Digital Technologies, Foundation to Level 10 – Unplugged activities

The VCAA has developed the following resource for Digital Technologies. The resource includes unplugged activities across a range of content descriptions in all strands from Foundation to Level 10. Unplugged activities are activities that do not require students to use digital systems or the internet. The unplugged activities in this resource can be completed by students at home, if they are working remotely, or by students working in the classroom.

This resource has been developed to assist teachers by providing examples of activities in which students can demonstrate their understanding of the curriculum. Activities are grouped by band: F–2, 3–4, 5–6, 7–8 and 9–10. The resource provides the relevant extracts of the achievement standard for the content descriptions provided. Not all the content descriptions have been included, because some are better suited to being delivered as plugged activities. The chosen content descriptions cover the strands Digital Systems, Data and Information and Creating Digital Solutions.

Each of the content descriptions has two corresponding unplugged activities for students. These unplugged activities involve students identifying digital systems, collecting data, sorting data, listing items, drawing diagrams, writing descriptions and instructions, developing tables and algorithms, testing algorithms and annotating mock-ups.

Teachers would need to prepare students for these activities with a range of teaching and learning activities. They may also wish to prepare student worksheets to go with these activities. Teachers should monitor students’ completion of the unplugged activities and assess these against the relevant achievement standard/s. Students could submit evidence of these activities for teachers to assess by taking photographs of their work and emailing them to the teacher, emailing completed documents to the teacher, or uploading their images and documents to the school learning management system.

Digital Technologies, Foundation to Level 2 – Unplugged activities

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| **Achievement standard extracts** | |
| By the end of Level 2, students identify how common digital systems are used to meet specific purposes.  Students use digital systems to represent simple patterns in data in different ways and collect familiar data and display them to convey meaning.  Students design solutions to simple problems using a sequence of steps and decisions … | |
| **Strand and content descriptions** | **Unplugged activities** |
| Digital Systems | |
| Identify and explore digital systems (hardware and software components) for a purpose [(VCDTDS013)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDS013) | * Identify common digital systems and describe their purpose, for example smart phones, desktop computers, tablets and smart TVs. Draw a diagram of these digital systems, label them and give a brief description of their purpose. * Identify and describe a range of hardware and software components for a desktop or laptop computer. Hardware components could include hard disk drives and printers. Software components could include operating systems and word processing software. |
| Data and Information | |
| Recognise and explore patterns in data and represent data as pictures, symbols and diagrams [(VCDTDI014)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDI014) | * Collect data about family members’ and relatives’ or friends’ birthday months. Draw a table with columns for each month and represent the birthdays as symbols for the relevant season. * Keep a list of the classes you study each day. Assign a symbol or a letter for each class, for example M for mathematics and S for science. After two weeks, list each of the classes for each day in a table. Compare the data for each day over the two weeks. Make some observations in relation to the data. |
| Collect, explore and sort data, and use digital systems to present the data creatively [(VCDTDI015)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDI015) | * Collect and sort some items at home or at school, such as books or toys, using different categories, such as alphabetical order, numerical order and size order. Write a short description of how you have sorted each collection of items. * Collect data about family members’ and relatives’ or friends’ birthday months and display the information as a pictograph. |
| Creating Digital Solutions | |
| Follow, describe and represent a sequence of steps and decisions (algorithms) needed to solve simple problems [(VCDTCD017)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTCD017) | * Follow some basic step-by-step instructions, such as a recipe to create something or solve a problem. Write down the steps followed and explain what was created, solved or completed. * Program a family member or friend as a robot, for example develop some instructions for them to follow using symbols for left, right, forward one, backward one. Write down the steps followed and describe how they were able to follow your instructions. |

Digital Technologies, Levels 3 and 4 – Unplugged activities

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| **Achievement standard extracts** | |
| 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 …  Students define simple problems, and design … digital solutions using algorithms that involve decision-making and user input … | |
| **Strand and content descriptions** | **Unplugged activities** |
| Digital Systems | |
| Explore a range of digital systems with peripheral devices for different purposes, and transmit different types of data [(VCDTDS019)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDS019) | * Create a table with two columns and list the peripheral devices you have at home or in the classroom in the left column. In the right column explain what each of the peripheral devices are used for and what data each device transmits. * Identify in a table the different types of data (text, images, video, sounds) that can be transmitted by each of the peripheral devices you listed in the activity above. |
| Data and Information | |
| Recognise different types of data and explore how the same data can be represented in different ways [(VCDTDI020)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDI020) | * Identify and describe a range of data types, such as numbers, text, images. For each data type provide an example of how the data type is used in a digital system. * For each of the data types you identified in the activity above, draw a diagram representing it using some commonly used icons, for example sound represented as a wave. |
| Collect, access and present different types of data using simple software to create information and solve problems [(VCDTDI021)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDI021) | * Collect and record some data on family members or friends in a table, for example their favourite colour, hair colour, birthday, suburb they live in and favourite food. * Sort the data collected in the activity above, for example, sort birthdays into numerical order from the first birthday in the year to the last. |
| Creating Digital Solutions | |
| Define simple problems, and describe and follow a sequence of steps and decisions involving branching and user input (algorithms) needed to solve them [(VCDTCD023)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTCD023) | * Provide a family member or friend with a set of instructions involving some decisions (yes or no conditions) to complete a task. Write the instructions down and describe how successfully the task was performed. * Using a teacher-provided algorithm, describe how the algorithm works in terms of input, processing and output, by annotating the algorithm. |

Digital Technologies, Levels 5 and 6 – Unplugged activities

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| **Achievement standard extracts** | |
| By the end of Level 6, students explain the functions of digital system components and how digital systems are connected to form networks that transmit data.  Students explain how digital systems use whole numbers as a basis for representing a variety of data types …  Students define problems in terms of data and functional requirements and design solutions by developing algorithms to address the problems. They incorporate decision-making, repetition and user interface design into their designs … | |
| **Strand and content descriptions** | **Unplugged activities** |
| Digital Systems | |
| Examine the main components of common digital systems, and how such digital systems may connect together to form networks to transmit data [(VCDTDS026)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDS026) | * Identify and describe the internal and external components of a digital system, such as a desktop personal computer. For example, internal components include hard disk drives and central processing unit; external components include speaker and monitors. * Describe how data is transmitted within a digital system, for example between an iPad and the school server. |
| Data and Information | |
| Examine how whole numbers are used as the basis for representing all types of data in digital systems [(VCDTDI027)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDI027) | * Examine binary numbers and describe how the binary number system relates to the control of digital devices through ‘on’ and ‘off’. * Represent the numbers 1 to 20 as binary numbers. |
| Creating Digital Solutions | |
| Define problems in terms of data and functional requirements, drawing on previously solved problems to identify similarities [(VCDTCD030)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTCD030) | * Define the nature of a problem that involves developing a software solution that converts numeric test scores into a letter grade. Describe who the software solution is for, what data is required by the solution and how the software solution will work. * Identify any existing features from existing software solutions that would be similar to the new software solution from the activity above. |
| Design a user interface for a digital system, generating and considering alternative design ideas [(VCDTCD031)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTCD031) | * Design the user interface for the software solution from the activity above using a mock-up. Annotate the mock-up describing the features used in the software solution. * Generate alternative design ideas for a game. Take into consideration different types of devices, such as tablets, smart phones, laptops and gaming consoles, as well as the orientation of the screens, such as portrait or landscape. |
| Design, modify and follow simple algorithms represented diagrammatically and in English, involving sequences of steps, branching, and iteration [(VCDTCD032)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTCD032) | * Draw a diagram that describes a set of instructions to sort numbers into numerical order. * Experiment with the different ways of representing instructions for decision-making or repeating a task. When making a decision, use branching statements such as ‘IF’ statements to represent true or false for the decision. When repeating a task, use iteration statements such as ‘REPEAT’ statements to represent continuing to perform a task until an end point is reached. |

Digital Technologies, Levels 7 and 8 – Unplugged activities

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| **Achievement standard extracts** | |
| By the end of Level 8, students distinguish between different types of networks and their suitability in meeting defined purposes.  Students explain how text, image and sound data can be represented and secured in digital systems and presented using digital systems. They analyse … data from a range of sources to model solutions …  Students define and decompose problems in terms of functional requirements and constraints. They design user experiences and algorithms incorporating branching and iterations, and … test, and modify … | |
| **Strand and content descriptions** | **Unplugged activities** |
| Digital Systems | |
| Investigate how data is transmitted and secured in wired, wireless and mobile networks [(VCDTDS035)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDS035) | * Draw a simple diagram of your home or school network using symbols to show the wireless router, laptops or tablet devices and printers. Indicate whether devices are connected wirelessly. * Describe the purpose of the network components such as routers, hubs, switches and bridges. In the description include their characteristics and capabilities. You could also create a network diagram using these components. |
| Data and Information | |
| Investigate how digital systems represent text, image and sound data in binary [(VCDTDI036)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDI036) | * Describe how the characters on a computer keyboard correspond to the characters in a character set such as ASCII code. You could enter the ASCII code for your name. * Describe the universal character encoding standard Unicode and how it is used. |
| Analyse and visualise data using a range of software to create information, and use structured data to model objects or events [(VCDTDI038)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDI038) | * Design a simple budget for your monthly income and expenses using a pencil and paper. Annotate the design, describing the features and functions of the software you would use to develop this solution. Include the use of formatting, calculations, tables and/or charts. * On a teacher-provided worksheet, identify and describe the attributes of a database software solution, including fields, records, tables, forms, relationships and keys. |
| Creating Digital Solutions | |
| Define and decompose real-world problems taking into account functional requirements and sustainability (economic, environmental, social), technical and usability constraints [(VCDTCD040)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTCD040) | * Identify the need for a new game that can be played on a tablet device, smart phone or gaming console. Identify and describe the different components or elements of the game, such as characters, movement, collisions, levels and scoring. * Determine the type of usability constraints on the game from the activity above in terms of the age of the user, language, dexterity, and hearing or vision loss. |
| Design the user experience of a digital system, generating, evaluating and communicating alternative designs [(VCDTCD041)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTCD041) | * Design the user interface for a new computer game, using a storyboard to explain the stages of the game. * Identify the features of the new game that will make it effective, such as the storyline, gameplay, environment, goals and rewards. |
| Design algorithms represented diagrammatically and in English, and trace algorithms to predict output for a given input and to identify errors [(VCDTCD042)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTCD042) | * Write an algorithm for a task, such as entering in a class set of test scores. Write the algorithm as English statements and include decisions and repetition. * Test the algorithm by tracing the input of a few test scores to check for the accuracy of the algorithm (desk-checking). Identify any errors and modify the algorithm. |

Digital Technologies, Levels 9 and 10 – Unplugged activities

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| **Achievement standard extracts** | |
| By the end of Level 10, students explain the control and management of networked digital systems and the data security implications of the interaction between hardware, software and users.  … They take account of privacy and security requirements when selecting and validating data …  Students define and decompose complex problems in terms of functional and non-functional requirements. They design and evaluate user experiences and algorithms … Students evaluate their … information systems in terms of risk … | |
| **Strand and content descriptions** | **Unplugged activities** |
| Digital Systems | |
| Investigate the role of hardware and software in managing, controlling and securing the movement of and access to data in networked digital systems [(VCDTDS045)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDS045) | * On a teacher-provided worksheet, evaluate the advantages and disadvantages of different transmission media used in networks, for example wi-fi, ethernet and fibre-optic. Describe how the transmission media transmits data and draw a diagram of it. * Explain the process of encryption for protecting data. Describe how it works when encrypting a message to a friend. |
| Data and Information | |
| Develop techniques for acquiring, storing and validating quantitative and qualitative data from a range of sources, considering privacy and security requirements [(VCDTDI047)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTDI047) | * Identify the advantages and disadvantages of collecting data using different methods, for example online surveys, face-to-face interviews, phone interviews, observation, responses to online posts and browser history. * Using a teacher-provided worksheet that includes sections of the following Acts, identify and describe the relevant sections of the *Privacy Act 1988* and the *Privacy and Data Protection Act 2014* regarding data collection and storage. |
| Creating Digital Solutions | |
| Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs [(VCDTCD050)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTCD050) | * Develop a specification for a basic reporting software solution for a classroom teacher. Include a problem statement, solution needs expressed as functional and non-functional requirements, assumptions or constraints, and the scope or boundaries of the software solution. * Identify a range of potential users of the software solution from the activity above and determine a range of questions to ask them about what they would like in the reporting software. |
| Design the user experience of a digital system, evaluating alternative designs against criteria including functionality, accessibility, usability and aesthetics [(VCDTCD051)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTCD051) | * Design three alternative user experiences for the software solution above as a mock-up. Include annotations detailing appearance and functionality. * Evaluate the three alternative user experiences above using evaluation criteria. The criteria should include functionality, accessibility, usability and aesthetics. |
| Design algorithms represented diagrammatically and in structured English and validate algorithms and programs through tracing and test cases [(VCDTCD052)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDTCD052) | * Write an algorithm for a task, such as entering in student results for a semester as numerical scores out of 100. Convert each of the scores to a letter grade for their reports. Validate the scores to ensure a number is entered between 0 and 100. * Draw the algorithm from the activity above as a flow chart, using appropriate symbols. |