-User (up to 20 computers) | $ 239.28 |

# HUMAN BODY DVD



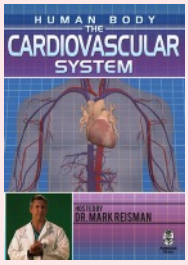

## VISUALISING HUMAN PHYSIOLOGY - Introduction to the Human Machine



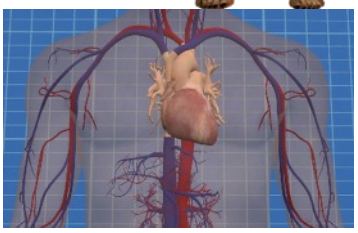
Human beings, like every living organism, are driven by two inherent needs – to survive, and ultimately, to reproduce – that is – to pass our genes on to the future of our species. To accomplish the goals of survival and reproduction we have inherited bodies finely crafted by evolution so that every one of us, every individual human organism, is an organic super factory – a living machine made up of systems that process fuel, build products, repair damage, expel waste, and defend against invaders. In this premiere program, the complex physiological systems of the human body are introduced – muscular movement, digestion, circulation, respiration, nerves, glands, immunity, and reproduction. The cellular basis of life, and the importance of carbon in organic chemistry are illustrated and explained.

© 2010 Closed Caption - 15 minutes

| Cat.# | User Type | Price |
|---|---|---|
| BM-4DH | Individual/ Institutional | $ 107.18 |



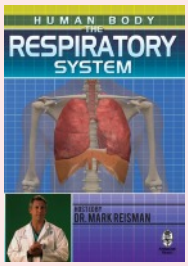

## HUMAN BODY: THE CARDIOVASCULAR SYSTEM



At the centre of the human cardiovascular system is the heart. The human heart is a muscular organ that is a bioengineering marvel. It works flawlessly, 24/7, throughout the lifetime of each individual. See how it delivers blood, a truly miracle substance, to all parts of the human body through a vast network of arteries and veins. Each component of the cardiovascular system's physiology and anatomy is shown in vivid detail. **Chapters:** Arteries and Veins, The Heart, Blood, Cardiovascular Anatomy.

© 2010 Closed Caption - 29 minutes

| Cat.# | User Type | Price |
|---|---|---|
| AB-26H | Individual/ Institutional | $ 83.33 |

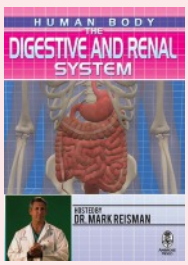



## HUMAN BODY: THE RESPIRATORY SYSTEM

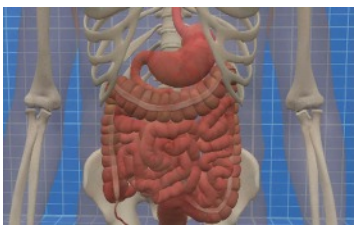
Breathing brings oxygen, found in the air we live in, into a unique set of organs called the lungs. Deep inside the lungs, that oxygen is transferred into the blood system and is used to power all of our muscles, including the muscles that produce breathing.Dr. Reisman takes you first through the structures of the air passageway, the anatomy and physiology of the lungs themselves, and finally reveals the mechanism of the incredible gas exchange between the respiratory and cardiovascular systems. He explains the many human respiratory disorders. **Chapters:** Breathing, Air Passageway, Respiratory Structures, Gas Exchange, Exhalation, Respiratory Disease.

© 2010 Closed Caption - 29 minutes

| Cat.# | User Type | Price |
|---|---|---|
| AB-27H | Individual/ Institutional | $ 83.33 |




## HUMAN BODY: THE DIGESTIVE & RENAL SYSTEM



The human body needs to take in food and water found in the environment, and through an almost miraculous sequence of mechanical and chemical processes, it converts that food into nutrients that sustain all the body's activities. The digestive track alone has nine major organs devoted to this process and the renal track three. Dr. Reisman provides a unique look at the anatomy and physiology of the many organs and structures of digestion. Discover the properties of metabolism and nutrition. **Chapters:** Introduction, Food and the Bioweb of Energy, Digestive Organs, Food Processes and the Upper Digestive Track, Lower Digestive Track, Internal Disorders, Anatomy and Physiology of the Liver, Gall Bladder and Pancreas, Renal System, Nutrition.

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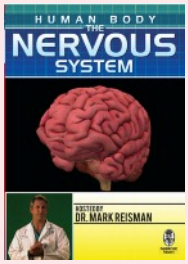
| Cat.# | User Type | Price |
|---|---|---|
| AB-28H | Individual/ Institutional | $ 83.33 |




## HUMAN BODY: THE NERVOUS SYSTEM

The human nervous system starts with the brain, extends down to the spinal cord,and connects to every part of the body through a vast network of fibers known as the peripheral nervous system. At the heart of this system is the neuron, a specialized cell that carries electrical impulses along neural pathways. **Chapters:** Evolution of the Brain, The Three Components of the Nervous System, Brain Anatomy, Primitive Brain, Brain Waves, Nervous System Diseases, Spinal Cord Anatomy.

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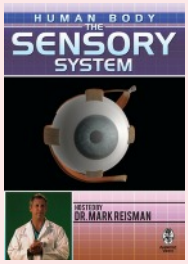
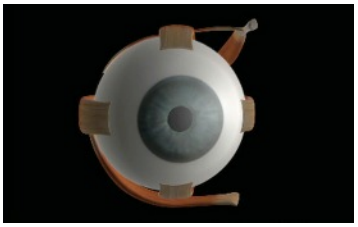
| Cat.# | User Type | Price |
|---|---|---|
| AB-25H | Individual/ Institutional | $ 83.33 |




## HUMAN BODY: THE SENSORY SYSTEM



Touch, taste, smell, hearing and sight - the human body's five major senses. They are senses that have evolved independently over millions of years but are brought together by our marvellous central nervous system into the most refined way of interacting with the environment of any species on the planet. Dr. Mark Reisman provides a unique look at the anatomy and physiology of each of these sensory systems and shows how the brain uses them to produce what we call being human. **Chapters:** Evolution of the Senses, Touch and Skin, Smell, Taste, Hearing, Sight.

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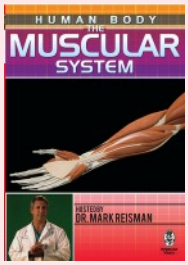
| Cat.# | User Type | Price |
|---|---|---|
| AB-29H | Individual/ Institutional | $ 83.33 |




## HUMAN BODY: THE MUSCULAR SYSTEM

Using the latest in 3-D graphics, medical imaging and cadaver specimens, see the human body's muscular system revealed in ways never seen before. **Chapters:** Introduction, Lever Principle, Muscle and Bone Anatomy, Muscle Chemistry, How Muscles Work, Muscular Anatomy and Physiology, Tendons, Ligaments and Fascia, Knee Anatomy, Muscle Disease, Muscles and Exercise, Involuntary Muscles.

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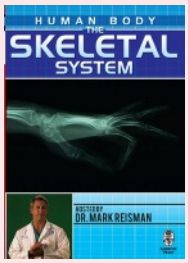
| Cat.# | User Type | Price |
|---|---|---|
| AB-24H | Individual/ Institutional | $ 83.33 |




## HUMAN BODY: THE SKELETAL SYSTEM

The 206 bones of the human skeleton are a miracle of bioengineering. Lightweight and incredibly strong, our bones give us the ability to walk upright, freeing our hands for precise manipulation of objects. See how the skeleton anchors the muscles and protects our essential organs: the heart, lungs, and brain. Learn how the bones themselves are chemical factories producing our red blood cells. **Chapters:** Introduction, Spine, Bones, Bone Composition, Protective Function of Bone, Pelvis Anatomy, Skull, Bone Joints, Cartilage, Bone Diseases, The Living Bone.

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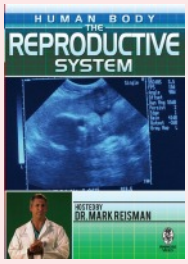
| Cat.# | User Type | Price |
|---|---|---|
| AB-23H | Individual/ Institutional | $ 83.33 |




## HUMAN BODY: THE REPRODUCTIVE SYSTEM

Of the body's major systems only the reproductive organs and structures are different in men and women. There is no greater miracle on the planet than the creation of a new life. There is no greater miracle on the planet than the creation of a new life. Dr. Mark Reisman takes you through each stage of this miracle, from the genetic basis of life, to the development of sex organs, to the formation of sex cells, to conception, to the emergence of the embryo, to the growth sequence of the fetus, and finally to the birth of a new human life. **Chapters:** Evolution of Sex, Genetics, Morphogenics and Pregnancy, Female Reproductive Organs, Male Reproductive Organs, Human Mating, Female Puberty, Male Puberty, Sex.

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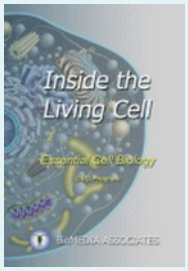
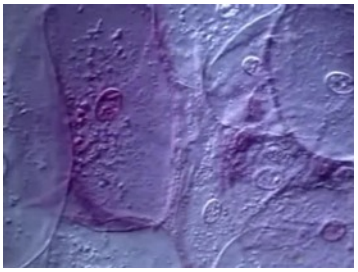
| Cat.# | User Type | Price |
|---|---|---|
| AB-30H | Individual/ Institutional | $ 83.33 |

# BIOLOGY DVD




## INSIDE THE LIVING CELL DVD



This highly visual tour of the processes that keep life operating will excite students with a new understanding of these fundamental units of life. Students learn how cells carry out the fundamental processes of life. The menu structure offers over 30 learning chapters that can be discussed and repeated as needed to assure that everyone is up to speed on the content.

Modules can be previewed and purchased individually - $84.58 each

**The Cell – Unit of Life** - Content: The Discovery of Cells, Cell Structures, Organelle Function, Cell Varieties, The Chemistry of Life

**The Outer Envelope** - Content: Membrane Structure, Osmosis, Transport Proteins, Active Transport, Cell Eating, Cell Drinking, Receptor Proteins

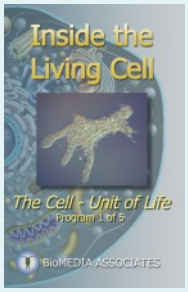
**How Cells Obtain Energy** - Content: ATP and Chemical Energy, Mitochondria, Aerobic Respiration, Chloroplasts, The Reactions of Photosynthesis

**How Cells are Controlled** - Content: The Protein Nature of Life, Enzymatic Reactions, Amino Acids and DNA, How Proteins are Built Turning on Genes

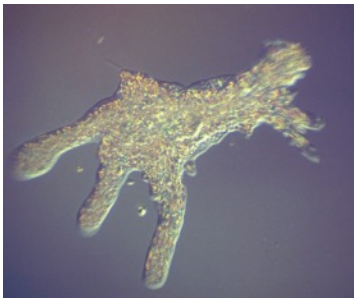
**How Cells Reproduce** - Content: DNA Structure, Replicating DNA Mutations Change the Genetic Code



| Cat.# | User Type | Price |
|---|---|---|
| BM-35DH | Individual/ Institutional | $ 268.84 |




## THE CELL: UNIT OF LIFE DVD



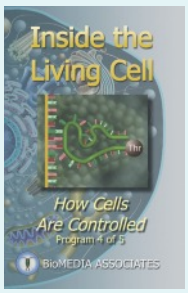
***The Cell: Unit of Life DVD*** shows the kinds of cells and emphasizes the fact that all cells have a common organization and how all cells carry out similar biochemical processes.

**Content:**

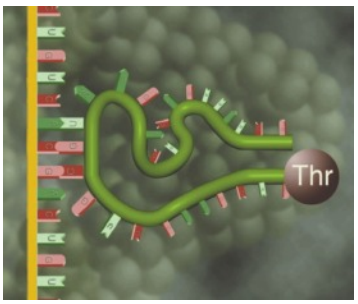
1. The Discovery of Cells
2. Cell Structures
3. Organelle Function
4. Cell Varieties
5. The Chemistry of Life



| Cat.# | User Type | Price |
|---|---|---|
| BM-351DH | Individual/ Institutional | $ 84.58 |




## HOW CELLS ARE CONTROLLED DVD



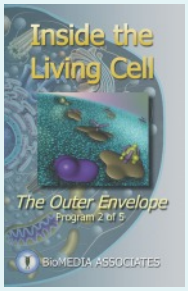

Illustrations show how genetic instructions carried on DNA are transcribed into RNA, leading to the production of specific enzymes that control the thousands of biochemical processes going on in living cells.

**Content:**

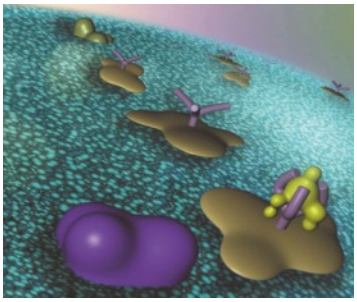
1. The Protein Nature of Life
2. Enzymatic Reactions
3. Amino Acids and DNA
4. How Proteins are Built
5. Turning on Genes



| Cat.# | User Type | Price |
|---|---|---|
| BM-353DH | Individual/ Institutional | $ 84.58 |




## THE OUTER ENVELOPE DVD



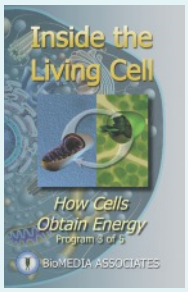
Here students become acquainted with the properties of the plasma membrane, how it governs the kinds of molecules that go in and out of cells, and how cells feed by engulfing (phagocytosis) and drink in fluids by pinocytosis.

**Content:**

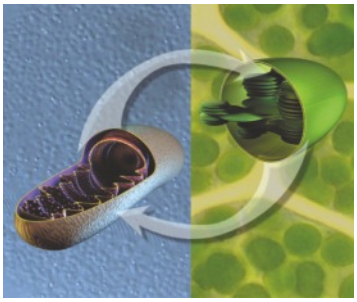
1. Membrane Structure
2. Osmosis
3. Transport Proteins
4. Active Transport
5. Cell Eating
6. Cell Drinking
7. Receptor Proteins

© 2006 Closed Caption - 15 minutes each module

| Cat.# | User Type | Price |
|---|---|---|
| BM-352DH | Individual/ Institutional | $ 84.58 |




## HOW CELLS OBTAIN ENERGY DVD



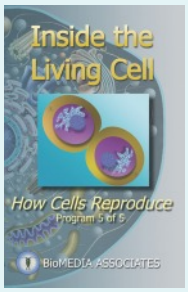
The ***How Cells Obtain Energy DVD*** illustrates the mechanisms of photosynthesis and cellular respiration. It introduces ATP, the universal energy carrier molecules that supplies energy hungry reactions, and shows the structure and function of Chloroplasts and Mitochondria, energy

**Content:**

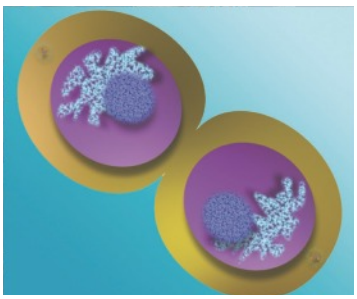
1. ATP and Chemical Energy
2. Mitochondria
3. Aerobic Respiration
4. Chloroplasts
5. The Reactions of Photosynthesis

© 2006 Closed Caption - 14 minutes each module

| Cat.# | User Type | Price |
|---|---|---|
| BM-354DH | Individual/ Institutional | $ 84.58 |




## HOW CELLS REPRODUCE DVD



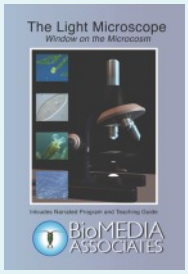
The ***How Cells Reproduce DVD*** shows how DNA replicates, how copy errors occur and are fixed by repair enzymes, how DNA is compressed into chromosomes making possible mitosis and cell division.

**Content:**

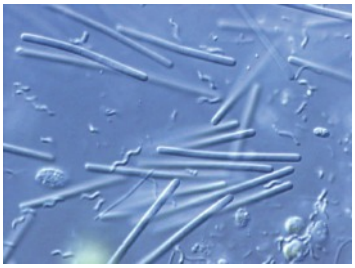
1. DNA Structure
2. Replicating DNA
3. Mutations Change the Genetic Code
4. Proofreading and Repair
5. The Stages of Mitosis

© 2006 Closed Caption - 15 minutes each module

| Cat.# | User Type | Price |
|---|---|---|
| BM-355DH | Individual/ Institutional | $ 84.58 |




## THE LIGHT MICROSCOPE DVD: Window on the Microcosm



Exploring the microworld can be enhanced using some easily applied techniques that are particularly useful for viewing living organisms. ***The Light Microscope*** program illustrates how to manipulate the lens and lighting systems of simple and compound microscopes for the best possible viewing of living organisms and prepared slides. Simple and compound microscopes, the limits of light, functions and techniques are covered in this program. Includes PDF Teaching Guide.

© 2010 Closed Caption - 15 minutes

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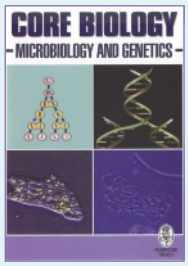
|---|---|---|
| BM-26DH | Individual/ Institutional | $ 107.18 |




## CORE BIOLOGY: MICROBIOLOGY AND GENETICS

***This DVD is included in the CORE BIOLOGY BUNDLE***


Microbiology, which includes genetics, is the story of understanding how the cell works. All life is cellular life ... All animal and plant tissue is made up of cells.. All infectious diseases are caused by invading cells ... Cell division is the process of creating all complex life ... And all genetic material is contained within the cell. The many cellular processes and the remarkable micro-world are presented in stunningly clear micro-videography in ***Core Biology: Microbiology and Genetics***.

Segments in this program are: 1673 - Anton Leeuwenhoek Describes Microscopic Life, 1838 - The Cellular Basis of Life, 1866 - Mendel's Laws of Inheritance, 1878 - Germ Theory of Disease, 1884 - The Structure of Cells, 1884 - Mitosis and Cell Division, 1905 - Meiosis, 1911 - Genes, 1967 - The Symbiotic Cell.

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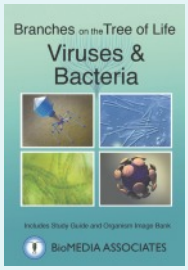
| Cat.# | User Type | Price |
|---|---|---|
| AB-16H | Individual/ Institutional | $ 83.33 |

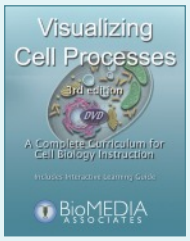



## THE BIOLOGY OF VIRUSES & BACTERIA DVD

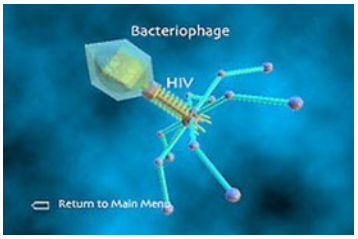
This program describes the discovery of viruses and their structure, how viruses are studied, how they infect their hosts, and how they replicate. Details are provided on the T-4 bacteriophage and retroviruses such as HIV. The bacteria section uses compelling microscopy of living bacteria to examine their structure, physiology, and behavior – and the vital roles these microbes play in the biosphere, including oxygen production (cyanobacteria), decomposition, nitrogen fixation, and as parasites as well as helpful symbionts. Includes PDF Teaching Guide and Image Bank.

© 2010 Closed Caption - 15 minutes

| Cat.# | User Type | Price |
|---|---|---|
| BM-29DH | Individual/ Institutional | $ 169.54 |




## VISUALISING CELL PROCESSES DVD - Third Edition





***Visualizing Cell Processes 3rd Edition DVD*** is a comprehensive program for teaching, learning, and understanding cell processes. The program consists of systematically arranged topics, making it the best tool available for mastering the concepts and vocabulary of cell biology for classroom and self-paced learning. The following modules can be purchased individually, Cells & Molecules DVD, Cell Movement & Transport DVD, Photosynthesis & Cellular Respiration DVD, The Genetic Code & It's Translations DVD, and the DNA Replication, Mitosis & Cell Reproduction DVD.

**Overview of Living Cells** - A Variety of Cells, Cell Organization, The Rise of Bacteria, Cyanobacteria & Oxygen, Eukarya Gets its Start

**DNA Structure and Cell Division** - Chromosome Condensation, Mitosis, Cytokinesis, Meiosis, Nucleotide Structure & Bonding, Replication Enzymes, Replicating the Strands, The Twisting Problem, Proofreading & Repair

**Genetic Code and Protein Synthesis** - The Protein Nature of Life, Protein Structure, Transcription, Translation & Protein Synthesis, Gene Regulation in Prokaryotes, Mutations, Introns & Exons

**Organic Molecules** - Carbon Bonding, Lip Structure, Protein Structure, Nucleic Acid Structure, Carbohydrate Structure

**Cell Movement & Transport** - The Plasma Membrane, Osmosis, Phagocytosis, Transport Proteins Pinocytosis, Golgi Function, Receptor-Mediated Endocytosis Microtubules, Lysosomes & Digestion Cilia, Motor Proteins

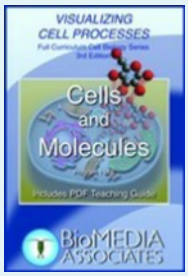
**Photosynthesis** - Chloroplast Structure, Light Trapping by Chlorophyll, The Light Dependent Reactions, Light Independent Reactions

**Cellular Respiration** - Glycolysis, Fermentation, Mitochondria, Krebs Cycle, Electron Transport Chain, ATP

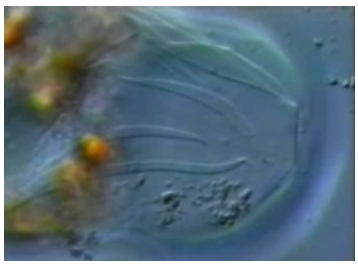
**Viruses and HIV** - T-4 Bacteriophage, HIV Structure & Life Cycle

© 2002 Closed Caption - 130 minutes

| Cat.# | User Type | Price |
|---|---|---|
| BM-27DH | Individual/ Institutional | $ 447.98 |




## CELLS & MOLECULES DVD



***Cells and Molecules*** is organized into short-play learning modules, for concise instruction. 15 minutes.

1. A Variety of Cells (1:25) Compares prokaryotes (spirilliform bacteria) and a eukaryote (small amoeba with prominent nucleus) and shows some of the diverse types of cells found in animals and plants.

2. Prokaryotes (00:40) Shows a Daphnia carcass undergoing bacterial decomposition; spiral bacteria 12 micrometers in length (from nutrient-rich pond water); a variety of decomposer bacteria, size range: 2-40 micrometers; Oscillatoria (from slow stream, near organic waste source).

3. Flagellates (00:38) Scenes include: Euglena (from pond sample), 60 micrometers (note the disc-shaped paramylum bodies used for starch storage); Peranema (from aquatic vegetation) 70-100 micrometers; Eudorina (pond plankton) 300 micrometers; Trichonympha (termite gut symbionts) 300-400 micrometers.

4. Amoebas (00:40) Organisms shown are: Amoeba (pond vegetation) 200 to 400 micrometers; Vahlkampfia (small amoeba from pond bottom), 20 micrometers; Arcella (pond scum), 80 micrometers.

5. Ciliates (1:00) Shows Paramecium (decomposing pond vegetation) 170 micrometers; Stentor (pond vegetation) 200 to 600 micrometers (the green coloration of the first species shown is due to symbiotic algae living in its cytoplasm); Euplotes (pond vegetation, bottom ooze) 70 to 150 micrometers (Euplotes represents a large group of ciliates that possess tendril-like cirri composed of fused cilia); Vorticella (on duckweed root) cells are about 70 micrometers across.

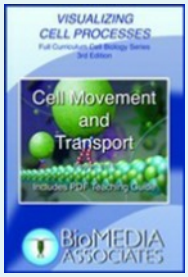
6. The Endosymbiotic Theory (1:10) A eukaryotic cell's energy transforming organelles, chloroplasts and mitochondria, appear to have originated as symbiotic prokaryotes.

7. Cell Organization (1:39) Provides an overview of the primary cell organelles: plasma membrane, nucleus, endoplasmic reticulum, Golgi bodies, lysosomes, mitochondria, and chloroplasts.

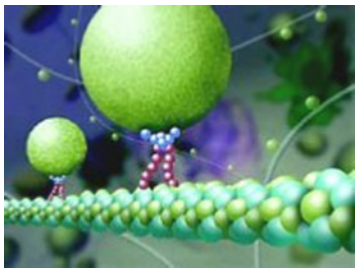
8. Overview of Organic Molecules (3:39) This module shows basic carbon bonding patterns, including the assembly and enzymatic breakdown of polymers.



| Cat.# | User Type | Price |
|---|---|---|
| BM-23DH | Individual/ Institutional | $ 107.18 |




## CELL MOVEMENT & TRANSPORT DVD



***Cell Movement and Transport*** is organized into short-play learning modules, for concise instruction.

1. Structure and Behaviour of the Plasma Membrane (00:57) Phospholipid bi-layers behave as a two dimensional fluid surrounding the cell.

2. Osmosis (2:25) Differences in water-potential between the cell interior and its surroundings affect the net movement of water into and out of a cell.

3. Transport Proteins (00:54) Biological membranes swarm with proteins that act as gates and channels, allowing substances to enter and leave cells.

4. Phagocytosis (1:39) Many types of free-living cells engulf food for digestion within food vacuoles.

5. Pinocytosis (00:25) Cells bring in nutrient fluids by incorporating them into small vesicles.

6. Receptor Mediated Endocytosis (00:47) Receptor proteins on the cell surface trap specific types of molecules that are taken in by endocytosis.

7. Golgi Function (00:38) The Golgi apparatus is a folded stack of membranes that sorts and packages cell products.

8. Lysosomes and Hydrolytic Digestion (1:20) Demonstrates the action of lysosomes and organelles that hold and transport hydrolytic enzymes.

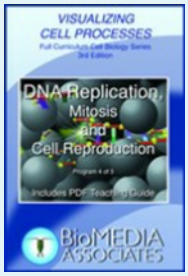
9. Microtubules (1:04) Quickly assembling and breaking down, microtubules create support structures and function in many kinds of cell movement.

10. Cilia (1:10) An amazing molecular hook and claw action drives the ciliary beat.

11. Actin and Myosin Motor Proteins (1:15) The interaction between these two proteins moves cell particles and produces the contraction of muscles.



| Cat.# | User Type | Price |
|---|---|---|
| BM-22DH | Individual/ Institutional | $ 107.18 |



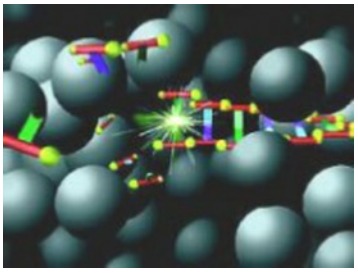

## DNA REPLICATION, MITOSIS & CELL REPRODUCTION DVD

***DNA and Cell Reproduction DNA and Cell Reproduction*** is organized into short-play learning modules, for concise instruction.

1. Mitosis: Chromosome Condensation (1:04) Shows the remarkable packaging of DNA as it condenses into chromosomes.

2. Mitosis: Stages (2:24) Reviews the chromosome patterns seen at different stages of the mitotic cycle.

3. Cytokinesis (00:30) Shows the basic differences between protist, animal and plant cell division.



4. Meiosis (1:00) Shows how chromosome sorting and crossing over introduces new gene combinations into a population, while achieving the reduction of chromosomes to the haploid number.

5.Nucleotide Structure and Bonding (1:26) Illustrates DNA chemistry, the basis for encoding genetic information in molecular structure.

6. Replication Enzymes (1:02) Demonstrates the chemical steps in DNA replication and shows how each step is accomplished by means of an enzyme.

7. Replicating the Leading and Lagging Strands (1:57) Because the two strands of DNA must be replicated in opposite directions, two different replication strategies are used at each replication fork.

8. Topoisomerase and the Twisting Problem (00:43) To prevent tightening of the helix as it is opened, an enzyme nicks the strand and allows it to rotate, relieving tension and permitting the replication fork to advance.

9. Proofreading and Repair (00:53) Damage to DNA is common, but a fleet of repair enzymes races over the DNA and corrects errors.

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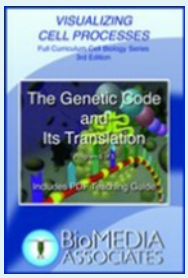
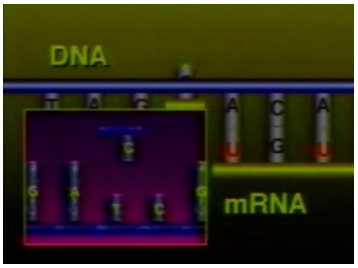


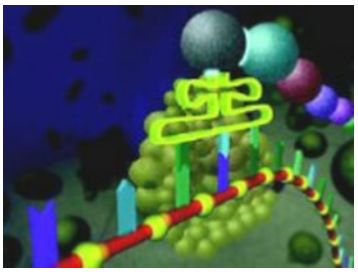

## THE GENETIC CODE & IT'S TRANSLATIONS DVD




***The Genetic Code and It's Translation*** video is organized into short-play learning modules, for concise instruction.

1. The Protein Nature of Life (1:25) Compares prokaryotes (spirilliform bacteria) and a eukaryote (small amoeba with prominent nucleus) and shows some of the diverse types of cells found in animals and plants.

2. Protein Structure (0:36) This module shows how 20 amino acids can produce an almost infinite number of proteins and how the shape of a protein is achieved.



3. Transcription (1:37) Shows how the DNA code is transcribed onto nucleotides of mRNA. The mRNA strands are then shown migrating into the cytoplasm where they are used as templates for synthesizing proteins.

4. Translation and the Protein Synthesis (1:31) Animates the functions of ribosomal RNA and transfer RNA in the translation of mRNA into a protein.

5. Gene Regulation in Prokaryotes (1:46) Production of the enzyme beta-galactosidase by lactose-digesting bacteria creates a model of the first gene regulation mechanism to be clearly understood Ñ the lac operon.

6. Classes of Eukaryote DNA (1:08) Not all of a cells functional DNA codes for large proteins. Short repeated sections code for small ones in high production, such as histones, while other repeat sections from the caps and centromere of chromosomes.

7. Exons and Introns (1:25) One of the great surprises in molecular biology was the discovery that up to 90 percent of a cells DNA is silent.

8. Mutations (1:44) This module illustrates several types of mutations that occur in DNA. Frame-shift mutations are the most damaging, whereas point mutations are a potential source of variety for evolutionary processes.

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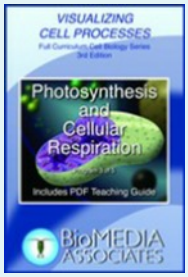
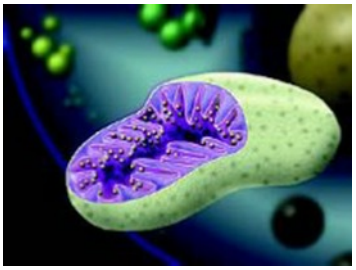



## PHOTOSYNTHESIS & CELLULAR RESPIRATION DVD

***Photosynthesis and Cellular Respiration*** is organized into short-play learning modules, for concise instruction.

**Cellular Respiration:**

1. Glycolysis and Fermentation (2:17) Glycolysis produces a net gain of two ATPs from a molecule of glucose, breaking it down into pyruvic acid.

2. Mitochondrion Structure (1:36) The internal structure of a mitochondrion can be understood in terms of compartmentalizing ATP production.

3. Aerobic Respiration (1:36) This module presents an overview of how energy is extracted from organic molecules using oxygen.

4. Krebs Cycle (1:03) Animation shows key steps in the energy extracting reactions that occur in the matrix of a mitochondrion.

5. Electron Transport Chain (1:16) Driven by oxygens thirst for electrons, proteins on the inner membrane pump hydrogen ions into the inner membrane space, creating conditions for ATP synthesis.

6. ATP Synthesis (00:51) Enzyme complexes on the inner mitochondrial membrane use a chemosynthetic process to synthesize ATP from ADP.

**Photosynthesis:**

7. Chloroplast Structure (00:44) The substructure of a chloroplast reflects its photosynthetic functions.

8. Light Trapping by Chlorophyll (00:55) Chlorophyll molecules form complexes that feed energized electrons into an electron transport chain.

9. The Light-Dependent Reactions of Photosynthesis (1:26) These reactions produce ATP and NADPH, the energy carriers that drive biosynthesis.

10. The Light-Independent Reactions of Photosynthesis (1:18) A cycle of reactions creates PGAL, the universal building block of sugars and starches.



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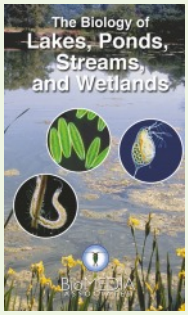
# BOTANY & ZOOLOGY DVD




## THE BIOLOGY OF PONDS, STREAMS AND WETLANDS DVD

**The Weedy Shallows**: Hydras, planarians, annelids, aquatic insects, rotifers, and protists, all interesting organisms that provide food for fish and other vertebrates.

**Open Water Environments**: Adaptations are observed in Daphnia and other cladocerans, copepods, rotifers, and planktonic algae.

**Bottom Environment**: Explores bacterial decomposition, recycling of materials, and ecological relationships in the bottom community.

**Stream Life, Inhabitants, and Adaptations**: This section takes a revealing underwater look at the highly specialized organisms that live in rapids, under rock communities, and in slower waters.

**Wetlands**: Investigates adaptations for life in wetland environments.

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## THE BIOLOGY OF THE SEASHORE DVD

**Abiotic and Biotic Factors:** Tides, wave shock, desiccation, and food.

**Adaptations for Wave Shock:** The variety of body forms and structures found in an environment ripped by waves.

**Defense:** Examines structural, chemical, and behavioral adaptations that protect animals in this crowded environment.

**Feeding:** Looks at adaptations used to harvest the abundant food sources of the shore.

**Reproduction:** Examines asexual and sexual strategies and the importance of larval development in the plankton.

**Rocky Shores, Sandy Beaches, Mudflats, Docks:** Reveals complex webs of life living in these accessible habitats.

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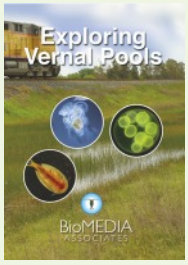


## EXPLORING VERNAL POOLS

The seasonal temporary wetlands, commonly known as vernal pools, are a menagerie of diverse and fascinating organisms. This program contains two parts: a non-narrated observation section and a fully narrated instructional section, including tips on how to collect and examine live organisms in the classroom or lab. It examines a diversity of vernal pool species from several groups: protozoans, bacteria, rotifers, flatworms, ostrocods, waterfleas, copepods, clam shrimp, fairy shrimp, tadpole shrimp, and aquatic insect larvae.

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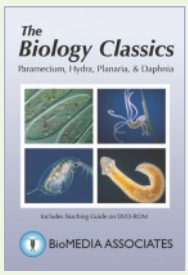
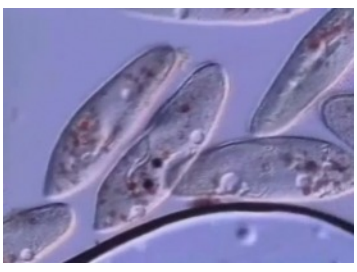



## PARAMECIUM, HYDRA, PLANARIA, AND DAPHNIA



The classics acquaint students with four organisms often studied in biology. This program introduces students to four organisms we call the Biology Classics, which are featured in most biology textbooks. Studying these "classics" broadens our concept of what it means to be alive. Structure, behavior, feeding, reproduction, and ecology are observed in each organism, allowing students to compare them. Detailed study guides that can be printed for student use are provided.

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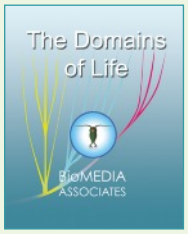


## THE DOMAINS OF LIFE

### Three Great Branches: Archaea, Bacteria & Eucarya

***The Domains of Life*** updates the five kingdoms classification scheme with the latest understanding of life's organization based on DNA, fossil, and biochemical evidence, reorganizing all life into three great branches: Archaea, Bacteria, and Eucarya. Concise animations and superb microscope footage of primitive cells show events that shaped life as we know it today.

### TOPICS INCLUDE:

Self-Replicating Molecules Evolve
The Archaeans: Earth's First Inhabitants
The Rise of Bacteria
Photosynthesis and Oxygen
Nucleated Cells Get Their Start
The Evolution of Mitochondria
The Domains of Life
The Eukaryotic Cell Evolves
Motor Proteins Get Cells Moving
Mitosis Assures Genetic Continuity
Plastids Evolve Through Endosymbiosis
The Red, Brown, and Green Lines
The Invention of Sex
The Origins of Multi-cellular Organisms

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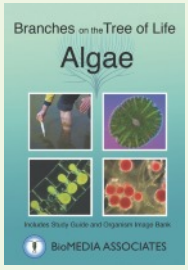


## THE BIOLOGY OF ALGAE

The term algae is a catchall for several evolutionary lines of photosynthetic organisms: dinoflagellates, red algae (plastids with chlorophyll A), diatoms, yellow-brown algae and brown algae (chlorophylls A and C), and green algae (chlorophylls A and B). This program explores the diversity, structure, ecological roles, and modern classification of these vital primary producers.

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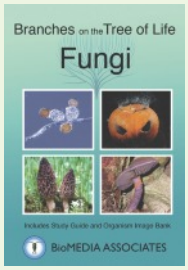


## THE BIOLOGY OF FUNGI

Fungi explores the structure, life cycles, ecology, classification, and evolutionary relationships of four major lines of fungi: Chytrids, Zygomycetes (various molds), Ascomycetes (yeasts, cup fungi, and most lichens), and Basidiomycetes (rusts and mushrooms). Emphasis is on adaptations and reproductive mechanisms.

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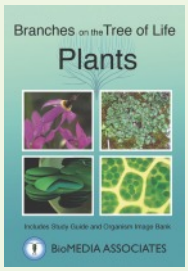


## THE BIOLOGY OF PLANTS

Clear graphic animation is used to describe the molecular-level mechanisms of photosynthesis including light-trapping by chlorophyll, how energized electrons are transported through proteins embedded in the thylakoid membrane, and how their energy fuels reactions that produce ATP and NADPH. Carbon dioxide feed a cycle of reactions that form the simple sugar glucose, a basic cell fuel. Major plant groups are featured in this program including mosses, liverworts, ferns, horsetails, gymnosperms and flowering plants. Observation section of living plant structures and Image Bank of 200 images of plant phyla, structures, and illustrations.

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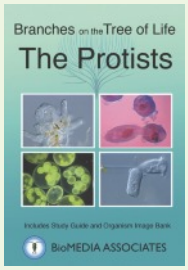
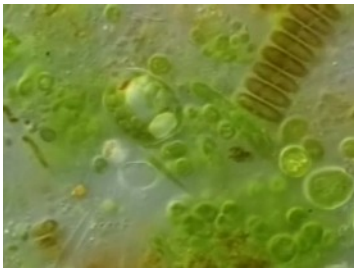



## THE BIOLOGY OF PROTISTS

The term protist covers a wide range of microscopic organisms formerly clumped into "Kingdom Protista." New molecular analyses show that the protistan lines of evolution go so far back in time they can be considered as different kingdoms of life. Through stunning photography of living protists, students are introduced to amoebas, flagellates, algae, and the elegant ciliated protists in ten learning modules.



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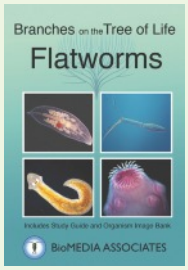


## THE BIOLOGY OF FLATWORMS

This program shows the structure, behavior, and life cycles of planarians and their free-living relatives (class Turbellaria). It illustrates the bizarre life cycles of flukes (class Trematoda) and tapeworms (class Cestoda) with detailed animations and revealing images of these parasites in action.

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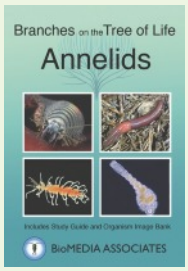


## THE BIOLOGY OF ANNELIDS

Worms with segmented bodies make up the Phylum Annelida. This program explores the three classes of annelids: Class Polychaeta (feeding, locomotion, and larval stages), Class Oligochaeta (lifestyles, feeding adaptations, and anatomy of freshwater oligochaetes and earth worms), and Class Hirudinea (leeches, crayfish, and worms show adaptations for commensal, parasitic, and scavenger lifestyles). DNA evidence places annelids close to the molluscs on the tree of life.

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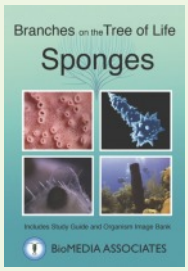


## THE BIOLOGY OF SPONGES

Imagine an animal with no mouth, no digestive system, no excretory or circulatory organs, no brain nor nervous system, and no movement as an adult. In spite of their simple nature, sponges are actually one of the most fascinating animal phyla, when viewed in developmental, ecological, and evolutionary terms. Through animations and timelapse microscopy, this program clarifies the structure, function, classification, and ecological roles of sponges.

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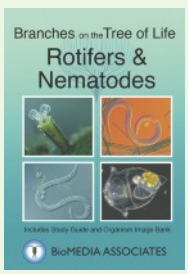


## THE BIOLOGY OF ROTIFERS & NEMATODES

The diversity of rotifers is stunning, and this program shows many different species. Planktonic rotifers have special adaptations for open water life. Nematodes (roundworms) include a number of important human parasites, seldom seen but easily found. Tree moss, leaf litter, and compost piles swarm with nematodes.

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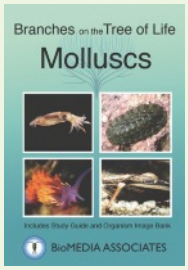


## THE BIOLOGY OF MOLLUSCS

Phylum Mollusca is the second most diverse phylum of animals, with over 100,000 known species. First examined are the basic characteristics of the phylum - a soft body, muscular foot, mantle cavity with gill, and hard calcified shell. The four most familiar classes of molluscs (chitons, gastropods, bivalves, and cephalopods) are studied in depth, viewing structure, life history, adaptations, and ecological interactions.

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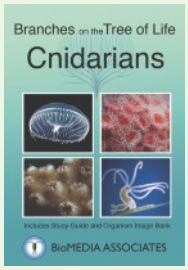


## THE BIOLOGY OF CNIDARIANS

The program begins with a remarkable series of observations on Hydra including: habitat, structure, feeding, nematocyst discharge, locomotion (by looping), and its sexual and asexual reproductive strategies. Obelia illustrates the two-stage life cycle found in many cnidarians. Examining the biology of jellyfish (class Scyphozoa), sea anemones, and corals (class Anthozoa) rounds out our treatment of phylum Cnidaria.

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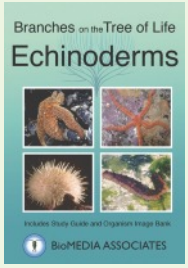
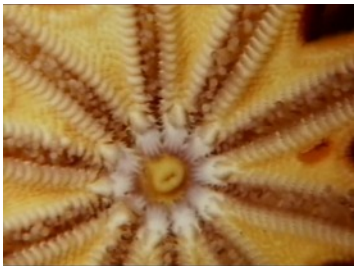



## THE BIOLOGY OF ECHINODERMS

Echinoderms are one branch of the deuterostome line of animal evolution, the branch to which Chordates also belong. Narrated modules cover phylum characteristics and key biological details for five classes: sea stars, brittle stars and basket stars, sea urchins and sand dollars (including developmental stages), sea cucumbers, and crinoids (feather stars).



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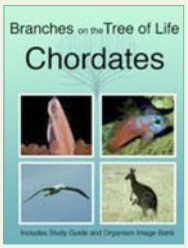
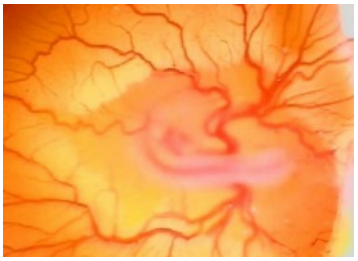



## THE BIOLOGY OF CHORDATES

The Phylum Chordata includes tunicates, sea lancelets, hagfish, and all familiar vertebrate animals. This program explores how these seemingly diverse animals evolved and how the group is unified by four characteristic structures: a hollow dorsal nerve chord, a supportive notochord, gill slits, and a post-anal tail. Key milestones in vertebrate evolution included improvements in swimming and feeding, the evolution of paired fins and a primitive lung, movement onto the land, and the amniotic egg.



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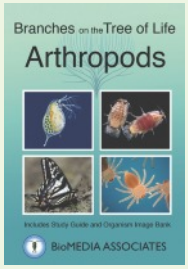


## THE BIOLOGY OF ARTHROPODS

Phylum Arthropoda is the most luxuriant branch on the tree of life. This program covers phylum characteristics and three major arthropod classes: Crustaceans (copepods, waterfleas, branchiopods, decapods, and barnacles), Chelicerates (scorpions, pseudoscorpions, spiders, ticks, and mites), Uniramians (centipedes, millipedes, and insects). In each section the focus is on adaptations, life cycles, and evolutionary relationships.

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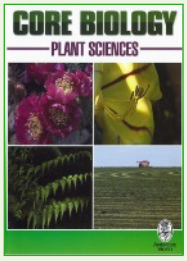
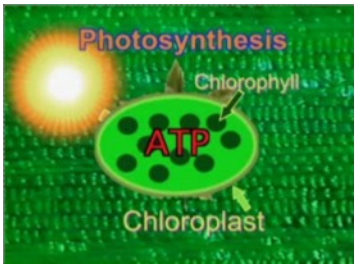



## CORE BIOLOGY: PLANT SCIENCES

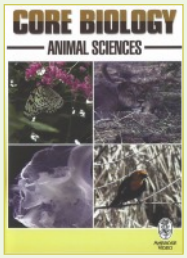
***This DVD is included in the CORE BIOLOGY BUNDLE***




Jared Diamond's central thesis in his best-selling book, Guns, Germs and Steel, is that the fate of human societies has always depended upon their skills as farmers ... This is what the plant sciences have always been about. Plant sciences or botany! No biological science has transformed society more than the successive waves of agricultural revolutions - new ways of growing more food. It started with the domestication of cereal crops - wheat, rice and corn. And in the 20th century, the green revolution has allowed nearly 7 billion people to live on the planet. The story of botany leads from the founding of agriculture and medicinal plants to understanding plant physiology and reproduction to the founding of genetics to finally understanding the miracle of photosynthesis.

© 2010 Closed Caption - 15 minutes

| Cat.# | User Type | Price |
|---|---|---|
| AB-17H | Individual/ Institutional | $ 83.33 |




## CORE BIOLOGY: ANIMAL SCIENCES

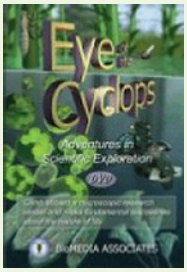
***This DVD is included in the CORE BIOLOGY BUNDLE***

An exciting ride through the world of animal classification, physiology, behavior, and communication. Today the Animal Sciences, Zoology, form the knowledge basis for such diverse disciplines as human physiology and nutrition ... Genetics and animal breeding ... And the exciting field of wildlife ecology. For the first time the scientific discoveries that provide insight into the nature of animal classification, physiology and behavior are brilliantly brought together in one program. Arranged chronologically, each discovery is presented with clear graphics and brilliant High Definition footage.

© 2010 Closed Caption - 15 minutes

| Cat.# | User Type | Price |
|---|---|---|
| AB-14H | Individual/ Institutional | $ 83.33 |

BUNDLE and SAVE - with the 4 DVD BIOLOGY BUNDLE - **$283.08**




## ADVENTURES IN SCIENTIFIC EXPLORATION DVD

Climb aboard the Cyclops, a microscopic research vessel, and investigate an amazing hidden world on which all living things depend. This series makes an excellent introduction to biological classification, diversity and ecology. The PDF teaching guide for each program describes follow-up activities and correlates the programs to the National Science Standards.

***Adventures in Scientific Exploration*** features voyages of discovery into nine environments: 3 pond regions, 2 stream, 2 woodland, 2 urban yard. The DVD also contains a bonus exploration journal filled with video observations, information about the organisms, and life cycle details. The Cyclops Technical Manual, through using animation and cutaway graphics, explores the design features of the imaginary vehicles used by the scientists in these ecological investigations.

**POND** - Explore the open water plankton, the weedy shallows predators and protozoa, and bottom decomposers. Open Water, Bottom Ooze, Aquatic Weed Forest.

**STREAM** - Study the adaptations of aquatic insect larvae for surviving in the violent torrent of rapids and waterfalls. Down the Rapids, Over the Falls.

**FOREST** - Trees and dead wood return to the soil with the help of bacteria, fungi, insects, and other decomposers. The Living Humous, The Rotting Log.

**BACKYARD** - Exploring a vibrant ecosystem of pollinators, predators, and spineless animals that till the soil. Plant Minders, Earth Movers.

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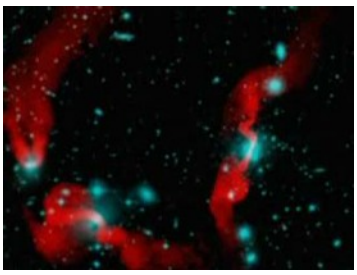
| Cat.# | User Type | Price |
|---|---|---|
| BM-42DH | Individual/ Institutional | $ 186.95 |

# EARTH SCIENCES DVD


## CORE ASTRONOMY

***Core Astronomy*** examines the key points in the development of astronomy, beginning with Greek astronomer Ptolemy's earth centered paradigm to Nicolaus Copernicus' introduction of a sun centered solar system, and Isaac Newton's three laws of motion. It then examines the discovery of Neptune, Einstein's theories of Special and General Relativity, Hubble's expanding universe, and the discoveries of quasars, white dwarfs, neutron stars, pulsars and black holes, and finally ends with astronomy's modern frontiers - the great attractor, dark matter and life existing on an extrasolar planet.



© 2007 Closed Caption - 38 minutes

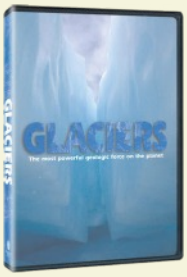
| Cat.# | User Type | Price |
|---|---|---|
| AB-13H | Individual/ Institutional | $ 83.33 |


## CORE GEOLOGY

Not since the discovery of gold in 1848 has the understanding of the world's geology been more important to the welfare of the nation. Throughout history the rise and fall of civilizations has been propelled by the abundance and scarcity of valued resources. At no time has this been truer than in the 21st century. Whether it is the search for oil or silicon to make microchips or uranium to run power plants, the search is directed by geologists. In ***Core Geology***, the building blocks of this most contemporary science are laid out in a logical order, including the meaning of the fossil record.

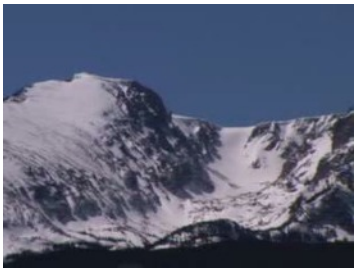
© 2007 Closed Caption - 30 minutes

| Cat.# | User Type | Price |
|---|---|---|
| AB-9H | Individual/ Institutional | $ 83.33 |




## GLACIERS

The most powerful geologic force on the planet - glaciers. Glaciers can dominate an entire continent ... Can reshape a continent's surface features in the blink of a geologic eye ... All the spectacular mountain peaks that inspire us have been shaped by glaciers. Includes interviews with leading glacial experts from around the country.



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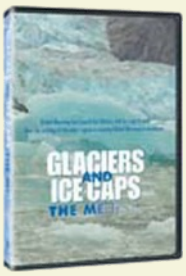
| Cat.# | User Type | Price |
|---|---|---|
| AB-4H | Individual/ Institutional | $ 83.33 |

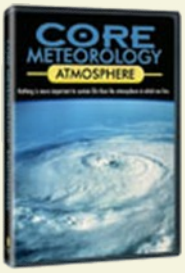



## GLACIERS AND ICE CAPS: THE MELTING

The change from a solid state, snow and ice, to a liquid state, water, makes the Arctic sensitive to climate change and introduces many dangerous positive feedback loops that can drive sudden detrimental climate shifts. Detrimental climate shifts that can affect the whole planet and human civilization. Includes interviews with leading glacial experts from around the country.

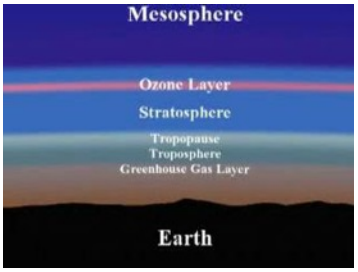
© 2008 Closed Caption - 30 minutes

| Cat.# | User Type | Price |
|---|---|---|
| AB-3H | Individual/ Institutional | $ 83.33 |




## CORE METEOROLOGY: ATMOSPHERE

This program presents the principles of atmospheric dynamics. The Earth's atmosphere is a dynamic balance of gases and sunlight that allows for the possibility of life. The Earth's atmosphere has a unique composition, structure and life sustaining Bio/Geo/Chemical cycles in its lower reaches. The program also shows how these atmospheric elements are being impacted by the unprecedented burning of fossil fuels.

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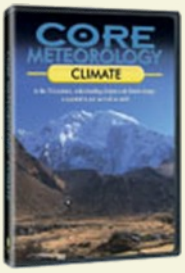
| Cat.# | User Type | Price |
|---|---|---|
| AB-5H | Individual/ Institutional | $ 83.33 |




## CORE METEOROLOGY: CLIMATE

This program clearly defines what climates are ... Presents the relationships between climates and biomes, and climates and people ... And describes the six major climate types. Lastly, it shows how weather extremes play a major role in each climate type.

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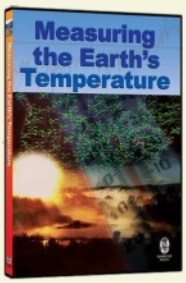
| Cat.# | User Type | Price |
|---|---|---|
| AB-6H | Individual/ Institutional | $ 83.33 |


## CORE METEOROLOGY: WEATHER

This program presents the principles of weather dynamics. It shows how weather conditions are measured, How computer models are used to predict the weather and, The special role of moisture in producing weather phenomena ... And finally, the impact of hazardous weather..

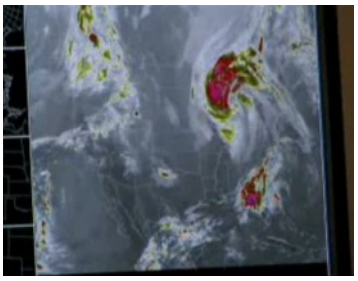
© 2008 Closed Caption - 30 minutes

| Cat.# | User Type | Price |
|---|---|---|
| AB-7H | Individual/ Institutional | $ 83.33 |




## MEASURING THE EARTH'S TEMPERATURE

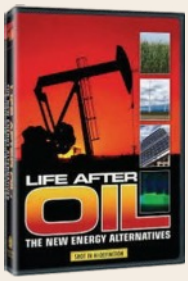
Starting with temperature records collected over 100 years ago, Measuring the Earth's Temperature takes the viewer from the earliest weather stations and balloon launches, to a network of super weather stations constructed in the 21st century.



© 2010 Closed Caption - 29 minutes

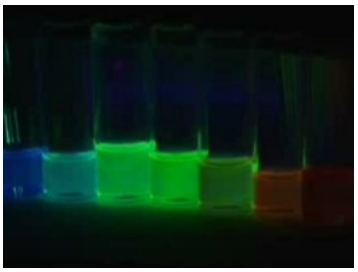
| Cat.# | User Type | Price |
|---|---|---|
| AB-1H | Individual/ Institutional | $ 83.33 |

# ENVIRONMENTAL SCIENCE DVD




## LIFE AFTER OIL: THE NEW ENERGY ALTERNATIVES

The six alternative energies that will free us from dependence on foreign oil. The challenge for our future is to make use of alternative sources of energy to replace our dependence on fossil fuels: oil and coal. Right now, such sources are right before us. All we need to do is to scale up what already exists in the laboratory. This program shows how we can do this through technological innovation and will power.



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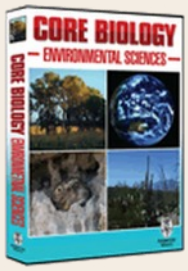
| Cat.# | User Type | Price |
|---|---|---|
| AB-8H | Individual/ Institutional | $ 83.33 |




## CORE BIOLOGY: ENVIRONMENTAL SCIENCE

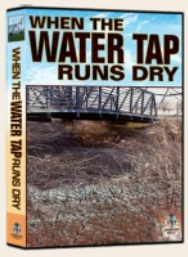
***This DVD is included in the CORE BIOLOGY BUNDLE***

The wonders of ecology and ecosystems revealed. A seminal moment in mankind's history occurred when in 1949 Aldo Leopold announced the concept of a land ethic: "We are all part of the greater interconnected whole of plants animals and microorganisms." Out of this pronouncement was born the new science of environmental studies.

© 2009 Closed Caption - 40 minutes

| Cat.# | User Type | Price |
|---|---|---|
| AB-15H | Individual/ Institutional | $ 83.33 |

BUNDLE and SAVE - with the 4 DVD BIOLOGY BUNDLE - **$283.08**




## WHEN THE WATER TAP RUNS DRY

The greatest impacts from climate change will not be warmer temperatures but water shortages. Learn how America's water infrastructure is incapable of handling these changes. There exist solutions that will make us rethink everything from how we use water, to where we live, to who owns water.

© 2006 Closed Caption - 116 minutes

| Cat.# | User Type | Price |
|---|---|---|
| AB-2H | Individual/ Institutional | $ 83.33 |

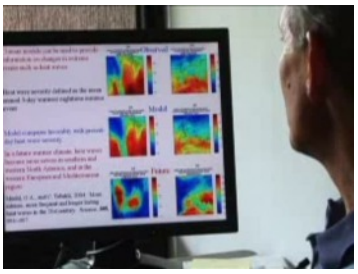

## GLOBAL WARMING: SCIENCE AND SOLUTIONS

Our planet is warming; it's significantly warmer in the 21st century than it was in the last third of the 20th century. Indeed, four of the warmest years on record have occurred in this century. This global warming is being forced by the unabated burning of fossil fuels pouring CO2 into the atmosphere ... And this warming appears to be forcing dramatic regional and worldwide climate shifts. This series takes you through the Science of Global Warming and the Solutions. We need only to trust the science and work together to implement these solutions... solutions we can no longer afford to ignore.

© 2006 Closed Caption - 116 minutes

| Cat.# | User Type | Price |
|---|---|---|
| AB-14H | Individual/ Institutional | $ 83.33 |


## GLOBAL WARMING: THE RISING STORM



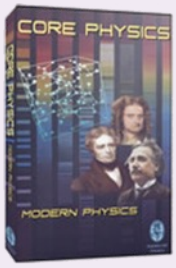
How much irreversible change to our atmosphere has already occurred? Can we control the devastating effects that the burning fossil fuels will cause? If there is not an immediate global initiative to save the planet, what will the future hold? In the last half of the 20th century, scientists began understanding that industrialization and the effects of explosive population growth were affecting the fundamental structure and composition of earth's atmosphere. Man's ever-increasing thirst for energy, quenched by the burning of fossil fuels, has dramatically increased greenhouse gases in the lower atmosphere.

We are now experiencing the first impact of these accumulating gases: A general warming of the planet. This DVD examines and explains this phenomenon, and looks into the future where other, more deadly impacts are predicted to follow. In the first decade of the 21st century, we find ourselves at the precipice of a dangerous, rising storm.



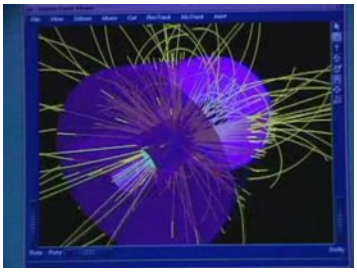
| Cat.# | User Type | Price |
|---|---|---|
| AB-18H | Individual/ Institutional | $ 116.83 |

# PHYSICS & CHEMISTRY DVD




## CORE PHYSICS: MODERN PHYSICS

In the long history of physics, a series of discoveries and laws laid the foundation for how the universe works. In Core Physics these discoveries and laws are laid out in chronological order, each naturally building on the former. This program covers modern physics . The period of time which brought us new paradigms of how the universe works and our place in it.



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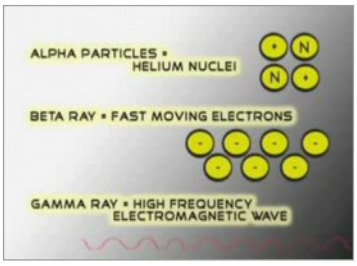
| Cat.# | User Type | Price |
|---|---|---|
| AB-12H | Individual/ Institutional | $ 83.33 |


## CORE PHYSICS: THE CLASSICAL PHYSICS

In the long history of physics, a series of discoveries and laws laid the foundation for how the universe works. In Core Physics these discoveries and laws are laid out in chronological order, each naturally building on the former. This program covers classical physics... the period which led to the Industrial Revolution and modern technology.

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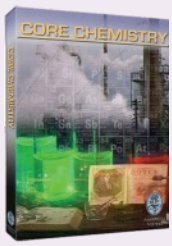
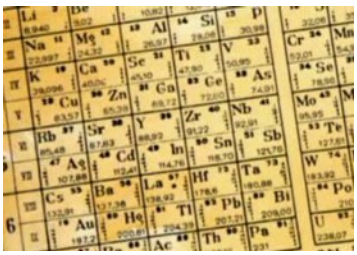
| Cat.# | User Type | Price |
|---|---|---|
| AB-11H | Individual/ Institutional | $ 83.33 |




## CORE CHEMISTRY

Future problems of energy, food, medicines and materials are the problems of chemistry. No science is more at the core of every technology that supports the seven billion people living on the planet today than chemistry. Chemistry is at the base of the foods, medicines, fuels and materials that are the hallmarks of modern life.



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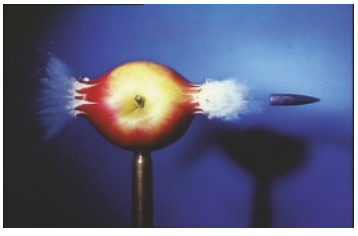

## HIDDEN BY TIME: Seeing the Physical World with High-Speed Cameras

In a world of motion, many events simply happen too fast to be seen with the unaided eye. With the aid of high-speed cameras, physical events which normally go unnoticed come to life to produce extraordinary sights. High-speed images reveal the awe and wonder of the physical world and provide an intriguing introduction to the study of physics. *Hidden by Time* is a collection of numerous physical events captured with high-speed cameras for classroom study. The program is comprised of high-speed motion events as well as high-speed still images.

**High-Speed Motion Events (Approximately 30 Minutes) -** Imaging of high-speed motion events was accomplished using a recently developed high-speed digital camera operating at 1000 and 2000 frames/sec; shutter speed of 0.04 milliseconds. Contained in the program are over 70 high-speed sequences involving impacts, collisions, and fluid behaviours.

**High-Speed Still Images (50 Images) -** Included in the collection of high-speed stills are over 20 classic images produced by Dr. Harold Edgerton, distinguished for his pioneering work in high-speed photography. Other high-speed still images were produced by Charles Miller, Massachusetts Institute of Technology; and Loren Winters, North Carolina School of Science and Mathematics.

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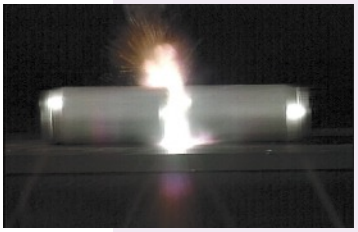
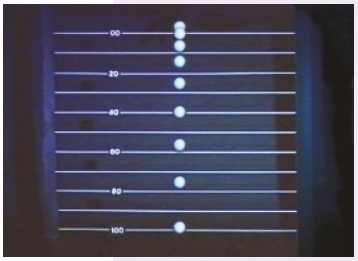
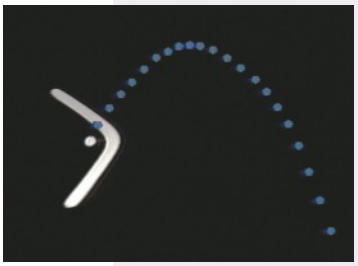
| Cat.# | User Type | Price |
|---|---|---|
| PCI-35DH | Individual/ Institutional | $ 120.89 |

## PHYSICS DEMONSTRATIONS IN MECHANICS DVD, Part 1 and 2







**Contents of Part 1: Uniform and Accelerated Motion:** Position-Time Observations (Stroboscopic Photography), **Gravitational Acceleration:** Determination of g (Stroboscopic Photography), **Projectile Motion:** Simultaneous Fall (Stroboscopic Photography), **Projectile Motion:** Monkey and Hunter, **Projectile Motion:** Trajectory of a Projectile (Stroboscopic Photography), **Circular Motion:** Direction of Centripetal Force, **Circular Motion:** Centrifugal Effects on Rotating Sphere, **Circular Motion:** Motion in a Vertical Plane, **Conservation of Energy:** Minimum Critical Velocity on a Vertical Loop, **Work and Conservation of Energy:** Energy Transformations on a Double Incline.

**Contents of Part 2: Newton's 1st Law:** Rest Inertia of Massive Ball, **Newton's 2nd Law:** Effects of a Varied Net Force on a Body's Motion, **Newton's 3rd Law:** Reaction Cart/Projected Ball Bearings, **Terminal Velocity:** Air Resistance Acting on a Free-Falling Body (Stroboscopic Photography), **Motion of Centre of Mass:** System with Internally Moving Components, **Motion of Centre of Mass:** Projected Boomerang & Tennis Racket (Stroboscopic Photography), **Conservation of Momentum:** Determination of a Bullet's Velocity, **Conservation of Momentum:** Internal Explosion,**Conservation of Angular Momentum:** System of Rotating Spheres, **Free-Fall Paradox:** Falling Chimney, **Centre of Percussion:** Impulsive Forces Delivered to a Baseball Bat.

| Cat.# | Licences | Price |
|---|---|---|
| PCI-8DH | Part 1 - Individual/ Institutional | $ 109.47 |
| PCI-9DH | Part 2 - Individual/ Institutional | $ 109.47 |
| PCI-10DH | Part 1 & 2 - Individual/ Institutional | $ 185.97 |

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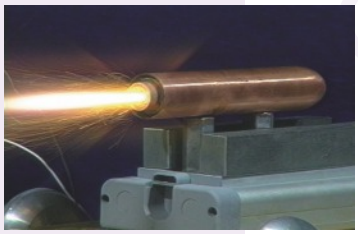

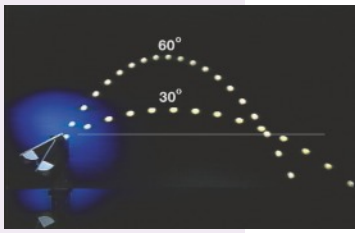



## PHYSICS DEMONSTRATIONS IN MECHANICS DVD, Parts 3, 4, 5 and 6

**Contents of Part 3: Graphical Analysis of Motion:** Car Accelerating on Highway (Computer Animation), **Vector Addition:** Object Travelling on Moving Surface, **Velocity and Acceleration Vectors:** Direction of **v** and **a** during Acceleration and Deceleration, **Newton's 1st Law:** Rest Inertia of Bursting Water Balloon; Shattering Flask; and Concrete Block Receiving Sharp Blow (High Speed Film), **Newton's 1st Law:** Motion Inertia of Steel Wedge Splitting Board; Ketchup Cart (High Speed Film), **Frame of Reference:** A Galactic Observer/Relative Motion (Computer Animation), **Frame of Reference:** Inertial and Non-inertial Reference Frames.

**Contents of Part 4: Fundamental Forces**: Gravitational, Electromagnetic, Strong, and Weak Forces *Computer Animation,* **Mass and Weight:** Weightlessness during Free-fall, **Newton's 2nd Law:** Force and Acceleration of a Rocket Powered Car, **Newton's 3rd Law:** Action-Reaction Forces of a Liquid Nitrogen Cannon, **Newton's 2nd and 3rd Laws:** Helicopter Dynamics, **Force Components:** Perpendicular Force Applied to Tension Cable, **Newton's Law of Universal Gravitation:** Cavendish Experiment *Time Lapse Film.*

**Contents of Part 5: Projectile Motion:** Ballistics Cart/Horizontal Components of Motion, **Projectile Motion:** Trajectory and Range Analysis, **Circular Motion:** Centripetal Force and Tangential Velocity, **Circular Motion:** Unique Behavior of a Rotating Chain, **Impulse and Momentum:** Egg Impacting Rigid Surface and Water Column, High Speed Film, **Characteristics of Collisions:** Elastic and Inelastic Collisions, **Elastic Collision:** Duration and Magnitude of Impact Forces.

**Contents of Part 6: Conservation of Momentum:** Strobe Analysis of Two-Dimensional Collisions, **Motion of Center of Mass:** Rigid and Non-Rigid Bodies, **Work and Energy:** Work Performed by Falling Mass High Speed Film, **Work and Energy:** Quantitative Analysis of Bow & Arrow System, **Rotational Dynamics:** Behavior of a Gyroscope, **Physics Teasers/ Predict the Outcome:** A Collection of Puzzling Physical Events.

| Cat.# | Licences | Price |
|---|---|---|
| PCI-11DH | Part 3 - Individual/ Institutional | $ 109.47 |
| PCI-12DH | Part 4 - Individual/ Institutional | $ 109.47 |
| PCI-13DH | Part 5 - Individual/ Institutional | $ 109.47 |
| PCI-14DH | Part 6 - Individual/ Institutional | $ 109.47 |
| PCI-15DH | Part 3 to 6 - Individual/ Institutional | $ 360.53 |
| PCI-36DH | Part 1 to 6 - Individual/ Institutional | $ 547.60 |

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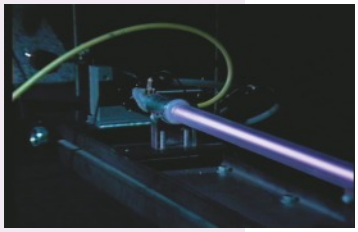
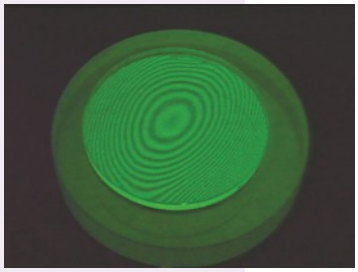




## PHYSICS DEMONSTRATIONS IN LIGHT DVD, Part 1 and 2

***Physics Demonstrations in Light*** is a two-part video program which presents a full range of demonstrations in the areas of geometrical optics, physical optics, and the nature of light. The program was developed in an effort to give physics teachers a comprehensive collection of video demonstrations, supplementing the instructor's live classroom demonstrations. The program was designed to meet the needs of high school physics classes as well as introductory level college physics classes.

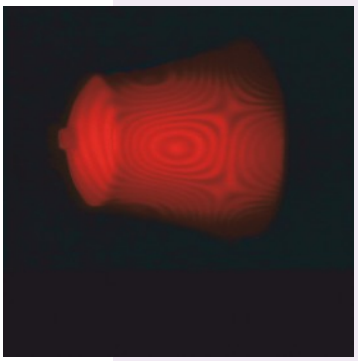
**Contents of Part 1: Propagation of Light:** Determination of the Speed of Light, **Visible and Infrared Spectrum:** White Light Dispersed on a Spectrum Recorder, **Inverse Square Law:** Light Intensity at Increasing Distances, **Refraction/Total Internal Reflection:** Light Incident on a Water-Air Interface, **Refraction/Schlieren Image:** Variations in the Index of Refraction of Air, **Refraction:** Simulation of Atmospheric Refraction, **Rayleigh Scattering:** Blue Sky and Sunset Simulation, **Laser Theory:** High Power $CO_2$ Laser.

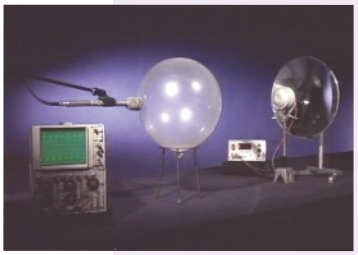
**Contents of Part 2: Interference/Interferometer:** Interference of White Light and Laser Light, **Interference/Interferometer:** Determination of the Wavelength of Light, **Diffraction and Interference:** Double-Slit Interference, **Diffraction and Interference:** Single-Slit Diffraction, **Diffraction and Interference:** Microwave Diffraction, **Thin Film Interference:** Newton's Rings/Air Wedge with Monochromatic Light, **Diffraction and Interference:** Diffraction Patterns Produced by Various Objects, **Holography:** The Making of a Hologram.

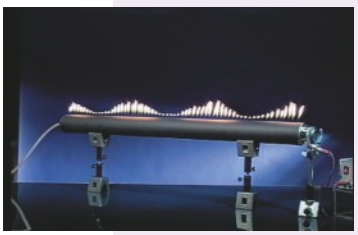
| Cat.# | Licences | Price |
|---|---|---|
| PCI-24DH | Part 1 - Individual/ Institutional | $ 109.47 |
| PCI-25DH | Part 2 - Individual/ Institutional | $ 109.47 |
| PCI-26DH | Part 1 & 2 - Individual/ Institutional | $ 185.97 |



## PHYSICS DEMONSTRATIONS IN SOUND AND WAVES DVD, Part 1, 2 & 3







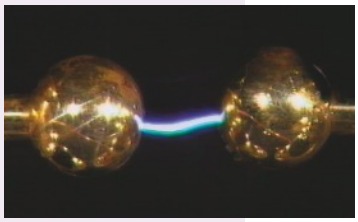
Physics Demonstrations in Sound & Waves is a three-part video program which presents a full range of demonstrations in the areas of sound, vibrations, and wave behavior. The program was developed in an effort to give physics teachers a comprehensive collection of video demonstrations, supplementing the instructor's live classroom demonstrations. Three-dimensional computer animation is used to augment many of the demonstrations, providing a graphical representation of the physical behavior.

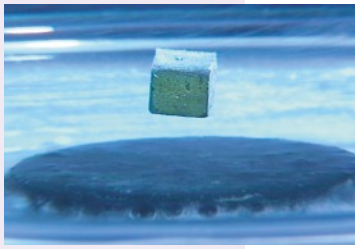
**Contents of Part 1: Mechanical Resonance:** Forced Vibrations with Single and Coupled Oscillators, **Velocity/Wavelength & Frequency/Reflected Waves:** Transverse Waves on a Coil Spring, **Change in Medium/Interference:** Transverse Waves on a Coil Spring, **Standing Waves:** Vibrational Modes on a String, **Longitudinal Waves:** Propagation/Interference of Longitudinal Waves, **Longitudinal Standing Waves:** Stroboscopic Analysis of Standing Wave Behaviour, **Waves in Two-Dimensions:** Reflection and Refraction of Waves in a Ripple Tank, **Waves in Two-Dimensions:** Interference and Diffraction of Waves in a Ripple Tank.

**Contents of Part 2: Nature of Sound Waves:** Sources and Propagation of Sound, **Propagation of Sound:** Direct Measurement of the Speed of Sound in Air and Metal, **Transmission of Sound Through a Medium:** Attenuation of Sound in a Vacuum, **Refraction of Sound:** Carbon Dioxide Sound Lens, **Interference of Sound:** Sound Divided into Two Paths of Differing Length, **Interference of Sound:** Beat Phenomena, **Diffraction of Sound:** Bending of Sound by an Obstacle, **Doppler Effect:** Frequency Shift of Moving Sound Source

**Contents of Part 3: Standing Sound Waves:** Resonating Air Column with Cork Dust, **Standing Sound Waves:** Resonance with Illuminating Gas in a Flame Tube, **Standing Sound Waves in Two-Dimensions:** Illuminating Gas in a Resonating Cavity, **Resonance/Real-Time Strobe Holography:** Resonant Modes of a Vibrating Bell, **Vibrations in a Two-Dimensional Surface:** Chladni Plate, **Superposition Principle:** Fourier Analysis & Synthesis of Complex Musical Tone, **Quality of Sound/Harmonics:** String Vibrations on a Guitar, **Frequency Spectrum of Sound:** Audible and Ultrasonic Waves.

| Cat.# | Licences | Price |
|---|---|---|
| PCI-20DH | Part 1 - Individual/ Institutional | $ 109.47 |
| PCI-21DH | Part 2 - Individual/ Institutional | $ 109.47 |
| PCI-22DH | Part 3 - Individual/ Institutional | $ 109.47 |
| PCI-23DH | Part 1 to 3 - Individual/ Institutional | $ 280.60 |





## PHYSICS DEMONSTRATIONS IN ELECTRICITY & MAGNETISM DVD, Part 1, 2 & 3

***Physics Demonstrations in Electricity & Magnetism*** is a three-part video program which presents a full range of demonstrations in the areas of electricity and magnetism. It was developed in an effort to give physics teachers a comprehensive collection of video demonstrations, supplementing the instructor's live classroom demonstrations. Three-dimensional computer animation is used to augment many of the demonstrations, providing a graphical representation of the physical behaviour.

**Contents of Part 1: Electrostatics:** Interaction of Charge, **Electrostatics:** Distribution of Charge on a Conductor, **Electrostatics:** Induction of Charge, **Isolation of Charges:** Kelvin Water Dropper, **Electrostatics:** Force Exerted between Charges, **Corona Discharge:** Detection of Electric Wind, **Momentum of an Electron:** Momentum Imparted During Collision, **Corona Discharge:** Lightning Model.

**Contents of Part 2: Corona Discharge:** Electronic Precipitator, **Electric Fields:** Mapping of Force Field, **Electric Fields:** Electromagnetic Shielding, **Electric Fields:** Parallel Plate Capacitor, **Electric Fields:** Energy Stored in a Capacitor, **Electrochemical Effects:** Operation of a Battery, **Temperature and Resistance:** Effect of Temperature Extremes on Conductivity, **Superconductivity:** Zero Resistance and Meissner Effect.

**Contents of Part 3: Magnetic Fields:** Mapping of Force Field, **Electricity and Magnetism:** Lenz's Law, **Electromagnetic Effects:** Force on an Electron Beam, **Electromagnetic Effects:** Forces on Current Carrying Wire, **Electromagnetic Effects:** Magnetic Forces on Moving Charge, **Electricity and Magnetism:** Induction of Current, **Induction Application:** Voltage Transformer, **Eddy Currents:** Force Acting on a Moving Conductor.

| Cat.# | Licences | Price |
|---|---|---|
| PCI-27DH | Part 1 - Individual/ Institutional | $ 109.47 |
| PCI-28DH | Part 2 - Individual/ Institutional | $ 109.47 |
| PCI-29DH | Part 3 - Individual/ Institutional | $ 109.47 |
| PCI-30DH | Part 1 to 3 - Individual/ Institutional | $ 280.60 |

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## PHYSICS DEMONSTRATIONS IN HEAT DVD, Part 1, 2 & 3

*Physics Demonstrations in Heat* is a three-part video program which presents a full range of demonstrations in thermal properties of matter, mechanisms of heat transfer, and thermodynamics. The program was developed in an effort to give physics teachers a comprehensive collection of video demonstrations, supplementing the instructor's live classroom demonstrations. Instructors will find the program suitable for high school as well as introductory level college Parabolic mirror focuses infrared physics classes.

**Contents of Part 1: Thermal Expansion:** Changing Volume of a Liquid, **Phase Change Expansion:**, Exploding Ice Bomb, **Thermal Expansion:** Forces Exerted During Expansion and Contraction, **Linear Expansion:** Determination of Expansion Coefficient, **Phase Changes:** Transition from Gaseous to Liquid $O_2$, **Cryogenics:** Changes in Material Properties, **Cryogenics:** Organic Materials, **Specific Heat:** Determination of $C_p$.

**Contents of Part 2: Thermal Conduction:** Propagation in a Metal Rod, **Thermal Conduction:** Comparison of Heat Transfer in Two Materials, **Thermal Convection:** Induced Fluid Flow, **Thermal Convection:** Projection of Convection Currents, **Thermal Radiation:** Focused Transmission Using Parabolic Mirrors, **Thermal Radiation:** Black Body Effects, **Thermal Radiation:** Leslie's Cube, **Heat Transfer:** Boiling Inferno, **Heat Transfer Mechanisms:** A Side by Side Comparison.

**Contents of Part 3: Mechanical Equivalent of Heat:** Bullet Fired into a Lead Mass, **Kinetic Model:** Temperature Effects on Gases, **Induced Phase Change:** Liquid to Solid Transition of $N_2$, **Cryophorous:** Cooling by Evaporation,**Induced Phase Change:** Boiling by Cooling, **Condensation:** Formation of a Cloud, **Pressure and Temperature:** Piston in a Cylinder, **Entropy:** Time Reversal/Mixing of a Dye.

| Cat.# | Licences | Price |
|---|---|---|
| PCI-16DH | Part 1 - Individual/ Institutional | $ 109.47 |
| PCI-17DH | Part 2 - Individual/ Institutional | $ 109.47 |
| PCI-18DH | Part 3 - Individual/ Institutional | $ 109.47 |
| PCI-19DH | Part 1 to 3 - Individual/ Institutional | $ 280.60 |

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## THE PHYSICS OF SPACE FLIGHT - Parts 1, 2 and 3

The ***Physics of Space Flight Series*** is a three-part video program which presents physics principles as they apply to space flight and space related events. The program's photography was provided entirely by NASA, affording a great deal of spectacular footage accompanying the physics principles being illustrated. Computer animation and the use of graphics also assist in presenting physical concepts. The program was designed for use by high school physics classes and introductory level college physics courses.

**Part 1: Acceleration Machines, Launching a Space Vehicle:** *Newton's Laws of Motion, Kinematics, Conservation of Energy & Momentum, Power, Aerodynamic Effects.* This program details the physics involved in launching a space vehicle. The Space Shuttle and Saturn V launches are dynamically examined in terms of the vehicle's thrust, changing weight, net force, acceleration, and velocity throughout the initial stages of ascent and injection into orbit. The dynamics of launching a rocket from the earth's surface is contrasted to the lift-off of the Lunar Module from the surface of the moon. The rocket engine principle is discussed in terms of Newton's Third Law of Motion. Newton's Second Law of Motion, expressed in terms of momentum, is used to find the magnitude of thrust produced by a single Space Shuttle main engine. Launch trajectories and the effect of the earth's rotation on launching a rocket into orbit are also explained.

**Part 2: Physics in Space Orbital Motion & Re-entry:** *Newton's Laws of Motion, Circular Motion, Rotational Dynamics, Heat, Conservation of Energy.* This program focuses on the physics of orbital motion and re-entry into the earth's atmosphere. The program discusses the dynamics of orbital motion and the apparent weightlessness experienced while in orbit. Kepler's 3 laws of planetary motion are applied to satellites, explaining the characteristics of both circular and elliptical orbits. Orbital motion of the Space Shuttle is studied in terms of the acting gravitational centripetal force, orbital radius, and orbital velocity. Satellite deployment from the Space Shuttle and subsequent attainment of geosynchro nous orbit is also examined. The weightless environ ment provides a unique opportunity for motion studies in which Newton's Three Laws of Motion become particularly apparent. Heat transfer in the vacuum of space and a discussion on thermal energy concludes the program as the atmospheric re-entry of the Space Shuttle is contrasted to that of the Command Module.

**Part 3: Gravity:** *A Broadened View: Newton's Law of Universal Gravitation, Gravitational Acceleration, Newton's Laws of Motion, Fluid Mechanics.* This program centers on presenting a broadened perspective of gravity, with emphasis given to observing its influence in different environments. Newton's Law of Universal Gravitation is used to determine the magnitude of the earth's gravitational force at increasingly distant locations from its center; computer graphics are used to simulate pulling away from the earth with the inverse square curve graphically being developed. The microgravity environment is examined in terms of its effect on various physical properties and the unique mechanics it presents to orbiting space structures. Gravitational acceleration on the surface of the moon is contrasted to that of earth by observing experiments and events which took place during the moon walks of the Apollo Program. Finally, an examination of the Gravity Assist Principle, or "Slingshot Effect", provides an intriguing example of utilizing gravitational forces to greatly accelerate spacecraft on their journey to the outer solar system.



| Cat.# | Licences | Price |
|---|---|---|
| PCI-31DH | Part 1 - Individual/ Institutional | $ 109.47 |
| PCI-32DH | Part 2 - Individual/ Institutional | $ 109.47 |
| PCI-33DH | Part 3 - Individual/ Institutional | $ 109.47 |
| PCI-34DH | Part 1 to 3 - Individual/ Institutional | $ 280.60 |

Prices do not include GST