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UNIT 3: HARDWARE AND SOFTWARE BASICS

Estimated Time in Hours: 3-4

<p><u>Big Idea(s)</u> 2 Establishing Trust 5 System Security</p>	<p><u>Enduring Understandings</u> 2.3, 5.1, 5.2</p>	<p><u>Projects & Major Assignments</u> - Hardware T-Chart - Three Column Notes on a Process - Project: Hardware & Software Working Together</p>
<p>Guiding Questions:</p> <ul style="list-style-type: none"> How do hardware and software work together to achieve an objective? 		
<p>Learning Objectives & Respective Essential Knowledge Statements</p>	<p>Materials</p>	<p>Instructional Activities and Classroom Assessments</p>
<p>5.1.1 LO: Students will identify how hardware and software work together in complex ways to achieve an overall objective. EK:5.1.1a,b</p> <p>5.2.1 LO: Students will convey that computer hardware refers to the physical parts of a computer and related devices. EK: 5.2.1a,b,c,d</p>	<ul style="list-style-type: none"> Window Notes Sheet (access a blank Window Notes template at https://toolsforclassroominstructionthatworks.com/wp-content/uploads/2018/01/Window-Notes.pdf) Notebook CyberPatriot Training Materials Unit 5: Computer Basics and Virtualization. <i>USCyberPatriot.org</i> (use Unit 5 Section 1 only; must register as a Coach, Mentor, or Team Assistant to see the most recent training materials) 	<p>Understanding hardware and software: (1-day lesson) Students gain an understanding of the difference between hardware and software and are able to define hardware and software.</p> <ul style="list-style-type: none"> In this lesson students use the window notes they took in Unit 2. They begin by defining hardware and software in their notebooks. Students then learn about how computers work. Begin with the anatomy of a computer, followed by the BIOS, and software. The class discusses hardware (be sure to address 5.2.1c,d in the discussion) and creates a T-chart identifying internal and external hardware. The class then discusses software and takes notes on the discussion.

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	<ul style="list-style-type: none"> • Poster Paper • Markers 	
<p>2.3.2 LO: Students will know that the principle of process isolation prevents tampering or interference from/by other processes. EK:2.3.2a,b</p>	<ul style="list-style-type: none"> • KWL Chart (find example KWL chart at https://www.timvandeval.com/templates/kwl-chart-template/) • Three Column Notes (for an example of a 3-column note chart, visit https://www.teacherspayteachers.com/Product/Three-Column-Chart-Graphic-Organizer-Critical-Thinking-Skills-220940) • “The Central Processing Unit (CPU): Crash Course Computer Science #7.” <i>YouTube</i>, uploaded by CrashCourse, 5 Apr 2017, https://www.youtube.com/watch?v=FZGugFqdr60&feature=youtu.be • “Instructions & Programs: Crash Course Computer Science #8.” <i>YouTube</i>, uploaded by CrashCourse, 12 Apr 2017, 	<p>Understanding the CPU & Instructions: (1-day lesson) Students will gain an understanding of the CPU and how processes have an address space which only it can access.</p> <ul style="list-style-type: none"> • In this lesson students begin by accessing prior knowledge. As a class, create a KWL chart about what students know about the CPU and processes. Students then use the three column notes to take a column of notes on each of the three videos that they watch about how the CPU runs and how instructions are stored in a region of memory. After students watch the first video, students share what they learned that is on their notes in column one with a partner. They updated their notes with anything they missed that their partner shared. The process is repeated with the 2nd and 3rd videos. The class is wrapped up with a class discussion about how a process is a program running on a computer, how each process has a region of memory which only it can access and how the CPU runs that process. The KWL chart is completed with what they learned and questions the students still have.

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	<p>https://www.youtube.com/watch?v=ztgXvg6r3k&feature=youtu.be</p> <ul style="list-style-type: none"> • “Advanced CPU Designs: Crash Course Computer Science #9.” <i>YouTube</i>, uploaded by CrashCourse, 26 Apr 2017, https://www.youtube.com/watch?v=rtAIC5J1U40&feature=youtu.be 	
<p>2.3.2 LO: Students will know that the principle of process isolation prevents tampering or interference from/by other processes. EK:2.3.2c</p> <p>5.1.1 LO: Students will identify how hardware and software work together in complex ways to achieve an overall objective. EK:5.1.1a,b,c,e,f,g,h,i,j,k,l</p> <p>5.2.1 LO: Students will convey that computer hardware refers to the physical parts of a computer and related devices. EK: 5.2.1a,b</p>	<ul style="list-style-type: none"> • “How Computers Work: Hardware and Software.” <i>YouTube</i>, uploaded by Code.org, 30 Jan 2018, https://www.youtube.com/watch?v=xnyFYiK2rSY&feature=youtu.be • Window Notes Sheet (access a blank Window Notes template at https://toolsforclassroominstructionthatworks.com/wp-content/uploads/2018/01/Window-Notes.pdf) 	<p>Understanding How Computers Work: (1-2-day lesson) Students learn about operating systems and how hardware and software work together.</p> <ul style="list-style-type: none"> • In this lesson students start by watching the video on How Computers Work: Hardware and Software. While watching the video students take window notes. After the video, discuss as a class how processes have to use defined communications mediated by the operating system to communicate with other processes and how hardware and software work together to achieve an overall objective. Then, students are introduced to the project to reinforce their learning. <p>Assessment: <i>Using everything the students learned in the Understanding hardware and software lesson and the video on how Computers Work: Hardware and Software students demonstrate their knowledge about hardware and software by creating a project to reinforce their peers’ knowledge about hardware, software and how hardware and software work</i></p>

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		<i>together. The project could be a visual (sketch, model, etc.), a board game, a comic, etc. Students then present their project.</i>
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