Australian Curriculum: Digital Technologies key concepts mapping - Years 9 and 10

BAND DESCRIPTION

Learning in Digital Technologies focuses on further developing understanding and skills in computational thinking such as precisely and accurately describing problems and the use of modular approaches to solutions. It also focuses on engaging students with specialised learning in preparation for vocational training or learning in the senior secondary years. By the end of Year 10, students will have had opportunities to analyse problems and design, implement and evaluate a range of digital solutions, such as database-driven websites and artificial intelligence engines and simulations.

In Year 9 and 10, students consider how human interaction with networked systems introduces complexities surrounding access to, and the security and privacy of, data of various types. They interrogate security practices and techniques used to compress data, and learn about the importance of separating content, presentation and behavioural elements for data integrity and maintenance purposes.

Students explore how bias can impact the results and value of data collection methods and they use structured data to analyse, visualise, model and evaluate objects and events.

They learn how to develop multilevel abstractions, identify standard elements such as searching and sorting in algorithms, and explore the trade-offs between the simplicity of a model and the faithfulness of its representation.

When defining problems students consider the functional and non-functional requirements of a solution through interacting with clients and regularly reviewing processes. They consolidate their algorithmic design skills to incorporate testing and review, and further develop their understanding of the user experience to incorporate a wider variety of user needs. Students develop modular solutions to complex problems using an object-oriented programming language where appropriate, and evaluate their solutions and existing information systems based on a broad set of criteria including connections to existing policies and their enterprise potential. They consider the privacy and security implications of how data are used and controlled, and suggest how policies and practices can be improved to ensure the sustainability and safety of information systems.

Students progressively become more skilled at identifying the steps involved in planning solutions and developing detailed plans that are mindful of risks and sustainability requirements. When creating solutions, both individually and collaboratively, students comply with legal obligations, particularly with respect to the ownership of information, and when creating interactive solutions for sharing in online environments.

KEY CONCEPTS

The **key concepts** that underpin the Digital Technologies Curriculum establish a way of thinking about problems, opportunities and information systems and provide a framework for knowledge and practice. They are:

- **abstraction**, which underpins all content, particularly the content descriptions relating to the concepts of data representation, and specification, algorithms and implementation
- **data collection** (properties, sources and collection of data)
- **data representation** (symbolism and separation)
- **data interpretation** (patterns and contexts)
- **specification** (descriptions and techniques)
- **algorithms** (following and describing)
- **implementation** (translating and programming)
- **digital systems** (hardware, software, and networks and the internet)
- **interactions** (people and digital systems, data and processes)
- **impact** (sustainability and empowerment)

ACHIEVEMENT STANDARD

By the end of Year 10, students explain the control and management of networked digital systems and the security implications of the interaction between hardware, software and users. They explain simple data compression, and why content data are separated from presentation.

Students plan and manage digital projects using an iterative approach. They define and decompose complex problems in terms of functional and non-functional requirements. Students design and evaluate user experiences and algorithms. They design and implement modular programs, including an object-oriented program, using algorithms and data structures involving modular functions that reflect the relationships of real-world data and data entities. They take account of privacy and security requirements when selecting and validating data. Students test and predict results and implement digital solutions. They evaluate information systems and their solutions in terms of risk, sustainability and potential for innovation and enterprise. They share and collaborate online, establishing protocols for the use, transmission and maintenance of data and projects.

CONTENT DESCRIPTIONS

Digital Technologies knowledge and understanding

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 (ACTDIK034)

Representation of data

Analyse simple compression of data and how content data are separated from presentation (ACTDIK035)

Digital Technologies processes and production skills

Collecting, managing and analysing data

Develop techniques for acquiring, storing and validating quantitative and qualitative data from a range of sources, considering privacy and security requirements (ACTDIP036)

Analyse and visualise data to create information and address complex problems, and model processes, entities and their relationships using structured data (ACTDIP037)

Creating designed solutions by:

Investigating and defining

Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs (ACTDIP038)

Generating and designing

Design the user experience of a digital system by evaluating alternative designs against criteria including functionality, accessibility, usability, and aesthetics (ACTDIP039)

Design algorithms represented diagrammatically and in structured English and validate algorithms and programs through tracing and test cases (ACTDIP040)

Producing and implementing

Implement modular programs, applying selected algorithms and data structures including using an object-oriented programming language (ACTDIP041)

Evaluating

Evaluate critically how student solutions and existing information systems and policies take account of future risks and sustainability and provide opportunities for innovation and enterprise (ACTDIP042)

Collaborating and managing

Create interactive solutions for sharing ideas and information online, taking into account safety, social contexts and legal responsibilities (ACTDIP043)

Plan and manage projects using an iterative and collaborative approach, identifying risks and considering safety and sustainability (ACTDIP044)