Standard: CS.D.01 Grade Band: 3-5

Grade	Standard
3	Identify internal and external parts of **computing devices** that function together to form a system.
4	Describe how internal and external parts of computing devices function to form a system.
5	Describe and model how internal and external parts of computing devices function to form a system. Describe how some **components** rely on others for correct **functionality.**

Grade	Essential Skills
3	Name the parts of **computing devices** that work together.
4	Describe how different parts of a computing device interact with each other and work together.
5	Create a model of a computing system that shows how **components** interact to function correctly.

Explanation
Students will explain that **computing devices** often include various components (mouse, keyboard, monitor, game controller). The **components** may be connected physically (with wires, or as part of one device) and/or connected wirelessly to form an interconnected system. These components depend on the computer's **central processing unit (CPU)** to function. Students should be able to identify, and by 5th grade to model, how the CPU depends on the components to provide **input** and produce **output**. Input may be received from the keyboard and/or controller, mouse, touchscreen, or trackpad and output may be produced on a screen in the form of text and images and/or on speakers in the form of sound.

Think of this as similar to….
When you bake a cake you use bowls, pans, mixing spoons, flour, sugar, butter, eggs, measuring cups, an oven, oven mitts and probably other items. Each item has its own role, and all are essential to create the final product.

Essential Questions
How do internal and external parts of a **computing device** work together to form a system?
How do components of a computing device rely on each other to function?

Implementation Examples—What would this look like in the classroom?

Grade(s)	Title	Description	Link	Content Connection & Notes
3	**Computers All Around**	**Grade 3--**Students identify hardware and software, distinguish between them and explain how they depend on each other to perform various functions. Students consider the ways computer hardware and software affect our daily lives.	Computers All Around	
3	**Computer Processing**	**Grade 3**--Students are introduced to the four basic functions that computers perform and think about the advantages that computers have over humans in taking in input, processing and storing data, and providing output. Students identify how humans interface with computers and correctly name the input, processing, storage and output devices. Students are challenged to invent a new input/output prototype of their choosing, name the parts appropriately and explain how they work together.	Computer Processing	This lesson also aligns with **CS CS.HS.01.**
3-4	**I Have, Who Has?**	**Grade 3**--Students are given a card with one component of a computing device, and a question about a different part of a device. A student has to find the card which answers the question they have, as well as the card which they have the answer to. **Grade 4**--Students identify the component they have as input, output, processor, or storage. Students should identify connections and potential interactions among the components.	I Have, Who Has?	This lesson also aligns with **CS CS.HS.01.**
4	**How Computers Work**	**Grade 4-**Students think through what a computer is, what the parts of a computing device are, and how they work together to perform tasks. They explore inputs, outputs, processors and storage and the way they interact. Students who are ready can also explore binary and circuits and logic.	How Computers Work	This lesson also aligns with **CS CS.HS.01.**
4	**Input and Output**	**Grade 4**--Students learn the difference between input and output devices, and they creatively invent a new device that combines input and output.		
5	**Nervous System--Human and Computer**	**Grade 5**--Students describe how animals and people receive different types of information through their senses, which trigger signals to be sent to and processed by their brain, which triggers responses to that information. Students compare this to how information travels through a computer from mouse (sensor) to processor (brain) and prompts a response (output).		This lesson also aligns with **CS CS.HS.01** and with **NGSS 4-LS1-2.**

Grade(s)	Title	Description	Link	Content Connection & Notes
5	**Simulate Plotting on a Coordinate Plane**	**Grade 5**--Students take on the role of a part of a computer (display, CPU, or memory) and model its function and interactions with other components by plotting a value on a coordinate plane.	Simulate Plotting on a Coordinate Plane	This lesson also aligns with **CS CS.HS.01**and **Math 5.G.1.**
5	**Flow Chart**	**Grade 5**--Students create a diagram or flow chart to indicate how a keyboard, desktop computer, monitor, and word processing software interact with each other. The keyboard (hardware) detects a key press, which the operating system and word processing application (software) displays as a new character that has been inserted into the document and is visible through the monitor (hardware). Students could also create a model by acting out the interactions of these different hardware and software components.		This lesson also aligns with **CS CS.HS.01.**

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These annotations are a collaboration between Maryland Center for Computing Education and the Maryland State Department of Education.