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| C:\Users\NELBATOORY\Desktop\2353_NSWED_STEM_LOGO.png**Baulkham Hills High School**  **Integrated STEM Program** | |
| **UNIT NAME: WeatherTECH - digital weather station** | **YEAR: 8** |
| Description  Students design and produce a durable, environmentally friendly digital weather station which can measure a range of local weather. Students conduct the experiments to measure the temperatures and rainfall over a period of time. The data is then displayed, analysed and students make conclusion from the data. Students will focus on developing their critical and creative thinking, as well as problem solving skills. | TAS UNIT LENGTH: 10 weeks, 2 lessons per week, 80 minutes  MATHS UNIT LENGTH: 6 weeks, 6 lessons Data collection and representation  SCIENCE UNIT LENGTH: 14 lessons  Timetable structure in the school consists of 40 minute periods in an 8 period day |
| **EXTENSION**  TAS: Use CAD and 3D Printer to design and make alternative sensor for weather measurement e.g. water gauge, wind speed or wind direction  MATHS: Analysing single sets of data and evaluating evidence making predictions.  SCIENCE: *Sc5-LW2 Conserving and maintaining the quality and*[*sustainability*](http://syllabus.bostes.nsw.edu.au/glossary/sci/sustainability/?ajax) *of the environment requires scientific understanding of interactions within, the cycling of matter and the flow of energy through ecosystems. Students recall that ecosystems consist of communities of interdependent organisms and abiotic components of the environment*  **AREA OF STUDY** Information and communications  **DESIGN SPECIALISATION** Communication and Information Systems Design  **TECHNOLOGY** Control Technologies  **CONTRIBUTING TECHNOLOGIES**  Information technologies  Electronics technologies  **INDIVIDUAL DESIGN PROJECT**  Mini DESIGN PROJECT 1 Design, produce and evaluate a key name tag  Mini DESIGN PROJECT 2 Design, produce and evaluate a functional weather sensor or system  Mini DESIGN PROJECT 3 Design, produce and evaluate a housing for the sensor  **CLASS DESIGN PROJECT**  Major DESIGN PROJECT Design, produce and evaluate a digital, wireless, solar powered weather station | |

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| **OUTCOMES** |
| **TAS**  FOCUS OUTCOMES  4.1.1- applies design processes that respond to needs and opportunities in each design project  4.3.2- demonstrates responsible and safe use of a range of tools, materials and techniques in each design project  4.5.2- produces quality solutions that respond to identified needs and opportunities in each design project  4.6.1- applies appropriate evaluation techniques throughout each design Project  CONTRIBUTING OUTCOMES  4.1.2- describes factors influencing design in the areas of study of Built Environments, Products, and Information and Communications.  4.1.3- identifies the roles of designers and their contribution to the improvement of the quality of life  4.2.1- generates and communicates creative design ideas and solutions  4.2.2- selects, analyses, presents and applies research and experimentation from a variety of sources  4.3.2- demonstrates responsible and safe use of a range of tools, materials and techniques in each design project  4.4.1- explains the impact of innovation and emerging technologies on society and the environment  4.5.1- applies management processes to successfully complete design projects  4.6.2- identifies and explains ethical, social, environmental and sustainability considerations related to design projects |
| **MATHS**  AREA OF STUDY: Statistics and Probability.  FOCUS OUTCOMES  MA4-1WM – communicates and connects mathematical ideas using appropriate terminology, diagrams and symbols.  MA4-3WM – recognises and explains mathematical relationships using reason.  MA4-19SP – collects, represent and interprets single set of data, using appropriate statistical displays.  MA4-20SP – analyses single sets of data using measure of location, and range.  CONTRIBUTING OUTCOMES  Real life skills  MALS- 35SP – Recognises data displayed in a variety of formats  MALS- 36SP- gathers, organises and displays data  MALS- 37SP – interprets information and draw conclusions from data displays. |
| **SCIENCE**  FOCUS OUTCOMES  Sc4-5WS - collaboratively and individually produces a plan to investigate questions and problems  Sc4-6WS - follows a sequence of instructions to safely undertake a range of investigation types, collaboratively and individually  Sc4-7WS - processes and analyses data from a first-hand investigation and secondary sources to identify trends, patterns and relationships, and draw conclusion  Sc4-9WS - presents science ideas, findings and information to a given audience using appropriate scientific language, text types and representations  Sc4-ES4 - Science understanding influences the development of practices in areas of human activity such as industry, agriculture and marine and terrestrial resource management. (ACSHE121, ACSHE136)  Sc4-LW5 - Science and technology contribute to finding solutions to conserving and managing sustainable ecosystems.  e. explain, using examples, how scientific evidence and/or technological developments contribute to developing solutions to manage the impact of natural events on Australian ecosystems  f. describe how scientific knowledge has influenced the development of practices in agriculture, e.g. animal husbandry or crop cultivation to improve yields and [sustainability](http://syllabus.bostes.nsw.edu.au/glossary/sci/sustainability/?ajax), or the effect of plant-cloning techniques in horticulture SEL |
| **RESOURCES**  Websites  Student content listed in eWorkbook  <https://www.arduino.cc/en/Reference/HomePage>  <https://forum.arduino.cc/>  [**HTTP://BOM.GOV.AU/CLIMATE/DATA**](HTTP://BOM.GOV.AU/CLIMATE/DATA) **OR use weather station directory to locate a station near you!**  [**http://www.bom.gov.au/iwk/climate/climate\_culture/index.shtml**](http://www.bom.gov.au/iwk/climate/climate_culture/index.shtml) **(aboriginal perspectives)**  Books  Arduino For Dummies 1st Edition by John Nussey  **Cambridge Year 8 book Chapter 9.**  Other  SparkFun pdf - “Intro to Arduino Zero to Prototyping in a Flash!”  **Signpost Year 9 book Chapter 12.**  <https://climate.ncsu.edu/edu/k12> An excellent resource.  [**http://www.doe.mass.edu/stem/standards/StrandMap-PreK-12-WC-3pg.pdf**](http://www.doe.mass.edu/stem/standards/StrandMap-PreK-12-WC-3pg.pdf)  [**http://www.artofmanliness.com/2015/07/07/fair-or-foul-how-to-use-a-barometer/**](http://www.artofmanliness.com/2015/07/07/fair-or-foul-how-to-use-a-barometer/)  **http://environment.nationalgeographic.com/environment/natural-disasters/forces-of-nature/**  **SBS Changing Climates, Changing Times (Video)** |

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| **General Capabilities:** *(See Teaching and Learning Program to identify links to General Capabilities)*  Learning Across the curriculum used in this document are from the Board of Studies Teaching and Educational Standards (BOSTES) NSW <http://syllabus.bostes.nsw.edu.au/mathematics/mathematics-k10/learning-across-the-curriculum/>  The cross-curriculum priorities:   * Aboriginal and Torres Strait Islander histories and cultures Aboriginal and Torres Strait Islander histories and cultures * Asia and Australia's engagement with Asia Asia and Australia's engagement with Asia * Sustainability Sustainability   The general capabilities:   * Critical and creative thinking Critical and creative thinking * Ethical understanding Ethical understanding * Information and communication technology capability Information and communication technology capability * Intercultural understanding Intercultural understanding * Literacy Literacy * Numeracy Numeracy * Personal and social capability Personal and social capability   Other learning across the curriculum areas:   * Work and enterprise Work and enterprise   **Syllabus Outcomes:**  The outcomes used in this document are from the Board of Studies Teaching and Educational Standards (BOSTES) NSW. <http://www.boardofstudies.nsw.edu.au/syllabus_sc/> |

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| WEEK 1 | | | | | |
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| Week 1 P1&2Outcome | Students learn about (Tech) | Students learn to (Tech) | Integrated learning experiences | Evidence of Learning and Assessment strategies | Register & Evaluation |
| **4.1.1**  applies design processes that respond to needs and opportunities in each design project | * design processes * needs and opportunities in the areas of study * Products * design processes used by designers | * establish criteria for successful achievement of needs and opportunities * consider short-term and long-term consequences of design in the design process * evaluate design processes * identify needs and opportunities that require solutions in the areas of study * identify a design process used by a designer | Multimedia PowerPoint introduction Tech Mandatory  eWorkbook Alphabetical BrainstormingGraphical Brainstorming Graphical examples of the Design Process  An explanation of the Design Process  Literacy | Students will: Participate in class discussions analysing the information and concepts presented. Completes Alphabetical Brainstorming Completes Graphical Brainstorming Use subject metalanguage correctly after reviewing graphical examples of Design process and an explanation of the Design Process. Completes modifies graphic on typical Design Process |  |
| **4.1.2**  describes factors influencing design in the areas of study of Built Environments, Products, and Information and Communications | * definitions of design * factors affecting design * safety | * recall a definition of design * examine factors affecting design in the areas of study of Products * describe the factors affecting design in the development of each design project * evaluate the appropriateness of specific design solutions for different cultural groups including Aboriginal and Torres Strait Islanders and other Indigenous peoples |  |
| **4.1.3**  identifies the roles of designers and their contribution to the improvement of the quality of life | * relationship of design to the areas of study of Products * different design specialisations * the nature of the work of designers as individuals and as collaborators * the contributions of females and males who engage in design and technology * work and training opportunities for people who engage in design and technology in each area of study | * identify relationships of design to each area of study * describe the nature of each of the areas of study of Built Environments, Products, and Information and Communications * identify a range of design specialisations relevant to each area of study * apply group work & collaborative strategies to project development identify the contribution the designer makes to the improvement of everyday life * explore work and training opportunities for people who engage in design and technology relevant to each area of study |  | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook |  |
| **4.4.1**  explains the impact of innovation and emerging technologies on society and the environment | * innovation and emerging technologies relating to tools, materials, techniques or products in each area of study | * identify and describe a selected innovation or emerging technology in each area of study of Built Environments, Products, and Information and Communications |  |
| * the impact of innovation and emerging technology on society and the environment | * explain the impact of innovations and emerging technologies on society and the environment including new ICTs |  |

| WEEK 1 | | | | | |
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| Week 1 P3&4Outcome | Students learn about (Tech) | Students learn to (Tech) | Integrated learning experiences | Evidence of Learning and Assessment strategies | Register & Evaluation |
| **4.2.1**  generates and communicates creative design ideas and solutions | * methods used to generate creative design ideas including * mind mapping * brain storming * sketching & drawing * modelling * experimenting & testing | * use a variety of methods to generate creative design ideas for each design project | eWorkbook  Discuss concepts with class. Reading workbook and watching YouTube clips then answer questions on:  - Electricity  - Circuits  - Ohms law  - Solar Cells  - Arduino  - RedBoard  - IC’s  - WeatherTECH Parts list  - WeatherTECH Project groups | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook |  |
| * use of design folio to record and reflect on design ideas and decisions | * use a design folio to record and reflect on design ideas and decisions |  |
| * communication methods including * drawings, sketches and models * written reports * oral presentations * digital presentations | * sketch, draw and model to aid design development * manipulate images with tools such as editing, resizing, grouping, aligning and positioning |  |
| * communication methods suitable for specific audiences including * users and clients * technical experts * peers | * communicate information appropriate to specified audiences |  |
| * using ICTs to plan, develop and document design projects | * use ICTs to communicate information including saving a document in various file types and storage locations from within the application * use word processing features including page numbering and page breaks, find and replace, word count, spell check and thesaurus, columns and sections, inserting text/objects/images |  |
| **4.2.2**  selects, analyses, presents and applies research and experimentation from a variety of sources | * experimentation and testing of design ideas | * apply the results of experimentation to designing and making when developing each design project | eWorkbook  Discuss concepts with class. Reading workbook and watching YouTube clips then answer questions on:  - Electricity  - Circuits  - Ohms law  - Solar Cells  - Arduino  - RedBoard  - IC’s  - WeatherTECH Parts list  - WeatherTECH Project groups | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook |  |
| * relationship of experimentation to success criteria | * identify, interpret and evaluate data from a variety of sources |  |
| * research methods * needs analysis * surveys and interviews * searching techniques including use of the Internet | * use effective research methods to identify needs and opportunities and locate information relevant to the development of each design project * identify solutions to other similar needs and opportunities * use the internet when researching |  |

| WEEK 2 | | | | | |
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| Week 2 P2Outcome | Students learn about (Tech) | Students learn to (Tech) | Integrated learning experiences | Evidence of Learning and Assessment strategies | Register & Evaluation |
| **4.2.1**  generates and communicates creative design ideas and solutions | * methods used to generate creative design ideas including * mind mapping * brain storming * sketching & drawing * modelling * experimenting & testing | * use a variety of methods to generate creative design ideas for each design project | eWorkbookCritical and creative thinking  Discuss concepts with class. Reading workbook and watching YouTube clips then answer questions on: WeatherTECH Project small group scenario  1. Investigation 2. Design 3. Make 4. Test | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook |  |
| * use of design folio to record and reflect on design ideas and decisions | * use a design folio to record and reflect on design ideas and decisions |  |
| * communication methods including * drawings, sketches and models * written reports * oral presentations * digital presentations | * sketch, draw and model to aid design development * manipulate images with tools such as editing, resizing, grouping, aligning and positioning |  |
| * communication methods suitable for specific audiences including * users and clients * technical experts * peers | * communicate information appropriate to specified audiences |  |
| * using ICTs to plan, develop and document design projects | * compose a design folio for a specific audience in electronic format including features such as tabs, indents, headers and footers, margins and line and paragraph spacing and using appropriate layout and graphic design * use ICTs to communicate information including saving a document in various file types and storage locations from within the application * use word processing features including page numbering and page breaks, find and replace, word count, spell check and thesaurus, columns and sections, inserting text/objects/images |  |
| **4.2.2**  selects, analyses, presents and applies research and experimentation from a variety of sources | * experimentation and testing of design ideas | * apply the results of experimentation to designing and making when developing each design project | eWorkbook  Discuss concepts with class. Reading workbook and watching YouTube clips then answer questions on: WeatherTECH Project small group scenario  1. Investigation 2. Design 3. Make 4. Test | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook |  |
| * relationship of experimentation to success criteria | * identify, interpret and evaluate data from a variety of sources |  |
| * research methods * needs analysis * surveys and interviews * searching techniques including use of the Internet | * use effective research methods to identify needs and opportunities and locate information relevant to the development of each design project * identify solutions to other similar needs and opportunities * use the internet when researching |  |
| **4.3.1** applies a broad range of contemporary and appropriate tools, materials and techniques with competence in the development of design projects | **Materials/Inputs**   * data types, formats and information as inputs of design and production * component categories for hardware, including input devices, processors and output devices * robots and other mechatronic devices, sensors, actuators such as motors, switches, lights * programmable logic controllers (PLCs) and associated hardware | * identify and select appropriate data for use in a design project * recognise, connect and use input and output devices to construct systems including sensors, switches, wiring, lights and motors for a design project | eWorkbookCritical and creative thinking  Discuss concepts with class. Reading workbook and watching YouTube clips then answer questions on: WeatherTECH Project small group scenario  1. Investigation 2. Design 3. Make 4. Test | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook |  |
| **Tools**   * specific tools relating to control technologies * the function, selection and correct use of a range of contemporary tools including * simple programming languages * simple programs that meet identified needs * construction tools * simple testing tools including multimeter | * select and correctly use tools appropriate for the construction, maintenance and management of systems for a design project |  |
| **Techniques**   * program design * compiling programs * connecting interdependent devices * modelling and prototyping systems * testing systems in the working environment * industrial production methods | * select and use appropriate program development techniques and structures for an identified need * connect interdependent devices for the purposes of a design solution * troubleshoot problems with systems * test function of solutions for a design project |  |
| **4.3.2**  demonstrates responsible and safe use of a range of tools, materials and techniques in each design project | * risk management strategies * responsible behaviour in working environments * Work Health and Safety practices | * manage risk when developing design projects | eWorkbook  Discuss concepts with class. Reading workbook and watching YouTube clips then answer questions on : WeatherTECH Project small group scenario  1. Investigation 2. Design 3. Make 4. Test | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook |  |
| * the safe and responsible use of materials, tools and techniques in each design project | * use tools, materials and techniques in a responsible and safe manner in each design project. |  |
| * maintenance of tools and equipment | * maintain tools and equipment including computer equipment |  |

| WEEK 2 | | | | | |
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| Week 2 P1-4Outcome | Students learn about (Tech) | Students learn to (Tech) | Integrated learning experiences | Evidence of Learning and Assessment strategies | Register & Evaluation |
| **4.6.1**  applies appropriate evaluation techniques throughout each design project | * developing criteria for success as a tool for assessing design development and production | * apply criteria for success in decision making during the development of each design project | eWorkbook  Discuss concepts with class. Reading workbook and watching YouTube clips then answer questions on: WeatherTECH Project small group scenario  1. Investigation 2. Design 3. Make 4. Test | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook |  |
| * ongoing evaluation of design ideas and decisions * final evaluation considering * design process used * design solutions * reflection on learning | * use criteria for success to reflect on the design process used and the solutions * evaluate prior to, during and at completion of each design solution * self-assess and peer-assess design solutions |  |
| **4.6.2**  identifies and explains ethical, social, environmental and sustainability considerations related to design projects | * ethical and responsible design * environmental and sustainability considerations | * identify ethical, social, and environmental and sustainability considerations relevant to each design project * be responsible and ethical in the decisions made in the development and production of each design project * explain the responsibilities of designers * demonstrate appropriate ethics and etiquette in relation to computer use such as general computer care, passwords, file security, network use, printing and shared resources |  |

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| WEEK 3 | | | | | | |
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| Week 3 P1-4Outcome | Students learn about (Tech) | | Students learn to (Tech) | Integrated learning experiences | Evidence of Learning and Assessment strategies | Register & Evaluation |
| **4.1.1**  applies design processes that respond to needs and opportunities in each design project | * design processes including * analysing needs, problems and opportunities * establishing criteria for success * researching * generating creative ideas * communicating ideas * experimenting and testing ideas * risk management * managing resources * producing design solutions * evaluating ideas and solutions * needs and opportunities in the areas of study * Built Environments * Products * Information & Communications * design processes used by designers | | * establish a design process that responds to an identified need and opportunity * apply a design process when developing quality solutions for each design project * establish criteria for successful achievement of needs and opportunities * record design processes and decision making in a design folio for each design project. * consider short-term and long-term consequences of design in the design process * evaluate design processes * identify needs and opportunities that require solutions in the areas of study * identify a design process used by a designer | eWorkbook  Discuss concepts with class. Reading workbook and watching practical CAD demonstrations  Introduction to:  The Key Tag design Situation and Brief.  Sample Key Tag designs CAD 3D Printer | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook  Design a Key Tag to achieve requirements of the Design Brief using CAD software and the 3D Printer software and hardware |  |
| **4.1.2**  describes factors influencing design in the areas of study of Built Environments, Products, and Information and Communications | * definitions of design * factors affecting design * function * aesthetics * human form * scale * ergonomics * ethical * environmental * legislation including WHS * cost * socio-cultural * resource availability * physical & material properties * safety | | * recall a definition of design * examine factors affecting design in the areas of study of Built Environments, Products, and Information and Communications * describe the factors affecting design in the development of each design project * evaluate the appropriateness of specific design solutions for different cultural groups including Aboriginal and Torres Strait Islanders and other Indigenous peoples |  |
| **4.1.3**  identifies the roles of designers and their contribution to the improvement of the quality of life | * relationship of design to the areas of study of Built Environments, Products, and Information and Communications * different design specialisations * the nature of the work of designers as individuals and as collaborators * the contributions of females and males who engage in design and technology * work and training opportunities for people who engage in design and technology in each area of study | | * identify relationships of design to each area of study * describe the nature of each of the areas of study of Built Environments, Products, and Information and Communications * identify a range of design specialisations relevant to each area of study * apply group work & collaborative strategies to project development identify the contribution the designer makes to the improvement of everyday life * explore work and training opportunities for people who engage in design and technology relevant to each area of study | eWorkbook  Discuss concepts with class. Reading workbook and watching practical CAD demonstrations  Introduction to:  The Key Tag design Situation and Brief.  Sample Key Tag designs CAD 3D Printer  Information and communication technology capability | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook  Design a Key Tag to achieve requirements of the Design Brief using CAD software and the 3D Printer software and hardware |  |
| **4.4.1**  explains the impact of innovation and emerging technologies on society and the environment | * innovation and emerging technologies relating to tools, materials, techniques or products in each area of study * the impact of innovation and emerging technology on society and the environment | | * identify and describe a selected innovation or emerging technology in each area of study of Built Environments, Products, and Information and Communications * explain the impact of innovations and emerging technologies on society and the environment including new ICTs |  |
| **4.3.1** applies a broad range of contemporary and appropriate tools, materials and techniques with competence in the development of design projects | **Materials/Inputs**   * data types, formats and information as inputs of design and production * component categories for hardware, including input devices, processors and output devices * robots and other mechatronic devices, sensors, actuators such as motors, switches, lights * programmable logic controllers (PLCs) and associated hardware | | * identify and select appropriate data for use in a design project * recognise, connect and use input and output devices to construct systems including sensors, switches, wiring, lights and motors for a design project | eWorkbook  Discuss concepts with class. Reading workbook and watching YouTube clips then answer questions on: WeatherTECH Project small group scenario  1. Investigation 2. Design 3. Make 4. Test | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook |  |
| **Tools**   * specific tools relating to control technologies * the function, selection and correct use of a range of contemporary tools including * simple programming languages * simple programs that meet identified needs * construction tools * simple testing tools including multimeter | | * select and correctly use tools appropriate for the construction, maintenance and management of systems for a design project |  |
| **4.6.1**  applies appropriate evaluation techniques throughout each design project | | * developing criteria for success as a tool for assessing design development and production * ongoing evaluation of design ideas and decisions * final evaluation considering * design process used * design solutions * reflection on learning   **Techniques**   * program design * compiling programs * connecting interdependent devices * modelling and prototyping systems * testing systems in the working environment * industrial production method | * apply criteria for success in decision making during the development of each design project * use criteria for success to reflect on the design process used and the solutions * evaluate prior to, during and at completion of each design solution * self-assess and peer-assess design solutions * select and use appropriate program development techniques and structures for an identified need * connect interdependent devices for the purposes of a design solution * troubleshoot problems with systems * test function of solutions for a design project | eWorkbook  Discuss concepts with class. Reading workbook and watching practical CAD demonstrations  Introduction to:  The Key Tag design Situation and Brief.  Sample Key Tag designs CAD 3D Printer | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook  Design a Key Tag to achieve requirements of the Design Brief using CAD software and the 3D Printer software and hardware |  |
| **4.6.2**  identifies and explains ethical, social, environmental and sustainability considerations related to design projects | | * ethical and responsible design * environmental and sustainability considerations | * identify ethical, social, and environmental and sustainability considerations relevant to each design project * be responsible and ethical in the decisions made in the development and production of each design project * explain the responsibilities of designers * demonstrate appropriate ethics and etiquette in relation to computer use such as general computer care, passwords, file security, network use, printing and shared resources |  |  |  |

| WEEK 4 | | | | | |
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| Week 4 P1-4Outcome | Students learn about (Tech) | Students learn to (Tech) | Integrated learning experiences | Evidence of Learning and Assessment strategies | Register & Evaluation |
| **4.2.1**  generates and communicates creative design ideas and solutions | * methods used to generate creative design ideas including * mind mapping * brain storming * sketching & drawing * modelling * experimenting & testing * use of design folio to record and reflect on design ideas and decisions * communication methods including * drawings, sketches and models * written reports * oral presentations * digital presentations * communication methods suitable for specific audiences including * users and clients * technical experts * peers * using ICTs to plan, develop and document design projects | * use a variety of methods to generate creative design ideas for each design project * use a design folio to record and reflect on design ideas and decisions * sketch, draw and model to aid design development * manipulate images with tools such as editing, resizing, grouping, aligning and positioning * communicate information appropriate to specified audiences * compose a design folio for a specific audience in electronic format including features such as tabs, indents, headers and footers, margins and line and paragraph spacing and using appropriate layout and graphic design * use ICTs to communicate information including saving a document in various file types and storage locations from within the application * use word processing features including page numbering and page breaks, find and replace, word count, spell check and thesaurus, columns and sections, inserting text/objects/images | eWorkbook  Discuss concepts with class. Reading workbook and watching practical CAD demonstrations  Introduction to:  The Sensor and Hardware Housing Design Situation and Brief.  Critical and creative thinking | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook  Design the Sensor and Hardware Housing to achieve requirements of the Design Brief using CAD software. |  |
| **4.2.2**  selects, analyses, presents and applies research and experimentation from a variety of sources | * experimentation and testing of design ideas * relationship of experimentation to success criteria * research methods * needs analysis * surveys and interviews * searching techniques including use of the Internet | * apply the results of experimentation to designing and making when developing each design project * identify, interpret and evaluate data from a variety of sources * use effective research methods to identify needs and opportunities and locate information relevant to the development of each design project * identify solutions to other similar needs and opportunities * use the internet when researching | eWorkbook  Discuss concepts with class. Reading workbook and watching practical CAD demonstrations  Introduction to:  The Sensor and Hardware Housing Design Situation and Brief. | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook  Design the Sensor and Hardware Housing to achieve requirements of the Design Brief using CAD software. |  |
| **4.3.1** applies a broad range of contemporary and appropriate tools, materials and techniques with competence in the development of design projects | **Materials/Inputs**   * data types, formats and information as inputs of design and production * component categories for hardware, including input devices, processors and output devices * robots and other mechatronic devices, sensors, actuators such as motors, switches, lights * programmable logic controllers (PLCs) and associated hardware   **Tools**   * specific tools relating to control technologies * the function, selection and correct use of a range of contemporary tools including * simple programming languages * simple programs that meet identified needs * construction tools * simple testing tools including multimeter | * identify and select appropriate data for use in a design project * recognise, connect and use input and output devices to construct systems including sensors, switches, wiring, lights and motors for a design project * select and correctly use tools appropriate for the construction, maintenance and management of systems for a design project | eWorkbook  Discuss concepts with class. Reading workbook and watching practical CAD demonstrations  Introduction to:  The Sensor and Hardware Housing Design Situation and Brief. | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook  Design the Sensor and Hardware Housing to achieve requirements of the Design Brief using CAD software. |  |
| **Techniques**   * program design * compiling programs * connecting interdependent devices * modelling and prototyping systems * testing systems in the working environment * industrial production methods | * select and use appropriate program development techniques and structures for an identified need * connect interdependent devices for the purposes of a design solution * troubleshoot problems with systems * test function of solutions for a design project |  |
| **4.3.2**  demonstrates responsible and safe use of a range of tools, materials and techniques in each design project | * risk management strategies * responsible behaviour in working environments * Work Health and Safety practices | * manage risk when developing design projects | eWorkbook  Discuss concepts with class. Reading workbook and watching practical CAD demonstrations  Introduction to:  The Sensor and Hardware Housing Design Situation and Brief. | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook  Design the Sensor and Hardware Housing to achieve requirements of the Design Brief using CAD software. |  |
| * the safe and responsible use of materials, tools and techniques in each design project | * use tools, materials and techniques in a responsible and safe manner in each design project. |  |
| * maintenance of tools and equipment | * maintain tools and equipment including computer equipment |  |
| **4.6.1**  applies appropriate evaluation techniques throughout each design project | * developing criteria for success as a tool for assessing design development and production | * apply criteria for success in decision making during the development of each design project |  |
| * ongoing evaluation of design ideas and decisions * final evaluation considering * design process used * design solutions * reflection on learning | * use criteria for success to reflect on the design process used and the solutions * evaluate prior to, during and at completion of each design solution * self-assess and peer-assess design solutions |  |

| WEEK 5 | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Week 5 P1-4 Outcome | | | Students learn about (Tech) | | Students learn to (Tech) | Integrated learning experiences | Evidence of Learning and Assessment strategies | | Register & Evaluation | |
| **4.2.1**  generates and communicates creative design ideas and solutions | | | * methods used to generate creative design ideas including * mind mapping * brain storming * sketching & drawing * modelling * experimenting & testing | | * use a variety of methods to generate creative design ideas for each design project | eWorkbook  Discuss concepts with small groups and class.  Each student is to present their Sensor and Hardware Housing solution to their small group.  The group analyses each design solutions features addressing the requirements of the Design Situation and Brief.  The group then chooses the best housing to make using the 3D Printer.  Literacy | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook  Design the Sensor and Hardware Housing to achieve requirements of the Design Brief using CAD software and 3D Printer | |  | |
| * use of design folio to record and reflect on design ideas and decisions | | * use a design folio to record and reflect on design ideas and decisions |  | |
| * communication methods including * drawings, sketches and models * written reports * oral presentations * digital presentations | | * sketch, draw and model to aid design development * manipulate images with tools such as editing, resizing, grouping, aligning and positioning |  | |
| * communication methods suitable for specific audiences including * users and clients * technical experts * peers | | * communicate information appropriate to specified audiences |  | |
| * using ICTs to plan, develop and document design projects | | * compose a design folio for a specific audience in electronic format including features such as tabs, indents, headers and footers, margins and line and paragraph spacing and using appropriate layout and graphic design * use ICTs to communicate information including saving a document in various file types and storage locations from within the application * use word processing features including page numbering and page breaks, find and replace, word count, spell check and thesaurus, columns and sections, inserting text/objects/images |  | |
| **4.2.2**  selects, analyses, presents and applies research and experimentation from a variety of sources | | | * experimentation and testing of design ideas | | * apply the results of experimentation to designing and making when developing each design project | eWorkbook  Discuss concepts with small groups and class.  Each student is to present their Sensor and Hardware Housing solution to their small group.  The group analyses each design solutions features addressing the requirements of the Design Situation and Brief.  The group then chooses the best housing to make using the 3D Printer. | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook  Design the Sensor and Hardware Housing to achieve requirements of the Design Brief using CAD software and 3D Printer | |  | |
| * relationship of experimentation to success criteria | | * identify, interpret and evaluate data from a variety of sources |  | |
| * research methods * needs analysis * surveys and interviews * searching techniques including use of the Internet | | * use effective research methods to identify needs and opportunities and locate information relevant to the development of each design project * identify solutions to other similar needs and opportunities * use the internet when researching |  | |
| **4.3.1** applies a broad range of contemporary and appropriate tools, materials and techniques with competence in the development of design projects | | | **Materials/Inputs**   * data types, formats and information as inputs of design and production * component categories for hardware, including input devices, processors and output devices * robots and other mechatronic devices, sensors, actuators such as motors, switches, lights * programmable logic controllers (PLCs) and associated hardware | | * identify and select appropriate data for use in a design project * recognise, connect and use input and output devices to construct systems including sensors, switches, wiring, lights and motors for a design project | eWorkbook  Discuss concepts with small groups and class.  Each student is to present their Sensor and Hardware Housing solution to their small group.  The group analyses each design solutions features addressing the requirements of the Design Situation and Brief.  The group then chooses the best housing to make using the 3D Printer. | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook  Design the Sensor and Hardware Housing to achieve requirements of the Design Brief using CAD software and 3D Printer | |  | |
| **Tools**   * specific tools relating to control technologies * the function, selection and correct use of a range of contemporary tools including * simple programming languages * simple programs that meet identified needs * construction tools * simple testing tools including multimeter | | * select and correctly use tools appropriate for the construction, maintenance and management of systems for a design project |  | |
| **Techniques**   * program design * compiling programs * connecting interdependent devices * modelling and prototyping systems * testing systems in the working environment * industrial production methods | | * select and use appropriate program development techniques and structures for an identified need * connect interdependent devices for the purposes of a design solution * troubleshoot problems with systems * test function of solutions for a design project |  | |
| **4.3.2**  demonstrates responsible and safe use of a range of tools, materials and techniques in each design project | * risk management strategies * responsible behaviour in working environments * Work Health and Safety practices | | * manage risk when developing design projects | | eWorkbook  Discuss concepts with small groups and class.  Each student is to present their Sensor and Hardware Housing solution to their small group.  The group analyses each design solutions features addressing the requirements of the Design Situation and Brief.  The group then chooses the best housing to make using the 3D Printer. | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook  Design the Sensor and Hardware Housing to achieve requirements of the Design Brief using CAD software and 3D Printer |  | |
| * the safe and responsible use of materials, tools and techniques in each design project | | * use tools, materials and techniques in a responsible and safe manner in each design project. | |  | |
| * maintenance of tools and equipment | | * maintain tools and equipment including computer equipment | |  | |
| **4.6.1**  applies appropriate evaluation techniques throughout each design project | * developing criteria for success as a tool for assessing design development and production | | * apply criteria for success in decision making during the development of each design project | |  | |
| * ongoing evaluation of design ideas and decisions * final evaluation considering * design process used * design solutions * reflection on learning | | * use criteria for success to reflect on the design process used and the solutions * evaluate prior to, during and at completion of each design solution * self-assess and peer-assess design solutions | |  | |

| WEEK 6 | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| Week 6 P1-4Outcome | | Students learn about (Tech) | Students learn to (Tech) | Integrated learning experiences | Evidence of Learning and Assessment strategies | Register & Evaluation |
| **4.2.1**  generates and communicates creative design ideas and solutions | | * methods used to generate creative design ideas including * mind mapping * brain storming * sketching & drawing * modelling * experimenting & testing | * use a variety of methods to generate creative design ideas for each design project | eWorkbook  Discuss concepts with small groups and class.  The best housing for each group is make using the 3D Printer.  The sensors test fitted.  The function of the sensor is checked again by monitoring the data it produces. | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook  Students will fit the Sensor and Hardware in the Housing.  Student will then test for themselves the fit and function of the housing solution with the sensors installed and the data produced.  Demonstrate for the teacher the fit and function of the housing solution with the sensors installed and the data produced. |  |
| * use of design folio to record and reflect on design ideas and decisions | * use a design folio to record and reflect on design ideas and decisions |  |
| * communication methods including * drawings, sketches and models * written reports * oral presentations * digital presentations | * sketch, draw and model to aid design development * manipulate images with tools such as editing, resizing, grouping, aligning and positioning |  |
| * communication methods suitable for specific audiences including * users and clients * technical experts * peers | * communicate information appropriate to specified audiences |  |
| * using ICTs to plan, develop and document design projects | * compose a design folio for a specific audience in electronic format including features such as tabs, indents, headers and footers, margins and line and paragraph spacing and using appropriate layout and graphic design * use ICTs to communicate information including saving a document in various file types and storage locations from within the application * use word processing features including page numbering and page breaks, find and replace, word count, spell check and thesaurus, columns and sections, inserting text/objects/images |  |
| **4.2.2**  selects, analyses, presents and applies research and experimentation from a variety of sources | | * experimentation and testing of design ideas | * apply the results of experimentation to designing and making when developing each design project | eWorkbook  Discuss concepts with small groups and class.  The best housing for each group is make using the 3D Printer.  The sensors test fitted.  The function of the sensor is checked again by monitoring the data it produces. | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook  Students will fit the Sensor and Hardware in the Housing.  Student will then test for themselves the fit and function of the housing solution with the sensors installed and the data produced.  Demonstrate for the teacher the fit and function of the housing solution with the sensors installed and the data produced. |  |
| * relationship of experimentation to success criteria | * identify, interpret and evaluate data from a variety of sources |  |
| * research methods * needs analysis * surveys and interviews * searching techniques including use of the Internet | * use effective research methods to identify needs and opportunities and locate information relevant to the development of each design project * identify solutions to other similar needs and opportunities * use the internet when researching |  |
| **4.3.1** applies a broad range of contemporary and appropriate tools, materials and techniques with competence in the development of design projects | | **Materials/Inputs**   * data types, formats and information as inputs of design and production * component categories for hardware, including input devices, processors and output devices * robots and other mechatronic devices, sensors, actuators such as motors, switches, lights * programmable logic controllers (PLCs) and associated hardware | * identify and select appropriate data for use in a design project * recognise, connect and use input and output devices to construct systems including sensors, switches, wiring, lights and motors for a design project | eWorkbook  Discuss concepts with small groups and class.  The best housing for each group is make using the 3D Printer.  The sensors test fitted.  The function of the sensor is checked again by monitoring the data it produces. | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook  Students will fit the Sensor and Hardware in the Housing.  Student will then test for themselves the fit and function of the housing solution with the sensors installed and the data produced.  Demonstrate for the teacher the fit and function of the housing solution with the sensors installed and the data produced. |  |
| **Tools**   * specific tools relating to control technologies * the function, selection and correct use of a range of contemporary tools including * simple programming languages * simple programs that meet identified needs * construction tools * simple testing tools including multimeter | * select and correctly use tools appropriate for the construction, maintenance and management of systems for a design project |  |
| **Techniques**   * program design * compiling programs * connecting interdependent devices * modelling and prototyping systems * testing systems in the working environment * industrial production methods | * select and use appropriate program development techniques and structures for an identified need * connect interdependent devices for the purposes of a design solution * troubleshoot problems with systems * test function of solutions for a design project |  |
| **4.3.2**  demonstrates responsible and safe use of a range of tools, materials and techniques in each design project | * risk management strategies * responsible behaviour in working environments * Work Health and Safety practices | | * manage risk when developing design projects | eWorkbook  Discuss concepts with small groups and class.  The best housing for each group is make using the 3D Printer.  The sensors test fitted.  The function of the sensor is checked again by monitoring the data it produces. | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook  Students will fit the Sensor and Hardware in the Housing.  Student will then test for themselves the fit and function of the housing solution with the sensors installed and the data produced.  Demonstrate for the teacher the fit and function of the housing solution with the sensors installed and the data produced. |  |
| * the safe and responsible use of materials, tools and techniques in each design project | | * use tools, materials and techniques in a responsible and safe manner in each design project. |  |
| * maintenance of tools and equipment | | * maintain tools and equipment including computer equipment |  |
| **4.6.1**  applies appropriate evaluation techniques throughout each design project | * developing criteria for success as a tool for assessing design development and production | | * apply criteria for success in decision making during the development of each design project |  |
| * ongoing evaluation of design ideas and decisions * final evaluation considering * design process used * design solutions * reflection on learning | | * use criteria for success to reflect on the design process used and the solutions * evaluate prior to, during and at completion of each design solution * self-assess and peer-assess design solutions |  |

| WEEK 7 | | | | | |
| --- | --- | --- | --- | --- | --- |
| Week 7 P1&2 Outcome | Students learn about (Tech) | Students learn to (Tech) | Integrated learning experiences | Evidence of Learning and Assessment strategies | Register & Evaluation |
| **4.2.1**  generates and communicates creative design ideas and solutions | * methods used to generate creative design ideas including * mind mapping * brain storming * sketching & drawing * modelling * experimenting & testing | * use a variety of methods to generate creative design ideas for each design project | eWorkbook  Discuss concepts with small groups and class.  The small group contributes to:  Assembly of the WeatherTECH digital weather station.  The field testing of the WeatherTECH project  Checked the function of the Weather station again by monitoring the data it produces.  The group also starts preparing the information for the formal documentation and evaluation of the project, the Instructable | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook  Assemble and monitor their sensor or hardware in the weather station project.  Demonstrate for the teacher the function of their housing solution with the sensors installed by the data produced. |  |
| * use of design folio to record and reflect on design ideas and decisions | * use a design folio to record and reflect on design ideas and decisions |  |
| * communication methods including * drawings, sketches and models * written reports * oral presentations * digital presentations | * sketch, draw and model to aid design development * manipulate images with tools such as editing, resizing, grouping, aligning and positioning |  |
| * communication methods suitable for specific audiences including * users and clients * technical experts * peers | * communicate information appropriate to specified audiences |  |
| * using ICTs to plan, develop and document design projects | * compose a design folio for a specific audience in electronic format including features such as tabs, indents, headers and footers, margins and line and paragraph spacing and using appropriate layout and graphic design * use ICTs to communicate information including saving a document in various file types and storage locations from within the application * use word processing features including page numbering and page breaks, find and replace, word count, spell check and thesaurus, columns and sections, inserting text/objects/images |  |
| **4.2.2**  selects, analyses, presents and applies research and experimentation from a variety of sources | * experimentation and testing of design ideas | * apply the results of experimentation to designing and making when developing each design project | eWorkbook  Discuss concepts with small groups and class.  The small group contributes to:  Assembly of the WeatherTECH digital weather station.  The field testing of the WeatherTECH project  Checked the function of the Weather station again by monitoring the data it produces.  The group also starts preparing the information for the formal documentation and evaluation of the project, the Instructable | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook  Assemble and monitor their sensor or hardware in the weather station project.  Demonstrate for the teacher the function of their housing solution with the sensors installed by the data produced. |  |
| * relationship of experimentation to success criteria | * identify, interpret and evaluate data from a variety of sources |  |
| * research methods * needs analysis * surveys and interviews * searching techniques including use of the Internet | * use effective research methods to identify needs and opportunities and locate information relevant to the development of each design project * identify solutions to other similar needs and opportunities * use the internet when researching |  |
| **4.3.1** applies a broad range of contemporary and appropriate tools, materials and techniques with competence in the development of design projects | **Materials/Inputs**   * data types, formats and information as inputs of design and production * component categories for hardware, including input devices, processors and output devices * robots and other mechatronic devices, sensors, actuators such as motors, switches, lights * programmable logic controllers (PLCs) and associated hardware | * identify and select appropriate data for use in a design project * recognise, connect and use input and output devices to construct systems including sensors, switches, wiring, lights and motors for a design project | eWorkbook  Discuss concepts with small groups and class.  The small group contributes to:  Assembly of the WeatherTECH digital weather station.  The field testing of the WeatherTECH project  Checked the function of the Weather station again by monitoring the data it produces.  The group also starts preparing the information for the formal documentation and evaluation of the project, the Instructable | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook  Assemble and monitor their sensor or hardware in the weather station project.  Demonstrate for the teacher the function of their housing solution with the sensors installed by the data produced. |  |
| **Tools**   * specific tools relating to control technologies * the function, selection and correct use of a range of contemporary tools including * simple programming languages * simple programs that meet identified needs * construction tools * simple testing tools including multimeter | * select and correctly use tools appropriate for the construction, maintenance and management of systems for a design project |  |
| **Techniques**   * program design * compiling programs * connecting interdependent devices * modelling and prototyping systems * testing systems in the working environment * industrial production methods | * select and use appropriate program development techniques and structures for an identified need * connect interdependent devices for the purposes of a design solution * troubleshoot problems with systems * test function of solutions for a design project |  |
| **4.3.2**  demonstrates responsible and safe use of a range of tools, materials and techniques in each design project | * risk management strategies * responsible behaviour in working environments * Work Health and Safety practices | * manage risk when developing design projects | eWorkbook  Discuss concepts with small groups and class.  The small group contributes to:  Assembly of the WeatherTECH digital weather station.  The field testing of the WeatherTECH project  Checked the function of the Weather station again by monitoring the data it produces.  The group also starts preparing the information for the formal documentation and evaluation of the project, the Instructable | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook  Assemble and monitor their sensor or hardware in the weather station project.  Demonstrate for the teacher the function of their housing solution with the sensors installed by the data produced. |  |
| * the safe and responsible use of materials, tools and techniques in each design project | * use tools, materials and techniques in a responsible and safe manner in each design project. |  |
| * maintenance of tools and equipment | * maintain tools and equipment including computer equipment |  |
| **4.5.2**  produces quality solutions that respond to identified needs and opportunities in each design project | * suitable materials, tools and techniques for design projects * skill development and refinement | * identify suitable materials, tools and techniques for each design project * practice and refine skills needed for design projects |  |
| * construction steps that contribute to a quality solution | * apply a design process that responds to needs and opportunities for each design project |  |
| * relationship of quality solutions to needs and opportunities and the criteria for success for each design project | * produce solutions reflecting quality standards appropriate to each design project |  |  |  |

| WEEK 7 | | | | | |
| --- | --- | --- | --- | --- | --- |
| Week 7 P3&4Outcome | Students learn about (Tech) | Students learn to (Tech) | Integrated learning experiences | Evidence of Learning and Assessment strategies | Register & Evaluation |
| **4.6.1**  applies appropriate evaluation techniques throughout each design project | * developing criteria for success as a tool for assessing design development and production | * apply criteria for success in decision making during the development of each design project | eWorkbook  Discuss concepts with small groups and class.  The small group contributes to:  Assembly of the WeatherTECH digital weather station.  The field testing of the WeatherTECH project  Checked the function of the Weather station again by monitoring the data it produces.  The group also starts preparing the information for the formal documentation and evaluation of the project, the Instructable | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook  Assemble and monitor their sensor or hardware in the weather station project.  Demonstrate for the teacher the function of their housing solution with the sensors installed by the data produced. |  |
| * ongoing evaluation of design ideas and decisions * final evaluation considering * design process used * design solutions * reflection on learning | * use criteria for success to reflect on the design process used and the solutions * evaluate prior to, during and at completion of each design solution * self-assess and peer-assess design solutions |  |
| **4.6.2**  identifies and explains ethical, social, environmental and sustainability considerations related to design projects | * ethical and responsible design * environmental and sustainability considerations | * identify ethical, social, and environmental and sustainability considerations relevant to each design project * be responsible and ethical in the decisions made in the development and production of each design project * explain the responsibilities of designers * demonstrate appropriate ethics and etiquette in relation to computer use such as general computer care, passwords, file security, network use, printing and shared resources |  |

| WEEK 8 | | | | | |
| --- | --- | --- | --- | --- | --- |
| Week 8 P1-4 Outcome | Students learn about (Tech) | Students learn to (Tech) | Integrated learning experiences | Evidence of Learning and Assessment strategies | Register & Evaluation |
| **4.2.1**  generates and communicates creative design ideas and solutions | * methods used to generate creative design ideas including * mind mapping * brain storming * sketching & drawing * modelling * experimenting & testing | * use a variety of methods to generate creative design ideas for each design project | eWorkbook  Discuss concepts with small groups and class.  The small group contributes to:  The field testing of the WeatherTECH project  Checked the function of the Weather station against other formal and informal weather stations and weather reports again by monitoring the data it produces.  The group also starts preparing the information for the formal documentation and evaluation of the project, the Instructable | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook  Demonstrate for the teacher the function of their sensor and other weather reading and reports by the data produced.  Demonstrate for the teacher that each groups Instructable documentation is be worked on. |  |
| * use of design folio to record and reflect on design ideas and decisions | * use a design folio to record and reflect on design ideas and decisions |  |
| * communication methods including * drawings, sketches and models * written reports * oral presentations * digital presentations | * sketch, draw and model to aid design development * manipulate images with tools such as editing, resizing, grouping, aligning and positioning |  |
| * communication methods suitable for specific audiences including * users and clients * technical experts * peers | * communicate information appropriate to specified audiences |  |
| * using ICTs to plan, develop and document design projects | * compose a design folio for a specific audience in electronic format including features such as tabs, indents, headers and footers, margins and line and paragraph spacing and using appropriate layout and graphic design * use ICTs to communicate information including saving a document in various file types and storage locations from within the application * use word processing features including page numbering and page breaks, find and replace, word count, spell check and thesaurus, columns and sections, inserting text/objects/images |  |
| **4.3.2**  demonstrates responsible and safe use of a range of tools, materials and techniques in each design project | * risk management strategies * responsible behaviour in working environments * Work Health and Safety practices | * manage risk when developing design projects | eWorkbook  Discuss concepts with small groups and class.  The small group contributes to:  The field testing of the WeatherTECH project  Checked the function of the Weather station against other formal and informal weather stations and weather reports again by monitoring the data it produces.  The group also starts preparing the information for the formal documentation and evaluation of the project, the Instructable | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook  Demonstrate for the teacher the function of their sensor and other weather reading and reports by the data produced.  Demonstrate for the teacher that each groups Instructable documentation is be worked on. |  |
| * the safe and responsible use of materials, tools and techniques in each design project | * use tools, materials and techniques in a responsible and safe manner in each design project. |  |
| * maintenance of tools and equipment | * maintain tools and equipment including computer equipment |  |
| **4.6.1**  applies appropriate evaluation techniques throughout each design project | * developing criteria for success as a tool for assessing design development and production | * apply criteria for success in decision making during the development of each design project |  |
| * ongoing evaluation of design ideas and decisions * final evaluation considering * design process used * design solutions * reflection on learning | * use criteria for success to reflect on the design process used and the solutions * evaluate prior to, during and at completion of each design solution * self-assess and peer-assess design solutions |  |

| WEEK 9 | | | | | |
| --- | --- | --- | --- | --- | --- |
| Week 9 P1-4 Outcome | Students learn about (Tech) | Students learn to (Tech) | Integrated learning experiences | Evidence of Learning and Assessment strategies | Register & Evaluation |
| **4.2.1**  generates and communicates creative design ideas and solutions | * methods used to generate creative design ideas including * mind mapping * brain storming * sketching & drawing * modelling * experimenting & testing | * use a variety of methods to generate creative design ideas for each design project | eWorkbook  Discuss concepts with small groups and class.  The small group contributes to:  The field testing of the WeatherTECH project  Checked the function of the Weather station against other formal and informal weather stations and weather reports again by monitoring the data it produces.  The group also starts preparing the information for the formal documentation and evaluation of the project, the Instructable | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook  Demonstrate for the teacher the function of their sensor and other weather reading and reports by the data produced.  Demonstrate for the teacher that each groups Instructable documentation is be worked on. |  |
| * use of design folio to record and reflect on design ideas and decisions | * use a design folio to record and reflect on design ideas and decisions |  |
| * communication methods including * drawings, sketches and models * written reports * oral presentations * digital presentations | * sketch, draw and model to aid design development * manipulate images with tools such as editing, resizing, grouping, aligning and positioning |  |
| * communication methods suitable for specific audiences including * users and clients * technical experts * peers | * communicate information appropriate to specified audiences |  |
| * using ICTs to plan, develop and document design projects | * compose a design folio for a specific audience in electronic format including features such as tabs, indents, headers and footers, margins and line and paragraph spacing and using appropriate layout and graphic design * use ICTs to communicate information including saving a document in various file types and storage locations from within the application * use word processing features including page numbering and page breaks, find and replace, word count, spell check and thesaurus, columns and sections, inserting text/objects/images |  |
| **4.3.2**  demonstrates responsible and safe use of a range of tools, materials and techniques in each design project | * risk management strategies * responsible behaviour in working environments * Work Health and Safety practices | * manage risk when developing design projects | eWorkbook  Discuss concepts with small groups and class.  The small group contributes to:  The field testing of the WeatherTECH project  Checked the function of the Weather station against other formal and informal weather stations and weather reports again by monitoring the data it produces.  The group also starts preparing the information for the formal documentation and evaluation of the project, the Instructable | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Complete the outcome and content specific questions form their eWorkbook  Demonstrate for the teacher the function of their sensor and other weather reading and reports by the data produced.  Demonstrate for the teacher that each groups Instructable documentation is be worked on. |  |
| * the safe and responsible use of materials, tools and techniques in each design project | * use tools, materials and techniques in a responsible and safe manner in each design project. |  |
| * maintenance of tools and equipment | * maintain tools and equipment including computer equipment |  |
| **4.6.1**  applies appropriate evaluation techniques throughout each design project | * developing criteria for success as a tool for assessing design development and production | * apply criteria for success in decision making during the development of each design project |  |
| * ongoing evaluation of design ideas and decisions * final evaluation considering * design process used * design solutions * reflection on learning | * use criteria for success to reflect on the design process used and the solutions * evaluate prior to, during and at completion of each design solution * self-assess and peer-assess design solutions |  |
| **4.6.2**  identifies and explains ethical, social, environmental and sustainability considerations related to design projects | * ethical and responsible design * environmental and sustainability considerations | * identify ethical, social, and environmental and sustainability considerations relevant to each design project * be responsible and ethical in the decisions made in the development and production of each design project * explain the responsibilities of designers * demonstrate appropriate ethics and etiquette in relation to computer use such as general computer care, passwords, file security, network use, printing and shared resources |  |

| WEEK 10 | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Week 10 P3&4 Outcome | | Students learn about (Tech) | | Students learn to (Tech) | | Integrated learning experiences | | Evidence of Learning and Assessment strategies | | Register & Evaluation | |
| **4.1.1**  applies design processes that respond to needs and opportunities in each design project | | * design processes including * analysing needs, problems and opportunities * establishing criteria for success * researching * generating creative ideas * communicating ideas * experimenting and testing ideas * risk management * managing resources * producing design solutions * evaluating ideas and solutions * needs and opportunities in the areas of study * Built Environments * Products * Information & Communications * design processes used by designers | | * establish a design process that responds to an identified need and opportunity * apply a design process when developing quality solutions for each design project * establish criteria for successful achievement of needs and opportunities * record design processes and decision making in a design folio for each design project. * consider short-term and long-term consequences of design in the design process * evaluate design processes * identify needs and opportunities that require solutions in the areas of study * identify a design process used by a designer | | eWorkbook  Discuss concepts with small groups and class.  Each student: completes and self-marks eWorkbook  submits their eWorkbook to the teacher for marking.  Group members submit peer marks to the teacher  The small group presents the WeatherTECH Instructable, Housing design and sensor or hardware coding with sample data to the class in a multimedia presentation for 5 to 10 minutes | | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Completes the outcome and content specific questions form their eWorkbook  Students submit self and peer marking to the teacher  WeatherTECH Instructable, and class in a multimedia presentation | |  | |
| **4.2.1**  generates and communicates creative design ideas and solutions | | * methods used to generate creative design ideas including * mind mapping * brain storming * sketching & drawing * modelling * experimenting & testing | | * use a variety of methods to generate creative design ideas for each design project | | eWorkbook  Discuss concepts with small groups and class.  Each student: completes and self-marks eWorkbook  submits their eWorkbook to the teacher for marking.  Group members submit peer marks to the teacher  The small group presents the WeatherTECH Instructable, Housing design and sensor or hardware coding with sample data to the class in a multimedia presentation for 5 to 10 minutes | | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Completes the outcome and content specific questions form their eWorkbook  Students submit self and peer marking to the teacher  WeatherTECH Instructable, and class in a multimedia presentation | |  | | |
| * use of design folio to record and reflect on design ideas and decisions | | * use a design folio to record and reflect on design ideas and decisions | |  | | |
| * communication methods including * drawings, sketches and models * written reports * oral presentations * digital presentations | | * sketch, draw and model to aid design development * manipulate images with tools such as editing, resizing, grouping, aligning and positioning | |  | | |
| * communication methods suitable for specific audiences including * users and clients * technical experts * peers | | * communicate information appropriate to specified audiences | |  | | |
| * using ICTs to plan, develop and document design projects | | * compose a design folio for a specific audience in electronic format including features such as tabs, indents, headers and footers, margins and line and paragraph spacing and using appropriate layout and graphic design * use ICTs to communicate information including saving a document in various file types and storage locations from within the application * use word processing features including page numbering and page breaks, find and replace, word count, spell check and thesaurus, columns and sections, inserting text/objects/images | |  | | |
| **4.2.2**  selects, analyses, presents and applies research and experimentation from a variety of sources | | * experimentation and testing of design ideas | | * apply the results of experimentation to designing and making when developing each design project | | eWorkbook  Discuss concepts with small groups and class.  Each student: completes and self-marks eWorkbook  submits their eWorkbook to the teacher for marking.  Group members submit peer marks to the teacher  The small group presents the WeatherTECH Instructable, Housing design and sensor or hardware coding with sample data to the class in a multimedia presentation for 5 to 10 minutes | | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Completes the outcome and content specific questions form their eWorkbook  Students submit self and peer marking to the teacher  WeatherTECH Instructable, and class in a multimedia presentation | |  | |
| * relationship of experimentation to success criteria | | * identify, interpret and evaluate data from a variety of sources | |  | |
| * research methods * needs analysis * surveys and interviews * searching techniques including use of the Internet | | * use effective research methods to identify needs and opportunities and locate information relevant to the development of each design project * identify solutions to other similar needs and opportunities * use the internet when researching | |  | |
| **4.5.2**  produces quality solutions that respond to identified needs and opportunities in each design project | | * suitable materials, tools and techniques for design projects * skill development and refinement | | * identify suitable materials, tools and techniques for each design project * practice and refine skills needed for design projects | |  | |
| * construction steps that contribute to a quality solution | | * apply a design process that responds to needs and opportunities for each design project | |  | |
|  | | * relationship of quality solutions to needs and opportunities and the criteria for success for each design project | | * produce solutions reflecting quality standards appropriate to each design project | |  | |  | |  | |
| **4.6.1**  applies appropriate evaluation techniques throughout each design project | | * developing criteria for success as a tool for assessing design development and production | | * apply criteria for success in decision making during the development of each design project | | eWorkbook  Discuss concepts with small groups and class.  Each student: completes and self-marks eWorkbook  submits their eWorkbook to the teacher for marking.  Group members submit peer marks to the teacher  The small group presents the WeatherTECH Instructable, Housing design and sensor or hardware coding with sample data to the class in a multimedia presentation for 5 to 10 minutes | | Students will: Participate in class discussions analysing the information and concepts presented.  Use subject metalanguage correctly.  Answer teacher questions in class relating to the information presented.  Completes the outcome and content specific questions form their eWorkbook  Students submit self and peer marking to the teacher  WeatherTECH Instructable, and class in a multimedia presentation | |  | |
| * ongoing evaluation of design ideas and decisions * final evaluation considering * design process used * design solutions * reflection on learning | | * use criteria for success to reflect on the design process used and the solutions * evaluate prior to, during and at completion of each design solution * self-assess and peer-assess design solutions | |  | |
| **4.6.2**  identifies and explains ethical, social, environmental and sustainability considerations related to design projects | | * ethical and responsible design * environmental and sustainability considerations | | * identify ethical, social, and environmental and sustainability considerations relevant to each design project * be responsible and ethical in the decisions made in the development and production of each design project * explain the responsibilities of designers * demonstrate appropriate ethics and etiquette in relation to computer use such as general computer care, passwords, file security, network use, printing and shared resources | |  | |

MATHS

| Lesson | Outcome(s) | Students learn about | Students learn to | Integrated learning experiences | Evidence of learning/assessment strategies | Register |
| --- | --- | --- | --- | --- | --- | --- |
| Content (Mathematics) | | Evaluation |
| 1 | MA4-1WM | Define ‘variable’ in the context of statistics **Investigate** techniques for collecting data  **Identify** examples of categorical or numerical (discrete or continuous) | Recognise data as numerical (quantitative) as discrete or continuous or categorical | Class discussion on collecting data and why companies collect data, and type of data collected from the weather station | Students to fill in their responses in the space provided | Check homework scores. HW Exercise A is out of 18 |
| 2, 3 | MA4-3WM **MA4-19SP** | Identify examples of variables for which data could be collected by a census or by a sample **Identify** and investigate issues involving of data from primary and secondary sources  **Interpret** a variety of graphs, including dot plots, stem-and-leaf plots, divided bar graphs, sectors graphs, line graphs and frequency histogram and polygons  **Compare** the strengths and weaknesses of different forms of data display | Collect data from either a primary or secondary sources **Construct** frequency distribution tables and then represent data using dot plots, stem-and-leaf plots, divided bar graphs, sectors graphs, line graphs and frequency histogram and polygons | Types of data displays useful for displaying weather station data Do a class survey and record results - favourite colour  Use of technology to draw different displays | Different features  Between dot plots and column graphs Size of angle for sector graphs and length of section in bar graphs | Identify correct types of display and include all the required features Check homework score. HW Exercise B is out of 24 |
| 4 | MA4-20SP | Describe the mean, median and mode as ‘measures of location’ or ‘measures of central tendency’ and the range as a ‘measure of spread’ **Identify** any clusters, gaps and outliers in sets of data Investigate the effect of outliers on the mean and median, mode and range by considering a small set of data | Calculate mean, median, mode and range for sets of data and interpret these statistics in the context of data Calculate each measures of location, with and without the inclusion of the outlier to see the effect of outlier on each measure | Students summaries data collected from weather station NumeracyCritical and creative thinking | The values of the mean, median, mode and range for each set of data are recorded in the booklet | Calculation of the mean, median, mode and range are correct Check homework score. HW Exercise C is out of 30 |
| 5 | MA4-19SP | Analyse the data using appropriate displays | Collect and interpret data | Finding the mean, median, mode and range for each set of data Choose an appropriate display  Analyse data from the weather station to observe any significant statistical trend or pattern | Sheets of data and statistical displays | Accurate calculation of mean, median, mode and range for each set of data. Exercise mark is out of 30 |
| 6 | MA4-3WM **MA4-20SP** | Draw conclusions from data displayed in a graph, including extrapolation and interpolation | Draw conclusion from the data and predict the future results based on the projection from the present data | Extrapolate line graph to make predictions about data collected from weather station in 2030 | Graph to show extrapolation | Prediction consistent with the other sources Exercise mark is out of 10 |

SCIENCE

| Lesson | Outcome(s) | Students learn about | | Students learn to | Integrated learning experiences | Evidence of learning/assessment strategies | Register |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Content (Science) | | | Evaluation |
| 1 | Sc4-5WS  Sc4-7WS | Designing fair tests |  | | The Study of Science Worksheet | Complete Questionnaire on the Study of Science  Recall appropriate definitions  Evaluate experimental design:  Amy’s experiment vs Lauren’s experiment |  |
| 2, 3 | Sc4-6WS  Sc4-9WS |  | Follow a planned procedure | | Perform Amy and Lauren’s experiment on particle size and solubility | Write up  Method, hypothesis, etc |  |
| 4, 5 | Sc4-9WS | History of Scientists contributing to our understanding of Weather | Research and present a brief report. | | Research and present the contribution of:   * Robert Boyle * Evangelista Torricelli * Daniel Fahrenheit * Anders Celsius * Lord Kelvin * Sir Francis Beaufort   to our understanding of our weather. | Students able to give a brief presentation on their findings. |  |
| 6, 7 |  | Abiotic Features of an environment  (relate to climate) | Identify that Air Pressure, Volume and Temperature influence the abiotic features such as Density, humidity and air movement | | * Investigate Pressure: (Boyle’s Law P1V1=P2V2 at constant temperature.) * Handout on Pressure | * Experiment: determining the “Equivalent pressure” to crush aluminium can. * Students identify nouns within the passage as mechanism to assist study |  |
| 8 |  |  |  | | Handout on Humidity and relative humidity. Application to agriculture.  Handout on temperature  (Includes Impact on Agriculture) | Read a wet/dry thermometer and determine Relative humidity |  |
| 9 |  |  |  | | Charles Law (V1/T1=V2/T2) at constant pressure.  Recognise that Laboratory conditions do not mirror environmental conditionsNumeracy | Graph of an ideal gas volume against temperature  And extrapolate to determine absolute zero |  |
| 10 |  | Effect of Media on our perception | Research appropriately to make an informed decision | | Gather and process (newspaper/Media articles) relating to climate initiatives/extreme weather.  Forces of Nature Website (national geographic)  LiteracyCritical and creative thinking | Students work collaboratively to produce a consensus position backed up by appropriate research |  |
| 11 |  |  |  | | Begin video:  Changing Climates, Changing Times (SBS) | Students provide a prediction on climatic impacts in 2075 |  |
| **12, 13** | Sc4-7WS | Making predictions | Gather and process first-hand information and compare to reliable information | |  | Collect BoM weather data  Make an anemometer or barometer |  |
| 14 |  |  |  | |  | Completion of worksheets |  |