



YEAR 13 A LEVEL COMPUTER SCIENCE AUTUMN TERM 1 – PAPER 1

‘An ambitious curriculum that meets the needs of all’

Medium Term Planning – Networks and Web Technologies

Curriculum Intent	Pupils will be taught the following National Curriculum guidelines this term:
Skills/Assessment Objective Links	<p>At the end of this Unit all students should be able to:</p> <ul style="list-style-type: none">▪ State the importance of protocols and standards▪ Describe the structure of the Internet▪ Explain the protocols used within the TCP/IP stack▪ Demonstrate DNS in action using an IP address within a web browser▪ Describe and identify examples of LANs and WANs▪ Explain packet switching▪ Provide examples of network threats and state methods to overcome these▪ Explain the function of a firewall▪ State the functions of a proxy server▪ Create a basic webpage using HTML and some CSS▪ Use JavaScript to make web form elements interactive and add validation▪ Describe the characteristics of the PageRank algorithm and state the factors that influence page ranking <p>Most students will be able to:</p> <ul style="list-style-type: none">▪ Describe the processes at each layer of the TCP/IP stack▪ Explain the DNS resolution process▪ Explain packet switching in contrast to circuit switching▪ State the advantages of layering protocols in the TCP/IP stack▪ Explain, by use of example, the difference between client and server side processing▪ Use sequence and selection statements in JavaScript with a range of data types including arrays <p>Some students will be able to:</p> <ul style="list-style-type: none">▪ Describe how improved code quality can protect against networking vulnerabilities▪ Apply the PageRank algorithm using iterative steps
Numeracy	
Literacy	<p>Vocabulary Tier 3: URL, Internet registry, registrar, DNS, IP address, WAN, LAN, topology, bus, star, Wi-Fi, WAP, packet switching, router, gateway, MAC address, TCP/IP stack, protocol, layer, FTP, POP, IMAP, SMTP, packet, filtering, firewall, proxy, worm, Trojan, virus, malware, social engineering, phishing, HTML, CSS, JavaScript, tag, PageRank, index, meta tag, client-server, API, client side processing, server side processing</p> <p>Vocabulary Tier 2: social, language, client</p> <p>Reading: Worksheets, presentations, answer sheets, exam questions, mark scheme, further reading for homework</p> <p>Writing: Answer on the worksheet via word</p> <p>Oracy: listening and using tier 3 words</p>
Becoming future ready	<p>Careers/Employability:</p> <p>Understand the grade requirements at universities and the topics that can be applied for. Explore apprenticeship opportunities with a range of industries.</p> <ul style="list-style-type: none">▪ Software Architect.▪ Data Scientist.▪ Machine Learning Engineer.▪ Blockchain Developer▪ Cybersecurity Engineer.▪ Cloud Solutions Architect.▪ AI Research Scientist.

	<ul style="list-style-type: none"> Full-Stack Developer.
Adaptation	Throughout this topic, quality first teaching will provide differentiation:
QFT/SEND Provision	<p>By product: Learners are asked to present outcomes in a different way via pieces of writing, targeted questioning, models and drawings and speaking.</p> <p>By resource: Worksheets are well presented and accessible. Instructions are clearly outlined and separate from the information so that pupils know where to begin and end. Handouts are differentiated by outcome. Resources used will appeal to the range of preferred learning styles of pupils e.g. visual, auditory or kinesthetic learners. Scaffolding of tasks – word frames.</p> <p>By Intervention: By providing different levels of supervision and support</p> <p>By Progressive Questioning: Exploring pupils' understanding through interactive dialogue using Blooms Taxonomy.</p> <p>By Grouping: According to prior attainment, gender, social preference, preferred learning style.</p> <p>By Task: Pupils identify targets which are meaningful to them via feedback sheets</p> <p>By Offering Optional Activities: In class or as homework, to extend learning.</p> <p>This QFT/SEND provision will be explicit within the lesson by lesson schemes of work.</p>
Implementation Curriculum Delivery	To be able to:
Learning Outcomes (Knowledge)	<p>Topic 1 Structure of the Internet Understand the structure of the Internet Describe the term 'Uniform Resource Locator' in the context of networking Explain the terms 'domain name' and 'IP address' Describe how domain names are organised Understand the purpose and function of the Domain Name Server (DNS) system Describe the characteristics of LANs and WANs</p> <p>Topic 2 Internet communication Describe circuit switching and packet switching Understand the role of packet switching and routers Understand the function of network hardware devices Understand the importance of protocols and standards Describe the roles of the four layers in the TCP/IP protocol stack Be familiar with transferring files using FTP Explain the role of an email server in sending and retrieving email</p> <p>Topic 3 Network security and threats Discuss network security and threats Discuss use of firewalls, proxies and encryption Discuss worms, Trojans and viruses and the vulnerabilities that they exploit</p> <p>Topic 4 HTML and CSS To understand HTML and the role of HTML on the World Wide Web To understand CSS and the role of CSS in Web Pages To be familiar with various HTML and CSS tags and their functions To use inline CSS directly within HTML files using the <style> tag, and with external style sheets</p> <p>Topic 5 Web forms and JavaScript Be able to add HTML form controls to a web page Explain the role of JavaScript inside web pages Understand and follow JavaScript syntax Write basic JavaScript code for a given scenario Use JavaScript to change the content of HTML elements Create output, including alert boxes using JavaScript</p> <p>Topic 6 Search Engine Indexing To understand how web pages are indexed by search engines To understand the PageRank algorithm To be able to interpret and apply the PageRank algorithm to a given scenario</p>

**Topic 7 Client-server and peer-to-peer**

To understand the client/server and peer-to-peer models

Describe situations where each model may be used

To understand client and server side processing

To identify the different uses of client and server side processing and describe situations when either may be most practical

To identify the advantages and disadvantages of client and server side processing

End of unit assessment

Current learning to be developed in the future within:

Links to legal, moral, ethical and cultural issues

Assessment

See assessment maps for formative and summative assessment opportunities.

Impact

Review assessment results and target pupils that require further support via:-

- Learning conversation
- Changing seating plan
- Plan lessons to address areas of concern in assessment
- Targeted homework based on low performance areas identified in the assessment and marked pieces
- Stretch and challenge high ability pupils by identifying ambitious next steps to expand knowledge

Create a feedback sheet for each student

Each student identifies areas of Green, Amber and Red using Mark Assessment on their feedback sheet

Complete NOW task on areas identified as Amber and Red