

# Innovative Learning Spaces



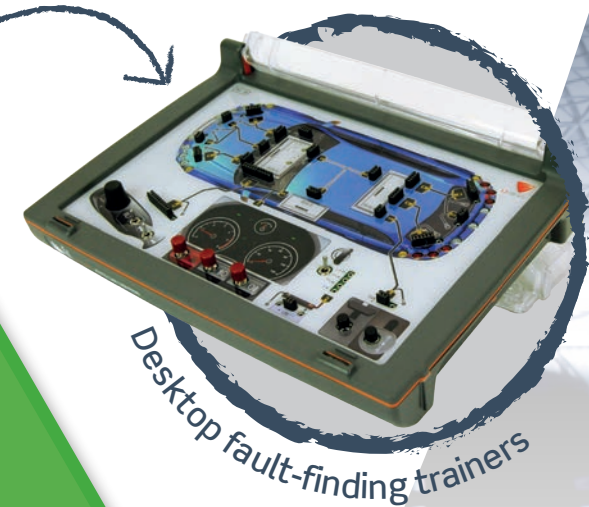
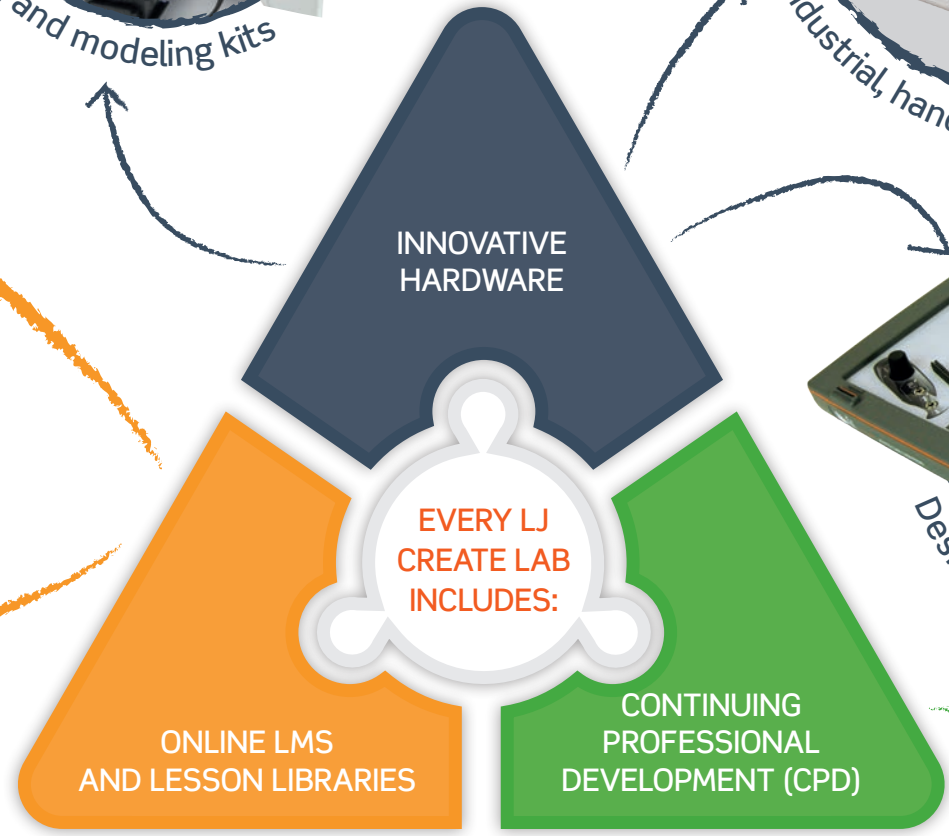
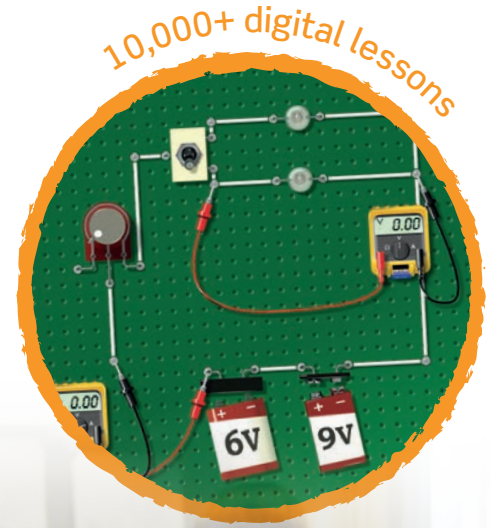
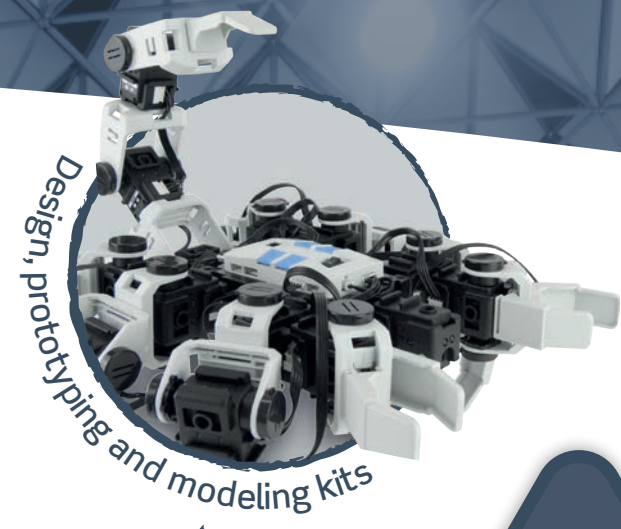
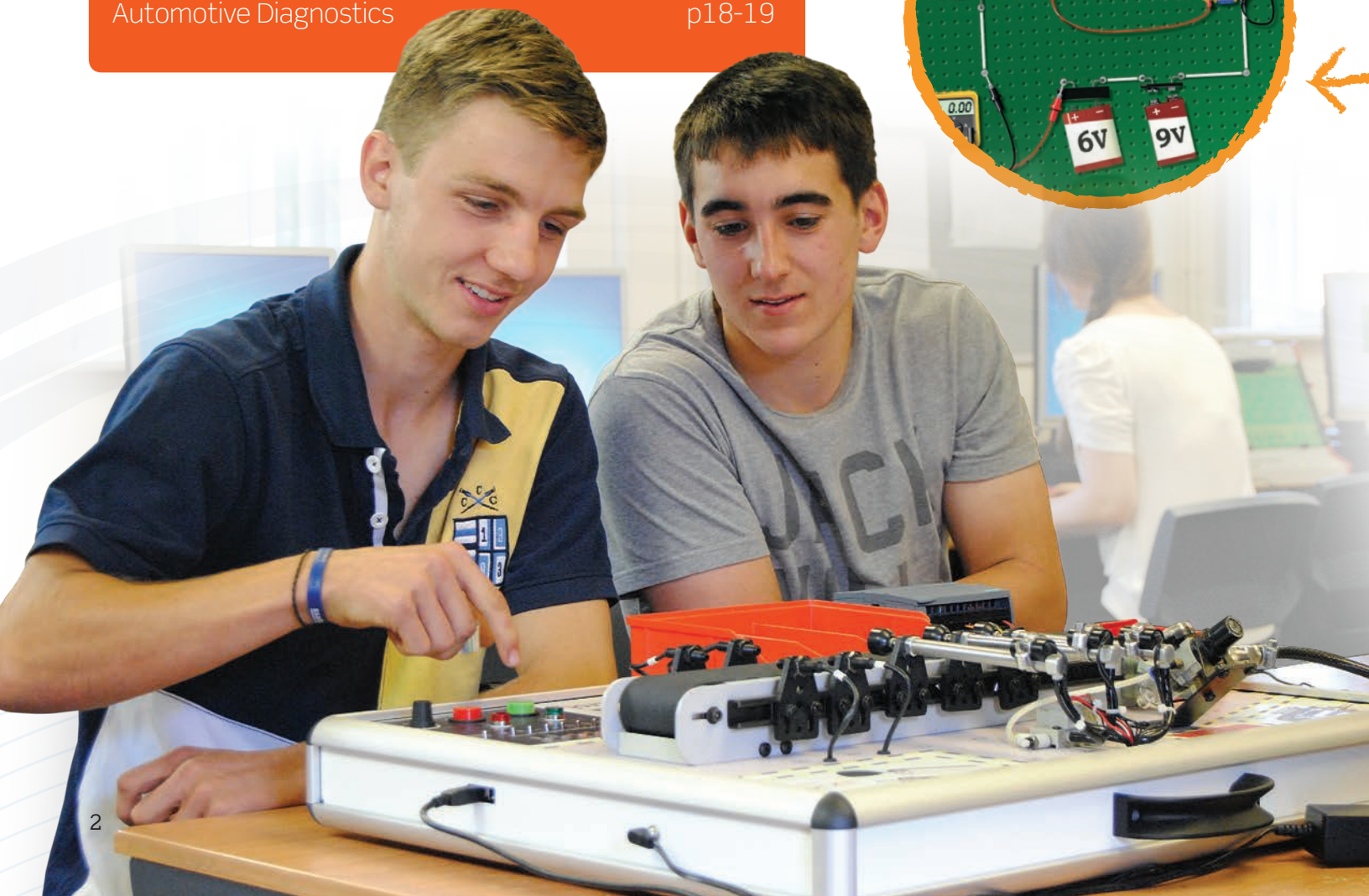
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Learning for life

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# Smart Labs

At LJ create we pride ourselves on the innovative learning spaces we produce for a wide range of STEM education and occupational disciplines. We call these smart labs. This brochure illustrates a few examples of these labs. We combine and customize these spaces to meet every customer's specific needs.

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# Smart Labs

Our SMART Labs are designed to create:

- SKILLS** - in students: academic, occupational and learning skills
- MOTIVATION** - for students, staff and stakeholders who take pride in a 'showpiece'
- ADAPTABILITY** - for different staff and student groups
- RESULTS** - for the institution and individuals
- TIME** - for instructional staff to spend on the best parts of their jobs

Type	Title	Topic	Subject
5.1	Absolute and Relative Measurement Errors	Measuring Instruments	Electrical Networks
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5.1	AC Motor Principles, and the Three-Phase Synchronous M	AC Motors	Power Electronics
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5.1	AC Supply with Pure Capacitive Loading - Exercise 4.1	Capacitor Circuits	Electronic Principles
5.1	AC Supply with Pure Capacitive Loading - Worksheet 2	Capacitor Circuits	Electronic Principles
5.1	AC Supply with Pure Inductive Loading - Exercise 5.1	Inductor Circuits	Electronic Principles
5.1	AC Supply with Pure Inductive Loading - Worksheet 3	Inductor Circuits	Electronic Principles
5.1	AC Supply with Pure Inductive Loading - Worksheet 4	Inductor Circuits	Electronic Principles
5.1	Accident Prevention in the Warehouse	Human Resources	Freight Logistics
5.1	Accident Prevention in the Warehouse	Human Resources	Freight Logistics

### SKILLS

- Active learning lessons and projects develop cognitive and manipulative skills
- Student-centered learning develops responsibility and lifelong learning skills
- Our large library of lessons integrate science, math, language, careers and occupational learning



### MOTIVATION

- Students love the active learning sessions in our smart labs. They are gaining just the knowledge they need to complete investigations, experiments and projects - applying this information while developing useful skills.
- Students enjoy their enhanced role in a well-organized student-centered environment. They have responsibility for their own learning. They can help each other and, to some extent, they can set their own pace of working.
- Staff enjoy the relative freedom that the smart labs provide. They find that they are no longer locked to a group of students for a set period of time or trapped at the front of the room. Neither are they faced with the task every evening of planning the lab lessons for the following day, or grading work from the previous day.
- Instead of this they can focus on the tasks for which most people enter the teaching profession - the job of helping individual students achieve as much as possible.
- The immediate feedback provided by a learning management system is always motivating for both students and staff.
- The smart labs look great and are an obviously high-tech environment. This is very exciting to everybody associated with the institution and a source of pride to staff and administration.



### ADAPTABILITY

- Our library of lessons and courses is so large that individual teachers have lots of choices for each class. Additionally, the lessons have been produced to a consistent high standard and develop successful outcomes in the Smart Lab for all staff. This helps enormously during staff transition times or in larger institutions.
- The nature of the smart lab means that if institutions are in a situation where a non-specialist has to look after the class for short periods the activities in the lab will be unaffected.

### RESULTS

- The primary purpose of our labs is to deliver results. Whether used for qualifications at elementary, secondary or above, the focus is upon better performance in unit or course assessments and examinations. Performance in a lesson is assessed against the learning objectives and courses have pre- and post-testing available. Project-based units are supplied with a number of options for assessed portfolios.
- The learning management system tracks and reports performance - providing teaching and administrative staff with the necessary tools to react when appropriate.
- LJ Create lessons include integrated academic tasks. These are supported by specific lessons that students can call up when required. This in-context academic intervention is a fantastic tool for enhancing mathematics, science and language skills.

Program	Progress	Time	Logins	Score
Engineering Design	300 h	00 m	20	74%
Construction Engineering	225 h	00 m	15	88%
Biomedical Technology	105 h	00 m	7	77%
Transportation Technology	315 h	00 m	21	78%
Mass Transportation	180 h	00 m	12	67%
Industrial Robotics	315 h	00 m	21	87%
Mobile Robotics	180 h	00 m	12	82%
Agricultural Technology	165 h	00 m	11	89%
Basic Mechatronics	330 h	00 m	22	81%
Intermediate Electronics	240 h	00 m	16	80%
Energy in Buildings	255 h	00 m	17	76%
Manufacturing Technology	270 h	00 m	18	91%

### TIME

- Our lessons are preconfigured to meet specific learning objectives and are sequenced against required or optional standards. So staff can spend their planning time concentrating on extra instruction for individuals that might need it, or adapting our lessons - always easier than starting from scratch.
- With most students in a class being self-occupied in the smart labs, teachers can focus on the advanced, or struggling, students that will benefit most from close attention.
- Since the labs are usually ready to run, staff don't need to find the extra time normally needed to configure experiments or project work.

### Lesson 1

STEM Design - Engineering Design  
Time: 60 minutes

Whole Class Activity

**Introduction**  
This is a whole class activity.

**Objectives**

**Recommended Equipment**

Innovative learning spaces for:

# Design and Technology Projects

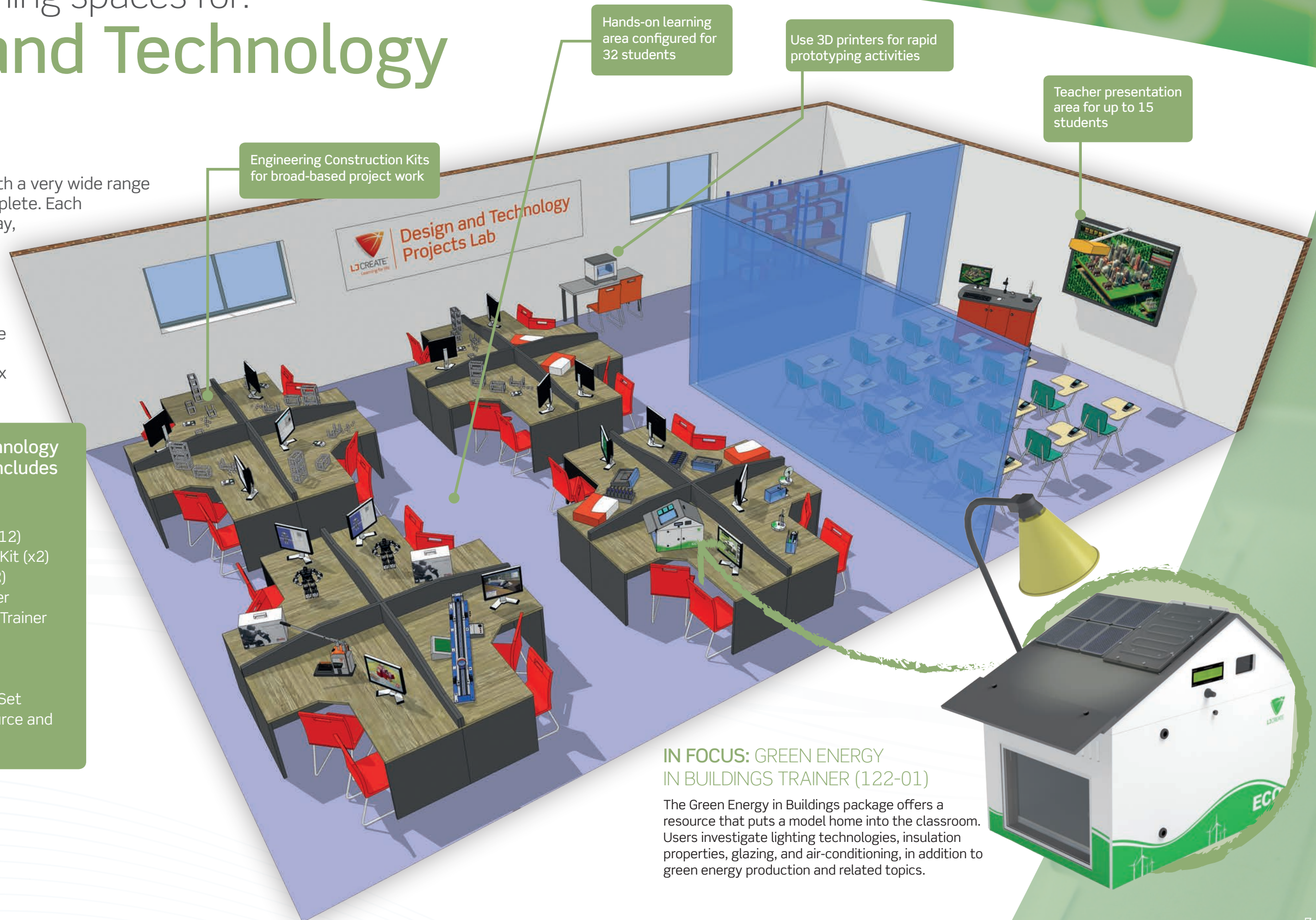
This space provides students with a very wide range of STEM-related projects to complete. Each project is tied to a career pathway, and instruction includes information about related college requirements and all levels of careers.

The program is extremely flexible for implementation and can be used across five grade levels - six through ten.

This typical Design and Technology Projects Lab configuration includes the following resources:

- Biomedical Technology Kit (x2)
- Engineering Construction Kit (x12)
- Educational Robotics Invention Kit (x2)
- Fluid Power Resource Pack (x12)
- Green Energy in Buildings Trainer
- Sustainable Energy Production Trainer
- Electronic Circuits Trainer (x2)
- Injection Molding Machine
- Rapid Prototyping Machine
- Research and Design Teaching Set
- Structures and Materials Resource and Consumables Pack

To find out more, visit:  
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Hands-on learning area configured for 32 students

Use 3D printers for rapid prototyping activities

Teacher presentation area for up to 15 students

Engineering Construction Kits for broad-based project work

## IN FOCUS: GREEN ENERGY IN BUILDINGS TRAINER (122-01)

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



# Innovative learning spaces for: ➔ Science Inquiry

We create a collegiate-style open science laboratory, driven by the use of technology, in which students can be assigned a number of practical experiments to be completed each term and then left with the responsibility to visit the lab, log in to the system, collect the matching kit or kits and conduct their experiment.

These labs are available in Elementary, Middle School, or High School format.

This typical Science Inquiry Lab configuration includes the following resources:

- Teacher STEM Cart
- Biology Experiment Kit (x4)
- Physics Experiment Kit (x4)
- Chemistry Experiment Kit (x4)
- Data Logging Kit (x4)
- Chemistry Apparatus Kit (x2)

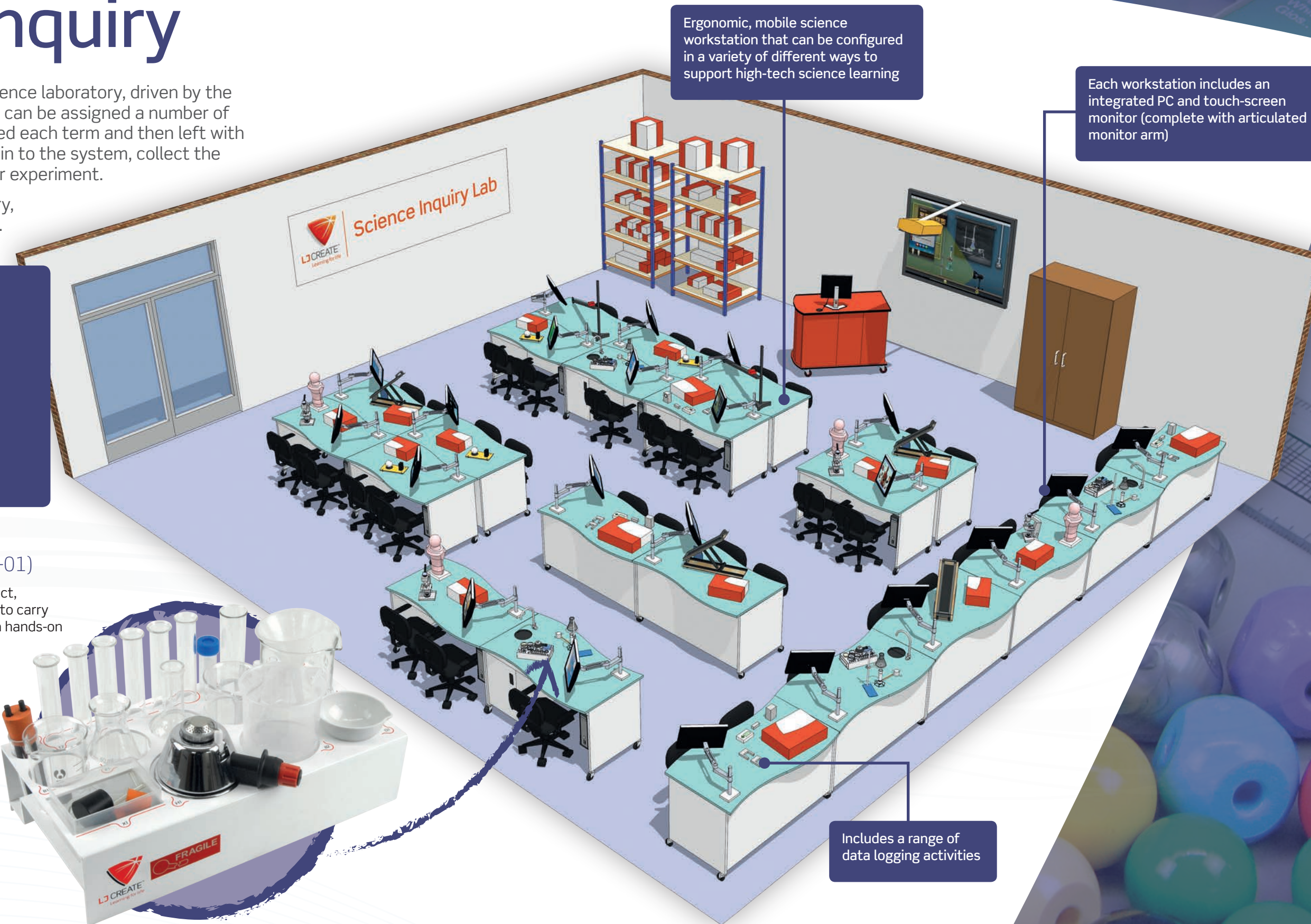
## IN FOCUS: CHEMISTRY APPARATUS KIT (512-01)

The Chemistry kit is comprehensive yet compact, with most of the essential items you will need to carry out a large proportion of your chemistry lesson hands-on experiments.

Typical practical tasks include:

- Acids and Bases
- Atomic Structure and Ions
- Chemical Change
- Halogens
- Decomposition
- Separating Mixtures

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# Innovative learning spaces for: Career Pathways

This broad-based careers lab will provide the underpinning skills and knowledge for a wide range of careers to students in Grades 9 through 12. Interactive software and hands-on activities provide general job skills and put the learning of academic skills in an occupational context.

Pathway options in this space include: Agriculture, Construction, Business, Health Sciences, Manufacturing and Transportation.

This typical Career Pathways Lab configuration includes the following resources:

- Mechanisms Trainer
- Electronic Circuits Teaching Set (x2)
- Industrial Control Trainer
- Electronic Communications Trainer
- Sustainable Energy Production Trainer
- Robotics Trainer
- Engineering Construction Kit (x2)
- Injection Molding Trainer (x2)
- Rapid Prototyping Machine
- Biology Experiment Kit (x2)
- Data Logging Kit

## IN FOCUS: INJECTION MOLDING TRAINER (350-01)

The Injection Molding Trainer offers a classroom-based resource for investigating the techniques used to create thermo-plastic products. Students initially use the trainer to mold a variety of items, including a model car and different designs of door handles.

Using the trainer alongside a 3D printer allows students to follow rapid prototyping and tooling techniques, including:

- 3D printing, evaluation and improvement of prototypes
- 3D printing of injection mold tools
- Injection molding of the final product

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[ljcreate.com](http://ljcreate.com)



Teacher presentation area for up to 12 students

The Robotics Trainer offers a classroom-based resource for practical investigation of the technology and engineering behind modern automated systems

Complete project-based tasks with the Engineering Construction Kit; students build electro-mechanical models based around real-world STEM themes

Innovative learning spaces for:

# ➔ Electronics Certification

Students learn the necessary cognitive and practical skills for many technician occupations involving electrical or electronic systems.

These include: Medical Equipment Technician, IT Support, Manufacturing Maintenance and Audio Support Technician. Certifications available include the ETA Student Electronics Technician.

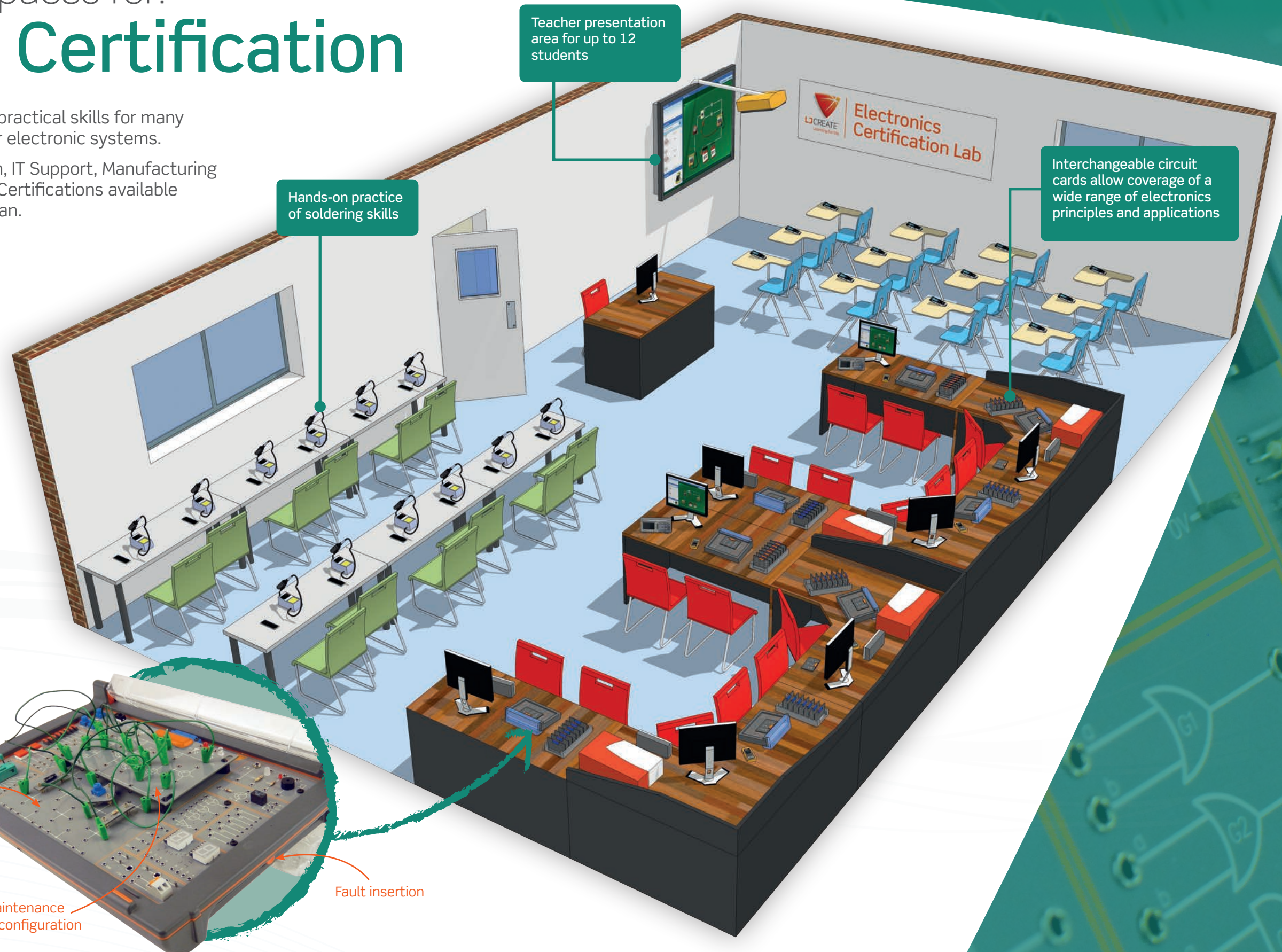
This typical Electronics Certification Lab configuration includes the following resources:

- Electronics Study Trainer (x8)
- Instrumentation Pack (x10)
- Circuit Card Set (x8)
- Electronic Circuits Consumable Pack (x2)
- Circuit Soldering Station and Tools (x12)

## IN FOCUS: ELECTRONICS STUDY TRAINER (320-00)

This trainer is part of the core electronics series. It allows the practical study of a wide range of electronics subjects, including DC and AC circuits, electrical networks, semiconductors, logic gates and fault-finding techniques.

The unique design of the trainer includes a heavy-duty casing with transparent protective cover. When in use, the cover folds back to provide an angled support for the unit. With the cover closed, trainers become stackable for easy storage.



Patching area of discrete components

Fault insertion

Reliable, low maintenance cards for quick configuration of circuits

To find out more, visit:  
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# Innovative learning spaces for: ➔ Mechatronics

Students study Mechanical Systems, Control Systems, Fluid Power, and Electronics. Computer and device programming is included in many different forms for a diverse and rounded engineering experience.

Curriculum aligns with State learning standards for Mechatronics and the requisite skills for apprenticeships.

This typical Mechatronics Lab configuration includes the following resources:

- Electronics Study Trainer (x4)
- Circuit card Set (x2)
- Educational Robotics Invention Kits (x2)
- Hydraulics Trainer (x2)
- Mechanisms Trainer (x2)
- Electro-pneumatics Trainer (x2)
- Industrial Controls Trainer (x2)
- PLC Trainer (x2)
- Transducer and Instrumentation Trainer (x2)
- Motor Controls and Data Acquisition Teaching Set

## IN FOCUS: INDUSTRIAL CONTROL TRAINER (290-01)

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.

Alternatively students can create their own programs and see them in action on the trainer using the included simulation package. This trainer includes a curriculum CD containing theory and practical learning tasks, as well as tutor support materials.



Investigate hydraulic systems and components in a practical way using an all-in-one desktop trainer

Students can perform a comprehensive range of PLC programming tasks

Combine code and creativity with our Educational Robotics Invention Kits

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Innovative learning spaces for:

# Light or Heavy Duty Vehicle Repair

The modern automobile is a complex collection of electronic and mechanical systems.

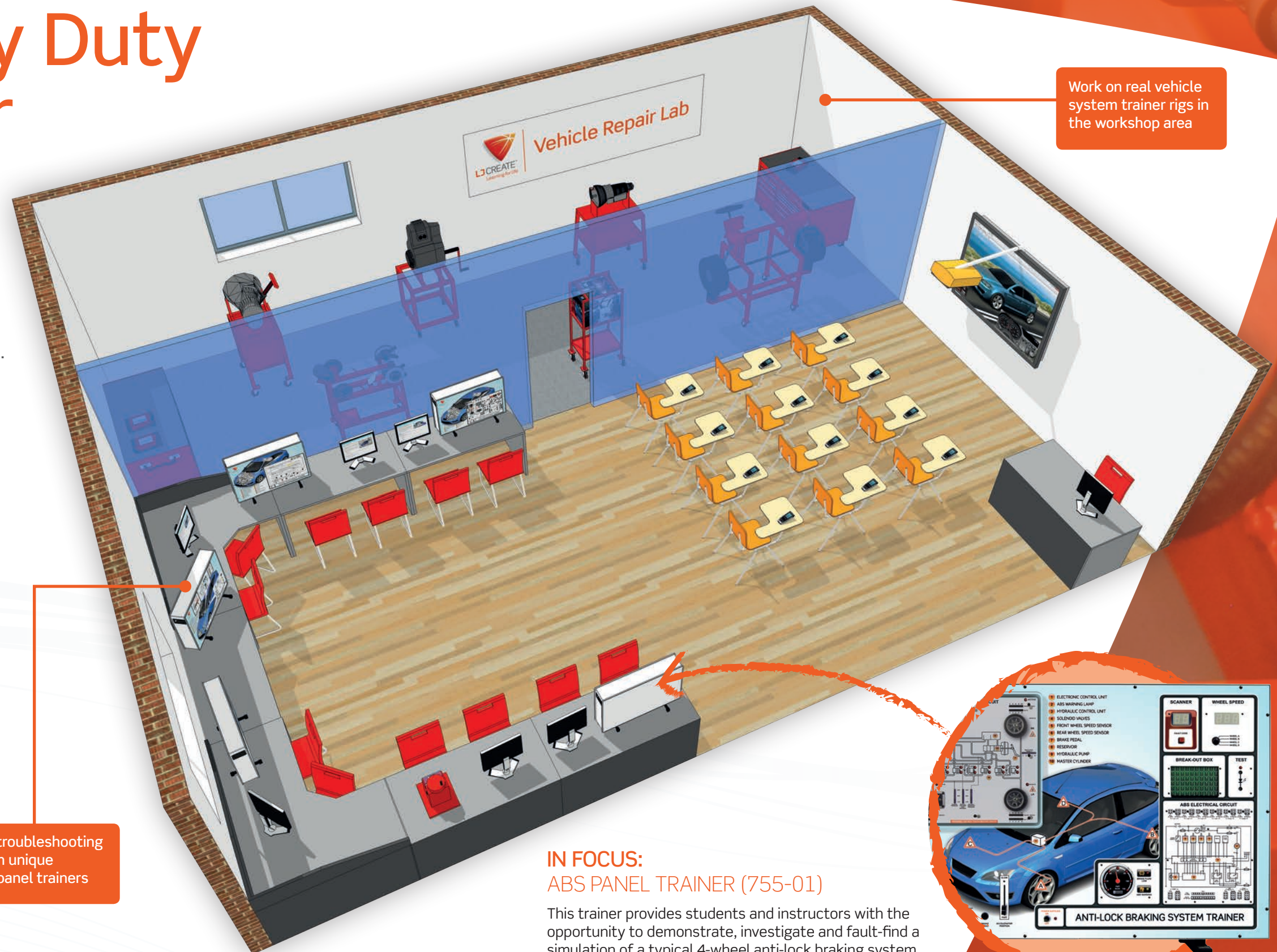
This laboratory is designed to limit the amount of text-based learning that future automotive technicians complete and replaces it with interactive experiences and skills practice across all the vehicle systems including engines, braking, steering and suspension, air conditioning and transmission systems.

This typical Light or Heavy Duty Vehicle Repair Lab configuration includes the following:

- Ignition and Charging Systems Panel
- Distributorless Ignition System Trainer
- Displays and Accessories Panel
- Engine Management Panel
- Sectioned Petrol Engine
- Sectioned Diesel Engine
- Sectioned Manual Gearbox
- Air Conditioning Panel
- Air Conditioning Trainer
- ABS Braking Panel
- Braking Systems Trainer
- Steering and Suspension Trainer

Practice troubleshooting skills with unique desktop panel trainers

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## IN FOCUS: ABS PANEL TRAINER (755-01)

This trainer provides students and instructors with the opportunity to demonstrate, investigate and fault-find a simulation of a typical 4-wheel anti-lock braking system.



Innovative learning spaces for:

# Automotive Diagnostics

Modern vehicle systems are linked together by a series of computers, which run everything at high speed.

The use of diagnosis tools and subsequent troubleshooting is the most required skill in the current automotive industry.

This typical Automotive Diagnostics Lab configuration includes the following:

- Automotive Electronic Circuits Board (x16)
- Modern Starting/Charging Troubleshooting Board (x4)
- Modern Lighting Circuits Troubleshooting Board (x4)
- Accessories Troubleshooting Board (x4)
- Engine Trainer with Fault Insertion
- Distributorless Ignition System Trainer
- Hybrid Systems Panel

## IN FOCUS: MODERN STARTING AND CHARGING SYSTEMS BOARD (720-02)

The board is focused on the starting and charging systems of a modern vehicle. Students are set tasks that encourage them to explore CAN Data Bus systems practically and also improve their knowledge of components, circuits, signals and systems. Students will also be directed to work through a number of fault-finding activities (8 in all), encouraging fault-diagnosis skills.

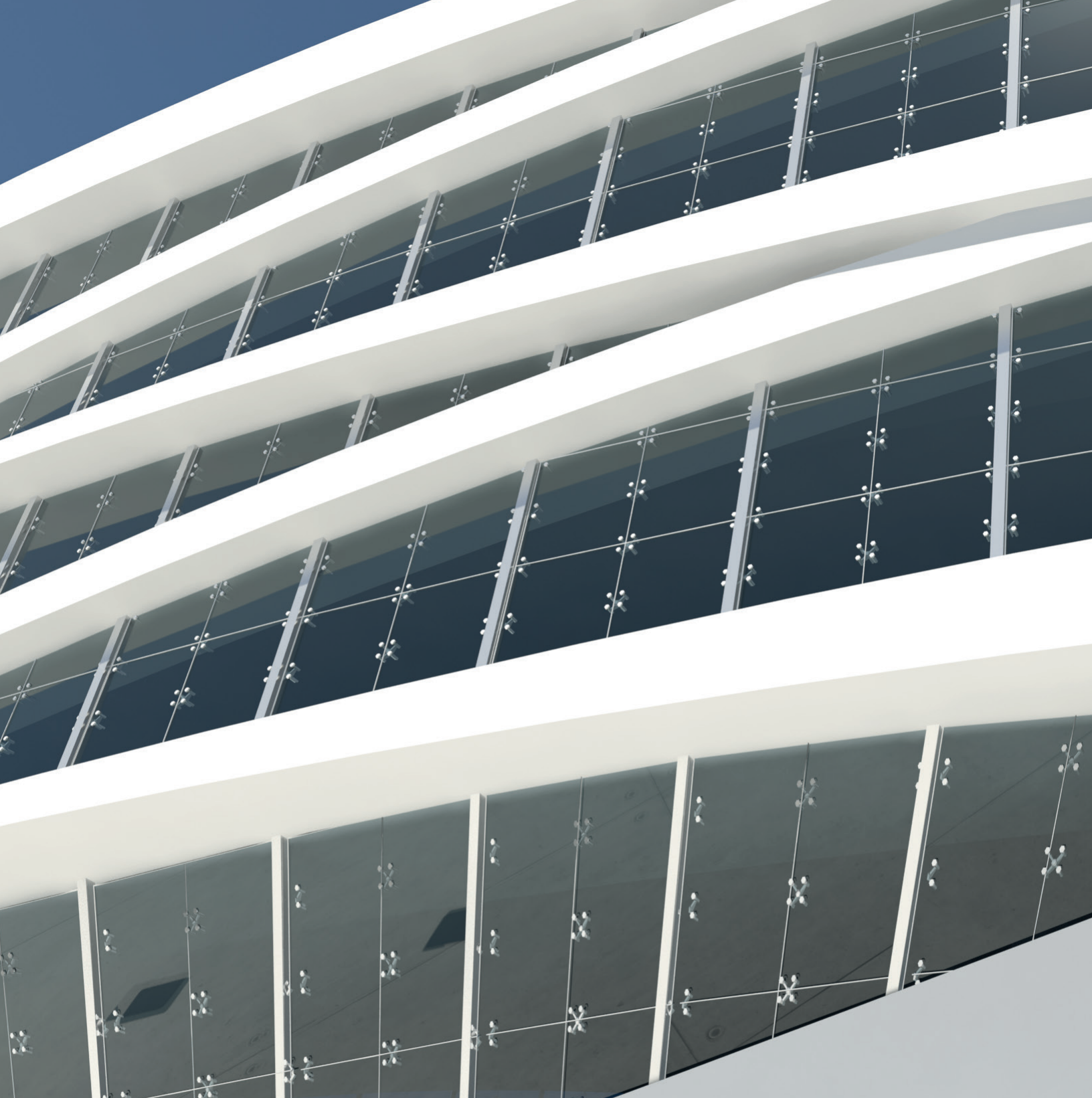
Typical Activities Include:

- Investigate High Speed CAN Data Bus
- Perform CAN Bus Conventional and Advanced Starting and Charging System Measurements
- Perform CAN Bus Consumers Measurements
- Diagnose 8 Different CAN Bus Starting and Charging Faults

To find out more, visit:  
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Unique connection system represents the connectors on an actual vehicle, enabling realistic troubleshooting in the lab





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

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