**STEAM**

Year 4 Scope & Sequence

|  |  |  |  |
| --- | --- | --- | --- |
| **Year Level:** | Year 4 | | |
| **Domain:** | **Design and Technologies** aims to develop the knowledge, understanding and skills to ensure that students:   * become critical users of technologies, and designers and producers of designed solutions * can investigate, generate and critique designed solutions for sustainable futures * use design and systems thinking to generate innovative and ethical design ideas, and communicate these to a range of audiences * create designed solutions suitable for a range of contexts by creatively selecting and safely manipulating a range of materials, systems, components, tools and equipment * learn how to transfer the knowledge and skills from design and technologies to new situations * understand the roles and responsibilities of people in design and technologies occupations, and how they contribute to society. | **Media Arts** aims to develop students’:   * conceptual and perceptual ideas and representations through design and inquiry processes * understanding of the use of the techniques, materials, processes and technologies * critical and creative thinking skills, Media Arts languages, knowledge of Media Arts theories and practices * respect for and acknowledgement of the diverse roles, innovations, traditions, histories and cultures of artists, designers, commentators and critics * understanding of Media Arts social, cultural and industry practices * confidence, curiosity, imagination, enjoyment and a personal aesthetic. | The **Digital Technologies** curriculum aims to ensure that students can:   * design, create, manage and evaluate sustainable and innovative digital solutions to meet and redefine current and future needs * use computational thinking and the key concepts of abstraction; data collection, representation and interpretation; specification, algorithms and development to create digital solutions * apply systems thinking to monitor, analyse, predict and shape the interactions within and between information systems and the impact of these systems on individuals, societies, economies and environments * confidently use digital systems to efficiently and effectively automate the transformation of data into information and to creatively communicate ideas in a range of settings * apply protocols and legal practices that support safe, ethical and respectful communications and collaboration with known and unknown audiences. |
| **Victorian Curriculum Strands and Sub-Strands:** | Technologies and SocietyThe Technologies and Society strand focuses on how people use and develop technologies. It takes into account economic, environmental, ethical, legal, aesthetic and functional factors, and the impact of technologies on individuals, families, local, regional and global communities, and the environment.Technologies Contexts The Technologies Contexts strand focuses on the characteristics and properties of technologies contexts, and how they can be used to create innovative designed solutions. It explores four particular contexts, organised under the following sub-strands:   * Engineering principles and systems explores how forces can be used to create light, sound, heat, movement, control or support in systems. Students develop an understanding of how forces and the properties of materials affect the behaviour and performance of designed engineering solutions. * Food and fibre production focuses on food and fibre as human-produced or harvested resources, and how food and fibre are produced in managed environments such as farms or plantations, or harvested from wild stocks. Students develop an understanding of the challenges involved in managing these resources within sustainable agricultural systems. They develop their knowledge and understanding about the managed systems that produce food and fibre through creating designed solutions. * Food specialisations explores the application of nutrition principles and the characteristics and properties of food, food selection and preparation, and contemporary food issues. Students come to understand the importance of a variety of foods, sound nutrition principles, food preparation skills and food safety. * Materials and technologies specialisations explores a broad range of traditional, contemporary and emerging materials, and specialist areas that involve an extensive use of technologies. Students learn to make ethical and sustainable decisions about designed solutions and processes by learning about and working with materials and production processes.  Creating Designed Solutions The Creating Designed Solutions strand is based on the major aspects of design thinking, design processes and production processes. The content descriptions in this strand reflect a design process and would typically be addressed through a design brief. Creating Designed Solutions is organised by five sub-strands:   * Investigating – students critique, explore and investigate needs and opportunities, reflecting on how the choices they make have implications for the individual, society and the environment. * Generating *–* students develop and communicate ideas for a range of audiences. Students make choices, weigh up options, consider alternatives and document the various design ideas and possibilities. * Producing – students apply a variety of skills and techniques to make designed solutions to meet specific purposes and user needs. They apply knowledge about components and materials, including their characteristics and properties, to ensure their suitability. Students learn about the importance of adopting safe work practices. They develop accurate production skills to achieve quality designed solutions. * Evaluating – students evaluate and make judgments throughout a design process, about the quality and effectiveness of their designed solutions and others. They determine effective ways to test and judge their designed solutions and reflect on processes used and how they could transfer what they have learnt to other design opportunities. * Planning and managing – students learn to plan and manage time, along with other resources, to effectively create designed solutions. Working individually and collaboratively, students’ progress from planning steps in a project, through to more complex project management activities that consider factors such as cost, risk and quality control. | **Explore and Represent Ideas**  Investigate and devise representations of people in their community, through settings, ideas and story structure in images, sounds and text  **Media Arts Practices**  Use media technologies to create time and space through the manipulation of images, sounds and text when telling stories  **Present and Perform**  Plan, create and present media artworks for specific purposes with awareness of responsible media practice  **Respond and Interpret**  Identify intended purposes and meanings of media artworks considering who makes media artworks and the characteristics of audiences who view them in different social, historical and cultural contexts, including media artworks of Aboriginal and Torres Strait Islander Peoples | **Digital Systems**  Focuses on the hardware, software and network components of digital systems. Students initially learn about a range of hardware and software, and progress to an understanding of how data are transmitted between components within a system, and how the hardware and software interact to form networks.  **Data and Information**  Focuses on the properties of data, how they are collected and represented, and how they are interpreted in context to produce information. Students learn how data are represented and structured symbolically for use by digital systems, as well as techniques for collecting, managing and organising data that is used to solve problems and create and communicate ideas and information.  **Creating Digital Solutions**  Explores the interrelated processes and associated skills by which students create digital solutions. Students engage in the four processes of analysing, designing, developing and evaluating. Creating Digital Solutions requires skills in using digital systems and computational, design and systems thinking, and interacting safely by using appropriate technical and social protocols. |
| **Victorian Curriculum Content Descriptions**  [**Link to Curriculum Audit**](https://drive.google.com/open?id=1anR1JGiRAfORMqY2roNt4PWvoDme4hAsGGMQNZsURf8) | **Digital Technologies**  Explore a range of digital systems with peripheral devices for different purposes, and transmit different types of data [(VCDTDS019)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDS019)  Recognise different types of data and explore how the same data can be represented in different ways[(VCDTDI020)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDI020)  Collect, access and present different types of data using simple software to create information and solve problems [(VCDTDI021)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDI021)  Individually and with others, plan, create and communicate ideas and information safely, applying agreed ethical and social protocols [(VCDTDI022)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDI022)  Define simple problems, and describe and follow a sequence of steps and decisions involving branching and user input (algorithms) needed to solve them[(VCDTCD023)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTCD023)  Develop simple solutions as visual programs[(VCDTCD024)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTCD024)  Explain how student-developed solutions and existing information systems meet common personal, school or community needs [(VCDTCD025)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTCD025)  **Design & Technologies**  Recognise the role of people in design and technologies occupations and explore factors, including sustainability, that impact on the design of solutions to meet community needs [(VCDSTS023)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDSTS023)  Critique needs or opportunities for designing and explore and test a variety of materials, components, tools and equipment and the techniques needed to create designed solutions [(VCDSCD028)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDSCD028)  Generate, develop, and communicate design ideas and decisions using appropriate technical terms and graphical representation techniques [(VCDSCD029)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDSCD029)  Select and use materials, components, tools and equipment using safe work practices to produce designed solutions [(VCDSCD030)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDSCD030)  Evaluate design ideas, processes and solutions based on criteria for success developed with guidance and including care for the environment and communities[(VCDSCD031)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDSCD031)  Plan a sequence of production steps when making designed solutions [(VCDSCD032)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDSCD032)  **Media Arts**  Investigate and devise representations of people in their community, through settings, ideas and story structure in images, sounds and text [(VCAMAE025)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCAMAE025)  Use media technologies to create time and space through the manipulation of images, sounds and text when telling stories [(VCAMAM026)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCAMAM026)  Plan, create and present media artworks for specific purposes with awareness of responsible media practice [(VCAMAP027)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCAMAP027)  Identify intended purposes and meanings of media artworks considering who makes media artworks and the characteristics of audiences who view them in different social, historical and cultural contexts, including media artworks of Aboriginal and Torres Strait Islander Peoples [(VCAMAR028)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCAMAR028) | | |
| **Victorian Curriculum Achievement standard:** | **Digital Technologies**  By the end of Level 4, students describe how a range of digital systems and their peripheral devices can be used for different purposes.  Students explain how the same data sets can be represented in different ways. They collect and manipulate different data when creating information and digital solutions. They plan and safely use information systems when creating and communicating ideas and information, applying agreed protocols.  Students define simple problems, and design and develop digital solutions using algorithms that involve decision-making and user input. They explain how their developed solutions and existing information systems meet their purposes.  **Design & Technologies**  By the end of Level 4 students explain how solutions are designed to best meet needs of the communities and their environments. They describe contributions of people in design and technologies occupations. Students describe how the features of technologies can be used to create designed solutions for each of the prescribed technologies contexts.  Students create designed solutions for each of the prescribed technologies contexts. They explain needs or opportunities and evaluate ideas and designed solutions against identified criteria for success, including sustainability considerations. They develop and expand design ideas and communicate these using models and drawings including annotations and symbols. Students plan and sequence major steps in design and production. They identify appropriate technologies and techniques and demonstrate safe work practices when creating designed solutions.  **Media Arts**  By the end of Level 4, students describe similarities and differences between media artworks they make and view. They discuss how and why they and others use images, sound and text to make and present media artworks. They identify the characteristics of audiences who view media artworks and the social, historical and cultural contexts in which media artworks are viewed.  Students use intent, structure, setting, characters, media elements and media technologies to make and share media artworks that communicate ideas to an audience. | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Term 1** | | | |
| **Unit Title** | Arty Pants | | |
| **Key Understandings** | * art can be created using technology * media art is multi-modal and can be used for a variety of purposes * many iPad apps can be used to create one piece of Media Art | | |
| **Vocabulary** | edit, manipulate, import, export, app smash, audio | | |
| **Week** | **Learning Intention** | **Task/ Activities** | **Resources/ Linked Achievement Standard** |
| **1** | To understand what the STEAM classroom looks like, feels like, sounds like. | Start up   * Setting expectations (Co-constructed)   + STEAM Room   + Resources   + Word Wall Set up   + Reward system * Empathy Maps   (Download required apps, sign in to Google, teacher to set up class iDoceo) | Seesaw  Self Service |
| **2** | To understand what the STEAM classroom looks like, feels like, sounds like. | Start up   * Review expectations and model * Introduction to Media Arts - Image Editing   (Download required apps, sign in to Google, teacher to set up class iDoceo) | Seesaw  Self Service  Colourscape  Adobe Spark |
| **3** | To understand what the STEAM classroom looks like, feels like, sounds like. | Start up   * Review expectations and model * Introduction to Media Arts - Audio recording and editing   (Download required apps, sign in to Google, teacher to set up class iDoceo) | Garage Band  Seesaw  Self Service |
| **4** | To understand how we can create, edit and share videos | Introduction to Media Arts - Video editing | iMovie  iMovie Trailer  VCAMAE025  VCAMAM026 |
| **5** | To create our own custom digital images | Introduction to Media Arts - Drawing images with technology (custom shapes) | Keynote  VCAMAE025  VCAMAM026 |
| **6** | To understand how we can create custom images that we can export | Introduction to Media Arts - Creating transitions, importing images and exporting custom shapes as images | Keynote  VCAMAE025  VCAMAM026 |
| **7** | To share our understanding of media arts | Student Choice Project - Media Arts | Colourscape, Adobe Spark, Garage Band, Keynote, iMovie, iMovie Trailer.  VCAMAE025  VCAMAM026  VCAMAP027  VCAMAR028 |
| **8** | To share our understanding of media arts | * Student Choice Project - Media Arts | Colourscape, Adobe Spark, Garage Band, Keynote, iMovie, iMovie Trailer.  VCAMAE025  VCAMAM026  VCAMAP027  VCAMAR028 |
| **9** | To share our understanding of media arts | * Student Choice Project - Media Arts | Colourscape, Adobe Spark, Garage Band, Keynote, iMovie, iMovie Trailer.  VCAMAE025  VCAMAM026  VCAMAP027  VCAMAR028 |
| **10** | To reflect on what we have learnt about Media Arts | Reflection/ Share | Seesaw  VCAMAR028 |
| **Assessment** | Key Assessment Task:  Achievement Standards to assess this term: | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Term 2** | | | |
| **Unit Title** | Hard Wired! | | |
| **Key Understandings** | * To understand digital system components and peripheral devices can be used to perform input, output and storage functions * To understand how data can be collected, accessed and presented using simple software to create information and solve problems | | |
| **Vocabulary** | hardware, software, input, output, circuits, engineering, plan, code | | |
| **1** | To understand how computer hardware works | * Intro to circuits   + Brain Box   + unplugged | VCDTDS019 |
| **2** | To understand how computer hardware work | * Intro to circuits   + Brain Box   + unplugged | VCDTDS019 |
| **3** | To understand how we can use code to program computer hardware devices | * Intro to Micro:bit * Tour of Microsoft MakeCode * Downloading a MakeCode Program to the micro:bit | VCDTDS019  VCDTDI020  VCDTDI021 |
| **4** | To understand the planning phase of the Engineering Design Process | * Micro:pet (Plan) | VCDTDS019 |
| **5** | To understand the making phase of the Engineering Design Process | * Micro:pet (Make) | VCDTDS019  VCDTDI020  VCDTDI021  VCDTDI022  VCDTCD023  VCDTCD024 |
| **6** | To understand the making phase of the Engineering Design Process | * Micro:pet (Make) | VCDTDS019  VCDTDI020  VCDTDI021  VCDTDI022  VCDTCD023  VCDTCD024 |
| **7** | To understand the making phase of the Engineering Design Process | * Micro:pet (Make) | VCDTDS019  VCDTDI020  VCDTDI021  VCDTDI022  VCDTCD023  VCDTCD024 |
| **8** | To understand the making phase of the Engineering Design Process | * Micro:pet (Make) | VCDTDS019  VCDTDI020  VCDTDI021  VCDTDI022  VCDTCD023  VCDTCD024 |
| **9** | To understand the making phase of the Engineering Design Process | * Micro:pet (Make) | VCDTDS019  VCDTDI020  VCDTDI021  VCDTDI022  VCDTCD023  VCDTCD024 |
| **10** | To reflect on what we know about computers, inputs and outputs and circuits. | * Reflection | VCDTCD025 |
| Assessment | Key Assessment Task:      Achievement Standards to assess this term: | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Term 3** | | | |
| **Unit Title** | Hard Wired 2 | | |
| **Key Understandings** | * To understand digital system components and peripheral devices can be used to perform input, output and storage functions | | |
| **Vocabulary** | inputs, outputs, peripheral devices, variables, coding, conditionals, radio, communicate, connect, data, pairing | | |
| **1** | To understand how a Micro:bit acts like a mini computer. | * Inputs/Outputs-Happy face/Sad face | VCDTDS019  VCDTDI020  VCDTDI021  VCDTCD024 |
| **2** | To understand what variables are and how we can use them when programming. | * coding variables with rock/ paper/ scissors | VCDTDS019  VCDTDI020  VCDTDI021  VCDTCD024 |
| **3** | To understand what conditionals are and how we can use them when programming. | * coding conditionals with a coin flipper game | VCDTDS019  VCDTDI020  VCDTDI021  VCDTCD024 |
| **4** | To understand how to use the radio blocks to send and receive data between Micro:bits. | * using radio blocks to communicate with others (micro:chat) | VCDTDS019  VCDTDI020  VCDTDI021  VCDTCD024 |
| **5** | To understand the types of things we can make with Micro:bit | * Present with a multitude of different things students can use Micro:bit for. They choose one to build over the remainder of the term. | VCDTDS019  VCDTDI020  VCDTDI021  VCDTDI022  VCDTCD023  VCDTCD024  VCDTCD025  VCDSTS023  VCDSTC027  VCDSCD028  VCDSCD029  VCDSCD030  VCDSCD031  VCDSCD032 |
| **6** | To use the Engineering Design Process to plan and create an input/ output device. | * planning | VCDTDS019  VCDTDI021  VCDTDI022  VCDTCD023  VCDTCD024  VCDSTC027  VCDSCD028  VCDSCD029  VCDSCD030  VCDSCD031  VCDSCD032 |
| **7** | To use the Engineering Design Process to create an input/ output device. | * making | VCDTDS019  VCDTDI021  VCDSCD030 |
| **8** | To use the Engineering Design Process to create an input/ output device. | * making | VCDTDS019  VCDTDI021  VCDTCD024  VCDSCD030 |
| **9** | To use the Engineering Design Process to create and improve an input/ output device. | * making and improving | VCDTDS019  VCDTDI021  VCDTCD024  VCDSCD030 |
| **10** | To reflect on what we know about computer hardware and software. | * End of term reflection * 2 stars and a wish | VCDTDI022  VCDTCD025  VCDSCD028  VCDSCD031 |
| Assessment | Key Assessment Task:      Achievement Standards to assess this term: | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Term 4** | | | |
| **Unit Title** | Mini Rube Goldberg | | |
| **Key Understandings** | * simple machines allow us to work more efficiently * simple machines work by applying different forces * Rube Goldberg machines work by applying different simple machines to create a chain reaction | | |
| **Vocabulary** | simple machine, forces, push, pull, lift, work, level, incline, wedge, screw, wheel, axle, chain reaction, energy transfer | | |
| **1** | We are learning to understand how simple machines make our life easier. | * Introduction to Simple Machines * Creating Simple Machines with pasta |  |
| **2** | We are learning to create our own simple machines so that we can understand their abilities. | * Creating simple machines with pasta (creating a simple machine card) * Reflecting on where we would use these simple machines |  |
| **3** | We are learning to identify simple machines in our community so that we can understand their importance to us. | * Brainstorm where we see the different simple machines in real life (lever, inclined plane, wedge, screw, wheel and axle, pulley) * What materials can we use to create simple machines? Where can we find them? - Brainstorm and bring from home. * Exploring and investigating simple machines (digital activity) * Detailed reflection of our findings |  |
| **4** | We are learning to apply our knowledge of simple machines to explore how they can be used to create a Rube Goldberg Machine. | * Introduction to Rube Goldberg machines (where did they come from) * Investigation into Rube Goldberg Machines * How can we use simple machines in a Rube Goldberg? * Note taking - what do we see, what do we like, what will I try, what materials might I need | [Video resources](https://docs.google.com/document/d/1OyTkyDxIntmD0Zx2ck11hxfIbBgOLRDoMMUGm55kgvc/edit) |
| **5**  **STEAM WEEK** | We are learning to carefully plan a Rube Goldberg machine so that we know what materials we will need. | * reflection of what a Rube Goldberg machine is * Explicit modelling of appropriate plans using paper or keynote (uploaded to Seesaw) * design parameters |  |
| **6** | We are learning to produce our own Rube Goldberg machine by carefully following our plans. | * Beginning creation of a Rube Goldberg machine |  |
| **7** | We are learning to produce our own Rube Goldberg machine by carefully following our plans. | * Continuing creation of Rube Goldberg machines |  |
| **8** | We are learning to modify our design so that we can improve our Rube Goldberg machine. | * What does it mean to modify something * What can we modify on our machines to make them better? |  |
| **9** | We are learning to test and refine our design so that our Rube Goldberg machine is the best we can create. | * Discussion of the importance of testing and refining our design. |  |
| **10** | To reflect on what we have learnt this term. | End of Semester Reflection   * [Reflection](https://education.makewonder.com/assets/files/resources.pdf) | [VCDTDI016](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDI016)  [VCDSCD021](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDSCD021) |
| **11** | Activities Week | * STEAM Activities * Tinker Time * Clean Up |  |
| Assessment | Key Assessment Task:   * Students are to create a detailed plan for a Rube Goldberg machine that includes a labelled diagram, measurements, a list of materials and a description of how it will function.   Achievement Standards to assess this term: | | |