



# Exploring STEM Learning Cloud

Brought to Australia and New Zealand by



**Pullman Academic**

Better Learning Outcomes

A Division of Pullman Learning Group

Start work in 2 minutes

World class hardware for  
hands-on training



# Create a STEM Program

The cloud-based STEM program is a multi-mode resource designed for both whole-class and individualised instruction. The interactive nature of the content will provide a wealth of opportunities to provide engaging STEM teaching.

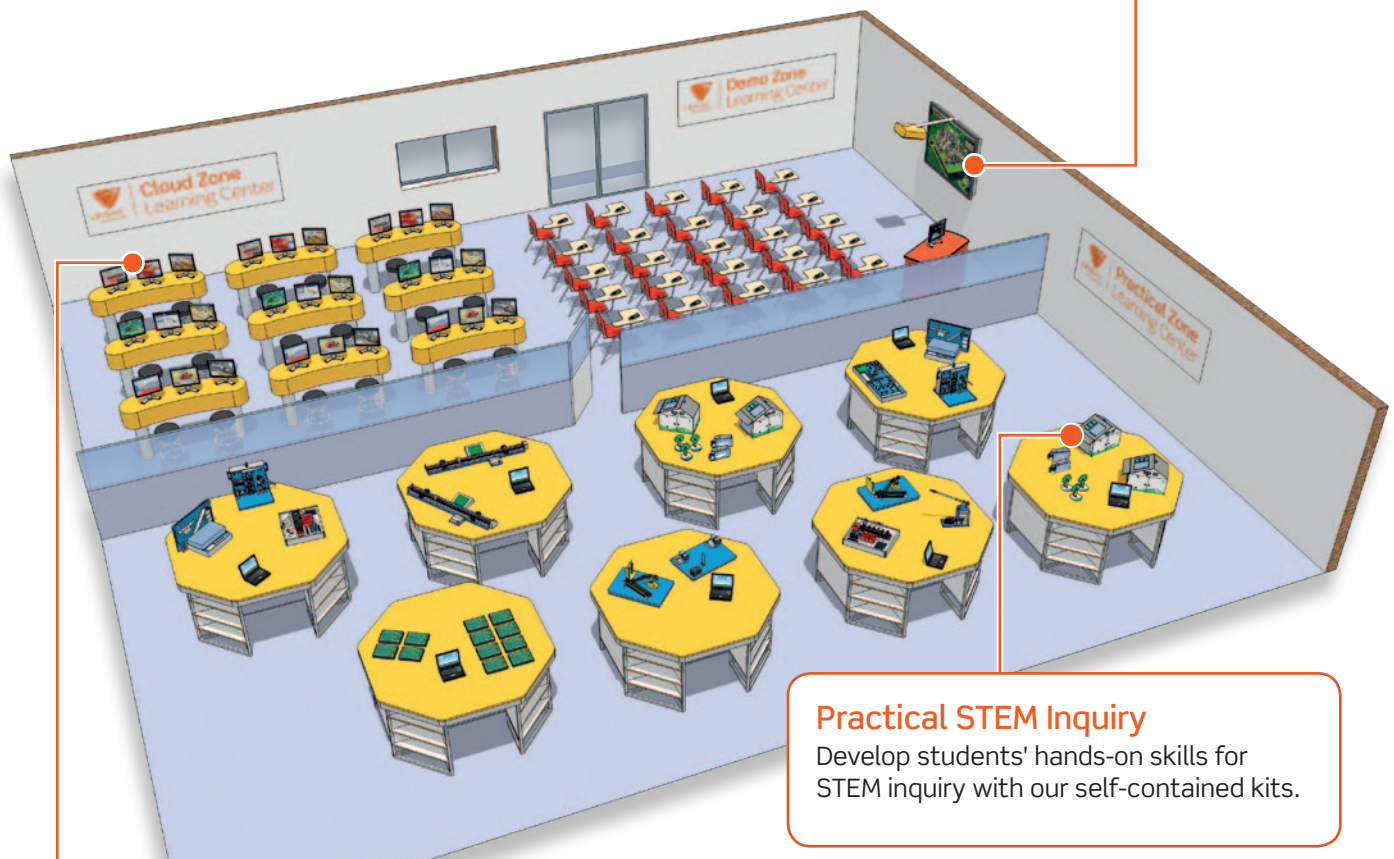
Through a unique combination of high-quality cloud-based content and a unique STEM trainers and hardware packs, we will put real-world problem- solving tasks into any STEM learning environment.

We want to help your school create a new and exciting STEM program.

## The Multi-Mode STEM Learning Environment

### Teaching Demonstrations

Present theory topics and practical demos with our interactive and practical tools.



### Virtual Investigations

Investigate and assess at school and at home using the built-in STEM apps.

### Practical STEM Inquiry

Develop students' hands-on skills for STEM inquiry with our self-contained kits.

The descriptions, images and availability of systems contained in this brochure are based on information available to Pullman Learning Group at the time of printing. While we endeavour to update this information regularly, from time-to-time descriptions may change or systems may be modified or discontinued.



# STEM - Cloud Software Package

## our solution

cloud-based, blended learning

'hands-on' practical activities



The STEM cloud-based software package is based upon a large and varied library of content that is continuously growing and updated to meet STEM teaching standards.

### Our Solution

Purchase an annual site licence and you will be provided with a domain within our STEM database that provides the following:

- Easy access via our cloud-based portal
- Continuously updated content
- Access for all enrolled students and staff
- Student and school performance reporting facilities

### Beautiful, Immersive Content

The range of content provided will allow each topic area to be supported with amazing and captivating resources. The multi-mode nature of the content provides the following types of learning materials:

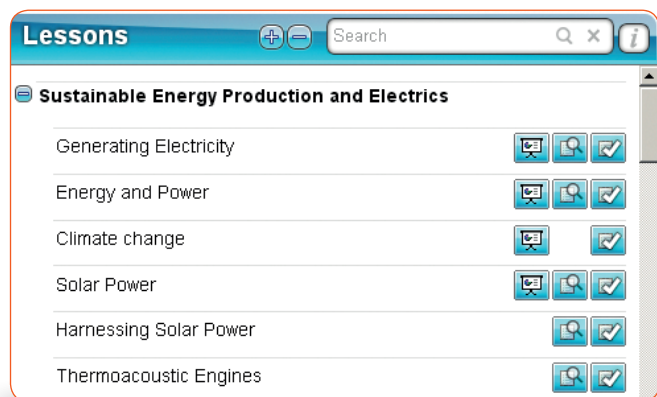
- Multimedia Presentations
- Virtual Lab Investigations
- Hands-on Practical Activities
- Problem-Solving Projects
- Academic and Technical Support Tasks



STEM Institution – Annual Site License  
Order As: EXS/AL

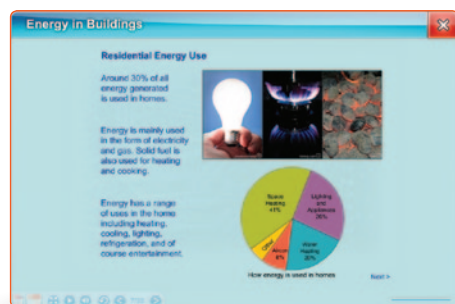
## eLEARNING

A wide range of presentations, investigations, and assessments to help develop skills and knowledge in STEM learning.

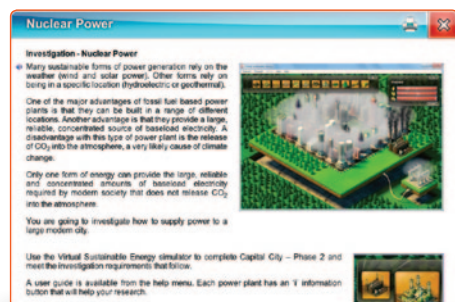


## EXAMPLE CONTENT

### Presentations



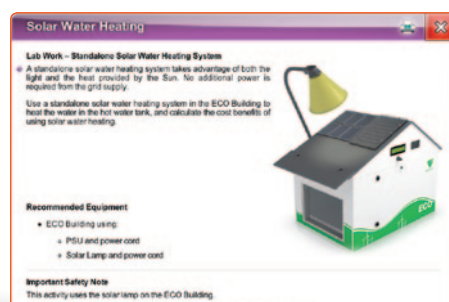
### Investigations



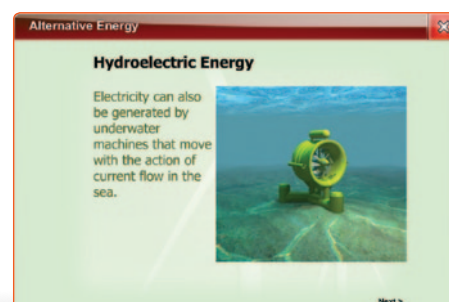
### Assessments



### Practical Tasks



### Support Materials



## Our Two-Minute Rule

Once a user has logged in, they are ready to start work with no installation or training required.

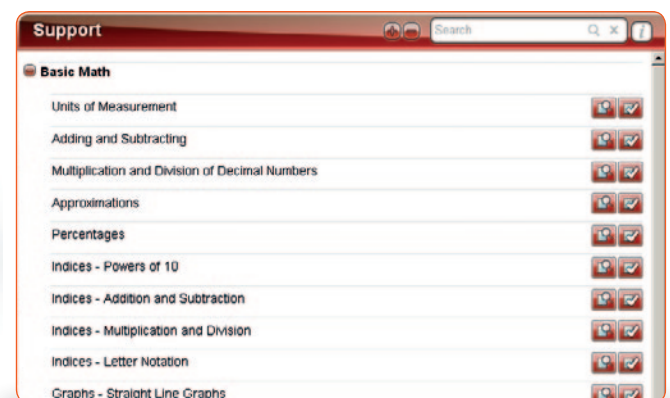
The intuitive menu system has been designed to meet our 'two-minute rule'.

We insist to our content development team that you **MUST** be able to use our software within two minutes.



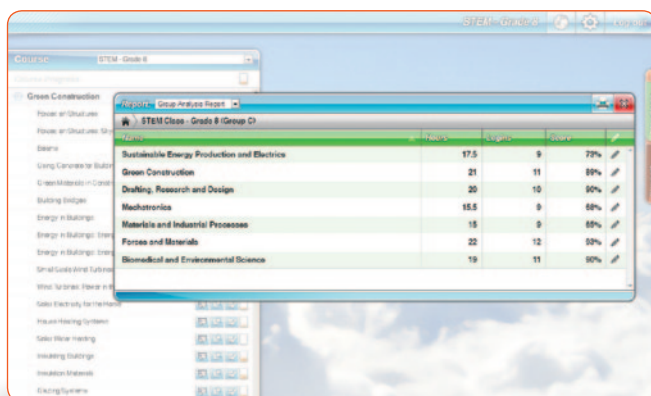
## ACADEMIC AND TECHNICAL SUPPORT

Resources offering background technical knowledge and academic support for maths and English.



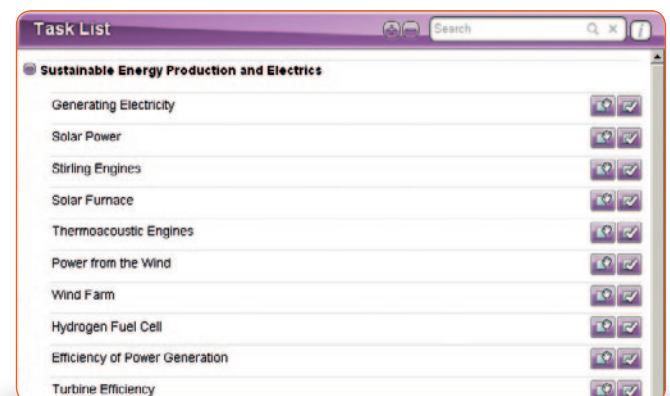
## LEARNING MANAGEMENT SYSTEM

Automatically tracks and records student/school progress and attainment.



## PRACTICAL TASKS

Hands-on activities linked to theoretical resources provide users with the ability to develop practical skills.





# STEM Hardware Packs

## Sustainable Energy Production Trainer



The Sustainable Energy Production Hardware Pack offers a set of demonstrator based resources for practical investigation of alternative energy production techniques. The pack consists of the following demonstrators:

### Solar Furnace

A parabolic dish assembly designed to concentrate the sun's energy on a focal point to create heat. The standard configuration includes a receptacle for monitoring water temperature increase due to the heat created as a demonstration activity.

### Thermo-acoustic Engine

This device demonstrates how a heat source can generate a standing wave in a gas. The oscillation can be used in this case to drive a piston and flywheel, which is in turn connected to a small generator. The power can be monitored via the 2mm connection points. This unit can also be located in the solar furnace assembly which can be used to replace the burner as a heat source to demonstrate a fully sustainable energy source.

### Stirling Engine

This bench top model demonstrates how cyclic compression of a gas can be used to convert heat energy into mechanical energy. The unit includes a metal bowl which is filled with hot water to provide the heat source.

### Typical Practical Activities Include:

- Heating water using a solar furnace
- Recording energy output from a thermo-acoustic engine
- Identify the operation of a Stirling Engine

Order As: 100-01

## Green Energy in Buildings Trainer



The Green Energy in Buildings package offers a resource that puts a model home into the classroom. Users can investigate lighting technologies, insulation properties, glazing, and air-conditioning, in addition to green energy production and related topics.

The interface software displays in real time the energy consumption in the building, as well as key data such as temperatures and light levels.

### Typical Practical Activities Include:

- Investigating Energy Use in Buildings
- Home Wind Turbines
- Solar Electric Systems
- Energy for Heating Buildings
- Solar Water Heating
- Insulation and Glazing Performance
- Heat Pump Principles

Order As: 122-01

# STEM Hardware Packs

## Structures and Materials Teaching Set



The Structures and Materials package offers student activities, either individually or in small groups, to investigate the science and technology behind the built environment.

The equipment included enables students to explore beam designs and then perform destructive testing on them to analyse the properties of their materials and the performance of their design.

### Typical Practical Activities Include:

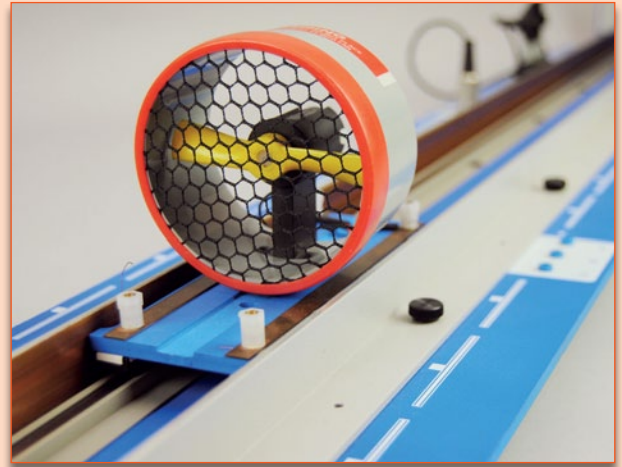
- Identify the forces that act on structures
- Investigate how skyscrapers are constructed
- Construct model beams from wood
- Use a computer model to design beams
- Explore the use of concrete as a construction material
- Construct a reinforced plaster of Paris beam
- Research the use of concrete additives
- Identify examples of how sustainable materials can be used in construction
- Develop a composite material using recycled materials and test its properties
- Identify different styles of bridges
- Design and construct a model bridge
- Test a model bridge

### The Set Includes:

- Structures and Materials Class Consumable Pack x 1 (121-01)
- Structures and Materials Kit x 12 (121-02)

Order As: 121-00

## Research and Design Teaching Set



The Research and Design package offers student activities, either individually or in small groups, to investigate science and technology coupled with research and design and how it impacts our world, through the context of a modern mass-transit system based upon a maglev train simulation.

### Typical Practical Activities Include:

- Identify transportation issues as problems that a research and design project might attempt to solve
- Extract information to create a formal list of specifications for a design brief
- Investigate and research transportation technologies
- Use the Internet to research information about the fuels used in propulsion systems
- Use a virtual laboratory to test materials for use in making electrical contacts
- Measure the force created by a model vehicle crashing
- Reduce the fares paid by passengers using a maglev transportation system

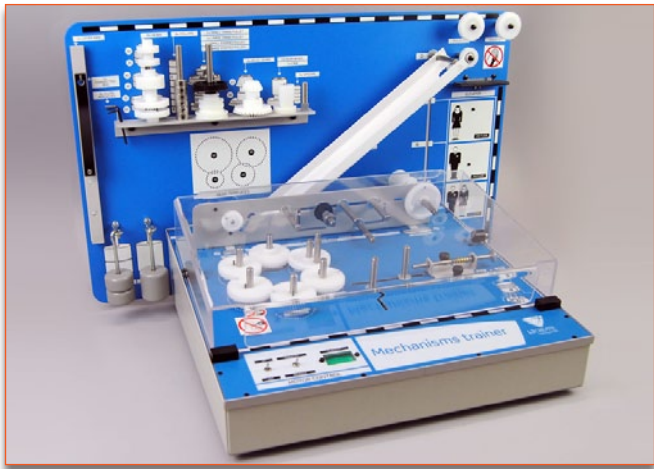
### The Set Includes:

- Research and Design Class Consumable Pack x 1 (150-02)
- Mass-Transit System Trainer x 1 (150-01)

Order As: 150-00

# STEM Hardware Packs

## Mechanisms Trainer



The Mechanisms Trainer offers a classroom based resource for practical investigation of a variety of fundamental mechanical systems.

The trainer allows users to investigate gears, pulleys, levers, cams, belt drives, and inclined planes.

### Typical Practical Activities Include:

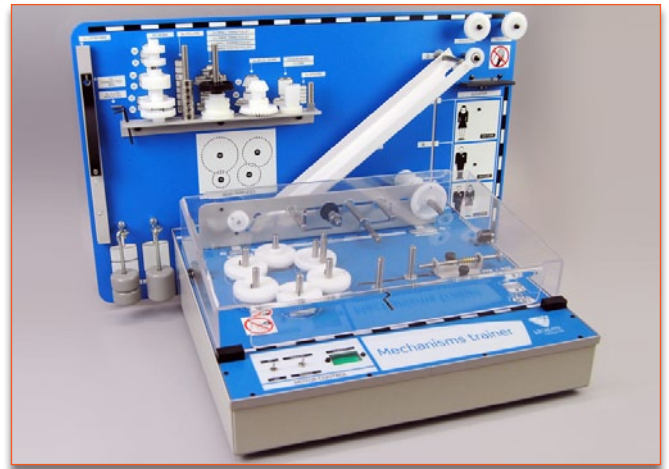
- Identify the different types of motion found in mechanical systems.
- Demonstrate the effect of using an idler gear in a simple gear train.
- Determine compound gear train ratios and speed.
- Identify the purpose of belt drives.
- Demonstrate the relationship between distance and effort for a pulley system.
- Measure effort and movement for first, second and third class levers.
- Demonstrate how the profile of a cam affects the output of the cam follower.
- Calculate the mechanical advantage provided by an inclined plane.
- Identify how lubricants, bushes and bearings are used to reduce friction.

### The Set Includes:

- Mechanisms Trainer
- Power Supply
- Accessory Kit

Order As: 260-01

## Hydraulics Trainer



The Hydraulics Trainer offers a classroom-based resource for practical investigation of hydraulic components and systems.

The trainer consists of a rig and push fit hydraulic hoses to allow rapid circuit connection and setup. Students can investigate cylinders and valves in a variety of circuit configurations and input pressures.

### Typical Practical Activities Include:

- Identify the fundamental parts of a hydraulic system.
- Construct a hydraulic circuit to operate a hydraulic cylinder.
- Compare hydraulic components to schematic symbols.
- Identify the basic laws governing hydraulics.
- Demonstrate Pascal's law.
- Explain the operation of hydraulic actuators.
- Measure the pressure created by a hand pump.
- Control cylinder speed using a flow control valve.

### The Set Includes:

- Hydraulics Unit
- Hydraulic Hose Set
- Accessory Kit
- Lever and Mass Set
- Drip Tray
- Hydraulic Fluid

Order As: 280-01



# STEM Hardware Packs

## Electro-Pneumatics Trainer



The Electro-pneumatics Trainer offers a classroom-based resource for practical investigation of pneumatic components and systems. The trainer consists of a two-part rig, the first of which allows users to connect components to create fundamental circuits.

The second element is an electro-pneumatic sorting system that brings together electronic sensing, actuators and logic gates to sort clear and black parts into different bins.

### Typical Practical Activities Include:

- Discover the symbols used to represent pneumatic components.
- Demonstrate the operation of single-acting and double-acting cylinders.
- Construct a pneumatic circuit to use a shuttle valve.
- Identify the use of flow regulators in controlling cylinder speed.
- Construct pneumatic circuits to function as OR, AND & NOT operators.
- Observe how a time delay can be constructed into a pneumatic circuit.
- Construct electronic circuits to control a pneumatic system.

### The Set Includes:

- Trainer (Part 1 – Component Board)
- Trainer (Part 2 – Electro-pneumatic Sorter)
- Hand Operated Air Compressor
- Power Supply
- Accessory Kit

Order As: 270-01

## Industrial Control Trainer



The Industrial Control Trainer offers a classroom based resource for practical investigation of automated control systems. Users can select from a range of prepared demonstration programs to explore how step-based ladder logic programs are used in automated systems.

### Typical Practical Activities Include:

- Simulate custom manufacturing by building models.
- Construct ladder logic programs.
- Investigate the sequence of events for a PLC to activate an actuator.
- Identify how to read and construct truth tables.
- Build a latching program to control an actuator.
- Complete a ladder logic program for an airlock control system.
- Use a counter in a ladder logic program.
- Use a timer to delay lighting a lamp after a button is pressed.
- Adapt a ladder logic program to give indication of the width of a part on a conveyor.
- Create a program that will automatically sort parts according to their width.

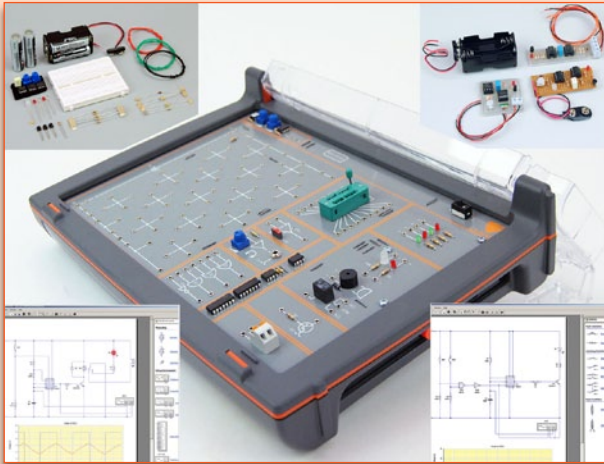
### The Set Includes:

- Industrial Control Sorting Application
- Power Supply
- USB Lead
- Accessory Kit (Includes conveyor shroud)
- Hand Operated Air Compressor
- Sorting Application Simulation Software

Order As: 290-01

# STEM Hardware Packs

## Electronic Circuits Trainer Teaching Set



The Electronic Circuits hardware and resource packs can be used for class demonstrations as well as offering student activities either individually or in small groups.

The equipment included will quickly turn any classroom into an electronics laboratory.

**The set is configured for up to 24 students and includes:**

- Electronic Circuits Hardware Pack x 1 (450-01)
  - Electronics patching board
  - Mounted component set
  - Digital multimeter
  - Connection lead set
  - Power supply
- Electronic Circuits Kit x 12 (450-02)
  - Breadboard
  - Component Kit
  - Container
- Electronic Circuits Class Consumables Pack x 1 (450-03)
  - PCB projects kit x 24
  - Projects component kit
  - Container
- Circuit Design and Simulation Software (Initial 5 User) x 1 (450-04)
- Circuit Design and Simulation Software (Additional 5 User) x 4 (450-05)

Order As: 450-01

## Injection Moulding Trainer



The Injection Moulding trainer offers a classroom-based resource for investigating the techniques used to create thermo-plastic products.

Students will see how a good grasp of the science of material properties is needed to select appropriate materials and methods for production. They will also gain an understanding of how mathematics is required to develop production costs and propose selling costs.

### Typical Practical Activities Include:

- Investigate how plastics, woods and metals can be processed into spoons.
- Research smart materials.
- Investigate the molding process.
- Measure the thermal characteristics of metals, plastics, woods and composites.
- Measure the hardness, impact and tensile strengths of materials.
- Investigate the causes of mold flash and shrinkage.
- Research tools and fabrication processes used in manufacturing.
- Select suitable materials for use in electrical cables.
- Compare the costs of differently designed molded parts.
- Design, prototype, test and evaluate a door knob.

### The Set Includes:

- Injection Molding Rig
- Mold Set
- Accessory Kit
- Model Cabinet Door

Order As: 350-01

# STEM Hardware Packs

## Robotics Trainer



The Robotics Trainer offers a classroom-based resource for practical investigation of the technology and engineering behind modern automated systems. Users can select from a range of prepared demonstration programs to explore the design and logic used to program automated systems.

### Typical Practical Activities Include:

- Manual Control of a Robot
- Flowcharts and Programs
- Sensing, Decisions, and Counting
- Open and Closed Loop Control
- Transportation Around the Work-cell
- Manipulating Parts
- Industrial Robots
- Pre-programmed sequences
- Problem Solving

### The Set Includes:

- Robotic Work-cell
  - Baseboard
  - Conveyor Belt
  - Infra-red Light Gate
  - Component Dispenser (Large and Small)
  - Component Bin
- Robotic Arm
- Power Supply and Accessory Kit
- USB to Parallel Adapter
- Robot Control Software

Order As: 240-01

## Learning Management System



Learning Management System (LMS) automatically tracks and records the progress and attainment of your students. You can see how much time students spend on each module, how often they log in, and instantly see records of their grades across the program.

The LMS gives the teacher control over the construction of courses, allowing them to be tailored for their students, and includes extensive student-tracking and reporting.





## Inspiring and Exciting Learning Technologies

Pullman Academic is committed to helping Schools develop successful and engaging STEM (Science, Technology, Engineering and Mathematics) environments. We achieve this by:

- Consulting with our clients to understand their objectives
- Supplying quality products specifically designed for STEM education
- Investing in professional implementation and ongoing support with our local team
- Providing professional development and training to maximise the value of your purchase

## To Teach Science, Technology, Engineering and Mathematics

We supply a growing and diverse range of the world's leading equipment, learning resources and courseware that are especially designed for education. We cover:

- Robotics
- Cloud-based STEM Resources
- Sustainable and Green Technologies
- 3D Printing and Design
- Science and Data Loggers
- Automotive
- Electro Technologies
- Engineering and Industrial Technologies

## Delivering Better Learning Outcomes

Our range provides better learning outcomes by bringing subject matter to life. This engages students in the learning process, keeping them interested and motivated to learn, while building their underlying understanding and strengthening knowledge retention.

**Make a difference, call Pullman Academic on +61 3 9557 7993**

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