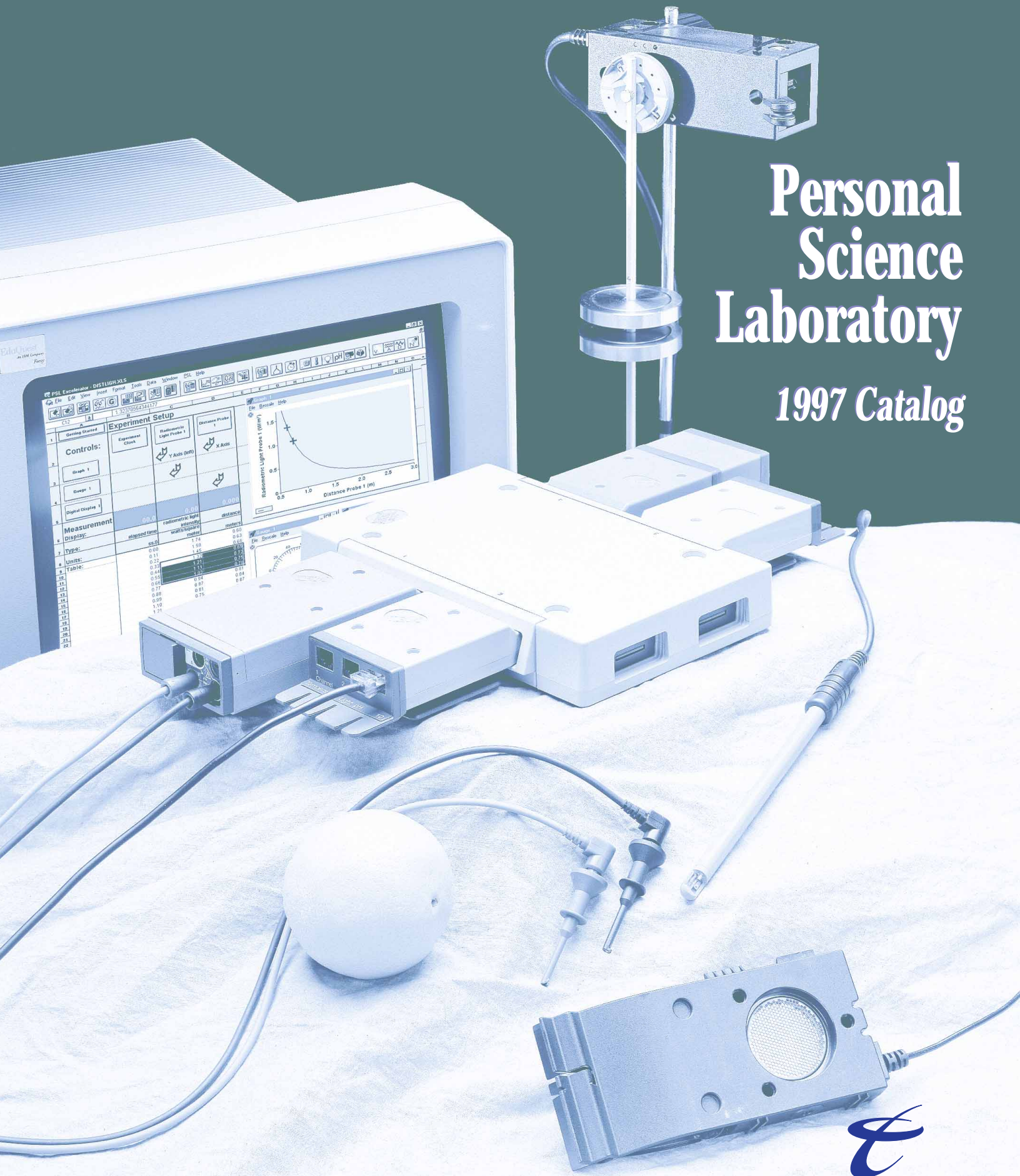


# Personal Science Laboratory

## 1997 Catalog



**TEAM LABS**  
*Create a new reality*

# What is the Personal Science Laboratory?

PSL is a hands-on, computer-based science exploration tool consisting of quality probeware, award winning curriculum, and easy-to-use software. Providing real-time data capture and graphing as well as analysis, PSL allows students to concentrate on developing analytical and problem solving skills while discovering science. PSL harnesses the power of computer technology and saves classroom time for both students and educators.

## How does PSL contribute to learning?

PSL is a time-saving, student-engaging tool which allows educators to move away from didactic instruction and into the world of hands-on science.

- Curriculum correlates to the National Content Standards for science and math
- Encourages constructivist education and scientific inquiry
- Develops problem solving skills and cooperative learning
- Builds technology skills

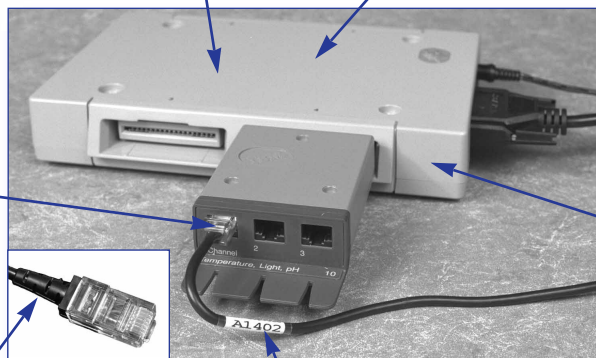
## Why is PSL the best?

**1** Quality Design and Construction  
Backed by the best warranty available:  
**3 years!**

Meets school safety and insurance requirements:  
Underwriters Laboratories listed and FCC Class B approved

Constructed of "student proof" high-impact plastic

Numerous built-in mounting and ergonomic features

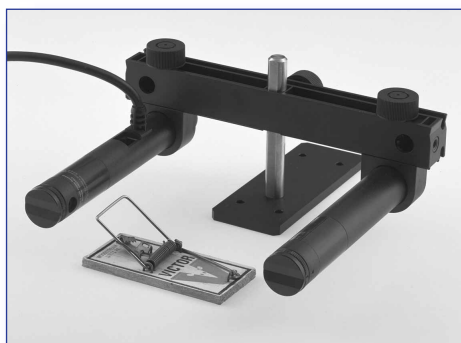


Snap together, high-use rated, gold-plated connectors

Modular design allows you to meet your current and future needs

Cabling designed with built in strain relief for years of reliability

Factory-calibrated probes



**2**

## Unparalleled Accuracy and Resolution

*PSL is a laboratory-grade scientific instrument designed to do real science*

- Time events to one millionth of a second. Fast enough to measure the velocity of a bullet or a mousetrap!
- Temperature Probes resolve 0.05°C change
- Light Probes are linear to 1% from zero to 100,000 lux
- pH Probe will respond to a 0.01 pH change
- Measure DC Voltage to 10 microvolts, and current to 0.1 microamps
- Rotary Motion Probe reads 1440 positions per revolution and speeds to 8,000 RPM
- Distance Probe measures movements as small as 1/2 millimeter



## Distinct Solutions for all Grades

### Grade-Specific Probeware, Software, and Curriculum

#### Probeware for all grades:

- Physics, Chemistry, and Integrated Science Paks for High School and College
- Fusion Series and Middle School Comprehensive Paks for grades 6-9
- 5 probeware Paks for grades 3-6 Nature of Science Investigations
- Individual probes and custom Paks available for all grade levels

#### Software for all grades:

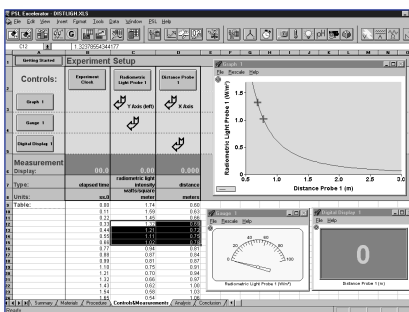
- PSL Exceleator for Middle, High School, or College (*bottom left*)
- PSL Explorer for Middle and High School (*bottom center*)
- IBM's Nature of Science for Elementary (*bottom right*)



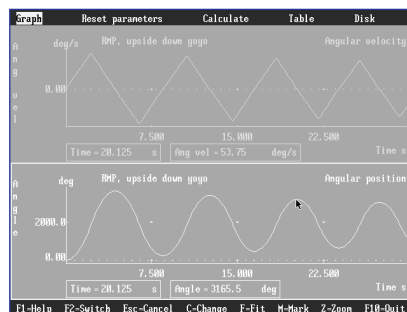
*Probe-based Experiment Guide, Fusion Series and IBM's Nature of Science Investigations make up the full series of curriculum guides.*

#### Curriculum for all grades:

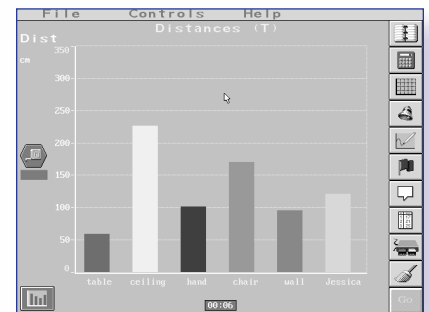
- Probe-based Experiment Guides for 8th through 12th grades
- Fusion Series for 6th, 7th, 8th, and 9th grades
- IBM's Nature of Science Investigations for 3rd, 4th, 5th, and 6th grades



*PSL Exceleator for Middle, High School, or College*



*PSL Explorer for Middle and High School*



*IBM's Nature of Science for Elementary*



## Easy to use

- Factory calibrated probes save classroom time
- Load experiment set-up files from disk
- Icon/Menu driven software
- Real-time data capture and screen plotting
- Full length experiment curriculum
- Various set-up options allow numerous experiments per probe
- Portable - from classroom to classroom or outside



## Support for PSL

- Toll free expertise, call 1-800-PSL-HELP (775-4357)
- Nationwide and International Dealers
- E-mail help: pslhelp@teamlabs.com
- WEB site with complete and current information Includes: Technical Support, User's Circle, Student Resources and Teacher Resources



## Training for PSL

- Accredited Training at Colorado State University, through the Institute of Applied Classroom Technology
- "Technology Educators" certification and PSL training at Team Labs
- Team Labs training at your location
- Certified "Technology Educators" from Team Labs
- Certified "Education Instructional Specialist" from IBM
- PSL workshops at major trade shows



# What's New for 1997?



## PSL Excelsator — New Windows™ Software

*Harness the power of technology with PSL Excelsator:*

**A fully integrated data acquisition, analysis, and reporting application for Microsoft Excel™!**

**Start collecting data with the click of a single button**

**Set experiment triggers to automatically start and stop recording data**

**Select any combination of probes with the click of a toolbar button**

**Use the Preview button to view data without recording it in the Measurement Table**

**Save experiment setups and then open them at a later date**

**Change experiment parameters by clicking on Control Buttons**

**Take advantage of extensive on-line help**

**Use the Get Fast Graph Selection button to link Fast Graphs with the Measurement Table**

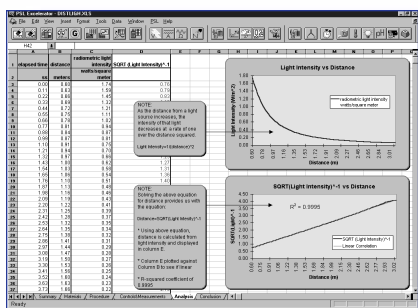
**Select Fast Graphs for real time plotting**

**Select optional Fast Gauge or Fast Digital Displays to see real time values from a probe**

**Requires Excel 5.0c or 7.0 call for educational prices**

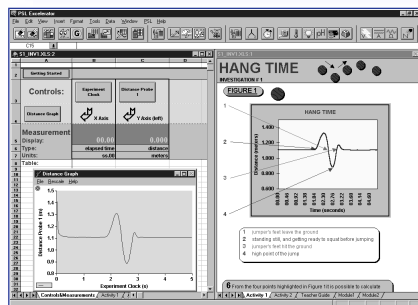
“PSL Excelsator is an excellent application of technology. It allows students to spend more time exploring, thinking critically, and comprehending. The use of technology in the science classroom has finally moved beyond mere word processing and tutorial CD-ROM's.”

Craig Carlile - Director of The Institute of Applied Classroom Technology - Colorado State University



### Unlimited data analysis and management!

- Perform curve fitting and data reduction using over 300 functions available in Microsoft Excel
- Perform T-tests and other statistical analysis
- Quickly create calculated results from probe data
- Make the most of laboratory time by combining data collection and analysis in a spreadsheet environment
- Store, display, and analyze multiple experiment trials within one workbook
- Exchange data and reports with Microsoft Word and other applications



### Multimedia platform for interactive curriculum!

- Include sound clips, photographs, video, drawings, and complete instructions on how to perform an investigation or to summarize the results
- Use investigation workbooks to exchange experiments and data between students and educators
- Take full advantage of Excel multimedia features to author complete investigations
- Have students create unique multimedia lab reports

# The Fusion Series — Middle School Curriculum

The Fusion Series is a unique and exciting set of 12 investigations developed specifically for grades 6 through 9. This series integrates science, mathematics, and technology and correlates closely with the National Content Standards. Including teacher section, student section, assessment, and experiment extensions, this series is a complete, ready-to-go curriculum. Delivered in a three-ring binder that includes photocopyable masters and softcopy on CD-ROM. Softcopy permits teacher modification of the lessons and allows students to work directly on the computer. (See page 7 for Fusion Series Paks)



## Fusion Investigations:

Flying Saucer ▲ Hang Time ▲ The Murder of Mr. Blue ▲ Spinning in Space ▲ Density Dilemma ▲ Seismic Tremors ▲ Phase Changing Chocolate ▲ Banana Batteries ▲ Frozen Fingers ▲ Photosynthetic Photography ▲ The Hot and Cold Solution ▲ An Electrifying Slinky

# PSL Force Probe

## Announcing the much requested PSL Force Probe

The PSL Force Probe is a rugged, easy-to-use probe that will add significant new capabilities to your laboratory. Investigations of Newton's laws, Hooke's law, energy storage, impulse, and human physiology (how strong are your fingers?) can all be performed with ease. Position the probe vertically and use it as a dynamic scale (shown at bottom). The PSL Force Probe Kit comes complete with a PSL Force Probe, Table Adapter, Elastic Bumper Adapter, two extension springs, and a Universal Probe Stand.

Order #PSL7500. Items also sold separately. \*The PSL Force Probe requires a PSL Digital Multimeter Module (DMM).

*Stainless steel Sensor Tip provides both a hook and impact surface without additional parts. Also allows snap-on attachment of adapters*

*High-impact, flame retardant housing provides a comfortable hand-held probe as well as meeting safety requirements of UL™ Laboratories*

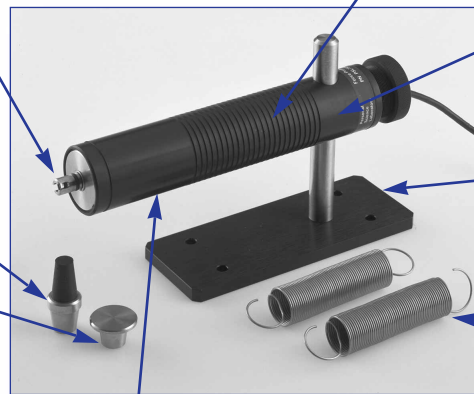
*Built-in ring stand mount allows quick attachment to standard laboratory equipment*

*Bumper Adapter makes studies of elastic impacts a snap*

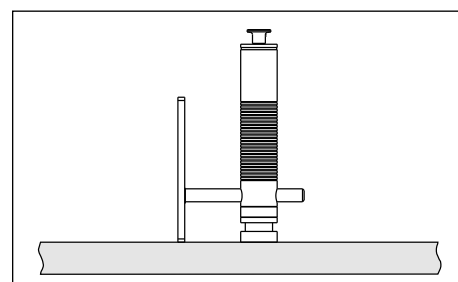
*Universal Probe Stand adapts probe to a wide variety of experiment setups, including dynamics carts*

*Table Adapter for use in pushing experiments, from fingers to rockets*

*Extension springs allow investigations of Hooke's law, energy storage, oscillators, and much more!*



*Industrial LVDT magnetic bridge technology for ruggedness, infinite life, superior stability and extremely low drift - at any temperature. **The probe is completely overload protected.** LVDT? See our WEB site.*



### Specifications:

Ranges	± 6, ± 60 newtons, push or pull -> fully overload protected!
Resolution	0.002 newtons (6 newton range)
Calibration	factory calibrated, no user calibration necessary

# Purchasing the Personal Science Laboratory In 3 Easy Steps!

The Personal Science Laboratory consists of three components: Probeware, Software, and Curriculum. To outfit your laboratory you will need Probeware Stations, (usually more than one), Software and Curriculum. To simplify the process, Team Labs has created a variety of complete "Paks" for all grades levels that incorporate these three components.

## Step 1: What Type of Computers are Required?

Presently PSL runs on IBM-compatible computers; a MAC version will be available in '97. PSL does NOT require the latest in computer technology; PSL Explorer software is designed to run on DOS-based machines such as 8086, 286, or 386 machines. In this case you need 512K of memory and 2 MB of hard disk space or run directly from diskette. PSL Excelsator software requires Windows-compatible machines with a 486 or Pentium processor, 8MB of memory, and 5MB of hard disk space. PSL Excelsator requires Microsoft Excel 5.0c or above to operate. All computers must be equipped with a serial port and graphics display.

## Step 2: How Many PSL Probeware Stations do I Need?

*The Whole Class Approach:* The optimal learning environment for discovery-based learning is three or four students per PSL station and one for the teacher. An average class of 28 students would therefore require eight to ten PSL Probeware Stations.

*The Learning Center Approach:* Resource constraints, either with computer hardware or budgets, often require splitting the class into two groups or "Learning Centers", then split each group into teams of three or four students. One group working on PSL Stations, and the other group doing non-computer activities such as research or report writing. This approach can reduce the number of PSL Stations to four to five PSL Probeware Stations.

\*Please note that either of the above options can be implemented within an individual science classroom -or- within a "computer lab" that many teachers share.

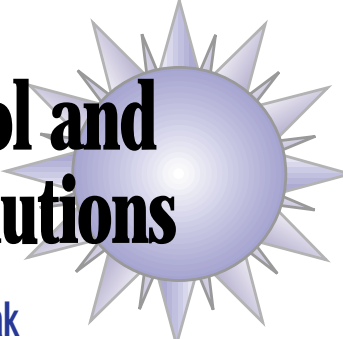
*Single Station Approach:* Sometimes there is only one computer available in a classroom. In this case a single PSL Probeware Station can be used to run experiments and demonstrate concepts. This works especially well when the results are projected on a large screen.

*Mobile Lab Approach:* Any of the above three options can be implemented by sharing PSL Probeware Stations between classrooms. If there are computers in all the classrooms, PSL Stations can be placed on a portable cart that contains a computer. The mobile lab approach is often used when the school is on a limited budget but needs to start along the science/technology integration road.

## Step 3: Which PSL Paks do I Buy?

Team Labs offers "Paks" which include Probeware, Software, Curriculum, and Manuals. These Paks are specifically configured for every grade level and are detailed on the following pages. Additional Probeware Stations are available for each Pak which include only probeware. All PSL products can also be purchased separately. Contact Team Labs or your local dealer for assistance.

# High School and College Solutions



## Integrated Sciences Pak

*Our most complete package of probeware, software, curriculum, and user guides. Designed for labs that are teaching a variety of sciences and math.*

### Probeware

- Distance Probe
- 2 Standard Temperature Probes
- 2 Extended Temperature Probes
- Photometric Light Probe
- Radiometric Light Probe
- pH Probe
- Digital Multimeter Module
- Force Probe Kit
- Rotary Motion Probe Kit
- Photo Event Probe
- Laser Light Source
- Prototype Module
- Precision Picket Fence

### Curriculum/Guides

- Motion Experiments
- Temperature Experiments
- Light Experiments
- pH Experiments
- DMM Users Guide
- DIO Users Guide
- RMP Users Guide
- PEP Users Guide
- Force Probe Users Guide
- Software Users Guide w/disk
- Hardware Users Guide
- Technical Reference

## Physics Pak

*A complete package of probeware, software, curriculum, and user guides specifically tailored for the physics classroom.*

### Probeware

- Distance Probe
- 2 Standard Temperature Probes
- 2 Extended Temperature Probes
- Photometric Light Probe
- Radiometric Light Probe
- Digital Multimeter Module
- Force Probe Kit
- Rotary Motion Probe Kit
- 2 Photo Event Probes
- Laser Light Source
- Prototype Module
- Precision Picket Fence

### Curriculum/Guides

- Motion Experiments
- Temperature Experiments
- Light Experiments
- DMM Users Guide
- DIO Users Guide
- RMP Users Guide
- PEP Users Guide
- Force Probe Users Guide
- Software Users Guide w/disk
- Hardware Users Guide
- Technical Reference

## Chemistry Pak

*A complete package of probeware, software, curriculum, and user guides specifically tailored for the chemistry classroom.*

### Probeware

- 2 Standard Temperature Probes
- 2 Extended Temperature Probes
- Photometric Light Probe
- Radiometric Light Probe
- pH Probe
- Digital Multimeter Module

### Curriculum/Guides

- Temperature Experiments
- pH Experiments
- DMM Users Guide
- Software Users Guide w/disk
- Hardware Users Guide
- Technical Reference

Pak Options	PSL Explorer DOS or Win	PSL Excelerator Windows only	
		Excel 5.0	Excel 7.0
Physics Pak	PSL141D*	PSL141E	PSL141F
Additional Probeware Stations	PSL141N	PSL141N	PSL141N
Chemistry Pak	PSL131D*	PSL131E	PSL131F
Additional Probeware Stations	PSL131N	PSL131N	PSL131N
Integrated Sciences Pak	PSL151D*	PSL151E	PSL151F
Additional Probeware Stations	PSL151N	PSL151N	PSL151N

### All Paks include:

Base Unit, Power Supply, Serial Communications Cable, and any Interface Modules necessary to run listed probes.

*\*Also Includes Student Masters of curriculum.*

## Probe-Based Curriculum Guides

Experiment curriculum guides are available in two versions: the photocopyable "Student Masters", and the "Teacher Versions" with annotated answers. All include full length experiments which are designed to be easily integrated into a teacher's existing curriculum. Explorer Paks include both versions, Excelerator Paks include Teacher Versions only.

	Student	Teacher
• Temperature Experiments	57F1982	57F1981
• Light Experiments	57F1991	57F1990
• Motion Experiments	57F1985	57F1984
• pH Experiments	57F1988	57F1987

# Middle and Jr. High School Solutions

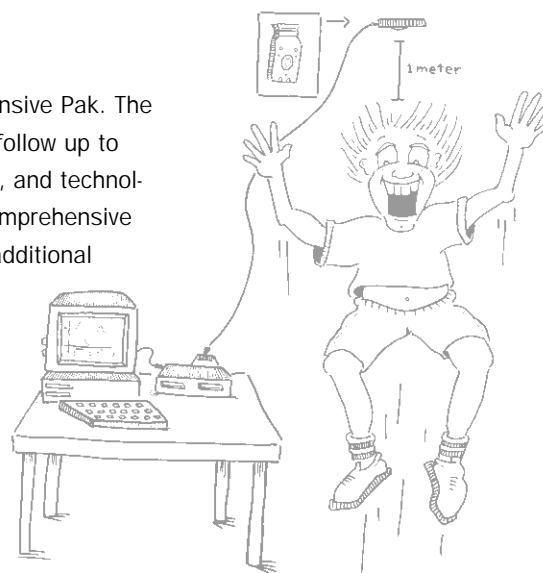
For grades 6 through 9

Team Labs offers two Paks, the Fusion Series Pak and the Middle School Comprehensive Pak. The Fusion Series is an excellent starting point for middle school students, or a perfect follow up to IBM's elementary Nature of Science. It offers investigations that fuse science, math, and technology into fun experiments like "Phase Changing Chocolate" and "Hang Time". The Comprehensive Pak includes additional probes, the Fusion Series Curriculum, as well as dozens of additional experiments that cover motion, temperature, light, and pH as individual subjects.

Pak Options	PSL Explorer DOS or Win
Fusion Series Pak	PSL201D
Additional Probeware Stations	PSL201N
M.S. Comprehensive Pak	PSL116D
Additional Probeware Station	PSL116N

**All Paks include:**

Base Unit, Power Supply, Serial Communications Cable, and any Interface Modules necessary to run listed probes.



**Fusion Series Pak**

## Middle School Comprehensive Pak

*Offering probe-based curriculum for motion, temperature, light, and pH as well as the Fusion Series curriculum. Designed for more in-depth explorations of physical sciences, life sciences, and earth sciences.*

*Probeware*

- Distance Probe
- 2 Standard Temperature Probes
- 2 Extended Temperature Probes
- Photometric Light Probe
- Radiometric Light Probe
- pH Probe
- Digital Multimeter Module
- Rotary Motion Probe Kit

*Curriculum/Guides*

- Fusion Series
- Motion Experiments
- Temperature Experiments
- Light Experiments
- pH Experiments
- DMM Users Guide
- DIO Users Guide
- RMP Users Guide
- Software Users Guide w/disk
- Hardware Users Guide
- Technical Reference

## Fusion Series Pak

*Concentrating on the exciting and fun Fusion Series Investigations (see Page 4) this Pak will be sure to captivate and stimulate even the most non-science students.*

*Probeware*

- Distance Probe
- 1 Standard Temperature Probe
- 1 Extended Temperature Probe
- Photometric Light Probe
- Radiometric Light Probe
- Digital Multimeter Module
- Rotary Motion Probe Kit

*Curriculum/Guides*

- Fusion Series
- DMM Users Guide
- DIO Users Guide
- RMP Users Guide
- Software Users Guide w/disk
- Hardware Users Guide
- Technical Reference





# Elementary School Solutions

IBM's award winning Nature of Science Investigation Series allows young students to explore basic scientific concepts through the hands-on approach of the Personal Science Laboratory. Starting in third grade and progressing through sixth grade, students explore the properties of temperature, motion, and light. Specific curriculum guides and software accompany each grade level. Probeware is available through Team Labs. Software and curriculum are available through IBM.

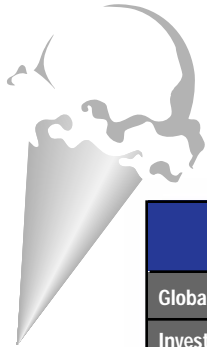


For Nature of Science  
CALL IBM at:  
800.IBM.4EDU or  
770.303.1907

OR



Visit our Web site for link to IBM  
<http://www.teamlabs.com/>



<i>Probeware Paks for Nature of Science</i>	Part Number	Base Unit*	Tlp Module	Distance Probe with Module	Photometric Light Probe	Standard Temp. Probe	Extended Temp. Probe
Global Pak - Run all Investigations	2506580	1	1	1	1	2	2
Investigating Light - 3rd Grade	2506581	1	1		1		
Investigating Motion and Movement - 4th Grade	2506582	1		1			
Investigating Solar Energy - 5th Grade	2506583	1	1			2	2
Investigating Bodies in Balance - 6th Grade	2506584	1	1				
*Includes serial communications cable and power supply.							

## Starter Paks and Custom Solutions

### Starter Pak 1

*A place to begin your hands-on investigations, and an excellent base from which to add additional probes in the future.*

#### Probeware

- 1 Standard Temperature Probe
- 1 Extended Temperature Probe

#### Curriculum/Guides

- Temperature Experiments
- Software Users Guide w/disk
- Hardware Users Guide

### Starter Pak 2

*Offering more probes than the Starter Pak 1 and including Temperature, Light, and Motion Experiments, this is a highly recommended choice for getting started.*

#### Probeware

- Distance Probe
- 2 Standard Temperature Probes
- 2 Extended Temperature Probes
- Radiometric Light Probe

#### Curriculum/Guides

- Motion Experiments
- Light Experiments
- Temperature Experiments
- Software Users Guide w/disk
- Hardware Users Guide
- Technical Reference

Pak Options	PSL Explorer DOS or Win	PSL Excelerator Windows only	
		Excel 5.0	Excel 7.0
Starter Pak 1	PSL101D	PSL101E	PSL101F
Additional Probeware Stations	PSL101N	PSL101N	PSL101N
Starter Pak 2	PSL106D	PSL106E	PSL106F
Additional Probeware Stations	PSL106N	PSL106N	PSL106N

#### All Paks include:

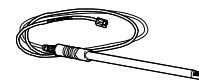
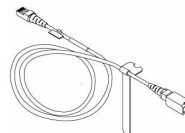
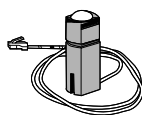
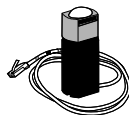
Base Unit, Power Supply, Serial Communications Cable, and any Interface Modules necessary to run listed probes.

### Custom Solutions

Team Labs will be glad to tailor a package of probeware, curriculum, and software to meet your needs and teaching goals.

Any of our products can be purchased individually to add to your laboratory . . . now or in the future.

## PSL Components



### Temperature Probes

When used with the TLP module, these probes can measure temperature with 0.05° C resolution and 1° C accuracy. The probes feature a solid-state current output temperature sensor, 1.5 meter cable, come pre-calibrated and are waterproof.

#### Standard Temperature Probes

A fast 0.14 second (in water) time constant with a temperature range of -40 to 105°C. For use in air, water or other non-corrosive liquids.

Order # 84F9106

#### Extended Temperature Probe

Jacketed in a stainless-steel tube with a Teflon cable for use in harsh environments over an extended temperature range of -55 to 150°C. Time constant in water is 1.2 seconds.

Order # 84F9107



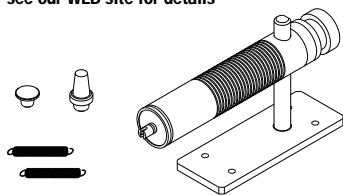
### Force Probe Kit

Ranges of 6 and 60 newtons, factory calibration, built-in ringstand mount and a rugged, student-ready LVDT technology make this probe a favorite in the classroom. The PSL Force Probe Kit allows students to perform a wide variety of experiments with ease and accuracy. The Accessory Kit provides for many common experiments and includes a Universal Stand, Bumper and Table Adapters, and two springs.

Force Probe Kit  
Force Probe (only)  
Force Probe Accessory Kit

Order # PSL7500  
Order # PSL7501  
Order # PSL7502

LVDT? see our WEB site for details



### Light Probes

When used with the TLP module, these probes deliver pre-calibrated, high accuracy light measurements using a solid state photodiode with no light hysteresis, minimal temperature sensitivity and full range linearity. The probes feature a multi-functional package that provides a 1/4-20 tripod mount, flat mounting surfaces and a 1.5 meter cable. The probes are waterproof. Both light probes include 5 filter holders for implementing custom attenuators or response curves.

#### Radiometric Light Probe

A response curve that extends from 400 to 950 nm and calibrated to measure light intensity in Watts per meter<sup>2</sup>. Intensity range is 0 to 100 W/m<sup>2</sup> with a resolution of 0.001 W/m<sup>2</sup>.

Order # 57F7930

#### Photometric Light Probe

A response curve that closely matches the human eye, and calibrated to measure light intensity in lux. Intensity range is 0 to 100,000 (bright sun) lux, spectral range of 400 to 700 nm and a resolution of 1 lux.

Order # 57F7929



### Temperature/Light Extension Cable

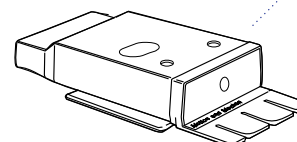
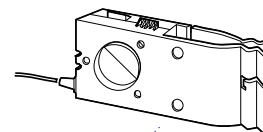
Adds 10 meters to the reach of your temperature and light probes. Perfect for outdoor experiments performed from indoors, or anything else you would like some distance from. Up to thirty extensions (yes, that's 300 m) may be connected in series. Call for custom lengths.

Order # PSL7100

### pH Probe

A solid-state pH probe that uses an EPA-approved method and provides a fast response, easy storing probe in an unbreakable package. Built-in temperature sensing allows simultaneous measurements of pH and temperature. The probe requires very small amounts of samples for measurement and is ideally suited for micro-chemistry or measuring solids such as soil. The pH range is 0 to 12 pH with a resolution of 0.01 pH. Accuracy is 0.02. Normal life is approximately one to three years. One year warranty.

Order # 57F7928



### Temperature, Light & pH (TLP) Module

A high-resolution interface module that supports the three most commonly used classroom probes: temperature, light and pH. This module supports up to three temperature or light probes and one pH probe.

Order # 57F7925



### Distance Probe w/Motion & Mechanics Module

Non-invasive, non-contact distance measurements using an ultrasonic sonar transducer. This probe is ideal for a wide range of experiments from physics to human physiology and is very popular for use in teaching mathematics. The patented PSL housing design provides fast, easy setup in the classroom. Measurement range is 0.4 to 10 meters.

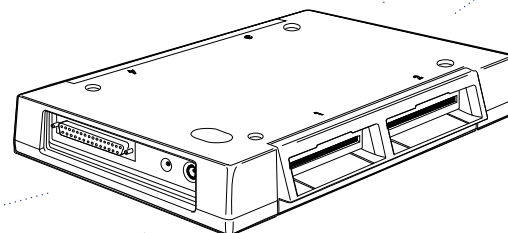
Order # 57F7922



### Digital Multimeter Module w/Leads

A fully-isolated digital multimeter that can measure AC and DC voltage and current, resistance, frequency and AC true RMS. The DMM can measure voltage and current simultaneously to provide measurements of power. The unique ability to measure current as easily as voltage makes many experiments that were impossible, possible. The DMM is also an easy way to adapt other probes or inputs to a PSL system. The meter is fully protected against overload and includes high-flexibility red and black test leads. Voltage ranges to 40 volts, current to 2 amperes, resistance to 40 MΩ and frequency to 175 KHz.

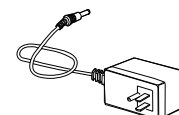
Order # 04G5956



### Power Supply

115 VAC wall mounted, UL listed supply that powers the entire PSL system. Output is 8 volts DC at 1 ampere.

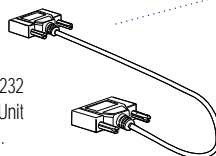
Order # 57F7931

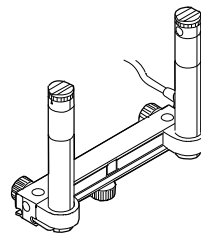
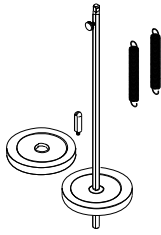
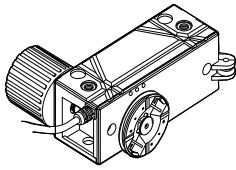


### Communications Cable

A 1.5 meter shielded RS-232 cable that attaches the Base Unit to the Host PC's Serial Port.

Order # 57F7932





### Rotary Motion Probe (RMP)

This patented, PSL unique probe is a true motion microscope. It measures angular position with a resolution of 0.25 degrees (that's 1440 counts per revolution!) and linear position to 0.1 mm. This probe is simple to use and requires no calibration, yet can reveal relationships never before seen in the classroom. When used with the optional accessory kit, the RMP can perform many of the linear and angular experiments common in the physics classroom. Also has applications in physiology and biology for muscle deflection, etc.

Order # 04G5944

RMP User Guide  
Order # 37G0091

### Rotary Motion Accessory Kit

Two inner masses, two outer ring masses, a pendulum rod, an RMP shaft adapter, a thumb-screw, a spool of "special" (non-elastic) thread, and two springs, allow the RMP to perform a great variety of experiments. The RMP User Guide gives typical applications for the physics classroom.

Order #04G5945

RMP User Guide

### Rotary Motion Probe Kit

Includes the Rotary Motion Probe and RMP Accessory Kit.

Order #PSL7510

### Photo Event Probe (PEP)

A photogate so unique we had to give it a new name. With a rise time of less than two microseconds, this probe is truly faster than a speeding bullet, and we measured the speed of a bullet with this probe to prove it. The PEP uses a visible red LED light source and is fully configurable for photo-timing of objects as small as a thread or as large as a softball. When used with the Laser Source, it can time objects larger than a bus. The mounting system also allows the PEP to be used as a reflective sensor, enabling many new applications.

Order # 04G5948

PEP User Guide  
Order # 37G0092

### Laser Source

A 1 milliwatt visible ( 670 nm red) class II laser for stand-alone laser experiments or use in conjunction with the Photo Event Probe. The Laser Source can be used in place of the LED Source in a PEP to greatly extend the range of separation between the Source and Receiver. The Laser Source comes with a 4 meter cable for use with the PEP or may be connected directly to the Digital Input /Output Module Jack Adapter.

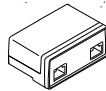
Order # 04G5951

### DIO Jack Adapter

This adapter provides two modular jacks to interface the DIO module to the RMP, PEP and other digital accessories that use a modular plug.

Order # 04G5942

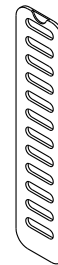
DIO User Guide



### Precision Picket Fence

The PSL Precision Picket Fence is designed for use with the PSL Photo Event Probe (PEP) to provide students an easy and accurate method to measure the free-fall acceleration due to gravity. Machined slots in a Lexan™ base ensures high accuracy and immunity to damage from handling and storage. The fence can also be attached to moving objects such as cars to measure their velocity using the PEP.

Order # PSL7134

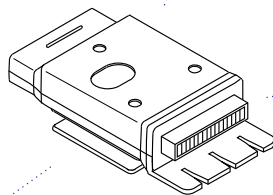


### Digital Input/Output Module (DIO)

This module contains the interface electronics for the RMP and PEP, and can also be used to monitor or control a variety of external devices. It provides eight fully protected digital input lines, eight digital output lines (with sufficient power to drive small motors, two relays and access to the counting and timing functions of the Base Unit). The module input/output signals may be accessed using the cable adapter, or plugging a PSL Prototype card directly into the rear of the module. The DIO module is fully supported by a comprehensive technical reference to help you or your students develop custom accessories and programs.

Order # 04G5940

DIO User Guide  
Order # 37G0090

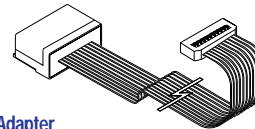


### DIO Cable Adapter

Use this DIO adapter to connect the Digital Input/Output Module to a variety of switches, relays, motors, robots or other devices in your laboratory. The Cable Adapter connects to the rear of the DIO module and provides full access to the interface signals of the DIO via a 34-conductor flat ribbon cable. The one meter cable is terminated with a 2 row by 17 position connector designed to mate with a standard 0.100 inch spacing pin header. The DIO Technical Reference gives complete details of the signals available.

Order # 04G5941

DIO User Guide



### Prototyping Cards

These cards allow students and educators to design and build their own accessories for PSL. These cards may be used with either the Base Unit or the DIO Module. The PSL Technical Reference provides electrical details and interfacing examples.

#### Standard Prototype Cards

Package of five 104 mm (standard) length cards.

Order # 57F7933

#### Long Prototype Cards

Package of three 180 mm (extended) length cards

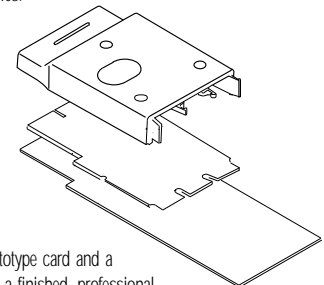
Order # 57F7934

#### Prototype Module

A kit that includes one standard-length prototype card and a complete module case. Gives your projects a finished, professional look and protects the components.

Order # 57F7924

PSL Technical Reference



Contact us about portable, battery powered operation!

### Base Unit

The microcomputer "Brain Box" that supervises all PSL operations. The Base Unit allows up to four modules to be attached and provides the interface to the host PC. Low power CMOS electronics and a durable case make it ready for portable operation.

Order # 84F9096

PSL Technical Reference  
Order # 57F7937

PSL Hardware Uses Guide  
Order # 57F7936

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\$ 50	84F9106	- Standard Temperature Probe
\$ 70	84F9107	- Extended Temperature Probe
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\$ 265	PSL7500	Force Probe with Accessory Kit
\$ 220	PSL7501	- Force Probe
\$ 45	PSL7502	- Force Probe Accessory Kit
\$ 160	04G5940	Digital Input/Output (DIO) Module
\$ 50	04G5941	- DIO Cable Adapter
\$ 45	04G5942	- DIO Jack Adapter
\$ 295	PSL7510	Rotary Motion Probe with Accessory Kit
\$ 220	04G5944	- Rotary Motion Probe (RMP)
\$ 75	04G5945	- Rotary Motion Accessory Kit
\$ 25	PSL7133	- RMP Springs (package of 10)
\$ 185	04G5948	Photo Event Probe (PEP) with LED Source
\$ 210	04G5951	- PEP Laser Source
\$ 25	PSL7105	- PEP Source Extension Cable
\$ 20	PSL7134	- Precision Picket Fence
\$ 35	57F7924	Prototype Module
\$ 70	57F7933	- Standard Prototype Cards (package of 5)
\$ 70	57F7934	- Long Prototype Cards (package of 3)

**!! NEW !!**