KESTEVEN AND SLEAFORD HIGH SCHOOL

Computer Science Scheme of Learning

Year 11 – Term 3

Intent – Rationale

Term 2 focuses on computer networking, teaching students how networks can be configured (topology), the hardware involved (hubs/switches/routers/NIC), the role of layering (TCP/IP stack), common protocols and the potential benefits and drawbacks of networked versus standalone computers.

Sequencing – what prior learning does this topic build upon?	Sequencing – what subsequent learning does this topic feed into?
• N/A	• A-Level Computer Science Chapters 16 and 17 (Y12 and Y13 Term 4)
What are the links with other subjects in the curriculum?	**What are the links to SMSC, British Values and Careers?**
• N/A	• GB4h
What are the opportunities for developing literacy skills and developing learner confidence and enjoyment in reading?	**What are the opportunities for developing mathematical skills?**
• Networking For Dummies, 11th Edition by Doug Lowe • Basics of Network Topologies: Discover how easy computer network topologies are to learn and understand by Clint Griffin	• N/A

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Intent – Concepts

What knowledge will students gain and what skills will they develop as a consequence of this topic?	
Know • **Networks and topologies:** types of network (LAN(local area network) and WAN (wide area network)), factors that affect the performance of networks, the different roles of computers in a client-server and a peer-to-peer network, the hardware needed to connect stand-alone computers into a local area network (o wireless access points, routers, switches, NIC (network interface controller/card), transmission media), the internet as a worldwide collection of computer networks (DNS (domain name server), hosting, the cloud, web servers and clients), star and mesh network topologies • **Common protocols including:** TCP/IP (transmission control protocol/internet protocol), http (hyper text transfer protocol), https (hyper text transfer protocol secure), ftp (file transfer protocol), pop (post office protocol), IMAP (internet message access protocol), SMTP (simple mail transfer protocol) and the concept of layers **Apply** • Be able to describe the characteristics of LANS and WANS including common examples of each, the factors that can affect the performance of a network, e.g.: number of devices connected, bandwidth, the tasks performed by each piece of hardware stated above and the use of circuit/packet switching • Be able to describe the concept of the internet as a network of computer networks, how the DNS system works, the role of web servers, and the concept of clients. • Be able to describe the cloud: remote service provision (e.g. Storage, software, processing), advantages and disadvantages of the cloud • Be able to describe the advantages and disadvantages of the star and mesh topologies and apply understanding of networks to a given scenario • Be able to describe the principle of encryption to secure data across network connections, and the role of IP addressing (ipv4 and ipv6) and MAC addressing • Be able to describe the role of standards and protocols, and state the purpose of the studied protocols • Be able to describe how layers are used in protocols and the benefits of using layers using TCP/IP 4-layer model as an example **Extend** • Understand how hackers can use packet sniffing and other methods to spy on network traffic and steps to reduce risk, including the use of VPN.	
What subject specific language will be used and developed in this topic?	**What opportunities are available for assessing the progress of students?**

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• Network • Topology (ring, bus, star and mesh) • LAN • WAN • Client-server • Peer-to-peer • Hub • Router • Switch • Media • Fibre optic • Server • Client • Domain name • URL	• Ethernet • Standard • Protocol (TCP/IP, HTTP, HTTPS, POP, IMAP, SMTP, FTP) • Packet switching • Routing • Encryption • Symmetric • Asymmetric • Cloud	• Class Notes and in-lesson observation • Kahoot starters/plenaries and verbal questioning • Formal assessment in scheduled weeks

Intent – Concepts

Lesson title	Learning challenge	Higher level challenge	Suggested activities and resources
			See P drive for lesson presentations/resources