Digital Technologies Progression Points: Year 6 v8.3

Independent Schools Queensland (ISQ) has developed Progression Points to support teachers in independent schools with implementation of version 8.3 of the Australian Curriculum.

A Word document version of the Progression Points is available so that teachers can rearrange the sequences of learning.

Personnel in independent schools are encouraged to consider how the Progression Points could be used to: -

* diagnose through formative assessment, the capabilities, strengths and weaknesses of individual students
* plan teaching programs to meet the needs of individuals and groups of students
* formally assess the progress of individuals and groups of students
* report to parents on the achievements of their children against the Australian Curriculum.

The “demonstrating” column accurately reflects the expectations of version 8.3 of the Australian Curriculum achievement standards.

ISQ welcomes any suggestions for improvement from teachers working very closely with the Progression Points.

**Digital Technologies Progression Points – Year 6**

| **Strand and content descriptions for teaching*****Modes*** | **Emerging** | **Developing** | **Demonstrating** | **Advancing**  | **Extending** |
| --- | --- | --- | --- | --- | --- |
| Beginning to work towards the achievement standard  | Working towards the achievement standard | Demonstrating the achievement standard | Working beyond the achievement standard | Extending with depth beyond the achievement standard |
| * *With explicit prompts (step-by-step oral scaffolding, reference to charts, word wall, etc)*
* *In familiar contexts*
* *Learning to follow procedures*
 | * *With prompts (oral or written questions, reference to charts, word walls, etc)*
* *In familiar contexts*
* *Attempts to explain*
 | * *Independent (with access to charts, word walls, etc.)*
* *In familiar contexts*
* *Explains basic understanding*
 | * *Independent (with access to charts, word walls, etc.)*
* *Applying in familiar contexts*
* *Explains with detail*
 | * *Independent (with access to charts, word walls, etc.)*
* *Applying in new contexts*
* *Explains with connections outside the teaching context*
 |
| **Achievement Standard**By the end of Year 6, students explain the fundamentals of digital system components (hardware, software and networks) and how digital systems are connected to form networks. They explain how digital systems use whole numbers as a basis for representing a variety of data types. |
| **Content Descriptions** | Students explain the fundamentals of digital system components (hardware, software and networks) and how digital systems are connected to form networks |
| **KNOWLEDGE AND UNDERSTANDING** | Examine the main [components](http://www.australiancurriculum.edu.au/glossary/popup?a=T&t=components) of common digital systems and how they may connect together to form networks to transmit [data](http://www.australiancurriculum.edu.au/glossary/popup?a=T&t=data) [(ACTDIK014)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACTDIK014) | **In familiar contexts, students:*** **identify** internal components of a digital system.

*EG. Identifies that computer has a CPU (Central Processing Unit)** **identify** external components of a digital system and that can connect to a digital system to transmit data.

*EG. Identifies a keyboard as an external component and that can be connected with or without wires** **identify** two digital systems that can be connected.

*EG. States that a printer can be connected to a computer* | **In familiar contexts with prompts, students:*** **describe** the purpose of internal components of a digital

*EG. Describes that a CPU (Central Processing Unit) is chip inside a computer, that is often described as the brain of the computer** **describe** the purpose of external components of a digital system and how they connect to transmit data

*EG. Identifies a keyboard as an external component and that it can be connected via a USB (wired connection)** **describe** the ways data can be transmitted between digital systems.

*EG. Identifies that there are multiple ways that digital systems can transmit data (wired or unwired)* | **In familiar contexts, students:*** **explain** the function of internal and external components of a digital system and how they work together.

*EG. Explains that a CPU (Central Processing Unit) manages the instruction of a digital system by performing arithmetic, logic and managing input and output.* * **explore** how data may be transmitted between two small digital systems.

*EG. demonstrate how to print to a wireless printer, transfer pictures from a mobile device to a computer* | **Independently and in familiar contexts, students:*** **explain** how internal and external components work together in a digital system to transmit and process data.

*EG. Provides simple explanation around how a CPU processes the input from a keyboard and instructs software* * **explain** how data is transmitted between larger digital systems.

*EG. Provides a simple explanation of how data is transmitted via the internet.** **investigate** how emerging digital systems work (such as augmented or virtual reality).

*EG. can describe how augmented reality uses components (such as a device camera) to combine real world elements with digital elements in a virtual reality* | **Independently and in new contexts, students:*** **explain and compare** the function of alternative components (including emerging technologies)

*EG. Explains differences between wired or wireless keyboard versus a touchscreen keyboard** **explain** and **compare** methods of data transmission between digital systems based on needs and considerations such as sustainability.

*EG. Suggests best method for collaborating or transmitting/sharing data, demonstrating understanding of pros and cons of each method* |
|  | Student explain how digital systems use whole numbers as a basis for representing a variety of data types |
| **KNOWLEDGE AND UNDERSTANDING** | Examine how whole numbers are used to represent all [data](http://www.australiancurriculum.edu.au/glossary/popup?a=T&t=data) in digital systems [(ACTDIK015)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACTDIK015) | **With explicit prompts, students:*** **explain** that digital systems represent and transmit data using numbers (called Binary Digits) which is why they are called digital systems

*EG. Can state that computers communicate using binary which is 1’s and 0’s* | **With prompts, students:*** **explains** that digital systems represent and transmit data using numbers (called Binary Digits) which is why they are called digital systems

 *EG. Can state that computers communicate using binary which is 1’s and 0’s* | **Independently, students:*** **explains** how binary representation of numbers using 1s and 0s represent the on and off electrical states respectively in hardware and robotics and that all types of types of data are transmitted this way.

*EG. Understands that a Bit is a “Binary Digit” and that 8 bits make a byte, that 1’s and 0’s mean ‘off’ or ‘on’ in an electrical circuit. Using a guide to represent or interpret something in binary.*  | **Independently, students:*** **explains** how whole numbers are represented in binary.

*EG. Exploring how division by two can be used as a technique to determine the binary representation of any whole number by collecting remainder terms. Counting in binary from zero to 15, or writing a friend’s age in binary.* | **Independently, and in new contexts:*** **explains** simplyhow binary is used to represent such things as characters, colours, pictures, videos or sounds.

*EG. Explains simply how an image is communicated digitally using binary through the breakdown of pixels and RGB (Red, Green Blue) colours*  |
|  | Students define problems in terms of data and functional requirements and design solutions by developing algorithms to address problems  |
| **PROCESSES AND PRODUCTION SKILLS** | Define problems in terms of [data](http://www.australiancurriculum.edu.au/glossary/popup?a=T&t=data) and functional requirements drawing on previously solved problems [(ACTDIP017)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACTDIP017)Design a [user interface](http://www.australiancurriculum.edu.au/glossary/popup?a=T&t=user+interface) for a [digital system](http://www.australiancurriculum.edu.au/glossary/popup?a=T&t=digital+system) [(ACTDIP018)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACTDIP018) | **With explicit prompts, students:*** **identify** some requirements of a digital solution.

*EG. The student can state some elements that they will need to include in their solutions to achieve meet their objective** **with support, design** a simple user interface for a classroom application or a game (storyboard or mock up design) that provides part of a solution to a need.
 | **With prompts, students:*** **identify** requirements of a digital solution and explain how these requirements will solve a problem.
* **design** a simple user interface for a classroom application or a game (storyboard or mock up design) that addresses a specific need or purpose using specified digital solutions.
 | **In familiar contexts, students can independently:*** **investigate** digital solutions to **identify** how functional needs are met

*EG. How data is effectively communicated, what makes an interface user-friendly, elements that make an interface child friendly or easier to navigate (consider font sizes, layout, icons, use of colour, etc…)** **decompose** (break down) a problem into functional requirements (including data required)

*EG. Students break down the functional requirements of a game in terms of basic use, ie. characters, ‘Finished’ screen, a maze, levels… and data required, ie. images, instructions, symbols** use examples of known solutions to **design** a user interface (storyboard or mock up design) that addresses a specific need or purpose.

*EG. designing a webpage to display information for other children, design a classroom application or game, basing design on examples* | **Students independently:*** **investigate and compare** a variety of digital solutions and **explain** how different features address functional needs or problems in different situations for different people.

*EG. Compare how different interfaces achieve the same objective or how generic icons are understood despite language** **decompose** (break down) a problem into functional requirements (including data required) and **explain** the interactivity of elements

*EG. Students break down the functional requirements of a game in terms of basic use, and data required, and begin to organise the requirements logically based on interactivity of the elements, ie. ‘Finished’ screen takes the user to the ‘start’ page of the next level** using investigations**, design** a user interface for wider audiences or interfaces with more complex components and features, taking greater consideration of design elements and features that make it more effective.

*EG. Adding more engaging or interactive elements to a website, considering aesthetics, creating more dynamic content (links, pictures, videos, a more complex sitemap)* | **Students independently:*** **investigate and compare** a variety of digital solutions and **draw conclusions** about which digital solutions best meets needs.

*EG. Justifying which solutions best meets needs, highlight limitations and make suggestions for improvement** **decompose** (break down) a problem into functional requirements (including data required) and **explain** the interactivity of elements and **justify** their necessity

*EG. Students break down the functional requirements of a game and data required, and begin to organise the requirements logically based on interactivity of the elements, justifies the reason for each element and how it links to others, ie. rewards and leader boards and levels achieved** **design** alternative interfaces as a solution to a problem using a range of design tools and **compare** and **evaluate** the success of each solution.

*EG. Creating multiple layouts for a website, making video content for a website, designing their own character, creating levels and a storyline, rewards, or health bar* |
|  | Students incorporate decision-making, repetition and user interface design into their designs and implement their digital solutions, including a visual program.  |
| **PROCESSES AND PRODUCTION SKILLS** | Design, modify and follow simple algorithms involving sequences of steps, [branching](http://www.australiancurriculum.edu.au/glossary/popup?a=T&t=branching), and [iteration](http://www.australiancurriculum.edu.au/glossary/popup?a=T&t=iteration) (repetition) [(ACTDIP019)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACTDIP019)Implement digital solutions as simple visual programs involving [branching](http://www.australiancurriculum.edu.au/glossary/popup?a=T&t=branching), [iteration](http://www.australiancurriculum.edu.au/glossary/popup?a=T&t=iteration) (repetition), and user [input](http://www.australiancurriculum.edu.au/glossary/popup?a=T&t=input) [(ACTDIP020)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACTDIP020) | **With explicit prompts, students:*** **use** a simple algorithm (process) to solve a problem and **explain** how it works.
* **implement** a basic algorithm using visual programming or formulas.

*EG. receives considerable support to create their algorithm, modifies an existing algorithm or produces an algorithm that performs a simple function.*  | **With prompts, students:*** **modify** a simple algorithm (process) to solve a problem and **explain** how it works.
* **implement** a basic algorithm using simple visual programming or formulas, using basic branching, some “IF’’ statements or some repeat statements.

*EG. creating an simple “yes/no” guessing game or modifying a maze game in Scratch or creating an algorithm that performs simple functions* | **Students independently:*** use a design thinking process to **create** a simple algorithm (process) to solve a problem and **explain** how it works.

*EG. design a plan for a robot’s movement, a game flow or strategy, a programme for data input, management and display** **implement** an algorithm using simple visual programming or formulas that include some simple branching, “IF’’ statements, repeat statements that requires user input.

*EG. creating an interactive guessing or maze game in Scratch, creating a program to meet a purpose such as a database for user input* | **Students independently:*** use a design thinking process to **create** an effective algorithm (process) to solve a problem and **explain** how it works.
* **implement** an effective algorithm using visual programming or formulas that use branching, “IF’’ statements, repeat statements that requires user input.

*EG. Student creates an algorithm with more effective used of controls – such as using “repeat controls” instead of just repeating algorithms over and over. They may produce a game with more than 1 objective or function. It may have greater capability for user interaction or input.* | **Students independently:*** use a design thinking process to independently **create** an advanced algorithm (process) to solve a problem **explain** how it works.
* **implement** an advanced algorithm using visual programing or formulas using advanced branching, “IF’’ statements, repeat statements that requires user input. Student may demonstrate capability with text based programming.

*EG. Student creates an algorithm with more complexity and provides a solution with greater capabilities that can handle greater user input. Student may start to work with non-visual / text based programing (JavaScript)* |
|  | They explain how information systems and their solutions meet needs and consider sustainability. |
| **PROCESSES AND PRODUCTION SKILLS** | Explain how student solutions and existing information systems are [sustainable](http://www.australiancurriculum.edu.au/glossary/popup?a=T&t=sustainable) and meet current and future local community needs [(ACTDIP021)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACTDIP021) | **With explicit prompts, students:*** **identify** a feature of a digital solution that meets a need**.**
 | **With prompts, students:*** **explain** simply how their own or other digital solutions meets a design objective

*EG. can explain the function and purpose of elements on a website or within an algorithm of their design and how it contributes towards fulfilling a need* | **Students independently:*** **explain** how their digital solutions meets a design objective or how another digital solutions or existing information systems has evolved to meet user and community needs into the future.

*EG.: explain the evolution of digital texts (eBooks)/ paperless offices/ electronic banking/ data storage and explain how they are more environmentally sustainable, the development of icons that are understood despite different languages around the word, the centralisation of knowledge on the internet*  | **Students independently:*** **explain and evaluate** how digital solutions and information systems have evolved to meet user and community needs and consider the implications of change in relation to ethical use and fair access.

*EG. exploring the ethics and impact of management practices on the use of communication networks, for example internet censorship from a local, national and global perspective and the impact on freedom of access and expression. The implications for the “unconnected” or “digitally illiterate”*  | **Students independently:*** **explain and evaluate** how digital solutions and information systems have evolved to meet user and community needs and make suggestions for improvements or future applications of digital systems.

*EG. imagining how the functioning of one type of information system could be applied in a new way to meet a community or national need or making recommendations about how existing systems could be improved, considering opportunities and consequences of decisions for future application, energy saving features* |
|  | Students manage the creation and communication of ideas and information in collaborative digital projects using validated data and agreed protocols. |
| **PROCESSES AND PRODUCTION SKILLS** | Plan, create and communicate ideas and information, including collaboratively online, applying agreed ethical, social and technical protocols [(ACTDIP022)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACTDIP022) | **With explicit prompts, students:*** **apply** rules for safe and acceptable use of technology in monitored situations.

*EG. Uses technology in a safe and respectful way (computer lab or when working with a device) but may require supervision in online environments.* | **With prompts, students:*** **list** rules for safe and acceptable online practices and **applies** rules in monitored environments.

*EG. Is developing the ability to work independently in safe and acceptable ways in online environments.* | **In familiar contexts, students:*** **explain** rules for safe and acceptable online practices and **applies** rules when working independently on digital projects.

*EG. has a clear understanding of eSafety rules and practices, cyber-bullying, safe searching, identifying trustworthy websites and what is generally considered acceptable conduct in online environments.* | **Independently:*** **explain** rules for ethical, safe and socially acceptable online practices and **applies** rules when managing independent and collaborative digital projects.

*EG. makes considerations about ownership, creative commons and copyright in digital projects, understands digital footprint and demonstrates understanding of privacy when building an online profile or interacting collaboratively in safe ways in online environments* | **Independently:*** **explains and justifies** need forrules for ethical, safe and socially acceptable online practices and **Applies** and **monitors** rules when managing independent and collaborative digital projects.

*EG. explains implications of free wifi, terms of use, unsecure networks, building personal digital presences, engaging in Social media and collection and storage of data.* |