DIGITAL TECHNOLOGIES: KNOWLEDGE OF DIGITAL INFRASTRUCTURE

Knowledge of digital infrastructure focuses on the concepts of digital infrastructure within personal computers, local area networks (LANs) and Wide Area Networks (WANs).

Initially students learn about the common components of basic digital infrastructures consisting of personal computer hardware, associated peripherals and system software. Students learn about the purpose of the components, typical connections and data flow between components, characteristics of components that limit their inter-operability, and procedures and protocols for installing or replacing a component or a program. Student's progress to learn about complex concepts of digital infrastructure associated with LANs and WANs.

	LEVEL 6	LEVEL 7	LEVEL 8
LO	*Demonstrate understanding of digital infrastructure components*	*Demonstrate understanding of LAN infrastructure systems*	*Demonstrate understanding of WAN infrastructure systems*
TEACHER GUIDANCE	To support students to develop understandings about of digital infrastructure components at level 6, teachers could: • Provide students with the opportunity to explore digital infrastructure in order to identify personal computer hardware, associated peripherals and system software. • Provide the opportunity for students to explore the purpose of components and their characteristics. • Assist in the refinement of reflective and inquiry questions related to the understanding of procedures and protocols associated with basic infrastructure. • Guide students on how to prepare reports including ways to structure a report and literacy strategies to support report writing in a way that will allow students to describe, explain, and discuss. • Provide opportunities for students to practice report writing.	To support students to develop understandings about LAN infrastructure systems at level 7, teachers could: • Provide students with the opportunity to explore local area networks (LAN s) consisting of a number of networked devices which includes at least three PCs connected with an unmanaged switch, simple server elements and a single connection to the internet. • Provide the opportunity for students to explore the characteristics and purposes of LANs, and discuss their components, network layers, bandwidth, data transmission modes, IP addressing, DHCP (Dynamic Host Configuration Protocol), NAT (Network Address Translation) and ICMP (Internet Control Message Protocol). • Assist in the refinement of reflective and inquiry questions related to the understanding of procedures and protocols associated with the development and maintenance of LANs. • Support students to prepare reports including ways to structure a report and literacy strategies to support report writing in a way that will allow students to describe, explain, and discuss. • Ensure students have opportunities to practice report writing.	To support students to develop understandings about WAN infrastructure systems at level 8, teachers could: • Provide students with the opportunity to explore wide area networks (WANs). • Provide the opportunity for students to explore the characteristics and purposes of WANs, and discuss their components, and the layers in the TCP/IP networking model. • Assisting in the refinement of reflective and inquiry questions related to the understanding of procedures and protocols associated with the development and maintenance of WANs. • Support students to prepare reports including ways to structure a report and literacy strategies to support report writing in a way that will allow students to describe, explain, and discuss. • Ensure students have opportunities to practice report writing.
INDICATORS	Students can: • describe and identify the purpose of the components of basic digital infrastructures • describe the typical connections and data flow between components of a basic digital infrastructure • describe the key characteristics of components of a basic digital infrastructure that limit their inter-operability • describe a procedure or protocol for installing or replacing a physical component or a program • explain how the purpose of components determines the connections between components and the typical flow of data along them • explain how the key characteristics of components limit their inter-operability • explain the importance of procedures and protocols when installing or replacing a component or a program • discuss the characteristics and limitations of the connections that carry data between components • discuss the key characteristics used to specify each kind of component in terms of inter-operability, tradeoffs, efficiencies, cost, and context of use.	Students can: • describe networking concepts such as the characteristics and purposes of a local area network (LAN), standard networking models, bandwidth, data transmission modes, IP addressing, DHCP, NAT, and ICMP • explain why the components have been used in a LAN to achieve the desired characteristics • explain how the connection technologies allow the components to function in a LAN • describe the access control method used in the Ethernet architecture. • compare and contrast the characteristics and the purposes of peer-to-peer LANs and client/server LANs • explain the layers in the TCP/IP networking model and the role of this model in a LAN architecture • explain IP (Internet Protocol) addressing with reference to static addresses and dynamically obtained addresses • discuss the advantages and disadvantages of the common cable, fibre and wireless technologies for connecting the components of a LAN • discuss IP addressing schema including the consequences for static addresses and dynamically obtained addresses • discuss how the access control method used in the Ethernet architecture manages Ethernet traffic on a LAN.	Students can: • describe Wide Area Network (WAN) technologies such as WAN protocols, basic routing principles including static routing, common wired, optical and wireless technologies, WAN architecture specified in terms of physical topologies and logical topologies. • explain why the components have been used in a WAN to achieve the desired characteristics • describe the use of WAN protocols in a WAN architecture. • compare and contrast the characteristics and the purposes of different WAN technologies and components • explain the layers in the Transmission Control Protocol (TCP)/ Internet Protocol (IP) networking model and the role of this model in a WAN architecture • discuss IP (Internet Protocol) addressing with reference to static addresses and dynamically obtained addresses. • explain the WAN technologies and components of a WAN • explain IP addressing schema • explain how NAT (Network Address Translation) provides a form of firewall • explain the management procedures for a WAN link.
AS	**AS910780 Digital Technologies 1.50** *Demonstrate understanding of the common components of basic digital infrastructures*	**AS91377 Digital Technologies 2.50** *Demonstrate understanding of local area network technologies*	**AS91641 Digital Technologies 3.50** *Demonstrate understanding of wide area network technologies*
	Level 1 Digital Technologies standards & assessment resources	Level 2 Digital Technologies standards & assessment resources	Level 3 Technology achievement standards & assessment DRAFT