Digital Technologies – 3 and 4_ Digital systems

Strand	Knowledge and understanding			Processes and production skills			
	Digital systems	Representation of data	Collecting, managing and analysing data	*Creating digital solutions by:*			
				Investigating and defining	Producing and implementing	Evaluating	Collaborating and managing
Content Description	Identify and explore a range of digital systems with peripheral devices for different purposes, and transmit different types of data (ACTDIK007)	Recognise different types of data and explore how the same data can be represented in different ways (ACTDIK008)	Collect, access and present different types of data using simple software to create information and solve problems (ACTDIP009)	Define simple problems, and describe and follow a sequence of steps and decisions (algorithms) needed to solve them (ACTDIP010)	Implement simple digital solutions as visual programs with algorithms involving branching (decisions) and user input (ACTDIP011)	Explain how student solutions and existing information systems meet common personal, school or community needs (ACTDIP012)	Plan, create and communicate ideas and information independently and with others, applying agreed ethical and social protocols (ACTDIP013)

Sequence of Lessons / Unit	Approx. time rq'd	Year	CD	Achievement standard #	CD	Achievement standard #	CD	Achievement standard #	CD	Achievement standard #	CD	Achievement standard #	CD	Achievement standard #	CD	Achievement standard #
Peripheral devices	5	3	☑	1												

Years F-2 Achievement Standard	Years 3 and 4 Achievement Standard	Years 5 and 6 Achievement Standard
By the end of Year 2 • Students identify how common digital systems (hardware and software) are used to meet specific purposes. (1) • They use digital systems to represent simple patterns in data in different ways. (2) • Students design solutions to simple problems using a sequence of steps and decisions. (3) • They collect familiar data and display them to convey meaning. (4) • They create and organise ideas and information using information systems, and share information in safe online environments. (5)	By the end of Year 4 • Students describe how a range of digital systems (hardware and software) and their peripheral devices can be used for different purposes. (1) • They explain how the same data sets can be represented in different ways. (2) • Students define simple problems, design and implement digital solutions using algorithms that involve decision-making and user input. (3) • They explain how the solutions meet their purposes. (4) • They collect and manipulate different data when creating information and digital solutions. (5) • They safely use and manage information systems for identified needs using agreed protocols and describe how information systems are used. (6)	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. (1) • They explain how digital systems use whole numbers as a basis for representing a variety of data types. (2) • Students define problems in terms of data and functional requirements and design solutions by developing algorithms to address the problems. (3) • They incorporate decision-making, repetition and user interface design into their designs and implement their digital solutions, including a visual program. (4) • They explain how information systems and their solutions meet needs and consider sustainability. (5) • Students manage the creation and communication of ideas and information in collaborative digital projects using validated data and agreed protocols. (6)

Topic: Digital systems

Units

Year 3   **Year 4**

Peripheral devices 5 hours Explore, sort and classify peripheral devices. Use peripheral devices for a particular task.	**Exploring input and output** 7 hours Explore inputs and outputs using a circuit board, electronic kit or programmable board.

Peripheral devices
A peripheral device is typically a device that is external to a computer and connected either wirelessly or via a cable, although some are internal to the digital system. A way of introducing students to peripheral devices is to start with a desktop computer with no other devices connected. Progressively add devices as the different user needs are introduced. Treasure hunt and 'What am I?' type activities can encourage students to sort and classify peripheral devices and can help reinforce understandings about them. Create task cards that require students to use specific peripheral devices to complete a task. Compare and contrast peripherals that do the same or similar job in different ways.

	Flow of activities			
Short text	**Exploring peripheral devices** Introduce peripheral devices that connect to a computer.	**Peripheral devices categories** Sort and classify peripheral devices.	**Using peripheral devices** Use a range of peripheral devices for a particular purpose.	**Evaluating peripherals** Compare and contrast peripherals that do the same or similar job in different ways.
	Digital systems (ACTDIK007)	Digital systems (ACTDIK007)	Digital systems (ACTDIK007)	Digital systems (ACTDIK007)
Questions to guide exploration	*What is a computer without peripheral devices?*	*What do peripheral devices do?*	*What peripherals do I need to use?*	*What is a better digital system solution?*
What's this about?	A computer is an example of a digital system. A peripheral device is typically a device that is external to a computer and connected either via a wireless network or a cable. A digital system, such as a tablet device, often has internal hardware components such as a camera, microphone and keyboard; however, on other digital systems these components might be considered peripheral devices because they need to be added to the digital system.	A keyboard is the most common input device that allows a user to enter characters (letters, numbers and symbols) and some functions. A mouse is an input device that allows the user to select and hover over information. A digital camera is an input peripheral that records and stores still and moving images and can transmit data wirelessly or through a cable. An external hard drive or USB flash drive is a storage device that stores many files, photos and videos. Files can be uploaded from these drives or downloaded from the computer. A printer is an output device that allows a user to make a paper copy of what is on the screen. These are all devices that may be located in the classroom through a 'digital treasure hunt' (see below).	Peripheral devices are additional parts of a digital system designed to perform a specific function over and above what the digital system can do. For example, if sound needs to be broadcast in a large area, speakers are added to the computer. Similarly, if text on a screen needs to be annotated, a stylus can be used to input this information.	A Bluetooth keyboard and mouse provides portability (within a certain distance) and cross-device compatibility. There are no cords to get tangled or that confine the user to very limited distance from the computer; however, Bluetooth versions require batteries and may cost slightly more. A tablet device is an example of a device that has inputs that are also outputs. For example, the screen can be a virtual keyboard for input of data while also displaying the data. Tablets have devices available internally rather than externally; for example, a microphone and camera. These interact with the tablet's software. Peripheral devices such as digital microscopes or Bluetooth speakers can be added to tablets to enhance their functionality.
Learning task	Introduce students to peripheral devices. Start with a desktop computer with no other devices connected. Progressively add devices as the different user needs are introduced. Use guiding questions to identify the need for a device to: • type (keyboard) • see what has been typed (monitor) • select onscreen data (mouse) • make a paper copy of onscreen data (printer) • listen to audio (speakers or headphones) • record your voice (microphone) • take video of you to communicate with others online (webcam)	Organise a 'digital treasure hunt' in search of peripherals that are input and/or output, or storage devices. Typical examples may include a printer, keyboard, USB memory stick, digital microscope, digital camera, interactive whiteboard, stylus, speakers and data projector. Give a series of descriptions and ask students to guess which peripheral you are talking about. Students develop their own 'What am I?' questions to share in small groups, including the category of input, output or storage. Students reflect on their learning. Ask students questions to get them to think about what the peripheral actually did and how data was transferred.	Create task cards that require students to use specific peripheral devices to complete the task. Sample tasks may include: • Take a digital photograph and incorporate it into a document to create a printed sign for the classroom. • Communicate via video call using a webcam to share information. Take a screen shot of your call and record some dot points of your discussion. • Work with three other students to create a combined story. One student starts the story. The next student uses a stylus to edit and add to the story. The	Compare wireless keyboards and mouses to their cabled counterparts. What are some benefits and sustainability issues that may arise (eg batteries are required for wireless peripherals)? Compare two digital systems with peripheral devices that serve similar functions, such as: • a joystick and a mouse when playing games • outputting information to a group of 50 people using a data projector or providing them with printed materials. Compare storage devices such as a cabled hard drive and a USB flash storage device. Discuss the

	• store a file from the computer (USB flash drive). Discuss how computers; for example, to create documents the computer relies on software provided on the computer system. Students draw, or photograph and print, peripherals. They label their diagram showing the connections such as ports, wired and wireless (Bluetooth or WiFi) connections; for example, a printer connected through a wireless modem.		third student uses a digital camera as the input. • Create a presentation on a chosen topic. Share the presentation to the class on a large screen using a data projector as the peripheral device. • Use a drawing package to draw on screen with a stylus (touchscreen). Share a paper version of the completed piece of artwork. Students identify the input, output and storage hardware and software components as well as the peripheral devices used to complete given tasks. They organise the items into a table with the headings 'hardware' and 'software'.	use of transferring files or longer term storage of large files; for example, images or video.
Supporting resources and tools and purpose/context for use.	**Learn about** What are peripheral devices of a computer?: Definition, examples and types This website provides an excellent overview of peripheral devices.	**Lesson ideas** Peripherals Students explore different types of peripherals used every day to identify the data transmitted. Colour code (with stickers) all the peripherals students can see within the school according to input, output and storage.	**Learn about** Introducing peripherals Find out about a broad range of peripheral devices.	**Learn about** Wired or wireless mouse? Explore the pros and cons of wired and wireless mouses.
Assessment	**Suggested approaches:** Refer to students' labelled diagram. **Achievement standard** **Describe** how a range of digital systems (hardware and software) and their peripheral devices can be used for different purposes.	**Suggested approaches:** Students should be able to describe the different purposes of each peripheral device and the type of data transferred. Using the recording sheet as evidence complete the following checklist: • Name common peripherals. • Give an example of how each peripheral is used. • Explain if data is sent or received by the computer or the peripheral. • List types of data/information transferred by each peripheral. OR Students classify a list of peripheral devices on the basis of function (input, output, storage) and describe how the data is transferred between devices. **Achievement standard** **Describe** how a range of digital systems (hardware and software) and their peripheral devices can be used for different purposes.	**Suggested approaches:** Refer to students' labelled diagram and table showing software and hardware used in the task. Provide students with a range of peripherals and ask students to correctly identify the ones required to complete a task card. **Achievement standard** **Describe** how a range of digital systems (hardware and software) and their peripheral devices can be used for different purposes.	**Suggested approaches:** Refer to students' discussion around comparisons made between digital systems. Ask students to create a 'Y-chart'. Students select one of two technical options to meet a scenario and describe the key features of the preferred peripherals. **Achievement standard** **Describe** how a range of digital systems (hardware and software) and their peripheral devices can be used for different purposes.