

# PowerLab® LabTutor® Systems

## Interactive Data Acquisition and Courseware for Life Science Education



PowerLab LabTutor Systems concentrate on teaching scientific principles, not data acquisition skills. The systems include PowerLab data acquisition units, transducers and accessories, and the revolutionary LabTutor Teaching Suite. Freely available LabTutor experiments include background information, instructions, real-time data acquisition, analysis and electronic report submission — all within a single software application.

### The Innovation of LabTutor Teaching Suite

The innovative LabTutor 4 Teaching Suite is an integrated solution for life science laboratory courses. It provides great learning outcomes and delivers outstanding time and cost savings for departments and institutions. Students' interest is quickly captured through an interactive, independent discovery process that requires almost no supervision. Educators can save time by managing course content, student lists and experiment updates on a single networked computer. Experiment customization and creation tools are included in the package and optional off-site student and educator access to experiments via the Internet is also available.

### The Reliability of PowerLab Hardware

ADInstruments' PowerLab data acquisition systems have earned their reputation as a powerful, reliable and versatile part of the world's best research laboratories. The innovative PowerLab 15T balances this quality and reliability with a set of easy-to-use features for education.

### The Ease of Complete Systems at Affordable Prices

Every PowerLab LabTutor System is supplied with the software, hardware, transducers and accessories for a wide range of experiments. The ability to add components to a system provides flexibility, and safeguards your investment. In addition, the complete PowerLab LabTutor System solution offers outstanding value for money.

## Features & Benefits

- Affordable solutions for life science education
- Complete hardware packages with PowerLab and compatible transducers
- Includes ready-to-use experiments with real data acquisition
- Time-saving central data and student administration for educators
- Option to provide students with online access to experiments and data
- Free experiment and software upgrades
- Supplied with LabAuthor software for experiment creation and editing

## Quality & Safety

PowerLab systems are manufactured under the ISO 9001:2008 certified quality management system and have a three year warranty.

PowerLab systems meet the European EMC directive, which is equivalent to the FCC Class B standard in the United States.

All biopotential signal conditioners are approved to the IEC 60601-1 patient safety standard, making them safe for use with human subjects.



# PowerLab LabTutor Systems

## PTB4151 Human Physiology System I

The PTB4151 includes a four-channel PowerLab 15T data acquisition unit with an integrated isolated stimulator and dual-channel bioamplifier. The selection of transducers and accessories allow students to complete a wide range of LabTutor human physiology experiments. These include blood pressure, cardiovascular effects of exercise, breathing, ECG, EEG, EMG, and reflexes and reaction times.

			MLT004/ST Grip Force Transducer
<b>ML4818 PowerLab 15T</b>	<ul style="list-style-type: none"> <li>MLS400 LabTutor 4 Software Suite</li> <li>MLA2540 Shielded Bio Amp Cable</li> <li>MLA2505 Shielded Lead Wires</li> <li>MLADDF30 Stimulating Bar Electrode</li> </ul>		MLAYDG Dry Earth Strap
	MLT1010/D Pulse Transducer		MLAWBT9 EEG Flat Electrodes
	MLT1132/D Respiratory Belt Transducer		MLA700 Reusable ECG Electrodes
	MLT1100/D Sphygmomanometer		MLA1010 Disposable ECG Electrodes
	MLA92/D Push Button Switch		MLA1093 Abrasive Gel
	MLT201 Cardio Microphone		MLA1090 Electrode Cream
			MLA1095 Electrode Paste
			MLA1094 Alcohol Swabs

## PTB4152 Human Physiology System II














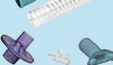












In addition to the equipment supplied with the PTB4151, the Human Physiology System II includes the PTK10 Human Respiratory Kit. This provides the option to perform a number of respiratory airflow and volume exercises such as lung volumes and capacities, pulmonary function tests and the effects of airway restriction.

			MLAWBT9 EEG Flat Electrodes
<b>ML4818 PowerLab 15T</b>	<ul style="list-style-type: none"> <li>MLS400 LabTutor 4 Software Suite</li> <li>MLA2540 Shielded Bio Amp Cable</li> <li>MLA2505 Shielded Lead Wires</li> <li>MLADDF30 Stimulating Bar Electrode</li> </ul>		MLA700 Reusable ECG Electrodes
	MLT1010/D Pulse Transducer		MLA1010 Disposable ECG Electrodes
	MLT1132/D Respiratory Belt Transducer		MLA1093 Abrasive Gel
	MLT1100/D Sphygmomanometer		MLA1090 Electrode Cream
	MLA92/D Push Button Switch		MLA1095 Electrode Paste
	MLT201 Cardio Microphone		MLA1094 Alcohol Swabs
	MLT004/ST Grip Force Transducer	<div style="border: 1px solid #00a0e3; padding: 5px;"> <p style="text-align: center; margin: 0;"><b>PTK10 Human Respiratory Kit</b></p> <p> ML311 Spirometer Pod</p> <p> MLT1000L Respiratory Flow Head</p> <p> MLA1011A Clean Bore Tubing &amp; Adapter</p> <p> MLA145 Student Respiratory Kit (5 kits)</p> </div>	
	MLAYDG Dry Earth Strap		

# Complete Solutions for Life Science Education












## PTB4153 Human and Animal Physiology System

The PTB4153 Human and Animal Physiology System includes the PTK11 Nerve and Muscle Kit. As well as the human physiology experiments featured in the PTB4152 Human Physiology System II, the PTB4153 can be used to complete a number of animal physiology experiments. These include earthworm action potentials, frog heart, frog nerve and frog skeletal muscle experiments.

			MLA1010	Disposable ECG Electrodes	
<b>ML4818 PowerLab 15T</b>	<ul style="list-style-type: none"> <li>• MLS400 LabTutor 4 Software Suite</li> <li>• MLA2540 Shielded Bio Amp Cable</li> <li>• MLA2505 Shielded Lead Wires</li> <li>• MLADDF30 Stimulating Bar Electrode</li> </ul>		MLA1093	Abrasive Gel	
	MLT1010/D	Pulse Transducer		MLA1090	Electrode Cream
	MLT1132/D	Respiratory Belt Transducer		MLA1095	Electrode Paste
	MLT1100/D	Sphygmomanometer		MLA1094	Alcohol Swabs
	MLA92/D	Push Button Switch	<div style="background-color: #e0f0ff; padding: 5px;"> <p><b>PTK10 Human Respiratory Kit</b></p> <p> ML311 Spirometer Pod</p> <p> MLT1000L Respiratory Flow Head</p> <p> MLA1011A Clean Bore Tubing &amp; Adapter</p> <p> MLA145 Student Respiratory Kit (5 kits)</p> </div>		
	MLT201	Cardio Microphone			
	MLT004/ST	Grip Force Transducer			
	MLAYDG	Dry Earth Strap			
	MLA1605	Shielded Lead Wires (5 alligator clips, 25 cm)			
	MLAWBT9	EEG Flat Electrodes	<div style="background-color: #e0f0ff; padding: 5px;"> <p><b>PTK11 Nerve and Muscle Kit</b></p> <p> MLTF500/ST Teaching Force Transducer</p> <p> MLA0320 Animal Nerve Stimulating Electrode</p> <p> MLT016/B Nerve Chamber with Cables</p> <p> MLA285 Differential Pod Input Cables (2)</p> <p> MLA270 Stimulator Cable</p> </div>		
	MLA700	Reusable ECG Electrodes			

## PTB4154 Animal Physiology System

This system is used for isolated nerve and muscle preparations from animals. These include earthworm action potentials, frog heart, frog nerve and frog skeletal muscle experiments. The Bridge Pod and Force Transducer measure muscle contractions, and the PowerLab unit's Output connector and Bio Amp provide the means to stimulate and record action potentials.

			MLA0320	Animal Nerve Stimulating Electrode	
<b>ML4818 PowerLab 15T</b>	<ul style="list-style-type: none"> <li>• MLS400 LabTutor 4 Software Suite</li> <li>• MLA2540 Shielded Bio Amp Cable</li> <li>• MLA2505 Shielded Lead Wires</li> <li>• MLADDF30 Stimulating Bar Electrode</li> </ul>		MLT016/B	Nerve Chamber with Cables:	
	MLT1010/D	Pulse Transducer		MLA285	Differential Pod Input Cables (2)
	MLTF500/ST	Teaching Force Transducer		MLA270	Stimulator Cable
			MLA1605	Shielded Lead Wires (5 alligator clips, 25 cm)	
			MLA013	Muscle Holder	
			MLA40	Manipulator & Stand	

# Configured LabTutor Experiments

The experiment lists are frequently updated and expanded. The latest LabTutor Experiments and Resources are in many languages and freely available for LabTutor users from the Downloads page of our website at [www.adinstruments.com/downloads/](http://www.adinstruments.com/downloads/)

Experiments are available in the following categories:



## Teaching Kits

Each Teaching Kit extends a Teaching System's experiment range into new subject areas and disciplines.

### PTK10 Human Respiratory Kit

Used for measuring respiratory flow and volume.



### PTK15 EOG Kit

Configured for recording human eye movements.



### PTK19 Nerve and Muscle Kit II

Allows recording of isolated nerve and muscle activity.



### PTK11 Nerve and Muscle Kit

Allows recording of isolated nerve and muscle activity.



### PTK17 Reflex Kit

Used for stimulating and measuring human reflexes.



### PTK20 Exercise Breathing Kit

For collecting expired air for LabTutor Exercise Physiology experiments



### PTK13 Pharmacology Kit

For pharmacological studies using isolated tissues.



### PTK18 Biochemistry Kit

For recording pH, oxygen, temperature and volumes.



### PTK25 Wireless Heart Rate Kit

For recording human heart rate wirelessly.



# The LabTutor 4 Software Suite

Each PowerLab LabTutor Teaching System classroom is supplied with the LabTutor 4 Teaching Suite. The Suite contains three different applications that work together to provide students with an engaging, easy-to-follow experiment interface (LabTutor), and provide educators with centralized control of experiment content and course configuration (LabTutor Server and LabAuthor). The LabTutor 4 Teaching Suite is also compatible with LabTutor Online, optional licenses that provide students with remote access to their LabTutor experiments and data.

## LabTutor Server

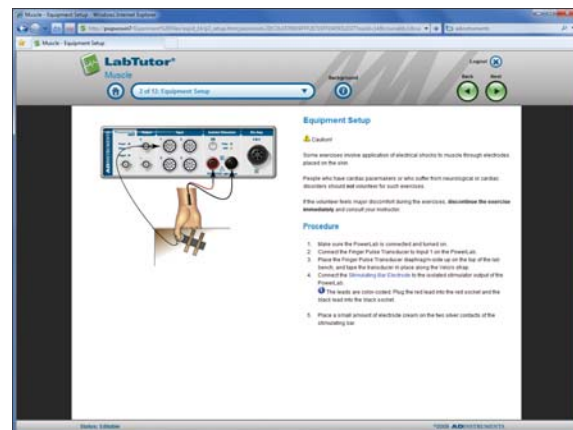
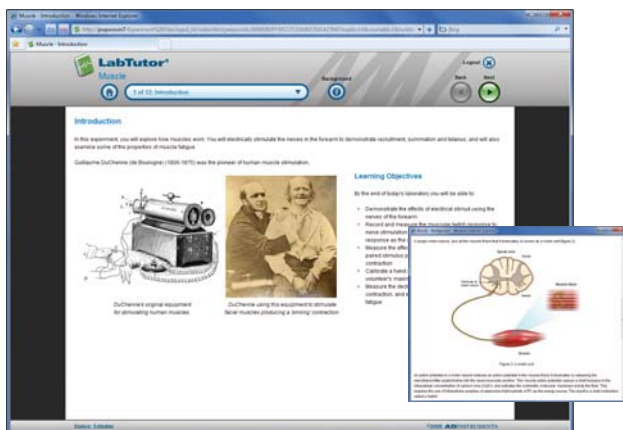
LabTutor Server is the centralized administrative interface of the LabTutor 4 Suite. From one simple interface, educators can create and manage multiple courses for their classroom. For each different course, you can choose to download and install any of the extensive choice of pre-configured experiments (see page 4), or upload experiments customized in LabAuthor. Experiments are instantly installed and updated on each networked computer in your classroom.

LabTutor Server also allows you to track student activity (both in class and remotely with LabTutor Online), manage student enrollments and data, and access students' completed experiments for marking.

## LabTutor

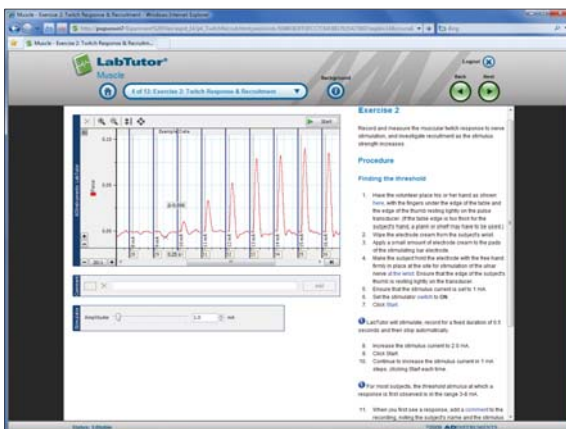
LabTutor provides experiment background information, step-by-step instructions, real-time data acquisition, interactive analysis, measurement and graphing tools, and electronic reporting and submission in one student-friendly interface. The sample experiment pages below illustrate the LabTutor experiment structure

### Introduction & Setup



The Introduction section explains the experiment and its Learning Objectives. A Background information button provides additional scientific details. This is followed with experiment setup instructions.

### Data Acquisition & Analysis



After setup, LabTutor takes students through an exercise set with step-by-step instructions, real-time data acquisition and interactive analysis tasks.

# The LabTutor 4 Software Suite

## Reports & Submission



Recorded and analyzed data is transferred to the Report section, where students answer questions based on their data and observations. Reports are electronically submitted to the LabTutor Server.

## LabAuthor

LabAuthor provides easy-to-use software tools for creating and editing LabTutor experiments. You can make changes to any preconfigured LabTutor experiment, or create a new experiment to suit your students' abilities, your laboratory classroom's facilities and your curriculum's learning outcomes. LabAuthor is included in the LabTutor 4 Software Suite.

## LabTutor Online

LabTutor Online is an optional addition to the LabTutor 4 Suite that gives students remote access to their LabTutor experiments and data. Students can spend less time in the lab, and complete pre-lab preparation and post-lab analysis and reporting tasks from any computer with an internet connection. Educators can boost their course's online learning content, and access student's submitted reports for marking from home or the office.

## PowerLab 15T



### PowerLab 15T Specifications

- Two general recording channels
- Built-in two-channel bioamplifier
- Built-in isolated stimulator
- Analog bandwidth: 25 kHz
- Two analog outputs (-10 to +10 V)
- 16-bit signal resolution
- Continuous sampling rates: 100 kHz per channel (4 channels)
- Human Safety Certification: IEC 60601-1 (Patient Safety) IEC 60601-1-2 (EMC)
- Communication: USB 1.1 and 2.0

The PowerLab 15T provides high-quality, easy-to-use and affordable data acquisition. The built-in amplifier and stimulator are certified safe for human use, so you can feel at ease when students connect themselves to the PowerLab. Students can begin recording in seconds by simply starting LabTutor software and plugging in the transducer or electrode.



**"How do I add video to LabTutor experiments?"**

Find the answer to this and other questions on our Software Forum – [www.adinstruments.com/forum](http://www.adinstruments.com/forum)

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PowerLab systems and signal conditioners meet the European EMC directive. ADInstruments signal conditioners for human use are approved to the IEC60601-1 patient safety standard and meet the CSA C22.2 No. 601.1-M90 and UL Std No. 2601-1 safety of medical electrical equipment standards.



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ISO 9001:2008 Certified Quality Management System



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