



education

Learning with LEGO® Education: How robotics can meet the NSW Technology Mandatory 7-8 Syllabus outcomes

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Strand		Objectives and outcomes	Content/Skills Focus	LEGO Education	Teacher Notes
Skills	Design and Production	TE4-1DP Designs, communicates and evaluates innovative ideas and creative solutions to authentic problems or opportunities.	Generate and communicate the development of design ideas, plans and processes for various audiences using appropriate technical terms and technologies including graphical representation techniques, for example, models and prototypes.	Students use Mindstorms EV3 Core Set (45544) to design, build and program a prototype of an amusement ride following 'The Engineering Design Process', and considering a range of suitable materials, for example, motor, gears, pulley etc.	Students are given a design brief, to make an amusement park ride suitable for a specific age range. Students are guided by The Engineering Design Process and document their work at each phase. Students design, build, program and test their prototype, including their algorithms (including branching and iteration). Students select the most appropriate materials and justify their decisions. Students document their work using the Content Editor.
		TE4-2DP Plans and manages the production of designed solutions.	Produces products or systems that apply engineering principles.	Students document their prototypes and algorithms in the Mindstorms EV3 Software Content Editor.	
		TE4-3DP Selects and safely applies a broad range of tools, materials and processes in the production of quality projects.	Investigate needs and opportunities for designing an engineered system and investigate and select from a range of materials, components, tools, equipment and processes.		

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Skills	Design and Production	TE4-4DP Designs algorithms for digital solutions and implements them in a general-purpose programming language.	Implement and modify programs involving branching, iteration and functions in a general-purpose programming language, for example, robotics.		
	Life Skills	TELS-3DP Participates in the production of designed solutions.	Participate in producing a model or prototype to test a design idea, for example, prototype of a windmill or amusement park ride using pulleys or gears.		
		TELS-5DP Follows simple algorithms in a range of contexts.	Participate in producing a digital solution using algorithms, for example, guiding a robot.		

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Knowledge and Understanding	Agriculture and Food Technologies	<p>TE4-5AG Investigates how food and fibre are produced in managed environments.</p> <p>TE4-6FO Explains how the characteristics and properties of food determine preparation techniques for healthy eating.</p>	Produce and implement an agricultural project and/or produce nutritious food.	Students use Mindstorms EV3 Core Set (45544) to design a sustainable agricultural solution used to process or produce food (see build instructions for sorting machine).	Students investigate the role of new technologies in agriculture and how they are used to produce food. Students design, build and program an automated machine that is capable of sorting fruit by colour (for example, red and green apples).
	Material Technologies	<p>TE4-9MA Investigates how the characteristics and properties of tools, materials and processes affect their use in design solutions.</p>	Apply appropriate tools, equipment, materials, techniques and processes in the production of a design project, for example, contemporary, traditional and/or advancing manufacturing techniques.	Students use Mindstorms EV3 Model Core Set (45544) to build a robotic arm used in manufacturing (see build instructions for robotic arm).	Students build and program a robotic arm used in advanced manufacturing and make observations and comparisons to traditional forms of manufacturing, such as manual labour. Students discuss impact on manufacturing following the introduction of robotics.

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Knowledge and Understanding	Engineered Systems	<p>TE4-8EN Explains how force, motion and energy are used in engineered systems.</p>	Investigate how force, motion and/or energy are utilised when designing engineered systems, for example, mechanisms involving simple machines.	Students use Mindstorms EV3 Core Set (45544) to build a prototype of a windmill using a variety of systems and materials, for example, gears, cogs, batteries (force).	Students design, build and program a simple machine (windmill) using a variety of materials, for example, gears, cogs, batteries to investigate energy (force). Students discuss how energy is transferred from power source creating an action in the windmill. Students test and evaluate their design against design criteria.
			Produce products or systems that apply engineering principles, for example, a product that applies force, motion and/or energy for a purpose, eg toys, windmill.		

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Knowledge and Understanding	Digital Technologies	TE4-7DI Explains how data is represented in digital systems and transmitted in networks.	Collect and access data from a range of sources, for example, using sensors to collect temperature data.	Students use Mindstorms EV3 Core Set (45544) with additional temperature sensor, and the Content Editor to collect and assess temperature data (graphs, flow charts etc).	Students build a device capable of measuring temperature (using temperature sensor add on). Students document their investigations. Students designs algorithms that allows for different actions to be performed depending on specific conditions, for example, design a sequence of steps where a light flashes once a certain temperature has been reached. For example, in testing whether a light works to indicate reaching a specific temperature, students create an algorithms involving branching to explain by designing flowchart on Content Editor.
			Implement and modify programs involving branching, iteration and functions in a general-purpose programming language, for example, robotics.		
			Trace algorithms to predict output for a given input and to identify errors.		

