MindSET-do

Lesson Structure 70 minute lessons

Year 7 – Self-Driving Car			
Lesson Number	**Focus**	**Australian Curriculum General Capabilities**	**Australian Curriculum Content Descriptors**
1	Contemporary issue – road safety	• **Critical and creative thinking –** inquiring – identifying, exploring and organising information and ideas • **Critical and creative thinking –** generating ideas, possibilities and actions • **Personal and social capability** – Social awareness • **Ethical understanding -** exploring values, rights and responsibilities	• **Science** - Solutions to contemporary issues that are found using science and technology, may impact on other areas of society and may involve ethical considerations (ACSHE120) • **Design technologies** - Investigate the ways in which products, services and environments evolve locally, regionally and globally and how competing factors including social, ethical and sustainability considerations are prioritised in the development of technologies and designed solutions for preferred futures (ACTDEK029)
2	Elements of a Self-driving car	• **Critical and creative thinking** – inquiring – identifying, exploring and organising information and ideas • **Critical and creative thinking** – generating ideas, possibilities and actions • **Personal and social capability** – Social awareness • **Ethical understanding -** exploring values, rights and responsibilities	• **Science** - Solutions to contemporary issues that are found using science and technology, may impact on other areas of society and may involve ethical considerations (ACSHE120) • **Design technologies -** Investigate the ways in which products, services and environments evolve locally, regionally and globally and how competing factors including social, ethical and sustainability considerations are prioritised in the development of technologies and designed solutions for preferred futures (ACTDEK029)

Year 7- Self-Driving Car			
Lesson Number	**Focus**	**Australian Curriculum General Capabilities**	**Australian Curriculum Content Descriptors**
3	Elements of the car system – Circuits and Arduino (Lights on and off)	• **Critical and creative thinking** – inquiring – identifying, exploring and organising information and ideas • **Critical and creative thinking** – generating ideas, possibilities and actions • **Critical and creative thinking** – reflecting on thinking and processes • **Critical and creative thinking** – analysing, synthesising and evaluating reasoning and procedures	• **Digital technologies** - Design algorithms represented diagrammatically and in English, and trace algorithms to predict output for a given input and to identify errors (ACTDIP029)
4	Elements of the car system – Programming a Motor Control Board	• **Critical and creative thinking** – inquiring – identifying, exploring and organising information and ideas • **Critical and creative thinking** – generating ideas, possibilities and actions • **Critical and creative thinking** – reflecting on thinking and processes • **Critical and creative thinking** – analysing, synthesising and evaluating reasoning and procedures	• **Digital technologies -** Design algorithms represented diagrammatically and in English, and trace algorithms to predict output for a given input and to identify errors (ACTDIP029) • **Digital technologies** - Implement and modify programs with user interfaces involving branching, iteration and functions in a general-purpose programming language (ACTDIP030) • **Design technologies** - Analyse how motion, force and energy are used to manipulate and control electromechanical systems when designing simple, engineered solutions (ACTDEK031)

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5	Elements of the car system – Programming an ultrasonic sensor and serial monitor	• **Critical and creative thinking** – inquiring – identifying, exploring and organising information and ideas • **Critical and creative thinking** – generating ideas, possibilities and actions • **Critical and creative thinking** – reflecting on thinking and processes • **Critical and creative thinking** – analysing, synthesising and evaluating reasoning and procedures	• **Digital technologies** - Design algorithms represented diagrammatically and in English, and trace algorithms to predict output for a given input and to identify errors (ACTDIP029) • **Digital technologies** - Implement and modify programs with user interfaces involving branching, iteration and functions in a general-purpose programming language (ACTDIP030) • **Design technologies** - Analyse how motion, force and energy are used to manipulate and control electromechanical systems when designing simple, engineered solutions (ACTDEK031)
6	Elements of the car system – Learn how logic (branching) works	• **Critical and creative thinking** – inquiring – identifying, exploring and organising information and ideas • **Critical and creative thinking** – generating ideas, possibilities and actions • **Critical and creative thinking** – reflecting on thinking and processes • **Critical and creative thinking** – analysing, synthesising and evaluating reasoning and procedures	• **Digital technologies** - Design algorithms represented diagrammatically and in English, and trace algorithms to predict output for a given input and to identify errors (ACTDIP029) • **Digital technologies** - Implement and modify programs with user interfaces involving branching, iteration and functions in a general-purpose programming language (ACTDIP030) • **Design technologies** - Analyse how motion, force and energy are used to manipulate and control electromechanical systems when designing simple, engineered solutions (ACTDEK031)

Year 7- Self-Driving Car

Design Brief: Design and program a self-driving car using an Arduino which considers ethical, social and sustainability issues and can sense the road, map the road and negotiate its place on the road.

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Design and technologies project: Design and program a self-driving car		• **Critical and creative thinking** – inquiring – identifying, exploring and organising information and ideas • **Critical and creative thinking** – generating ideas, possibilities and actions • **Critical and creative thinking** – reflecting on thinking and processes • **Critical and creative thinking** – analysing, synthesising and evaluating reasoning and procedures • **Personal and social capability** – social management • **ICT capability** – Applying social and ethical protocols and practices when using ICT • **ICT capability** – managing and operating ICT	• **Design and technologies** – Analyse how motion, force and energy are used to manipulate and control electromechanical systems when designing simple, engineered solutions (ACTDEK031) • **Design and technologies** – Analyse ways to produce designed solutions through selecting and combining characteristics and properties of materials, systems, components, tools and equipment (ACTDEK034) • **Design and technologies** – processes and production skills (ACTDEP035), (ACTDEP036), (ACTDEP037), (ACTDEP038), (ACTDEP039) • **Digital technologies** - Plan and manage projects that create and communicate ideas and information collaboratively online, taking safety and social contexts into account (ACTDIP032) • **Digital technologies** - Evaluate how student solutions and existing information systems meet needs, are innovative, and take account of future risks and sustainability (ACTDIP031)

Lesson Number	Focus	Learning outcomes	Resources
7	Generate and refine ideas	• Understand the requirements of the design brief • Create 3 x self-driving car design ideas, Draw and label each system and describe how it works (in consideration of ethical, social and sustainability issues) • Evaluate and select a final design	Year 7 generate and refine ideas worksheet – **Group task** Arduino kits
8	Production plan	• Collaborate with group members • Select an online collaboration tool for planning and storing files • Draw and label final self-driving car design and describe how it works (in consideration of ethical, social and sustainability issues) • List materials and equipment • List risks and risk management strategies • Write pseudo-code for Arduino programming • Create production steps and allocate group roles	Year 7 Production plan worksheet – **group task** Arduino kits
9	Producing and implementing	• Collaborating and managing the production process • Safely use appropriate materials to collaboratively execute the production of the self-driving car design • Create and debug Arduino program collaboratively • Test product meets design brief specifications	Completed Year 7 production plan worksheet for each group – **group task** Arduino kits

10	evaluating	• Evaluate and reflect on self-driving car design • Explain use of code, evaluate and reflect on programming Arduino • Evaluate and reflect on collaboration skills and strategies • Explain future use of designed product in the community, including ethical, social and sustainability considerations	Year 7 evaluation worksheet – **group and individual task**
11	Presenting	• Groups present their designed product to an audience • Groups explain their self-driving car design and Arduino program to the class	Completed Year 7 production plan worksheet for each group – **group task** Each group's designed product