TOPIC: Computer Networks

LEARNING OBJECTIVES:

- **Define a computer network**

- **Benefits and risks of computer networks**

- **The main types of computer network**

	Teacher Activity	Pupil Activity
Starter activity (5-10 mins) [individual/paired or group]	Define what a computer network is: A computer network is a telecommunications network which allows computers to exchange data	Discuss (individual/paired or group) what you think a computer network is

Main activity one (15 mins) [individual/paired or group]	Explain the benefits and risks of a computer network:	Class discussion (individual/ paired or group) or have mix and match cards: What you think the benefits and risks are of a computer network
	Benefits:	
	• **Optimisation**	
	- Files can be backed up in case of a disaster	
	• **Storage Space**	The pupils need to come up with as many different benefits as they can think of in 5 minutes
	- Storage could be up to terabits of space which would need massive storage houses were they to be stored by paper format	
	- You can additionally get extra space through Google Drive	
	• **Save money**	The pupils need come up with as many different risks they can think of in 5 minutes
	- Computer networks allows you to store information which can be accessed by other individuals, complete multiple tasks using different software applications and be able to communicate instantly. All which could possibly take up to a day to do could be done within a couple hours.	
	• **Secure**	Class discussion
	- Users cannot see other users' files unlike on stand-alone machines.	Note down the most sensible answers for the benefits and risks of a computer network.
	• **Instant Communication**	
	- Using WhatsApp/Lync, you are able to talk to someone across the world instantly	Ensure that realistic reasons have also been stated
	Risks of Computer networks	
	• **Redundant technology**	
	- Redundant technology causes security risks as companies stop patching old systems, which introduces more risk	
	• **Cyber attacks**	
	- Due to the cyber threats, you could be at risk of a cyber-attack and information could be stolen from your server. You could be fined depending on what type of information was being stored	
	• **Denial of service**	
	- You could be denied access to information intentionally/ accidentally which could cost your business and loss your information.	
	• **Computers are expensive to manage and maintain**	
	- Hence you may in turn not patch and systems and put your network at greater risk.	

Plenary one (5-10 mins)	Assess learning against the learning objectives • This is an open activity whereby the teacher will decide on the best approach to do this based on the pedagogical approach your school takes on assessment.	**For example:** • 5 minute timed writing exercise on what has been learned so far • Fill in class notes • Have a discussion • Answer open questions • Answer directed questions Note down the most sensible answers for the benefits and risks of a computer network. Ensure that realistic reasons have also been stated

| Main activity two (15 mins) [individual/paired or group] | The main types of computer network: <br> o   Personal Area Network (PAN)
 o   Local Area Network (LAN)
 o   Wide Area Network (WAN)

 Personal Area Network (PAN)

 A PAN is a very small network that usually consists of personal devices that interconnect including; computers, tablets, phones, Bluetooth headsets, printers.

 Bluetooth PAN

 A Bluetooth PAN is where Bluetooth enabled devices would connect together to form a network an example of this would be a phone and a hands-free headset connecting together in which voice is transferred between the two devices.

 Local Area Network (LAN)

 A local area network (LAN) is a group of computers and associated devices that share a common communications line or wireless link to a server. Typically, a LAN encompasses computers and peripherals connected to a server within a distinct geographic area such as an office or a commercial establishment. Computers and other mobile devices use a LAN connection to share resources such as a printer or network storage.

 Advantages

 • ***Speed*** *- One of the major advantages with LANs are the speeds they can reach. A LAN can operate up to 30x faster than a WAN*

 • ***Cost*** *- Another advantage to having a LAN connection is the cost. It is relatively cheap to have as it tends to require less hassle to set up and less advanced infrastructure to keep it running.*

 • ***Ease of Setup*** *- A LAN connection tends to require some relatively simple things to set it up. All you need is some Ethernet cables, a network switch, and you are good to go. Alternatively, you can also see LANs being done over Wi-Fi, or you can use Wi-Fi in conjunction with standard Ethernet connections to create a LAN available to all kinds of devices, whether it be a smartphone or a desktop computer.*

 Disadvantages

 • ***Limited to small area*** *- The major disadvantage with a LAN is inherent in its name. "Local" Area Networks are only good as far as you can reach an Ethernet cable or Wi-Fi signal. Simply put, you cannot buy an Ethernet cable that will reach throughout an entire building, and a Wi-Fi connection rapidly deteriorates as you get further than a few dozen meters away.* | Class discussion (individual/ paired or group)

 List all the devices they can think of with Bluetooth and how they interact.

 An example would be a phone and a wireless speaker. To test the range of Bluetooth they can play music through the speaker and measure the clarity with each metre they go further from the speaker. This will help consolidate the various facts about Bluetooth PANs.

 Note down the advantages and disadvantages of **LAN**

 Note down the advantages and disadvantages of **WAN** |

Main activity two		
(15 mins) [individual/paired or group]	**Wide Area Network (WAN)** *A wide area network is a computer network that extends over a large geographical distance. A WAN connects different smaller networks, including local area networks (LAN). This ensures that computers and users in one location can communicate with computers and users in other locations. The internet is a big example of WAN.* **Advantages:** • *Allow for much larger and more intricate network* • *Can cover near infinite geographical distance* • *Sharing of data* **Disadvantages:** • *Speed is slower compared to LAN due to size – the further the distance the slower the network.* • *Harder to set up* *High cost – technology required for WAN is expensive*	

Plenary two		For example:
(5-10 mins)	*Assess learning against the learning objectives* *This is an open activity whereby the teacher will decide on the best approach to do this based on the pedagogical approach your school takes on assessment.*	• 5 minute timed writing exercise on what has been learned so far • Fill in class notes • Have a discussion • Answer open questions • Answer directed questions
Homework (optional)	*Teacher choice based on homework policy of school.*	For example: Draw or label a diagram the different networks (PAN, LAN, WAN)

Key Terms: Computer networks	
Computer Network	*A computer network is a telecommunications network which allows computers to exchange data*
Personal Area Network (PAN)	*A PAN is a very small network that usually consists of personal devices that interconnect including; computers, tablets, phones, Bluetooth headsets, printers.*
Bluetooth PAN	*A Bluetooth PAN is where Bluetooth enabled devices would connect together to form a network an example of this would be a phone and a hands-free headset connecting together in which voice is transferred between the two devices.*
Local Area Network (LAN)	*A local area network (LAN) is a group of computers and associated devices that share a common communications line or wireless link to a server. Typically, a LAN encompasses computers and peripherals connected to a server within a distinct geographic area such as an office or a commercial establishment. Computers and other mobile devices use a LAN connection to share resources such as a printer or network storage.*
Wide Area Network (WAN)	*A wide area network is a computer network that extends over a large geographical distance. A WAN connects different smaller networks, including local area networks (LAN). This ensures that computers and users in one location can communicate with computers and users in other locations. The internet is a big example of WAN.*