Digital Technologies at Kew High School

The Digital Technologies program is designed to empower students to become creative designers of digital solutions. Our students must develop a range of twenty first century skills to survive, adapt and succeed in an ever changing environment.

The Digital Technologies curriculum consists of three strands, Digital Systems, Creating Digital Solutions and Data and Information. Kew High addresses these three strands through cross-curricular activities accompanied by withdrawal programs. Additionally Year 10 students can undertake electives in Computer Programming and Robotics.

At the core of Digital Technologies is the understanding and application of problem solving methodologies. Students are asked to decompose problems and consider the solution requirements from the perspectives of various stakeholders. They are required to investigate how data is acquired, analysed, visualised and consumed and how information can be secured as it traverses an increasingly connected world.

Content Descriptors and Achievement Standards referenced in this document appear in the VCAA Digital Technologies Curriculum:

https://victoriancurriculum.vcaa.vic.edu.au/technologies/digital-technologies/curriculum/f-10

Year 7

Activity	Subject and Timing	Content Descriptor(s)
M&Ms Project - Students learn to interpret data, create frequency tables and a variety of data displays, as well as the calculation and interpretation of key statistics.	Maths, Term 3	Analyse and visualise data using a range of software to create information, and use structured data to model objects or events.
Smart City Project – The Smart City project involves the collection and analysis of data collected from a model progressive city. The city will initially collect data about energy usage in each house. Students will analyse the data use and trends. They will be asked to suggest improvements to the design of the city to improve energy efficiency and automation.	Maths, Term 3 - proposed	Acquire data from a range of sources and evaluate their authenticity, accuracy and timeliness. Analyse and visualise data using a range of software to create information, and use structured data to model objects or events. Manage, create and communicate interactive ideas, information and projects collaboratively online, taking safety and social contexts into account. Evaluate how well student-developed solutions and existing information systems meet needs, are innovative and take account of future risks and sustainability.
Muse Data Analysis – Students analyse results of EEG mediation sessions of their classmates. They may consider the types of data collected and potential privacy issues in handling of health data.	Maths, Term 3	Analyse and visualise data using a range of software to create information, and use structured data to model objects or events. Design the user experience of a digital system, generating, evaluating and communicating alternative designs. (Extension only).
Ecology Investigation – Students analyse a nature reserve adjacent the	Science, Term 4	Acquire data from a range of sources and evaluate

school. They consider the implications of primary and secondary data collection. They classify and visualise the data collected.		their authenticity, accuracy and timeliness. Analyse and visualise data using a range of software to create information, and use structured data to model objects or events.
Computer Science Unit – Students complete a range of programming tasks on Raspbery Pis configured as hotspots. They build weather stations using sensors and develop the support coding in Python and HTML.	Science, Term 4 (no longer run)	Design algorithms represented diagrammatically and in English, and trace algorithms to predict output for a given input and to identify errors. Develop and modify programs with user interfaces involving branching, iteration and functions using a general-purpose programming language. Investigate how data is transmitted and secured in wired, wireless and mobile networks.
Number Sense unit includes an overview of binary. https://classic.csunplugged.org/binary-numbers/	Maths, Term 3	Investigate how digital systems represent text, image and sound data in binary
Social Engineering Incursion Laser Cut Collage – Students develop patterns programmatically and then laser cut a class wide collage. https://repl.it/@nettybm/LaserStarter	Forms separated across Terms 2 and 3.	Design algorithms represented diagrammatically and in English, and trace algorithms to predict output for a given input and to identify errors. Develop and modify programs with user interfaces involving branching, iteration and functions using a general-purpose programming language.

Social Engineering Incursion Design a Lure – Students research common scams identified by ScamWatch and choose a scam that they feel may be successful in compromising the identity of a teenage student. They develop a website mock-up to illustrate how the scam may be enacted.	Forms separated across Terms 2 and 3.	Develop and modify programs with user interfaces involving branching, iteration and functions using a general-purpose programming language. Define and decompose real-world problems taking into account functional requirements and sustainability (economic, environmental, social), technical and usability constraints. Evaluate how well student-developed solutions and existing information systems meet needs, are innovative and take account of future risks and sustainability.
Social Engineering Incursion Improving the Design – Students consider how to describe and improve common daily tasks.	Forms separated across Terms 2 and 3.	Design algorithms represented diagrammatically and in English, and trace algorithms to predict output for a given input and to identify errors.
Social Engineering Incursion USB dead drop – Students analyse how a USB dead drop is executed, how data is exfiltrated and how to protect against such risks.	Forms separated across Terms 2 and 3.	Investigate how data is transmitted and secured in wired, wireless and mobile networks.

Achievement Standard

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 and evaluate data from a range of sources to model solutions and create information. They manage the collaborative creation of interactive ideas, information and projects and use appropriate codes of conduct when communicating online.

Students define and decompose problems in terms of functional requirements and constraints. They design user experiences and algorithms incorporating branching and iterations, and develop, test, and modify digital solutions. Students evaluate information systems and their solutions in terms of meeting needs, innovation and sustainability.

Formal Assessment

Mathematics CAT – M&Ms Data Project - Students complete a project assessing their skills and knowledge of the work related to Data. Students learn to interpret data, create frequency tables and a variety of data displays, as well as the calculation and interpretation of key statistics. The project requires the students to carry out some research and then make a presentation to the manager of a confectionary company.

Social Engineering Incursion CAT – Students research scams that may be successful in compromising the identity of a teenage student. They consider the impact, cost to the economy, prevention and weaponisation of such as scam. Students create a mock-up website using JavaScript to entice targets to reveal personal information.

Year 10

Computer Programming

Unit	Length	Content Descriptor(s)
Introduction to Algorithms, Design and Pseudocode	4 Weeks	Design algorithms represented diagrammatically and in structured English and validate algorithms and programs through tracing and test cases.
Python or C# and GUI Development	4 Weeks	Design algorithms represented diagrammatically and in structured English and validate algorithms and programs through tracing and test cases. Develop modular programs, applying selected algorithms and data structures including using an object-oriented programming language.
Data and Programming for Mathematics and Science	2 Weeks	Analyse and visualise data to create information and address complex problems, and model processes, entities and their relationships using structured data. Analyse simple compression of data and how content data are separated from presentation.
Project and Problem Solving	5 Weeks	Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs. Design the user experience of a digital system,

		evaluating alternative designs against criteria including functionality, accessibility, usability and aesthetics Manage and collaboratively create interactive solutions for sharing ideas and information online, taking into account social contexts and legal responsibilities.

Robotics

Unit	Length	Content Descriptor(s)
Robotics sensing and responding.	5 Weeks	Investigate the role of hardware and software in managing, controlling and securing the movement of and access to data in networked digital systems.
Robotics in the real world.	5 Weeks	Evaluate critically how well student-developed solutions and existing information systems and policies take account of future risks and sustainability and provide opportunities for innovation. Define and decompose real-world problems precisely, taking into account functional and non-functional requirements and including interviewing stakeholders to identify needs.
Artificial Intelligence.	5 Weeks	Design algorithms represented diagrammatically and in structured English and validate algorithms and programs through tracing and test cases.

Achievement Standard

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.

Students explain simple data compression, and why content data are separated from presentation. They take account of privacy and security requirements when selecting and validating data and use digital systems to analyse, visualise and model salient aspects of data. Students share and collaborate online, establishing protocols for the legal and safe use, transmission and maintenance of data and projects.

Students define and decompose complex problems in terms of functional and non-functional requirements. They design and evaluate user experiences and algorithms, and develop and test modular programs, including an object-oriented program. Students evaluate their solutions and information systems in terms of risk, sustainability and potential for innovation.

Formal Assessment

Computer Programming

CAT 1 – Programming Principles - Students are required to create simple projects to explore and explain key programming principles.

CAT 2 – Programming Portfolio- Students are required to collate a portfolio of C# or Python programs and then address questions about these programs in a brief interview.

CAT 3 – Programming Project - Students develop a project of their choice. They are required to apply a Problem Solving Methodology studied in class and produce a number of related resources.

Robotics

CAT 1 - An Aware Robot - Students create a series of robots to learn about sensors and logical processing of instructions. Students need to record their design and build process for each robot and reflect on the effectiveness of their design.

CAT 2 – A Real Robot Presentation - Students are required to research an area in which robotics are commonly used, create a prototype robot which represents a robotic function in that sector and present on their findings and process.

CAT 3 – An Intelligent Robot - Students explore concepts related to Artificial Intelligence by analysing some supplied robotic programs. They need to determine the purpose of each program and represent part of each program using a visual organiser. Students then make minor modifications to the programs and analyse how their robots perform against those of other students.