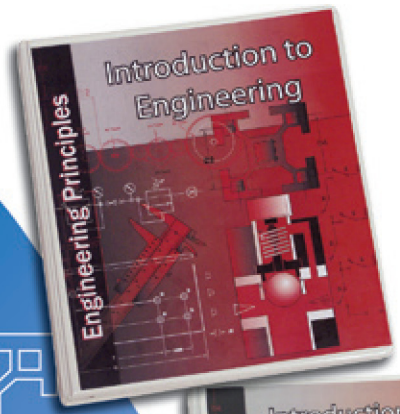
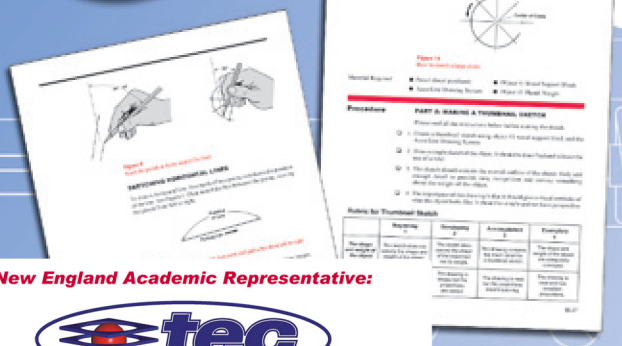
Engineering Principles

Introduction to Engineering

Science
Technology
Engineering
Math





New England Academic Representative:

Technology Education Concepts
1-800-338-2238 | www.TECedu.com | info@TECedu.com

ENERGY CONCEPTS, INC.

Introduction To Engineering

In **ECI Model 271S Introduction to Engineering Trainer**, students explore engineering careers, communication techniques, and the design process. As students learn about types of drawings, documentation, and presentations, they develop the skills needed in project development. They are challenged with a design project, and create a model of their own designs.

Components

Wood Support Block
Plumb Weight
Juicer
Extension Shaft
Shaft Coupler
Modeling Tool Set
Modeling Supplies
Accu-line Drawing System
Cloth Tape Ruler
Ellipse/Circle Set
Triangle Set
Steel Ruler
Graph Paper Package

The Laboratory Manual

The Lab manual is designed to help students develop a thorough understanding of the subject matter. The manual is clearly written and professionally illustrated. It is printed in two-colors and comes in a quality vinyl binder.

System Familiarization
Inventory of Tools and Objects

Introduction
Introduction to Engineering
Advanced Level Internet Searches
Research for Technical Information
Engineering Careers

Communications
Sketching and Perspective Drawings
Orthographic Sketches
Dimensioning
Technical Writing
Technical Writing-Directions
Technical Report
Oral Presentations

The Design Process
Introduction
Demonstrating the Design Process
Innovation of a Hall Locker

Instructor's Resource Guide

The Resource Guide includes sample data and answers to quiz questions, as well as a Student Journal CD. The journal provides a convenient way for students to enter and save their data and answers to experiment questions. The instructor can also have the students print paper copies to hand in for grading.

ENERGY CONCEPTS, INC.
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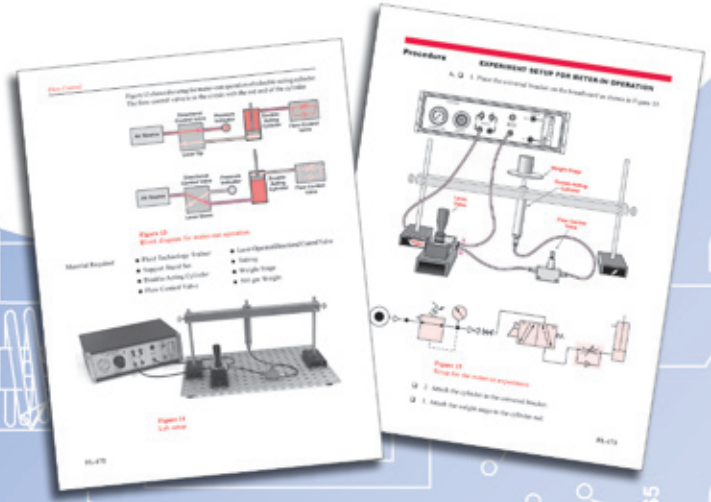
Engineering Principles

Fluid Systems

Science
Technology
Engineering
Math

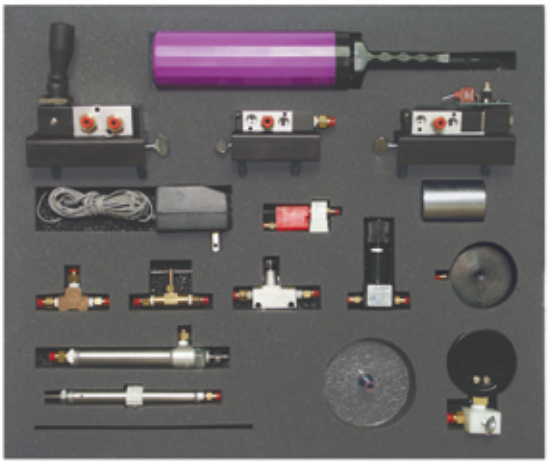


ENERGY CONCEPTS, INC.

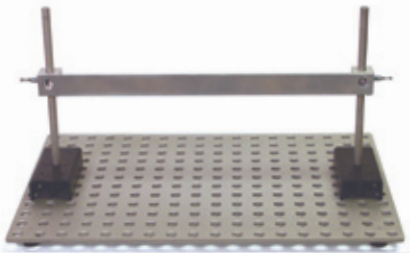
Fluid Systems

The **ECI Model 276S Fluid Systems** is a complete comprehensive trainer that introduces students to fluid technology and applications. The hands-on experiments demonstrate how different pneumatic devices operate and can be combined into systems to do work. The trainer includes industrial grade components, with quick-disconnect fittings and a mechanical breadboarding system for fast circuit construction.

System Components



- Manual Lever Valve
- Solenoid Valve
- Air-Piloted Valve
- Relief Valve
- Flow Control Valve
- Hand Pump
- Needle Valve
- Single-Acting Cylinder
- Double-Acting Cylinder
- Pressure Gauge
- Vacuum Generator
- Air Bearing
- Weight Stage
- Weight, 500 G
- Transformer
- Accessory Package
- Tubing Package



Support Stand Set

Fluid Control Panel

The Fluid Control Panel has a System Pressure Regulator and pressure gauge. It also includes two Pressure Control Switches, Pressure Indicator, and Flowmeter. The air ports are provided with quality quick-disconnect fittings.

The Laboratory Manual

The Lab manual is designed to help students develop a thorough understanding of the subject matter. The manual is clearly written and professionally illustrated. It is printed in two-colors and comes in a quality vinyl binder.

System Familiarization
Inventory of Parts and Symbols

Principles of Fluid Power
Blowing In the Wind
Demonstrating Compressibility is Different Between Liquids and Gasses

Control and Monitoring Pressure
Pressure Regulators
Pressure Relief Valves
Sequence Valves

Air Pressure and System Monitors
Air Pressure
Pressure Gauges, and Indicators
Measuring Air Flow

Directional Controls
Using a Directional Control Valve
The Air-Piloted Directional Control Valve
Solenoid Directional Control Valve

Linear Actuators
Using a Double-Acting Cylinder
Using a Single-Acting Cylinder
Doing Work with a Cylinder

Force in Fluid Systems
Using an Air Bearing
Vacuum

Flow Control
Meter-in and Meter-out Operation
Measuring Power in a Pneumatic Circuit

Fluid Power Applications
Automating a Drill Press
Measuring Energy
Pick and Place Robot

Instructor's Resource Guide

The Resource Guide includes sample data and answers to quiz questions, as well as a Student Journal CD. The journal provides a convenient way for students to enter and save their data and answers to experiment questions. The instructor can also have the students print paper copies to hand in for grading.

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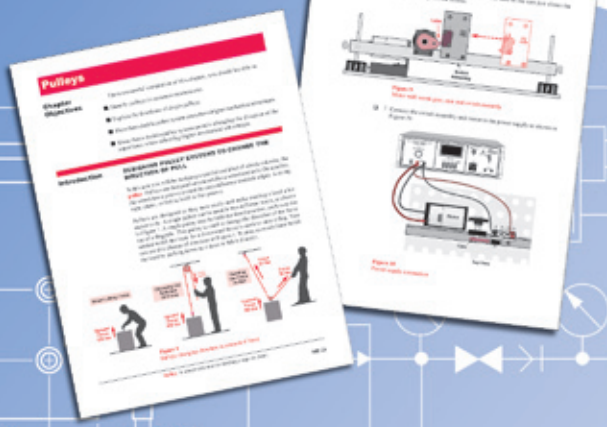
Engineering Principles

Mechanisms

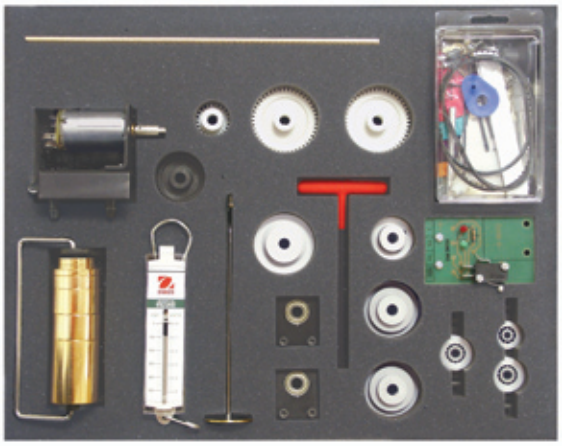
Science
Technology
Engineering
Math

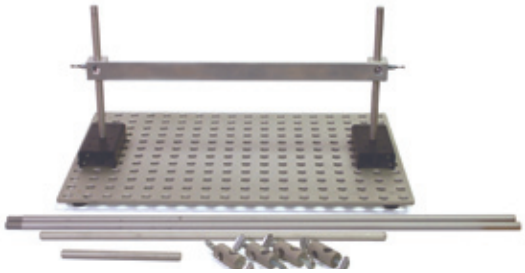


ENERGY CONCEPTS, INC.

Mechanisms

The **ECI Model 275S Mechanisms Trainer** is a challenging program covering basic devices and simple machines. The students use the unique support stand system to construct a variety of simple and complex mechanical circuits and apply the physics concepts used in mechanical systems. The hands-on experiments and calculations help prepare students to succeed in higher levels of study in engineering.





Support Stand Set

System Components

Single Pulley
Double Pulley
22T Spur Gear
45T Spur Gear (2)
24 Pitch Worm Wheel
T-Handle Wrench
Small Timing Pulley
Large Timing Pulley
Three-Step Pulley (2)
Motor, DC
CAM Switch Assembly
Spindle Mount Assembly (2)
Spring Scale
Weight Set
Weight Hanger
Ruler
Hardware Package

Instrumentation

Digital Tachometer

Digital Multimeter

High Current Power Supply

The AC/DC power supply is fully protected and specifically designed to provide long life under classroom conditions. Built with rugged 20-gauge steel, it is made in the USA and backed by a 3-year warranty.

The Laboratory Manual

The Lab manual is designed to help students develop a thorough understanding of the subject matter. It is clearly written and professionally illustrated. It is printed in two-colors and comes in a quality vinyl binder.

Introduction
Safety
System Familiarization

Simple Machines
Introduction
The Lever

Pulleys
The Single Pulley
The Double Pulley

Gears
Spur Gears
Increasing Speed with Spur Gears
Worm Gears

Belts and Pulleys
Introduction
Belt and Pulley Systems

Cams
Introduction
Cams

Linkages
Introduction
Linkages

Instructor's Resource Guide

The Resource Guide includes sample data and answers to quiz questions, as well as a Student Journal CD. The journal provides a convenient way for students to enter and save their data and answers to experiment questions. The instructor can also have the students print paper copies to hand in for grading.

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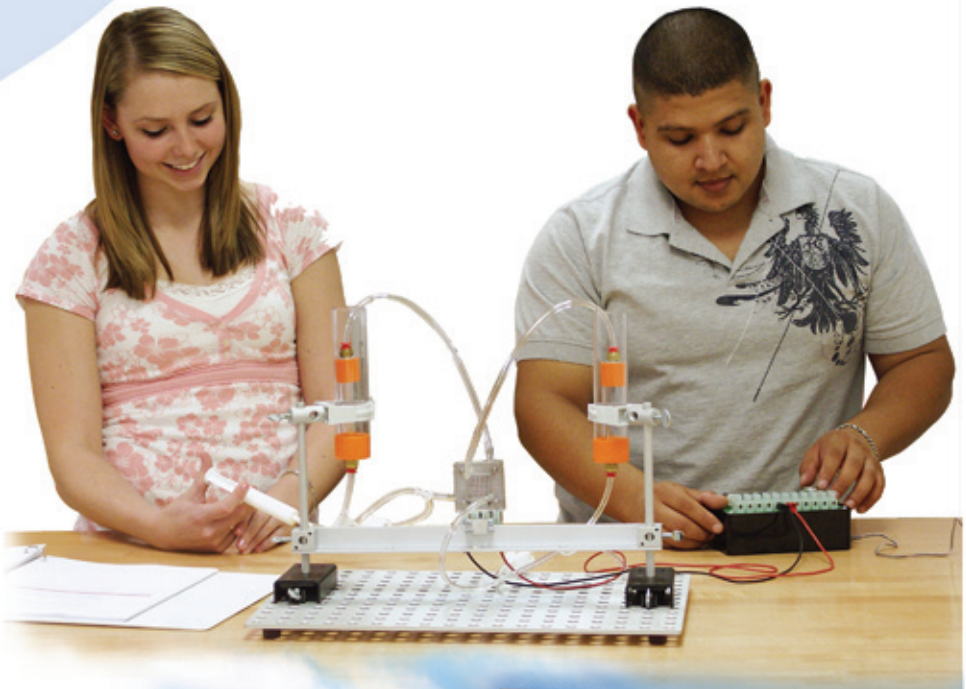
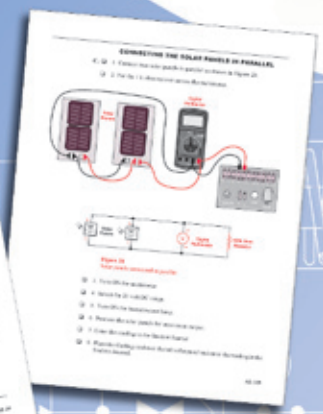
Engineering Principles

Alternative Energy

Science
Technology
Engineering
Math





ENERGY CONCEPTS, INC. ECI

Alternative Energy

In ECI **Model 274S Alternative Energy Trainer**, students perform hands-on experiments for wind, solar, and fuel cell technologies. In this basic introduction to alternative energies, students are challenged to calculate energy needs, analyze data, and create their own designs. As the use of alternative energy is grows, the need increases to prepare students for careers in this field.

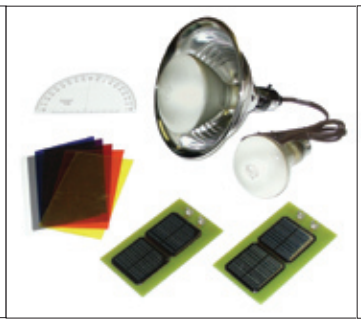
Components

Propellers (3)
Hub, Aluminum
Blade Component Kit
Plastic Cutter
Plastic Cement
Generator
Fan (not shown)

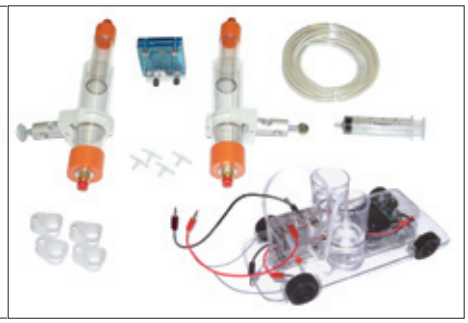
Solar Cell Modules
Protractor
Lamp
Floodlights (2)
Filter Set
Lead Set
Load Module

Fuel Cell
Reservoir Tanks (2)
Collection Tanks (2)
Tubing Package
Syringe

Wind

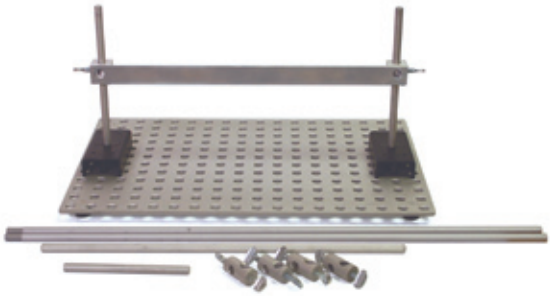


Solar



Fuel Cell

Support Stand Set



Instrumentation

Digital Anemometer

Digital Tachometer

Digital Multimeter

The Laboratory Manual

The Lab manual is designed to help students develop a thorough understanding of the subject matter. The manual is clearly written and professionally illustrated. It is printed in two-colors and comes in a quality vinyl binder.

System Familiarization and Safety
Wind Energy
Gathering Data for Turbine Site
Making a Wind Rose
Generating Electricity
Wind Speeds and Energy Output
Designing Rotor Blades
Evaluating Rotor Performance
Turbine Control Systems
Designing A Wind Energy System
Energy and Power Needs of a Home
Using Data to Select Components
Solar Energy
Introduction to Photovoltaic Systems
The Greenhouse Effect
Converting Light to Electricity
Finding the Maximum Power
Designing a Solar System for a Home
Hydrogen Fuel Cells
Generating Hydrogen
Generating Electricity with a Fuel Cell
Running an Electric Motor
Verifying the Presence of Gases

Instructor's Resource Guide

The Resource Guide includes sample data and answers to quiz questions, as well as a Student Journal CD. The journal provides a convenient way for students to enter and save their data and answers to experiment questions. The instructor can also have the students print paper copies to hand in for grading.

PB-274S

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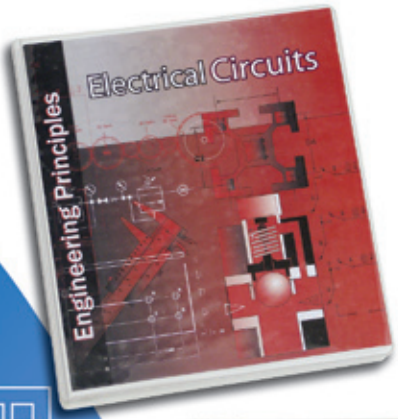
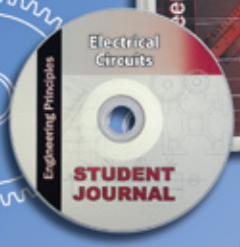
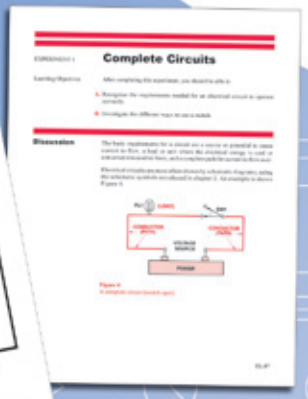
Engineering Principles

Electrical Circuits

Science
Technology
Engineering
Math



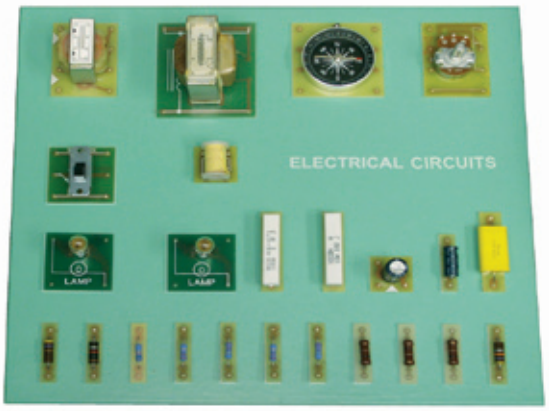




ENERGY CONCEPTS, INC.

Electrical Circuits

The **ECI Model 273S Electrical Circuits Trainer** guides students through hands-on experiments designed to provide an understanding of electricity, electrical components, and circuits. The understanding of electrical circuits is a necessity for engineers working with complex systems and devices. Students will be able to apply what they have learned in a wide range of job situations in their future careers.



Components

Potentiometer	10 Ω, 10 W Resistor	1 μfd, 50 VDC Capacitor
Coil	100 Ω, 2 W Resistor	100 μfd, 25 VDC Capacitor
SPDT Switch	220 Ω, 1 W Resistor	1000 μfd, 50 VDC Capacitor
Compass	470 Ω, 5 W Resistor	Accessory Package
Inductor	820 Ω, 1 W Resistor	
Transformer	1 kΩ, 1 W Resistor	
Lamp	10 kΩ, 1 W Resistor	
	47 kΩ, 1 W Resistor	

Instrumentation

High Current Power Supply

The AC/DC power supply is fully protected and specifically designed to provide long life under classroom conditions. Built with rugged 20-gauge steel, it is made in the USA and backed by a 3-year warranty.

Digital Multimeter

Circuit Panel and Easel

ECI's **Circuit Panel** is completely flexible and suitable for any general breadboarding work. The patented design can be used for basic set-up to advanced electronic circuits.

The **Circuit Panel Easel** is designed to hold the circuit panel for convenient circuit building. The base lifts out to reveal a roomy storage compartment for tools and accessories.

The Laboratory Manual

The Lab manual is designed to help students develop a thorough understanding of the subject matter. The manual is clearly written and professionally illustrated. It is printed in two-colors and comes in a quality vinyl binder.

System Familiarization	Conductors and Insulators	Resistive Circuits
Safety In The Laboratory	Batteries	Magnetism and Electromagnetism
Parts and Symbols	Series Circuits	Alternating Current
Wiring Procedures	Parallel Circuits	Self Inductance in a Coil
Basic Electricity	Resistors and Ohm's Law	Capacitance
Structure of Matter	Electrical Power and Energy	Capacitor Characteristics

Instructor's Resource Guide

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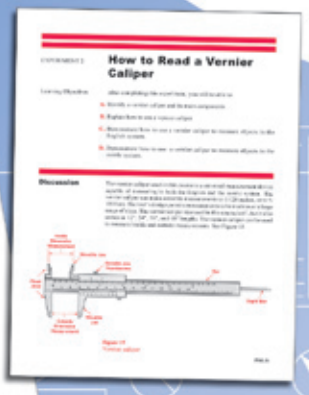
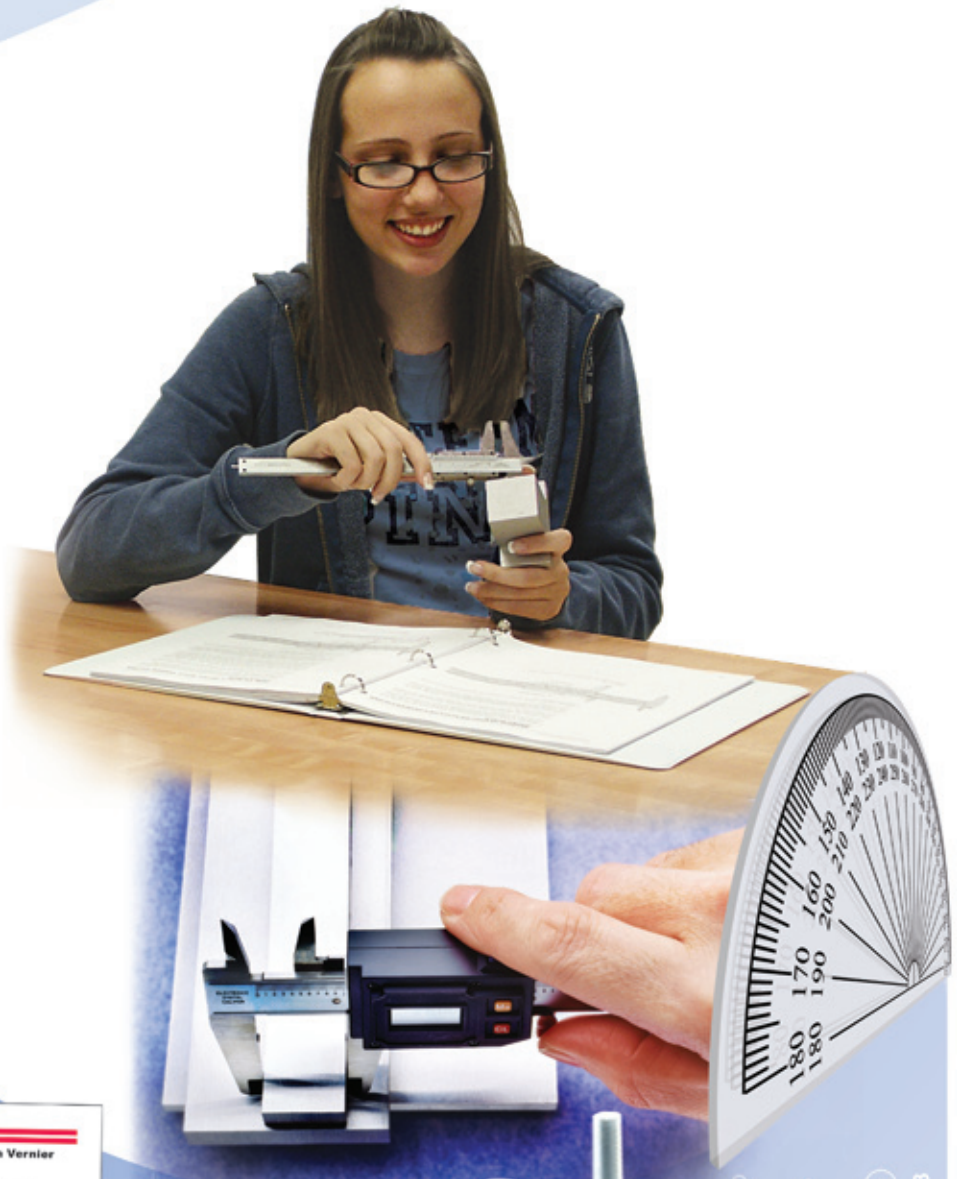
Engineering Principles

Precision Measurements

Science
Technology
Engineering
Math

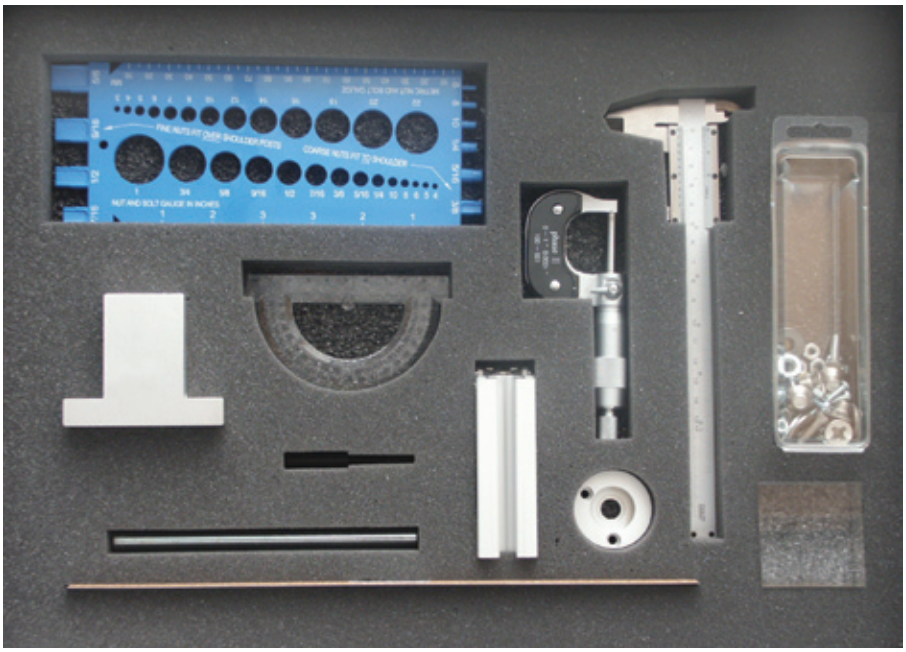




ENERGY CONCEPTS, INC. ECi

Precision Measurements

In ECI 272S training system, students develop skills using a range of tools and mathematics for attaining measurements. The hands-on experiments help students gain the ability to make accurate measurements and dimensions, which is often crucial for the success or failure of a project. Students will find that these skills will be useful in virtually any career path.



Components

Measurement Objects

Acrylic Block
Two-Step Rod
Metal Object #1
Metal Object #2
Metal Object #3

Screw, Nut, and Washer Set

Includes ten each of the following:
- Four different sizes of screws
- Four different sizes of nuts
- Three different sizes of washers

Measurement Tools

- ❑ Protractor
- ❑ Vernier Caliper
- ❑ Micrometer
- ❑ Steel Rule
- ❑ Screw and Nut Gauge

The Laboratory Manual

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System Familiarization
Inventory of Tools and Objects

Precision Measurements
Introduction

Using a Steel Rule
Reading a Fractional Scale
Reading a Decimal Scale
Reading a Centimeter Scale
Measuring Objects

How to Read a Vernier Caliper
Reading an English Scale
Reading a Metric Scale
How to Measure Depth
Digital and Dial Calipers
Measuring Objects

Using a Micrometer
How to Read a Micrometer
Types of Micrometers
Reading a Meteric Micrometer

Using a Protractor
Reading the scale on a protractor
Measuring Angles

Screw and Nut Measurements Using a Gauge
Classes and Sizes of Screws
Measuring Screws
Measuring Nuts

Instructor's Resource Guide

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