Computing Knowledge Map

What's the 5 year intention? Our curriculum has a strong emphasis on the cumulative acquisition and contextualisation of knowledge.

Light Hall School
The best from everyone, all of the time.

The Big Knowledge Picture

Year 7 → Year 11

- Introduction to computer system and basic office tools
- E-Safety – staying safe
- Computer hardware
- Control & Algorithms
- Programming - basics
- Web design
- Programming
- Digital Artefacts
- E-Safety
- Computer hardware
- Binary & Character Set
- Algorithms
- Legislation & Digital Graphics
- System Security
- Computing Project
- Boolean Logic & Data storage
- Programming and Programming Techniques
- Data Types
- Data Storage & Systems Architecture
- System Security and Software
- Defensive Design & Testing
- Programming

The KS3 Big Questions

Year 7 → Year 9

What is the difference between Cyberbullying and traditional bullying?
What is the difference between RAM & ROM?
What are the main programming constructs?

What are the purpose, use and content of digital artefacts?
Explain the positive impact that technology has had on our lives
Explain the difference between ASCII and Unicode

What are the steps in a binary search?
What are the main pieces of legislation?
What are the main threats to a computer system? How can you prevent them?

The KS4 Big Questions

Year 10 → Year 11

What are the main Boolean expressions? Can you draw their truth tables?
Compare the characteristics of different storage devices

What are the main programming constructs?
How do you write pseudocode?
How do you produce flowcharts?

What are the main searching and sorting algorithms? Can you produce them?

YEAR 11

Testing
- What are the main types of test data?
- Penetration testing is when you test the system as you make it
- Verification tests the system meets the specification whereas validation limits the errors

Defensive Design
- How do you authenticate a computer system?

System Software
- What is the main characteristics of an operating system?

System Security
- There are many threats to a computer system, they include phishing, viruses and DDOS Attacks
- What are the characteristics of different threats to a computer system?

Searching & Sorting Algorithms
- The main sorting algorithms are Bubble, Merge and Insertion
- What are the main sorting algorithms?

Programming
- Binary Search needs the data to be in order whereas a Linear search doesn't
- Compare the characteristics of different searching algorithms
- In industry the main programming languages are C and Java
- How do we convert algorithms into programming code?

GCSE Exam and Post 16 Destination

System Architecture
- Von Neumann in 1945 came up with the idea of data and instructions being stored in the primary storage
- How can you improve the performance of a CPU? How does clock speed and cache impact the performance of a computer?
- What are the main components of the CPU

Data Storage
- Optical, Magnetic and Solid State are the main types of Secondary Storage
- What are the main types of storage and their characteristics?

Programming
- SQL is a programming language used in databases. Arrays are lists which can be represented in 1D or 2D forms
- What is SQL and arrays?

Programming Techniques
- Iteration, Sequence and Selection are the main programming constructs
- How can strings be manipulated? How can you program to read and write to a file?
- What is the difference between selection and iteration? How can the techniques be programmed?

YEAR 10 KEY STAGE 4

Project
- What is Computational Thinking?
- Decomposition is about breaking the task down into small manageable chunks, there are many ways to do this.
- Target audience is who the product is aimed at

Pre-Production
- How do you identify target audience?
- What are client requirements?
- Client requirements come from a client brief and show what is required

Networking
- LAN is a small geographical area and WAN is a large geographical area.
- How can a computer networks performance be improved?
- What are the different topologies?
- What are the main pieces of hardware?

System Security
- Client-server networks have a central server that controls all of the network
- A network attack is an attempt to gain access to, steal, modify or delete data on a network
- How do you prevent the threats?
- What are the main threats to a computer system?

Legislation & Digital Graphics
- Computer Misuse Act deals with hacking and viruses
- The Data Protection Act was replaced with GDPR in 2018
- What are the main principles of the DPA?
- What are the characteristics of different digital graphics

Algorithms
- The main searching algorithms are Binary and Linear
- Compare the characteristics of searching and sorting algorithms

Boolean Logic
- Boolean logic is centred around 3 main words – AND, OR & NOT, they can be displayed in Truth Tables
- What is the purpose of a logic gate? How do you complete truth tables?

Data Storage (Binary)
- Binary is the way a computer communicates – it uses 0 and 1's. A BIT is the smallest amount of data
- How are images and sound stored? What happens if bit depth or sample size is increased?

Algorithm Design
- Computational thinking involves suggesting solutions to problems – this can be done through algorithms
- Main principles of computational thinking – Abstraction, Decomposition and Algorithmic Thinking
- Designing a range of different algorithms for different situations, completing algorithms and identifying errors

Data Storage (Hardware)
- Images and sound are both converted into 0's and 1's so the computer can understand them
- How are sound and images stored in digital form
- What happens if images and sound are compressed? Which method of compression should be used

YEAR 9

Programming Techniques
- How do you carry out different types of testing?

Binary Logic
- A logic gate is a set of circuits that show a path
- What are the different logic gates?

Binary
- Binary is number 2 based system (0 or 1), whereas denary is a number 10 based system (0-9)
- How do you convert between Denary and Binary?

Computer Hardware (CPU)
- The central processing unit controls is the part of the computer that allows it to function
- Embedded systems are present in everything we do – cooking, cleaning, telling the time
- What are the characteristics of the CPU?
- What is an embedded system?

E-Safety
- Technology has created jobs and allows people to work from anywhere
- What impact has technology on the world? Discuss the positives and negatives

Digital Artefacts
- Pre-Production Documents are used as the first steep in planning a project
- What is the purpose, use and content of different digital artefacts?

Programming
- Python was designed because it was similar to pseudocode
- How do you convert instructions into programming code?
- Why is testing important to a system?

YEAR 8

Web Design
- How do you write HTML Tags
- Hyper Text Mark-up Language
- Webpages are stored on Web Servers
- What makes a good website?

Programming
- Programs allow programs to be controlled
- What are the different syntax rules used in different languages?

Programming
- Keywords when writing pseudocode: IPNUT, OUTPUT, IF, THEN, ELSE
- Why do we need to learn about programming?

Control & Algorithms
- Flowcharts are visual representations of algorithms
- What is Pseudocode?

Algorithms
- An algorithm is a set of instructions which is used to create a program
- What are the main flowchart symbols?
- What is an algorithm?

Computer Hardware & Software
- A computer system is made up of INPUTS – PROCESSES - OUTPUTS
- What is the difference between RAM & ROM?
- What is the difference between input and output devices?

E-Safety
- When posting pictures think about what the picture shows – it can be dangerous
- E-Safety is about keeping you safe online
- Cyberbullying involves technology which means it is harder to avoid but can be easier to stop
- What is a 'Digital Footprint'?
- What is the difference between cyberbullying and traditional bullying?
- Do the risks of social media outweigh the benefits

YEAR 7 KEY STAGE 3

Excellence • High expectations and aspirations • Love of Learning • Active participation • Sound moral compass