**Subject: Computing**

**Year level: 9**

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| **Topic name** | **Sub Topic** | **Comments** | **VicCurric Ref** | **Learning Intention / Comments** |
| Data & Information |   |   |   |   |
| Week 1 | Compression | Data CompressionExpand binary image taskLossy Lossless comparisonHow Video codecs WorkA file format (png,jpg,mp4,wma,etc.) acts as a container for specific data. This data can be compressed in particular ways. And needs to be decoded to be understood correctly, i.e. a Movie where the audio plays, but not the video. | Analyse simple compression of data and how content data are separated from presentation [(VCDTDI046)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDI046) * explaining how simple compression schemes reduce the size of repetitive data, for example how run length encoding reduces the size of images
* explaining the difference between lossy and lossless compression, for example the difference between JPEG and PNG images
* explaining codecs for audio-visual compression, for example common codecs for video formats

  | To understand the difference between lossy & lossless data compressionTo understand why data is compressed  |
| Week 2 | Getting what you need/want!(Acquiring Data)  | Detail on Quantitative, Qualitative Data.Surveys-CAPTCHA -CSI Factbook Segway into Privacy and security (Next session) | Develop techniques for acquiring, storing and validating quantitative and qualitative data from a range of sources, considering privacy and security requirements [(VCDTDI047)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDI047) * developing strategies and techniques for capturing accurate and usable qualitative and quantitative data of different formats, for example using text entry for open-ended questions to acquire qualitative data, or using radio buttons or checkboxes for closed questions to acquire quantitative data
* identifying strengths and weaknesses of collecting data using different methods, for example online surveys, face-to-face interviews, phone interviews, observation, blog entries in response to a posting, phone logs, browser history and online webcam systems

  | To distinguish between qualitative and quantitative data and when each is appropriate.To understand the three different methods of collecting data; surveys, interviews, and observations |
| Week 2-3 | Privacy & Security | Legal Responsibilities: Australian Privacy Principles. Intellectual Property. | Manage and collaboratively create interactive solutions for sharing ideas and information online, taking into account social contexts and legal responsibilities [(VCDTDI049)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDI049) * investigating legal responsibilities of organisations regarding the storage, communication and disposal of personal and organisational data, for example the Australian Privacy Principles as they apply to intellectual property
* applying techniques to make ethical decisions when faced with dilemmas about security and ownership of data, for example selecting an action that results in the greatest benefit for the most number of people; avoiding the use of photos of deceased persons from Aboriginal and Torres Strait Islander communities
 | To determine if data needs to be protected in regards to privacyTo understand the legal responsibilities of storing, communicating and disposing of data  |
| Week 3 -5 | Information is powerful | Visualisation software tool - MS Excel (Should try to expand to other web based)Graphic Representation of Data (EXCEL)Pivot Tables (EXCEL)Absolute Cell Referencing ($C$5 - stops it from changing when copied) (EXCEL)Compound Interest easier to understand (EXCEL) Extension: Database Introduction | Analyse and visualise data to create information and address complex problems, and model processes, entities and their relationships using structured data [(VCDTDI048)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDI048) * using visualisation software tools to identify patterns and relationships between sets of data and information, and support abstract reasoning, for example representing data using histograms, network diagrams and maps
* summarising data using advanced filtering and grouping techniques, for example pivot tables in spreadsheets and aggregation functions in databases
* automating calculations, for example using absolute cell referencing to automatically extend formulas, and automating arithmetic calculations using built-in functions such as trigonometry, compound interest
* simulating simple, iterative processes, for example modelling compound interest or ecological models using a spreadsheet

  | To be able to create a visualisation of large datasets to produce relevant information.To be able to automate calculations |
| Genuino Project |   |   |   |   |
| Week 6-10 | Working Together(Hardware & Software) | Hardware & Software working togetherWorking with Genuino's-Turn on a light-Press a button-Sensors / Interactions  | Design algorithms represented diagrammatically and in structured English and validate algorithms and programs through tracing and test cases[(VCDTCD052)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTCD052) * designing algorithms to solve real-world problems and describing algorithms using flow charts and structured English, for example START, END, IF and UNTIL
* recognising that different algorithms can solve a problem with different trade-offs
* tracing algorithms to predict results and program state for a given input, for example desk checking or using an interactive debugging tool
* using tracing techniques to test algorithms, for example desk checking an algorithm for a given input by stepping through the algorithm while keeping track of contents of the variables
* developing test cases that correspond to the requirements of the specifications, for example validating program behaviour on a range of valid and invalid user input

Develop modular programs, applying selected algorithms and data structures including using an object-oriented programming language [(VCDTCD053)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTCD053) * defining classes that represent the attributes and behaviour of objects in the real world or in a game
* considering different algorithms and selecting the most appropriate based on the type of problem, for example branching algorithms suit optimisation problems and simple recursive algorithms solve the base cases directly
* selecting different types of data structures such as an array, record and object to model structured data

Investigate the role of hardware and software in managing, controlling and securing the movement of and access to data in networked digital systems [(VCDTDS045)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDS045) * explaining the role of hardware and software components in allowing people to interact with digital systems, for example using a mouse or touch pad or screen, speech, accelerometer
* investigating the operation and use of robotic process control systems

   | To understand that digital electronics are controlled by software (code)To be able to program software to control electronic hardwareTo design an algorithm that allows a two lights to alternately flash  |
| Week 11-12 | Assessment | Create a Product | Previous References | Demonstrate prior knowledge, and prepare resources for a digital portfolio  |
| Website Design |   |   |   |   |
| Week 13 | Asking Questions | Functional RequirementsNon Functional RequirementsUX Design | Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs[(VCDTCD050)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTCD050)  Design the user experience of a digital system, evaluating alternative designs against criteria including functionality, accessibility, usability and aesthetics [(VCDTCD051)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTCD051)   | To be able to identify and develop functional and non-functional requirements given specific requirementsTo be able to design a digital user experience, not just a user interface |
| Week 14 - 18 | Digital Product Website | Website DevelopmentStakeholders   | Evaluate critically how well student-developed solutions and existing information systems and policies take account of future risks and sustainability and provide opportunities for innovation [(VCDTCD054)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTCD054)  Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs[(VCDTCD050)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTCD050)   | To be able critically evaluate their solution and identify sustainability, future risks and identify possible areas for improvement/innovationTo be able to collect information from key stakeholders to enable evaluation of their website  |
| Week 19 | Website Folio | Students compile all their design, research into a folio and submit for summative assessment | Previous References | Demonstrate prior knowledge |