Year 7 – Design Brief

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| 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.  |
| **Lesson Number** | **Focus** | **Australian Curriculum****General Capabilities** | **Australian Curriculum Content****Descriptors** |
| **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)
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| **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 generating and refining 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 components in the self driving car
* List risks and risk management strategies
* Write pseudo-code for Arduino programming
* Create production steps and allocate group roles
 | Year 7  Investigating components worksheet**– group task**  Year 7 production plan ‘Bringing it Together’ 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 ‘Bringing it Together’ worksheet for each group – **group task**  Arduino kits   |
| **Lesson** **Number**  | **Focus**  | **Learning outcomes**  | **Resources**  |
| **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 **–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 worksheets – **group task**  Each group’s designed product    |