

# Tools for Physiology

## Physiology Kits



A complete Kymograph-based physiology experiments lab offering a "hands-on" experience to biology students. This complete "course in a case" contains all the necessary apparatus, including a microprocessor-controlled Kymograph and a comprehensive Teacher's Manual, to perform a wide range of experimentation:

- **Physiology of Respiration in Man**, Topics include: Respiratory Patterns, Effects of Exercise on Respiration, Sensory Stimuli Affecting Respiratory Movements.
- **Physiology of Frog Muscle Contraction**, Topics include: Muscle Twitch, Muscle Response to Variations in Stimuli, Strength & Frequency.
- **Physiology of Frog and Turtle Heart**, Topics include: Recording Heartbeat, Refractory Period of the Heart, The "All or None" Response.

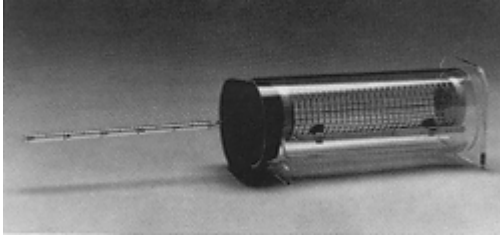
All components are packed in a rugged attache-style case. Battery included. Available as smoke or ink-writing models in 110v or 220v. Also available: Physiology Accessory Kits, for schools which already own a Kymograph.

Also recommended--The Electrophysiology System 690 for advanced studies in physiology, including the Nerve Action Potential, EEGs, ECGs and EMGs. Catalog #7092-690.

### Catalog:

- |   |  |                                    |
|---|--|------------------------------------|
| ● #7005-401<br>PK-1<br>Smoke<br>writing | ● #7005-402 PK-2<br>Smoke writing<br>w/Smoking Stand &<br>Burner | ● #7005-403<br>PK-3 Ink<br>writing |
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## Small Animal Metabolism Apparatus



An economical student experiment apparatus for determining the oxygen consumption of small animals (weighing less than 150g). A fun, educational experience and an effective demonstration of basal metabolism.

Other suggested activities include the comparison of metabolic rates between animals of different species, sex or size; and comparisons of animals under varying environmental conditions, such as light/dark, cool/warm and resting/working.

Contains all the equipment necessary to conduct the experiments. Animal and CO<sub>2</sub> absorbant not included.

Catalog #7122-410

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## Bio-Monitor



A sturdy, dependable instrument used to detect and display bioelectrical events associated with cardiac and striated muscle activity. The Bio-Monitor provides both visual (flashing light) and audible (beep tone) responses.

The Bio-Monitor is found to be an acceptable "alternative to dissection" product for non-dissection educational environments.

The Bio-Monitor comes with all the accessories needed to perform experiments at the classroom level, including:

- Determining Mean Heartbeat
- Heart Rate Differences by Sex and Height
- Effects of Rapid Breathing and Exercising

A comprehensive Teacher's Manual and batteries are included.

Catalog #7092-910

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## Isolated Square Wave Stimulator



A convenient source of electric current for classroom experiments which require safe, controllable electrical stimuli of muscles and nerves. The Phipps & Bird Square Wave Stimulator is capable of supporting a wide spectrum of physiological processes ranging from the simple through the very sophisticated. Recreate the scientific breakthroughs of Galvani, Lapicque and others.

### Specifications:

- Wave Form: Square
- Stimulus Amplitude: 0-100 volts
- Stimulus Duration: 0.04ms to 50ms
- Frequency: 1-1000 pulses per second
- Sync-Output: 10v square wave
- Stimulator Protection: Isolated transformer
- Fuse: 1 amp, 3 AG
- Signal Magnet Output: Activated magnet (2 ohms or over) once for each stimulus at frequencies of up to 20 stimuli per second. A stimulus frequency in excess of 20 stimuli per second will cause the signal magnet to lock in.
- Operational Modes: Continuous automatic, continuous manual, and manual single pulse control.
- Power: Available in 110vac and 220vac, 35w max. 50-60Hz.
- Dimensions: 28cm X 20cm X 10cm (10" X 8" X 3")  
Also recommended--Signal Magnet, **Catalog #7081-001** /Kit.

Catalog #7092-611

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## Balanced Biological Bio-Amplifier

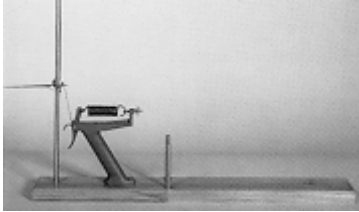


A multi-purpose, medium sensitivity amplifier for use in conducting cardiac muscle potentials, nerve and striated muscle potentials, and cortical and electroencephalographic signals.

Catalog #7092-631

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## Ergograph



For studying the physiology of muscle fatigue. Used with a kymograph (purchased separately), the Ergograph provides fatigue curve tracings from the student's index finger working against an adjustable tension coil spring.

Catalog #7089-000

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## Blood Pressure Experiments Kit



Teach students how to take blood pressure readings with a blood pressure cuff and stethoscope. Experiment with the impact that exercise, caffeine, pain or standing has on blood pressure.

Catalog #5000-000

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## Isolated Organ Tissue Bath



Muscle chamber accessories available. Four chamber designs, each available in 10, 20,30 and 50cc sizes. Study the effects of drugs or electrical stimuli on isolated organs and smooth muscle segments of the intestine, uterus, ureter, trachea, vessel segments, etc. Comes complete with heater/agitator and muscle chambers.

Catalog:

● #7053-400

● #7053-400A (two chambers)

● #7053-400B (four chambers)

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## Student Wet Spirometer, 9-liter



Now there's an academic-quality wet spirometer that combines reliability and accuracy with an increased volume to accommodate students with larger lung capacities.

Introduce students to the basics of respiratory physiology through experiments in which they are the subjects. Measure Tidal Volumes (TV), Inspiratory Capacity (IC), Inspiratory Reserve Volume (IRV), Expiratory Reserve Volume (ERV), and Vital Capacity (VC).

### Catalog #7087-200

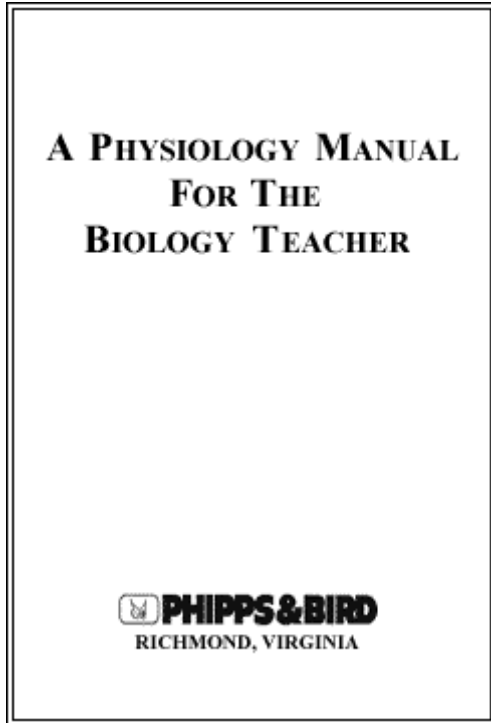
- Large, easy-to-read scale graduations.
- Highly accurate.
- Larger-than-normal 9-liter capacity.
- Disposable mouthpieces and one-way plastic valve for sanitary classroom use.
- Easily portable and storable.

**Each unit comes complete with instructions and a lab manual of theory and student experiments along with an initial supply of 100 disposable mouthpieces.**

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# Physiology Manual



## Table of Contents

### *Part I*

Physiology of Respiration in Humans  
Physiology of Muscle Contraction (Frog)  
Physiology of Cardiac Tissue (Frog & Turtle)

### *Part II*

The Kymograph  
Lever Systems  
Inductarium and Stimuli  
The Signal Magnet and Its Uses  
The Pneumograph and Tambour  
The Spirometer

### *Part III*

The Frog  
The Turtle  
Preparation of Amphibian Ringer's Solution

### **Catalog #7005-406**

Edited by Barbara Ettner  
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