Computer Architecture Lesson Plan

Unit 1 Representing and Transmitting Information

Purpose: to help students understand how computers function in order to execute tasks, create artifacts, and share those files with others via the Internet.

Standards

CPP.L2-03 Design, develop, publish, and present products (e.g., web pages, mobile applications, animations) using technology resources that demonstrate and communicate curriculum concepts.

CD.L2-04 Use developmentally appropriate, accurate terminology when communicating about technology.

CD.L2-06 Describe the major components and functions of computer systems and networks.

CD.L3A-03 Describe the principal components of computer organization (e.g., input, output, processing, and storage).

CD.L3A-04 Compare various forms of input and output.

CD.L3B-02 Identify and describe hardware (e.g., physical layers, logic gates, chips, components).

Learning Objectives

- Students will be able to identify the major hardware and software components inside a typical computer and explain their function in relationship to the computer's functional process.
- Students will research a topic with a partner to learn what the component's main function is, where it is located in relationship to other components, and how it fits into the computer's overall functional process.
- Students will be able to distinguish between two primary types of memory and explain how the computer uses memory to process information and store information long-term.

YouTube Video: TED-Ed by Bettina Bair https://www.youtube.com/watch?v=AkFi90lZmXA

Assessment:

1. The BIOS is most like the computer's A. Brain, B. Eyes and Hands, C. Stomach, D. Lungs, E. None of the above
2. The CPU can handle _____ of instructions a second. A. Thousands, B. Millions, C. Billions, D. Trillions, E. None of the above
3. Programs are encoded and stored in computer memory as A. 1's and 0's, B. plain text, C. HTML, D. electrons, E. all of the above
4. The CPU's job is to A. store information, B. Deal with input and output from peripherals, C. Edit files in memory, D. Fetch and execute instructions, E. All of the above
5. The critical components of your computer's architecture are A. Wires, Plastic, and Silicon; B. Programs, Bits, Bytes, HTML; C. Peripherals, BIOS, CPU, Programs, and Memory; D. Mouse, Motherboard, Integrated Circuits, Wires; E. None of the above
6. BIOS stands for A. Biologic Input Operating System, B. Basic Input Output System, C. Basic Integer Operating System, D. Basic Input Output Software, E. None of the above

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Vocabulary Exploration Topics

Communication	Processing Data	Storing Data
Input Device	CPU/ALU/Heat Sink	Cache
Output Device	Integrated Circuit	Hard Disc Drive
Network Interface Card	Motherboard	RAM (SRAM/DRAM)
	Operating System	Register
	BIOS/ROM/PROM	Solid State Drive
	Real-time Clock	

Activity Overview

Students will work with a partner to research and present: definition/description of its function, where it is located/found, and examples if possible. Students will use a prepared Slides presentation 3-5 minutes. Students will take notes that can be used on the final.

Notes

Volatile Memory/Temporary Storage: L1 cache, L2 cache, RAM, Virtual Memory
Non-Volatile Memory/Permanent Storage: ROM/BIOS, removable drives, network storage, cloud storage, hard drive
Input Devices: mouse, keyboard, printer, scanner, removable drive
Output Devices: monitor, printer, projector

Review Resources

What's Inside a Computer
http://www.gcflearnfree.org/computerbasics/inside-a-computer/1/
How Stuff Works
http://computer.howstuffworks.com/inside-computer.htm
What does the inside of a computer look like?
http://www.computerhope.com/issues/ch000997.htm
What's Inside Your Computer?
http://www.makeuseof.com/tag/whats-inside-your-computer-the-story-of-every-component-you-need-to-know-3/
How Transistors Work by Gokul J. Krishnan
YouTube https://www.youtube.com/watch?v=WhNyURBiJcU
http://ed.ted.com/lessons/how-transistors-work-gokul-j-krishnan
How Computer Memory Works by Kanawat Senanan
https://www.youtube.com/watch?v=p3q5zWCw8J4
Quantum Computers Explained—Limits of Human Technology by Kurzgesagt (7:16)
https://www.youtube.com/watch?v=JhHMJCUmq28