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| Subject Title: Digital Technologies Year level: 9  Learning Area: Information Technology Semester: 1 Lessons per week: 3 x 50 mins | | | | | | |
| **Subject Description**  Students learn about hardware and software, computational thinking and programming skills, as well as drawing and animation skills. They do this by:   * learning how to build and program Lego Mindstorms EV3 robots, and make them complete various challenges, * learning about the Raspberry PI and Sense Hat, and using Python to interact with the various hardware and software tools, * learning how to draw and animate characters in Adobe Flash. | | | | | | |
| **AC Achievement Standard**  By the end of Year 10, students explain the control and management of networked digital systems and the security implications of the interaction between hardware, software and users. They explain simple data compression, and why content data are separated from presentation.  Students plan and manage digital projects using an iterative approach. They define and decompose complex problems in terms of functional and non-functional requirements. Students design and evaluate user experiences and algorithms. They design and implement modular programs, including an object-oriented program, using algorithms and data structures involving modular functions that reflect the relationships of real-world data and data entities. They take account of privacy and security requirements when selecting and validating data. Students test and predict results and implement digital solutions. They evaluate information systems and their solutions in terms of risk, sustainability and potential for innovation and enterprise. They share and collaborate online, establishing protocols for the use, transmission and maintenance of data and projects. | | | | | | |
| **KEY: Australian Curriculum Capabilities**: [Literacy](http://www.australiancurriculum.edu.au/GeneralCapabilities/Literacy)  Numeracy  ICT  Critical and Creative Thinking  Personal and Social  Ethical Understanding [Intercultural Understanding](http://www.australiancurriculum.edu.au/GeneralCapabilities/Intercultural-understanding)  **Australian Curriculum Cross-Curricular Priorities:** ATSIH**:** Aboriginal & Torres Strait Islander Histories; AAEA: Asia & Australia’s Engagement with Asia; S: Sustainability | | | | | | |
| **Biblical World View Questions / Big Picture Thinking** *(IDEAS T&L Vision Statement related key words – more discussion to come on this)* | | | | | | |
| **Scope & Sequence Content** | | | | | **Assessment Tasks & Weighting** | **Key Resources** |
| **Term** | **Week** | **Topic** | **Content Descriptions** | **Elaborations** |
| **Term 1** | 1 | Introduction to Computing and Explicit Instructions  Robotics | Investigate the role of hardware and software in managing, controlling and securing the movement of and access to data in networked digital systems (ACTDIK034) | Introduction to what is a computer, as well as basic computer components.  Explicit Instructions Activity.     * Building Lego Robots * Introduction to Lego Mindstorm robot programming (how to make a robot go forwards, and turn). |  | Activity:  Explicit Instructions Activity  Lego Mindstorms software tutorials. |
| 2 | Robotics | Design algorithms represented diagrammatically and in structured English and validate algorithms and programs through tracing and test cases (ACTDIP040) | Square Move Challenge Assignment:   * Students have to program their robots to move in a perfect square. | Assignment: Square Move Challenge - 10% | Assignment:  Square Move Challenge sheet |
| 3 | Robotics | Design algorithms represented diagrammatically and in structured English and validate algorithms and programs through tracing and test cases (ACTDIP040) | Moving objects with the Lego robot.  Yellow Circuit Challenge Assignment:   * Students have to program their robots to complete a particular circuit. | Assignment: Yellow Circuit Challenge - 15% | Lego Mindstorms Software Tutorials |
| 4-5 | Robotics | Design algorithms represented diagrammatically and in structured English and validate algorithms and programs through tracing and test cases (ACTDIP040) | Yellow Circuit Challenge Assignment:   * Students have to program their robots to complete a particular circuit. | Robotics 5 week progress – 5% |  |
| 6 | Raspberry PI | Investigate the role of hardware and software in managing, controlling and securing the movement of and access to data in networked digital systems (ACTDIK034) | Introduction.  What forms a computer.  Linux OS and Terminal Commands. |  | Videos:  What is a Rapberry PI (https://www.youtube.com/watch?v=\_cviTxswW8c)  Worksheets:  1 The Raspberry PI  2 Essential Parts of a Computer  3 Label the Raspberry PI  4 Terminal Commands  5 Exploring the Terminal |
| 7 | Raspberry PI |  | Brief introduction to Python in Raspberry PI.    Minecraft with PI.  Whack-a-Block game in Minecraft Skills Task:   * Students have to follow a tutorial to create a Whack-a-block game in Minecraft using Python. | Skills Task: Whac-a-Block Game – 5% | Worksheets (from Raspberry PI website):  1 Minecraft with PI (<https://www.raspberrypi.org/learning/getting-started-with-minecraft-pi>)  2 Whack a Block (<https://www.raspberrypi.org/learning/minecraft-whac-a-block-game>) |
| 8 | Raspberry PI | Investigate the role of hardware and software in managing, controlling and securing the movement of and access to data in networked digital systems (ACTDIK034) | Sense Hat Intro and Random Sparkles activity.  Sense Hat Picasso Assignment:   * Students have to use the Python and Sense Hat skills which they have learned to display a creative drawing using the Sense Hat LED display. | Assignment: Sense Hat Picasso - 10% | Worksheets (from Raspberry PI website):  1 Sense Hat Random Sparkles (<https://www.raspberrypi.org/learning/sense-hat-random-sparkles/>)  Assignment:  1 Sense Hat Picasso Assignment sheet |
| 9 | Raspberry PI | Investigate the role of hardware and software in managing, controlling and securing the movement of and access to data in networked digital systems (ACTDIK034) | Sense Hat Picasso Assignment:   * Students have to use the Python and Sense Hat skills which they have learned to display a creative drawing using the Sense Hat LED display.     Further work with Sense Hat. |  | Worksheets (from Raspberry PI website):  1 Getting Started With the Sense Hat (<https://www.raspberrypi.org/learning/getting-started-with-the-sense-hat/>)  Assignment:  1 Sense Hat Picasso Assignment sheet |
| 10 | Raspberry PI | Investigate the role of hardware and software in managing, controlling and securing the movement of and access to data in networked digital systems (ACTDIK034) | Colour Words Assignment:   * Students have to use the Python and Sense Hat skills which they have learned to display colourful and creative scrolling text on the Sense Hat LED display.     Further work with Sense Hat. | Assignment: Colour Words – 5%  Raspberry PI 5 week progress – 5% | Worksheets (from Raspberry PI website):  1 Getting Started With the Sense Hat (<https://www.raspberrypi.org/learning/getting-started-with-the-sense-hat/>)  Assignment:  1 Colour Words Assignment sheet |
| **Term 2** | 1 | Adobe Flash |  | Introduction,  Merge vs. Object Drawing,  Adobe Flash Tools. |  | Videos:  1 Flash Intro  2 Merge vs. Object Drawing  3 Adobe Flash Tools  Worksheets:  1 Adobe Tools  2 Merge and Object Drawing  3 Rectangle and Oval Primitives  4 Poly-star and Changing Drawing Mode |
| 2 | Adobe Flash |  | * Robot Drawing Assignment: * Students have to use the Adobe Flash skills which they have learned to copy and re-draw an image of a robot. | Assignment: Robot Drawing – 10% | Assignment:  Robot Drawing Assignment |
| 3 | Adobe Flash |  | Colour Swatches and Gradients,  Flash Layers. |  | Videos:  1 Colour Swatches and Gradients  2 Flash Layers  Worksheets:  4 Gradients and Colour Swatches  5 The Brush and Pencil Tools  Assignment:  Robot Drawing Assignment |
| 4 | Adobe Flash |  | Drawing Character in Flash Skills Task:   * Students have to follow a video tutorial and draw the same character, using Flash, which is shown in the tutorial. | Skills Task: Drawing Character in Flash – 5% | Videos (By Incredible Tutorials):  How to Draw a Cartoon Character (<https://www.youtube.com/watch?v=Kr2Y3DKHiJg>)  Worksheets:  1 Drawing Character in Flash Skills Task |
|  | 5 | Adobe Flash |  | Drawing Character in Flash Skills Task:   * Students have to follow a video tutorial and draw the same character, using Flash, which is shown in the tutorial.   Alter Ego Assignment:   * Students use the skills which they have learned in Adobe Flash to draw an image of themselves. | Assignment: Alter Ego Assignment – 15% | Videos (By Incredible Tutorials):  How to Draw a Cartoon Character (<https://www.youtube.com/watch?v=Kr2Y3DKHiJg>)  Worksheets:  1 Copy Tutorial Character  Assignment:  1 Alter Ego Assignment sheet |
|  | 6 | Adobe Flash |  | Alter Ego Assignment:   * Students use the skills which they have learned in Adobe Flash to draw an image of themselves. |  | Assignment:  1 Alter Ego Assignment sheet |
|  | 7 | Adobe Flash |  | Alter Ego Assignment:   * Students use the skills which they have learned in Adobe Flash to draw an image of themselves.     Animating a character in Adobe Flash. |  | Videos (By Incredible Tutorials):  1 Putting a Symbol into another Symbol (<https://www.youtube.com/watch?v=SreBTgl_JlI>)  2 How to do a Walking Animation (<https://www.youtube.com/watch?v=4qOuvtgAkyQ>)  Assignment:  1 Alter Ego Assignment sheet |
|  | 8 | Adobe Flash |  | Animating a character in Adobe Flash. |  | Videos (By Incredible Tutorials):  1 Putting a Symbol into another Symbol (<https://www.youtube.com/watch?v=SreBTgl_JlI>)  2 How to do a Walking Animation (<https://www.youtube.com/watch?v=4qOuvtgAkyQ>) |
|  | 9 | Adobe Flash |  | Animating a character in Adobe Flash.  Move! Assignment:   * Students use the animation skills which they have learned to animate their ‘Alter-egos’ (the character which they drew when completing the Alter Ego assignment) | Assignment: Move! – 10% | Videos (By Incredible Tutorials):  1 Putting a Symbol into another Symbol (<https://www.youtube.com/watch?v=SreBTgl_JlI>)  2 How to do a Walking Animation (<https://www.youtube.com/watch?v=4qOuvtgAkyQ>)  Assignment:  Move! Assignment sheet |
|  | 10 | Adobe Flash |  | Move! Assignment:   * Students use the animation skills which they have learned to animate their ‘Alter-egos’ (the character which they drew when completing the Alter Ego assignment) | Adobe Flash 10 week progress – 5% | Assignment:  Move! Assignment sheet |