**Subject: Computing**

**Year level: 7**

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| **Topic name** | **Sub Topic** | **Comments** | **VicCurric Ref** | **Learning Intention / Comments** |
| Computers at ESC |  |  |  |  |
| Week 1 | Using ESC Systems (XUNO, S:/ Drive) | Allows students to become familiar with the school computer system. Also allowing for a quick observation of current skill level of students | Manage, create and communicate interactive ideas, information and projects collaboratively online, taking safety and social contexts into account  [(VCDTDI039)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDI039)   * organising the instructions and files in readiness for the development of a solution, for example applying a file name convention such as author initials, version and date to all data files that are going to be used to create solutions * devising and applying protocols to manage the collaborative creation of solutions, for example planning to use cloud computing to store common files and establishing virtual meetings that acknowledge time zone differences | * + To be able to use the school portal to submit work, view timetables and current news.   + Understand learn how local network drives and compare with the cloud storage system.   + To be able to print at ESC |
| The Power of Data |  |  |  |  |
| Week 2-3 | How to Collect Data? | How to use a search engine (intitle: , inurl: prefixes, etc.)    What is Data? | Analyse and visualise data using a range of software to create information, and use structured data to model objects or events  [(VCDTDI038)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDI038)   * Designing a search engine query to find specific information on the web and checking its accuracy against information contained in other sources, for example entering instructions such as intitle: and inurl: prefixes to find information within a general directory, and comparing the results with information found in a wiki * acquiring data from a range of sources, for example people, websites, books, mobile phones, radiofrequency identification (RFID) and data repositories such as the Australian Bureau of Statistics datasets, and compiling these data into a digital format * checking authenticity of data, for example ensuring the source or author is a reliable individual or organisation * using techniques to locate data that are timely, for example using a filtering function to specify the timeframe, such as years, for the required data | * + Understand what **data** is   + Understand the variations of data collection   + To be able to collect each data type   + identify how certain technology around them works (Myki(RFID), Barcode Scanners) |
| Week 4 | Analysing Data? | What is Information?  What is the difference between data and information?  Filter | Analyse and visualise data using a range of software to create information, and use structured data to model objects or events  [(VCDTDI038)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDI038)   * using features and functions of software to summarise data to create information, for example calculating a simple budget of income and payments and creating a summary table for analysis * visualising data to create information, for example displaying geocoded data on a map * applying a set of conditions to a spreadsheet to organise and filter data, for example using conditional formatting to highlight the state of particular cells, and filtering and sorting categorical data using column filters * describing the attributes of complex objects, for example defining the records, fields, formats and relationships of a simple dataset | * + Understand the difference between data and information   + To be able to filter information   + Understand quantitative and qualitative data |
| Week 5 | Presenting information | Extension of analysis.  -Focus on other methods of displaying data outside of a simple chart or filtered table. | Analyse and visualise data using a range of software to create information, and use structured data to model objects or events  [(VCDTDI038)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDI038)   * visualising data to create information, for example displaying geocoded data on a map     Manage, create and communicate interactive ideas, information and projects collaboratively online, taking safety and social contexts into account  [(VCDTDI039)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDI039)   * organising the timeline, resources, file naming conventions, back-up measures and sequence of tasks required to collaboratively create solutions that meet specified needs     Define and decompose real-world problems taking into account functional requirements and sustainability (economic, environmental, social), technical and usability constraints  [(VCDTCD040)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTCD040)   * identifying that problems can be decomposed into sub elements, for example creating a decision tree to represent the breakdown and relationships of sub elements to the main problem or identifying the elements of game design such as characters, movements, collisions and scoring | * + To be able to create a range of data visualisations   + To be able to decompose a task into subtasks, and to apply a timeline to each task. |
| Week 6-8 | Assessment | Travel Task   * Students collect data * Students analyse data * Students collect further data based off analysis * Students present their information | All Prior "Power of Data" Links. | To be able to demonstrate knowledge of data & Analysis |
| Computers 101 |  |  |  |  |
| Week 9-10 | Digital | Introduction: Count the Dots <http://csunplugged.org/binary-numbers/>  Image Representation: Colour by Numbers <http://csunplugged.org/image-representation/>  Text, Letters, symbols - ASCII - <https://www.youtube.com/watch?v=zKE2jmUCGZU>  Unicode - <https://www.youtube.com/watch?v=MijmeoH9LT4>    Unicode Charts Lookup Activity  Bitmap vs Vector  Decimal to Binary <https://www.mathsisfun.com/binary-number-system.html>  Ways media elements are presented    Excel RGB Demonstration  <http://www.think-maths.co.uk/spreadsheet> | Investigate how digital systems represent text, image and sound data in binary  [(VCDTDI036)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDI036)   * investigating how colours are represented in images and videos, for example manipulating red, green and blue (RGB) colours in an image editor * explaining that characters in text correspond to numbers defined by the character set, for example ‘A’ corresponds to 65 in the ASCII and Unicode character sets * recognising that Unicode attempts to represent the written symbols of every language; and using Unicode charts to look up characters from Asian writing systems * investigating the different representation of bitmap and vector graphics and its consequences, for example pixelation in magnified bitmap and vector images * converting between decimal and 8-bit (1 byte) unsigned binary, covering whole numbers typically used for characters and RGB, for example 65 in decimal is 01000001 in 8-bit binary * ~~explaining ways media elements are presented, for example the difference between embedded and linked media elements~~ | Students are introduced to the RGB System. (this will be covered in more depth with mBot)  Pixelation - Why are they different from Vector images? Specific Point vs Calculated curve -Use Straight Line)  Binary Numbers - Converting between decimal and 8 bit  ASCII  Difference between unicode & ASCII |
| Week 11 | Networks | Warriors of the Net - <https://www.youtube.com/watch?v=PBWhzz_Gn10>  Brief Protocol differences - TCP/IP, HTTP, HTTPS, FTP, WAP  Cell Towers & Mobiles - possibly: <https://www.youtube.com/watch?v=RhOKTHDHtho>    Have graphs/data of wireless, wired & Mobile network speeds. (include 2G,3G,4G) | Investigate how data are transmitted and secured in wired, wireless and mobile networks  [(VCDTDS035)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDS035)   * explaining that networks have components that control the movement of data, for example routers, hubs, switches and bridges manage data traffic and that the characteristics of these components impact on the operation (speed and security) of networks * recognising that there are different communications protocols for transmitting data in networks, for example hypertext transfer protocol (HTTP) is used for transferring web page files in a browser, file transfer protocol (FTP) is used for sending and receiving any files over a network and transmission control protocol/internet protocol (TCP/IP) is used for controlling file transfers over the internet * explaining how cellular radio towers (transceivers) and mobile phones work together to create mobile networks * comparing the reliability and speed of transmitting data through wireless, wired and mobile networks | Introduce students about protocols, (No deeper than the Warriors of the net video explanation)  Components of a network. Bring in the older physical pieces (Hub, Switch, Router, WAP).  Comparison of Reliability & Speed of data) through different networks - brief as their will be a focus on this during the mBot Program  How mobile phones work. |
| Robots |  |  |  |  |
| Week 12 | Robots Introduction  [Introduction & Movement](onenote:#Introduction%20%20Movement&section-id={AFFAF6A3-707E-46CC-9B75-EC806F30448E}&page-id={382D8A06-C40B-471C-9EB2-C3F7BBBDF2BA}&end&base-path=https://eduvic-my.sharepoint.com/personal/09048098_education_vic_gov_au/Documents/Staff%20Notebooks/ESC%20Technology%) | What are robots?  What are they used for?    Pro's/Cons wired verse wireless on mBot    Students are then asked to design a UI in scratch to control their robot. Based off a Young student (5Yrs using) | Investigate how data are transmitted and secured in wired, wireless and mobile networks  [(VCDTDS035)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDS035)   * comparing the reliability and speed of transmitting data through wireless, wired and mobile networks     Define and decompose real-world problems taking into account functional requirements and sustainability (economic, environmental, social), technical and usability constraints  [(VCDTCD040)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTCD040)   * determining the factors that influence proposed solution ideas, for example user age affects the language used for instructions, dexterity affects the size of buttons and links, hearing or vision loss influence captioned or audio-described multimedia as alternative ways that common information is presented on a website |  |
| Week 12-15 | [Sensing the World](onenote:#Sensing%20the%20World&section-id={AFFAF6A3-707E-46CC-9B75-EC806F30448E}&page-id={9F0BB190-FF77-4D6B-91B0-1944BFCC75EB}&end&base-path=https://eduvic-my.sharepoint.com/personal/09048098_education_vic_gov_au/Documents/Staff%20Notebooks/ESC%20Technology%20365) | Change the lights. Colours Represented - RGB - <https://www.youtube.com/watch?v=R3unPcJDbCc>  Make the robot Move via arrows on UI  Make the distance sensor read out appear on the UI  Make robot drive towards a wall, and the robot will stop, lights change colour as it gets closer (Manual forward will not work until lights are green and distance is clear)  Algorithm   * sequence of steps to solve a problem * Flow charting in Years 7 to 9     Extended task - M-Bot playing xylophone    Decomposition   * breaking down a problem down to smaller parts * Understanding functional requirements * Identifying constraints * Modify existing Travel Task to meet new curriculum requirements |  |  |
| Week 16 | Assessment | mBot Navigates a maze.  Students are allowed to trial/error in pairs throughout lesson. (Teacher manages maze runs) |  |  |