

Statewide IT Bridge Curriculum Contextualized Science Module

Students will:

OUTCOMES	CONTENT	ACTIVITIES/RESOURCES	ASSESSMENT
<p>1. Be introduced to computer hardware</p> <p>Standards: 5.S.CC.2 Demonstrate active listening skills. 5.R.RS.2 Determine the central idea or conclusions of a text; trace the text’s explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. 5.R.RS.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context.</p>	<p>Explore computer hardware; expand computer vocabulary; complete initial computer skills assessment</p>	<ul style="list-style-type: none"> • Explore computer hardware NOTE: Instructor will need old desktop computer with side and/or top removed OR computer photo https://www.alamy.com/stock-photo/inside-of-computer-cpu.html OR computer game What's inside a computer? https://www.purposegames.com/game/inside-a-computer-quiz <p>Activity 1: Envisage the inside of a computer Invite students to draw a picture of what they think the inside of their computer looks like. Encourage them to show what they think makes the computer work.</p> <p>Activity 2: Explore a computer Have students explore a computer using one of the following alternatives:</p> <ul style="list-style-type: none"> • https://edu.gcfglobal.org/en/computerbasics/inside-a-computer/1/ • OR explore a computer that has the side and/or top removed to display the inside <p>As they read/explore, encourage students to name what they see, and make a list of any words or terms they do not understand. Words should include:</p> <ul style="list-style-type: none"> • motherboard • chipset • BIOS • operating system • memory <p>Add new words to the list as they discuss the computer.</p>	<p>Verbal interaction</p> <p>Student reflection</p> <p>Written work</p>

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Activity 3: Computer Vocabulary

- Have students go to www.WhatIs.com to look up the words on their lists. NOTE: Part of this lesson could be completed with students gathered around a single classroom computer, with a projected image of the website as the whole class views it together, with students working at individual computers in a lab setting, or with students working individually at a learning center computer.
- Next, write a list of words on a board or chart and have students give a verbal definition of each word or write a one-sentence definition for each word.
- Then ask students to create their own personal dictionary of computer terms. The five terms you provided for the activity can be the start of that dictionary. Encourage students to add to their lists of terms and definitions throughout the year as they learn more about computers and other technology.
- **Vocabulary Assessment**
Students will provide correct definitions for each of the five words in the activity.
Answer Key: (Definitions from WhatIs.com.)
 1. A motherboard is the physical arrangement in a computer that contains the computer's basic circuitry and components.
 2. A chipset is a group of microchips designed to work as a unit in performing one or more related functions.
 3. BIOS (Basic Input / Output System) is the program a computer's microprocessor uses to get the computer system started after it is turned on.
 4. An operating system (sometimes abbreviated as "OS") is the program that manages all the other programs in a computer.
 5. Memory is the name for the electronic holding place for instructions and data that a computer's microprocessor can reach quickly.

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<p style="text-align: center;">2. Be introduced to computer software</p> <p>Standards: 5.S.CC.2 Demonstrate active listening skills. 5.R.RS.2 Determine the central idea or conclusions of a text; trace the text’s explanation or depiction of a complex process, phenomenon, or concept; provide an</p>	<p>Understand the concept of computer software; determine how hardware and software work together</p>	<p>Activity 4: Computer Skills Assessment Have students answer the questions on the Computer check-in sheet and take the online basic skills assessment: https://assessment.digitalliteracyassessment.org/basic-computer-skills-1</p> <p>NOTE: Students need mouse and basic keyboard skills (arrow keys, enter key) for this assessment.</p> <p>Mouse activities (if needed)</p> <ul style="list-style-type: none"> • New User Tutorial http://tech.tln.lib.mi.us/tutor/ • Mouserice at www.pbclibrary.org/mousing/mouserice.htm <ul style="list-style-type: none"> • Get basic understanding of computer software and conceptualize how software and hardware work together. <p>Activity 1. What is software?</p> <ul style="list-style-type: none"> • Distribute and review together “Introduction to Software” (See “Activities/Resources” section) • View “How Computers Work: Hardware and Software” https://www.youtube.com/watch?v=xnyFYiK2rSY • Review the major types of software: operating system software, application software, programming software tools • Discuss other types of software: embedded software, server programs, e-mail clients, multimedia players, image editors, voice chat <p>Activity 2: How software and hardware work together</p> <ul style="list-style-type: none"> • Read and discuss the following article: “Grace Hopper's Compiler: Computing's Hidden Hero” http://www.bbc.com/news/business-38677721 	<p>Verbal interaction</p> <p>Student reflection</p>
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<p>accurate summary of the text. 5.R.RS.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context.</p> <p>3. Create a database by entering home inventory data into a form</p> <p>Standards: 5.W.WL.3 Produce clear and coherent writing in which the development, organization and style are appropriate to task, purpose and audience.</p>	<p>Explain the benefits of a database compared to a workbook or spreadsheet; describe why businesses use databases; identify the main parts of a database; build a database to inventory home items for insurance purposes; evaluate techniques for</p>	<p>NOTE: In preparation for this lesson, consider using the following lessons to introduce databases to students:</p> <ul style="list-style-type: none"> • https://edu.gcfglobal.org/en/access2016/introduction-to-databases/1/ • https://edu.gcfglobal.org/en/access2016/designing-your-own-database/1/ • Understand the use and purpose of databases and create an individual database. <p>Activity 1: Review the “Introduction to Databases Activity Sheet” document</p> <p>Activity 2: Complete the “Introduction to Databases Vocabulary Review”</p> <p>Activity 3: Complete the “Intro to Databases Outline Organizer”</p> <ul style="list-style-type: none"> • Discuss the relevance of using databases <ul style="list-style-type: none"> ◦ Organization of vast amounts of data - discuss how overwhelming it would be to organize and keep track of employee information for a large retail corporation with 1.5 million employees. 	<p>Verbal interaction</p> <p>Student reflection</p> <p>Written work (rubric for database)</p>
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<p>5.S.CC.2 Demonstrate active listening skills</p> <p>6.S.CC.1 Initiate and participate effectively in a range of collaborative discussions with diverse partners on texts, topics and issues appropriate to skill level, building on others' ideas and expressing their own clearly and persuasively.</p> <p>5.R.FW.1 Understand and use technology systems.</p>	<p>selecting a pre-built template and entering data</p>	<ul style="list-style-type: none"> • Explain the benefits of using a database as opposed to a workbook or spreadsheet <ul style="list-style-type: none"> ◦ On the surface, both types of software seem similar. After all, they store data, and you can enter data in a grid of cells. ◦ The question is, “How do you want to organize your data?” ◦ Database software has a relational structure that helps keep large amounts of information accurate and provides customized, manageable tables. ◦ Spreadsheet software is used to analyze numbers using formulas, while database software is used for the storage of large amounts of data that can be accessed easily and quickly. • Demonstrate selecting a template and entering data into the database. <ul style="list-style-type: none"> ◦ Demonstrate using the following tools/features: <p>Guided Practice: Instructor will use database software and demonstrate how to select and download a pre-built template from the database software package or the internet. The students will enter and save a new asset, choosing something from the classroom. Ask for one or two volunteers to demonstrate in front of their peers. Encourage students watching to peer-coach and evaluate the student demonstrator on his or her techniques.</p> <ul style="list-style-type: none"> ▪ Navigating to and opening the database software ▪ Selecting and downloading a pre-built template from the database software package or the internet ▪ Beginning a new database and entering data about an item in the classroom (a computer or projector is a good item) ▪ Saving the new asset <p>Activity 4: Review the “Independent Database Creation” (See “Introduction to Databases Activities” in “Activities/Resources”)</p> <p>Activity 5: Review “Home Inventory Database Evaluation Rubric” Explain Independent Practice Activity</p>	
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<p>4. Learn the importance and structure of firewalls</p> <p>Standards: 6.S.CC.1 Initiate and participate effectively in a range of collaborative</p>	<p>Learn what a firewall is and why it is important; discover what the OSI 7 Layer Model is and where a firewall should be operated within it; learn how to configure a</p>	<ul style="list-style-type: none"> ◦ Students will brainstorm the fields needed to enter home inventory information for insurance purposes (i.e., Item Name, Description, Model/Part Number, Estimated Purchase Price, etc.) ◦ Students will be responsible for “inventorying” at least 25 items from their home. <p>They will create their own database using the skills taught in this lesson to create a home inventory database. Students will work on their personal home inventory databases independently.</p> <p>Activity 6: Complete the fill-in-the-blank “Introduction to Databases Vocabulary Review” as a review of the lesson</p> <ul style="list-style-type: none"> • Learn the fundamentals of firewalls <p>Note: In preparation for this lesson, consider using the following as an informational resource regarding firewalls http://www.petraeus.org/fw/Firewall%20basics%20L1.pdf</p> <p>Activity 1: Virtual firewall</p> <ul style="list-style-type: none"> • Assign two students to be personal computers in a network. Give them signs to put on their chest that say “personal computer.” • Assign two students to be the “Firewall.” Have students extend their arms out and connect them. Have them stand in front of the personal computer students. • Have one student stand behind the firewall students and give them a sign that says “Internet.” • Facilitate discussion on why a firewall is important. 	<p>Verbal interaction</p> <p>Instructor observation</p>
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<p>discussions with diverse partners on texts, topics and issues appropriate to skill level, building on others' ideas and expressing their own clearly and persuasively.</p> <p>6.R.RS.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.</p> <p>5. Discover basics of computer networking</p> <p>Standards: 5.S.CC.2 Demonstrate active listening skills</p>	<p>firewall with firewall rules; learn to configure a Windows firewall</p> <p>Identify computer networking; describe network fundamentals; determine computer network terms</p>	<ul style="list-style-type: none"> Facilitate discussion on how a packet of information will travel internally and externally. Show video: https://www.youtube.com/watch?v=6UtiQwCX2wU Review firewalls as a collection of valves and discuss firewall rules. <ul style="list-style-type: none"> Identify what computer networking is and what it entails <p>NOTE: In preparation for this lesson, use the “Computer Network Fundamentals Teacher Pack” located in the Activities/Resources document for information and activities regarding computer networking.</p> <p>Activity 1: Computer networking vocabulary</p> <ul style="list-style-type: none"> Discuss vocabulary words that may appear frequently during computer networking discussions. 	<p>Verbal interaction</p> <p>Student reflection</p> <p>Instructor observation</p>
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<p>6.S.CC.1 Initiate and participate effectively in a range of collaborative discussions with diverse partners on texts, topics and issues appropriate to skill level, building on others' ideas and expressing their own clearly and persuasively.</p> <p>6.R.RS.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.</p>		<ul style="list-style-type: none"> • Show the websites http://www.webopedia.com and http://www.techweb.com/encyclopedia. • Vocab word search exercise: Distribute worksheet that includes a word search for vocabulary words and also definitions to keep in notebooks for future reference. To create a word search, consider the following website: http://www.edhelper.com <p>Using the following vocabulary words:</p> <ol style="list-style-type: none"> 1. Byte -- equal to 8 bits 2. Bit -- smallest unit of information 3. NIC -- Network interface card 4. Worm -- replicates self through disk & memory 5. Virus -- software used to infect computer 6. Error control -- testing for accurate transmission of data 7. Fiber optics – technology that transmits information as pulses of light 8. Infrared -- invisible band of radiation 9. Physical layer -- provide transmission of bits over network medium 10. Protocol -- rules governing the transmission and receiving of data 11. Ethernet -- most widely used LAN 12. Routing -- forwards data to transmission 13. Topology -- pattern of interconnection 14. Domain -- all resources under the control of a single computer system 15. Address -- the number of a particular memory 16. Microwave -- vibrates at 1 GHz and above 17. Twisted pair -- commonly used for telephone cabling 18. Technology -- implies the use of computers 19. Internet -- made up of over 65 million computers 20. FEC -- forward error control 	
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- Instructor will give an incentive for first student to find information on various websites when asked to recall vocabulary word (e.g., give candy to first to find what "worm" means) throughout the unit.

Activity 2: Discuss computer networking

- See Computer Networking Fundamentals presentation <https://sway.office.com/H1ifD5KUZdLWkhFz>
- What is networking?
- How do networks help us?
 - Communication, sharing resources, sharing software, sharing data
- Describe Network Fundamentals including network types, topologies and design

Activity 3: What are the fundamentals of networking?

- Types, topologies, design and components
- Network types – LANs, MANs, WANs
- Watch video <https://www.youtube.com/watch?v=eVKjiHCUpZo&feature=youtu.be>

Activity 4: LAN Network topology and other topologies

- What is a network topology?
- Video https://www.youtube.com/watch?v=4ZaTa_JQM_E
- Discuss considerations when choosing a topology
- Determine these terms: domain name, IP address, worm, virus, byte, bit, protocols, token ring, Ethernet, routing, network, topology, error (control), etc.

Activity 5: Components of a computer network

- Physical layer and what its components are (i.e. equipment, cables).
- Interfaces, hubs/switches, routers, cabling, software protocols
- Video: what is TCP/IP? https://www.youtube.com/watch?v=PpsEaqJV_A0&feature=youtu.be

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		<ul style="list-style-type: none">• May point out on actual computer or use www.blackbox.com. Instructor will demonstrate on computer where equipment is located both by computer and Internet site www.blackbox.com.	
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