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Digital Learning Team

Primary Digital Technologies Progression

This document is designed to support the learning of digital technologies as outlined in the recently revised experiences and outcomes for technologies. The outcomes, experiences and accompanying benchmarks have been organised from Early to Fourth level and represent learning in Digital Literacy and Computing Science. Please note that digital technologies are not designed to be taught in isolation and references to the use of digital technologies are found in other areas of the curriculum, including Technologies more widely.

In addition to the progression a group of experienced teachers have developed resources to support Building Resilience, Growth Mindset unit which can be delivered using digital technologies.

Many thanks to Alet Bauer (Gilmerton Primary), Ross Gibson (Canal View Primary), Ross Hucheson (Hermitage Park Primary), Kirsty Kyles (Wardie Primary), Jude Moir (Echline Primary) and Debra Wilson (Towerbank Primary) who have developed these supporting materials.

Digital Literacy

Experiences and Outcomes: Using digital products and services in a variety of contexts to achieve a purposeful outcome

- I can explore digital technologies and use what I learn to solve problems and *share* ideas and thoughts. TCH 0-01a
- I can explore and experiment with digital technologies and can use what I learn to support and enhance my learning in different contexts. TCH 1-01a
- I can extend and enhance my knowledge of digital technologies to collect, analyse ideas, relevant information and organise these in an appropriate way. TCH 2-01a
- I can explore and use the features of a range of digital technologies, integrated software and online resources to determine the most appropriate to solve problems. TCH 3-01a
- I can select and use digital technologies to access, select relevant information and solve real world problems. TCH 4-01a

Benchmarks

Early	First	Second	Third	Fourth
• Recognises different types of digital technology. • Identifies the key components of different types of digital technology. • Logs on to a preferred device with a given password. • Identifies icons for different applications. • Opens and close a pre-saved file. • Identifies and consistently use the close icon. • Uses digital technologies in a responsible way and with appropriate care.	• Communicate and collaborate with others using digital technology for example, email, Glow or other platforms. • Opens and saves a file to and from a specific location. • Identifies the key components of frequently used digital technology and whether it is a piece of hardware or software. • Uses digital technology to collect, capture, combine and share text, sound, video and images	• Identifies and saves in a range of standard file formats • Saves files using an organised filing system. • Stores, shares and collaborates using an online cloud based service for example, Glow or other platforms. • Identifies the key features of input, output and storage devices. • Selects and use applications and software to capture, create and modify text, images, sound and video. • Selects the most appropriate digital software to perform a task.	• Uses the most appropriate applications and software tools to capture, create and modify text, images, sound, and video to present and collaborate. • Demonstrates an understanding of file handling for example, uploading, downloading, sharing and permission setting, for example within Glow or other platforms.	• Demonstrates an understanding of how digital literacy will impact on their future learning and career pathways. • Consistently use a range of devices and digital software and applications and services to share, create, collaborate effectively and publish digital content online

Experiences and Outcomes: searching, processing and managing information responsibly

- I can use digital technologies to explore how to search and find information. TCH 0-02a
- Using digital technologies responsibly I can access, retrieve and use information to support, enrich or extend learning in different contexts. TCH 1-02a
- I can use digital technologies to search, access and retrieve information and are aware that not all of this information will be credible. TCH 2-02a
- Having used digital technologies to search, access and retrieve information I can justify my selection in terms of validity, reliability and have an awareness of plagiarism. TCH 3-02a
- I can use digital technologies to process and manage information responsibly and can reference sources accordingly. TCH 4-02a

Benchmarks

Early	First	Second	Third	Fourth
• Identifies and uses images and key words when searching for specific information. • Demonstrates an understanding of how information can be found on websites as text, audio, images and video. • Demonstrates an understanding of how they should not use materials owned by others without permission.	• Demonstrates an understanding of the concept of ownership of material and ideas. • Demonstrates an understanding of the different functions of a browser and search engine. • Recognises what should and shouldn't be searched for on the Internet.	• Uses search engines to search the internet for specific or relevant information for example, using quotation marks to narrow the results. • Access websites and use navigation skills to retrieve information for a specific task. • Demonstrates an understanding of usage rights and can apply these within a search for example creative commons	• Gathers and combines data and information from a range of sources to create a publication, presentation or information resource. • Uses applications to analyse data and identify trends/make predictions based on source data. • Demonstrates efficient searching techniques for example using 'and', 'or', 'not'	• Gathers, evaluates and combines data and information from a range of sources to create a publication, presentation or information resource. • Evaluates applications to analyse data and identify trends/make predictions based on source data. • Evaluates efficient searching techniques for example using 'and', 'or','not'

Experiences and Outcomes: cyber resilience and internet safety

- I can explore, play and communicate using digital technologies safely and securely. TCH 0-03a
- I can extend my knowledge of how to use digital technology to communicate with others and I am aware of ways to keep safe and secure. TCH 1-03a
- I can explore online communities demonstrating an understanding of responsible digital behaviour and I'm aware of how to keep myself safe and secure. TCH 2-03a
- I can keep myself safe and secure in online environments and I am aware of the importance and consequences of doing this for myself and others.TCH 3-03a
- I can explore the impact of cyber-crime for business and industry and the consequences this can have on me. TCH 4-03a

Benchmarks

Early	First	Second	Third	Fourth
• Demonstrates an understanding of appropriate behaviour and language in the digital environment. • Demonstrates an understanding of the importance of passwords and passcodes for example access to school building.	• Demonstrates understanding of my rights and responsibilities as a digital citizen. • Demonstrates understanding of the potential dangers online and who to go to for advice and who to report a concern to. • Demonstrates an understanding for the need for strong passwords. • Explains the need to get a person's permission before taking a picture or video of them.	• Demonstrates an understanding of the content they should include in an online profile. • Discusses the importance of being a responsible digital citizen, giving examples of appropriate online behaviours and actions. • Identifies appropriate ways to report concerns. • Uses strong passwords. • Has an understanding of the law as it relates to inappropriate or illegal online behaviours, for example, the sharing of inappropriate images	• Demonstrates an understanding of the legal implications and importance of protecting their own and others' privacy when communicating online. • Evaluates online presence and identifies safe guards. • Present relevant ideas and information to explain risks to safety and security of their personal devices and networks including encryption. • Applies appropriate online safety features when becoming involved with online communities such as online gaming, chat rooms, forums and social media. • Demonstrate an understanding of different cyber threats, for example, viruses, phishing, identity theft, extortion and sextortion. • Demonstrates understanding of device security including personal and domestic devices.	• Demonstrates understanding of how industry collects and uses personal data ethically and how this relates to data security legislation. • Demonstrates understanding of how cyber security breaches in industry can impact on individuals. • Evaluates the digital footprint of industry and identifies good practice • Identifies the main causes of security breaches in industry. • Demonstrates understanding of safe disposal of data and devices.

Computing Science

Experiences and Outcomes: understanding the world through computational thinking

- I can explore computational thinking processes involved in a variety of everyday tasks and can identify patterns in objects or information TCH 0-13a
- I can explore and comment on processes in the world around me making use of core computational thinking concepts and can organise information in a logical way TCH 1-13a
- I understand the operation of a process and its outcome. I can structure related items of information. TCH 2-13a
- I can describe different fundamental information processes and how they communicate and can identify their use in solving different problems TCH 3-13a
- I am developing my understanding of information and can use an information model to describe particular aspects of a real-world system TCH 3-13b
- I can describe in detail the processes used in real world solutions, compare these processes against alternative solutions and justify which is the most appropriate. TCH 4-13a
- I can informally compare algorithms for correctness and efficiency. TCH 4-13b

Benchmarks

Early	First	Second	Third	Fourth
• Identifies and sequences the main steps in an everyday task to create instructions/an algorithm for example, washing hands. • Classifies objects and groups them into simple categories for examples, groups toy bricks according to colour. • Identifies patterns, similarities and differences in objects or information such as colour, size and temperature and simple relationships between them.	• Follows sequences of instructions/algorithms from everyday situations for example, recipes or directions, including those with selection and repetition. • Identifies steps in a process and describes precisely the effect of each step. • Makes decisions based on logical thinking including IF, AND, OR and NOT for example, collecting balls in the gym hall but NOT basketballs, line up if you are left-handed OR have green eyes. • Collects, groups and orders information in a logical, organised way using my own and others' criteria (MNU 1-20a and b).	• Compares activities consisting of a single sequence of steps with those consisting of multiple parallel steps, for example, making tomato sauce and cooking pasta to be served at the same time. • Identifies algorithms/instructions that include repeated groups of instructions a fixed number of times and/or loops until a condition is met. • Identifies when a process is not predictable because it has a random element for example, a board game which uses dice. • Structures related items of information for example, a family tree (MNU 2- 20b). • Uses a recognised set of instructions/ an algorithm to sort real worlds objects for examples, books in a library or trading cards	• Recognises and describes information systems with communicating processes which occur in the world around me • Explains the difference between parallel processes and those that communicate with each other • Demonstrates an understanding of the basic principles of compression and encryption of information • Identifies a set of characteristics describing a collection of related items that enable each item to be individually identified • Identifies the use of common algorithms such as sorting and searching as part of larger processes.	• Identifies the transfer of information through complex systems involving both computers and physical artefacts, for example, airline check-in, parcel tracking and delivery. • Describes instances of human decision making as an information process, for example, deciding which check-out queue to pick, which route to take to school, how to prepare family dinner / a school event. • Compares alternative algorithms for the same problem and understands that there are different ways of defining "better" solutions depending on the problem context for example, is speed or space more valuable in this context?

Experiences and Outcomes: understanding and analysing computing technology

- I understand that sequences of instructions are used to control computing technology. TCH 0-14a
- I can experiment with and identify uses of a range of computing technology in the world around me. TCH 0-14b
- I understand the instructions of a visual programming language and can predict the outcome of a program written using the language. TCH 1-14a
- I understand how computers process information. TCH 1-14b
- I can explain core programming language concepts in appropriate technical language. TCH 2-14a
- I understand how information is stored and how key components of computing technology connect and interact through networks.TCH 2-14b
- I understand language constructs for representing structured information. TCH 3-14a
- I can describe the structure and operation of computing systems which have multiple software and hardware levels that interact with each other. TCH 3-14b
- I understand constructs and data structures in a textual programming language. TCH 4-14a
- I can explain the overall operation and architecture of a digitally created solution. TCH 4-14b
- I understand the relationship between high level language and the operation of computer. TCH 4-14c

Benchmarks

Early	First	Second	Third	Fourth
• Demonstrates an understanding of how symbols can represent process and information. • Predicts what a device or person will do when presented with a sequence of instructions for example, arrows drawn on paper. • Identifies computing devices in the world (including those hidden in appliances and objects such as automatic doors).	• Demonstrates an understanding of the meaning of individual instructions when using a visual programming language (including sequences, fixed repetition and selection). • Explains and predicts what a program in a visual programming language will do when it runs for example, what audio, visual or movement effect will result. • Demonstrates an understanding that computers take information as input, process and store that information and output the results.	• Explains the meaning of individual instructions (including variables and conditional repetition) in a visual programming language • Predicts what a complete program in a visual programming language will do when it runs, including how the properties of objects for example, position, direction and appearance change as the program runs through each instruction. • Explains and predicts how parallel activities interact • Demonstrates an understanding that all computer data is represented in binary for example, numbers, text, black and white graphics.	• Understands that the same information could be represented in more than one representational system • Understands that different information could be represented in exactly the same representation • Demonstrates an understanding of structured information in programs, databases or webpages • Describes the effect of mark-up language on the appearance of a webpage, and understand that this may be different on different devices.	• Understands basic control constructs such as sequence, selection repetition, variables and numerical calculations in a textual language • Demonstrates an understanding of how visual instructions and textual instructions for the same construct are related • Identifies and explains syntax errors in a program written in a textual language • Demonstrates an understanding of representations of data structures in a textual language.

		• Describes the purpose of the processor, memory and storage and the relationship between them • Demonstrates an understanding of how networks are connected and used to communicate and share information, for example the internet.	• Demonstrates an understanding of the von Neumann architecture and how machine code instructions are stored and executed within a computer system • Reads and explains code extracts including those with variables and data structures • Demonstrate an understanding of how computers communicate and share information over networks including the concepts of sender, receiver, address and packets. • Understands simple compression and encryption techniques used in computing technology	• Demonstrates an understanding of how computers represent and manipulate information in a range of formats • Demonstrates an understanding of program plans expressed in accepted design representations for example pseudocode, storyboarding, structure diagram, data flow diagram, flow chart • Demonstrates an understanding of the underling technical concepts of some specific facets of modern complex technologies for example, online payment systems and satnav. • Demonstrates an understanding that computers translate information processes between different levels of abstraction

Experiences and Outcomes: Designing, building and testing computing solutions
I can develop a sequence of instructions and run them using programmable devices or equivalent. TCH 0-15a
I can demonstrate a range of basic problem solving skills by building simple programs to carry out a given task, using an appropriate language. TCH 1-15a
I can create, develop and evaluate computing solutions in response to a design challenge. TCH 2-15a
I can select appropriate development tools to design, build, evaluate and refine computing solutions based on requirements. TCH 3-15a
I can select appropriate development tools to design, build, evaluate and refine computing solutions to process and present information whilst making reasoned arguments to justify my decisions. TCH 4-15a

Benchmarks

Early	First	Second	Third	Fourth
• Designs a simple sequence of instructions/algorithm for programmable device to carry out a task for example, directional instructions: forwards/backwards. • Identifies and corrects errors in a set of instructions.	• Simplifies problems by breaking them down into smaller more manageable parts. • Constructs a sequence of instructions to solve a task, explaining the expected output from each step and how each to contributes towards solving the task. • Creates programs to carry out activities (using selection and fixed repetition) in an visual programming language. • Identifies when a program does not do what was intended and can correct errors/bugs. • Evaluates solutions/programs and suggests improvements.	• Creates programs in a visual programming language including variables and conditional repetition. • Identifies patterns in problem solving and reuses aspects of previous solutions appropriately for example, reuse code for a timer, score counter or controlling arrow keys. • Identifies any mismatches between the task description and the programmed solution, and indicates how to fix them.	• Designs and builds a program using a visual language combining constructs and using multiple variables. • Represents and manipulates structured information in programs, or databases for example, works with a list data structure in a visual language, or a flat file database. • Interprets a problem statement, and identifies processes and information to create a physical computing and/or software solution. • Can find and correct errors in program logic. • Groups related instructions into named subprograms (in a visual language). • Writes code in which there is communication between parallel processes (in a visual language).	• Analyses problem specifications across a range of contexts, identifying key requirements. • Writes a program in a textual language which uses variables and constructs such as sequence, selection and repetition. • Creates a design using accepted design notations for example, pseudocode storyboarding, structure diagram, data flow diagram, flow chart. • Develops a relational database to represent structured information. • Debugs code and can distinguish between the nature of identified errors e.g. syntax and logic. • Writes test and evaluation reports. • Can make use of logical operators – AND, OR, NOT.

			• Writes code which receives and responds to real world inputs (in a visual language). • Designs and builds web pages using appropriate mark-up languages.	• Writes a program in a textual language which uses variables within instructions instead of specific values where appropriate. • Designs appropriate data structures to represent information in a textual language. • Selects an appropriate platform on which to develop a physical and/or software solution from a requirements specification. • Compares common algorithms for example, those for sorting and searching, and justify which would be most appropriate for a given problem. • Design and build web pages which includes interactivity.