

CAREER PATHWAYS

A flexible pathway into future career readiness

LJ CREATE™
Learning for life

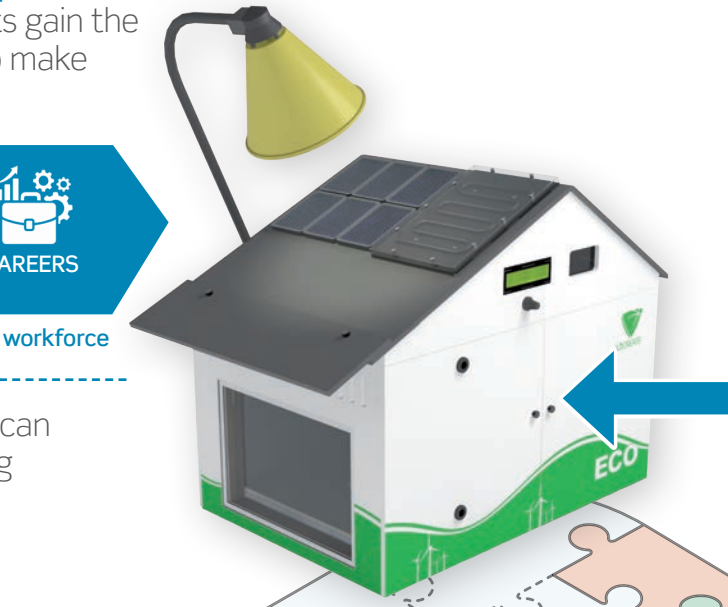
Career Pathways

Build your journey, shape your future.

Career Pathways is a program designed to **bridge the gap between education and the workforce**. By starting early, students gain the skills and confidence and career awareness they need to make informed choices and **stay on track for future success**.

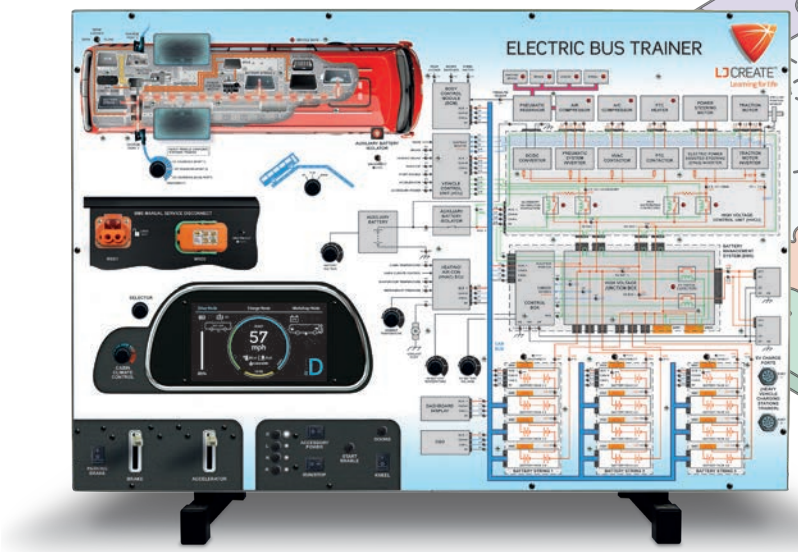
MIDDLE SCHOOL	HIGH SCHOOL	COLLEGE PROGRAMS	CAREERS
Build foundation	Gain experience	Earn qualifications	Enter the workforce

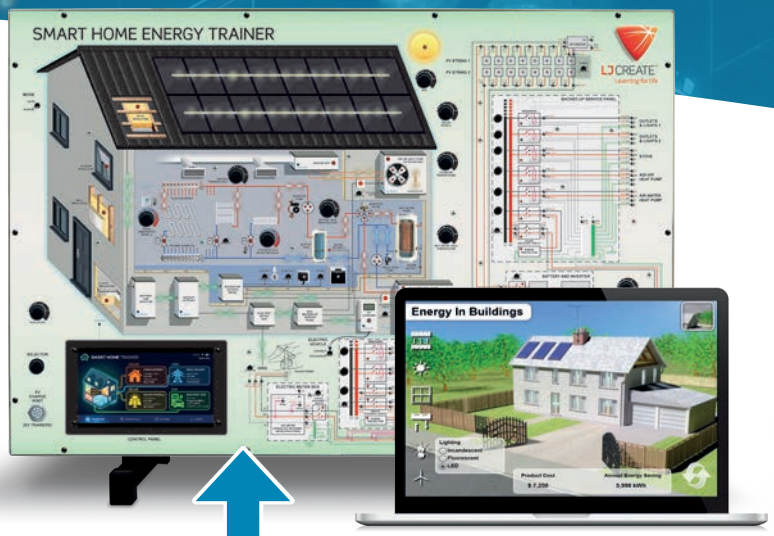
Rather than following a single fixed program, instructors can build a customized Career Pathways program by selecting from **any combination of courses**, each covering key industries and skills needed for the modern world.



BUILD A CUSTOM PROGRAM FROM THE COURSE BANK BELOW:

- Career Pathways Foundation (Mandatory)
- Agriculture
- Engineering Design
- Industrial Robotics
- Mechatronics
- Mobile Robotics
- Transportation
- Computer Science
- Construction
- Electronic Circuits
- Machine Tools
- Manufacturing Processes
- Electronic Communications
- Mechanical Systems
- Hydraulics
- Electropneumatics
- Robotics
- Biomedical Technology
- Automotive Technology
- Electricity
- Marketing and Sales
- Logistics and Supply Chain
- Workplace Skills
- Electric Vehicles
- Electric Mass Transit
- Charging Stations
- Green Homes
- Smart Energy Homes
- Green Energy Production
- Ecosystems
- Applications of AI
- Injection Molding
- Science Investigation Skills





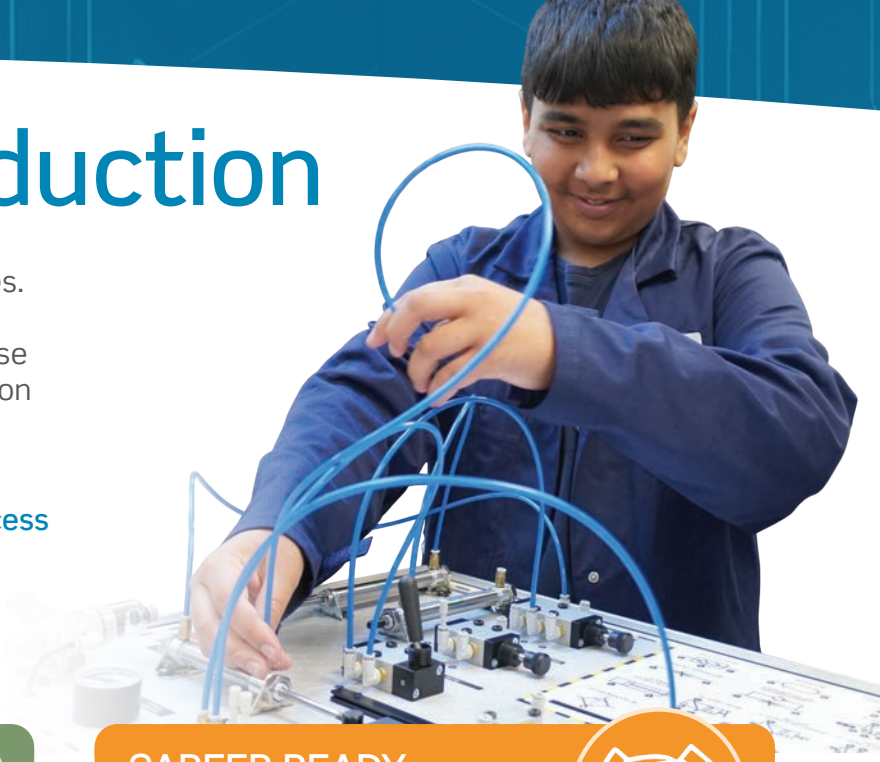


DEVELOP PROBLEM-SOLVING SKILLS WITH HANDS-ON ACTIVITIES



BUILD A PATHWAY TOWARDS FUTURE CAREER READINESS

Program Introduction



Career Pathways includes three types of courses. Each program **begins with the Career Pathways Foundation** course. This is a slightly longer course intended to bring all students to an equal position of readiness.

Instructional program design involves selecting from the other courses in a **mix-and-match process** to cover exactly the types of content and the styles of learning that meets your local needs.

THREE COURSE TYPES:

TECHNICAL SKILLS DEVELOPMENT

These courses provide foundation level training in a wide range of technical subjects - covering all areas of the national skills shortage.

This training creates a bridge to additional study as students progress through their education and training. It also serves to identify for students their specific areas of interest, helping them on the correct path to career readiness.

Courses include:

- Robotics
- Hydraulics
- Electropneumatics
- Mechanical Systems
- Machine Tools
- Electronic Communications
- Electric Vehicles
- Automotive Technology
- Electricity
- Injection Molding
- Electric Mass Transit
- Charging Stations

These courses are intended to be offered in a modular format that students use for independent self-learning.

CAREER READY PRACTICES

These courses introduce career ready practices and prepare young people for lifelong learning.

High value careers require continuous up-skilling, and this is only going to increase in importance for the next generation.

This group of courses has a focus on:

1. Applying academic skills
2. Personal health
3. Effective communication
4. The environment
5. Creativity
6. Research
7. Use of technology

Courses include:

- Biomedical Technology
- Ecosystems
- Workplace Skills
- Marketing and Sales
- Green Homes
- Green Energy Production
- Smart Energy Homes
- Applications of AI
- Manufacturing Processes
- Science Investigation Skills

Several of these courses are usually offered to students in a modular format while most can be used for whole-class instruction.



PROJECT-BASED LEARNING

Each of these courses is designed around a capstone project and you can anticipate a range of outcomes from different groups. This cluster of courses delivers modern, high-value career knowledge and skills while developing specific critical-thinking skills through project-based learning.

In terms of career readiness skills these courses have a focus on:

1. Contributing to a team
2. Creativity and innovation
3. Critical thinking and perseverance
4. Effective management
5. Working productively as a team

Courses include:

- Engineering Design
- Mechatronics
- Agriculture
- Transportation
- Industrial Robotics
- Mobile Robotics
- Logistics and Supply Chain
- Electronic Circuits
- Construction
- Computer Science

These courses are all intended to be used for whole-class instruction but can also be offered in combination for small-group instruction.

Today's students need more than traditional classroom learning. They need hands-on experience, real-world skills development, and adaptable capabilities to **thrive in a rapidly changing workforce**.

The Career Pathways program utilizes **three distinct course types** to expose students to modern technology and emerging career opportunities, laying a comprehensive foundation for **future educational and career success**.

EXPLORE CAREERS

Introduce students to a wide range of career sectors and the technology used in today's world.

BUILD SKILLS

Develop foundational technical, digital, and problem-solving skills through hands-on learning.

CONNECT LEARNING

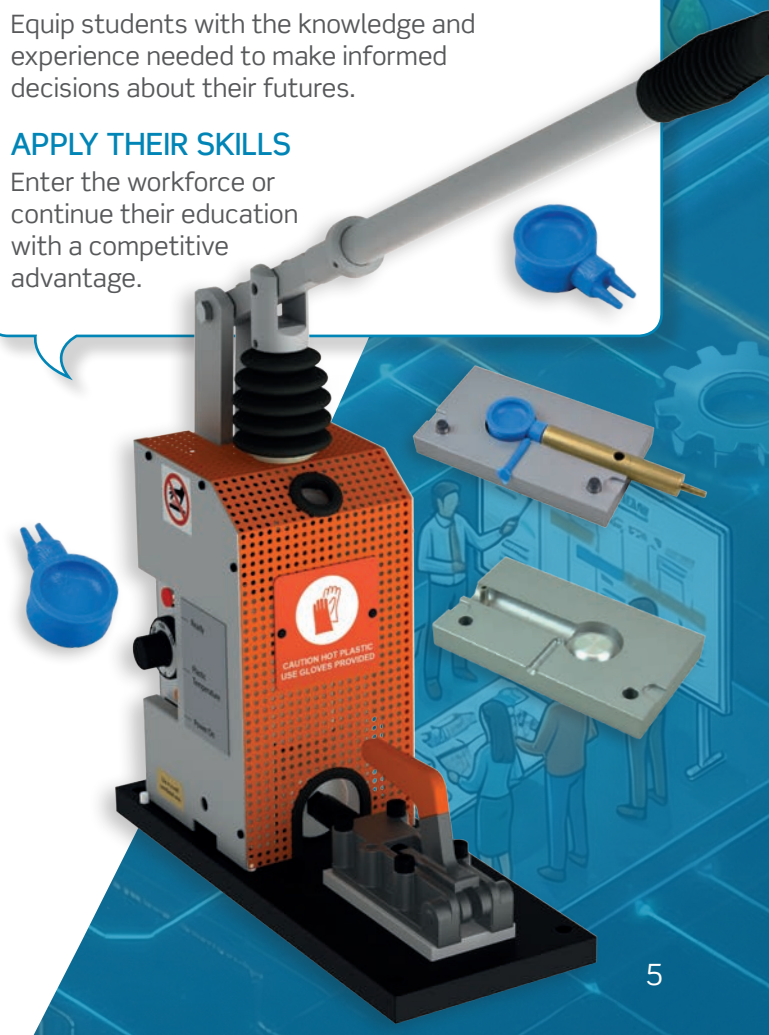
Discover how the skills students learn today pave the way for high school, college, and beyond.

PROGRESS WITH CONFIDENCE

Equip students with the knowledge and experience needed to make informed decisions about their futures.

APPLY THEIR SKILLS

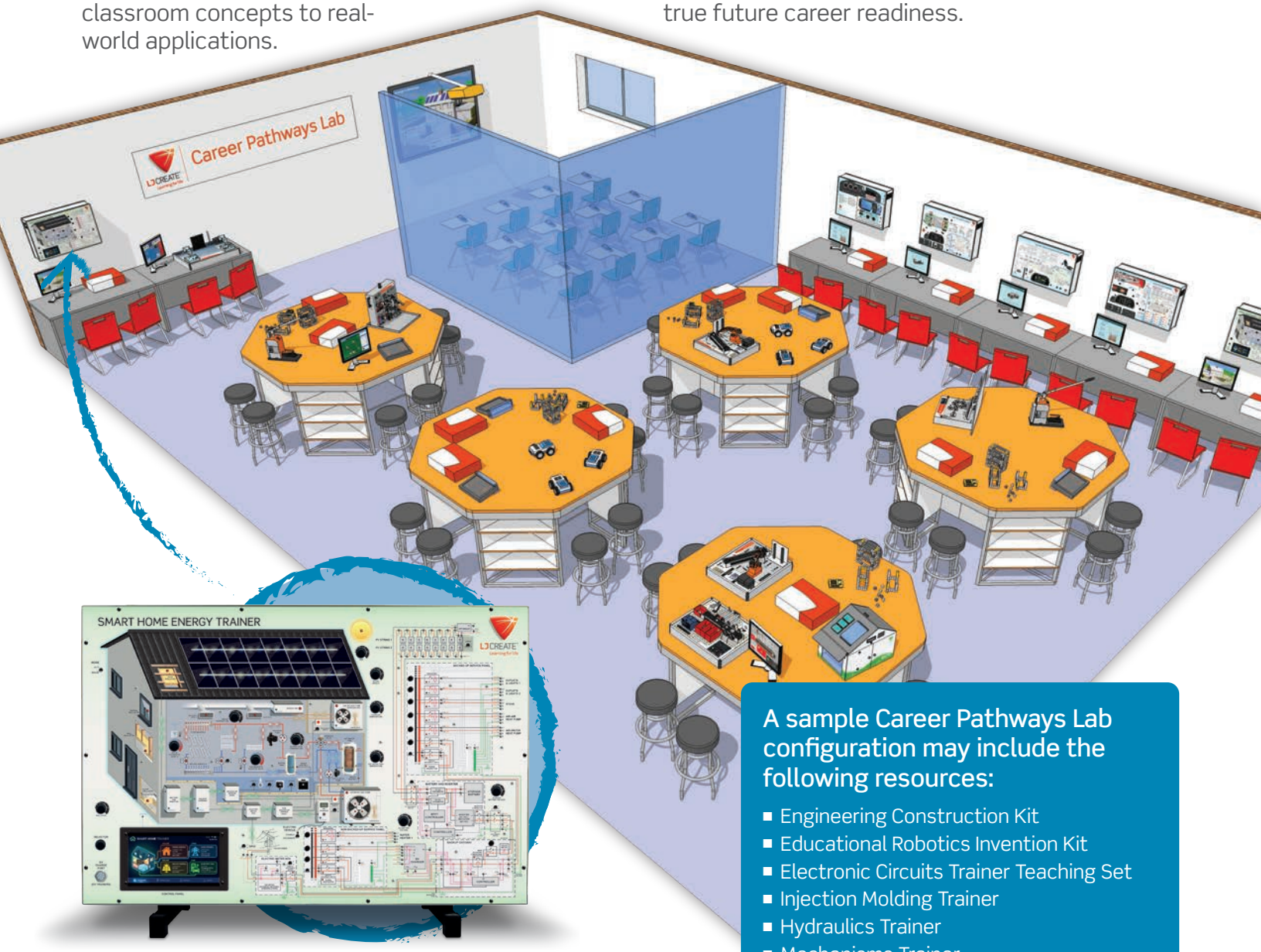
Enter the workforce or continue their education with a competitive advantage.



Lab Configuration

The Career Pathways Lab forms the foundation of a **comprehensive workforce readiness program**, motivating students through engaging, hands-on activities that connect classroom concepts to real-world applications.

By **preparing students for the future of work** through relevant content, personalized pathways, and technical experience, we deliver high-impact learning environments that ensure true future career readiness.



IN FOCUS: SMART HOME ENERGY TRAINER (123-01)

This innovative new trainer will demonstrate how a modern smart home manages, produces, stores, and uses electrical energy.

The trainer will allow for safe exploration of the energy management of the home, utilizing: solar power, battery storage, EV charging, heat pumps, and smart control systems.

A sample Career Pathways Lab configuration may include the following resources:

- Engineering Construction Kit
- Educational Robotics Invention Kit
- Electronic Circuits Trainer Teaching Set
- Injection Molding Trainer
- Hydraulics Trainer
- Mechanisms Trainer
- Robotics Trainer
- Electronic Communications Trainer
- Displays and Accessories Trainer
- Electric Vehicle Systems Panel Trainer
- Electric Bus Trainer
- Electric Vehicle Charging Stations Trainer
- Green Energy in Buildings Trainer
- Smart Home Energy Trainer

Getting Started

Career Pathways Foundation Course



Every Career Pathways journey begins here. As a prerequisite for the entire program, the Career Pathways Foundation Course must be completed first.

It equips students with essential STEM concepts, delivering the solid groundwork needed to excel across all subsequent courses. Because many of our project-based learning modules rely on the Engineering Construction Kit, this course introduces the fundamentals of building, designing, and programming with the kit, ensuring every student is fully prepared to hit the ground running.

Lessons Include

- Introduction
- Industry 4.0
- Tools and Safety
- Data and Cloud Computing
- Project Management
- Data and Measurement
- Measuring with Calipers & Micrometers
- Measurement Tolerances
- Exploring Scientific Data
- Charting Data
- Data Acquisition Probes
- Investigating Speed and Velocity
- Investigating Energy, Force, and Gravity
- Investigating Sound Waves
- Engineering Design
- Building a Helicopter - Task
- Starting a Motor with a Switch - Task
- Testing Inputs and Outputs - Task
- Introduction to Engineering Design
- Engineering Problems
- Models and Prototypes
- Communicating Engineering Design
- Electrical Systems
- Basic Electrical Quantities in Circuits
- Electric Current and Safety
- Measuring Voltage
- Introduction to Electric Current
- Changeover Switches
- Electrical Power
- The DC Motor
- Mechanical Systems
- Simple Machines
- Relationship Between Voltage, Current and Resistance
- Simple Gears
- Compound Gears
- Special Gears
- Powering Machines - Task
- Levers
- Design Project - A Fairground Ride - Task
- 3D Printing Process, Materials, and Applications
- 3D Printing - Task

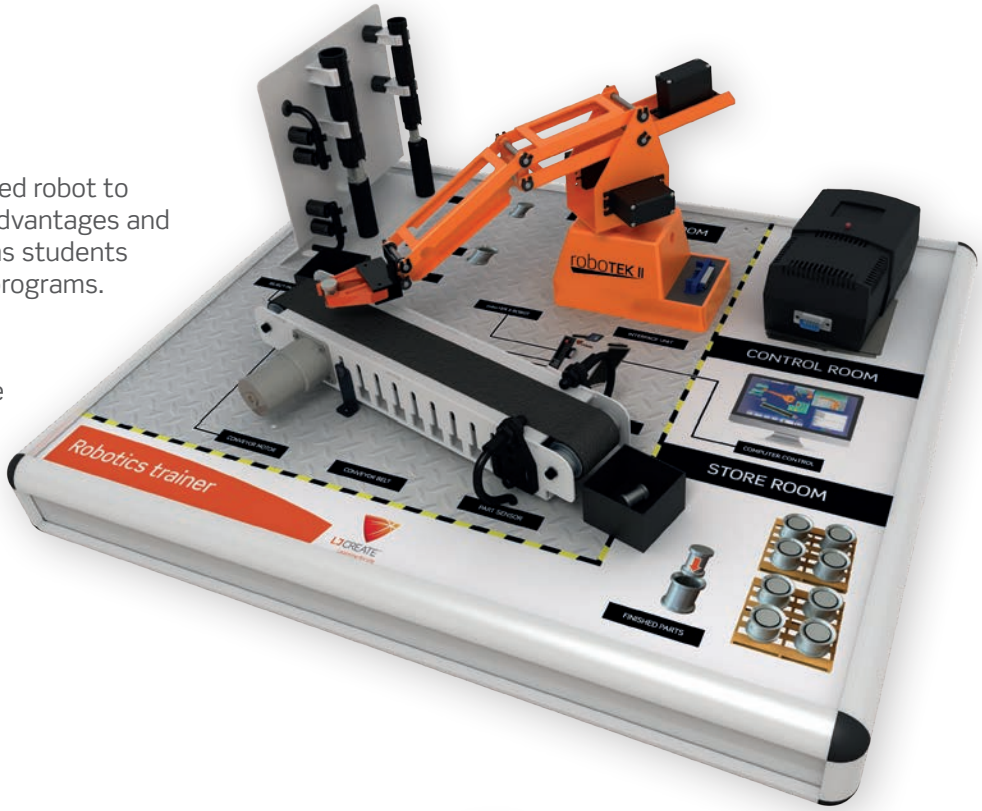
Equipment

- Engineering Construction Kit (220-02)
- Measurement Kit (511-08)
- Physics Apparatus Kit (511-01)
- Smart Sensor Data Logging Kit Complete (521-00)



Technical Skills Development

Robotics Course



Students will use a computer-controlled robot to design an automated work-cell. The advantages and limitations of robots will be explored as students progress to design their own control programs.

Typical Careers

Robotics Engineer, Autonomous Drone Operator, Industrial Automation Engineer, Product Design Engineer

Lessons Include

- Controlling Robots
- Programming a Robot
- Open and Closed Loop Control
- Robots in Action
- Pre-programmed Sequences

Equipment

- Robotics Trainer (240-01)

Hydraulics Course



Students explore basic hydraulic applications before building circuits from diagrams and written instructions and applying mathematics to investigate lifting forces, levers and valves. After designing their own circuits the course culminates in a challenge to develop a dump truck hydraulic system.

Typical Careers

Fluid Power Engineer, Amusement Park Ride Technician, Hydraulic Technician/Specialist

Lessons Include

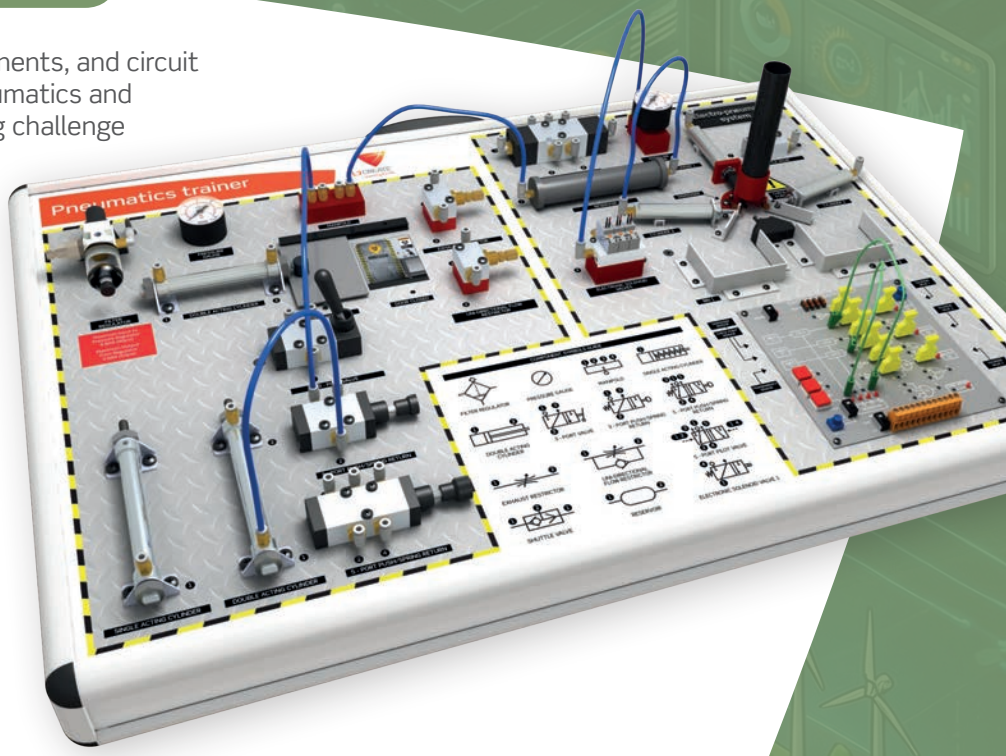
- Hydraulic Applications
- Building a Hydraulic Circuit
- Controlling Cylinders
- Hydraulics in Operation

Equipment

- Hydraulics Trainer (280-01)

Electropneumatics Course

Students learn pneumatic principles, components, and circuit diagrams before progressing to electro-pneumatics and automation, culminating in a problem-solving challenge for the students to demonstrate what they have learned by building an electropneumatic parts sorter.



Typical Careers

Automation & Controls Engineer, Fluid Power Systems Designer, Food & Beverage Processing Maintenance Mechanic, Transit Systems Mechanical Technician

Lessons Include

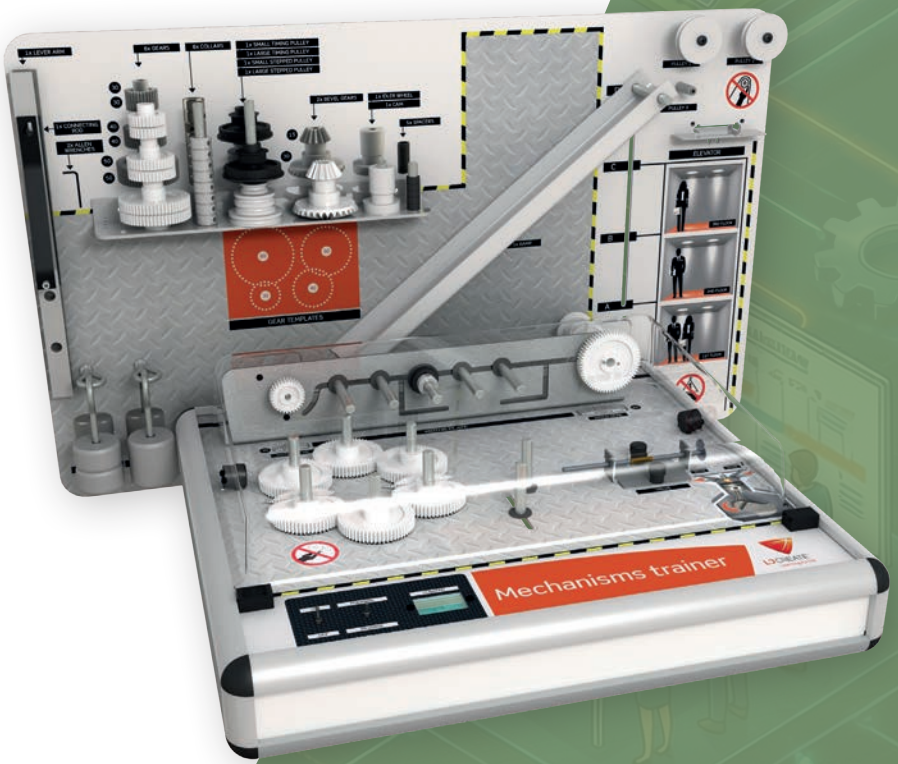
- Fundamental Principles of Pneumatics
- Making use of Pneumatics
- Control Valves
- Pneumatic Problem Solving
- Pneumatic Circuit Time Delays

Equipment

- Pneumatics Trainer (270-01)

Mechanical Systems Course

Students Identify the different types of motion found in mechanical systems, including gear trains, belt drives, pulley systems and levers. Students explore the application of mechanical systems and how to use them together to solve problems. The conclusion of their studies is the design of an engine cam drive system.



Typical Careers

Machinery Maintenance Worker, Mechanical Engineer, Industrial Production Manager, Industrial Engineering Technician,

Lessons Include

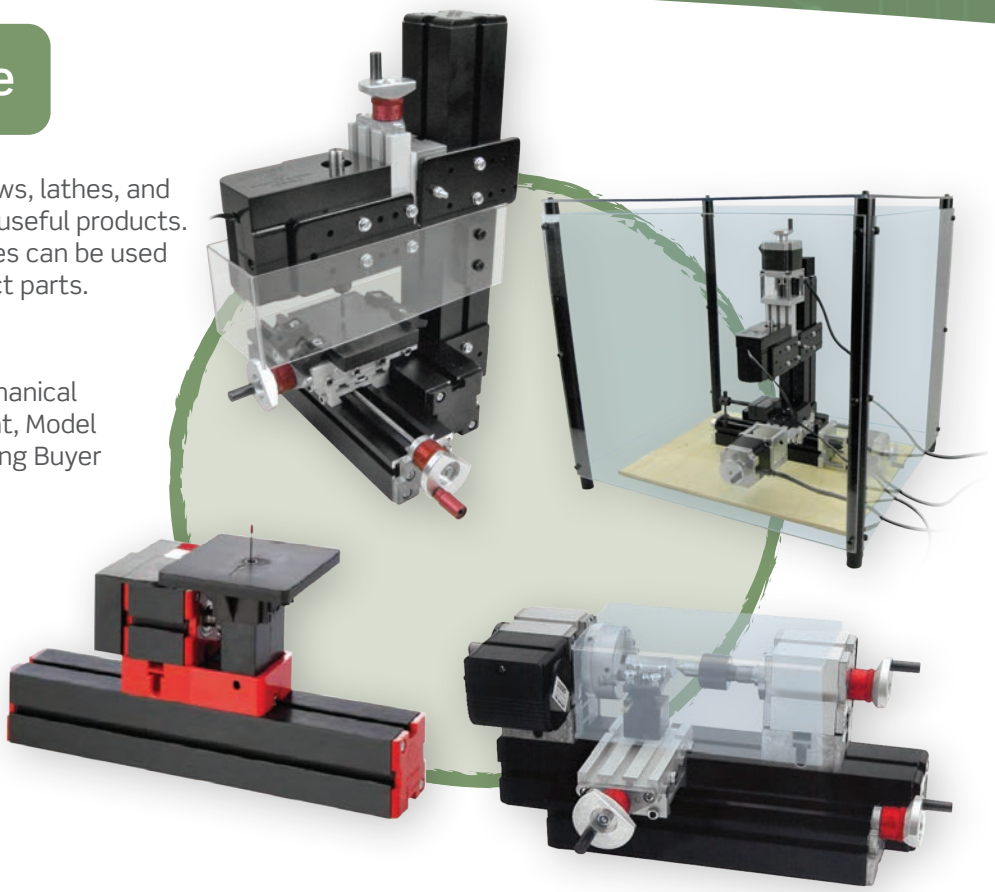
- Inclined Planes
- Levers
- Gears and Simple Gear Trains
- Cams and Cranks

Equipment

- Mechanisms Trainer (260-01)

Machine Tools Course

Discover how machine tools, such as saws, lathes, and mills are used to convert materials into useful products. Students also explore how CNC machines can be used to automate the manufacture of product parts.



Typical Careers

Design Engineer, CNC Programmer, Mechanical Drafter, Production Supervisor, Millwright, Model Maker, Machine Tool Operator, Engineering Buyer

Lessons Include

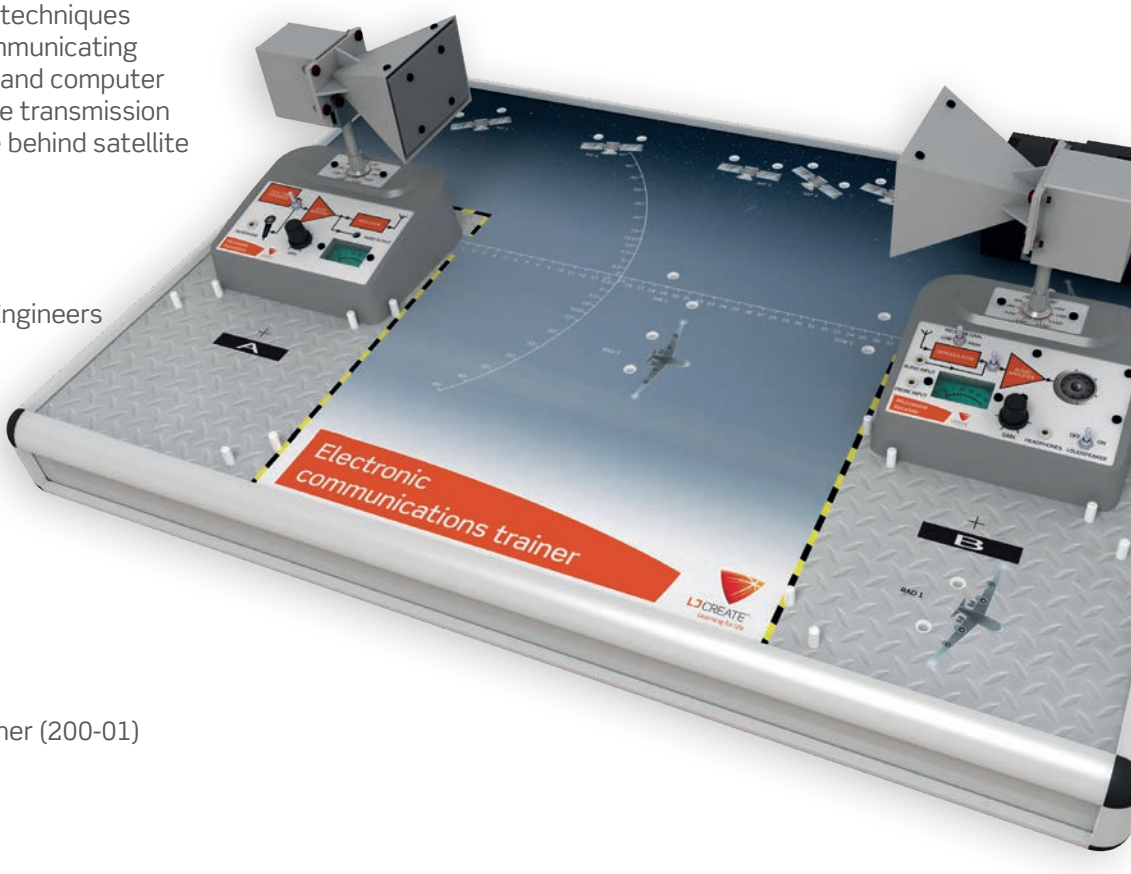
- Safety and Protective Measures
- Manufacturing Processes
- Machine Tools and Terminology
- Cutting Metal
- Turning
- Milling
- CNC Programming for Milling
- Reading Machine Diagrams

Equipment

- Machine Tools Class Pack (506-50)

Electronic Communications Course

Students explore communication techniques from the earliest examples of communicating over distance to modern satellite and computer technology. They use a microwave transmission system to investigate the science behind satellite communications.



Typical Careers

Telecommunication Technicians, Telephone Engineers, Broadcast Engineers

Lessons Include

- Communication Methods
- Early Communication
- Digital TV and Radio
- Telephone Communication
- Cell Phones
- Communication on the Internet
- Networks

Equipment

- Electronic Communications Trainer (200-01)

Electric Vehicles Course

In this course students will learn about the skills and knowledge required to maintain and repair Electric and Hybrid vehicles. Students will develop fault-finding and diagnostics techniques on this course.

Typical Careers

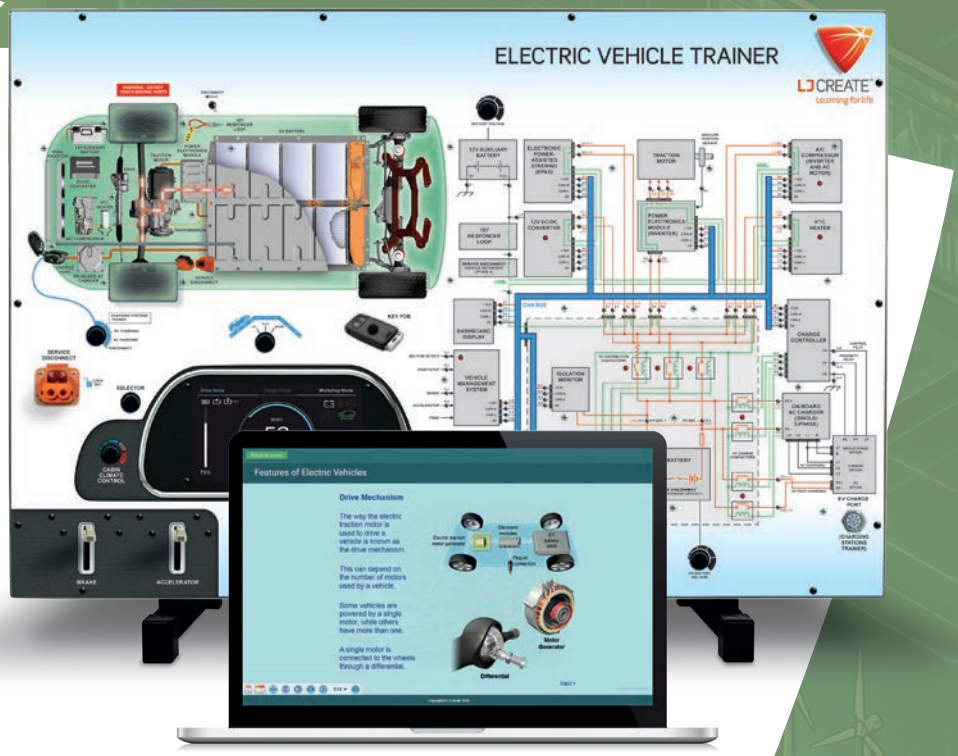
Electric Vehicle Technician, High-Voltage Battery Specialist, EV Diagnostic Specialist, EV Master Technician, EV Retrofit & Conversion Specialist

Lessons Include

- Electric Vehicle CAN Bus System
- Traction Motor Control
- Regenerative Braking System
- HV Battery Thermal Management
- Disabling the HV System

Equipment

- Electric Vehicle Systems Panel Trainer (740-01)



Automotive Technology Course

Students use a large simulator panel to explore the operation of auto electrical systems. Students will learn about the operation of internal combustion engines, transmission systems, brakes, and steering and suspension. They will verify operation and troubleshooting by taking electrical measurements.

Typical Careers

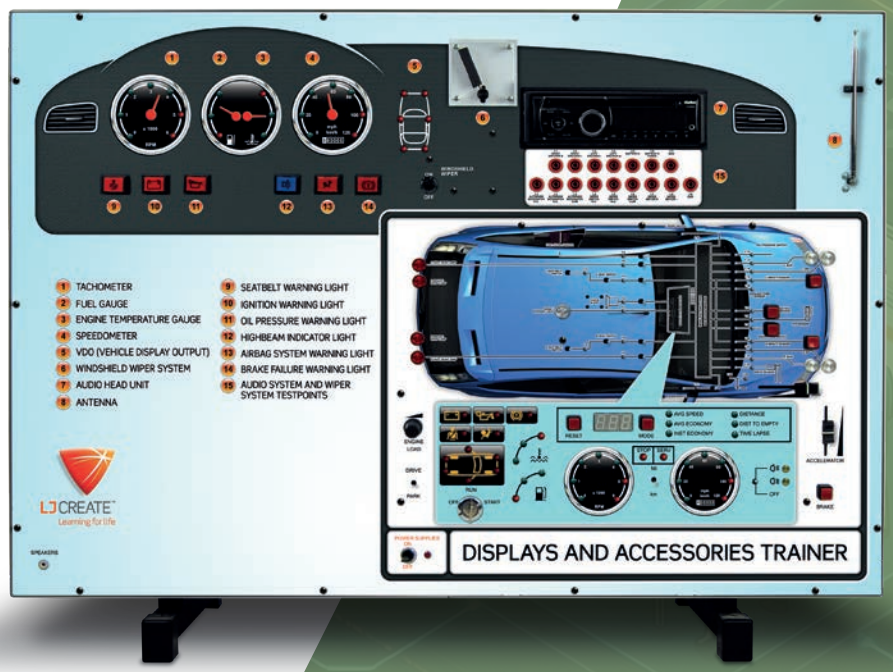
Auto Design Engineer, Auto Manufacturing Technician, Auto Maintenance Technician, Roadside Assistance Technician, Auto Salesperson, Auto Parts Manager

Lessons Include

- Starting Systems
- Starting and Charging
- Lighting Systems
- Introduction to Engine Systems
- Automatic Transmission Systems
- Manual Transmission Systems
- Definition of Electric Vehicles
- Wheel and Tire Fundamentals

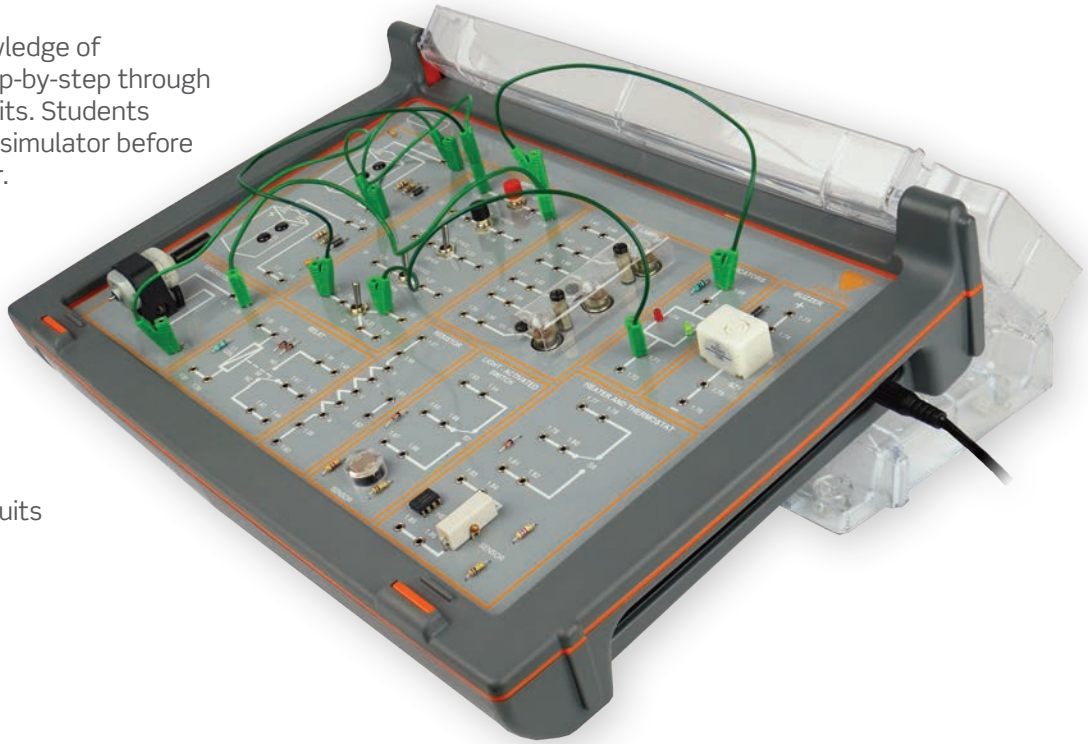
Equipment

- Displays and Accessories Systems Trainer (752-01)



Electricity Course

This course assumes no prior knowledge of electricity as it takes students step-by-step through the rules that govern electric circuits. Students configure and test circuits using a simulator before they construct them on the trainer.



Typical Careers

Electrician, Industrial Electrical Technician, EV Charger Installer, Automation Repair Technician, Solar Panel Installer.

Lessons Include

- Basic Electricity
- Basic Electrical Quantities in Circuits
- Measurement in Circuits
- Simple Lamp Circuit
- Connecting Switches
- Generating Light

Equipment

- Basic Electricity Trainer (140-10)

Injection Molding Course

Students investigate how products are manufactured by processing materials. They also explore the process of injection molding of plastics, and they design and produce a series of injection molded products.



Typical Careers

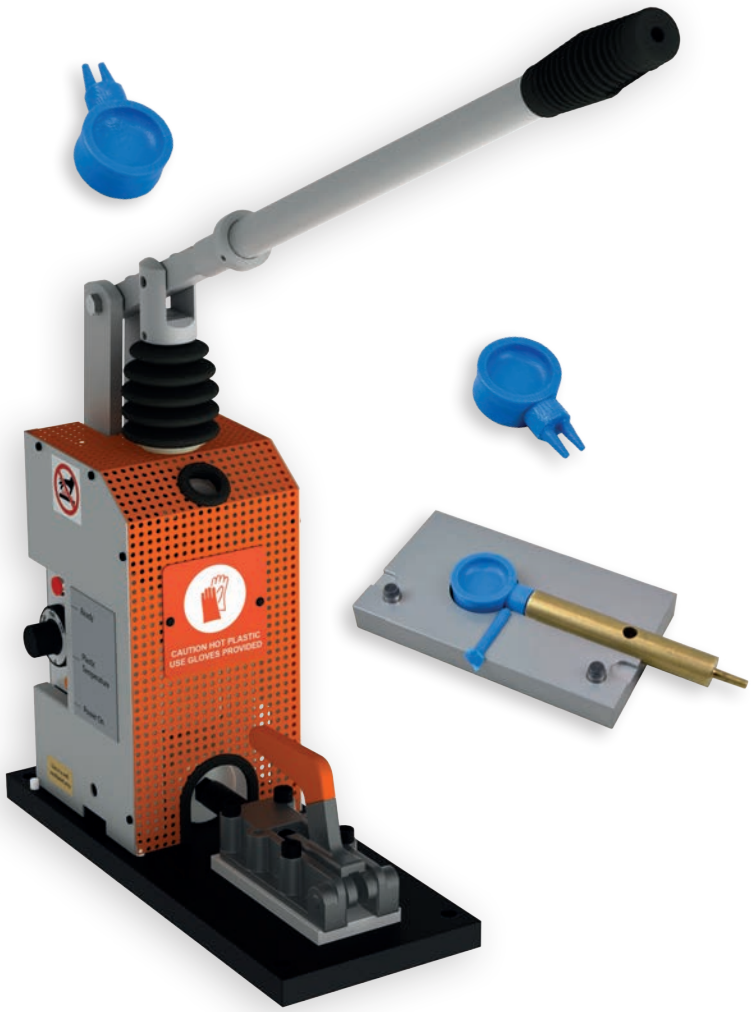
Production, Planning, and Expediting Clerk, Production Engineer, Machinist, Extruding, Forming, Pressing, and Compacting Machine Operator

Lessons Include

- Plastic Materials
- Injection Machine Controls
- Mechanical Properties of Materials
- Testing Materials
- Waste
- Reducing Waste and Cost
- Manufacturing Technology

Equipment

- Injection Molding Trainer (350-01)



Electric Mass Transit Course

In this course students will learn about the skills and knowledge required to maintain and repair electric buses. Students will investigate real-world system malfunctions of an EV bus electrical system.

Typical Careers

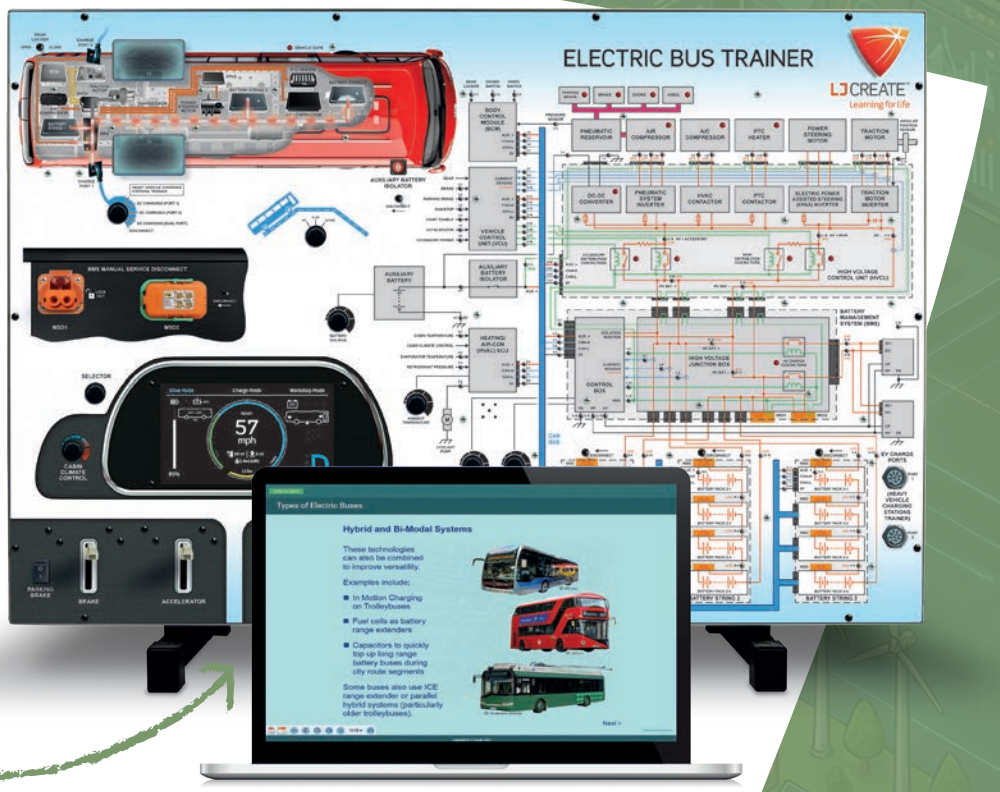
Heavy-Duty EV Maintenance Technician, Battery and Powertrain Repair Specialist, EVSE Field Technician, Fleet Telematics and Diagnostics Specialist

Lessons Include

- Introduction to Electric Buses
- Types of Electric Buses
- Introduction to the Electric Bus Trainer
- Cabin Climate Control System
- EV Bus Charging Systems

Equipment

- Electric Bus Trainer (745-01)



Charging Stations Course

In this course students will investigate and fault-find the circuitry and operation of off-car charging systems. The course will illustrate the operation of domestic and commercial charging systems for electric vehicles.

Typical Careers

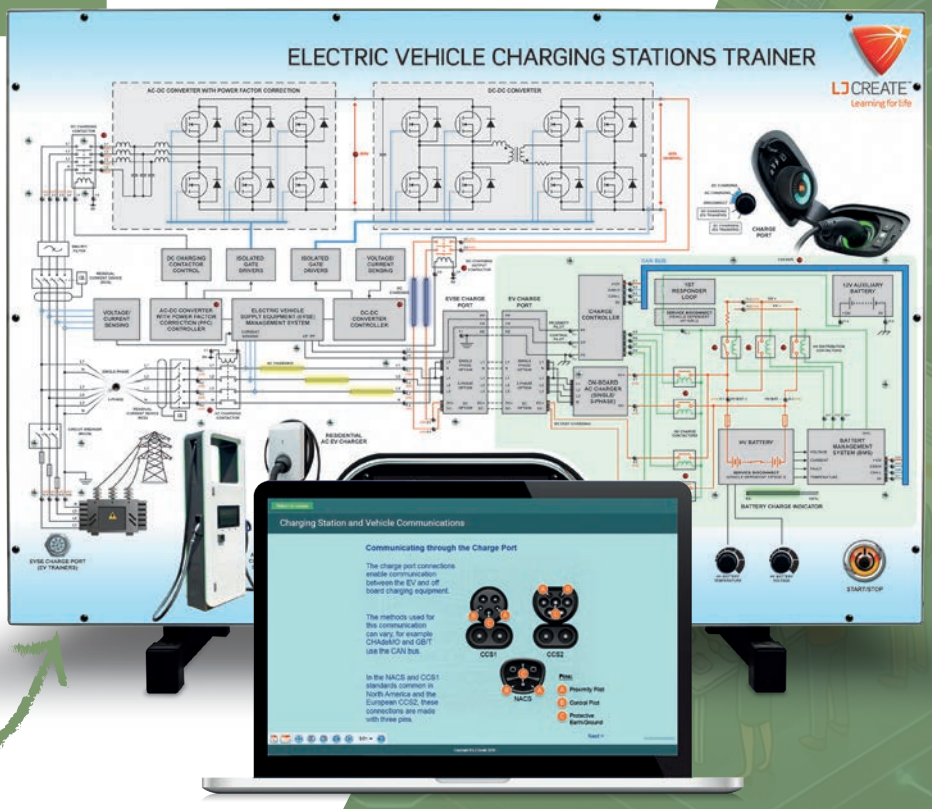
EV Charging Station Technician, Power Electronics Engineer, EV Charging Station Installer, EVSE Firmware Engineer

Lessons Include

- EV Charging Station Installations
- On-Board Vehicle AC Charger
- Single Phase AC Charging
- DC Fast Charging
- DC Fast Charging Station Operation

Equipment

- Electric Vehicle Charging Stations Trainer (743-01)



Career Ready Practices

Biomedical Technology Course

Students explore the impact on society of medical advances such as sanitation and vaccination. They investigate genetic engineering and medical scanning as examples of biomedical technology. Students also design and develop a control system for a medical scanning machine.



Typical Careers

Radiation Therapists, Medical Electronics Technician, Medicine, Radiologic Technologists

Lessons Include

- Sanitation
- Vaccination and Immunization
- Genetic Engineering
- Pharmaceuticals
- Medical Scanning

Equipment

- Biomedical Technology Kit (230-01)
- Engineering Construction Kit (220-02)

Ecosystems Course

Many applications of modern technology rely upon an understanding of our environment and the impact of human activity on it. This course provides background that every student will be able to apply to their careers. This should also help them to make informed decisions about information fed to them by the media.



Typical Careers

Civil Engineering, Infrastructure Construction Planning, Environmental Engineers, Public Planning Officer.

Lessons Include

- Populations, Resources, and the Environment
- Investigating Populations and Biodiversity
- Impacts on Biodiversity
- Carrying Capacity of Ecosystems
- Global Warming

Equipment

- Stream Table Kit (500-11)

Workplace Skills Course

This digital content course uses a variety of on-screen applications to introduce the student to a range of social skills that are required for success in the workplace. These skills will enhance interpersonal communication and team-building.

Typical Careers

Customer Support Specialist, Administrative Assistant, Human Resources Assistant, Office Facilities Coordinator, IT Support Specialist

Lessons Include

- Social Skills
- Dress Code
- Attending a Meeting
- Engage in a Two-Way Conversation
- Human Resources
- Visiting a Construction Site
- Workforce Planning



Marketing and Sales Course

Students will explore how marketing is used to develop sales for engineered products and services. Students will investigate how advertising and pricing can be used to promote sales of products and investigate the process by which the products are sold and distributed to customers.

Typical Careers

Sales Engineer, Marketing Assistant, Social Media Influencer, Product Designer, Advertising Copywriter

Lessons Include

- Control of the Customer's Order
- Sales Performance Indicators
- Marketing Communications
- Product Promotion Project
- Marketing Planning
- Products
- Pricing Strategies
- Advertising
- Distribution



Green Homes Course

Discover how energy is used in modern buildings and explore technology that helps reduce the energy used in buildings, including glazing insulation and heat pumps. Students also explore how renewable energy generation can be used to provide energy for buildings.

Typical Careers

Solar Energy Systems Engineer, Surveyor, Architect, Wind Turbine Service Technician, Solar Photovoltaic Installer, Energy Engineer

Lessons Include

- Energy and Power
- Small Scale Wind Turbines
- Solar Electricity for the Home
- Solar Water Heating
- Insulating Buildings
- Cooling

Equipment

- Green Energy in Buildings Trainer (122-01)



Green Energy Production Course

Students explore how electricity is generated in fossil-fuel power plants. Students investigate a range of sustainable methods of power generation, including wind, solar, geothermal, hydro, and nuclear power.

Typical Careers

Solar Thermal Technician, Power Distributor and Dispatcher, Nuclear Engineer, Wind Energy Engineer, Environmental Science Technician

Lessons Include

- Generating Electricity
- Wind Power
- Solar Power
- Hydropower
- Biomass Power
- Geothermal Energy

Equipment

- Sustainable Energy Production Trainer (100-01)
- Sustainable Energy Production Student Resource Pack (100-02)



Smart Energy Homes Course

In this course students will investigate how a modern home produces, stores, and uses electrical energy.

Students will safely explore energy management of the home utilizing: solar power, battery storage, EV charging, heat pumps, and smart control systems.

Typical Careers

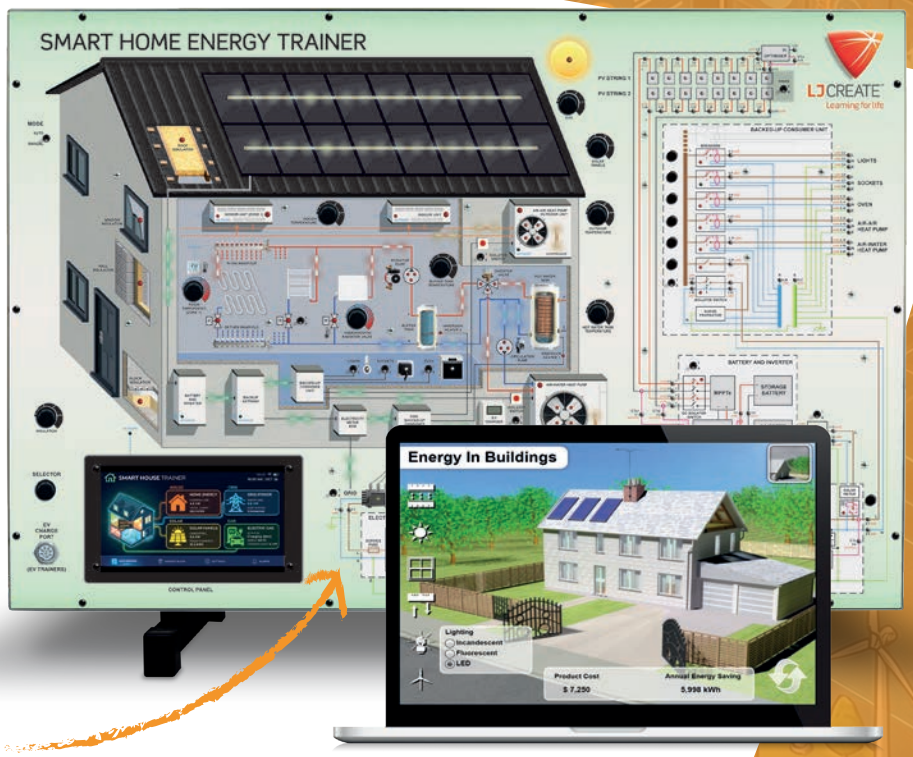
Residential Energy Storage Specialist, Solar PV & Microgeneration Engineer, Microgrid Systems Architect, Smart HVAC and Controls Technician

Lessons Include

- Benefits of Micro Generation of Energy
- Residential Solar Panels
- Efficiency of PV Panel Strings
- Smart Home Energy and the Environment

Equipment

- Smart Home Energy Trainer (123-01)



Applications of AI Course

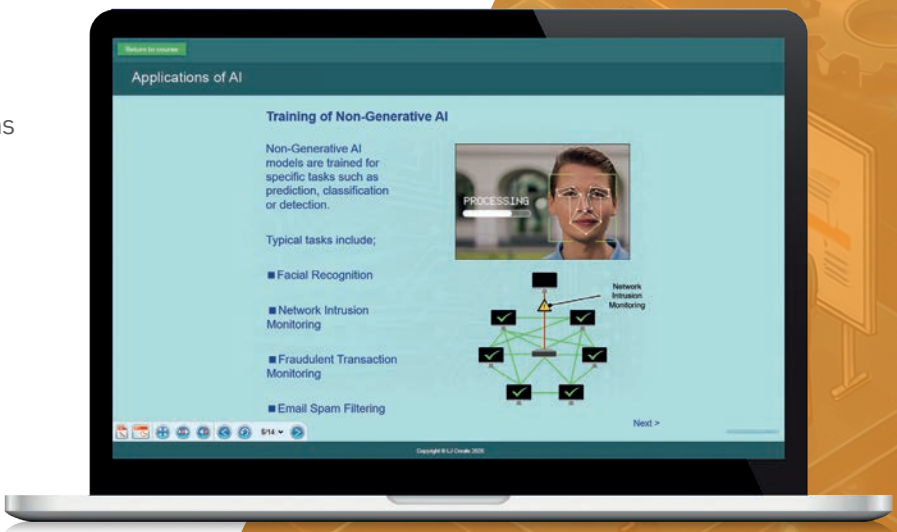
Artificial Intelligence now touches upon almost every occupation and area of education. A familiarity in the applications of AI is essential for young people planning a career pathway. Whether creating, translating, editing, or investigating, artificial intelligence is already adding efficiency to many tasks. This course introduces students to common AI applications and also investigates the positive and negative implications of the technology.

Typical Careers

AI Marketing Specialist, AI Content & Multimedia Creator, AI Prompt Engineer, AI Ethics & Policy Assistant, IoT & Automation Technician, AI Operations & Workflow Automation Assistant

Lessons Include

- Introduction to Artificial Intelligence
- Applications of AI
- Marketing Applications of AI
- AI and Websites
- AI in Media - Creating Graphics
- AI in Media - Creating Video
- Issues of AI in the Creative Industries
- Introduction to the use of AI in Programming
- AI for control of devices



Manufacturing Processes Course

Students study the basic processes of making things and use an interactive application as an introduction to Production Planning.



Typical Careers

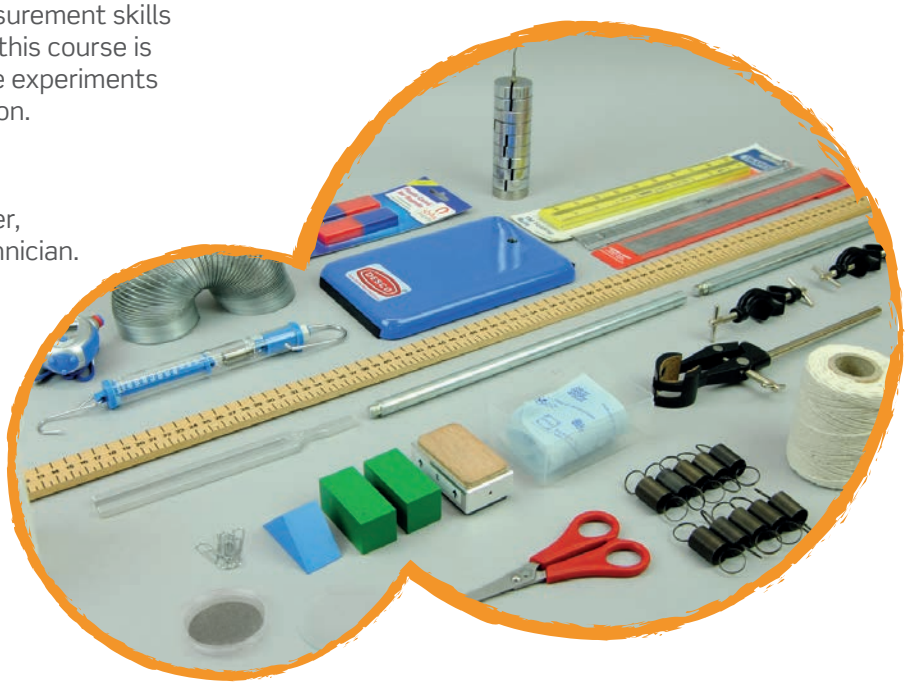
Production, Planning, and Expediting Clerk, Production Engineer, Machinist, Extruding, Forming, Pressing, and Compacting Machine Operator

Lessons Include

- Manufacturing Processes
- Safety and Protective Measures
- Environmental Protection
- Reading Machine Diagrams
- Process Planning
- Charting Data
- Improving Production
- Cutting Metal
- Drilling
- Bending

Science Investigation Skills Course

This course takes students through the process of Scientific Investigation, building on the measurement skills in the program foundation. The emphasis in this course is upon conducting a series of physical science experiments covering different forms of energy and motion.



Typical Careers

Laboratory Assistant, Scientist, Civil Engineer, Mechanical Engineering, Manufacturing Technician.

Lessons Include

- Laboratory Safety
- Planning Investigations
- Magnetism (Bar Magnets)
- Friction
- Newton's First Law of Motion
- Simple Machines
- Springs
- Mechanical Waves

Equipment

- Physics Apparatus Kit (511-01)
- Force and Energy Kit (511-02)

Project-Based Learning

Engineering Design Course



Students explore the engineering design process as a methodology for solving problems, improving, and developing new products. They create design specifications, generate and evaluate alternative solutions, produce models and prototypes of their solution, and recognize the importance of communication in the design process.

Typical Careers

Design Engineer, Product Designer, Electrical Engineer, Project Manager, Aerospace Engineer

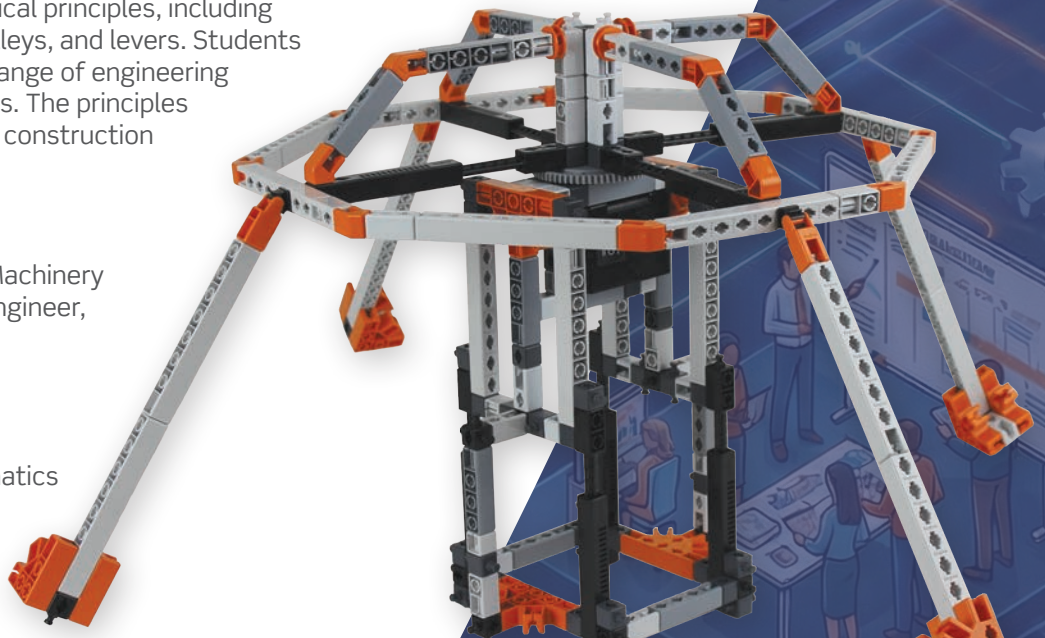
Lessons Include

- Introduction to Engineering Design
- Engineering Problems
- Alternative Solutions
- Communicating Engineering Design
- Design Project - An Automated Vehicle Gate

Equipment

- Engineering Construction Kit (220-02)

Mechatronics Course



This course explores basic mechanical principles, including simple machines such as gears, pulleys, and levers. Students design and develop solutions to a range of engineering problems using mechanical systems. The principles of fluid power and its application in construction machines is also investigated.

Typical Careers

Industrial Engineering Technician, Machinery Maintenance Worker, Mechanical Engineer, Industrial Production Manager

Lessons Include

- Simple Machines
- Fundamental Principles of Pneumatics
- Mechanical Systems
- Basic Fluid Power Engineering
- Fluid Power Cylinders

Equipment

- Engineering Construction Kit (220-02)

Agriculture Course

Students investigate the development of agricultural technology and its impact. The application of biotechnology in agriculture is also explored. Students also design a series of automated agricultural machines and environmental control systems.

Typical Careers

Agricultural Engineer, Agricultural and Food Science Technician, Farm Equipment Mechanic, Precision Agriculture Technician

Lessons Include

- Irrigation
- Agricultural Machines 1
- Agricultural Machines 2
- Creating Power from Biomass
- Artificial Environments
- Design Project - Mobile Tree Shaker

Equipment

- Engineering Construction Kit (220-02)



Transportation Course

This course investigates the development of transportation technology and its impact on society. Students explore the fundamental principles of transport technology and apply the physical science concepts to design transportation systems. Development of automated transportation systems is also covered.

Typical Careers

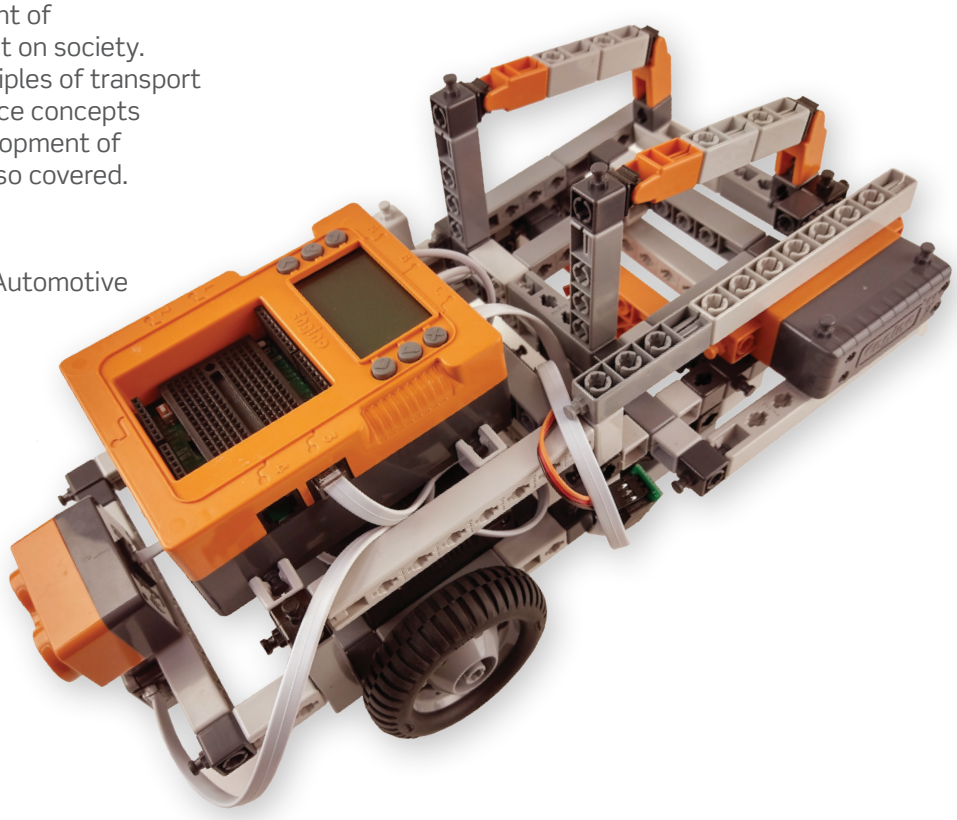
Automobile Engineer, Vehicle Designer, Automotive Technician, Cargo and Freight Agent

Lessons Include

- Introduction to Transportation
- Power and Control
- Torque
- Intelligent Vehicles
- Freight Transport

Equipment

- Engineering Construction Kit (220-02)



Industrial Robotics Course

Students explore the deployment of industrial machines and their impact on society. They also investigate the basic components of robotic systems and design a series of automated robotic systems to solve industrial problems.

Typical Careers

Robotics Engineer, Industrial Maintenance Technician, Automation Specialist, Industrial Production Manager

Lessons Include

- Industrial Machines
- Controlling Machines
- The Control Loop
- Sensors
- Actuators
- Industrial Robots

Equipment

- Engineering Construction Kit (220-02)



Mobile Robotics Course

Students explore applications of mobile robotic systems and investigate how mobile robotic systems are powered and controlled. Students also design a series of mobile robotic systems to meet a design brief.

Typical Careers

Robotics Technician, Robotics Engineer, Planetary Scientist, Aerospace Engineer, Mechatronics Engineer

Lessons Include

- Introduction to Mobile Robots
- Powering Mobile Robots
- Controlling Mobile Robots
- Sensors for Mobile Robots
- Space Robots

Equipment

- Engineering Construction Kit (220-02)



Logistics and Supply Chain Course

Students explore supply chain and logistics fundamentals, including storage, hazardous materials and transport, before learning about sensors and outputs related to supply chain systems and finally programing automated systems that mimic real life scenarios.

Typical Careers

Robotics Technician, Robotics Engineer, Logistics Technician, Aerospace Engineer, Mechatronics Engineer

Lessons Include

- Warehouse and Logistics
- The Organization of Storage
- Handling of Hazardous Materials
- Storage and Warehouse Technology
- Conveying
- Packaging of Goods
- Planning Logistics

Equipment

- Engineering Construction Kit (220-02)



Electronics Circuits Course

Students explore the design, development, and production of electronic systems. Students also use simulation tools to model electronic circuits and develop a series of electronic circuits using the systems approach.

Typical Careers

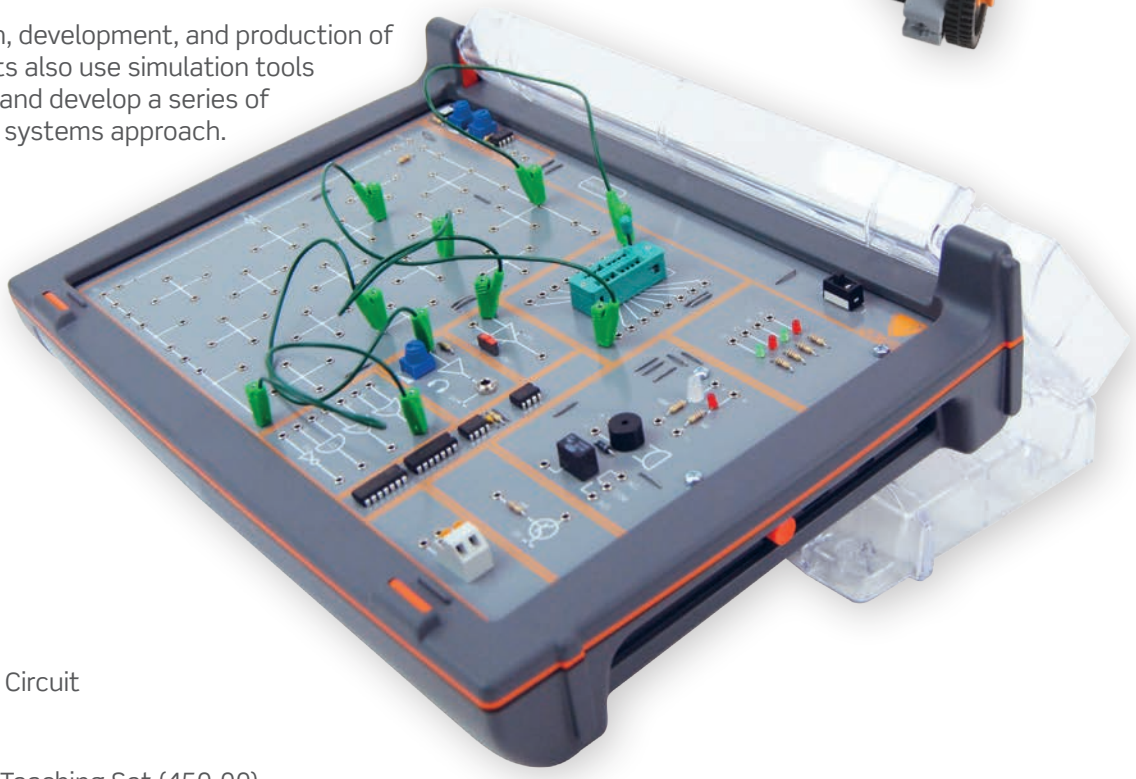
Electronics Engineer, Electronics Engineering Technologist, Electrical and Electronics Drafter, Microsystems Engineer

Lessons Include

- Simple Lamp Circuit
- Polarity Tester
- LED Lamp Circuit
- Automatic Light Circuit
- Breadboarding
- The Voltage Divider
- Improved Automatic Light Circuit

Equipment

- Electronic Circuits Trainer Teaching Set (450-00)



Construction Course

Students explore how structures are designed to withstand the forces imposed on them due to the weight of the structure, the building contents, and natural events such as earthquakes and weather. Students investigate how beams are used in construction and design a series of beams using different materials The properties of concrete structures are also investigated.



Typical Careers

Construction and Building Inspector, Structural Engineer, Architectural and Civil Drafter, Civil Engineer

Lessons Include

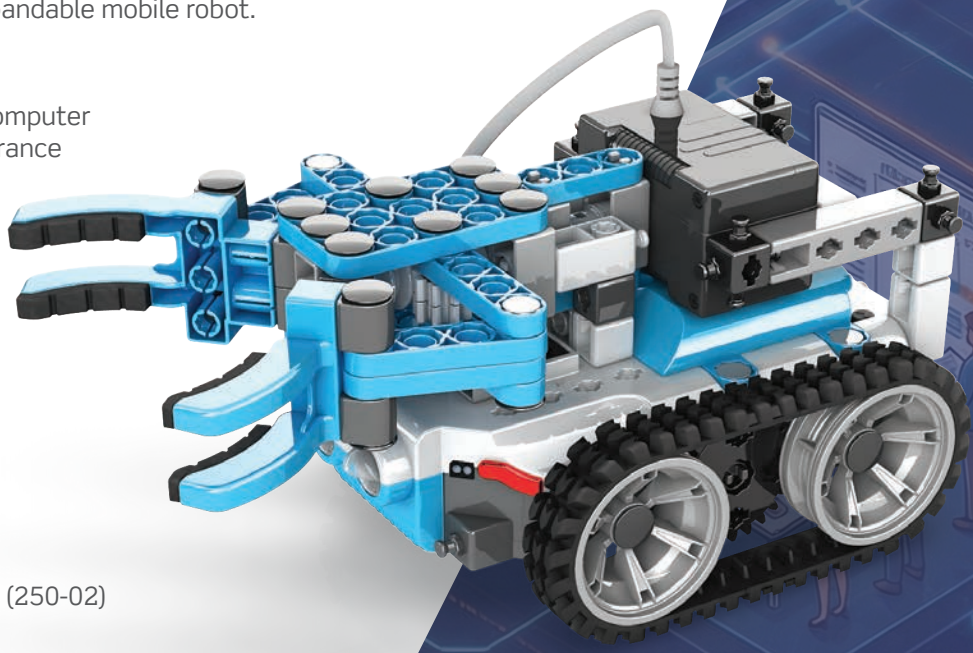
- Forces on Structures
- Beams
- Concrete
- Green Materials in Construction
- Building Bridges
- Design Project - Bridge Design

Equipment

- Structures and Materials Teaching Set (121-00)

Computer Science Course

This course will explore techniques for algorithm development including the use of problem solving techniques, flowchart design and pseudo code. Students will design algorithms, and then develop and test programs to control an expandable mobile robot.



Typical Careers

Applications Software Developer, Computer Programmer, Software Quality Assurance Engineer, Robotics Engineer

Lessons Include

- Computing Concepts
- Algorithms and Problem Solving
- Inputs and Outputs
- Data, Constants, and Variables
- Operators and Control Structures
- Documentation and Testing
- Design Project - A Gripper Robot

Equipment

- Educational Robotics Invention Kit (250-02)

Lesson Bank Topic Listing

over 2,400 lessons based on the following topic areas:



Mechanical Systems
(60+ individual learning units)

- Machines
- Machine Design
- Friction
- Inclined Planes
- Levers
- Gears
- Pulleys
- Cams and Cranks
- Careers

Fluid Power
(110+ individual learning units)

- Principle of Pneumatics
- Pneumatic Components, Symbols and Circuits
- Pneumatic Logic
- Sequential and Automatic Control Circuits
- Pneumatic Circuit Time Delays
- Electro-pneumatics
- Pneumatic Problem Solving
- Levers and Movement
- Principles of Hydraulics
- Hydraulic Components, Symbols and Circuits
- Hydraulic Cylinders
- Valves and Flow Control
- Actuators
- Creating Pressure with Pumps
- Hydraulic Problem Solving

Telecommunications
(20+ individual learning units)

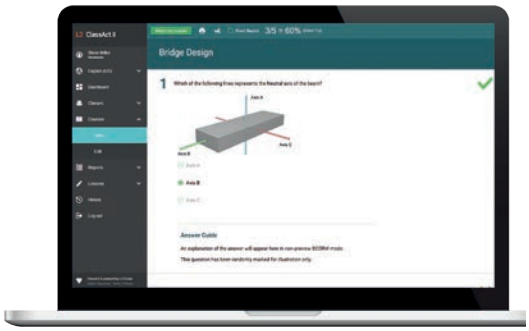
- Communication Methods
- Broadcasting
- Telephones
- Cell Phones
- Networks

Transportation
(70+ individual learning units)

- Research and Design
- Transportation Systems
- Propulsion Systems
- Transportation Logistics
- Moving the Maglev
- Force and Momentum
- Passenger Safety
- Intelligent Vehicles
- Freight Transport
- Dump Truck
- Program Control
- Costs
- Careers

Construction
(20+ individual learning units)

- Forces on Structures
- Concrete
- Beams
- Building Bridges
- Green Materials in Construction
- Careers

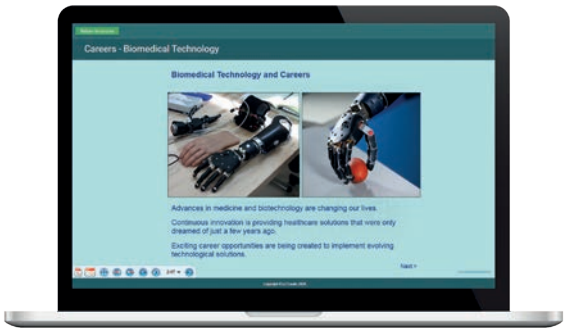


Manufacturing
(70+ individual learning units)

- Design
- Materials
- Manufacturing Engineering
- Waste Management
- Rapid Prototyping and Manufacture
- Careers

Agriculture
(20+ individual learning units)

- Farming Technology
- Machinery
- Careers



Biomedical Technology
(20+ individual learning units)

- Hygiene
- Treatment and Prevention
- Diagnostic Equipment
- Careers

Robotics
(70+ individual learning units)

- Controlling Robots
- Industrial Robotics
- Mobile Robotics
- Robots in Action
- Careers

Employability Skills
(20+ individual learning units)

- Social Skills
- Language Skills
- Customer Service



Electric Vehicles
(50+ individual learning units)

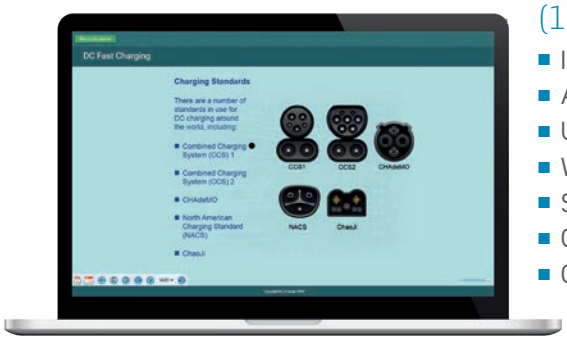
- Benefits and Drawbacks to Electric Light Vehicles
- High Voltage Electric Vehicle Safety
- Safety in High Voltage Vehicles
- Introduction to Electric Vehicles
- Definition of Electric Vehicles
- Features of Electric Vehicles
- First Responder Process
- Service Disconnect - the HVIL
- Reasons for the Development of High Voltage Vehicles
- Fuel and Emissions
- The Electric Vehicle Voltage Systems
- EV Powertrain Systems

Smart Home Energy
(50+ individual learning units)

- Introduction to Smart Home Energy
- Benefits of Micro Generation of Energy
- Smart Home Energy and the Environment
- Residential Solar Panels
- Efficiency of PV Panel Strings
- The Air Source Heat Pump
- Electricity Grid Gateway Operation
- Energy Efficient Heating and A/C
- Control of the HVAC System
- Residential Building Insulation
- Role of the Consumer Unit
- Fuses and Breakers

EV Mass Transit
(50+ individual learning units)

- Air Pollution and Quality
- Benefits of Electric Mass Transit Systems
- Introduction to Electric Buses
- Types of Electric Buses
- EV Bus Charging Systems
- Dangers of High Voltage Electrical Systems
- Battery Safety and Incident Recovery
- Electric Bus Communication Systems
- Electric Bus Thermal Management
- Cabin Climate Control System



EV Charging Stations
(30+ individual learning units)

- Types of Residential and Commercial Charging Stations
- Introduction to the EV Charging Stations Trainer
- EV Charging Station Installations
- On-Board Vehicle AC Charger
- Single Phase AC Charging
- DC Fast Charging
- DC Fast Charging Station Operation
- Charging Station Safety - RCD
- Charging Station and Vehicle Communications
- Charging Station Software

Mathematics
(100+ individual learning units)

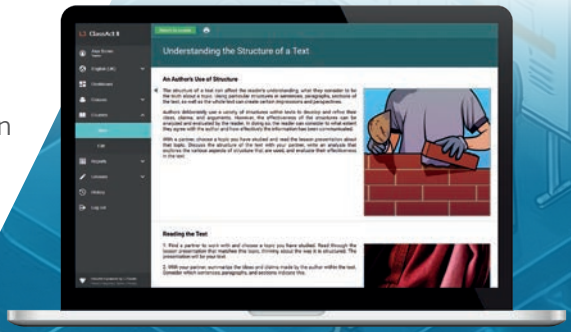
- Units of Measure
- Approximation
- Arithmetic
- Fractions
- Percentages
- Length, Area and Volume
- Graphs and Charts
- Equations
- Algebra
- Factorization
- Indices
- Angles
- Phasors
- Trigonometry

Information Technology
(150+ individual learning units)

- Introduction to IT
- Accessing the Internet
- Using MS Windows
- Word Processing
- Spreadsheets
- Computer Science
- Careers

English Language
(40+ individual learning units)

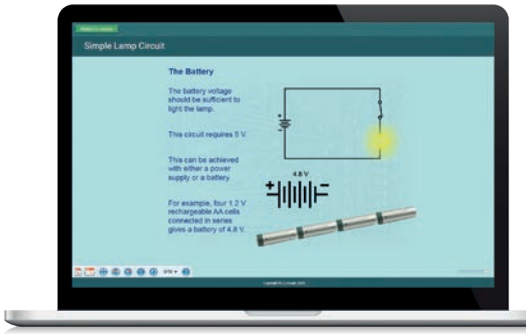
- Language
- Reading
- Speaking and Listening
- Writing



Lesson Bank
Topic Listing

Electronics
(150+ individual learning units)

- Basic Electricity
- Building on Breadboard
- Building on Stripboard
- Building Circuits on Printed Circuit Boards
- Electronic Problem Solving
- LED Lamp Circuit
- Automatic Light Circuit
- Power Supplies
- Baby Alarm
- Flashing Doorbell Circuit
- Freezer Temperature Warning Circuit
- Intruder Alarm
- Polarity Tester
- Elevator Door Controller
- Road Crossing Controller
- Careers



Engineering Design
(40+ individual learning units)

- The Design Process
- Building and Testing
- Programming
- Careers

Nuclear Physics
(30+ individual learning units)

- Atomic and Nuclear
- Radioactivity



Green Technologies
(140+ individual learning units)

- Biomass
- Efficiency of Power Generation
- Energy in Buildings
- Fuel Cells
- Geothermal
- Glass in Construction
- Heat Pumps
- House Heating Systems
- Solar Electric Systems
- Solar Heating
- Solar Power
- Hydropower
- Insulation
- Power Generation
- National Grid
- Nuclear Energy
- Wind Power
- Wind Turbines
- Careers

Forces and Motion
(80+ individual learning units)

- Types of Force
- Measurement of Force
- Force and Deformation
- Describing Movement
- Force and Acceleration
- Gravity
- Moment of a Force
- Momentum
- Pendulums
- Components of Force
- Projectiles

Earth and Space Sciences
(110 + individual learning units)

- Weather and Climate
- Earth Systems
- Sun, Earth and Moon Interaction
- Solar System
- The Universe

Scientific Investigation and Reasoning
(80+ individual learning units)

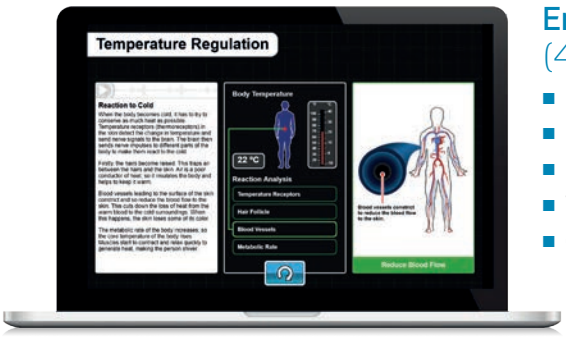
- Safety
- Using Equipment
- Scientific Method
- Data and its Uses
- Science and Society
- Sustainability

Physical Science
(120+ individual learning units)

- Changing Materials
- Properties of Matter
- Structure of Matter
- Atomic Structure
- Periodic Table
- Chemical Reactions
- Structure, Bonding and Reactivity
- Chemical Equations
- Energy in Chemical Reactions
- Carbon and its Compounds
- Energy
- Light
- Waves and Vibrations
- Digital Technology

Matter
(60+ individual learning units)

- Properties of Matter
- Fluids
- Density
- Solubility
- Measurement Errors
- Gas Laws



Life Science
(120+ individual learning units)

- Biological Systems
- Organism Structure and Function
- Plant Biology
- Cell Biology
- Basic Needs
- Food and Diet
- Energy and Living Things
- Reproductions
- Genetics
- Ecosystems
- Population and Biodiversity
- Taxonomy
- Adaptation
- Evolution
- Extinction
- Health and Disease

Scientific Processes
(110+ individual learning units)

- Safety
- Using Equipment
- Scientific Method
- Data and its Uses
- Science and Society

Earth Systems
(40+ individual learning units)

- Earth Systems
- Weather and Climate
- Human Sustainability
- Solar System

Energy
(40+ individual learning units)

- Forms of Energy
- Electrical Energy
- Heat Energy
- Work, Force and Energy
- Conservation of Energy

Chemical Structure and Bonding
(50+ individual learning units)

- Periodic Table
- Atomic Structure
- Chemical Bonding

Waves
(60+ individual learning units)

- Waves and Vibrations
- Optics
- Electromagnetic Spectrum
- Digital Technology

Chemical Reactions
(120+ individual learning units)

- Changing Materials
- Types of Reaction
- Acids and Bases
- Chemical Formulas
- Energy in Chemical Reactions
- Rates of Reaction
- Electrochemistry
- Stoichiometry

The Living World
(70+ individual learning units)

- Plant Biology
- Taxonomy
- Food Chains, Webs, and Pyramids
- Energy and Living Things
- Nutrient Cycles
- Population and Biodiversity
- Ecosystems
- Sustainability

Electricity and Magnetism
(40+ individual learning units)

- Static Electricity
- Magnetism
- Electrical Circuits
- Electromagnetism

Anatomy
(80+ individual learning units)

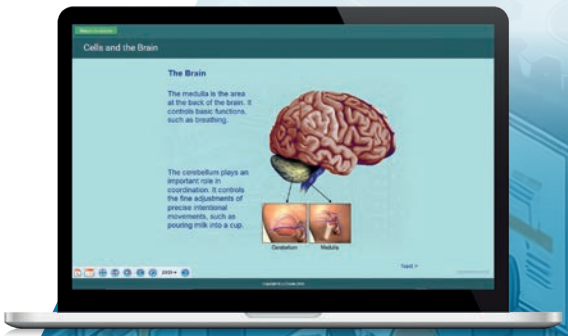
- Biological Systems
- The Eye
- Anatomy and Health
- Exercise
- Food and Diet

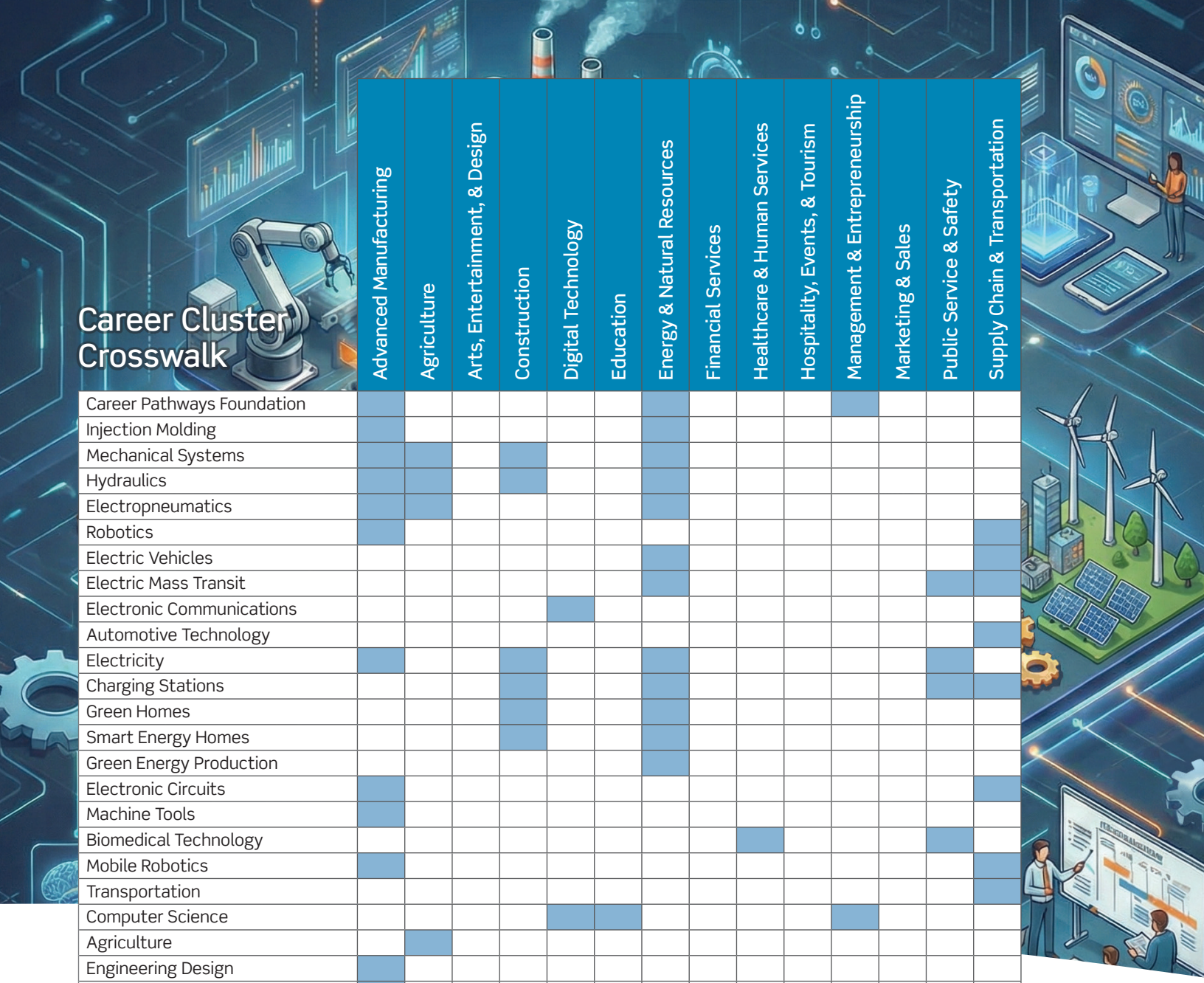
Evolution and Genetics
(50+ individual learning units)

- Reproduction
- Adaptation
- Evolution
- Genetics

Biochemistry and Cell Biology
(30+ individual learning units)

- Biomolecules
- Cells and Cellular Processes
- Microbiology





Career Cluster Crosswalk

	Advanced Manufacturing	Agriculture	Arts, Entertainment, & Design	Construction	Digital Technology	Education	Energy & Natural Resources	Financial Services	Healthcare & Human Services	Hospitality, Events, & Tourism	Management & Entrepreneurship	Marketing & Sales	Public Service & Safety	Supply Chain & Transportation
Career Pathways Foundation	■						■				■			
Injection Molding	■						■							
Mechanical Systems	■	■		■			■							
Hydraulics	■	■		■			■							
Electropneumatics	■	■					■							
Robotics	■													■
Electric Vehicles							■							■
Electric Mass Transit							■						■	■
Electronic Communications					■									
Automotive Technology														■
Electricity	■			■			■						■	
Charging Stations				■			■						■	■
Green Homes				■			■							
Smart Energy Homes				■			■							
Green Energy Production							■							
Electronic Circuits	■													■
Machine Tools	■													
Biomedical Technology									■				■	
Mobile Robotics	■													■
Transportation														■
Computer Science					■	■					■			
Agriculture		■												
Engineering Design	■													
Mechatronics	■													
Industrial Robotics	■													
Construction				■										
Ecosystems		■					■							
Applications of AI	■		■		■	■				■	■	■		
Workplace Skills	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Logistics and Supply Chain														■
Marketing and Sales												■		
Science Investigation Skills				■		■								
Manufacturing Processes	■										■			

For more information on our range of resources, please contact:

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