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

Technologies:
Digital Technologies

Teaching, learning and assessment exemplar

Year 5

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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Contents

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 presents planning for eight weeks of teaching and learning for each of the four terms, with a time allocation of one hour per week.

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.

Year level description

In the middle to late childhood phase of schooling, students develop a sense of self, their world expands, and they begin to see themselves as members of larger communities. Learning experiences emphasise and lead to an appreciation of both the commonality and diversity of human experience and concerns.

Digital Technologies builds on concepts previously acquired where students continue to develop understanding and skills in computational and design thinking.

In Year 5, students explore the role that individual components of digital systems play in the processing and representation of data. They recognise that all digital systems represent data as numbers. Students create a range of digital solutions that involve user input, variables and control structures.

When creating solutions, students identify appropriate data and requirements. They evaluate how well their design solutions work in current digital systems and reflect on their design process. Students develop strategies to communicate information and ideas using agreed protocols, considering the safety aspects of working in digital environments while identifying websites and apps that are trusted to store personal data online. They demonstrate increased responsibility for managing and organising activities, individually and in groups.

Achievement standard

By the end of the year:

Students identify internal components of digital systems and their functions. They identify ways data is represented using code, and provide relevant examples. Students create designed solutions, follow and represent diagrammatic algorithms involving user input, variables and control structures, such as sequencing, decisions and repetition. They implement algorithms using visual programming languages. Students identify and make judgements based on the use of personal data and how it contributes to a permanent digital footprint. They access multiple personal accounts using unique passphrases or biometrics and describe the risks of password reuse and not logging out.

In Digital Technologies, students define a problem, identify available resources and develop designed solutions. They develop and communicate alternative solutions, and use annotated diagrams, storyboards and appropriate technical terms for design ideas.

Term 1

Weeks 1–8: Privacy and security and digital systems

Term 1 Week 1: ICT usage protocols

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Design thinking skills **Producing and implementing** Use technologies, components and/or equipment to implement agreed protocols to produce a designed solution	**Learning intentions** • Understand the school's information and technologies (ICT) acceptable usage agreement. • Identify consequences for not following the rules. **Focus questions** • What are the consequences of not following ICT rules in the classroom? • How can we create ICT expectations that ensure a safe and productive learning environment? **Support notes** Students access a variety of computer hardware, peripherals, software and networks (internal and external) at school to be informed and safe users. The school's ICT Code of Conduct, or in some schools, the ICT Acceptable Use Policy/Agreement and Electronic Communications Guidelines (student) or equivalent, should define safe use of hardware, infrastructure and online services. Using parent-funded and personal devices are included in school policy and guidelines.	**Introduction** As an introduction to Digital Technologies, explain the rules and guidelines for the safe use of ICT hardware and software in the computer room and/or classroom and across the school. The teaching content and time needed will vary according to school context. Use the school's ICT Online Services Acceptable Use Agreement (Years 3–6) that students and parents are required to sign and ensure students understand what they have agreed to. Create a set of rules, expectations or protocols that students can follow to ensure digital safety and wellbeing. Discuss with students the consequences of not following the rules. This lesson provides an opportunity for teachers to ensure students can log in to the school network and other school platforms, as well as to assess students' keyboard skills and confidence using a computer, if this is considered relevant.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	Suggested assessment points Teacher observation of students' attitude, participation and contribution to the lesson. Teacher observation of students' keyboard skills and confidence using a computer.	**Learning activity** Allocate each student an expectation, rule or protocol. Students create a poster demonstrating how it contributes to their digital safety and wellbeing, e.g. 'I log out of my accounts when I have finished.' **Conclusion** Use an instruction strategy such as an exit ticket to reinforce the purpose and content of the school's ICT usage agreement.

Term 1 Week 2: Digital systems

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Digital systems Digital systems have main internal components that perform particular functions to achieve a purpose	**Learning intentions** • Identify the main components of a digital system. • Understand how different digital systems work and the purpose of different digital systems. **Focus questions** • What is a digital system? • What types of digital systems do people use? For example, QR codes or payment systems at the supermarket check-out. • What peripheral devices are used to communicate data and information? For example, a tap-and-go card for purchasing items at a pop-up store. **Support notes** All computer systems involve an input, a process and an output. Input devices include keyboards, mice, barcode scanners and game controllers. Processing is done by Central Processing Units (CPUs) and primary storage. Output devices include monitors, printers and speakers.	**Introduction** To determine students' prior knowledge of digital systems, provide each student (to work as individuals, pairs or small groups) with a work sheet/resource containing large photos of various computer systems, e.g. desktop computer and peripherals, tablet and accessories, gaming system and self-checkout from the supermarket. Students label the components of each system and write a brief explanation of how it works and what it is used for. Identify students' prior knowledge and confidence levels related to digital systems. Differentiate the task for students as required; for example, instead of a writing task, students can create a digital voice recording or creating a mini video (short-form video). Demonstrate and explain components that students do not understand. Ask students to write additional information on the work sheet. Check for understanding by asking questions and clarify any remaining misconceptions. Collect the student work sheets to complete a formative assessment task about digital systems in Week 3.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	Input and output devices are non-essential to the running of a device or computer system but extend its functionality. For example, touch screens, game controllers, microphones and barcode readers are input devices, and TV screens, printers, speakers and earbuds are output devices. Ensure students understand and can explain interactions between components in a digital system. Teach or revise the basic functions of the hardware components of a computer system. **Suggested assessment points** Assess the extent to which students can describe the basic functions between digital system components. Record each student's level of knowledge and understanding.	**Learning activity** When students have finished their formative assessment, they play a level of Google – *Be Internet Awesome – Interland*. This resource exposes students to concepts like responsible communication, online critical thinking, privacy and security, and digital citizenship. **Conclusion** Students gather in small groups to discuss the levels achieved in Google – *Be Internet Awesome – Interland* and what they liked about it. A Think-Pair-Share instructional strategy can be used for this activity.

Term 1 Week 3: Inside a computer

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Digital systems Digital systems have main internal components that perform particular functions to achieve a purpose	**Learning intentions** • Understand that a digital device is made up of several parts. • Identify the internal components of digital devices and their functions. **Focus questions** • What is inside a computer? • What are the functions of each of the components? **Support notes** Digital devices, such as computers, need both physical parts (hardware) and instructions (software) to work. They require power, user input and an operating system to perform tasks and functions. If possible**,** provide an old computer to dismantle, like a desktop or laptop, and remove the screws from the different components. Note: local councils often have e-waste collection points where old computers are discarded and could be collected for dismantling. Print out *My First Computer* • https://www.helloruby.com/play/2 (Appendix A.1 Resources: Term 1) for each student. **CPU (Central processing unit)** – the part that executes the program and tells the other components what they need to do.	**Introduction** Start the lesson with a card sorting activity (using physical cards, or digital cards shown on the class display screen) of various peripherals that students learnt in the previous year, e.g. printer, mouse, webcam, controller, etc. Students could sort the peripherals into two groups, input and output. **Learning activity** Use the video *How Computers Work: What Makes a Computer, a Computer?* (Appendix A.1: Resources – Term 1) to introduce the functions of internal components, such as the CPU and memory in a computer. **Optional activity**: Remove the various components of a computer to show the different parts. Have students identify each part and its function. Distribute the *My First Computer* template to each student. Have students cut out the different components and put them aside in a neat pile. Identify the different components and have students label the parts before they glue them into their computer. Students can then add the software, including an operating system and apps. **Conclusion** Request students to recall the main components of a computer and their functions.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	RAM (Random access memory) – the part of the computer that performs all the math and logic operations. The memory keeps track of information so that it can be recalled later. **Motherboard** – the main printed circuit board in a computer. All components are connected and communicate through this board. **SSD (Solid state drive) or HDD (Hard disk drive)** – the component that stores data and software, such as the operating system, apps and user files. Models for the exercise can be created with various materials, including paper, cardboard or 3D printed with plastics. These models do not need to be to scale. **Suggested assessment points** Observation record of students completing the simple computer simulation.	

Term 1 Week 4: Simple computer simulation

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Digital systems Digital systems have main internal components that perform particular functions to achieve a purpose	**Learning intentions** • Recall the different parts of a computer. • Act out a simulation of a simple computer. • Explain the purpose of each component. **Focus questions** • What are the main parts inside a computer, and what are their functions? • How do the CPU, RAM and storage work together to complete a task? **Support notes** Have students act out a simple computer simulation. • cse4k12.org – *How Computers Work*. https://cse4k12.org/how_computers_work/index.html (Appendix A.1: Resources – Term 1). • Print the work sheets for the simple computer simulation from cse4k12.org's *How Computers Work* activity. **Suggested assessment points** Observation record of students completing the simple computer simulation	**Introduction** Provide students with the computer that they created during the previous lesson. Have students explain the function of each part of the computer to a partner. Show a photo of each component and explain the purpose. Advise students they will be participating in a simple computer simulation where they will each take on the role of a different component and work together to run a basic program. **Learning activity** Divide students into groups of three. Allocate each student a role and hand out the relevant work sheet. Use the instructions and work sheets from cse4k12.org's *How Computers Work* to facilitate a simple computer simulation. **Conclusion** Have students use their paper laptop computer and explain the process when someone presses a button or opens an app in relation to the computer hardware components. Instruct students to be specific on the function of each component.

Term 1 Week 5: Private and personal information

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Privacy and security Personal data can be used to create a permanent digital footprint	**Learning intentions** • Define personal and private information. • Describe the reasons for keeping personal and private information confidential. **Focus questions** • What is the difference between personal and private information? • Why would someone want to steal your personal/private information? • Why do you need to protect your personal and private information? **Support notes** Students understand the difference between personal and private information and are confident about what information is/is not appropriate to share online. Information regularly requested by websites may include personal and/or private information, such as given name, family name, username, password, gender, birthday and email/phone contact. Students develop an understanding of why websites want their information. For example, for payment, marketing (direct and promotional) and mailing lists (which may be sold on to others).	**Introduction** Explain to the students that the introductory activity will outline the difference between personal and private information in the online world. **Learning activity** Provide each small group of students with a set of cards. Each card names a specific type of information that is either personal or private. Use different types of information that are regularly requested by websites, by new friends or that people ask each other in real life or online. Provide three headings – 'personal information', 'private information' and 'not sure' for the students to create a list. Explain to students they are to discuss and sort each card into one of the given categories. Allow students adequate time to complete the sorting activity and discuss their reasoning with the group. Students complete a rotation activity, with groups moving from table to table at the teacher's signal, to view and comment on all/some of the groups' sorting. Once each group has returned to their table, use a call-out to debrief the activity. It is important to ensure that each type of information is categorised correctly, and that students can understand and explain the reasoning. Reinforce with students that sharing information is a common way people connect with each other.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	Define: • personal information – information that is common to many people and cannot be used to identify you • private information – information that is specific to you and can be used to identify you • identity theft – when someone uses your private information to pretend to be you. Ensure students understand the difference between personal and private information, and that personal information is usually safe to share online. It is always best to get permission from a parent/guardian before sharing. Choose a suitable video about sharing online. Resources may be sourced from the following website. Common Sense Education – Private and Personal Information https://www.commonsense.org/education/digital-citizenship/lesson/private-and-personal-information (Grade 4, Private and Personal Information lesson video) (Appendix A.1: Resources – Term 1). **Suggested assessment points** Using an online/physical journal, students: • write an example of personal information and an example of private information • write a brief explanation of identity theft • write their group's rules about sharing information online.	Explain that there are lots of ways to share information; however, it is important not to overshare, especially with information that is private. Show students a suitable video about sharing information online to further explain the concept. An example of a video you could use is the first eight minutes of the *Online Safety Special* by Behind the News (BTN). (Appendix A.1: Resources – Term 1). After viewing the suggested video, hold a class discussion focusing on what type of information is/is not okay to share. Reinforce to students that private information is risky to share because it can identify an individual, being unique to that person (for example, your date of birth or home address). Ask: Why would someone want to steal another person's identity on the internet? If needed, explain the meaning of identity theft and give reasons why it occurs (hide own identity, fraud). Explain to students that on the internet there is the potential to come into contact with strangers you don't know. Because it is hard to know the intentions of people you have not met, it is best to remain cautious when sharing information. **Conclusion** Remind students how important it is, each time they share information online they should stop and consider if they are giving out information which should be kept private. In groups, students develop three quality rules for children about sharing information.

Term 1 Week 6: Digital footprint

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Privacy and security Personal data can be used to create a permanent digital footprint	**Learning intentions** • Define the term 'digital footprint' and identify activities that contribute to it. • Identify when/where they are, and are not, in control of their digital footprint. • Understand how to act responsibly when considering their own and others' digital footprints. **Focus questions** • What is your digital footprint? • How does your digital footprint affect you? • How are you responsible for your digital footprint? **Support notes** A digital footprint is a record of what you do online, including the sites you visit, things you post, comments you make, pictures of you and items posted about you. Not everything in your footprint is under your control. Acquire a photo of a footprint from an animal and a photo of an animal's fossil. Prepare some scenarios of online activity, e.g. blog posts, pictures/videos on social media and interactions in a video game. This lesson is taken from Common Sense Education website. • https://www.commonsense.org/education/digital-citizenship/lesson/our-online-tracks (Grade 4, Our Online Tracks)	**Introduction** Present to the class the image of an animal footprint. Using a Think-Pair-Share activity, have students analyse what they can tell about the animal from the picture. Explain that this is a fossil which preserves information about a plant or animal that can last for millions of years. Link this idea to a digital footprint. The actions we take online leave tracks and create a digital imprint that can last a long time. Even if we try to delete the activity, it is still saved for a long time, stored somewhere and accessible to someone. **Learning activity** Provide a handout to students with scenarios of different online activities that are appropriate for the current interests and interactions of the students. Have students analyse the activities and write what they can infer from them. Invite students to share their responses. Discuss whether these 'footprints' are in the person's control, e.g. if someone posts a photo of you, then it is out of your control. Ask the question, 'What can we do to ensure we are in control of and acting responsibly with our digital footprint?' Have students come up with different responsibilities for themselves and responsibilities to others.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	Suggested assessment points Using an online journal, students: • write an example of a digital footprint. • write their own personal responsibilities to manage their digital footprint.	**Conclusion** Share the lesson from the activity above through a class discussion and explore any differing opinions on their level of control over the actions.

Term 1 Week 7: Passphrases

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Privacy and security Access multiple personal accounts using unique passphrases or biometrics. Risks of password reuse and not logging out	**Learning intentions** • Understand the importance of using unique passphrases for each account. • Know the risk of reusing a passphrase and not logging out of accounts. **Focus questions** • Why should we use unique passphrases for different accounts? • What could happen if we reuse passphrases? • Why is it important to log out? **Support notes** This lesson builds on students' previous understanding of passwords, shifting their focus to the development of strong and unique passphrases to help protect personal information. Students learn how reusing passphrases across multiple accounts increases vulnerability, as if someone gains access to one account, they will have access to many. **Suggested assessment points** Use an exit ticket activity, where students explain the method they used to create unique passphrases and why having unique passphrases is important. Ensure students do not reveal their own personal passphrases. Observe students' verbal explanations of the benefits of a passphrase versus a password.	**Introduction** Show the class the BTN video *Password Power*. (Appendix A.1: Resources – Term 1) This video discusses the importance of passwords. Discuss the concept of personal accounts and have each student brainstorm on a small whiteboard, or in their workbook, all the personal accounts they or their parents have, e.g. emails, games, bank accounts, social media. Explain that each account has sensitive information that should be protected, e.g. games have emails, achievements, in-game currency and payment details. Write the words 'passphrase' and 'password' on the whiteboard. Ask students to turn to a partner and identify the difference between them. Introduce the concept that a passphrase is a series of random words e.g. 'happy sky blue jump'. Explain that a longer passphrase with 14 characters or more is stronger than a traditional password and will be harder for someone to guess. **Learning activity** Guide students through a simple process to develop their own passphrases by brainstorming all their favourite things on their whiteboard (e.g. colours, foods, cars, sports and emotions).

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		Ask the students to select one word and keep it in their head. Direct the students to move around the room and see if other students can guess their password. The word should be easy to guess if students use what they know about their peers. When they return to their desk, ask who had their password guessed. Discuss why they think some student's passwords were easy to guess. Next, have the students choose four unrelated words from their brainstorm, e.g. 'Ferrari blue hockey jealous'. Put them in a random order and then ask the students to remember them. Direct the students to repeat the last activity and have students try and guess their password. Remind the students that it must be the correct words, in the correct order. This should be more difficult. Discuss why it is more difficult (i.e. longer, exact order and random words). Introduce the risks of reusing a single passphrase across multiple accounts, using an analogy like a 'master key' that can open many doors if someone gets hold of it. Explain that a unique passphrase for each account acts as a separate, secure 'key', keeping accounts protected even if one key is lost or compromised. Demonstrate how students can make unique passphrases using a modifier related to the service provided by the account. Explain that logging out after using an account is like 'locking the door' to keep it secure. Share situations where it is essential to log out, like shared devices.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		Discuss the consequences of not logging out of a device, using the example of shared devices. **Conclusion** Recap the benefits of moving from a password to a passphrase and using unique passphrases for each account. Emphasise that developing these habits will help students stay safe online and protect their personal information.

Term 1 Week 8: Biometrics

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Privacy and security Access multiple personal accounts using unique passphrases or biometrics. Risks of password reuse and not logging out	**Learning intentions** • Understand how biometric technology is used for identification and security. • Explore the benefits and challenges of biometrics. **Focus questions** • What are biometrics and how do they help secure our accounts? • What are some examples of biometrics used in everyday life? • What are some of the benefits and challenges of biometrics for security? **Support notes** The term 'biometrics' comes from the Latin words 'bio', meaning 'life', and 'metric', meaning 'to measure'. Biometrics works by using technology to take measurements of people's unique physical and behavioural characteristics. Physical characteristics can include facial recognition, fingerprints, iris recognition, retina scanning, voice recognition and digital signatures. Students will explore how biometric data can be used to access secure areas or devices, like how passphrases are used.	**Introduction** Define *biometrics* and the word's origin in the Latin language. Discuss the different ways of identifying someone by means of their unique physical and biological characteristics. Provide examples of where biometrics might be used, such as unlocking phones or tablets, or hand scanners to enter buildings. Explain how biometrics can be used as an alternative to passwords or passphrases. **Learning activity** Have each student trace their hand on a blank sheet of paper. Then, using a ruler, ask students to measure: A. The distance from the tip of each finger to the base of the knuckle B. The width of the palm at the base of the knuckle C. The distance between the pinky finger knuckle and the thumb knuckle. Students write these measurements on their traced hand diagram. Demonstrate these measurements on the board, displaying an 'oversized' hand diagram to ensure the students are all measuring the correct locations on their hands. Alternatively, students could take a photo of their face using a tablet or similar device, then measure between different points on their face.

	Suggested assessment points Collect students' annotated hand tracings or facial photos to review their understanding of biometric measurement. Appendix B: Assessment task 1 – Privacy and security assessment.	In small groups, direct students to compare their measurements and inspect their similarities and differences. Guide students to consider why these differences exist (e.g. unique bone structures, hand shapes or facial features). Bring the class together and discuss their observations using the following questions: • Which measurements were the most unique? • Were any measurements surprisingly similar? Why? • Could these kinds of measurements be used as effective security? Why/why not? Emphasise that, in real-world applications, biometrics uses many measurements. A typical fingerprint scanner can measure between 10 to 15 specific points on a single fingerprint. No two fingerprints are exactly the same and this is what makes them so useful for identification. Discuss the benefits and challenges of using biometrics. Benefits can include security (hard to duplicate), convenience (no need to remember a password) and quick, unique identification. Challenges can include expensive technology, errors in recognition (cut on finger, facial changes, masks, too much light) and the safe storage of biometric data by corporations. **Conclusion** Distribute the assessment task – Privacy and security assessment (Appendix B).

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		Students will create a short video in which they respond to questions about the importance of strong passphrases, the risks of password reuse, and the use of biometrics for account security.

Term 2

Weeks 1–8: Computational thinking and website design

Term 2 Week 1: Computational thinking

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Digital implementation Design algorithms in plain English and/or flow charts that involve user input, variables and control structures (sequence, decisions and repetition) Implement algorithms in a visual programming environment involving variables and control structures (sequence, decisions and repetition) with user input **Design thinking skills** **Designing** Design solutions considering competing factors, with annotated diagrams, storyboards and/or a sequence of steps, using technical terms and an iterative process	**Learning intentions** • Understand the connection between patterns, computational thinking and solving problems. **Focus question** • How can identifying pattens help us create simpler and more efficient solutions? **Support notes** This lesson will start with pattern recognition and problem-solving using logic in the first optional activity. The second optional activity takes pattern recognition and logic into sequencing. Three important areas of thinking in the Technologies learning area are systems thinking, design thinking and computational thinking. Computational thinking describes the processes and approaches we draw on when thinking about how a computer can help us solve complex problems and create systems. A central part of computational thinking is logical thinking, or logic. Logic refers to the sequence of a program or event. Logical thinking is about using the information that is available or known to consider new information. It is not about guessing. A commonly known way to apply logical thinking is when solving *Sudoku*,	**Introduction** Display a number sequence, such as 7, 14, 21, 28 and so on, and ask students to use a Think-Pair-Share strategy and say what the next number in the sequence is. Ask students to explain the rule (algorithm) and how they worked it out. Answering that they 'just knew it' is not acceptable for this activity. **Learning activity** Write a second number sequence that is more challenging, yet not too difficult for the class, such as 5, 10, 16, 23 (going up by 5, then adding one more for each number in the sequence). Again, the focus is on explaining the rule and explaining how they worked out the rule. Write a third and more complex number sequence, if time and interest allow, e.g. 1, 1, 2, 3, 5, 8 (Fibonacci). Introduce the concept of computational thinking by explaining the connection between the process of looking for patterns and taking a logical approach to problem-solving. Briefly explain the four components of computational thinking to students, ensuring they understand the connection to digital technologies (in particular, coding and game design). Students are instructed to use images to identify patterns.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	where minimal information is given, but the rules help the user solve the puzzle in a methodical way. Computational thinking has four components: decomposition, pattern recognition, abstraction and algorithms. BBC – *Bitesize* https://www.bbc.co.uk/bitesize/subjects/zvc9q6f (Appendix A.1) has an explanation of computational thinking and its four components. Resources may be sourced from the following website. • Jules – *Best of Digital Literacy + Computational Thinking for Children* https://www.youtube.com/watch?v=mUXo-S7gzds (Appendix A.1: Resources – Term 2) **Suggested assessment points** Informal assessment of students' understanding, participation and contribution to the activities and tasks.	**Optional activity 1** Show students four related images. Students try to guess the single word that connects them. For example, images of a pencil, a book, a bag and a teacher might link to the word 'school'. After guessing, students should explain their reasoning, discussing how the images relate to the word. This can be done individually, in pairs or as a group, with hints provided as needed. Explain and reinforce to students (throughout any of the suggested or similar activities) that knowing or seeing a pattern makes it easier to solve a problem. For example, if you had to draw lots of cats or make a new computer game, it would be easier to create a template with the characteristics that all cats/computer games have and then add variables. Looking for patterns helps to make predictions, create rules and solve problems **Optional activity 2** Show a picture of four cats (two photos and two drawings). Ask students to name what is the same and what is different about the cats in the pictures. Ask students to decide on a general statement about cats. Ask if there are any exceptions to their general statement. This activity can be done as a whole class call-out or in small groups with students listing their answers on paper or a tablet. Reinforce to students the connection between identifying patterns and how it can save time in sequencing when coding.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		Conclusion Students draw a simple pattern and write a description of the pattern, in relation to computational thinking, to demonstrate what they have learnt.

Term 2 Week 2: Flow charts

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Digital implementation Design algorithms in plain English and/or flow charts that involve user input, variables and control structures (sequence, decisions and repetition) **Design thinking skills** **Designing** Design solutions considering competing factors, with annotated diagrams, storyboards and/or a sequence of steps, using technical terms and an iterative process	**Learning intentions** • Understand how flow charts represent the steps of an algorithm and help organise the problem-solving process. **Focus questions** • How do flow charts help represent the steps of an algorithm and organise the problem-solving process? • How can you use decision points in a flow chart to show different choices in an algorithm? **Support notes** In Digital Technologies, flow charts diagrammatically represent an algorithm (sequence of steps for solving problems) by showing the flow of data as it would be processed. A flow chart allows the reader to know the operations performed and the sequence of these operations. It shows the design the algorithm creator used to solve a problem. Five common symbols used in flow charts to represent an algorithm are: • an oval – start or end • a parallelogram – input and output • a rectangle – process to be done/carried out • a diamond – yes or no decisions • arrows – direction/flow of steps/actions.	**Introduction** Ask the class the question, 'Have you ever noticed how making one decision leads to a set of new choices?' Demonstrate an example on your board (e.g. what to eat for breakfast). Discuss the different outcomes. Introduce that flow charts are a visual tool to help map out our choices and decisions. **Learning activity** Have students participate in an appropriate online quiz. After the quiz, initiate a Think-Pair-Share activity for the question, 'How do you think the quiz knows which question to show you next?' Discuss answers with students. Explain that the quiz uses the answers to decide the next question. It flows to the next question based on responses. Revise flow charts by showing your exemplar flow chart. Illustrate each of the common symbols used in a flow chart. Select an everyday routine, such as getting ready for school or making a sandwich, and demonstrate how to show the routine in a flow chart. Have the students select their own routine or everyday process that involves a decision, e.g. washing dishes, making a Milo or making a sandwich, and instruct them to create a flow chart of that process.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	The flow chart activities in this lesson can also be done by providing students with an incomplete or 'fill in the box' flow chart if time is limited or to differentiate the task. **Suggested assessment points** Assess and provide formative feedback on the flow chart, including the correct placement of symbols that show a process students are familiar with (e.g. getting ready for school).	Once students have completed the activity, have them share their flow charts with the class. **Conclusion** Reflect as a class on the following questions: • Why is using a flow chart helpful when designing a program or making a decision? • What would happen if we did not use flow charts in problem-solving?

Term 2 Week 3: Introduction to websites

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Digital implementation Design algorithms in plain English and/or flow charts that involve user input, variables and control structures (sequence, decisions and repetition) **Design thinking skills** **Investigating and defining** Break down a design brief to define the purpose and requirements for a given task Investigate and select resources based on properties and functions for the given task	**Learning intention** • Understand the purpose of a website. **Focus question** • What are the key elements that make a website easy to use and effective for communicating? **Support notes** Website design introduces key concepts of computational thinking, including decomposition, algorithms and user input. Websites are broken down (decomposed) into manageable components, like pages or sections, allowing people to organise their ideas systematically. The sequence of interactions by the user can be seen as a simple algorithm, with user clicks leading to different outcomes. Understanding this teaches students conditional logic and flow, which is important to coding and algorithm development. Creating a website, even at a basic level, is an authentic, creative and integrated way for students to create digital solutions, giving them the opportunity to use their design thinking skills.	**Introduction** Prepare and print QR codes linking to three different websites (the school website, a children's entertainment site and an educational resource) and place them around the room. Find an example of a poorly designed website, one that is cluttered, unclear and hard to navigate (Appendix A.1: Resources – Term 2). **Learning activity** Instruct your students to scan the QR codes available on the different websites and record the differences and similarities between the different websites on a whiteboard or paper. Discuss the differences and similarities between the different websites, including discussion on home pages, links, buttons, pictures and headings. Explain to the students they will be designing and creating a website in Digital Technologies over the next few weeks. Show a picture of a poorly designed website and ask your students to discuss with their partner why it is not effective. Ask students to share their ideas with the class.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	When choosing a website theme or purpose, select topics that align with your class's current learning, such as integrating content from subjects like Science, English or Humanities and Social Sciences (HASS). Incorporating students' interests also keeps them engaged. This project is an excellent opportunity for cross-year collaboration. Year 5 students can create educational websites for younger students, enhancing the students' leadership skills and providing a real audience for their websites. **Suggested assessment points** Assess and provide formative feedback on the 3-2-1 reflection.	Ask the students, 'What do you think makes a really good website?' Instruct students to brainstorm their answers on their own whiteboards then compile a list of the students' ideas on the class whiteboard. Features could include user-friendly navigation, a clear and organised layout, engaging visuals such as images and effective links between pages. Group similar ideas where possible and select the top three ideas as the websites' success criteria. Have students write this information in their planning scaffold. Introduce the theme of the website your students will be creating, e.g. favourite animal, favourite school club or a simple online shop. Instruct students to brainstorm ideas for their website. Once they have brainstormed their ideas, have them share their ideas with their peers and seek feedback. **Conclusion** Using the 3-2-1 reflection, ask students to write down: • three things they learnt about websites • two of their favourite website ideas • one question they have about something they are unsure of. Answer student questions to clarify any uncertainties.

Term 2 Week 4: Website planning and layout

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Digital implementation Design algorithms in plain English and/or flow charts that involve user input, variables and control structures (sequence, decisions and repetition) **Design thinking skills** **Project management** Use agreed protocols and management roles to communicate decisions, plan and manage time to develop designed solutions **Designing** Design solutions considering competing factors, with annotated diagrams, storyboards and/or a sequence of steps, using technical terms and an iterative process **Evaluating** Use given criteria to evaluate design features, with consideration of competing factors, processes and the designed solution	**Learning Intentions** • Recognise and identify the main features of a webpage. • Define the differences between a website and a webpage. **Focus questions** • What are the main features of a webpage, and how do they contribute to its design and function? • How is a website different from a webpage, and why is it important to understand the distinction when designing? **Support notes** A website is a collection of interlinked web pages, stored under a single domain (website address/URL). A webpage is a digital document viewed using a web browser. When designing the website home page, provide students with a blank piece of paper and have them sketch the sections and main features. Including examples of different website layouts can also assist students in planning their websites. **Suggested assessment points** Assess the students' designs for the key elements of a home page. Look for clearly labelled and correct terms.	**Introduction** Review the key messages from last lesson by showing an example of a website and having the students recall a website's purpose and the main elements of a website. Define the differences between a website and a webpage. Narrow this down further by providing students with a printout of a different website home page and have them label the following: • website name • header • logo • page link/s • image/s • text. Advise students that in this lesson they will be web designers. Students will design the home page of their website using either a scaffold or blank paper. This is an opportunity to link the content of the webpage with a focus for another subject. **Learning activity** Start by having students rule a section in the top third of their page for their header. Have them add the title to their header and a section for their logo.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	Evaluate the logical placement of the elements, checking the layout is easy to navigate and effectively organised. Provide feedback to students of their strengths and areas requiring improvement.	Ask students to think about the navigation when designing the layout plan, referring back to the success criteria. Have them create a section for their page links. This can often be found under the header or down the left-hand side. Next, have students plan the content for their home page, including an area for text and images. Once students have finished planning their home page, ensure they have labelled the main features. Extension: Students who finish planning their home page early can add a colour scheme and start designing other elements, like the header and logo. **Conclusion** Students share their website home page designs with their peers. Peers to give feedback based on the success criteria.

Term 2 Week 5: Producing a home page

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Digital implementation Design algorithms in plain English and/or flow charts that involve user input, variables and control structures (sequence, decisions and repetition) **Design thinking skills** **Project management** Use agreed protocols and management roles to communicate decisions, plan and manage time to develop designed solutions **Producing and implementing** Use technologies, components and/or equipment to implement agreed protocols to produce a designed solution **Evaluating** Use given criteria to evaluate design features, with consideration of competing factors, processes and the designed solution	**Learning intention** • Use a layout plan to develop and create a home page. • Give and receive feedback on their home page. **Focus questions** • How can a layout plan help you design and create an effective home page? • What feedback can you give to improve the design and functionality of other students' home pages? **Support notes** Students can develop their home page using web design platforms like Google Sites® or Wix®, or word processing software such as PowerPoint® or Keynote®, with the use of hyperlinks to navigate between slides. Choose a platform that best aligns with your school's resources and teaching approaches. Teachers should also refer to their system/sector's third-party consent requirements before selecting a program. **Suggested assessment points** Observe the students' home pages as you move around the classroom. Check on and provide feedback to students based on the agreed success criteria. Encourage students to try and make their website as close as possible to their sketched designs.	**Introduction** Begin your lesson by having students review their annotated sketches from the previous lesson. Review the key elements of a home page (e.g. header, title, page navigation and content). Discuss with students the different success criteria for developing a home page, including: • clear layout and navigation • visually appealing • organised content. Introduce the web design platform. If using Google Sites or Wix, model how to select a layout and modify the elements. If using PowerPoint or Keynote, model the basic features of the program, like inserting shapes, text and images. **Learning activity** Instruct students to create their home page. Students can format elements of their home page to make it visually engaging and match their theme. Throughout the lesson, pair students to give feedback to their partners based on the success criteria, e.g. does the home page include all of the main elements with clear and easy-to-read content? **Conclusion** Share some student home page examples with the class. Referring back to the success criteria, highlight successes and brainstorm ways to further improve student work.

Term 2 Weeks 6–7: Navigation

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Digital implementation Design algorithms in plain English and/or flow charts that involve user input, variables and control structures (sequence, decisions and repetition) **Design thinking skills** **Project management** Use agreed protocols and management roles to communicate decisions, plan and manage time to develop designed solutions **Designing** Design solutions considering competing factors, with annotated diagrams, storyboards and/or a sequence of steps, using technical terms and an iterative process **Producing and implementing** Use technologies, components and/or equipment to implement agreed protocols to produce a designed solution	**Learning intention** • Know what a navigation path is and describe why it is useful. **Focus question** • What is a navigation path, and why is it useful? **Support notes** During this lesson, teach students to plan the structure of a website carefully. Students will need to pay attention to the navigation paths (the way the webpages are linked together). Students can plan this using a flow chart. **Suggested assessment points** Formatively assess the student's ability to: • record their navigation paths • create an organised website design • create working hyperlinks and website subpages.	**Introduction** Ask students if they have heard or read the story 'Hansel and Gretel'. Briefly retell the story to the students and ask why the breadcrumb trail was so important to the story. Discuss that in computing, breadcrumb trails or navigation paths are very important as they help the user keep track of where they have been on a website or help them find where they need to go if they get lost. Advise students they will be designing their website on paper today. **Learning activity** Using small whiteboards or paper, direct students to the Perth Zoo website https://perthzoo.wa.gov.au (Appendix A.1: Resources – Term 2). Request students to record the routes they take when navigating through the website, e.g. 'First, I went to the home page, then I clicked on animals, then I clicked on the African lion. Next, I clicked animals again and clicked on the elephant.' Explain to the students that a website needs a sitemap to map out the layout of the website. This ensures the user can have a good experience and not get lost or can find things easily.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		Show the example of a sitemap (Appendix A.2) and define that a sitemap is a website flow chart that plans the organisation of the webpages. Direct students back to the Perth Zoo website and instruct them to map out a small section of the website. Have students share their answers with a peer. Instruct students to plan their own websites. Provide a scaffold of a sitemap to assist students. Suggest that instead of working layer by layer, they may want to focus on one branch of their diagram and then move on to the next branch. Allow students time to build up their website designs. Once students have created their site map they can begin adding pages to their website. If adding webpages in PowerPoint or Keynote, students will duplicate the page and leave the logo, header, navigation bar unaltered. They will only modify the content on each subsequent page. Model how to link pages together using hyperlinking. Provide time for students to create pages for their website and link them together. **Conclusion** Direct students to test out their website hyperlinks to make sure they can move between the webpages seamlessly.

Term 2 Week 8: Website showcase and evaluation

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Design thinking skills **Project management** Use agreed protocols and management roles to communicate decisions, plan and manage time to develop designed solutions **Evaluating** Use given criteria to evaluate design features, with consideration of competing factors, processes and the designed solution	**Learning intentions** • Presentation of student's websites for feedback. • Utilise the success criteria to evaluate their own and other students' websites. **Focus question** • What can we learn from user feedback? **Suggested teaching points** Facilitate positive peer reviews by encouraging constructive and specific feedback. Use sentence starters like, 'I like…' and 'It would be even better if…'. Use simple feedback scaffolds such as 'two stars and a wish' if necessary. **Suggested assessment points** Make a summative assessment of the clarity and completeness of their website layout, including key elements like navigation, content and visual organisation. Assess the quality of self-evaluation and if the student has commented on strengths and areas for growth.	**Introduction** Instruct students to present their websites to their peers (or another class or year level) and gather feedback. Split students into small groups. Each student presents their website to a peer and requests feedback. The peer should evaluate the website against the success criteria and provide two stars and wish. Areas for comment could include: • How easy/effective is the navigation, and did all the links work? • Is the content clear and engaging? • Does the website achieve its designed purpose? **Learning activity** After gathering feedback from peers, students will reflect on their own work, answering questions such as: • What worked well with my website? • What is one area I could improve based on the feedback? • If I had more time, what changes would I make to enhance my website? Students can evaluate the design process by using a reflective journal, self-assessment rubric, discussion and sharing, digital presentation or video reflection. **Conclusion** Students to share one piece of feedback from their peers with the rest of the class.

Term 3

Weeks 1–8: Game creation

Term 3 Week 1: What makes a good game?

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Digital implementation Design algorithms in plain English and/or flow charts that involve user input, variables and control structures (sequence, decisions and repetition) **Design thinking skills** **Project management** Use agreed protocols and management roles to communicate decisions, plan and manage time to develop designed solutions **Investigating and defining** Break down a design brief to define the purpose and requirements for a given task	**Learning intentions** • Understand what makes a good game. • Understand that game creators identify the needs of their target audience. **Focus question** • What is the most important aspect to get right in a simple game? • Why would someone want to play your game? **Support notes** The teaching and learning focus in Term 3 is to collaborate with others to create a digital solution, using agreed protocols for a relevant context. Students will apply problem-solving processes by creating a digital game. Successful game design includes empathising, ideation, design, prototyping, testing and evaluation. Elements to consider when identifying likes and dislikes in a digital game: • appearance • challenge • goals • components • how the game works – inputs, processes, outputs • instructions • music and sound effects.	**Introduction** Ask students 'What makes a good digital game?' Give them one minute to think and list three things. Ensure each student has two sticky notes (or access to a collaborative screen) and ask them to write/type the name of their two favourite digital games. Discuss student responses. Ask students to be specific about what it is they like about the chosen game/s. If students need thinking and/or discussion time, allow time for pair or small group discussion. Chart or display on a screen the main common points. Ask students to name elements they dislike about their favourite game, or a game they dislike playing. Record the responses. Debrief by comparing the 'like' and 'dislike' chart, discussing the commonalities and differences. **Learning activity** Lead students toward the design thinking step of empathising (without making it explicit) by asking them: • Do you think that the designers of your favourite game/s are your age? • If not, how do you think the designers know what Year 5 students/young people would or would not like? Define 'target audience'. Discuss and outline how successful game designers need to empathise with their target audience by understanding how they see their world, how they feel

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	Additional game design resources and lesson plans can be found at: • https://www.digitaltechnologieshub.edu.au/teach-and-assess/classroom-resources/lesson-ideas/designing-a-mini-game-with-variables/ (Appendix A.1: Resources – Term 3) **Suggested assessment points** Consider students' design ideas and how well they are matched to the target audience.	about things, how they communicate and what their needs and motivations are. Challenge students to become game designers and brainstorm ideas to develop a game with a target audience of 5–6 or 11–12-year-olds. They should refer back to the list of likes and dislikes from earlier in the lesson. Students record their ideas and reasoning. **Conclusion** Discuss game ideas as a class and the differences between the games designed for 5–6-year-olds, compared to the older age group.

Term 3 Week 2: Game design (Part 1)

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Digital implementation Design algorithms in plain English and/or flow charts that involve user input, variables and control structures (sequence, decisions and repetition) **Design thinking skills** **Project management** Use agreed protocols and management roles to communicate decisions, plan and manage time to develop designed solutions **Investigating and defining** Break down a design brief to define the purpose and requirements for a given task **Designing** Design solutions considering competing factors, with annotated diagrams, storyboards and/or a sequence of steps, using technical terms and an iterative process	**Learning intentions** • Understand the steps of the design thinking process. • Using a design brief, identify a solution and design a game that meets a need. **Focus question** • What is the design thinking process? • How can we empathise with the target audience? **Support notes** Students develop an understanding of design thinking and its importance in problem-solving. Empathising is one element of design thinking. Understanding the user and how they think will help when designing a digital solution. If the game designer can understand the target audience, then they can think like them (Appendix A.1: Resources – Term 3). Assign students a target audience that is common for all or is different for each individual/pair.	**Introduction** Explain to students that during this term they will develop a digital game for an assigned target audience. They will learn about and apply the steps of design thinking to help them understand how to become a good game designer. Students could work individually or with a partner on this project. Remind students of the previous lesson where they identified a target audience and suggested design ideas to match the target audience. Explain each of the steps in the design thinking process of empathising, ideation, design, prototyping, testing and evaluation. Assign students their target audience. Students can be given a 'design brief' that lists a scenario for which they identify a solution and design a game to meet that need. Explain the meaning of the empathising step. Work together with students through this step. For example, prompt questions could include: • What do you know and understand about x (relevant age) year-olds? Do you have a brother/ sister/relative who is that age? • What do they like? • How do they act? • How do they think about things? • Can they write/read?

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	Explain the design thinking process to support student understanding of the terminology, the actual process and its importance in producing a successful product. The design process steps include: • empathising – aim to understand the target user • ideation – brainstorm ideas that could be developed in the game • design – develop the ideas into the process for the game; what will happen, how will it work. Students are familiar with this step, which includes flow chart/algorithm design, as well as the user interface • prototyping – working model or sample of the game • testing – users test the game. Observe and get feedback to identify any problems or areas for improvement • evaluation – final product evaluated by the user/s. Further ideas and resources can be found on the Digital Technologies Hub: https://www.digitaltechnologieshub.edu.au/search/?keywords=think%20like%20an%20inventor&page=1&items=8 **Suggested assessment points** Review and provide feedback on students' work sheets, listing the two ideas and the reason for choosing them.	Set parameters, such as no injuries or killing, no items that can harm people like guns or knives. Show a few examples of games they could create, e.g. a small maze game with obstacles and a key/door/reward to win the game or progress to the next level. **Learning activity** Students brainstorm ideas for their game. Encourage students to write down every idea they have, without judgement. For example, if working as pairs they can be challenged to write 20 to 30 ideas in 10 minutes. Use a brainstorming technique like rapid ideation to help with this process. Allow the remainder of the lesson for students to discuss their ideas and choose two ideas to take further. Provide guidance and feedback as needed. Students record their two choices on a work sheet (digital/hard copy) and explain their choices. In the next lesson, students will explore how their idea/s will work. **Conclusion** Students could collaboratively write their game ideas in an online presentation platform, such as Mentimeter®, to be shared with the class.

Term 3 Week 3: Game design (Part 2)

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Digital implementation Design algorithms in plain English and/or flow charts that involve user input, variables and control structures (sequence, decisions and repetition) **Design thinking skills** **Project management** Use agreed protocols and management roles to communicate decisions, plan and manage time to develop designed solutions **Investigating and defining** Break down a design brief to define the purpose and requirements for a given task Investigate and select resources based on properties and functions for the given task **Designing** Design solutions considering competing factors, with annotated diagrams, storyboards and/or a sequence of steps, using technical terms and an iterative process	**Learning intentions** • Understand the concept of competing factors. • Design and map out the elements of a simple game. **Focus questions** • What are competing factors, and how can they influence the design of your game? • How can you create success criteria that aligns with your target audience needs and preferences? **Support notes** Creating and designing a digital game requires the developer/designer to understand the target audience and devise what the game will look like and how it will work. The game must meet the requirements or purpose for which it was designed. Competing factors in designing a game involve balancing resources, time and skills. For example, a designer might have great ideas but limited time or budget, so they need to choose which features are most important. Ask students to approach this stage with the mindset of a 'designer'. This requires them to include as much detail as possible for the 'programmer', who will build the game (even though they will also be the 'programmer'). The point of this approach is to encourage students to include enough details for another person to build the game.	**Introduction** Students review their two game idea choices from the previous lesson and choose one to develop. Reinforce to students that during the design process they must include as much detail as possible to map out how the game will work, how it will look and what the user will do at each stage. Explain the concept of competing factors when they are designing. Make sure they understand that their game must be a simple, short game as the time for designing and building the game is limited. **Learning activity** Provide students with a series of prompts to guide their game design, such as: • purpose of the game • success criteria • features • types of data needed (text, images, sound) • rules of the game • user input • algorithms/flow chart (branching, iteration) • storyboard/screen layout. **Optional:** Use online tools approved for students to use to create flow charts and storyboards. Examples could include Canva®, PowerPoint, Keynote, Prezi®.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	Explain the elements included in the work sheet, ensuring students understand the expectation and amount of detail required. **Suggested assessment points** Monitor and provide feedback and guidance for students' completion of the elements required for their game design. Students submit their work at the end of the lesson for feedback on the design elements.	**Conclusion** Students play a brief game to wrap-up the lesson that involves students aligning popular characters of video games to the name of the game. For example, Pacman.

Term 3 Week 4: Variables and control structures

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Digital implementation Design algorithms in plain English and/or flow charts that involve user input, variables and control structures (sequence, decisions and repetition) **Design thinking skills** **Project management** Use agreed protocols and management roles to communicate decisions, plan and manage time to develop designed solutions **Designing** Design solutions considering competing factors, with annotated diagrams, storyboards and/or a sequence of steps, using technical terms and an iterative process	**Learning intentions** • Define 'variable' and 'control structures'. • Use sequence, repetition and decisions to control the flow of the program. • Use project management skills to plan and manage time. **Focus questions** • What are variables and control structures, and how do they help control the flow of a program? • How can you use variables like score, lives, or a timer to enhance the functionality of your program? • Why is it important to plan and manage your time? **Support notes** Control structures are programming constructs required for a program to run. Control structures include: • sequence of each instruction is followed in order like steps in a recipe • decisions that allow the program to make choices based on conditions (using 'if' statements) • repetition (loops) let actions repeat, making code more efficient. A Variable is a label for a piece of information used in a program and can be changed based on the conditions.	**Introduction** Introduce to the students the new vocabulary: • control structures – sequence, decisions and repetition • variables Explain how they should try and use this language when completing their game designs. Ask the students, 'What is project management?' Explain what project management involves: breaking a big task into smaller, manageable steps and making sure everything gets done on time. Emphasise the importance of time management in completing projects successfully. **Learning activity** Provide students with a template (or have them use an app or tool) to outline the steps needed to finish creating their game. They should allocate estimated time for each task and set milestones. Remind students to keep the game short and simple to complete the task before the end of the lesson. Students continue to design their game, focusing on completing the details for each of the required elements. When students feel they have completed their design, they can request feedback from a peer to check if that student considers they could build the game using their design.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	Information is stored in the computer's memory with variables. When the computer needs that information later, it looks for the label of the variable. Correct naming of variables is important for debugging and understanding what a program is intended for. Students may also use Constants. A Constant in programming is an identifier in programming that is set by the programmer that will not change in the duration of the program **Suggested assessment points** Students submit their work at the end of the lesson for feedback on the design elements.	Feedback should include details of how the game design could be improved. At the end of the lesson, instruct students to review their timeline, update tasks completed, and adjust for the next session. Submit the design for formative assessment before starting to develop the prototype. **Conclusion** Students identify risks that could cause the project to run overtime or cause milestones to be missed.

Term 3 Weeks 5–6: Building the game

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Digital implementation Implement algorithms in a visual programming environment involving variables and control structures (sequence, decisions and repetition) with user input **Design thinking skills** **Project management** Use agreed protocols and management roles to communicate decisions, plan and manage time to develop designed solutions **Producing and implementing** Use technologies, components and/or equipment to implement agreed protocols to produce a designed solution	**Learning intentions** • Use block coding to develop a prototype of their game design. • Use 'variables' and 'control structures' to implement their planned algorithms. **Focus questions** • How can block coding be used to create a prototype that matches your game? • How do variables and control structures help implement algorithms and improve user interactions in your game? **Support notes** Using a visual programming language allows students to sequence commands as 'blocks', rather than write code to develop a digital game. A block code program makes it accessible for students at this year level to implement sequences, decisions and repetition to achieve steps, that could be complicated to write. It will simplify the process by saving time and reducing potential for errors. There are various game-making platforms using visual programming languages (Appendix A.3). Teachers should refer to their system/sector's third-party consent requirements when selecting a platform and ensure it meets school and system guidelines.	**Introduction** Demonstrate the following control structures to create their games: • events • repetition • decisions (if-then, if-then-else). Model how to build a simple maze game with obstacles and a key/door/reward to win the game or progress to the next level. In this game: • events could be how the main character moves (keyboard buttons or following finger) • repetition could be used to code the movement of the obstacles or enemies moving throughout the maze • decisions will be used to program what happens when the main character touches the obstacles or the key/door/reward • variables would be used for a time countdown, lives or levels. **Learning activity** Encourage students to test each part of their game as they create it. As issues arise, students will need to problem-solve. It is likely that students will amend their original design as they develop their game.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	If students are familiar with more than one program, the teacher may choose different game-making platforms for some students. Depending on the school context and prior student knowledge, provide an explanation about the choice of the block-based program students will be using. Explain how the program will be the most suitable for their needs. Each block-based program has different strengths and limitations. Explain to students that when they develop their game, they will be faced with decisions they may not have thought about. For example, an idea may not work as they predicted, or students might come up with a new idea or design improvement during the production. **Suggested assessment points** Observe and note students' skill level and engagement.	**Conclusion** Conclude the lesson by inviting students to share with the class if their game has changed from the original design and students should provide a brief rationale for the change.

Term 3 Week 7: Peer feedback

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Digital implementation Implement algorithms in a visual programming environment involving variables and control structures (sequence, decisions and repetition) with user input **Design thinking skills** **Project management** Use agreed protocols and management roles to communicate decisions, plan and manage time to develop designed solutions **Evaluating** Use given criteria to evaluate design features, with consideration of competing factors, processes and the designed solution	**Learning intentions** • Develop an evaluation checklist based on success criteria to assess the game. • Evaluate and modify the game based on peer feedback. **Focus questions** • What are some criteria you can use to get feedback on your game when a peer tests it? • How can I improve my game using my peer's feedback? **Support notes** Understand the importance of evaluation; both peer and self-evaluation, when applying the problem-solving process during game design. Students should be able to explain how they have developed a solution using available hardware and software and applied specific instructions through programming of their interactive digital game. Explain the peer-review process for testing the prototype games. Check for understanding of the process by asking questions. **Suggested assessment points** Review peer feedback and student notes. Provide formative feedback.	**Introduction** Explain to students when they finish a prototype of their game, they will test the game on at least one peer. **Learning activity** Students select five criteria they will request their peer assess their game against and write a questionnaire for the peer to complete after testing. Encourage them to select criteria that aligns with the original success criteria. Areas of focus for the peer review can include: • level of enjoyment/interest (rating tick box) • appeal of the main character/other characters • story (if relevant) • accessibility of instructions • game difficulty • duration (too long/too short) • elements that are confusing for the player. Peer will play the game, then complete the checklist or provide written feedback. Encourage students to be supportive and honest and share ideas to improve their peer's game. Once their digital game has been reviewed by at least one peer, students make changes to their prototype game based on the peer feedback and their own observations.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		Conclusion Using the instructional strategy 'parallel lines', students move to one side of the classroom if they agree with a statement and on the other side of the classroom if they disagree with the statement. Statements should be related to the success criteria; for example, 'Is your game too difficult?'

Term 3 Week 8: Written evaluation

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Digital implementation Implement algorithms in a visual programming environment involving variables and control structures (sequence, decisions and repetition) with user input **Design thinking skills** **Project management** Use agreed protocols and management roles to communicate decisions, plan and manage time to develop designed solutions **Evaluating** Use given criteria to evaluate design features, with consideration of competing factors, processes and the designed solution	**Learning intentions** • Evaluate the game's design features against the success criteria and identify areas for improvement. **Focus questions** • How well does my game meet the success criteria? • What improvements can be made to make it better? **Support notes** Evaluating a digital solution draws on systems thinking as students consider how the solution meets and affects the user/s. Students need time to consider their digital game design experience in terms of the successes and challenges of the process and product. They should be provided with opportunity to evaluate the level at which the solution (their digital game) meets the needs of the target user, or the intended purpose. Explain the reflection points to students and ensure they understand the standard of responses required. Explain to students that they will compare their original design with the final game.	**Introduction** Explain that today, students will complete an evaluation for their finished game. Go through the evaluation questions with students. Evaluation questions can include: • What is the purpose of the game? • Who is the target user? • How will this game help the target user? • What were your game's three success criteria? • Did the game meet its success criteria? • How does the original game design compare with the final product? • What were the competing factors you had to consider when developing your game? Why did you choose one factor over another? • What changes were made during the development stage? Explain the reasons for the change/s. • How does the game address the functional requirements for user input and gameplay? • What did the reviewers consider to be the most interesting or appealing thing about the game? • What do you, as the game designer and programmer, consider to be the most interesting and appealing thing about the game? • List three design features that could improve the game.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	Suggested assessment points Written submission, and the digital game, can be submitted as a summative assessment. (Appendix C – Assessment task 2). This document provides resources and materials to assist with this assessment task.	**Learning activity** Give students time to complete the assessment task. **Conclusion** Once students have completed and submitted their assessment, students can celebrate by playing each other's games.

Term 4

Weeks 1–8: Cyberbullying, AI and representing data

Term 4 Week 1: Cyberbullying

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Privacy and security Personal data can be used to create a permanent digital footprint	**Learning intentions** • Understand the risks of using social media. • Identify strategies and responses to online bullying. **Focus questions** • What are the risks of using social media? • What are some strategies you can use when you or others experience online bullying? **Support notes** Teachers can use school-recommended or school-based resources, or access resources provided on the Digital Technologies Hub or the eSafety Commissioner website to help students engage with and develop their understanding of staying safe online. Additionally, the school can invite cyber safety educators to make a presentation to students, teachers and parents. Note: throughout this lesson teachers should be sensitive to the possibility that there may be students experiencing cyberbullying who do not want to talk about it in front of their peers. The focus of this lesson is to support students' understanding of cyberbullying – what it is, and what can be done to stop it.	**Introduction** Explain to students during this lesson they will be learning about strategies for dealing with cyberbullying and ways to defend others who are being bullied. Ask students (call out, brainstorm, or Think-Pair-Share), 'What is cyberbullying?' Record responses on a chart/screen. Use digital resources to illustrate and explain cyberbullying to students and extend or challenge students' current thinking. After viewing, invite students to add or delete anything on the chart/screen. **Learning activity** Provide small groups of students with cyberbullying scenarios. Students discuss what the bullying action is, who is doing the bullying, and what they think the person experiencing the bullying should do. Using an online collaborative tool (such as a chart created by the teacher), ask groups to input their responses through their device. Alternatively, the list can be displayed on a shared screen or paper chart. Students write a short paragraph listing one or two potential responses and/or actions to take if cyberbullying occurs to them or a friend and explain why they think this response and/or action would work.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	Cyberbullying is the use of technology to bully a person or group with the intent to hurt them socially, psychologically or even physically. Serious cyberbullying is material that is directed at a particular person with the intention to seriously embarrass, harass, threaten or humiliate them. Students recognise similarities and differences between in-person bullying, cyberbullying and being mean. Explore the difference between 'having fun', 'just joking', 'I didn't mean it', and bullying behaviours. Resources may be sourced from the following websites. • Common Sense Education – Is It Cyberbullying? https://www.commonsense.org/education/digital-citizenship/lesson/is-it-cyberbullying • eSafetyCommissioner – Video library for educators Video library for educators | eSafety Commissioner • eSafety Commissioner – Online safety posters and conversation starters ('How to report serious cyberbullying' material poster) https://www.esafety.gov.au/educators/classroom-resources/posters-and-conversation-starters **Suggested assessment points** Read students' reflection paragraph to determine their understanding of how to respond to cyberbullying.	**Conclusion** Students to access the eSaftey.gov.au website and familiarise themselves with the process of reporting online harm in Australia.

Term 4 Week 2: Artificial intelligence

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Privacy and security Personal data can be used to create a permanent digital footprint	**Learning intentions** • Understand what artificial intelligence (AI) is and how it affects our daily lives. • Know how to stay safe when interacting with AI systems. **Focus questions** • What is AI? • How does it affect our daily life? • What can we do to stay safe while using AI? **Support notes** Artificial intelligence is the ability of machines to mimic human capabilities in a way that we would consider 'smart'. Machine learning (ML) is an application of AI. With ML, the machine (computer) is given many examples of data, demonstrating what users would like the machine to do, so that it can figure out how to achieve a goal on its own. The machine learns from this data to adapt a novel strategy to achieve its goal.	**Introduction** Write 'AI' on the whiteboard and ask your students to tell you what they already know. Write the responses on the whiteboard, creating a large mind map or in a digital collaboration platform (i.e. Microsoft Teams®). Explain that AI is the ability of a machine to mimic the capability of a human, and as with any technology, there may be risks with its use. View the video *AI: Impact on Society* (Appendix A.1: Resources – Term 4). Discuss the possible risks of AI. **Learning activity** Split students into small groups and give them one of the following situations: • Your teacher has been replaced by an AI Robot. • You are provided with an AI Homework Helper that completes your homework for you. • Your parents purchase a driverless car. Invite students to investigate the benefits, risks and possible impacts of the technologies. These can include: • Reliability and bias – Has the AI machine been trained in quality and accurate data? Could the AI machine make a mistake?

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		• Human impact – How would this change peoples' jobs, daily life, or skills? Could this lead to people relying too heavily on AI or reducing the intelligence of people? • Data and privacy – Where does the collected device data go? Who owns it? Advise students that generative AI, such as ChatGPT or CoPilot, are models that are trained on a huge amount of data, and work by accurately predicting the answer you are looking for. Inform students that when they interact with the AI model, this is also adding to their digital footprint. Refer to the potential security risks mentioned the previous week. **Conclusion** Conduct a Think-Pair-Share activity about ways in which students can stay safe and reduce their digital footprint when interacting with generative AI. This can include: • not sharing personal information • seeking permission before using the tool • verifying the information and cross-checking facts.

Term 4 Week 3: Codes

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Data representation Data of all types, including text, numbers, sound and images, are represented using codes	**Learning intentions** • Use encoding to represent a sentence. • Create an algorithm that describes the encryption process. **Focus questions** • How can we use mapping to create and decode encrypted messages? • What steps can we include in an algorithm to describe the encryption and decryption process? **Support notes** Computer programming involves developing an executable program, and coding is part of that development. Coding involves writing instructions (commands) that a computer can interpret and follow. Coding is a part of programming. As computers can only understand binary (0 and 1), it would be very difficult and time consuming to write all computer instructions using binary code. Computer languages have been developed to make it easier to write instructions (coding) for computers. Encoding is used to represent data in a different way. Engaging students in encoding and decoding activities, such as creating a code to write a message, requires them to use and build on their pattern recognition and problem-solving skills. Encoding and decoding messages	**Introduction** Suggest to students that they want to send a private message to a friend. The only way they can deliver the message is to write it on a board that is observable by anyone who passes by. Ask students, 'What could you and your friend do to ensure that you are the only people who can decipher the message?' **Learning activity** Instruct students to Think-Pair-Share about how they would accomplish the task. Explain to students that they will be given an encoded message and have an allocated amount of time to solve it. Students can work individually or in pairs. Show/give students the encoded message. Make sure the message is challenging, but not impossible for students to decode. Use more than one encoded message to differentiate the level of difficulty for students. Display a timer. Provide students with only enough time to make progress but not solve the code. Once time is up, tell students they will be given additional time later in the lesson to solve the code. Stop displaying and collect the encoded message/s. Show students a message that has been encoded with the rule of matching the sequential letters of the alphabet with numbers from 1 to 26. Provide some hints, such as

<table>
<tr><th>Western Australian Curriculum content</th><th>Teaching and learning intentions</th><th>Learning experiences</th></tr>
<tr>
<td></td>
<td>can be explained to students in relation to the concept of coding for computer programs.

Note: this lesson is adapted from Digital Technologies Hub - Ciphering a sentence, which is based on original lessons developed by the Exploring Computational Thinking team at Google. https://www.digitaltechnologieshub.edu.au/search/ciphering-a-sentence/

In this lesson, students explore data representation. Ensure students understand the connection to encoding data in different formats which is covered in the next lesson.

Prepare an encoded message (cipher) for students using the mapping between letters and numbers in alphabet mapping number 2. When initially giving students the cipher, do not provide any rules for solving it.

Allow only enough time for students to start realising it would be easier/faster to solve with rules or instructions. Alternatively, if they do this quickly, tell them their challenge is to work out the rule. The point of this activity is so students understand the importance of:
• looking for and recognising patterns
• decomposition – breaking down data, processes or problems into smaller more manageable parts.

Demonstrate how to create a cipher message.</td>
<td>G = 7, M = 13, T = 20 and ask them to decode the message. Debrief the activity. Display a grid showing the ‘mapping’ of the numbers and letters.

Tell students they will be shown two rules to map and change the order of the alphabet, so they can encode and decode messages. Demonstrate and explain the rules.

Rule one: Divide the letters of the alphabet into two groups. When written in lower case, group one comprises the letters which have an enclosed area (a, b, d, e, g, o, p, q). Group two comprises the remaining letters.

Rule two: Sort the two groups of letters alphabetically with group one first (a, b, d, e, g, o, p, q), then group two (c, f, h, i, j, k, l, m, n, r, s, t, u, v, w, x, y, z).

Students draw their own table to map the letters and numbers as shown below. Name this table ‘alphabet mapping number 1’.
<table>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td></tr>
<tr><td>a</td><td>b</td><td>d</td><td>e</td><td>g</td><td>o</td><td>p</td><td>q</td><td>C</td><td>f</td><td>h</td><td>i</td><td>J</td></tr>
<tr><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td></tr>
<tr><td>k</td><td>l</td><td>m</td><td>n</td><td>r</td><td>s</td><td>t</td><td>u</td><td>V</td><td>w</td><td>x</td><td>y</td><td>z</td></tr>
</table>
Have each student encode a short message and swap with a partner to decode a message.

Introduce a third rule and apply it to the mapped table above.</td>
</tr>
</table>

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	Suggested assessment points Observation of student engagement with the task and how quickly students understand how to identify patterns to help them solve the problem. Students submit the written reflection for formative or summative assessment. Reflection prompts can include: • Which alphabet mapping did you find easiest to use to encode and decode a message and why? • When you were given the cipher (encoded message) and you did not know the rules used to encode it, how did you try to solve it? Did you see any patterns to help you discover the one-to-one mapping? How would you create a cipher that would be very difficult for someone else to decode?	**Rule three:** Swap the order of the letters, starting with z at 1, y at 2, x at 3, ending with d at 24, b at 25 and a at 26. Name it 'alphabet mapping number 2'. 1 2 3 4 5 6 7 8 9 10 11 12 13 z y x w v u t s R n m l k 14 15 16 17 18 19 20 21 22 23 24 25 26 j i h f c q p o G e d b a Or it could be completely different by mapping letter against letter. **Alternative Rule Three:** Map the alphabet in order starting at letter k. Call it 'alphabet mapping number 3'. **a b c d e f g h I j k l m** k l m n o p q r S t u v w **n o p q r s t u V w x y z** x y z a b c d e F g h i j Tell students they can now go back to the encoded message they were given at the start of the lesson. Explain which rule was used to encode the message and provide time for students to solve it. **Conclusion** Students complete a short verbal or written reflection on this process.

Term 4 Week 4: Braille

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Data representation Data of all types, including text, numbers, sound and images, are represented using codes	**Learning intentions** • Understand how braille symbols use tactile representations. • Encode words using braille symbols. **Focus questions** • How do braille symbols represent letters and words in a way that can be read by touch or sight? • How can we use braille symbols to encode and decode messages effectively? **Support notes** Braille is a system for representing text and other characters using combinations of flat and raised dots so they can be read by touch. One way to represent braille on paper without having to make raised dots is to draw a rectangle with six small circles in it, and to colour in only the circles that are 'raised'. Braille is a representation using bits. That is, it contains two different values (raised and not raised) and contains sequences of these to represent different patterns. The letter 'M', for example, is represented vertically as: 11 00 10 where '1' means raised dot, and '0' means not raised dot.	**Introduction** Ask students, 'Have you ever noticed little raised dots on signs, buttons in lifts, or public transport areas? What do you think they are for?' Explain that these dots form braille, a system of raised dots that visually impaired people use to read and write. Discuss examples of where braille is seen in conjunction with other symbols or signage, for example in lifts, toilets and public transport. Provide the alphabet represented in visual braille. Inform students that each symbol is unique. Look for patterns in the way the letters of the alphabet are represented (e.g. A–J uses the top four dots, K–T add the bottom left dot). Create a representation of students' names or familiar words in braille. Represent each letter as a rectangle with six circles either filled or not filled. **Learning activity** Game one: Prepare the braille letters on some cards. Students pair up. One student shows a braille card and the other guesses the letter. See who gets the most correct guesses from a series of different braille letters. Game two: Provide students with raised-dot braille cards (these could be pre-made, purchased, or created using glue dots). Blindfold one student in each pair and have them 'read' the braille using touch.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	Learning about braille is a good introduction to the binary system that uses 1s and 0s to represent data on a computer. **Suggested assessment points** Assess understanding through observations of students identifying braille patterns, translating words accurately, and participating in recognition games.	Discuss: • How difficult is it to distinguish the dots using touch alone? • What challenges might visually impaired people face when learning braille or reading quickly? **Conclusion** Design challenge: • Students create a short phrase or sign in braille (e.g. 'Welcome' or 'Stop'), ensuring it includes both visual text and braille.

Term 4 Weeks 5–6: Morse code

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Data representation Data of all types, including text, numbers, sound and images, are represented using codes	**Learning intentions** • Understand the structure and purpose of Morse code as a communication method. **Focus questions** • How does Morse code simplify communication using a series of dots and dashes? • What strategies can we use to accurately create and decode messages in Morse code? **Support notes** Morse code represents the letters of the alphabet using dots and dashes. Every letter has a unique sequence of dots and dashes. Dots are created using a short pulse and dashes with a longer one. Morse code can be transmitted as symbols, sound or light. Dots and dashes are used in combination to simplify the representation for each letter, enabling each letter to be represented with a maximum of four symbols. Imagine if you just used dots: you would need up to 26 dots to represent all the letters of the Roman alphabet. That would slow down the sending of messages. **Unplugged option** For an unplugged option, students can use flashcards, flashlights or LEDs, hand signals, or even short and long tugs on some string to represent Morse code dots and dashes.	**Introduction** As a fun starter, give students two minutes to write 'My name is_____', where each letter is a dot corresponding to its place in the alphabet (a = *, b = **, c= ***). Can they do that in this timeframe? This will help embed understanding of why the dots and dashes exist, as writing 26 dots for A to Z is impractical. Introduce to the class the importance and significance of Morse code in history. Explain how Morse code was used for sending messages over long distances. Provide the alphabet represented in Morse code, explaining how each letter is represented by a combination of dots (short sounds) and dashes (long sounds). Demonstrate how to produce these sounds using claps, taps, or sounds like 'beep'. **Learning activity** In pairs, students create simple messages and take turns decoding them. Discuss rules for message clarity, such as how to indicate spaces between letters and words. Encourage students to develop a system for pauses to differentiate words from letters.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
	In pairs, one student sends a message using their chosen method, while the other decodes it, practising timing and spacing between letters and words to ensure clarity without relying on any advanced technology. **Suggested assessment points** Assess students on their ability to accurately create and decode Morse code messages, focusing on the agreed rules for dots, dashes, and spacing. Evaluate their creativity and problem-solving skills in designing alternative methods for sending Morse code, considering practicality and effectiveness.	**Teaching** Demonstrate how to use a programming board like the BBC micro:bit to create and send coded messages. Explain how they can use simple coding to represent dots and dashes: for instance, the 'A' button for a dot (high pitch, ¼ beat) and 'B' button for a dash (low pitch, full beat). **Learning** In pairs, one student sends a coded message by pressing the A and B buttons to create the Morse sounds, while the other decodes and records the message. Compare the original message to the decoded message, discussing any inaccuracies and what caused them. Ask students to create an alternative way to send the Morse code message without relying on sound from the micro:bit, e.g. using the lights of the micro:bit or not using the micro:bit at all. Instruct the students to develop their code and test out their new solution. Reflect on whether their solution worked. **Conclusion** Discuss the pros and cons of each approach and how they addressed the challenges of clarity, timing, and practicality. Reflect on the flexibility of Morse code as a communication tool and its relevance in different scenarios.

Term 4 Week 7: QR codes

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Data representation Data of all types, including text, numbers, sound and images, are represented using codes	**Learning intentions** • Understand that digital data can be represented using codes, like QR codes. **Focus questions** • How do QR codes store and share information? • Why are QR codes a practical way to represent data? **Support notes** A QR code is another way to represent data. QR stands for 'quick response'. It is a scannable barcode-like image that directs you to a particular digital location set up by the code creator. To read the code you need an app that reads QR codes and the camera on a smartphone or tablet device. The QR code image, like a barcode image, is made up of pixels. Each pixel has a specific colour. In the case of a QR code, it is traditionally black or white, but does not need to be, as long as the foreground and background colours are in sharp contrast with each other. **Suggested assessment points** Assess the students' ability to create and test QR code applications.	**Introduction** Show the class a QR code and ask, 'What do you think this is, and what does it do?' Discuss how QR codes store data as patterns which devices can scan to reveal information. Scan a QR code in front of the class and display the data (e.g. text or a website). Explain that the black and white patterns represent binary data, but for now, they just need to understand that it encodes information for devices to interpret. **Learning activity** Hand out several example QR codes and have students scan them using devices. Ensure the QR codes lead to diverse content (e.g. a simple text message, an image, a website). Discuss as a group: What kind of information did the codes reveal? How did the devices read the data? Teach students to use an online QR code generator or app. An iPad has a built in QR code generator in the Shortcuts app. Brainstorm ideas and give time for students to create their own QR codes for the following: • Interactive jokes: encode a joke or riddle. • School garden: link to care instructions for plants or fun facts. • Digital library: create QR codes that link to book summaries or reviews.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		• Interactive narratives: write short stories or poems and encode them. • Classroom scavenger hunt: hide QR codes around the classroom with each giving a clue to help find the next one. Ask students if they have seen any other places where there are digital codes. Answers may include barcodes in shops, on library books. **Conclusion** Ask and discuss, 'How did encoding the information make it easier to share?'

Term 4 Week 8: Unicode and ASCII

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
Data representation Data of all types, including text, numbers, sound and images, are represented using codes	**Learning intentions** • Understand how computers represent text using codes like ASCII (American Standard Code for Information Interchange) and Unicode. **Focus questions** • How do computers use ASCII and Unicode to represent letters, numbers, and symbols? • Why is it important to have standardised systems for encoding text? **Support notes** Understanding ASCII and Unicode helps students understand how digital systems represent and process text, which is essential foundational knowledge in digital technologies. ASCII: Represents characters using 7-bit binary codes, primarily for the English alphabet, numbers and some symbols. Unicode: An extension of ASCII that allows representation of characters and symbols from all languages, using variable lengths (e.g. 16-bit or 32-bit encoding). **Suggested assessment points** Assess students' ability to accurately encode and decode text using ASCII and Unicode charts.	**Introduction** Ask the students, 'How do computers understand text the words on this screen?'. Explain that computers don't understand letters or symbols directly. Instead, they use codes (like ASCII and Unicode) to represent them as numbers, e.g. Letter 'A' in ASCII is 65. Show the students an ASCII chart and explain that each character is assigned a number from 0–127. Have students encode a simple word like hello using the chart. Then show them a string of codes on the board and have them convert it back into text. **Learning activity** Ask the students, 'Can you see if there is anything missing from the ASCII chart?' They might mention other symbols or emojis. Explain that Unicode expands on ASCII to include other characters and symbols from other languages or emojis. Show examples of Unicode characters from different languages or unique symbols. Provide a Unicode chart for a few characters (e.g. '€,' '∑,' or '😊'). Ask students to encode and decode words or symbols using the Unicode chart.

Western Australian Curriculum content	Teaching and learning intentions	Learning experiences
		Conclusion Ask the students, 'Why do you think computers need ASCII and Unicode to represent text?' 'What problems could occur without standardised systems like these?' Highlight how these systems enable global communication, ensuring consistency across devices and platforms. There would be no point having a code system that looked different from computer to computer because the information would become unreadable.

Appendix A

Resources

Appendix A.1: Resources – Term 1

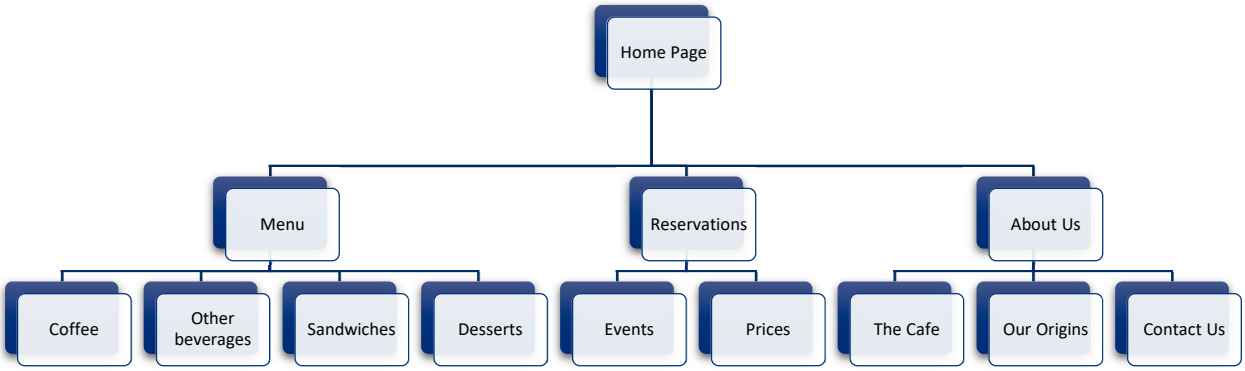
Resource	Link/information
Google – *Be Internet Awesome* – Interland	https://beinternetawesome.withgoogle.com/en_us/interland Game resource with concepts like responsible communication, online critical thinking, privacy and security, and digital citizenship.
Hello Ruby – *My First Computer*	https://www.helloruby.com/play/2 A playful platform introducing coding, computers and technology concepts to children through storytelling and activities.
cse4k12.org – *How Computers Work*	https://cse4k12.org/how_computers_work/index.html. The purpose of this activity is to give students a basic sense of how computers work by having them act out a simple computer simulation.
Behind the News (BTN) Special – *Online Safety*	https://www.youtube.com/watch?v=gk8xEEmMMYk In this BTN special episode, they explore how to stay safe online.
Common Sense Education – Home Page	https://www.commonsense.org/education Provides lessons, activities, and resources to teach digital citizenship, online safety and responsible technology use. • Private and Personal Information (Grade 4 video) https://www.commonsense.org/education/digital-citizenship/lesson/private-and-personal-information • Our Online Tracks (Grade 4 lesson) https://www.commonsense.org/education/digital-citizenship/lesson/our-online-tracks • Is It Cyberbullying? (Grade 5 lesson) https://www.commonsense.org/education/digital-citizenship/lesson/is-it-cyberbullying
Behind the News (BTN) – *Password Power*	https://www.abc.net.au/btn/classroom/password-power/10533172 In this BTN special episode, they discuss the importance of strong passwords.

Appendix A.2: Resources – Term 2

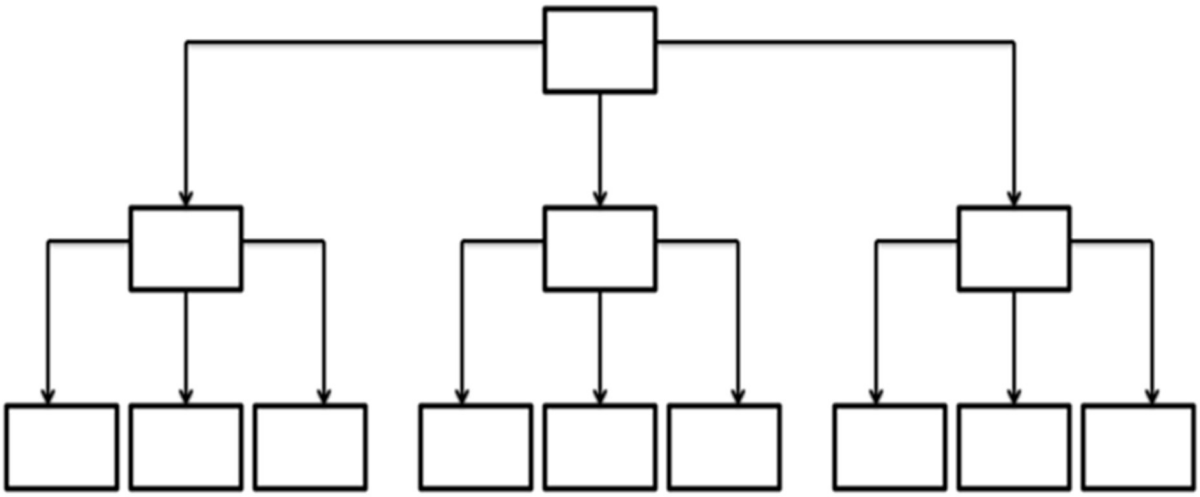
Resource	Link/information
BBC – Bitesize	https://www.bbc.co.uk/bitesize/subjects/zvc9q6f Offers a wide range of interactive resources and explanations, including computational thinking and other key concepts for students.
JULES – *Best of Digital Literacy + Computational Thinking for Children*	https://www.youtube.com/watch?v=mUXo-S7gzds This is an introduction to the four components.
Suggested websites for analysis including: • Kids entertainment • Educational resource • Poorly designed website	Kids entertainment: • Coolmathsgames https://www.coolmathgames.com • PBS Kids https://pbskids.org Educational resource: • National Geographic https://kids.nationalgeographic.com • Britannica Kids https://kids.britannica.com/kids Poorly designed websites: • Yale School of Art https://www.art.yale.edu • Berkshire Hathaway Inc https://www.berkshirehathaway.com
Perth Zoo Website	https://perthzoo.wa.gov.au Perth Zoo website used to analyse layout and navigation paths.

Appendix A.3: Example sitemap and template

This is an example sitemap for a fictional café.



Example sitemap template



Appendix A.4: Resources – Term 3

Resource	Link/information
Digital Technologies Hub	Education Services Australia. Digital Technologies Hub. https://www.digitaltechnologieshub.edu.au/ https://www.digitaltechnologieshub.edu.au/teachers/topics/game-based-learning Lesson ideas based on the Digital Technologies curriculum.
United Nations Sustainable Development Goals (SDGs)	https://sdgs.un.org/goals Global goals designed to address critical environmental, social, and economic challenges, integrating sustainability into education.

Appendix A.5: Game making platforms

These apps/websites are options for game creation and not recommendations. Teachers should choose a platform that meets school/sector guidelines and is appropriate for the needs of the class or students.

Resource	Link/information
Scratch	http://scratch.mit.edu/ A free, visual programming language developed by MIT that enables children to create interactive stories, games, and animations by snapping together code blocks, fostering creativity and logical thinking. Teachers should refer to their System/Sector's Third-Party consent *requirements if planning to use the online version.*
Hopscotch	https://www.gethopscotch.com An iOS app designed for kids to make games, stories, art and more, using a block-based interface on iPads and iPhones.
Tynker	https://www.tynker.com An educational and comprehensive coding curriculum for children, featuring interactive lessons, games, and projects that teach programming concepts through block-based coding and transition to text-based languages like JavaScript and Python.
Code.org Game Lab	https://code.org/educate/gamelab Game Lab is a programming environment where you can make simple animations and games with objects and characters that interact with each other. Design an animation or game, code with blocks or JavaScript to make it work, then share your app in seconds.
MakeCode Arcade	https://arcade.makecode.com A Microsoft platform that allows children to develop retro-style arcade games using block-based coding or JavaScript, promoting hands-on learning and creativity.
Snap!	https://snap.berkeley.edu An advanced visual programming language inspired by Scratch, designed for older children and teenagers to create complex projects with custom blocks and first-class functions, enhancing computational thinking skills.

Appendix A.6: Resources – Term 4

Resource	Link/information
YouTube Video *AI: Impact on Society*	https://www.youtube.com/watch?v=ng4c1g3COfs A video explaining how AI and machine learning works.
Digital Technologies Hub	https://www.digitaltechnologieshub.edu.au/ A range of lesson ideas for teaching digital technologies. https://www.digitaltechnologieshub.edu.au/search/ciphering-a-sentence/ A resource for teaching students about encryption.
eSafety Commissioner	https://www.esafety.gov.au/educators/classroom-resources Resources to assist in teaching online safety. Video library for educators | eSafety Commissioner Video library for educators https://www.esafety.gov.au/educators/classroom-resources/posters-and-conversation-starters Online safety posters and conversation starters ('How to report serious cyberbullying' material poster)
Common Sense Education	https://www.commonsense.org/education/digital-citizenship/lesson/is-it-cyberbullying A resource for teaching about cyberbullying.

Appendix B

Assessment task 1

Privacy and security assessment

Task details

Title	Privacy and security assessment
Description	Students create a short video in which they respond to questions about the importance of strong passphrases, the risks of password reuse, and the use of biometrics for account security.
Type of assessment	Formative or summative
Ways of assessing	Assess students' knowledge and understanding of privacy and security.
Evidence to be collected	Video response A **or** Video response B
Suggested time	One hour
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

Privacy and security

- Access multiple personal accounts using unique passphrases or biometrics. Risks of password reuse and not logging out.

Resources

- Video response sheets part A and part B

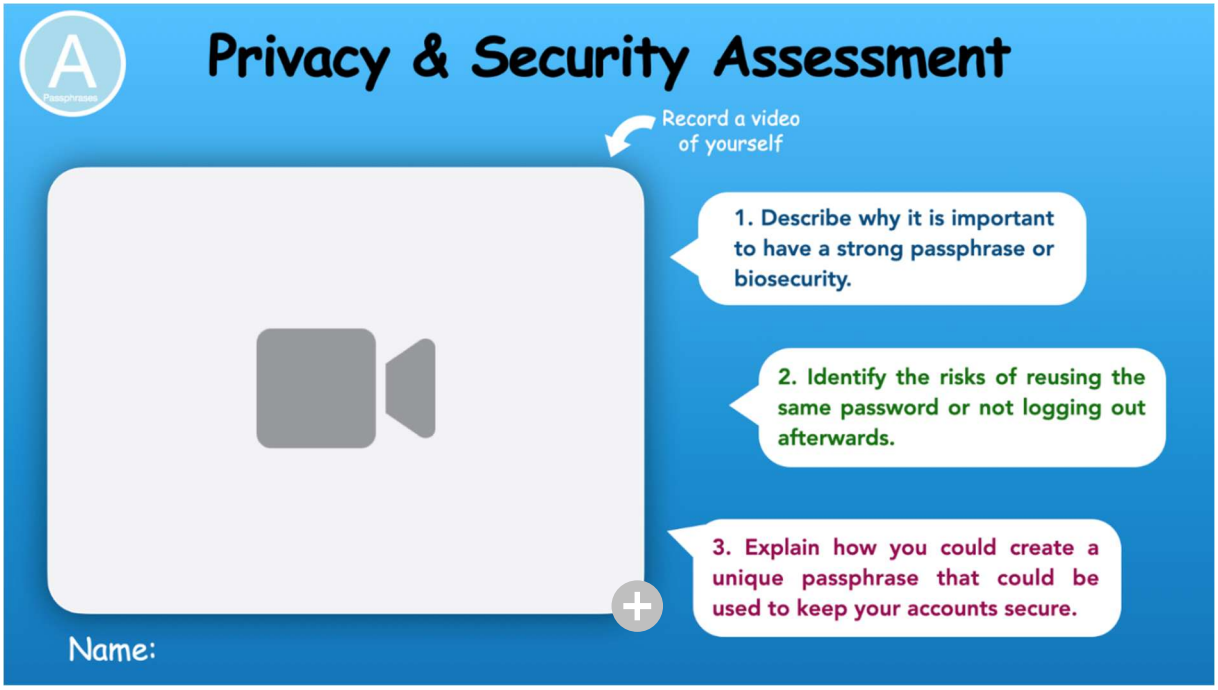
Instructions for teacher

Students will create a short, recorded video in which they respond to questions about the importance of strong passphrases, the risks of password reuse, and the use of biometrics for account security.

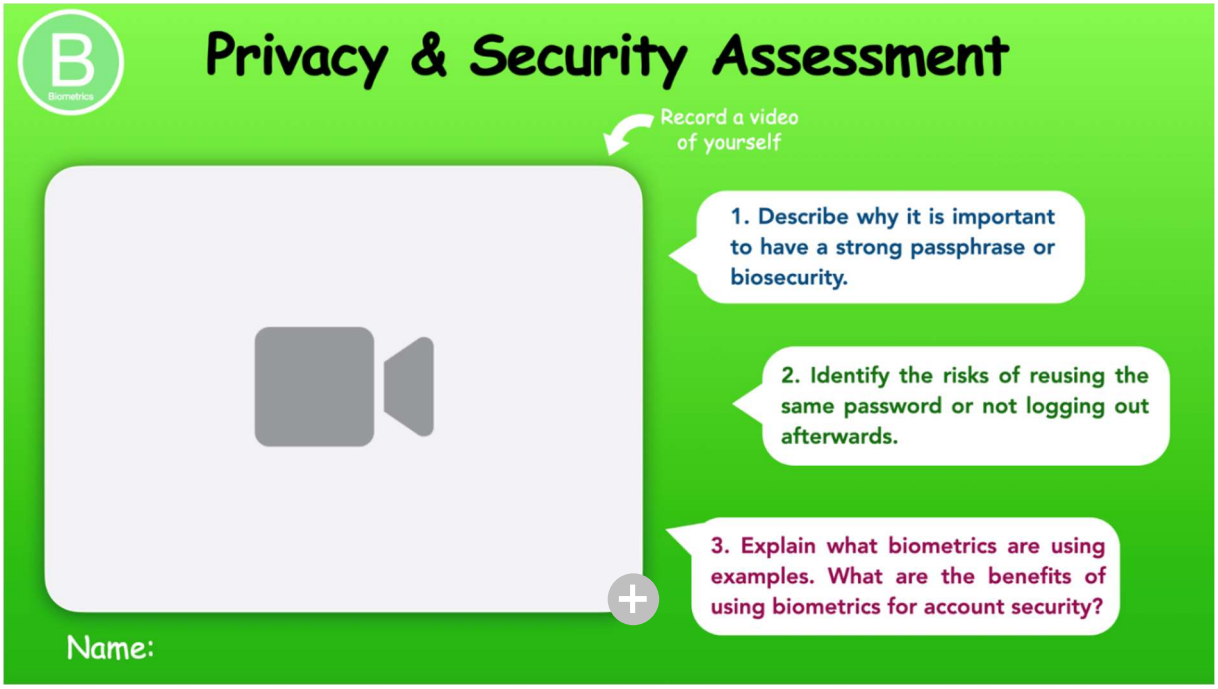
This response task has been separated into two parts to provide options for the students.
Students choose either Video recording sheet A (creating a passphrase) or B (focus on biometrics) and respond to the questions in a video format. Provide students the opportunity to clarify language and instructions as required.

If video recording equipment is unavailable, the questions could be offered as written response.

Video response sheet Part A: Creating a passphrase



Video response sheet Part B: Focus on biometrics



Marking key

Privacy and security

Description	Marks
Explain why it is important to have a strong passphrase or biosecurity for authentication	
Explains the importance of a strong passphrase or biosecurity for protecting personal information and preventing unauthorised access. Gives examples of personal information that needs to be protected	3
Describes in some detail the reason why strong passphrases or biosecurity are important	2
Identifies that strong passphrases or biosecurity are important for protecting information	1
Subtotal	**/3**
Identify the risks of reusing the same password or not logging out of a device or a software platform after use	
Identifies two or more risks of reusing the same password or not logging out of a device or software platform after use	2
Identifies one risk of reusing the same password or not logging out of a device or software platform after use	1
Subtotal	**/2**
Option A: Explain how you could create a unique passphrase that could be used to keep your accounts secure	
Explains the process of creating a unique, strong passphrase with modifiers for each account, giving reasons why this is necessary	3
Describes the process of creating a unique, strong passphrase with modifiers for each account	2
Makes a general statement about the process of creating unique passphrases	1
Subtotal	**/3**
Option B: Explain the purpose of biometrics and their benefits for account security	
Explains the purpose of biometrics and their benefits for account security	3
Describes the purpose of biometrics and their benefits for account security	2
Identifies biometrics with little explanation	1
Subtotal	**/3**
Total	**/8**

Appendix C

Assessment task 2

Game design evaluation

Task details

Title	Game design evaluation
Description	Investigate, design, produce and evaluate a mini game. Students will evaluate their game design and compare it to the finished product. They will evaluate the game against the success criteria.
Type of assessment	Summative
Ways of assessing	Design a mini game that draws on students' computational, design and systems thinking. When creating a mini game for a specific audience, students consider user needs and how the game will meet those needs. Designing a game is an engaging way to apply branching and iteration to control the program's flow, and explore the use of variables for score keeping, tracking lives and timing.
Evidence to be collected	Completed mini game or screen recording of the game being played Game design planning and flow charts/storyboards Peer evaluations Written or verbal responses to the evaluation that includes peer reviewed feedback
Suggested time	Four to five 60-minute 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 implementation

- Design algorithms in plain English and/or flow charts that involve user input, variables and control structures (sequence, decisions and repetition)
- Implement algorithms in a visual programming environment involving variables and control structures (sequence, decisions and repetition) with user input

Design thinking skills

Project management

- Use agreed protocols and management roles to communicate decisions, plan and manage time, to develop designed solutions

Investigating and defining

- Break down a design brief to define the purpose and requirements for a given task

Designing

- Design solutions considering competing factors, with annotated diagrams, storyboards and/or a sequence of steps, using technical terms and an iterative process

Producing and implementing

- Use technologies, components and/or equipment to implement agreed protocols to produce a designed solution

Evaluating

- Use given criteria to evaluate design features, consideration of competing factors, processes and the designed solution

Resources

- Game design evaluation sheet – printed papercopy or digital
- screen recording capability
- access to the game-making platform chosen by the teacher

Instructions for teacher

Provide students with a paper or digital template that outlines the criteria for the evaluation.

Explain the process for uploading a screen recording of their game as well as uploading the coding behind the game. Discuss the evaluation questions with students.

Complete the screen recording and ask the students to either upload it to the digital template, a digital work portfolio like Seesaw, or send the video directly to you.

Students will then answer the questions on the Game design evaluation sheet. These can be answered verbally if needed.

Game design evaluation **Name: _____** **Date: _____**

1. Take a screen recording
   a. Demonstrate the final game in action, explain the key elements and features
   b. Explain the main parts of the game's code, describe how different blocks contribute to the game's function.
   c. Describe where you have used **variables** and **control structures (sequence, decisions and repetition) with user input.**
2. Game design success criteria
   Identify your game's three success criteria. Outline whether the game met its success criteria. Explain how or why not.

Success criteria	**Judgements/evaluation** Did the game meet its success criteria?

3. Design and development
   Compare the original game design with the final product. Identify the changes that were made during the development stage. Explain the reasons for the change/s.

_____

_____

_____

_____

_____

_____

_____

_____

4. Competing factors
   Identify the competing factors you had to consider when developing your game.
   Explain why you chose one way over another.

_____

_____

_____

_____

_____

5. User experience
   a) Describe what your peer reviewer considered to be the most interesting or appealing thing about the game.

_____

_____

_____

_____

_____

   b) Describe what you, as the game designer and programmer, consider to be the most interesting and appealing thing about the game.

_____

_____

_____

_____

_____

6. Future Improvements
   List three design features (incorporating emerging technology) that could improve the game in the future.

1. _____

_____

_____

2. _____

_____

_____

3. _____

_____

_____

Marking key

Description	Marks
1a. Game demonstration	
Provides a clear and thorough demonstration of the final game in action, explaining all key gameplay elements and features	4
Shows the game in action, describing most gameplay features	3
Outlines basic gameplay but may miss key features or provide limited clarity on how the game works	2
Brief gameplay demonstration, missing key elements or demonstrating limited understanding of how the game works	1
Subtotal	**/4**
1b. Code explanation	
Explains the organisation of code blocks clearly and how each element contributes to the overall game functionality	4
Describes most key elements of the code blocks and their role in the game's functionality	3
Identifies the basic elements of the code organisation, showing some understanding of the game's functionality	2
Minimal explanation provided for code organisation or functionality	1
Subtotal	**/4**
1c. Explanation of key coding elements **For each element below, allocate 2 marks for identifying the element and explaining how it enhances gameplay and 1 mark for identifying the element only.**	
Variable – Identifies where a variable is used and explains how it enhances gameplay (e.g. tracking score, player progress)	1–2
Sequence – Identifies a sequence of code and explains the gameplay actions	1–2
Decision – Identifies a decision structure (e.g. if/else) and explains how it makes the game dynamic based on conditions	1–2
Repetition – Identifies a loop and explains how it allows repeated actions, making gameplay smoother and more efficient	1–2
User input – Identifies where user input is used and explains its impact on interaction and player control in the game	1–2
Subtotal	**/10**
2. Game design success criteria	
Identifies three success criteria and outlines if each was met	3
Recalls some success criteria and evaluates if these were met. These may be different to the original success criteria	1

Description	Marks
Subtotal	**/3**
3. Design and development	
Clearly compares the original design with the final product, explaining specific changes made during development and providing clear reasons for each change	2
Identifies some similarities and/or differences but with limited detail or reasoning	1
Subtotal	**/2**
4. Competing factors	
Identifies specific competing factors and explains why certain choices were made over others	2
Identifies competing factors with limited explanation of the choices made	1
Subtotal	**/2**
5a. User experience – Peer	
Describes the specific aspects that the peer reviewer found most interesting or appealing, showing an understanding of the reviewer's perspective	2
Provides a general description of the peer reviewer's feedback	1
Subtotal	**/2**
5b. User experience – Self	
Describes the specific aspects that they found interesting or appealing.	2
Provides a general description of the most interesting or appealing aspect	1
Subtotal	**/2**
6. Future improvements	
Lists three future improvements, including emerging technologies, that could enhance the game	3
Lists two to three improvements with no reference to emerging technology. Most features enhance the game	2
Lists one to two future improvements that could enhance the game	1
Subtotal	**/3**
Total	**/32**

Acknowledgements

Term 2, lesson 1

support notes	Digital Technologies Hub. (n.d.). Computational Thinking. Retrieved June, 2025, from https://www.digitaltechnologieshub.edu.au/teach-and-assess/classroom-resources/topics/computational-thinking/ Used under a Creative Commons Attribution 4.0 International licence.