Polyhedron Learning Media, Inc.

**Adding Depth and Dimension to Education**

Polyhedron Physics™ is a comprehensive set of 3D simulated laboratory equipment and data collection tools for conducting physics experiments. The experimental data produced by the simulations are realistic, including random and systematic errors. These features allow students to use standard data analysis and error analysis techniques to report on their own unique data, just as if the experiment had been performed using real equipment.

## KINEMATICS AND DYNAMICS

**CART AND PULLEY**
Use a laboratory cart and pulley to explore uniformly accelerated motion in one dimension, Newton’s Second Law, the relationship between impulse and change in momentum, and the relationship between work and change in mechanical energy.

**FREE FALL APPARATUS**
Use a position sensor to examine the relationship between the position, velocity, and acceleration of a free-falling body.

**INCLINABLE AIR TABLE**
Use an inclinable air table to investigate uniformly accelerated motion in two dimensions.

**PROJECTILE LAUNCHER AND IMPACT PAD**
Use a projectile launcher and an impact pad to investigate projectile motion.

**BALLISTIC PENDULUM**
Use a ballistic pendulum to demonstrate the conservation of momentum in a totally inelastic collision.

**FRICITION BLOCK**
Use a friction block to determine the coefficients of static friction and kinetic friction for two surfaces in contact.

**FORCE TABLE**
Use a force table to investigate the vector addition of forces.

**ROTATIONAL EQUILIBRIUM APPARATUS**
Use masses and pulleys to apply torques to a wheel and investigate rotational equilibrium.

**INERTIA WHEEL**
Use a disk, a ring, and four masses mounted on a bearing, a mass hanger and slotted masses, a string, and a timer to investigate the relationship between torque, moment of inertia, and angular acceleration.

**CENTRIPETAL FORCE APPARATUS**
Use a centripetal force apparatus to investigate the relationships between the centripetal force on an object and the mass, velocity, and radius of revolution of the object.

**SPRING-MASS SYSTEM**
Use a spring-mass system to investigate Hooke’s Law, simple harmonic motion, and conservation of mechanical energy.

**STANDING WAVES ON A STRING APPARATUS**
Use a string vibrator, a sine wave generator, and strings of various linear densities to investigate standing waves.

**PENDULUM**
Use a mass on a string to investigate the relationships between the mass, length, amplitude, and period of oscillation of a pendulum.

In development: Rotational Equilibrium Using a Meter Stick

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**THERMODYNAMICS**

**RESONANCE CHAMBER**
Use a transparent tube with moveable plunger, a sine wave generator and speaker, a microphone, and two sound level meters to investigate standing waves inside a resonance chamber.

**GAS LAWS APPARATUS**
Use a plastic syringe, a water bath, a hot plate, ice, a thermometer, a barometer, and masses to demonstrate Boyle’s Law, Charles’ Law, and Gay-Lussac’s Law, and to estimate values for absolute zero and the universal gas constant.

**THERMOMETERS**
Use an uncalibrated liquid column thermometer, a constant volume gas bulb with an absolute pressure gauge, a thermistor and ohmmeter, a water bath, a hot plate, and ice to investigate the measurement of temperature.

In development: Heat Engine; Calorimeter and Heating Coil; Archimedes’ Principle Apparatus; Calorimeter and Metal Samples

**ELECTRICITY**

**OHM’S LAW APPARATUS**
Use a resistor, a power supply, a voltmeter, and an ammeter to investigate the relationships between the voltage, current, and resistance in a circuit.

**SERIES AND PARALLEL CIRCUITS**
Use resistors, a power supply, a voltmeter, and an ammeter to investigate the effective resistances of circuits with resistors in series, in parallel, and in combinations of series and parallel components.

**KIRCHHOFF’S CIRCUIT LAWS APPARATUS**
Use power supplies, resistors, and ammeters to investigate Kirchhoff’s Circuit Laws.

**WHEATSTONE BRIDGE APPARATUS**
Use a slide-wire device, a variable resistance box, and a fixed resistor to investigate a Wheatstone bridge circuit.

**RC CIRCUITS**
Use a power supply, a voltmeter, capacitors, and resistors to investigate resistor-capacitor (RC) circuits.

**ELECTRIC FIELD MAPPING APPARATUS**
Use silver paint electrodes on resistance paper, a power supply, and a voltmeter to measure and diagram the equipotential surfaces and electric fields produced by a line of charge, two lines of opposite charge, and two oppositely-charged parallel plates.

In development: AC LR Circuits; AC RC Circuits; AC LRC Circuits; Electric Motor and Pulley; Galvanometer as a Voltmeter; Galvanometer as an Ammeter; Long Straight Wire Apparatus

**LIGHT AND OPTICS**

**RAY BOX AND MIRROR**
Use a plane mirror to investigate the relationships between object and image distances and angles of incidence and reflection.

**RAY BOX AND TRIANGULAR PRISM**
Use a triangular prism and a ray box to investigate the refraction of a ray of light, determine the minimum angle of deviation, and demonstrate critical refraction and total internal reflection.

**RAY BOX AND LENSES**
Use a ray box and a convex and concave lens to investigate the properties of converging and diverging lenses.

In development: Ray Box and Refraction Cell, Optical Bench and Lenses, Discharge Tube and Diffraction Grating

**NUCLEAR PHYSICS**

In development: Barium-137 Source and Geiger Counter; Beta and Gamma Sources and Absorbers

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