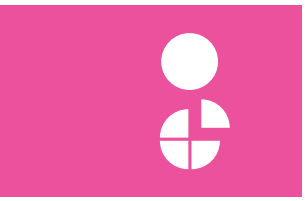
Computational Thinking in Action

A catalyst for growth and extension of Computational Thinking in the classroom.

What is Computational Thinking?

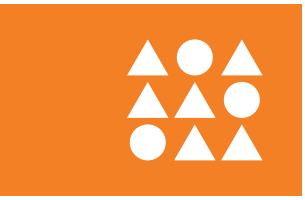
Computational Thinking is a set of skills that underpin learning within the Digital Technologies classroom. These skills allow students to engage with processes, techniques and digital systems to create improved solutions to address specific problems, opportunities or needs.

The six Computational Thinking skills:



DECOMPOSITION

Breaking down data, processes, or problems into smaller, manageable parts.



PATTERN RECOGNITION

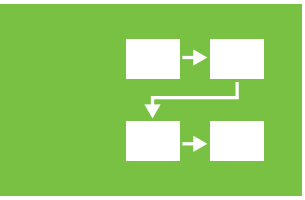
Observing patterns, trends, and regularities to make sense of data.

ABSTRACTION

Identifying and extracting relevant information.
The process of ignoring or removing unnecessary information.

MODELLING AND SIMULATION

Developing a model to imitate processes and problems.



ALGORITHMS

Creating an ordered series of instructions for solving similar problems or for doing a task.

EVALUATION

Determining the effectiveness of a solution and generalising.
Applying that information to new problems.

Thinking about Computational Thinking

Sort Computational Thinking Skills

Not important in the problem or solution	Important but not critical in the problem or solution	Critical in solving the problem or creating the solution

Compare Strategies

Challenges and successes

Other students' strategies

Wider problems and solutions

Apply Understanding

Explore real-world examples	Create designs and projects	Present and communicate findings

Touch Screens

Years 3-4
Years 5-6

Groups of 3

15 minutes

Pens/paper
Sheet of polystyrene
A circle counter

Student Instructions

Take turns to assess the material you have been given for it's potential to act as a touch screen, similar to the screen on a tablet. Describe its **properties** on the scale below

When you swipe across a rough surface there will be grip and it will be harder to move

Rough ⟷ **Smooth**

When you swipe across a smooth surface there will be no grip and it will be easier to move

Problem or use in touch screens and why?

When you push down on an elastic surface it will not leave a mark

Elastic ⟷ **Plastic**

When you push down on a plastic surface a mark will remain

Problem or use in touch screens and why?

When you bend a brittle surface it will break

Brittle ⟷ **Malleable**

When you bend a malleable surface it will not break

Problem or use in touch screens and why?

The perfect material

Imagine you could design a material to make the perfect touch screen device.

Research the properties below and decide which of these properties would suit your touch screen

Rough	Light	Thick	Malleable	Plastic
Smooth	Heavy	Thin	Brittle	Elastic

Can you find any other properties you might want in your perfect touch screen?

Brainstorm below the properties of your material and explain why this property would make it a good touch screen.

Properties	Why it would make a good touch screen?

Draw and label your device below explaining the properties of your touch screen

Touch screen: extension

Michael Seo

Check out **digitalcareers.csiro.au/MichaelSeo**

Michael created a material that can be used to filter very tiny impurities out of water. The applications of this sort of material could be huge in creating clean and safe sources of drinking water.

Regine Chantler

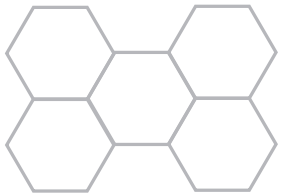
Regine Chantler is a scientist working with CSIRO's flexible electronics laboratory. She is working to develop new materials that are thin, flexible and semi-transparent that can also act as solar panels capturing electricity from sunlight! Her new materials differ from traditional solar panels because they are lightweight, flexible, portable and can be used in many different ways to produce electricity.

Find out more about Regine's work at **digitalcareers.csiro.au/links**

Improving materials

Pick a material that you think could be improved using nanotechnology. Research what this material is currently made of and decide which properties you might want to improve.

digitalcareers.csiro.au/links



Design a model for an improved material to improve a solution in your world

Use a design thinking process to create a model of your improved material

EXAMINE → **PLAN** → **PRODUCE** → **EVALUATE**

Submit your design to YICTE!

www.youngictexplorers.net.au