Government of **Western Australia**
School Curriculum and Standards Authority

Technologies: Digital Technologies

Teaching, learning and assessment exemplar

Year 7

Quiz me

Acknowledgement of Country

Kaya. The School Curriculum and Standards Authority (the Authority) acknowledges that our offices are on Whadjuk Noongar boodjar and that we deliver our services on the country of many traditional custodians and language groups throughout Western Australia. The Authority acknowledges the traditional custodians throughout Western Australia and their continuing connection to land, waters and community. We offer our respect to Elders past and present.

Background

This teaching, learning and assessment exemplar (the exemplar) has been developed by the School Curriculum and Standards Authority (the Authority) as part of the *School Education Act Employees (Teachers and Administrators) General Agreement 2017* (Clause 61.1–61.3).

Disclaimer

Any resources such as texts, websites and so on that may be referred to in this document are provided as examples of resources that teachers can use to support their learning programs. Their inclusion does not imply that they are mandatory or that they are the only resources relevant to the course. Teachers must exercise their professional judgement as to the appropriateness of any they may wish to use.

This resource utilises electronic web-based resources, such as videos and image galleries. Teachers should be present while an electronic resource is in use and close links immediately after a resource, such as a video has played to prevent default 'auto play' of additional videos. Where resources are referred for home study, they should be uploaded through Connect, or an equivalent system, that filters advertising content.

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The Western Australian Curriculum

The *Western Australian Curriculum and Assessment Outline* (the *Outline* – https://k10outline.scsa.wa.edu.au/) sets out the mandated curriculum, guiding principles for teaching, learning and assessment, and support for teachers in their assessment and reporting of student achievement. The *Outline* recognises that all students in Australian schools, or international schools implementing the Western Australian Curriculum, are entitled to be given access to the eight learning areas described in the *Alice Springs* (*Mparntwe*) *Education Declaration*, December 2019.

The Technologies curriculum

The mandated curriculum is presented in the year level syllabus documents.

The Technologies curriculum delivers a sequential and age-appropriate progression of learning with the following key elements:

- a year level description that provides an overview of the context for teaching and learning in the year
- a series of content descriptions, populated through strands and sub-strands, that sets out the knowledge, understanding and skills that teachers are expected to teach and students are expected to learn
- an achievement standard that describes an expected level that the majority of students are achieving by the end of a given year of schooling. An achievement standard describes the quality of learning (e.g. the depth of conceptual understanding and the sophistication of skills) that would indicate the student is well placed to commence the learning required in the next year.

This exemplar

This Technologies exemplar articulates the content in the *Outline* and approaches to teaching, learning and assessment reflective of the Principles of Teaching, Learning and Assessment. This exemplar demonstrates a sequence of teaching and learning, including suggested assessment points, for 16 lessons.

Catering for diversity

This exemplar provides a suggested approach for the delivery of the curriculum and reflects the rationale, aims and content structure of the learning area. When planning the learning experiences, consideration has been given to ensuring that they are inclusive and can be used in, or adapted for, individual circumstances. It is the classroom teacher who is best placed to consider and respond to (accommodate) the diversity of their students. Reflecting on the learning experiences offered in this exemplar will enable teachers to make appropriate adjustments (where applicable) to better cater for students' gender, personal interests, achievement levels, socio-economic, cultural and language backgrounds, experiences and local area contexts.

Using this exemplar

This teaching, learning and assessment exemplar provides suggestions to support the delivery of the mandated curriculum content. The exemplar provides:

- a teaching and learning sequence
- the mandated curriculum content to be taught at each point of the teaching and learning sequence, suggested resources, sample assessment tasks and marking keys
- the number of lessons to deliver the teaching and learning experiences
- learning intentions and support notes that may provide focus questions and additional information and/or examples to assist with the interpretation of curriculum content
- support notes to assist teachers to unpack the content and support teaching and learning experiences
- teaching and learning experiences that outline the structure of the lesson. These explicitly state each activity that the lesson will progress through and the key focus area for that activity.

Links to electronic resources

This sequence of lessons may utilise electronic web-based resources, such as videos and image galleries. Teachers should be present while an electronic resource is in use and close links immediately after a resource, such as a video, has played to prevent default 'auto play' of additional videos. Where resources are referred for home study, they should be uploaded through Connect, or an equivalent system, that filters advertising content.

Best practice

Teaching and learning

The teaching and learning opportunities offered in this exemplar are not exhaustive. Thus, teachers are encouraged to make professional decisions about which learning experiences, and the sequence in which they are delivered, are best suited to their classroom context, taking into account the availability of resources and student ability.

This sample may prove a useful starting point for amplifying creativity in the classroom, while presenting the embedded expectations of the Western Australian Curriculum: Technologies.

Teachers may find opportunities to incorporate the General Capabilities and the Cross-curriculum Priorities into the teaching and learning program.

Ways of teaching – teachers can locate additional information on the Ways of teaching from the School Curriculum and Standards Authority (the Authority) website https://k10outline.scsa.wa.edu.au/home/wa-curriculum/learning-areas/technologies/digital-technologies/p-10-digital-technologies-teaching/digital-technologies-ways-of-teaching.

Assessing

Assessment, both formative and summative, is an integral part of teaching and learning. Assessment should arise naturally out of the learning experiences provided to students. In addition, assessment should provide regular opportunities for teachers to reflect on student achievement and progress. As part of the support it provides for teachers, this exemplar includes suggested assessment points. It is the teacher's role to consider the contexts of their classroom and students, the range of assessments required, and the sampling of content descriptions selected to allow their students the opportunity to demonstrate achievement in relation to the year level achievement standard. Teachers are best placed to make decisions about whether the suggested assessment/s are used as formative or summative assessment and/or for moderation purposes.

Ways of assessing – a range of assessment strategies that can enable teachers to understand where students are in their learning is available on the Authority website https://k10outline.scsa.wa.edu.au/home/wa-curriculum/learning-areas/technologies/digital-technologies/p-10-digital-technologies-assessing/digital-technologies-ways-of-assessing.

Reflecting

Reflective practice involves a cyclic process during which teachers continually review the effects of their teaching and make appropriate adjustments to their planning. The cycle involves planning, teaching, observing, reflecting and replanning.

This exemplar supports reflective practice and provides flexibility for teachers in their planning. The exemplar shows how content can be combined and revisited throughout the year. Teachers will choose to expand or contract the amount of time spent on developing the required understandings and skills according to their reflective processes and professional judgements about their students' evolving learning needs.

Quiz me

This exemplar can be used to further develop students' understanding and skills in computational thinking. Throughout the teaching and learning sequence, teachers will explicitly teach the design thinking skills students require to complete the summative assessment task at the end of the sequence.

Students develop their skills to design flow charts in order to create an interactive quiz based on Digital systems content. They focus on the positive and negatives of wired and wireless devices, as well as the purpose of networking hardware. Students use their Design thinking skills to demonstrate their understanding of computational thinking.

Year level description

In the early adolescence phase of schooling, students align with their peer group and begin to question established conventions, practices and values. Learning and teaching programs assist students to develop a broader and more comprehensive understanding of the contexts of their lives and the world in which they live.

Digital Technologies further develops student understanding and skills in computational and design thinking, such as decomposing problems, and engages students with a wider range of information systems. Students begin to develop an interest in particular fields of knowledge.

In Year 7, students create a range of digital solutions. They explore the properties and hardware devices of networked systems. Students acquire, store and visualise data from a range of sources using spreadsheets. They further develop their understanding of the vital role that data plays in their lives.

When defining problems, students identify the key elements, factors and constraints at play. They design and develop increasingly complex algorithms. Students predict and evaluate their developed and existing solutions, considering time, tasks, data and the safe use of information systems. They plan and manage individual and team projects with some autonomy. Students consider ways of managing the exchange of ideas, tasks, files and feedback.

Achievement standard

By the end of the year:

Students identify the ways different types of networks, including wired, wireless and mobile networks, and their hardware components, transmit data. They identify how digital systems represent data using binary. Students acquire, store and visualise data from a range of sources using spreadsheets. They design algorithms involving control structures (iteration and selection). Students represent these algorithms using flow charts, pseudocode and correct terminology, and use them to implement, modify and debug programs. Students identify issues relating to a user's digital footprint and the permanence of data, while outlining ways of protecting accounts with multifactor authentication.

In Digital Technologies, students use project management processes and skills to plan, develop and communicate solutions, while considering time and available resources, and identify the purpose for a given digital task. Students use a range of techniques, technologies and appropriate terminology to design, develop, review and communicate ideas, plans and processes. They implement agreed protocols when using a range of technologies, components and/or equipment to produce designed solutions.

Lessons 1–16

Quiz me

Lesson 1: Digital footprint

The Western Australian Curriculum content addressed in this lesson is below.

Privacy and security

Issues relating to a user's digital footprint and the permanence of data

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Lesson outline

Learning intentions
• Students will be able to explain why it is difficult to determine who can view their information online and to understand guidelines for staying safe online.

Support notes for teacher

- A person's online activity contributes to their digital footprint. To manage one's digital footprint, a person should always consider privacy implications and only selectively share content online, and adjust privacy settings on social media to control who sees their content. (https://www.digitaltechnologieshub.edu.au/media/mjwcbt3c/dthub_infographic-privacy-security_a3_web.pdf)
- Data acquired by technology giants from the online activity of users can be analysed to predict the behaviour of customers and be shared with business partners for marketing purposes.
- The following website contains information relevant to this lesson:
  What your social media profile says about you - teachComputing (teachwithict.com)

Teacher

- Ask students to list types of information that can be shared or used online on the digital collaboration space. As a class, classify the information as public or private.

  Note: types of responses may include username, email address, age, gender, location, birthday, home address, phone number, comments on posts, likes, friendship status, online status, photos, videos, school uniform, debit card or parent credit card details and websites visited.

- Pose the question, 'How do we know who can access our data online?'
- Lead a discussion about the data used online and on digital devices and how it shapes a user's digital footprint. Highlight to students that people's digital footprint shapes what others think about them and what others may think about the communities they belong to, so it is essential to create and shape a positive digital footprint for their future. It is also important to protect private data and know how tech giants use the data we share for their own purposes.
- Summarise the activity by highlighting that people share a significant amount of data when they use digital technologies, and it can be difficult to know who can see this information online. With a few guidelines, people can have some control over how their data and information is collected, stored and used.

Students

Jigsaw and digital retrieval chart

Students use the *Jigsaw* cooperative learning strategy to become experts in one of the following four topics to share with their group and address the statement:

Explain how people can protect their data online and create a positive digital footprint.

Group topics

1. Account security: Passwords
2. Privacy settings
3. Secure your browser
4. Anti-virus

Lesson conclusion

The teacher uses either a digital or physical exit ticket for the lesson review to reinforce guidelines for being safe online and managing a digital footprint.

Lesson 2: Multifactor authentication

The Western Australian Curriculum content addressed in this lesson is below.

Privacy and security

Protecting accounts with multifactor authentication

Lesson outline

Learning intentions
• Understand the concept of multifactor authentication (MFA). • Identify different types of authentication factors. • Recognise the importance of MFA in securing digital information.

Preparation for lesson

- Construct a scenario in which a user discovers an online order that does not belong to them. When checking their bank account, there are charges that should not be there. It is likely that a hacker intercepted the user's personal data, bank account details, email and password when they purchased an item online. As the user has the same password for all accounts, the hacker now has access to these other accounts as well.
- Find a video that explains the concept of deepfakes and an online article that addresses the ethical questions that arise from this phenomenon.
- Source an online article that prompts thinking about the ethics of voice manipulation.

Support notes for teacher

Multifactor authentication prevents unauthorised access to online accounts by requiring additional verification steps beyond just entering a password, such as providing a one-time password or token.

There are three types of factors used in MFA:

- something you know (password, personal identification number – PIN)
- something you have (smartphone, security token)
- something you are (fingerprint, facial recognition).

Personal assistants such as Siri and Alexa can be trained to respond only to voices with which they become familiar. Fingerprints, facial data and voice data need to be stored on the user's device so that an identification can be made to grant access to the device.

Activate prior knowledge

- Ask students to consider how well they protect their digital footprint.
- Pose the questions, 'What security measures do I put into place to protect my digital identity?' and 'Is a password enough to secure my online data?'
- Prompt further discussion with the prepared scenario.

Teacher

- Explain the purpose of MFA and the three different types of factors.
- Ask students to do a *Think-pair-share* activity and find examples of the three different types of MFA.

Students

- Group research task – biometrics
- Show students the video on deepfakes.
- Discuss an online article that prompts thinking about the ethics of voice manipulation.
- Students to research hypotheses in small groups to demonstrate the potential for 'hacking' of biometrics.
    - Fingerprints – explore materials that can store fingerprints, such as putty, wax or PVA glue. Can the use of these unauthorised fingerprint representations unlock a device?
    - Facial recognition – can a change in appearance affect facial recognition? Test whether a hat, sunglasses or mask will reduce the effectiveness of unlocking a device.
    - Voice recognition – can editing a person's voice using audio software trick a personal digital assistant? Will Siri or Alexa be confused if a digital voice is altered in some way?

Lesson conclusion

Students use the following website to check the security of passwords.

- https://www.nsw.gov.au/id-support-nsw/be-prepared/passwords

Resources

- Turn on multifactor authentication | Cyber.gov.au

Lesson 3: Hardware CPU, RAM, HDD, SSD, power supply

The Western Australian Curriculum content addressed in this lesson is below.

Digital systems

Hardware devices of networks and their purposes

Lesson outline

Learning intentions
• Define the role of hardware in a digital system. This hardware can include central processing units (CPU), random access memory (RAM), hard disk drive (HDD), solid state drive (SSD) and power supply.

Preparation for lesson

- Gather physical hardware components for students to see and touch, e.g. an old, damaged personal computer (PC) with the case removed, allowing students to plug in and unplug components without risk of damage.
- Choose an online website that enables students to either make a custom computer set-up or an online computer-building simulator for students.

Support notes for teacher

- All systems involve inputs, processes and outputs. Digital systems involve inputting data through a range of peripherals, processing through computer hardware, such as a central processing unit (CPU) and primary storage, and outputting information or data through output devices.
- Hardware is tangible and usually stored in the case or tower of the device.
- A CPU is responsible for decoding and executing instructions in a computer or device to run programs and other processes.
- Random access memory (RAM) is a type of primary storage memory. Its role is to send and receive data to be processed by the CPU.
- A hard disk drive (HDD) is a memory device that is a type of secondary storage. HDD allows for data, such as images and documents, to be stored and retrieved in the future if power is lost from the device. HDD involves storage using mechanical moving parts.
- A solid state drive (SSD) is another secondary storage memory device. SSD allows for data, such as images and documents, to be stored and retrieved in the future if power is lost from the device. SSDs have a non-volatile flash memory instead of moving parts and are better suited for mobile devices.
- Power supplies allow power to flow from the source to the device. They can contain a fan for cooling and fuses for safety.

Activate prior knowledge

- Ask students to create a list of the devices they have access to, including tablets, laptops, phones and PCs, and to categorise the devices as either mobile devices or desktop systems. Students may mention servers. If so, create a third category.
- Explain that all these devices have similar hardware which enables them to operate.

Teacher

- Show each hardware device and explain how it works. Allow students to touch the hardware and to plug in and unplug the hardware. If the physical hardware is unavailable, show a video or image of the hardware.

Students

- Students complete the table below to provide a definition of the role of hardware based on what they have learned.
- After completing the definitions, use the internet to find an image and an example of the selected hardware.

Note: this can be edited to match students' interests.

Hardware	Role	Image	Example
Central processing unit			
Random access memory			
Hard disk drive			
Solid state drive			
Power supply			

- Direct students to an online website that allows them to either make a custom computer set-up or an online computer building simulator. Allow students to create their own virtual computer system or PC.

Lesson conclusion

Use an exit pass/ticket style of questioning for the conclusion or exit of the classroom with questions designed to reinforce the hardware concepts covered.

Lesson 4: Networks (wired and wireless)

The Western Australian Curriculum content addressed in this lesson is below.

Digital systems

Methods of data transmission in different types of networks including wired, wireless and mobile networks

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Lesson outline

Learning intentions
• Define the movement of a data packet through a network and compare wired and wireless networks.

Preparation for lesson

- Create a simple word match sheet or an online game where students use prior learning to match hardware and its role.
- Create or collect two computer advertisements for students to compare and contrast process speed, RAM and secondary storage space.
- Source some blank envelopes.
- Source diagrams online that show the difference between local area networks (LANs) and wide area networks (WANs).
- Source an online video explaining how wireless devices connect to the wireless network.

Support notes for teacher

- Networks refer to the interconnections of the hardware devices that send and receive data in both LANs and WANs.
- LANs are defined as networks that stretch over small geographical locations, such as a school or hospital network.
- WANs are defined as networks that connect over large geographical locations, such as bank branches or the internet.
- Mobile networks, such as 4G and 5G are cellular networks that are used to stretch large distances allowing freedom of movement or mobility of a device.
- Bluetooth is a short-range, short wave wireless radio frequency connectivity standard that is used to pair devices and is restricted to simple one-to-one connections. Bluetooth is commonly used in personal area networks (PANs).
- (wireless fidelity) is a short-range radio frequency with lowered physical security and low speeds, but with flexibility and mobility. This connection is intangible and cannot be touched.
- Wired networks are tangible and require cables, such as copper ethernet cables and fibre-optic cables. Mobility is lower, cost of installation is higher, and security and speeds are higher. Categories of copper ethernet cables denote the speed and bandwidth in which they can transfer data. Maximum data speed of Category 5 is 1GB and of Category 6 is 10GBs.

Activate prior knowledge

- Revise hardware roles from the previous lesson, e.g. by matching images to roles, using the game prepared by the teacher.
- Using the computer advertisements created or collected by the teacher, focus on two different examples of computer systems and analyse which is considered bigger in storage or faster in performance.

Teacher and students

Game

- Demonstrate how the school network passes messages between computers using a practical activity. Use envelopes to represent packets of data so that students can send and receive messages. Place students in groups with one student in each group representing a router and the others, computers. Name each group after a classroom block with each computer representing a classroom within that block.
- Students write a destination and message on each envelope and 'deliver' it (via a student representing the movement through the network) to the destination computer. The recipients write a reply and return it to the sender. Teachers may decide to see if students pick up on the need to put an 'address' for sending and replying.
- To extend the activity, servers can be added into the network, simulating the internet. It is important that every envelope is labelled and that students understand the protocol for messages moving through the 'network'. It would be useful to do one or two 'test' messages and discuss and review the results of each test through a call out.
- Discuss the concept of the fastest route and what would happen if that path was blocked.

Discussion

- Define the concept of a network with reference to the previous activity.
- Explain the differences between a LAN and WAN based on diagrams sourced online.

Students

Wired versus wireless

- In small groups, use words or graphics on a large sheet of paper to represent each group's understanding of how wireless networks work.
- Using the gallery walk strategy, students move freely around the classroom to view the thoughts of other groups, then reflect and discuss their understanding. Provide students with the opportunity to revise their representation. Alternatively, use a *Jigsaw* strategy.
- Students watch a short online video explaining what happens when a wireless device, such as a phone or mobile device, connects to the wireless network. Review the content and address any gaps in knowledge before progressing.
- Groups revisit their representation and make changes to reflect their developing knowledge.
- Students compare three devices that are both wired and wireless and list the benefits and limitations of each. A T-chart may be a useful graphic organiser for this activity.
- Students create a table of positives and negatives for wired and wireless networks. For example, wired network data transfer is faster and more secure; wireless networks are easier when adding new devices (scalable) and allow devices to be more mobile.

Optional activity: micro:bits

Students will compare and contrast wired and wireless networks using micro:bit devices. This activity can be used as an alternative to the gallery walk activity above if the required equipment is available. Required equipment: micro:bit devices and alligator clips.

Divide the class into two groups – wired and wireless.

- Wired: students will work in pairs to connect two micro:bits using alligator clips. They code a symbol that will show on the sender device and be sent to the receiving device. Students may then use Morse code to send a secret message from one device to the other. Focus questions: What do you see when you press button B? Why do you think this happens? If you disconnect an alligator clip, what happens? Morse code network (digitaltechnologieshub.edu.au)
- Wireless: each student to code a sender and receiver using the same micro:bit. The teacher will do the same. Students can change the message to one of their own; however, they will discover that the teacher is 'eavesdropping' on the conversation. The teacher will explain to the wireless students that their messages are being intercepted and challenge them to find a way to have a private conversation. Micro Chat (microbit.org)

Students work in pairs to create a chart that lists the benefits and limitations of their chosen type of network.

Have a class discussion about the pros and cons of the two types of networks. Refer to concepts, such as cyber security, portability and reliability.

Lesson conclusion

Students take a photograph or copy of the finished chart for reference in future lessons.
Students show the teacher a copy before exiting and are instructed to revise the concepts before the next lesson.

Lesson 5: Transmission speeds and bandwidth

The Western Australian Curriculum content addressed in this lesson is below.

Digital systems

Methods of data transmission in different types of networks including wired, wireless and mobile networks

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Lesson outline

Learning intentions
• Identify and interpret transmission speeds and the factors that affect transmission speeds. • Identify the differences between transmission speeds and bandwidth.

Preparation for lesson

- Source a speed test app for students to download.
- Take screenshots of various wi-fi networks to demonstrate the differences in speeds.
- Find visual aids or a video explaining the differences between wi-fi and common mobile networks (optional).
- Source comparisons of commercial National Broadband Network (NBN) plans, commenting on speeds available, cost and bandwidth (optional).
- Create a simple web research activity that includes questions of varying difficulty from lower to higher order.
- List of websites for student research.

Support notes for teacher

- Transmission speed refers to how quickly data travels from one place to another through the communication medium.
- Bandwidth refers to frequency and the amount of data that can travel at the same time.
- Performance of a network is usually measured by both transmission speeds and the bandwidth available.
- Students can download an app to test wi-fi transmission speeds on their device and compare home and school connection.
- Mobile networks, such as 4G and 5G are cellular networks that are used to cover large distances allowing freedom of movement or mobility of a device.
- Wi-fi (wireless fidelity) is a short-range radio frequency with lowered physical security and low speeds, but with flexibility and mobility.
- Copper cables (ethernet cables) are commonly seen in schools and at home. These cables send electricity through the copper which is a conductor. They are slower than fibre-optic cables, but allow for easier installation, flexibility of material and are cheaper in cost.
- Fibre-optic cables are made of glass tubes that are insulated and covered. The glass allows data to be sent as light and is less resistant than other materials. Fibre-optic cables are faster in speed and larger in bandwidth. Fibre-optic cables are more expensive to purchase and more difficult to install.

Activate prior knowledge

- Revise prior learning from previous lesson, by completing a simple table as a class, individually or in a small group.

Wired positives	Wired negatives	Wireless positives	Wireless negatives

Teacher

- Demonstrate how to use a speed test app and explain the speed of the wi-fi network.
- Compare the result of the speed test to other speeds that were tested in different locations, such as students' homes or a café.
- Discuss the factors affecting the speed of the wi-fi data transfer rates, including environmental factors, number of users on the network and hardware specifications. Explain the difference between transmission speeds and bandwidth with the help of visual aids or a video.
- Reinforce students' knowledge of different mobile networks and the differences between common mobile frequencies and wi-fi. Show students the video sourced by the teacher (optional).
- Explain the difference between copper cables and fibre-optic cables.
- Create a simple compare and contrast diagram for fibre-optic cables and copper cables.

Students

- Students compare commercial NBN plans, commenting on speeds available, cost and bandwidth (optional).
- Students individually complete the simple web research activity prepared by the teacher. This can be done digitally if resources are available.
- Students mark the answers in pairs and provide feedback to their partners.

Lesson conclusion

- Students justify which internet service provider's NBN plan was most appealing and explain why.
- Students list or take a photograph of networking devices they have at home before the next lesson.

Lesson 6: Network devices definitions

The Western Australian Curriculum content addressed in this lesson is below.

Digital systems

Hardware devices of networks and their purposes

Lesson outline

Learning intentions
• Identify network devices and their basic functions in a network.

Preparation for lesson

- Create an online quiz before the lesson to use at both the start and end of the lesson.
- Create a presentation of networking devices, images, definitions, and examples.
- Choose or create a note-taking framework.

Support notes for teacher

- Network hardware includes servers, switches, routers, modems, integrated service routers (ISRs) and network interface cards (NICs).
- A server is a computer with large storage space that sits centrally on a network to manage network operations and connected devices.
- Switches are used to extend ports allowing for multiple devices to connect to one device, such as a server.
- Routers are smart switches that direct traffic around a network choosing the most efficient path for packets to follow.
- Modems modulate and demodulate analog and digital signals to take advantage of cable mediums that use analog signals.
- ISRs are convergent devices found in most home networks. ISRs combine both wired and wireless routing functions, modems, firewalls, basics of switches, etc.
- NICs can be either wired or wireless or both. NICs are used to communicate and connect a device to a network. Without a NIC, a device is unable to connect to the network.
- Students will be most familiar with ISRs. Most home networks use this device as it is an all-in-one converged device that combines the functionality of wired and wireless routers, switch, modem, and security features, such as a firewall.

Activate prior knowledge

- Students complete a short online quiz, using software such as Kahoot, which focuses on wireless and wired connections and transmission speeds.

Teacher

- Deliver the content of the presentation of networking devices, images, definitions and examples. Gather feedback from students to gauge their understanding.

Students

- Students take notes, using a note-taking framework, recording the definitions discussed. Students can add images to the definitions for visual understanding.
- Time permitting, students may create a concept map that demonstrates the relationship between network hardware devices using a design application.

Lesson conclusion

Use the online quiz again and include new network devices.

Lesson 7: Network devices – practical

The Western Australian Curriculum content addressed in this lesson is below.

Digital systems

Methods of data transmission in different types of networks including wired, wireless and mobile networks

Hardware devices of networks and their purposes

Lesson outline

Learning intentions
• Identify and physically connect networking devices in a small network. Explain the role of the devices, and the differences between wired and wireless networks.

Preparation for lesson

- Collect networking devices for the practical activity. These devices do not need to be fully functioning, just able to show the physical connections. They are listed in the *Observation checklist for physical network components* (Appendix A). The types of networking devices for the practical activity can be changed to suit the school context and their availability.
- Teachers familiarise themselves with the networking device to be used.
- Prearrange with the school's network administrator to visit the school's server room.

Support notes for teacher

- If router or switches contain different types of ports, explain these. A port is the communication start and end point. Ports connect devices or patch panels in the wall. Data is communicated, sent and revived via these ports. Ports can vary in standards and speed of transmissions.
- Where appropriate, teachers may either scaffold or extend the scope of the assessment tasks.

Activate prior knowledge

- Visit the school's server room to identify the network components and reinforce their purposes.

Teacher

- Lead a discussion about networking devices and their roles.

Students

- In small groups, students label and explain components of physical networking devices and explain how they interrelate to create a network (Appendix A). This activity can be carried out formatively or summatively.

Lesson conclusion

- Feedback for the task can include general comments, what was done well, what needs improvement and how this can be done.
- In groups, students compare feedback from the teacher and discuss how to improve in the future.
- Teacher takes a photo of or completes the checklist for every student before the conclusion of the lesson.

Lessons 8–9: Network diagrams

The Western Australian Curriculum content addressed in these lessons is below.

Digital systems

Methods of data transmission in different types of networks including wired, wireless and mobile networks

Hardware devices of networks and their purposes

Lesson outline

Learning intentions
• Apply prior knowledge of networking devices to create a basic home network.

Preparation for lesson

- Collect or create a basic floor plan design for a standard house for students to use.
- Find and print out examples of networks and CISCO symbols that relate to routers (wired and wireless), servers, computers, mobile devices, switches and any other relevant devices.
- Extend the activity by including smart televisions, consoles etc. Students can use their own symbols for these devices.
- Teachers should familiarise themselves with CISCO Packet Tracer software or other selected drawing software.
- If similar software is unavailable, select a more advanced floor plan, such as a section of the school or the library, for students to create a network diagram hardcopy.
- Source a network diagram with various errors to use in the lesson conclusion.

Support notes for teacher

- This activity may be carried out digitally or by drawing the symbols onto a hard copy of the floor plan.
- A network diagram shows the location of the networking devices, other devices they are connected to, and how they are connected through either a wireless or wired connection. Consider efficient use of resources in the designs.

Activate prior knowledge

- Students draw their home network or a friend's network. Start with the basic floor plan and label the devices on their plans. Students may only have one or two devices and should indicate which devices are connected via a cable and which devices connect wirelessly. Students do not need to use correct symbols for this activation activity.

Teacher

- Discuss the symbol for each networking device. Check for understanding of the symbols and relate this back to the students' prior knowledge of the devices. Direct students' attention towards the labelling of cables and how to draw a wireless connection.
- Show examples of symbols and networks and discuss efficiency of networks.
- Teacher provides feedback and encourages conversations about wired or wireless connections.

Students

- Place the networking device symbols on the floor plan provided. Discuss and explain placement decisions in pairs or small groups.
- Take the paper-based network and use the CISCO Packet Tracer or similar software to build your network. If not available, supply students with a more advanced floor plan, such as a section of the school or the library to turn into a network diagram.
- As an extension, students draw the school network or a section of the school network that includes the server room.

Lesson conclusion

- Show the class a network diagram with various errors. Ask students to identify the errors as an exit ticket/pass.

Lesson 10: Flow chart symbols and basic sequence

The Western Australian Curriculum content addressed in this lesson is below.

Digital implementation

Design algorithms involving control structures (selection, decision and iteration), and represent them using flow charts and pseudocode

---

Lesson outline

Learning intentions
• Show the correct sequence of a basic set of instructions using correct flow chart symbols.

Preparation for lesson

- Source a class set of mathematical drawing aids to assist students to draw flow charts.
- Preselect and watch an 'exact instruction video or challenge' for the prior learning activity.
- Prepare at least one example of an algorithm for students to convert to a flow chart. This algorithm should only include a sequence.
- Prepare unfinished/incomplete flow charts or flow charts with errors for the lesson conclusion.

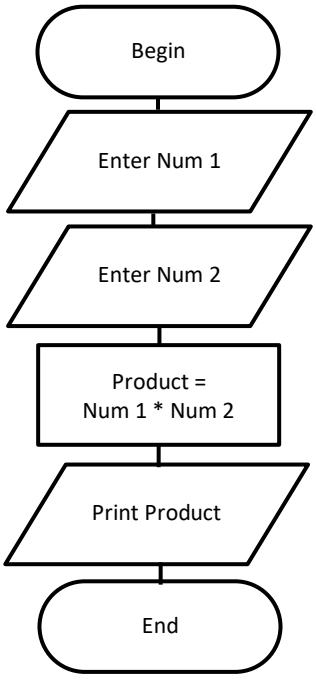
Support notes for teacher

- Sequence of steps refers to the order of a program. The sequence developed must be in a logical order. Computers work sequentially, line by line, top to bottom. If the order is incorrect, a logic error will be given. Just as students cannot put shoes on before socks, a computer works in a similar way. Students need to understand that a logical sequence is very important in programming.
- Students may use software, such as word processing software or online drawing tools to complete this activity. Teachers may choose to create flow charts on paper.

Activate prior knowledge

- Show students an 'exact instruction video or challenge' that illustrates the importance of correct sequencing, such as explaining a simple sequence for making a sandwich or drawing a picture.

Flow chart symbols and pseudocode	
Symbol	**Meaning**
	Terminal: begin and end
	Input or output
	Process: the description of an action or process
	Decision: one line comes in at the top and two lines leave it

Sequence	
The instructions are processed in order	
Flow chart	**Pseudocode**
	**Input(Num1)** **Input(Num2)** **Product ← Num1 * Num2** **Output(Product)**

Read and **Write** can be used in place of **Input** and **Output**; for example

Read(Num1)
Read(Num2)
Product ← Num1 * Num2
Write(Product)

Teacher

- Explain flow chart symbols through a game of matching the name of the symbol with a hand gesture or movement; for example, begin/end (oval shape) can be created by students with two hands representing an oval. Complete for all the symbols.
- Call out the meaning (begin/end) and ask students to respond with the gesture that represents it. Students with the incorrect answer sit down until a winner is determined.
- Students write down, in plain English, the steps to a simple life sequence, e.g. making breakfast or getting dressed for school. Complete in groups or individually.
- Write students' responses on the board with feedback from the students.
- Convert the sequence into a flow chart on the board or on a digital device.

Students

- Students use a pre-made algorithm with a basic sequence to create a simple flow chart and gather feedback on the accuracy of the flow charts. This could include a simple mathematical calculator adding two inputted numbers together.
- Students create a flow chart sequence without the aid of a pre-made algorithm; for example, for using a mathematical calculator to find the percentage they received on their last assessment task, or creating toast. Collect for feedback by teacher or have peers assess.

Lesson conclusion

- Students sit in small groups with the same unfinished/incomplete flow chart or flow charts with errors face down on the table.
- Students compete with other groups to complete or fix the flow chart in a set time.

Lesson 11: Flow chart branching (decisions)

The Western Australian Curriculum content addressed in this lesson is below.

Digital implementation

Design algorithms involving control structures (selection, decision and iteration), and represent them using flow charts and pseudocode

---

Lesson outline

Learning intentions
• Develop the skills required to design simple two-way decisions (branching) and multi-way decisions. These skills will be required to create programs and develop flow charts.

Preparation for lesson

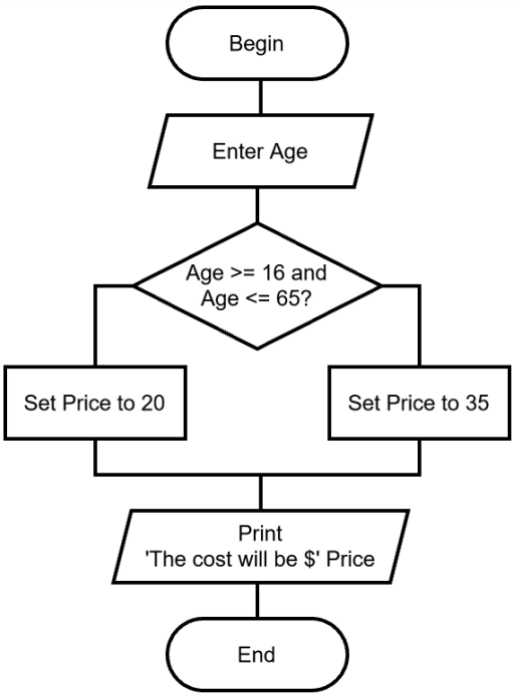
- Source a class set of mathematical drawing aids to draw flow charts.
- Create at least two flow chart examples with a number of errors for students to identify.
- Source an algorithm with one decision to show to students.
- Pre-populate an unfinished flow chart or the structure of the flow chart for the teacher-led activity.

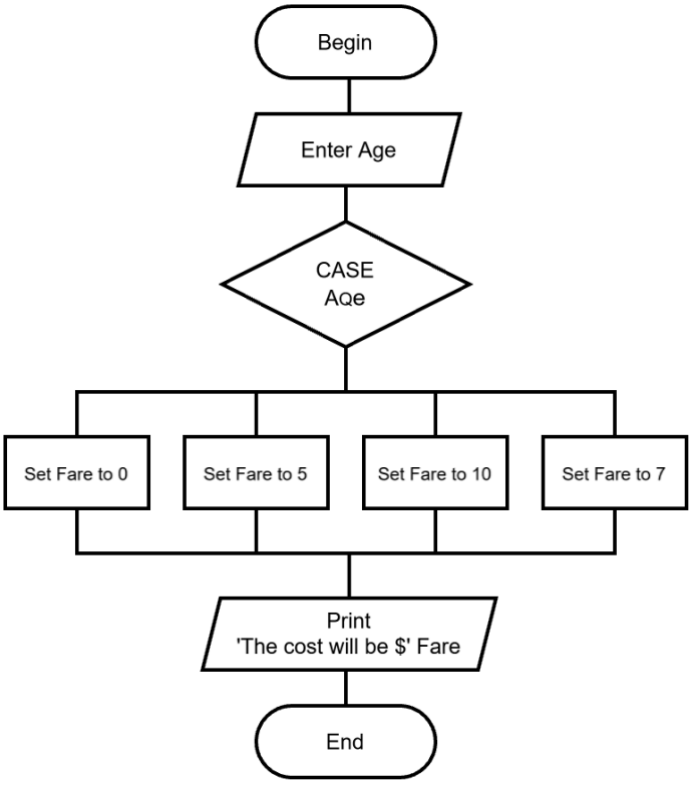
Support notes for teacher

- Branching is a term that refers to having more than one intended outcome.
- The digital solution must have choices, called selection. The three types of selection are: ♣ one-way selection (if-then); ♣ two-way selection (if-then-else); and ♣ multi-way selection (CASE).
- Teacher/students may also use a nested if statement when creating a multi-way selection. A nested 'if' statement is a decision inside a decision in order to get a larger amount of output options.

Note: keep the true/false (T/F) **or** yes/no (Y/N) consistent in the examples. For example, true is always on the left of a decision and false is on the right. This is not a requirement of flow charts but can be beneficial to students' learning.

Branching (two-way decision)	
Flow chart	Pseudocode

	**Two-way selection**
	If condition then else
	
	Input (Age)
	If (Age >= 16) and (Age <= 65) then
	Price ← 35
	Else
	Price ← 20
	End If
	Output ('The cost will be $' Price)

Branching (multi-way decision/CASE)	
Flow chart	Pseudocode
	**Multi-way selection (Case)** Input (Age) **Case Age of** **<4 : Fare ←0** **<16 : Fare ← 5** **<60 : Fare ← 10** **> 60 : Fare ← 7** **End Case** Output ('The cost of your trip will be $' Fare)

Activate prior knowledge

- Students spot the errors in the flow charts given by the teacher using their understanding of sequence from the previous lesson. Students compete to find as many errors as possible on each flow chart in a given timeframe.

Teacher

- Show an example of an algorithm with one decision and then convert the algorithm to a flow chart based on feedback from students. Complete in steps with the symbols drawn first and the data added afterwards, e.g. two prices for a transport ticket, a student concession or paying full price.
- Develop a flow chart in steps that include various two-way decisions. This can be pre-populated prior to the lesson so that the class works collectively to fill in the blanks. An example that can be used is making a cup of coffee with decisions about adding milk, cream and sugar.
- Pose the question, 'What happens when you have more than two answers or options?' Gather students' ideas on what types of situations or programs could require more than two options. Create a flow chart based on suggestions from students. This can be a nested 'if' statement if they prefer or a multi-way decision.

Students

- Individually expand on the teacher's example of the transport ticket flow chart and include two more options, one for veterans and another for babies. Teacher will set the ticket cost for these inclusions for students to follow.

Lesson conclusion

- In pairs, students allocate a speaker A and speaker B. Speaker A explains to speaker B how flow charts work and why they are useful in designing programs or products. Speaker B repeats the activity to speaker A. This will help in reinforcing knowledge learnt and allow for the identification of students that need extra support. Give feedback before the next lesson.

Lesson 12: Flow chart quiz questions

The Western Australian Curriculum content addressed in this lesson is below.

Digital implementation

Design algorithms involving control structures (selection, decision and iteration), and represent them using flow charts and pseudocode

---

Lesson outline

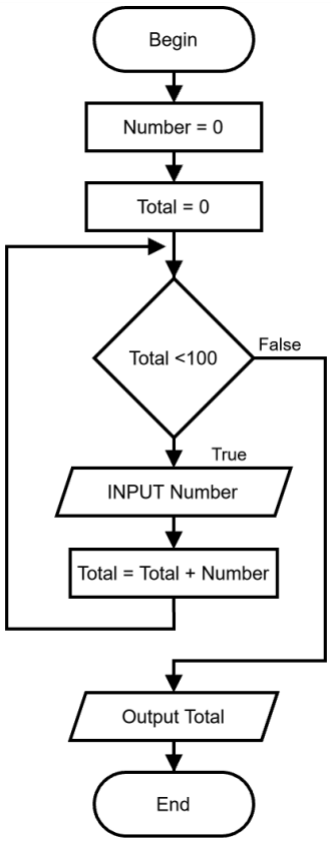
Learning intentions
• Develop five questions (minimum) in the creation of a flow chart as preparation for the upcoming *Quiz me* assessment.

Preparation for lesson

- Teachers familiarise themselves with the *Quiz me* assessment (Lessons 14–16).
- Source a class set of mathematical drawing aids for drawing flow charts.
- Create or gather an unfinished flow chart with at least two decisions to activate students' prior learning.
- Source three examples of the use of iteration (repetition).
- Prepare flow charts where the students can place examples of iteration.
- Prepare three questions and answers related to previous digital system lessons and content.

Support notes for teacher

- Introduce iteration (repetition) to help students loop their quiz once it is complete. Below is an example of iteration (repetition):



Activate prior knowledge

- Students complete unfinished flow chart with at least two decisions.

Teacher

- Explain iteration (repetition) and why it is important for programs and the creation of software. Show students three examples of the use of iteration (repetition). As a class, draw where the iteration (repetition) should be placed on pre-made flow charts.
- Display three questions and answers related to previous digital system lessons and content for students to model. The questions can be a combination of question-and-answer style questioning and multiple-choice. Students create a minimum of five of their own questions with answers.

Students

- Design flow charts that include their questions and answers. Questions should involve various decisions and outputs as planned.

Lesson conclusion

- Collect flow charts to edit and assess before the next lesson.

Lesson 13: Storyboards

The Western Australian Curriculum content addressed in this lesson is below.

Digital implementation

Break down the user experience (UX) of a digital system

Lesson outline

Learning intentions
• Apply design skills and design ideas to create a storyboard of the home page or index for a digital systems quiz.

Preparation for lesson

- Teachers familiarise themselves with the *Quiz me* assessment (Lessons 14–16).
- Select two websites or presentations to show side-by-side: one with effective design elements and usability and one that is poorly designed.
- Prepare a detailed annotated storyboard for a common website to use as an example. Collect high-quality student examples to use in future lessons.
- Print a copy of a storyboard template for students to use or students can create their own using a blank piece of paper. This involves using a landscaped rectangle with room to annotate outside of the drawing area.

Support notes for teacher

- Storyboards are used for designing user interfaces and are a graphical representation of the intended design. Storyboards show design elements, such as colour, navigation and usability of the design. Annotations must be explicit and detailed.
- A user interface is defined as the characteristics of the boundary between users and a computer system, or the way users interact with computer hardware or software. In software, this usually comprises fields for text and number entry, mouse pointers, buttons and other graphical elements.
- Storyboards should be created by hand for students to practise their fine motor skills. They can choose to use different coloured pencils or simply use annotations to describe the colours. Annotations should be detailed and include reasons for design choices. Annotations include usability, links, colours used, shapes, sizes, images, font sizes and font styles.
- Usability refers to how easy it is to navigate, find information, use sitemaps and follow a logical sequence of buttons in a product, website or app.

Activate prior knowledge

- The teacher displays two websites or presentations side-by-side. The index or home page will suffice: one with effective design elements, features and usability and one that is poorly designed and constructed. This can be a website or presentation that students are familiar with. Students analyse the features that they observe.

Teacher

- Present the pre-made example of an effective storyboard design, indicating the annotations to be included.

Students

- Create a storyboard of an index or home page for a quiz on the template provided.
- Evaluate each other's storyboards allowing for changes to be made to their designs.

Lesson conclusion

- All students should have a completed storyboard to begin the *Quiz me* assessment in the next lesson.
- Students articulate one design feature that they have learned or find interesting before the conclusion of the lesson. This can be completed through a PMI (plus, minus, interesting) activity.

Lessons 14–16: Quiz me summative assessment

See Appendix B for Western Australian Curriculum content links.

Preparation for lesson

Students require a copy of the:

- *Quiz me* summative assessment (Appendix B)
- Flow chart with the questions they created
- Storyboard of an index/home page they created.

Support notes for teacher

- The assessment task can be broken into parts and edited to suit the school context. Teachers should differentiate their teaching and assessment to meet the specific learning needs of their students, based on their levels of readiness to learn and their need to be challenged. Where appropriate, teachers may either scaffold or extend the scope of the assessment task.

Activate prior knowledge

- Students have previously created both the flow chart indicating questions and answers and the storyboard for the index/home page. A class discussion focusing on these documents should take place before the assessment.

Teacher

- Revise how to create interactive links in software of choice. This task can be broken down into sections with milestones for student planning and feedback.

Students

- Individually complete the *Quiz me* assessment.

Lesson conclusion

Conclude by having students play classmates' quizzes and give each other feedback to gain a greater understanding of digital system content.

Appendix A

Formative assessment task

Networking practical

Task details

Title	Networking practical
Description	In small groups, students label components of physical networking devices and explain what they are and how they interrelate.
Type of assessment	Formative (summative as an option)
Purpose of assessment	To assess students' understanding of the purpose of a network device and transmission media and their impact on network activities. To assess students' understanding of the difference between wired and wireless network connections.
Ways of assessing	Observation checklist
Evidence to be collected	Observation checklist and photographs (optional)
Suggested time	15 minutes per pair or group of students
Differentiation	Teachers should differentiate their teaching and assessment to meet the specific learning needs of their students, based on their level of readiness to learn and their need to be challenged. Where appropriate, teachers may either scaffold or extend the scope of the assessment tasks.

Content descriptions

Digital systems

- Methods of data transmission in different types of networks, including wired, wireless and mobile networks
- Hardware devices of networks and their purposes

Task preparation

Prior learning

Students have previously completed Lessons 3–9.

Resources

- Observation checklist
- Network components (these will vary based on availability; adapt checklist as needed), such as:
  - router
  - integrated service router (ISR)
  - modem
  - UTP cables
  - switch
  - network interface cards (NIC) etc.
- Labels printed for the selected network components

Instructions for teacher

- Before the lesson, create labels for the devices. These can vary based on availability of devices. Make sure you have the correct cables to connect the devices. The connection is not needed, just the physical layout in order to show understanding. Broken or discarded devices can be used.
- Reinforce students' prior knowledge of wireless and wired connections.
- Revise prior learning on network devices, such as routers (wired and wireless), switches, NICs, servers, modems, ISRs etc. (including firewalls for physical security).
- Place students into groups of no more than three students.
- Use the following sample observation checklist to complete the task. Note, this can be modified to suit the needs of your students and the availability of network components.

Instructions to students

- Review network components and what they are used for.
- Ask yourself to describe: Why do we use wired or wireless connections in different situations?
- Read the observation checklist before completing the task.
- As a group, work together to complete the observation checklist.

Observation checklist for physical network components (sample to be edited)

This task is designed to be a practical group task (of two to three members), including oral questioning of varying complexity to match student ability. Members of the group can be awarded different scores, if required.

Student names: _____

Part A: Label and explain networking devices				
	Labels networking devices correctly	Correctly identifies network component with a brief description	Correctly identifies and describes the network component	Correctly identifies and explains the function of the network component
integrated service router (ISR)	1 mark	2 marks	3 marks	4 marks
router	1 mark	2 marks	3 marks	4 marks
modem	1 mark	2 marks	3 marks	4 marks
switch	1 mark	2 marks	3 marks	4 marks
copper cable (UTP)	1 mark	2 marks	3 marks	4 marks
other cable	1 mark	2 marks	3 marks	4 marks
network interface card (NIC)	1 mark	2 marks	3 marks	4 marks

Part B: Connecting devices		
	Connects all of the devices correctly	Correctly explains position of the devices and purpose for this location in relation to other devices
Devices that need to be connected: ISR to cable, correct port, power to ISR, cable to laptop etc.	1–7 marks (1 mark for each correct connection)	1–7 marks (1 mark for each correct explanation)

Part C: Wired and wireless connections			
Wireless connections	Explains one positive and one negative of wireless connections 1–2 marks	Explains two positives and two negatives of wireless connections 3–4 marks	Explains three positives and three negatives of wireless connections 5–6 marks
Wired connections	Describes one positive and one negative of wired connections 1–2 marks	Explains two positives and two negatives of wired connections 3–4 marks	Explains three positives and three negatives of wired connections 5–6 marks

Marking key

Description	Marks
Part A: Description	
Label and explain networking devices (up to 4 marks per device for up to seven devices – adjust Subtotal and Total if using fewer devices)	
Correctly identifies and explains the function of the network component	4
Correctly identifies and describes the network component	3
Correctly identifies network component with a brief description	2
Labels networking devices correctly	1
Subtotal	**/28**
Part B: Description	
Connecting devices	
Connects all of the devices correctly (1 mark per correct answer)	1–7
Correctly explains the position of the devices and purpose for this location in relation to other devices (1 mark per correct answer)	1–7
Subtotal	**/14**
Part C: Description	
Wireless connections	
Explains three positives and three negatives of wireless connections	5–6
Explains two positives and two negatives of wireless connections	3–4
Explains one positive and one negative of wireless connections	1–2
Subtotal	**/6**
Wired connection	
Explains three positives and three negatives of wired connections	5–6
Explains two positives and two negatives of wired connections	3–4
Explains one positive and one negative of wired connections	1–2
Subtotal	**/6**
Total	**/54**

Appendix B

Summative assessment task

Quiz me

Task details

Title	Quiz me
Description	Students design and create an interactive non-linear quiz, based on digital systems content.
Type of assessment	Summative
Purpose of assessment	To assess students' ability to design a flow chart and storyboard with correct structure and constraints To assess students' ability to create and evaluate an informative quiz
Ways of assessing	Practical evidence, observation and evaluation
Evidence to be collected	Planning documentation (storyboard and flow chart) quiz (digital) self-evaluation
Suggested time	Three one-hour lessons
Differentiation	Teachers should differentiate their teaching and assessment to meet the specific learning needs of their students, based on their level of readiness to learn and their need to be challenged. Where appropriate, teachers may either scaffold or extend the scope of the assessment tasks.

Content descriptions

Digital systems

- Methods of data transmission in different types of networks, including wired, wireless and mobile networks
- Hardware devices of networks and their purposes

Digital implementation

- Break down the user experience (UX) of a digital system
- Design algorithms involving control structures (selection, decision and iteration), and represent them using flow charts and pseudocode

Design thinking skills

Investigating and defining

- Investigate and define the problem and requirements of a given design brief

Designing

- Design processes and solutions with given technologies and techniques, using appropriate technical terms

Producing and implementing

- Implement agreed protocols and use a range of technologies, components and/or equipment to produce designed solutions

Evaluating

- Use given contextual criteria to evaluate design processes and solutions

Task preparation

Prior learning

Students have previously completed all lessons.

Assessment task

Assessment conditions

Students may work individually or collaboratively to complete the task.

Resources

- Access to software that will allow students to create a quiz to provide immediate feedback, e.g. presentation software or a visual programming environment
- Design documentation
- Self-evaluation

Instructions for teacher

- Explain to students that they are to create a quiz for other students in the class using presentation or other software. The quiz should include:
  - an introductory slide with instructions
  - quiz questions based on hardware components of a network and different types of networks with a series of responses for the user to select from (minimum of five)
  - user feedback that users receive after selecting a response to the quiz, e.g. 'That is an incorrect response. Please try again' and 'Congratulations, that is correct. Please move on to the next question'
  - a final slide with a conclusion
  - a bibliography for all references used in the quiz.
- Distribute planning documentation and discuss with students.
- Once students have produced their quiz, ask students to swap their quiz with other students and have another student attempt the quiz and provide feedback.
- As an extension, students may choose to create a multiple-choice quiz or a combination of both styles of questions.

Instructions to students

Task description: Quiz me

Name: _____

Your task is to design, produce and evaluate an interactive quiz for other students in the class to try. The quiz must be based on either of these topics:

- different types of networks
- hardware components of a network

Include:

- an introduction, with instructions
- a conclusion to end the quiz
- a minimum of five questions, each with a series of responses that the user can select from. When the users select the response, they should receive immediate feedback, for example:
  - Well done – that's correct. Move on to the next question.
  - Oops, that's not right. Try again.
  - Unlucky. The correct answer is 'x'.

You may choose to use multiple-choice questions.

Make sure each response is linked to the correct feedback (i.e. right or wrong) and that users can proceed to the next part of the quiz.

Record in your bibliography all references and any images you use in the production of the quiz.

At the end of the task, swap with other students to try their quizzes and give your feedback. The feedback you are given can be used to help you complete your self-evaluation.

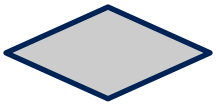
At the end of the task, submit your work for assessment. Include:

- planning documentation (storyboard and flow chart)
- electronic version of your quiz
- bibliography
- self-evaluation.

Storyboard

Flow chart

Using the following symbols (note each shape has a particular meaning/use), create a flow chart to represent how your quiz works.

Flow chart symbols	
	Start or end
	Process – used to represent any process, task or activity that takes place
	Input/output – used to represent information that the user needs to input or information that the program will output
	Decision – used when there is more than one alternative pathway, e.g. true/false, yes/no
	Arrow – connects other elements of the flow chart and shows the direction

Self-evaluation

To produce my quiz, I used the following software:

_____

_____

_____

To enhance the appearance of my quiz, I used these features because:

Feature	Reason
Colour selection	
Images	

The feedback I received from other students who tried my quiz included:

_____

_____

_____

_____

The best thing about my final product is: _____

_____

because _____

_____

_____

_____

_____

If I could change one thing about my final product it would be: _____

_____

because _____

_____

_____

_____

_____

Problems I had during the tasks were: _____

_____

_____

_____

_____

Marking key

Description	Marks
Investigating and defining	
Designs relevant questions at the intended level	9–10
Designs mostly relevant questions at the intended level	7–8
Designs some relevant questions at the intended level	5–6
Designs a limited number of relevant questions often not at the intended level	3–4
Develops off-topic questions	1–2
Subtotal	**/10**
Copyright is acknowledged (if required, e.g. in use of images)	1
Subtotal	**/1**
Designing – storyboard	
Includes detailed annotations describing design choices and effectively includes usability, navigation and design elements that reflect the intended target audience	7–8
Includes annotations with design choices and displays usability, navigation and design elements that reflect the intended target audience	5–6
Includes some annotations and displays some design elements, usability and navigation	3–4
Includes annotations that are brief or unfinished	1–2
Subtotal	**/8**
Designing – flow chart	
Creates a logical sequence of steps designed to solve a problem and considers modification	4
Creates a logical sequence of steps designed to solve a problem	3
Creates a sequence of steps designed to solve a problem	2
Creates an incomplete sequence of steps in a simple problem-solving plan	1
Subtotal	**/4**
Designing – flow chart	
Correctly identifies and efficiently implements two-way or multi-way decisions (branching)	4
Correctly identifies two-way or multi-way decisions (branching)	3
Correctly identifies two-way or multi-way decisions (branching)	2
Implements incomplete or incorrect two-way or multi-way decisions (branching)	1
Subtotal	**/4**

Description	Marks
Producing and implementing	
Provides a quiz that is efficient, functional and considers the user experience of a digital system, developing an engaging experience that allows for choices within a user interface. Includes working hyperlinks	9–10
Provides a quiz that is efficient and considers the user experience of a digital system, developing an engaging experience that allows for choices within a user interface. Includes hyperlinks that mostly work	7–8
Provides a quiz that considers the user experience of a digital system that allows for choices to be made within a user interface. Includes hyperlinks that mostly work	5–6
Provides a quiz with minimal consideration for the user experience and an incomplete or inappropriate user interface. Includes some hyperlinks that are active	3–4
Provides an unfinished quiz with limited consideration of the user experience	1–2
Subtotal	**/10**
Evaluating	
Provides a self-evaluation incorporating feedback from others which includes a detailed reflection of all stages of the design process	4
Provides a self-evaluation that evaluates design processes and solutions. Includes a detailed reflection of all stages of the design process	3
Provides a simple self-evaluation that includes a focus on some stages of the design process	2
Provides a minimal self-evaluation with minimal details	1
Subtotal	**/4**
Total	**/41**

Acknowledgements

Lesson 1:
Digital footprint

Teacher information	From 'A' to 'content' from: Digital Technologies Hub. (n.d.). *Privacy and Security*. Retrieved June, 2025, from https://www.digitaltechnologieshub.edu.au/media/mjwcbt3c/dthub_infographic-privacy-security_a3_web.pdf Used under a Creative Commons Attribution 4.0 International licence.

Lesson 2:
Multifactor authentication

Teacher information	Digital Technologies Hub. (n.d.). *Privacy and Security*. Retrieved June, 2025, from https://www.digitaltechnologieshub.edu.au/media/mjwcbt3c/dthub_infographic-privacy-security_a3_web.pdf Used under a Creative Commons Attribution 4.0 International licence.