DIGITAL TECHNOLOGIES HUB

Exploring Digital Technologies

A practical 30-minute session for teachers

- Using the Digital Technologies Hub effectively
  - Scope & sequence for planning
  - Adaptable learning sequences
  - Core concepts with practical examples
  - What effective DT teaching looks like
  - Flexible assessment approaches

Resources & next steps you can use right away

Walk away with practical strategies and ready-to-use resources.

Presented by Martin Richards
Curriculum and Learning Design Specialist

Acknowledgement of Country

I wish to acknowledge the Eastern Kulin Nation, Traditional Custodians of the land on which our ESA head office stands, and pay my respects to Elders past and present.

Artwork by **Keisha Leon**

Practical planning for DT

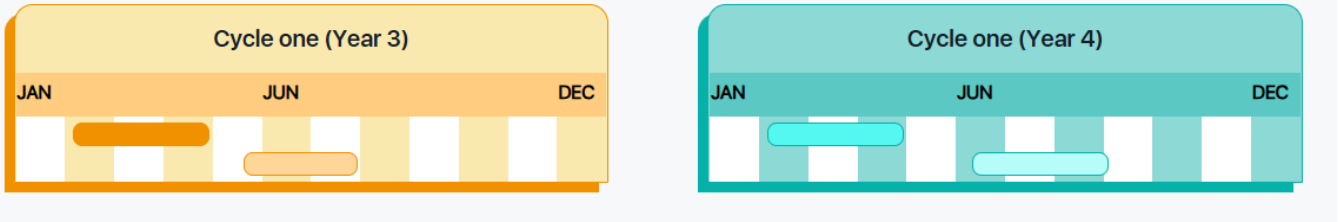
Wherever you're on your Digital Technologies journey, today's session should prove useful.

We're focusing on practical ways to plan and teach DT, with a clear focus on core concepts.

In this session, we'll focus on algorithms and do a deep dive.

I'll be using resources from the DT Hub.

Ways to timetable Digi-Tech



There are various ways to plan and implement Digi-Tech across a year.

- Short bursts within a term, using a sequence of lessons
- One dedicated term within the year
- One semester; two terms

Your chosen model will shape how you cover and revisit the core concepts.

Planning for DT Learning

Planning includes:

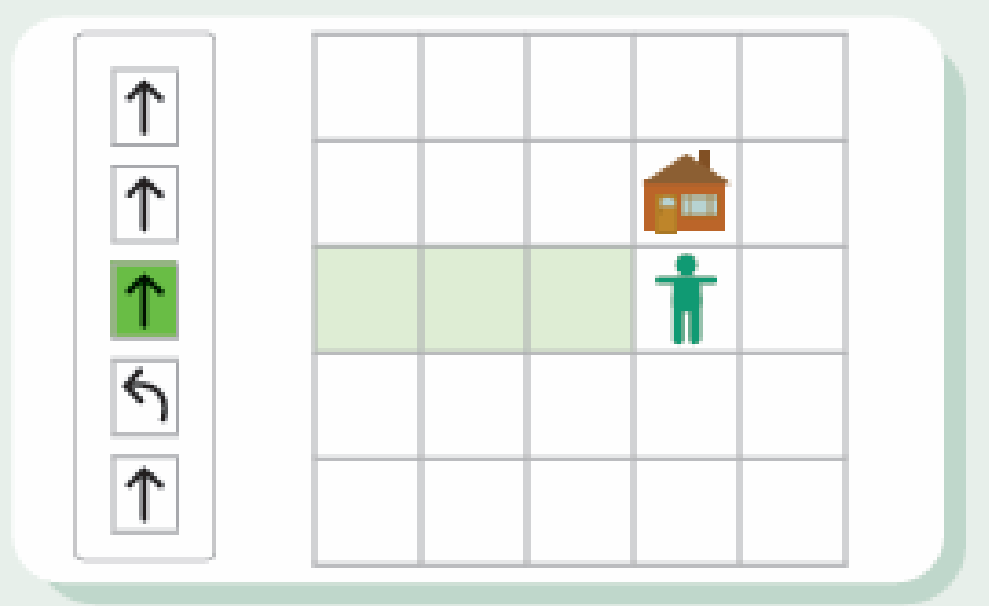
- Identifying the core Digital Technologies concepts
- Using practical activities that target those concepts
- Capturing evidence of learning as students engage

The achievement standard isn't just for reporting — it's where the core DT concepts live. Those concepts are what we plan around.

Core concept: Algorithms

Algorithms are a foundational concept across Digital Technologies:

- Work well in unplugged contexts
- Students learn to be precise
- Clear links to Mathematics, English and other learning areas



Algorithms definitions

- A clear, ordered sequence of steps and decisions needed to solve a problem.

Simplified and student friendly

- An algorithm is a set of step-by-step instructions that tell someone (or a computer) how to do something.

Why are Algorithms relevant?

Understanding algorithms helps students see how computers follow rules, make decisions, and repeat actions, forming the foundation of all programming and automation.

Core concept: Algorithms

- There are some key differences in skills required at each year band, can you spot them? And what are the common key terms?

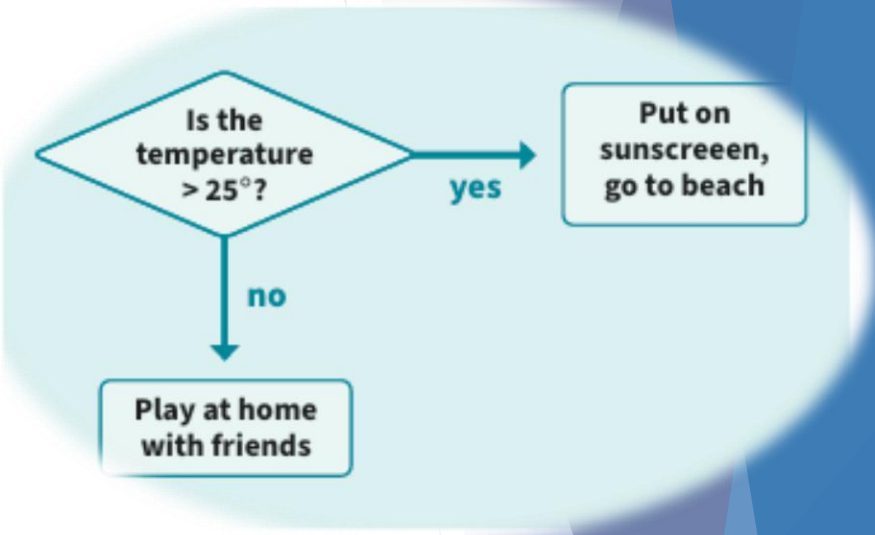
	Years 1–2	Years 3–4	Years 5–6
Achievement standard	Students follow and describe basic algorithms involving a sequence of steps and branching.	Students follow and describe simple algorithms involving branching and iteration.	Design algorithms involving multiple alternatives (branching) and iteration
Content descriptions	Follow and describe algorithms involving a sequence of steps, branching (decisions) and iteration (repetition)	Follow and describe algorithms involving sequencing, comparison operators (branching) and iteration	Students design algorithms involving complex branching and iteration

We're all teaching the *same three ideas* — sequencing, branching, iteration — just with increasing sophistication.

Using simpler terms for students

You can help students understand the ideas by using accessible language:

- Sequencing: doing things step-by-step, in order
- Branching: making a choice or deciding what happens next
- Iteration: repeating steps a number of times (a loop) until a condition is met



Algorithms Years 1-2

- Sequencing: doing things step-by-step, in order

Soak the rice paper

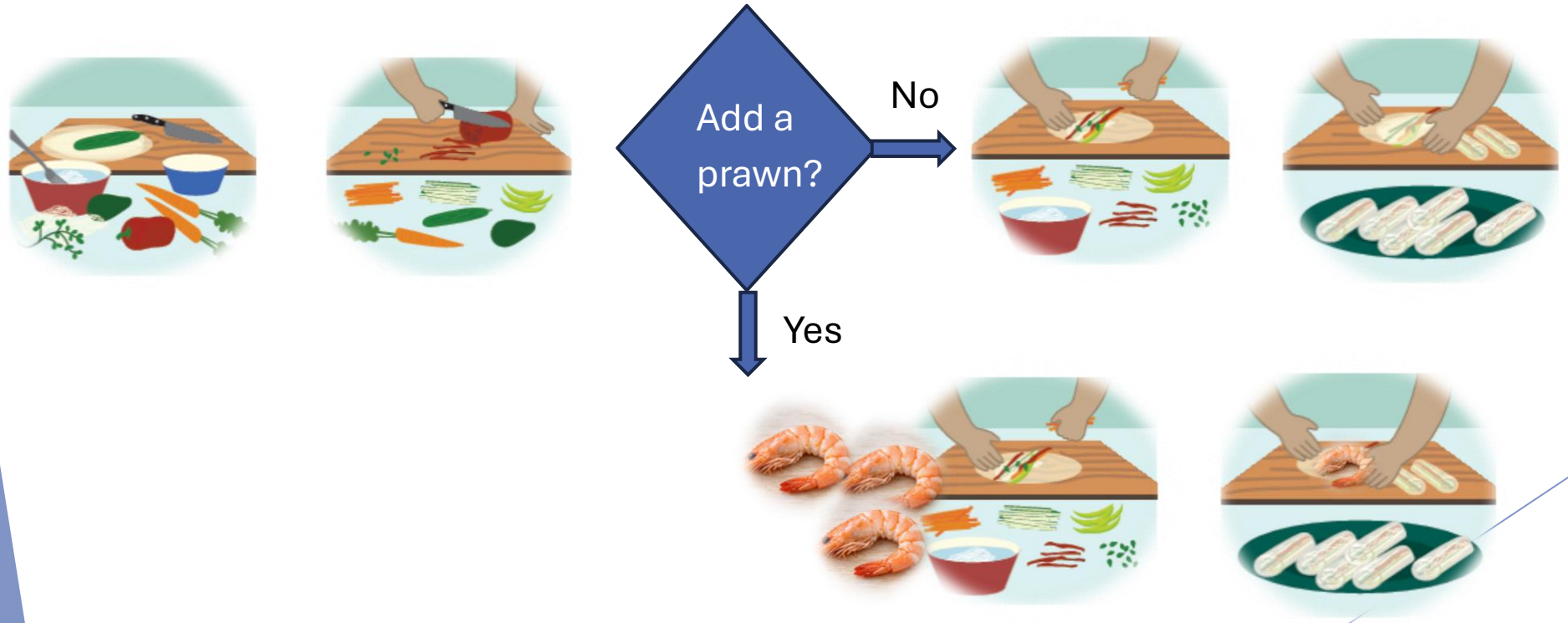
Cut the fillings

Add the fillings

Roll it up

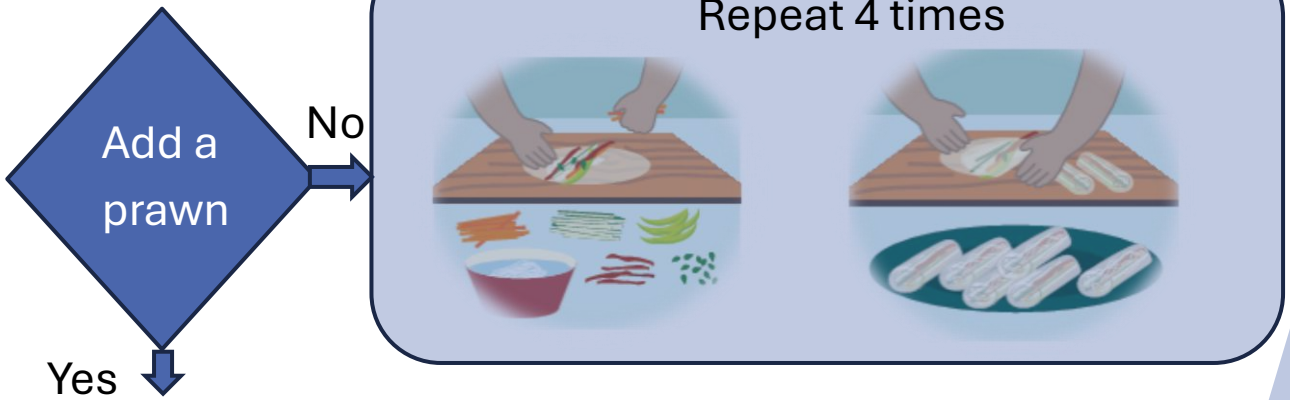
Examples using simpler terms

- Branching: making a choice or deciding what happens next



Examples using simpler terms

- Iteration: repeating steps a number of times (a loop) until a condition is met
- You need to make 10 rice paper rolls (4 vegetarian, 6 meat).



Connect the algorithm back to computers

- What we just did making rice paper rolls is exactly what computers do — they follow instructions precisely, in order.

Ask reflective questions such as:

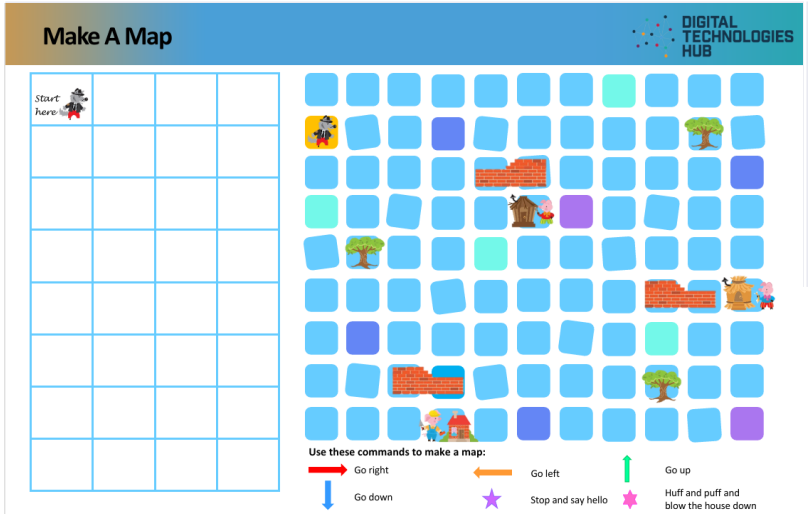
- What would happen if we missed a step?
- What if we did the steps in the wrong order?
- We said ‘add filling’ but didn’t say *how much*. *Can we improve the instruction?*

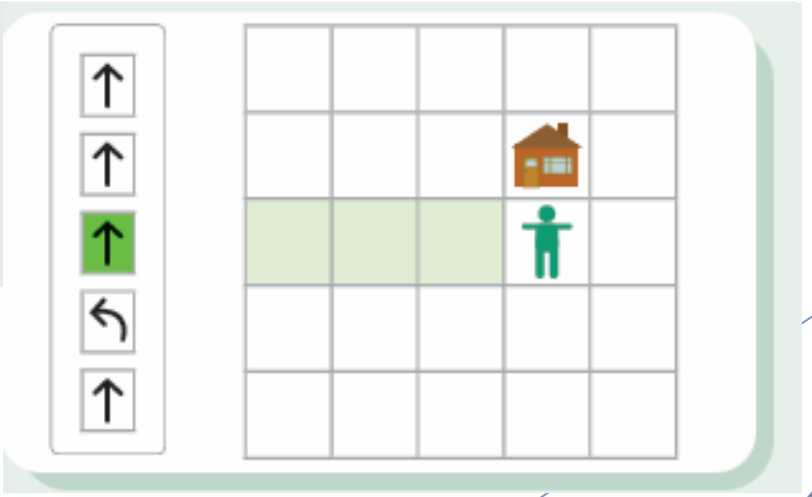
Learning focus *Students should be able to:*	Sample learning activity *What it might look like in the classroom*	Evidence of learning *What teachers might notice or collect*
Follow and describe steps with choices and repetition (branching and iteration)	Provide simple algorithms such as picture cards or spoken instructions and order them to achieve the intended outcome. Pause to discuss where a choice is made and which steps happen again.	The cards are ordered correctly. The student responds correctly to a simple choice and describes what happens next using everyday language. The student repeats a set of steps and explains why they did the same steps again.

Algorithms in Years 1-2

Links to Mathematics and English

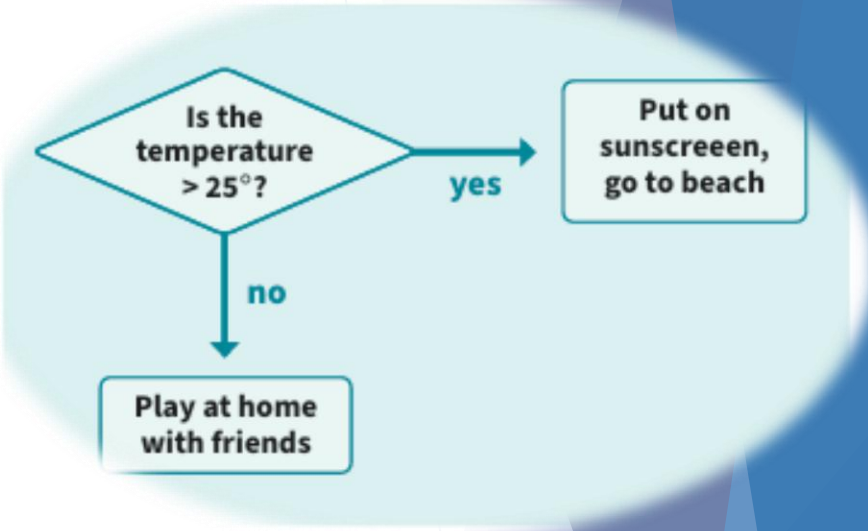
English	Mathematics
English through sequencing events, giving instructions, and retelling stories in order. Students can act out a story and follow an algorithm using a visual map, such as in a Three little pigs retell.	Mathematics through ordering steps, position and location (for example, giving directions to a location), recognising patterns, and following simple processes.





Algorithms in Years 3-4

Students follow and describe the steps that include decisions based on comparing data.



Planning a day:

1. Wake up
2. Look outside
3. Check the temperature
4. Is it greater than 25°?

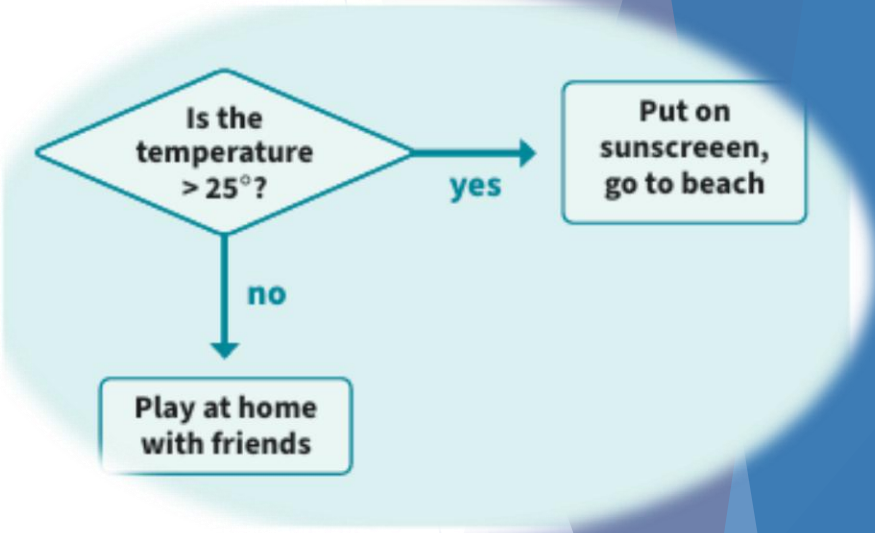
   Yes → Wear a hat and sunscreen, go to the beach

   No → Stay home and play with friends
5. Return home

Algorithms in Years 3-4

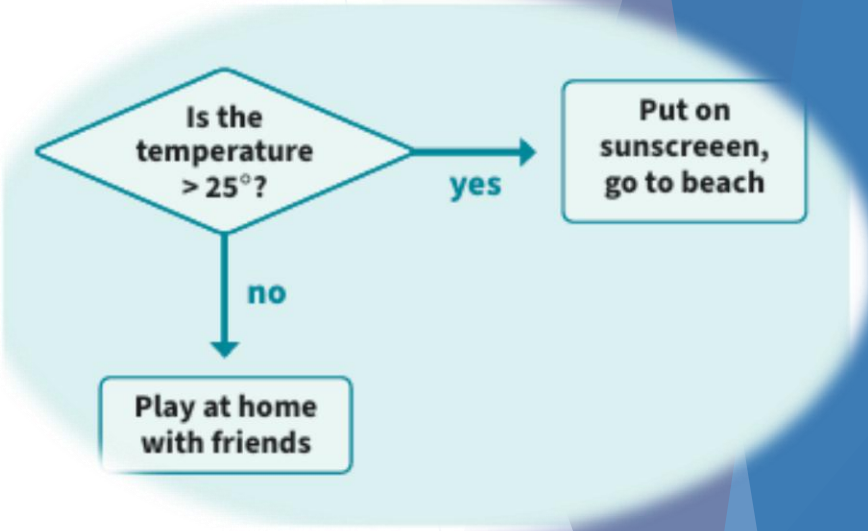
Data can be anything students can check or compare — temperature, number, colour, size, time, or any information that helps them choose the next step in an algorithm on comparing data.

- Number of items: Is there more than 5 items?
- Distance: Is the object further than 2m?
- Money: Does it cost more than $10.00
- Scores: Is the score higher than 50?
- Colour: Is the light red?
- Type/category: Does the animal have fur?



Algorithms in Years 3-4

Let's add some repeating steps (iteration)



Planning a day:

1. Wake up
2. Look outside
3. Check the temperature
4. Is it greater than 25°?
   - Yes → Go to the beach
     - Repeat until 3.00pm

       Swim → Get dry → Apply sunscreen → Play a game
   - No → Stay home and play with friends
5. Return home

Algorithms in Years 3-4

Learning focus ***Students should be able to:***	Sample learning activity ***What it might look like in the classroom***	Evidence of learning ***What teachers might notice or collect***
Follow and describe algorithms involving sequencing, comparison operators (branching) and iteration.	Students use number data, such as steps taken in a walking event. They compare these numbers using <, >, or = to decide what happens next. For example, *if steps = 100, receive a token*. They continue repeating the walking steps until they reach the target, such as 1 000 steps and earning 10 tokens.	• The student correctly compares money amounts using <, >, or =. • The student follows the correct decision pathway based on the comparison made. • The student repeats the steps of the algorithm until the stopping condition is reached. • The student explains where decisions are made and why steps are repeated.

Retention, retrieval and recall

Think back to the three key ideas introduced earlier. Can you match each term with a real-world example?

For example, what do these terms mean?

- Sequencing:
- Branching:
- Iteration:

choosing a path

repeating a task

following steps in order

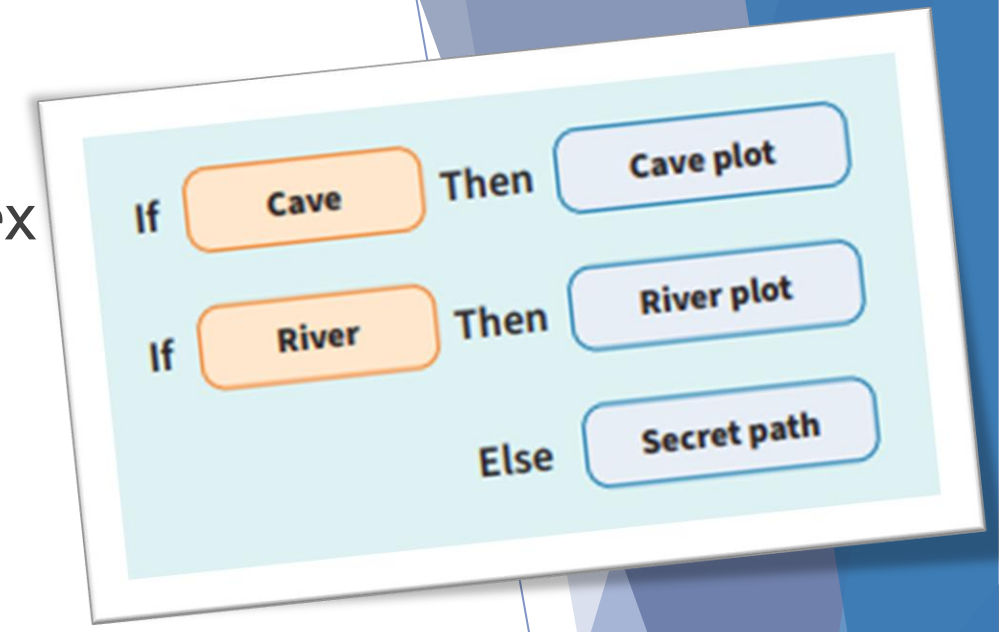
Retention, retrieval and recall

- Sequencing: following steps in order
- Branching: choosing a path
- Iteration: repeating a task

Now that we've explored Years 3–4, how does this differ from what students in Years 5–6 need to understand?

You don't need to understand every example today, just your year level.

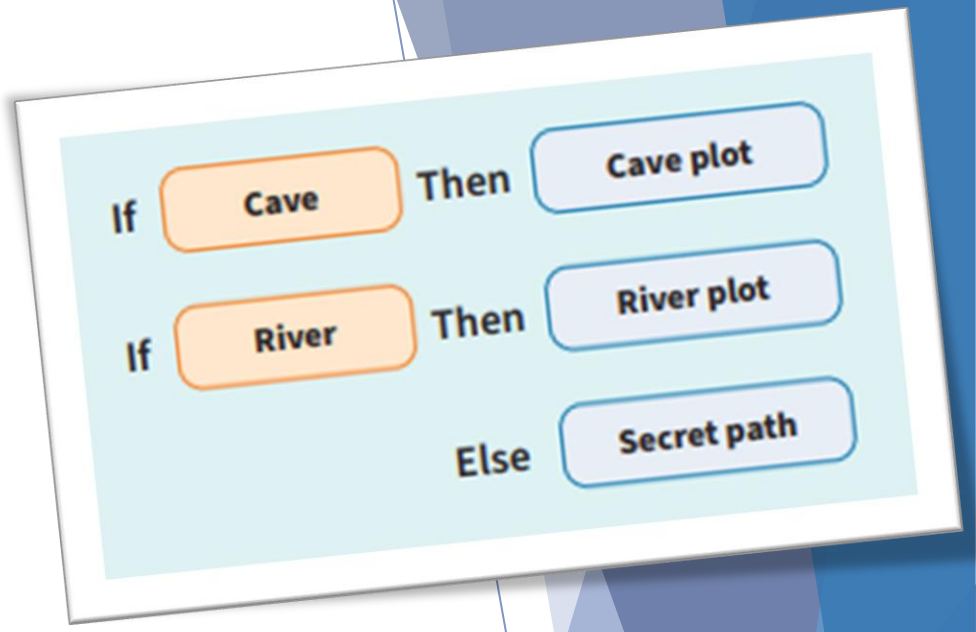
Algorithms in Years 5-6



Students design algorithms involving complex branching and iteration.

- Here's a'choose your own adventure' scenario.
- The algorithm includes IF / THEN / ELSE statements that lead to different pathways depending on the choice made.
  - IF the choice is cave, THEN the story follows the cave plot.
  - IF the choice is river, THEN the story follows the river plot.
  - Otherwise (ELSE) the story continues to follow the secret path plot.

Algorithms in Years 5-6

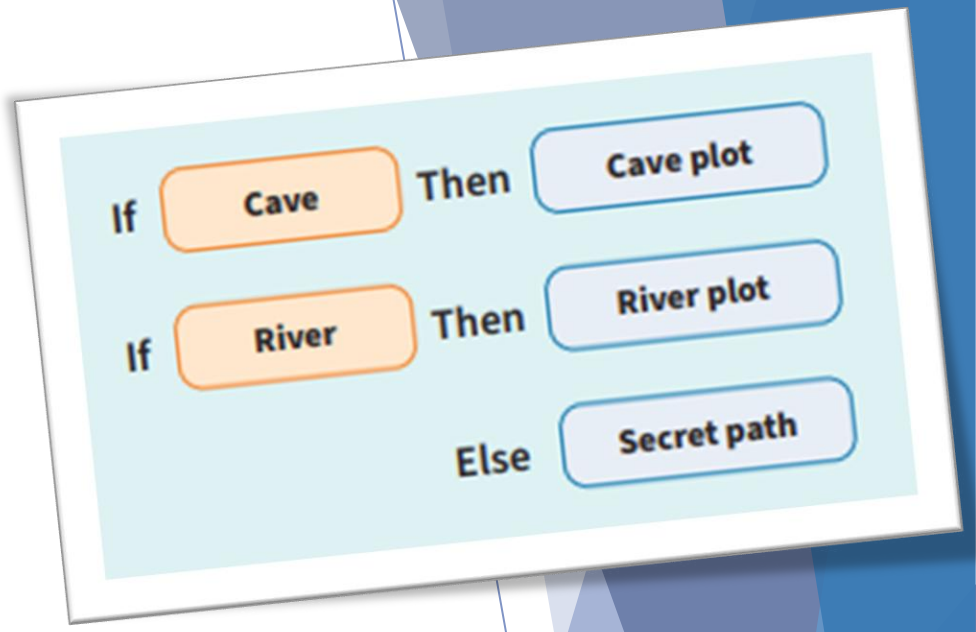


Students design algorithms involving complex branching and iteration.

- IF the choice is cave, THEN the story follows the cave plot.
  - **Enter cave**
  - **Repeat: Move forward → check for obstacles → Look for clues to find the treasure**
  - **Continue until you reach the treasure chamber and find the treasure**
  - **Story Ends**
- IF the choice is river, THEN the story follows the river plot.
- ELSE the story continues to follow the secret path plot.
- IF the chosen pathway reaches an ending, THEN Story Complete.

Pair-test the algorithms (debugging!)

Algorithms in Years 5-6



Students turn their algorithm into a graphic novel.

Use presentation software such as PowerPoint or Keynote.

Slide 1 → Story introduction

Slide 2 → Choice buttons: “Enter Cave” or “Go to River”

Slide 3 → Cave path

Slide 4 → Cave loop (iteration)

Slide 5 → Treasure chamber ending

Slide 6 → River path

Slide 7 → Secret path (the ELSE branch)

Slide 8 → Alternate endings

Students click buttons to follow the story.

Each button takes them to a different slide — a branching algorithm.

Algorithms in Years 5-6

Students move beyond simple decisions and start working with multiple alternatives working within a forever loop. In this game example, each attempt leads to different outcomes—move back to start, lose a life, end the game.

Algorithm

To keep in the maze:
If the dragon or ghost touches the colour ■ , then … move back.

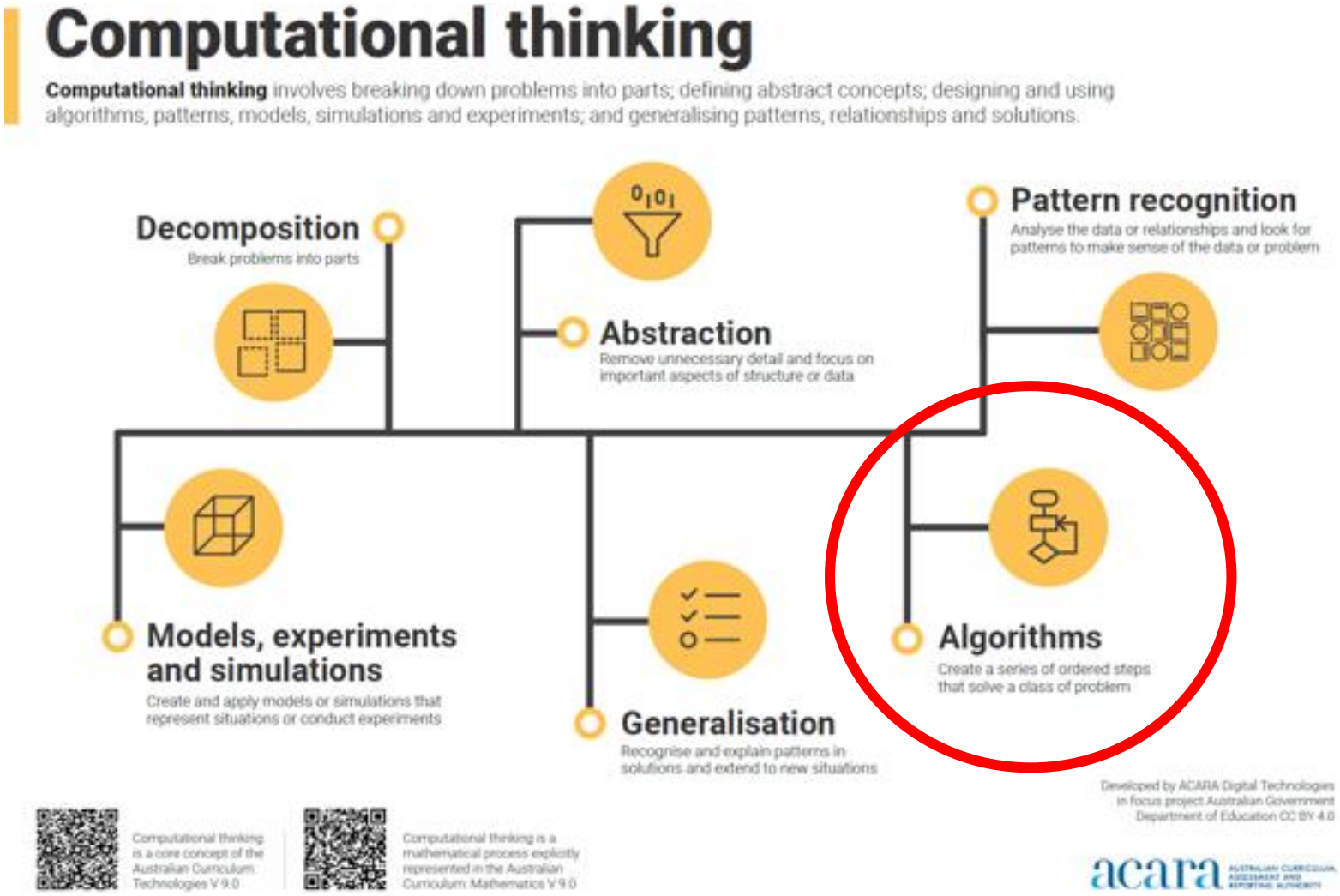
If the dragon touches the treasure, then … you win.

If the ghost catches the dragon, then … game over.

Algorithms in Years 5-6

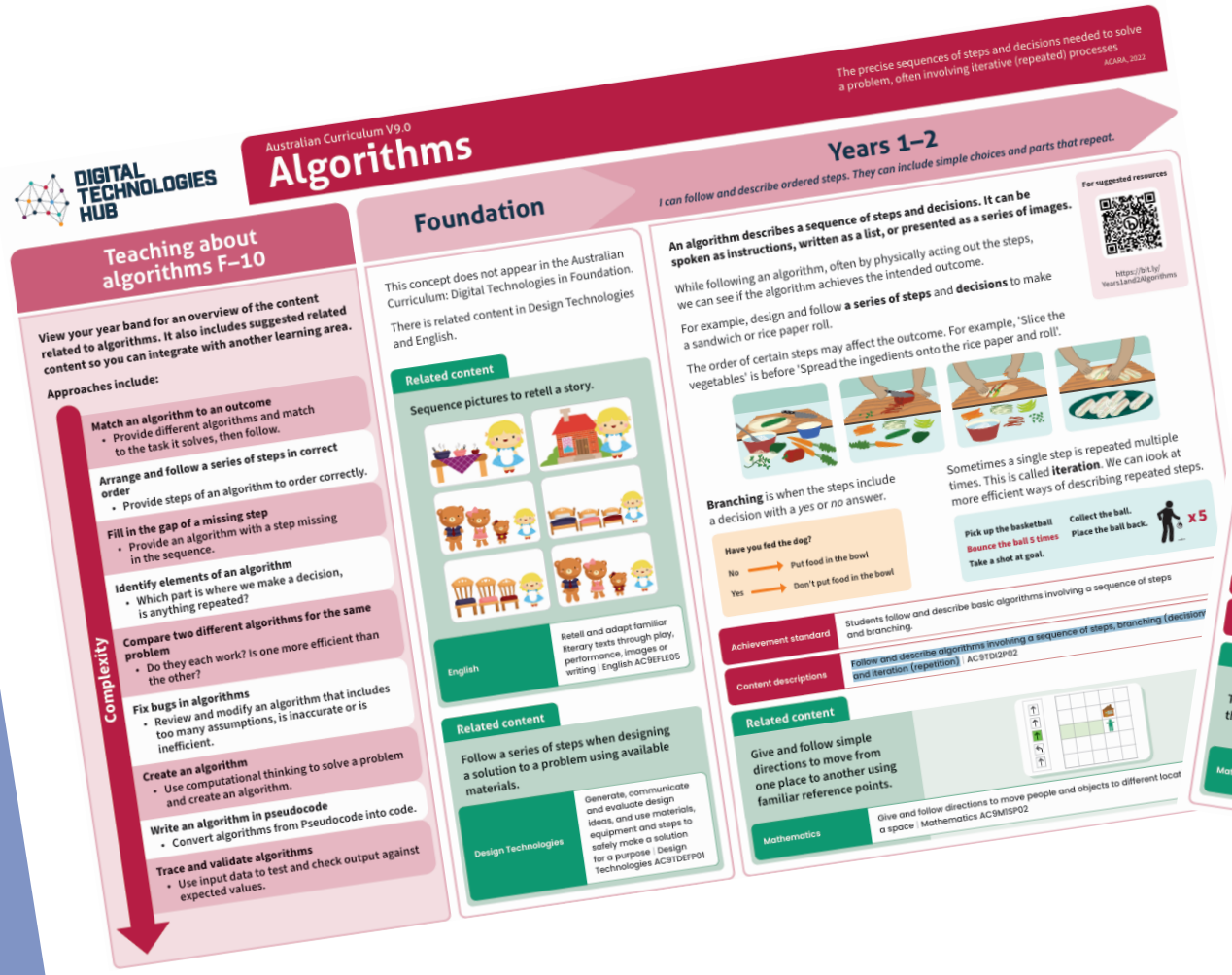
Learning focus ***Students should be able to:***	Sample learning activity ***What it might look like in the classroom***	Evidence of learning ***What teachers might notice or collect***
Design algorithms involving complex branching and iteration.	Students design and follow an algorithm for a simple game that includes lives, decisions, and repetition. The game starts with 3 lives. IF an attempt is unsuccessful, THEN subtract one life. IF lives > 0, THEN the game continues. ELSE the game ends. Create a paper version of the game based to follow the algorithm and keep track of lives, score and how game ends.	• The student designs an algorithm that includes clear branching decisions using if/then/else statements. • The student correctly applies iteration, repeating steps until the stopping condition is met. • The student keeps accurate count of lives and updates values correctly. • The student explains how decisions and repetition affect the length or outcome of the game. • *The game is programmed in Scratch*

Algorithms and computational thinking



Core concept posters

- Algorithms are introduced early, from Year 1, and build in complexity right through to Year 10



Plan your teaching

- Explore sample units and lessons.
- These sample units show how Algorithms can be taught as a short sequence or extended unit at each year level.

- Years 1–2: Solving simple problems
- Years 3–4: Introduction to programming
- Years 5–6: Programming challenges

Check understanding

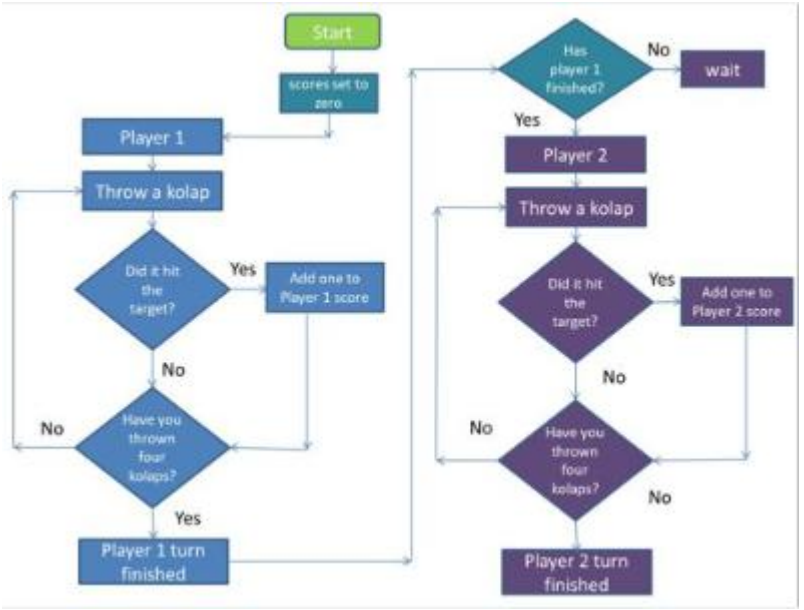
- What Year band does this relate to?
- Look for clues to help you.

Rubric: Algorithms

	1 (limited)	2 (basic)	3 (proficient)	4 (advanced)
Following algorithms (following verbal, written or drawn instructions)	with guidance can follow a simple sequence of steps	can follow a sequence of steps	can follow a sequence of steps with decisions (branching) and repeated steps (iteration)	can follow a sequence of steps with decisions (branching) and repeated steps (iteration), explaining the purpose of each step in achieving the overall outcome
Describing algorithms (describing an algorithm represented verbally, or as written or drawn instructions)	with guidance can describe a simple sequence of steps	can describe a sequence of steps	can describe a sequence of steps with decisions (branching) and repeated steps (iteration)	can describe a sequence of steps with decisions (branching) and repeated steps (iteration), explaining the purpose of each step in achieving the overall outcome. Can explain reasons for their choice of representation

First Nations Australians focused resources

Read a story by an Aboriginal or Torres Strait Islander author that has several clear steps in the story sequence and a connection to First Nations Australians.



Use Kolap, the instructive game that has a long history of being played on Mer Island in the Torres Strait region, to discuss how a game can be represented as an algorithm.

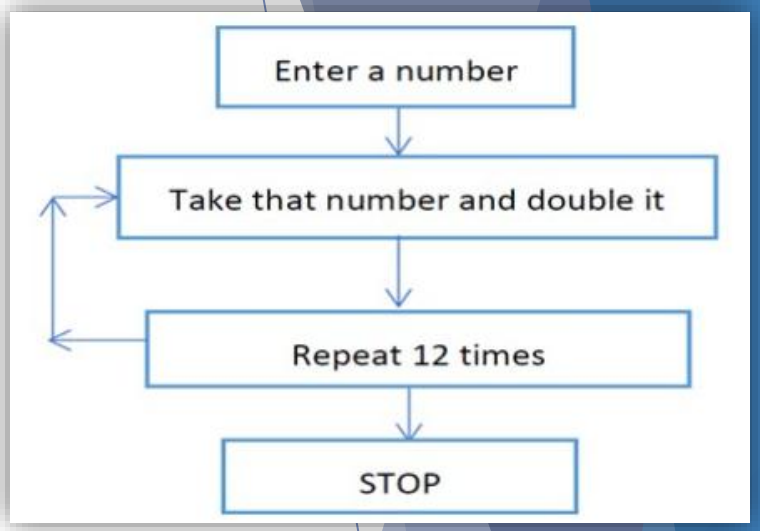
Learning sequence

- Learning map and outcomes
- Learning hook
- Learning construction
- Learning demo
- Learning reflection
- Resources

DOWNLOAD LESSON

Algorithms in Mathematics

- Algorithms feature in Number in Mathematics from Year 3
- Look for Follow and create algorithms
- Refer to Maths Hub for related resources (Year 5 example)



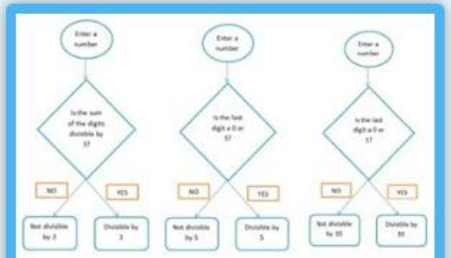
Teaching resources

	Units	Ingredient quantities	Amounts for double the ingredients Rule: =C3*2; then fill down
Brown sugar	grams	250	500
Self-raising flour	grams	250	500
Butter	grams	125	250
Apples		2	4
Egg		1	2
Cinnamon	teaspoon	1/2	1

Algorithms: Multiplying by a value

This lesson provides ideas for exploring contexts that multiply cells in a spreadsheet by a value.

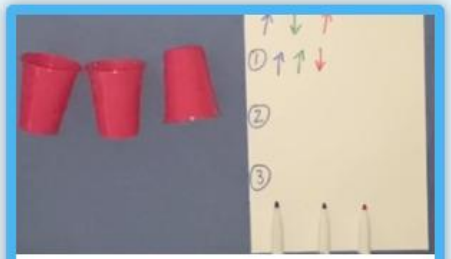
GO TO RESOURCE



Fix these divisibility rules

This lesson provides the divisibility rules as flowcharts. Students find which of the three flowcharts has an error.

GO TO RESOURCE



Magic cups

Students apply computational thinking and create an algorithm to flip pairs of cups, in exactly three moves, to have them all facing down.

GO TO RESOURCE

https://www.mathematicshub.edu.au/

DIGITAL TECHNOLOGIES HUB

Understanding DT | Plan and prepare | Teach and assess | For families | AI

Digital Technologies Hub

Find resources to help teachers, students and families learn about Digital Technologies.

Understanding DT

Engage with the Digital Technologies curriculum to plan, implement and assess effective lessons.

- Australian Curriculum: Digital Technologies
- Core concepts
- Webinars

LEARN MORE

Plan and prepare

Guidance and support to develop and implement a whole-school plan.

- Scope and sequence (F–10)
- School Implementation
- Programmable robots and drones

LEARN MORE

Teach and assess

Students can learn to code and create using digital technologies, and find out about relevant careers.

- Lesson ideas
- Planning for assessment
- Guides and resources

LEARN MORE

For families

Find out about Digit
Technologies to sup
child to learn skills,
digital solutions and
related career.

- Self-guides pro
activities
- Learn together
- Cybersafety at

LEARN MO

DIGITAL TECHNOLOGIES HUB

Digital Technologies – Unit Planning Template (6–8 weeks)

This template is provided as a planning aid. Teachers can adapt it to suit their school context and existing planning requirements.

The intention is to use it as you explore a scope and sequence topic provided on the DT Hub.

This sample is for a Years 1-2 class focusing on algorithms. A clean template is provided after the sample.

Sample unit planning template

Year level: Years 1-2
Topic: Algorithms
Duration: 6 weeks

1. Big idea for the term

Identify one key idea students should understand by the end of the unit.

Students understand that algorithms are a sequence of steps that can be followed to solve a problem or complete a task. They learn to recognise, describe and follow familiar algorithms, and begin to understand that algorithms are instructions that help computers know what to do.

2. Key skills or concepts

1. Sequence steps in order to complete a familiar task.
2. Follow and describe algorithms using images, verbally and text.
3. Begin to recognise branching (decisions) in everyday routines.
4. Begin to recognise branching and iteration (repetition) in everyday routines.

3. Weekly sequence overview

Week	Skill / concept focus	Selected activity/resource	Evidence collected
1	What is an algorithm? Recognising steps in everyday tasks Represent algorithms	Scope and sequence Years 1–2 *What is an algorithm?* (intro resource) or Sequencing Coding camp Lesson 3 (video) Students draw steps to complete a familiar activity, brush teeth, make breakfast, ~~ready~~ for bed.	Teacher observations, student drawings of step-based tasks, images sequenced in correct order
2	Sequencing steps Represent algorithms	Scope and sequence Years 1–2 Order a set of cards to create a smiley face biscuit.	Ordered picture cards, oral explanations
3	Sequencing steps Represent algorithms	Scope and sequence Years 1–2 *Algorithms – Storytelling sequence* (using a story with clear steps)	Ordered picture cards, oral explanations
4	Giving verbal instructions as commands, turn left, turn right, forward and backwards.	Scope and sequence Years 1–2 Instructing a human robot/floor robot.	Teacher observations, student steps to guide a floor robot to a position on a grid
5	Branching (simple decisions) and iteration (repetition)	Scope and sequence Years 1–2 Use traditional Australian First Nations game to introduce branching (Did you hit the target? If yes score a point; If no, then no point). Introduce repetition (throw the bean bag at the target; repeat 5 times).	~~Refer~~ to tally of each group scores, students can describe decisions and repeating parts of the algorithm to play the game.
6	Branching (simple decisions) and iteration (repetition)	Scope and sequence Years 1–2	Complete map with arrows to direct the wolf. Student