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

CLASSROOM IDEAS: YEARS 5–6

Exploring digital systems unplugged: networks

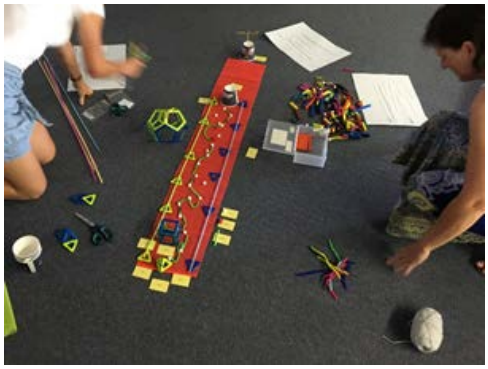

Figure 1: Teachers from Crossways Lutheran School build their own model of the internet

Figure 2: Students play the orange game to explore how a router works. Source: CS Unplugged website classic.csunplugged.org/routing-and-deadlock/ creativecommons.org/licenses/by-nc-sa/4.0/

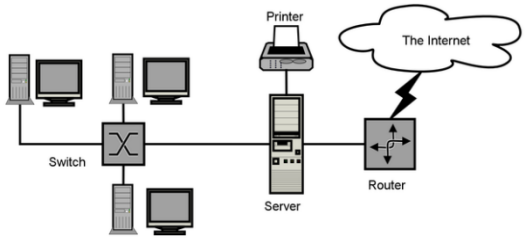

Figure 3: A sample network diagram. Source: en.wikipedia.org/wiki/File:Sample-network-diagram.png creativecommons.org/licenses/by-sa/3.0/

Unreliable internet or limited access to computers for your students can provide a good opportunity to learn about how a network functions or model how data travel around the internet.

There are many activities that can provide rich learning opportunities for students to develop understanding of Digital Technologies concepts unplugged. For example, in Figure 1, teachers have built a model of a network from physical materials, showing its parts and the flow of data using string and arrow-shaped objects.

Playing games (Figure 2) or having students act out a scenario that demonstrates the functioning of a network, how an email is sent or how a router works are other powerful ways to model concepts and aid understanding.

5-6 students could:

- discuss what a domain name server (DNS) is and how it functions
- explore how data are broken up into packets and sent through the internet to a destination using transmission control protocol/ internet protocol (TCP/IP) with the CS Unplugged activity, Tablets of Stone
- make a model of the internet using found or recycled materials (Figure 1)
- explore how digital systems work by role-playing information processes
- draw a network or a communication protocol as a diagram or flowchart (Figure 3)
- discuss how digital systems meet the needs of those who use them.

Links to the Australian Curriculum

Table 1: Links from the task to the Australian Curriculum: Digital Technologies Years 5–6

Digital Technologies ***Achievement standard***	By the end of Year 6, students explain the fundamentals of digital system components (hardware, software and networks) and how digital systems are connected to form networks. They explain how digital systems use whole numbers as a basis for representing a variety of data types. Students define problems in terms of data and functional requirements and design solutions by developing algorithms to address the problems. They incorporate decision-making, repetition and user interface design into their designs and implement their digital solutions, including a visual program. They explain how information systems and their solutions meet needs and consider sustainability. Students manage the creation and communication of ideas and information in collaborative digital projects using validated data and agreed protocols.		
Strands	Digital Technologies knowledge and understanding • Digital systems Digital Technologies processes and production skills • Evaluating		
Content descriptions	• Examine the main components of common digital systems and how they may connect together to form networks to transmit data (ACTDIK014) • Explain how student solutions and existing information systems are sustainable and meet current and future local community needs (ACTDIP021)		
Key concepts	• abstraction • algorithms • digital systems • interactions	***Key ideas***	Thinking in Technologies • computational thinking • systems thinking
Cross-curriculum priorities		***General capabilities***	• Literacy • Numeracy

Inquiry questions

- Why are there different types of networks and where and how are they used?
- What vocabulary should you know to learn more about network components or communication protocols? For example: server, local area network (LAN), wide area network (WAN), firewall, data packet.

Useful links

- Code.org – how the internet works (unplugged) https://code.org/curriculum/course3/18/Teacher
- Computer Science (CS) Unplugged activities https://classic.csunplugged.org/activities/
- CS Unplugged – exploring network protocols with the Tablets of Stone activity https://classic.csunplugged.org/network-protocols/
- CS Unplugged – exploring routing and deadlock using The Orange Game https://classic.csunplugged.org/routing-and-deadlock/
- Digital Technologies Hub – search resources using the term ‘networks’ https://www.digitaltechnologieshub.edu.au/