DTiF
Digital Technologies in focus
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acara
AUSTRALIAN CURRICULUM, ASSESSMENT AND REPORTING AUTHORITY

RESOURCING DIGITAL TECHNOLOGIES

Figure 1: Students can use broken and old hardware to investigate how digital systems function.

Figure 2: A set of 16 cards for students to use in a decision tree animal classification activity by the Australian Computing Academy (ACA) Source: https://aca.edu.au/resources/decision-trees-animal-trading-cards/

In the implementation of the Australian Curriculum: Digital Technologies it may be beneficial for schools to consider what resources will be most useful in teaching curriculum. It is recommended that schools audit their resources in order to plan where to store, how to share and, if budget permits, what to upgrade or buy new.

The Digital Technologies curriculum requires students to gain knowledge and understanding as well as processes and production skills. This can be taught with hardware or equipment (plugged) or through activities, games or experiences that do not need hardware, power or an internet connection (unplugged). For example, students could use broken and old laptops, phones and ICT equipment to explore digital systems (Figure 1).

Apart from using hardware, there are many ways to teach using resources such as picture books that address Digital Technologies concepts, apps, printable resources (Figure 2) and offline versions of software that can be used for visual or text-based programming.

In reviewing resources, schools could consider what other resources could enhance their current collection. There could be a benefit in organising resources in a database or spreadsheet format so that it could be sorted. The template shown in Figure 3 and provided blank on page 3 may also aid this process.

Digital Technologies resource mapping template   Date:_____

Description of resource	Plugged or unplugged?	Number?	Location	Suitable for year group(s)	Relevant Australian Curriculum links	Digital Technologies key concepts/key ideas
Sphero bolts	plugged		Makerspace (library)	2-6	ACTDIP010	algorithms computational thinking
Felt sandwich pieces	unplugged		4H resource cupboard	F-2	ACTDIP010	algorithms computational thinking
Make Code micro:bit online coding and simulation website	plugged		Online http://makecode.microbit.org	3-6	ACTDIP021	algorithms specification implementation interactions

Figure 3: An example of a resource mapping template

Types of resources

Resources might include a combination of plugged and unplugged items. The DTIF resources webpage www.tinyurl.com/DTIF-resources and the following list provide some suggestions.

Unplugged and printable resources

- Posters and card sets:
  - ACA https://aca.edu.au/resources/ (e.g. Figure 4)
  - DTiF https://www.australiancurriculum.edu.au/resources/digital-technologies-in-focus/resources/key-ideas-and-concepts/
- Activities and games
  - CS Unplugged https://csunplugged.org/en/
  - CS Field Guide https://csfieldguide.org.nz/en/

Figure 4: Cyber security cards by the ACA

Emulator websites

Emulators allow the user to interact with hardware by means of virtual simulation. Students can use visual or text-based programming to convert algorithms they have written into code and to test that code using the emulators online, with or without physical hardware.

- Autodesk Tinkercad (Figure 5) www.tinkercad.com
- Make Code www.microsoft.com/en-au/makecode

Figure 5: Tinkercad emulator

Hardware*

Schools should do their own research to determine the most suitable, age-appropriate and affordable hardware for their context. The Digital Technologies Hub www.digitaltechnologieshub.edu.au provides resources to support teaching with a wide range of hardware including: Ozobot, micro:bit, Makey Makey, Bee-Bot and Blue-Bot (Figure 6), Edison, Lego robotics and many more.

Figure 6: A Blue-Bot

Public datasets

Datasets (Figure 7) provide valuable opportunities for students in Years 6–10 to interpret data and draw conclusions from them. This applies to many learning areas.

- Australian Data Science Education Institute https://adsei.org/datasets/
- CSIRO https://data.csiro.au/dap/browse
- Bureau of Meteorology www.bom.gov.au/climate/data
- Australian Government open data https://data.gov.au/

Figure 7: Example CSIRO dataset resource

Alternative or offline versions of popular programming software

Some common online software can also be downloaded and used locally on desktop or laptop computers; for example, Scratch (Figure 8) https://scratch.mit.edu/download and Scratch Jnr for desktops and laptops https://jfo8000.github.io/ScratchJr-Desktop.

Figure 8: Download an offline version of Scratch.

Apps

There are variety of useful apps available. For example, to teach algorithms and or programming in F–2: Daisy Dinosaur and Scratch Jnr.
In Years 3–8: Hopscotch, Tynker, Lightbot and Swift Playgrounds.

Digital Technologies resource mapping template

Date:_____

Description of resource	Plugged or unplugged?	Number?	Location	Suitable for year group(s)	Relevant Australian Curriculum links	Digital Technologies key concepts/key ideas

Asking the following questions could also be beneficial:

- Where can equipment be stored?
- Will any hardware or software need repair or upgrading?
- Can new purchases of hardware be used in a range of ways with multiple year groups?
- How will resources be borrowed or shared among classes or faculties?
- What process should we create for charging and or checking equipment?

More ideas at the DTiF resources page: www.australiancurriculum.edu.au/resources/digital-technologies-in-focus/resources