Welcome to the ODU Microcredential SNIC Course!

Welcome to the microcredential course on Computing Systems, Networks and the Internet, and Cybersecurity! We are using the abbreviation SNIC (Systems Networks and Cybersecurity) to differentiate this course from the others, so you will see that acronym used throughout the course.

This microcredential course is formatted into three sections:

- **Course Materials**, comprised of Learning Modules containing content and resources for comptencies that are aligned with the Virginia Computer Science SOLs and mini-assessments to prepare you for the final course assessment
- **Lesson Plan Assignment**, includes resources and templates for developing your lesson plan required for the course
- **Final Assessment**, which - combined with the Lesson Plan you will submit - will demonstrate your mastery of the content for this course

To maximize development of your computer science pedagogical content knowledge, we recommend that you step through each module in the order presented. **Access the Course Materials, Lesson Plan Assignment, and Final Assessment sections using the menu to the left.**
Once you have completed each of the learning modules for this course, you will complete the Lesson Plan Assignment and the Final Assessment (order of completion of those is your choice).
Here is what to do:

- Click sequentially through the modules in Course Materials and view the material.
- Complete the quiz at the end of each module to test your knowledge ahead of the final assessment.
- Complete the Final Assessment for the course.
- Upload a lesson plan to finish the microcredential.

If you need assistance at any time, please email tcep@odu.edu.

Systems Networks and Cybersecurity Modules

Systems Networks and Cybersecurity Module 1

(https://canvas.odu.edu/courses/185315/pages/systems-networks-and-cybersecurity-module-1)

When you complete this learning module, you should be able to:

- **Identify** components of computing systems
- **Describe** the characteristics of computing systems including hardware, software, input, and output
- **Identify** and troubleshoot hardware and software problems that occur during use

Systems Networks and Cybersecurity Module 2

(https://canvas.odu.edu/courses/185315/pages/systems-networks-and-cybersecurity-module-2)

When you complete this learning module, you should be able to:

- **Discuss** electronic communication methods and their advantages
- **Compare** the size and scope of various types of computer networks
- **Identify** problems related to inappropriate use of computing devices and networks

Systems Networks and Cybersecurity Module 3

(https://canvas.odu.edu/courses/185315/pages/systems-networks-and-cybersecurity-module-3)

When you complete this learning module, you should be able to:

- **Identify** personal private information and the importance of protecting that information
- **Identify** and **use** strong passwords
- **Explain** why strong passwords should be used

Systems Networks and Cybersecurity Module 1

Use the "Next" button below to navigate through this module.

SNIC Module 1 includes the following:

SNIC Teacher Competency 1. Identify components of computing systems.

This teacher competency is aligned with the following Computer Science SOLs:

- CS K.5 The student will identify components of computing systems (e.g., keyboard, mouse, desktop computer, laptop computer, tablet, and printer).
- CS 1.7 The student will identify components of computing systems that are common among different types of computing devices including desktop and laptop computers, tablets, and mobile phones.
- CS 2.7 The student will describe the characteristics of computing systems to include hardware, software, input, and output.
- CS 3.8 The student will model how a computing system works including input and output.
- CS 4.8 The student will model how a computing system works including input and output, processors, and sensors.
- CS 5.7 The student will model how a computing system works including input and output, processors, sensors and storage.

SNIC Teacher Competency 2. Describe the characteristics of computing systems including hardware, software, input and output.

This teacher competency is aligned with the following Computer Science SOLs:

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- CS 4.8. The student will model how a computing system works including input and output, processors, and sensors.
- CS 5.7. The student will model how a computing system works including input and output, processors, sensors and storage.

SNIC Teacher Competency 3. Identify and troubleshoot hardware and software problems that occur during use.

This teacher competency is aligned with the following Computer Science SOLs:

- CS K.6 The student will identify, using accurate terminology, simple hardware and software problems that may occur during use (e.g., app or program is not working as expected, no sound is coming from a device, device will not turn on)

- CS 1.8 The student will identify, using accurate terminology, simple hardware and software problems that may occur during use (e.g., app or program is not working as expected, no sound is coming from the device, the device won't turn on).
- CS 2.8 The student will identify, using accurate terminology, simple hardware and software problems that may occur during use (e.g., app or program not working as expected, no sound, device won't turn on).
- CS 3.9 The student will identify, using accurate terminology, simple hardware and software problems that may occur during use, and apply strategies for solving problems (e.g., rebooting the device, checking for power, checking network availability, closing and reopening an app).
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SNIC Module 1 Quiz

SNIC Teacher Competency 1. Identify components of computing systems

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- CS 4.8 The student will model how a computing system works including input and output, processors, and sensors.
- CS 5.7 The student will model how a computing system works including input and output, processors, sensors and storage.

What do teachers need to know? The CS SOL Curriculum Framework states: "Computer systems are designed and built to specifications that allow for many different purposes. These computer systems range from general to more specific uses, and are available in a variety of form factors (e.g., laptop, desktop, tablet). When building or purchasing a computer for a specific task, it is important to match the desired performance with the components and their specifications so that the system isn't underpowered or ineffective in running a certain set of applications. It is also important to take into consideration the size and mobility of a computer system, the ability to add or replace parts if needed, and the type and size of storage in a computing system. All computers need a motherboard which houses most of the components inside of a computer system. Built onto the motherboard are the CPU and GPU (processor), RAM and ROM (memory), and hard drive (storage). Other components like the power supply, cooling system, sound card, speakers, monitor, etc. can further add to the complexity of the system but are often secondary to the main needs listed above."

Note: This video shows the basic components of a computing system. It does not have sound. We have included Powerpoint and PDF static versions of the video that can be downloaded as well.

***We recommend that you right click on the video link and choose "Open in New Tab" for best viewing.**

Computing device definitions.pptx
(https://canvas.odu.edu/courses/185315/files/44844940/download?wrap=1) **(https://canvas.odu.edu/courses/185315/files/44844940/download)**

Computing device definitions.pdf (https://canvas.odu.edu/courses/185315/files/44844948/download?wrap=1) **(https://canvas.odu.edu/courses/185315/files/44844948/download)**

Computing device definitions.mp4
(https://cdnapi.kaltura.com/p/1509371/sp/150937100/embedIframeJs/uiconf_id/15689921/partner_id/1509371?iframeembed=true&entry_id=1_hy317roz)

What do all modern computing devices have in common?

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Input device(s)

An **input device** describes the problem or task to the machine. It **sends** data to the central processing unit.

Keyboard

Microphone

Mouse

What do all modern computing devices have in common?

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Keyboard

Microphone

Mouse

Central Processing Unit (CPU)

The **CPU** controls the operations of the computer. It includes the Arithmetic Logic Unit (ALU) and the Control Unit.

- The ALU is where comparisons, calculations, and decisions are made.
- The control unit controls all the activities of the computer.

A microprocessor with its CPU and **memory**

What do all modern computing devices have in common?

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- The ALU is where comparisons, calculations, and decisions are made.
- The control unit controls all the activities of the computer.

A microprocessor with its CPU and **memory**

Output device(s)

An **output device** converts and displays data it **receives** in a meaningful way.

Headphones

Printer

Projector

SNIC Teacher Competency 1. Curricular Alignment and Curriculum Framework

The information contained on the next few pages will help you as you begin to develop your lesson plan for this course, including the following information for this competency:

- Computer Science SOL vertical alignment (K-5)
- Cross-curricular alignment
- Background information and Essential Skills, Questions, and Vocabulary (Curriculum Framework)

SNIC Teacher Competency 1. CS SOL Vertical Alignment (K-5)

The attached file illustrates the vertical alignment of this CS SOL competency across K-5 grade span. The yellow highlighted areas indicate the CS standards with which this teacher competency align. The light blue shaded areas indicate introductory level skills and the dark blue shaded areas indicate proficiency of the standards.

Please note that this vertical alignment document was developed by TCEP faculty and has not been vetted by the VDOE or CodeVA.

SNIC Vertical Alignment 1 and 2.pdf
(https://canvas.odu.edu/courses/185315/files/44844941/download?wrap=1)
(https://canvas.odu.edu/courses/185315/files/44844941/download?download_frd=1)

Computer Science SOLs	Grade					
	K	1	2	3	4	5
Identify components of computing systems (e.g keyboard, mouse, desktop computer, laptop computer, tablet, printer) K.5, 1.7						
Identify, using accurate terminology, simple hardware and software problems that may occur during use (e.g., app or program is not working as expected, no sound is coming from a device, device will not turn on) K.6, 1.8, 2.8						
Describe the characteristics of computing systems to include hardware, software, input, and output. 2.7						
Model how a computing system works including input and output. 3.8, 4.8, 5.7						
Identify, using accurate terminology, simple hardware and software problems that may occur during use, and apply strategies for solving problems (e.g., rebooting the device, checking for power, checking network availability, closing and reopening an app). 3.9, 4.9, 5.8						
Light blue – Introduction Dark blue - Proficient						

SNIC Teacher Competency 1. CS Cross-Curricular Alignment (K-5)

Listed below are some suggested areas of integration from the VDOE, but this is not an exhaustive list. What areas do you see for cross-curricular alignment?

Computer Science Standard	Opportunity for Integration
K.5 The student will identify components of computing systems (e.g., keyboard, mouse, desktop computer, laptop computer, tablet, and printer).	English: K.7 (expand vocabulary)
3.8 The student will model how a computing system works including input and output.	Mathematics: 3.16 (identify/analyze the patterns associated with input/output) Science: 3.8a (human activity as input, consequence as output)
4.8 The student will model how a computing system works including input and output, processors and sensors.	Mathematics: 4.15 (use of input tables) Science: 4.2a (discussion of the inputs and outputs of photosynthesis)
5.7 The student will model how a computing system works including input and output, processors, sensors and storage.	Mathematics: 5.18 (input/output tables)

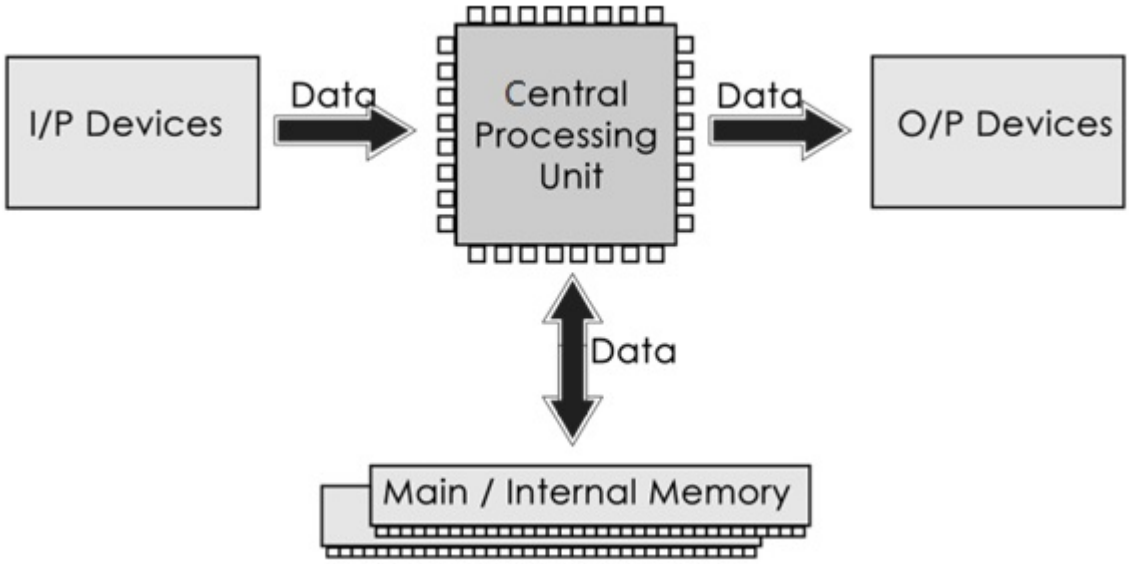
SNIC Teacher Competency 1. Additional Resources

Here are some additional resources that may be of interest to you. Please note that ODU is not responsible for the content contained on external sites.
***We recommend that you right click on the links and choose "Open in New Tab" for best viewing.**

Components of computer systems (https://www.tutorialspoint.com/computer_concepts/computer_concepts_components_of_computer_system.htm#:~:text=Computer%20systems%20consist%20of%20three%20components%20as%20shown,output%20devices.%20This%20is%20stored%20in%20computer%E2%80%99s%20memory.)

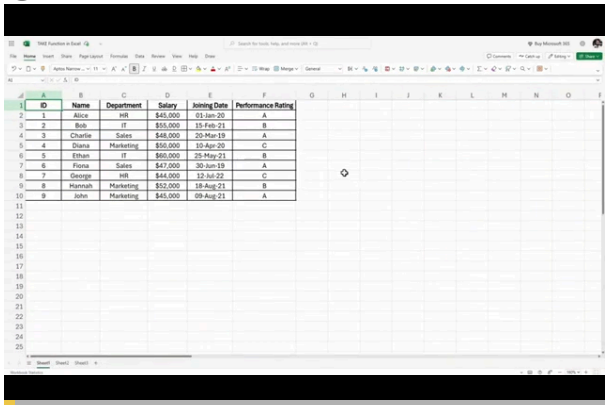
Components of Computer System

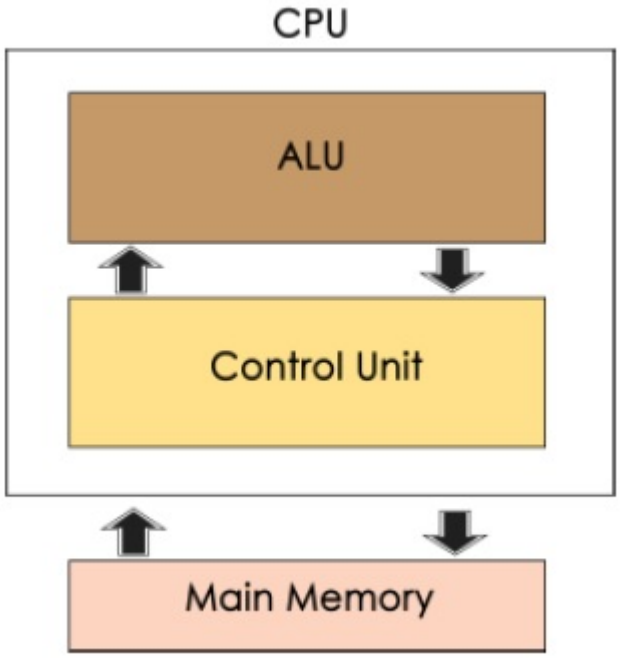
Computer systems consist of three components as shown in below image: **Central Processing Unit, Input devices and Output devices**. Input devices provide data input to processor, which processes data and generates useful information thats displayed to the user through output devices. This is stored in computers memory.



Central Processing Unit

The Central Processing Unit (CPU) is called "the brain of computer" as it controls operation of all parts of computer. It consists of two components: Arithmetic Logic Unit (ALU), and Control Unit.





Arithmetic Logic Unit (ALU)

Da[redacted], from where it is then sent to ALU, where rest of [redacted] f processing, such as comparisons, decision-ma[redacted]ormation takes place here and once again data is [redacted]

Co[redacted]

As name indicates, this part of CPU extracts instructions, performs execution, maintains and directs operations of entire system.

Functions of Control Unit

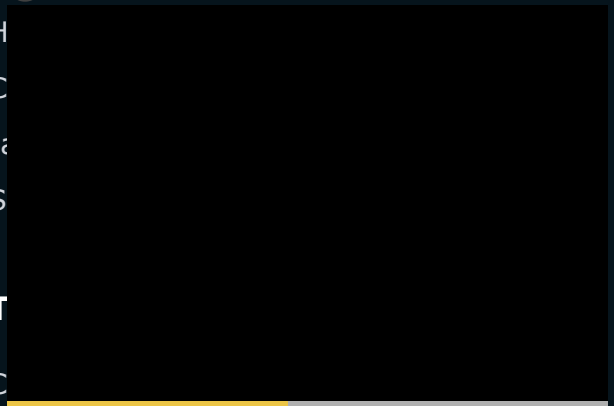
Control unit performs following functions −

- It controls all activities of computer
- Supervises flow of data within CPU
- Directs flow of data within CPU
- Transfers data to Arithmetic and Logic Unit
- Transfers results to memory
- Fetches results from memory to output devices

Memory Unit

This is unit in which data and instructions given to computer as well as results given by computer are stored. Unit of memory is "Byte".

1 Byte = 8 Bits



Amazon Web Services Tutorial

Microsoft Azure Tutorial

Git Tutorial

Ethical Hacking Tutorial

Docker Tutorial

Kubernetes Tutorial

DSA Tutorial

Spring Boot Tutorial

SDLC Tutorial

Unix Tutorial

CERTIFICATIONS

Business Analytics Certification

Java & Spring Boot Advanced Certification

Data Science Advanced Certification

Cloud Computing And DevOps

Advanced Certification In Business Analytics

Artificial Intelligence And Machine Learning

DevOps Certification

Game Development Certification

Front-End Developer Certification

AWS Certification Training

Python Programming Certification

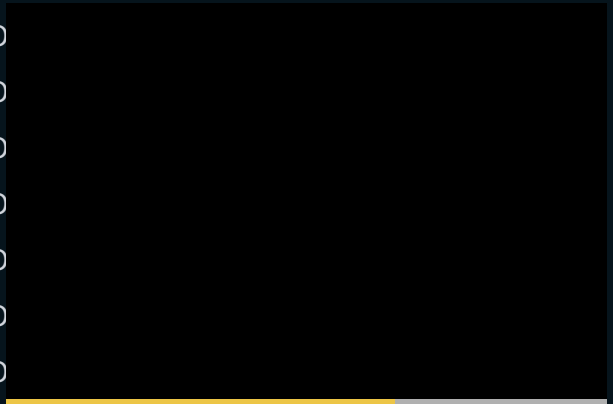
COMPILERS & EDITORS

Online Java Compiler

Online Python Compiler

Online Go Compiler

Online C Compiler



SNIC Teacher Competency 2. Describe the characteristics of computing systems including hardware, software, input, and output

This teacher competency is aligned with the following Computer Science SOLs:

- CS K.5. The student will identify components of computing systems (e.g., keyboard, mouse, desktop computer, laptop computer, tablet, and printer).
- CS 1.7. The student will identify components of computing systems that are common among different types of computing devices including desktop and laptop computers, tablets, and mobile phones.
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- CS 3.8. The student will model how a computing system works including input and output.
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- CS 5.7. The student will model how a computing system works including input and output, processors, sensors and storage.

Describe the characteristics of computing systems including hardware, software, input, and output

What do teachers need to know? The Curriculum Framework provides the following as context for this competency:

- Computing systems are composed of different components.These components enable the user to complete different tasks using a computing system. Common components among desktop and laptop computers, tablets, and mobile phones include a keyboard (either physical or screen based) for inputting information, audio for hearing information, and a screen for viewing information.
- A system is defined as a regularly interacting or interdependent group of items forming a unified whole. Systems always have inputs and outputs. Computing devices are defined as having input, processors, memory and output; these are considered part of a computer system. In computer science, input and output, also referred to as I/O, is the communication between an information processing system, such as a computer, and the outside world, possibly a human or another information processing system. This is how real world information is digitized, or translated in and out of binary.

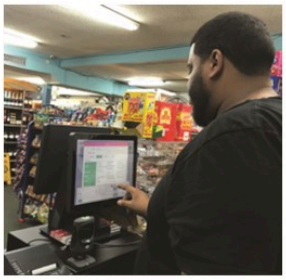
Inputs are the signals or data received by the system; these include electricity, the movements and clicks of your mouse, and the keys you type on a keyboard. An output is whatever comes out of the system; for example, outputs include data and what can be seen on the computer screen. There is a wide variety of digital collection tools used for gathering and inputting digital data. Tools may be chosen based upon the type of data people wish to observe or by the designers of the system. These collection tools include the movements and clicks of your mouse and the keys you type on a keyboard. Sensors are also used in computing systems, such as in robotics, to detect information and serve as input devices for the system.For example, a robotic device depends on sensors, such as a light sensor, to detect changes in brightness.

Students must be able to model a computer system in grade 3 to include input and output. In grade 5, students are introduced to the concept of storage. Computers store data that can be retrieved later. It is also good practice to save data in multiple locations to protect against loss. The storage capacity of a computing device varies as does the amount of storage required for the saving of different media (pictures, videos, text documents, etc). Data can be stored locally on a hard drive or on the Internet. The connection should be made that variables in programs are how we store and access data when programming. A variable is a name given to a spot in the computer’s memory. The programmer can access and change the data stored in that location by using the variable name.

Hardware vs. software: The physical components of a computer are called hardware. Hardware is any part of the computer that we can touch. Examples include memory devices, keyboards, touch screens, mouse, monitor, or central processing unit.Computer software gives the computer code based instructions or procedures for carrying out tasks. Computer software runs on a processor (hardware). Software examples include a computer's operating system such as Windows, as well as specific applications like Microsoft Word or Power Point, and web browsers such as Google Chrome.

What everyday items in your life are computing devices? Here are two similar examples: the modern day cash register and its close relative, the point of sale device. PDF versions of these examples are included for download.

A cash register is a computing device



What are its input devices?	What operations does it do?	What are its outputs?
Touch screen	Adds up prices	Total amount displayed
Bar code scanner	Calculates discounts	Beep alerts the user
Weigh scale	Keeps a running total	A receipt is printed
Card reader		

A point of sale device tracks inventory, too

What are its input devices?	What operations does it do?	What are its outputs?
Touch screen	Adds up prices	Total amount displayed
Bar code scanner	Calculates discounts	Beep alerts the user
Weigh scale	Keeps a running total	A receipt is printed
Card reader	Communicates with central server to monitor inventory	
	Alerts staff working elsewhere	

Point of sale.pdf (https://canvas.odu.edu/courses/185315/files/44844938?wrap=1)
(https://canvas.odu.edu/courses/185315/files/44844938/download?download_frd=1)

(https://canvas.odu.edu/courses/185315/files/44844938?wrap=1) Cash register(1).pdf
(https://canvas.odu.edu/courses/185315/files/44844864?wrap=1)
(https://canvas.odu.edu/courses/185315/files/44844864/download?download_frd=1)

A point of sale device tracks inventory, too

What are its input devices?

Touch screen

Bar code scanner

Weigh scale

Card reader

What operations does it do?

Adds up prices

Calculates discounts

Keeps a running total

Communicates with central server to monitor inventory

Alerts staff working elsewhere

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Total amount displayed

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A receipt is printed

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SNIC Teacher Competency 2. Curricular Alignment and Curriculum Framework

The information contained on the next few pages will help you as you begin to develop your lesson plan for this course, including the following information for this competency:

- Computer Science SOL vertical alignment (K-5)
- Cross-curricular alignment
- Background information and Essential Skills, Questions, and Vocabulary (Curriculum Framework)

SNIC Teacher Competency 2. CS SOL Vertical Alignment (K-5)

The attached file illustrates the vertical alignment of this CS SOL competency across K-5 grade span. The yellow highlighted areas indicate the CS standards with which this teacher competency align. The light blue shaded areas indicate introductory level skills and the dark blue shaded areas indicate proficiency of the standards.

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(https://canvas.odu.edu/courses/185315/files/44844941/download?download_frd=1)

Computer Science SOLs	Grade					
	K	1	2	3	4	5
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Identify, using accurate terminology, simple hardware and software problems that may occur during use (e.g., app or program is not working as expected, no sound is coming from a device, device will not turn on) K.6, 1.8, 2.8						
Describe the characteristics of computing systems to include hardware, software, input, and output. 2.7						
Model how a computing system works including input and output. 3.8, 4.8, 5.7						
Identify, using accurate terminology, simple hardware and software problems that may occur during use, and apply strategies for solving problems (e.g., rebooting the device, checking for power, checking network availability, closing and reopening an app). 3.9, 4.9, 5.8						
Light blue – Introduction Dark blue - Proficient						

SNIC Teacher Competency 2. CS Cross-Curricular Alignment (K-5)

Listed below are some suggested areas of integration from the VDOE, but this is not an exhaustive list. What areas do you see for cross-curricular alignment?

Computer Science Standard	Opportunity for Integration
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4.8 The student will model how a computing system works including input and output, processors and sensors.	Mathematics: 4.15 (use of input tables) Science: 4.2a (discussion of the inputs and outputs of photosynthesis)
5.7 The student will model how a computing system works including input and output, processors, sensors and storage.	Mathematics: 5.18 (input/output tables)

SNIC Teacher Competency 2. Additional Resources

Here are some additional resources that may be of interest to you. Please note that ODU is not responsible for the content contained on external sites.
***We recommend that you right click on the links and choose "Open in New Tab" for best viewing.**

- **Components of Computer - Five Basic Computer Components (byjus.com) (https://byjus.com/govt-exams/computer-components/)**
- **Components of a Computer System: Input and Output Units, CPU etc. (toppr.com) (https://www.toppr.com/guides/accountancy/application-of-computers-in-accounting/components-computer-system/)**
- **5 Parts of a Computer | Different Main & Basic Components | Names & Info (idtech.com) (https://www.idtech.com/blog/parts-of-a-computer)**
- **Hardware vs Software - Difference and Comparison | Diffen (https://www.diffen.com/difference/Hardware_vs_Software)**
- **What are the Characteristics of Computer System? (chtips.com) (https://www.chtips.com/computer-fundamentals/characteristics-of-computer-system#:~:text=%20The%20Basic%20Characteristics%20of%20Computer%20are%20as,9%20No%20Feeling%20%26%20No%20IQ%20More%20)**
- **What is the difference between an input and output device? (computerhope.com) (https://www.computerhope.com/issues/ch001355.htm)**
- **Difference between Hardware and Software - GeeksforGeeks (https://www.geeksforgeeks.org/difference-between-hardware-and-software/)**

SNIC Teacher Competency 3. Identify and troubleshoot hardware and software problems that occur during use

This teacher competency is aligned with the following Computer Science SOLs:

- CS K.6 The student will identify, using accurate terminology, simple hardware and software problems that may occur during use (e.g., app or program is not working as expected, no sound is coming from a device, device will not turn on)
- CS 1.8 The student will identify, using accurate terminology, simple hardware and software problems that may occur during use (e.g., app or program is not working as expected, no sound is coming from the device, the device won't turn on).
- CS 2.8 The student will identify, using accurate terminology, simple hardware and software problems that may occur during use (e.g., app or program not working as expected, no sound, device won't turn on).
- CS 3.9 The student will identify, using accurate terminology, simple hardware and software problems that may occur during use, and apply strategies for solving problems (e.g., rebooting the device, checking for power, checking network availability, closing and reopening an app).
- CS 4.9 The student will identify, using accurate terminology, simple hardware and software problems that may occur during use, and apply strategies for solving problems (e.g., rebooting the device, checking for power, checking for network availability, closing and reopening an app).
- CS 5.8 The student will identify, using accurate terminology, simple hardware and software problems that may occur during use and apply strategies for solving problems (e.g., rebooting the device, checking for power, checking network availability, closing and reopening an app.).

The attached file includes a troubleshooting table for simple computing problems.

ARCS Course 2 Teacher Competency 2.3 content.pdf
(https://canvas.odu.edu/courses/185315/files/44844934/download?wrap=1)
(https://canvas.odu.edu/courses/185315/files/44844934/download?download_frd=1)

Problem	Applicable Vocabulary	Troubleshooting/Solutions
Computer will not turn on	Desktop computer Laptop computer Tablet Boot (turn system on)	• Ensure that all cables and connections are plugged in properly • Ensure that computer is connected to electrical supply • Ensure that electrical supply/outlet has power
Error message during boot-up	Reboot (turn system off and then on again)	• Reboot device
Computer runs slower than normal		• Reboot device
Nothing displaying on screen	Monitor	• Ensure that cables between computer system and monitor are plugged in properly • Ensure that monitor is connected to electrical outlet • Ensure that electrical supply/outlet has power
Mouse or keyboard not working	Keyboard Mouse	• Ensure that keyboard or mouse is properly connected to computer system • Replace with another keyboard or mouse
No sound	Speakers	• Ensure that speakers are properly connected to computer system • Ensure that speakers are connected to electrical supply • Ensure that electrical supply/outlet has power • Ensure that volume is not muted • Adjust volume to audible level
Blue screen		• Reboot device
Application will not start		• Reboot device
Unable to connect to Internet	Network Wifi	• Ensure computing device is connected to network • If not connected, connect to network • Disconnect from network and reconnect
Application stops working in middle of task		• Close application and restart • Reboot device
Unable to print	Printer	• Ensure that printer application is installed on computing device • Ensure that printer is properly connected to computer system • Ensure that printer is connected to electrical supply • Ensure that electrical supply/outlet has power

SNIC Teacher Competency 3. Curricular Alignment and Curriculum Framework

The information contained on the next few pages will help you as you begin to develop your lesson plan for this course, including the following information for this competency:

- Computer Science SOL vertical alignment (K-5)
- Cross-curricular alignment
- Background information and Essential Skills, Questions, and Vocabulary (Curriculum Framework)

SNIC Teacher Competency 3. CS SOL Vertical Alignment (K-5)

The attached file illustrates the vertical alignment of this CS SOL competency across K-5 grade span. The yellow highlighted areas indicate the CS standards with which this teacher competency align. The light blue shaded areas indicate introductory level skills and the dark blue shaded areas indicate proficiency of the standards.

Please note that this vertical alignment document was developed by TCEP faculty and has not been vetted by the VDOE or CodeVA.

SNIC Vertical Alignment 3.pdf (https://canvas.odu.edu/courses/185315/files/44844959/download?wrap=1) (https://canvas.odu.edu/courses/185315/files/44844959/download?download_frd=1)

Computer Science SOLs	Grade					
	K	1	2	3	4	5
Identify components of computing systems (e.g keyboard, mouse, desktop computer, laptop computer, tablet, printer) K.5, 1.7						
Identify, using accurate terminology, simple hardware and software problems that may occur during use (e.g., app or program is not working as expected, no sound is coming from a device, device will not turn on) K.6, 1.8, 2.8						
Describe the characteristics of computing systems to include hardware, software, input, and output. 2.7						
Model how a computing system works including input and output. 3.8, 4.8, 5.7						
Identify, using accurate terminology, simple hardware and software problems that may occur during use, and apply strategies for solving problems (e.g., rebooting the device, checking for power, checking network availability, closing and reopening an app). 3.9, 4.9, 5.8						
Light blue – Introduction Dark blue - Proficient						

SNIC Teacher Competency 3. CS Cross-Curricular Alignment (K-5)

Listed below are some suggested areas of integration from the VDOE, but this is not an exhaustive list. What areas do you see for cross-curricular alignment?

Computer Science Standard	Opportunity for Integration
K.6 The student will identify, using accurate terminology, simple hardware and software problems that may occur during use (e.g., app or program is not working as expected, no sound is coming from a device, device will not turn on).	English: K.7 (expand vocabulary)
1.8 The student will identify, using accurate terminology, simple hardware and software problems that may occur during use (e.g., app or program is not working as expected, no sound is coming from the device, the device won't turn on).	English: 1.12e (using descriptive words)
2.8 The student will identify, using accurate terminology, simple hardware and software problems that may occur during use (e.g., app or program not working as expected, no sound, device won't turn on).	English: 2.10h (using descriptive language)
3.9 The student will identify, using accurate terminology, simple hardware and software problems that may occur during use, and apply strategies for solving problems (e.g., rebooting the device, checking for power, checking network availability, closing and reopening an app).	English: 3.1e (using appropriate language); 3.8 (importance of communicating with clarity)
4.9 The student will identify, using accurate terminology, simple hardware and software problems that may occur during use, and apply strategies for solving problems (e.g., rebooting the device, checking for power, checking for network availability, closing and reopening an app).	English: 4.1g (using specific vocabulary to communicate ideas)

SNIC Teacher Competency 3. Additional Resources

Here are some additional resources that may be of interest to you. Please note that ODU is not responsible for the content contained on external sites.
***We recommend that you right click on the links and choose "Open in New Tab" for best viewing.**

- **Hardware vs. Software Trouble - Common Hardware and Software Problems - Techroze (learnesl.net) (https://www.learnesl.net/hardware-vs-software-trouble/#:~:text=%20Hardware%20vs.%20Software%20Trouble%20%201%201.,common%20quick%20fixes%20available%20for%20computer...%20More%20)**
- **How to Tell a Hardware Problem From a Software Problem (howtogeek.com) (https://www.howtogeek.com/174062/how-to-tell-a-hardware-problem-from-a-software-problem/)**
- **How to Distinguish between Computer Hardware and Software - dummies (https://www.dummies.com/computers/for-seniors-how-to-distinguish-between-computer-hardware-and-software/)**
- **How to Tell the Difference Between a Software and a Hardware Problem | Geeks 2 You Computer Repair (https://geeks2you.com/how-to-tell-the-difference-between-a-software-and-a-hardware-problem/)**

Published | Preview | Assign To | Edit

SNIC Module 1 Quiz

This mini-quiz is optional but recommended as completion will help prepare you for the final assessment for this course.
You can take the quiz up to three times.

Quiz Type	Graded Quiz
Points	80
Assignment Group	Imported Assignments
Shuffle Answers	No
Time Limit	No Time Limit
Multiple Attempts	Yes
Score to Keep	
Attempts	3
View Responses	Always
Show Correct Answers	Immediately
One Question at a Time	No
Require Respondus LockDown Browser	No
Required to View Quiz Results	No

Due	For	Available from	Until
-	Everyone	-	-

Preview

Return to Course Materials

Congratulations, you have completed this module! Click here to return to **Course Materials (https://canvas.odu.edu/courses/185315/pages/systems-networks-and-cybersecurity-modules)** .

Systems Networks and Cybersecurity Module 2

Use the "Next" button below to navigate through this module.

SNIC Module 2 includes the following:

SNIC Teacher Competency 4. Discuss electronic communication methods and their advantages.

This teacher competency is aligned with the following Computer Science SOLs:

- CS K.11 The student will discuss, in a whole class setting, how information can be communicated electronically (e.g., email, social media).
- CS 1.13 The student will, in a whole class environment, discuss how information can be communicated electronically (e.g., email, social media).
- CS 2.15 The students will discuss, between partners and as a class, how information can be communicated electronically (e.g., email, social media, video conferencing, blogging).
- CS 3.17 The students will discuss in partners and as a class that information can be transmitted using computing devices via a network (e.g., email, blogging, video messaging).
- CS 4.18 The student will identify and explain different ways information can be transmitted using computing devices via a network (e.g., email, images, and videos)

SNIC Teacher Competency 5. Compare the size and scope of various types of computer networks.

This teacher competency is aligned with the following Computer Science SOLs:

- CS 5.17 The student will compare and contrast the difference between a local network and a worldwide network.

SNIC Teacher Competency 6. Identify problems related to inappropriate use of computing devices and networks.

This teacher competency is aligned with the following Computer Science SOLs:

- CS 1.9 The student will describe what is allowed and what is not allowed at school associated with the use of technology.
- CS 2.9 The student will explain what is allowed and what is not allowed at school associated with the use of technology (e.g., class rules).
- CS 3.10 The student will identify problems that relate to inappropriate use of computing devices and networks.
- CS 4.10 The student will identify and explain problems that relate to inappropriate use of computing devices and networks.
- CS 5.9 The student will evaluate and solve problems that relate to inappropriate use of computing devices and networks.

SNIC Module 2 Quiz

SNIC Teacher Competency 4. Discuss electronic communication methods and their advantages

This teacher competency is aligned with the following Computer Science SOLs:

- CS K.11 The student will discuss, in a whole class setting, how information can be communicated electronically (e.g., email, social media).
- CS 1.13 The student will, in a whole class environment, discuss how information can be communicated electronically (e.g., email, social media).
- CS 2.15 The students will discuss, between partners and as a class, how information can be communicated electronically (e.g., email, social media, video conferencing, blogging).
- CS 3.17 The students will discuss in partners and as a class that information can be transmitted using computing devices via a network (e.g., email, blogging, video messaging).
- CS 4.18 The student will identify and explain different ways information can be transmitted using computing devices via a network (e.g., email, images, and videos)

Types and Uses of Electronic Communications

The attached infographic identifies, defines and outlines uses of various types of electronic communications.

ARCS Course 2 Teacher Competency 2.4 content.pdf
(https://canvas.odu.edu/courses/185315/files/44844867/download?wrap=1)
(https://canvas.odu.edu/courses/185315/files/44844867/download?download_frd=1)

Technology has changed the way we communicate – at home, at school, at work!

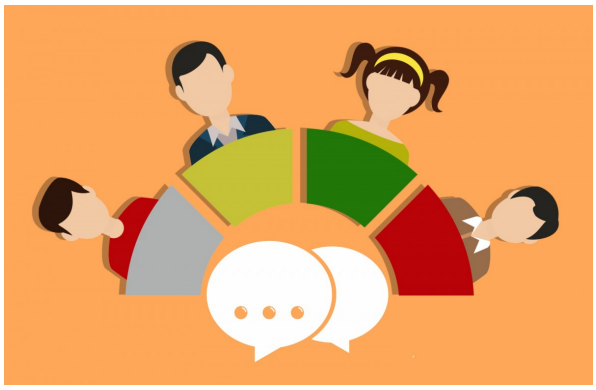
Email

Email is one way to communicate electronically. Email is widely used for personal communications and work because it transfers messages immediately. Access to email is offered free through several online services such as Google (gmail) and Yahoo! Email applications can be accessed through most devices (cell phone, laptop, tablet, desktop computer), but they need to be connected to a network to send and receive messages.

Messaging

Electronic messages are often used in place of email as they are less formal and can be transmitted immediately using many different devices and apps. You can message through cell phone texts, Snapchat, Facebook Messenger, and others. Though most messages can be deleted, many can be retrieved digitally if needed. For this reason, it is important to use safe and appropriate methods of communication,* and refrain from abusive or hurtful messages.

*Safety and ethics in electronic communications will be covered in detail in later modules.



Audio/Video Communications

During the COVID-19 pandemic, individuals, businesses and schools maximized the use of audio/video communications applications like Zoom, WebEx, Skype, FaceTime, HouseParty, and others. These applications allowed us to gather safely while still being social and productive. A webcam, microphone and speakers, or a headset (ear buds, headphones) is needed to fully participate in A/V conferencing, along with internet or cellular service, although there is often a “phone-in” option for joining meetings with audio only.

Social Media

Social media refer to applications that allow users to post and share content with others, including messages, pictures, videos, news, etc. Social media provides a platform to share information with large numbers of others, often called “followers,” at one time. Individuals, businesses and organizations can interact with followers on social media, making it an excellent tool for marketing products, ideas, and general information. Examples of social media include Facebook, Twitter, Tik Tok, Pinterest, YouTube, and Instagram.

SNIC Teacher Competency 4. Curricular Alignment and Curriculum Framework

The information contained on the next few pages will help you as you begin to develop your lesson plan for this course, including the following information for this competency:

- Computer Science SOL vertical alignment (K-5)
- Cross-curricular alignment
- Background information and Essential Skills, Questions, and Vocabulary (Curriculum Framework)

SNIC Teacher Competency 4. CS SOL Vertical Alignment (K-5)

The attached file illustrates the vertical alignment of this CS SOL competency across K-5 grade span. The yellow highlighted areas indicate the CS standards with which this teacher competency align. The light blue shaded areas indicate introductory level skills and the dark blue shaded areas indicate proficiency of the standards.

Please note that this vertical alignment document was developed by TCEP faculty and has not been vetted by the VDOE or CodeVA.

SNIC Vertical Alignment 4.pdf (https://canvas.odu.edu/courses/185315/files/44844897/download?wrap=1) **(https://canvas.odu.edu/courses/185315/files/44844897/download?download_frd=1)**

Computer Science SOLs	Grade					
	K	1	2	3	4	5
Discuss, in a whole class setting, how information can be communicated electronically (e.g., email, social media, video conferencing, blogging). K.11, 1.13, 2.15						
Discuss in partners and as a class that information can be transmitted using computing devices via a network (e.g., email, blogging, video messaging). 3.17						
Identify and explain different ways information can be transmitted using computing devices via a network (e.g., email, images, and videos). 4.18						
Compare and contrast the difference between a local network and a worldwide network. 5.17						
Light blue – Introduction Dark blue - Proficient						

SNIC Teacher Competency 4. CS Cross-Curricular Alignment (K-5)

Listed below are some suggested areas of integration from the VDOE, but this is not an exhaustive list. What areas do you see for cross-curricular alignment?

Computer Science Standard	Opportunity for Integration
K.11 The student will discuss, in a whole class setting, how information can be communicated electronically (e.g., email, social media).	English: K.1 (oral communication) Social Studies: K.1 (collaborating and participating in classroom activities)

SNIC Teacher Competency 4. Additional Resources

Here are some additional resources that may be of interest to you. Please note that ODU is not responsible for the content contained on external sites.
***We recommend that you right click on the links and choose "Open in New Tab" for best viewing.**

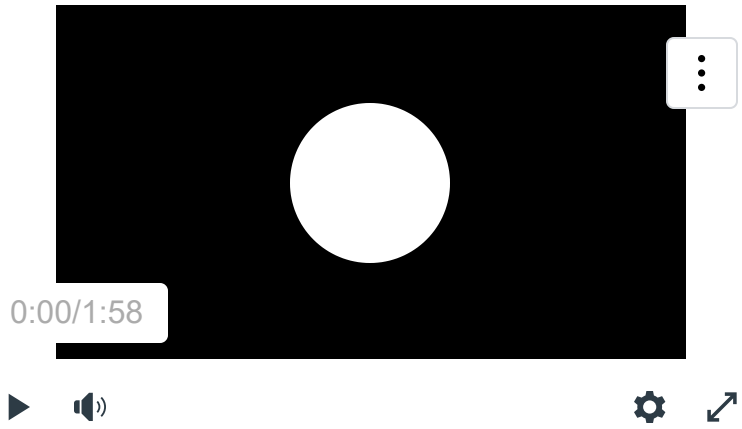
- **What is an Electronic Communication and Its Types (elprocus.com) (https://www.elprocus.com/electronic-communication-and-its-types/#:~:text=Electronic%20communication%20can%20be%20defined%20as%2C%20the%20communication,graphics%2C%20sound%2C%20pictures%2C%20maps%2C%20software%2C%20and%20many%20things.)**
- **Online Communication - Definition, Types and Skills | Marketing91 (https://www.marketing91.com/online-communication/)**
- **Most Effective Tools and Rules of Online Communication - Mailbird (getmailbird.com) (https://www.getmailbird.com/online-communication/)**
- **Advantages and Disadvantages of Online Communication (bangthetable.com) (https://www.bangthetable.com/blog/advantages-and-disadvantages-of-online-communication-2/)**

SNIC Teacher Competency 5. Compare the size and scope of various types of computer networks

This teacher competency is aligned with the following Computer Science SOLs:

- CS 5.17 The student will compare and contrast the difference between a local network and a worldwide network.

Computer Networks



SNIC 5 Computer networks.pdf (https://canvas.odu.edu/courses/185315/files/44844958?wrap=1) **(https://canvas.odu.edu/courses/185315/files/44844958/download?download_frd=1)**

The attached PDF is a static version of the video included on the previous page. If you choose to view the video, we recommend that you right click on the file and choose "Open in New Tab" for best viewing.

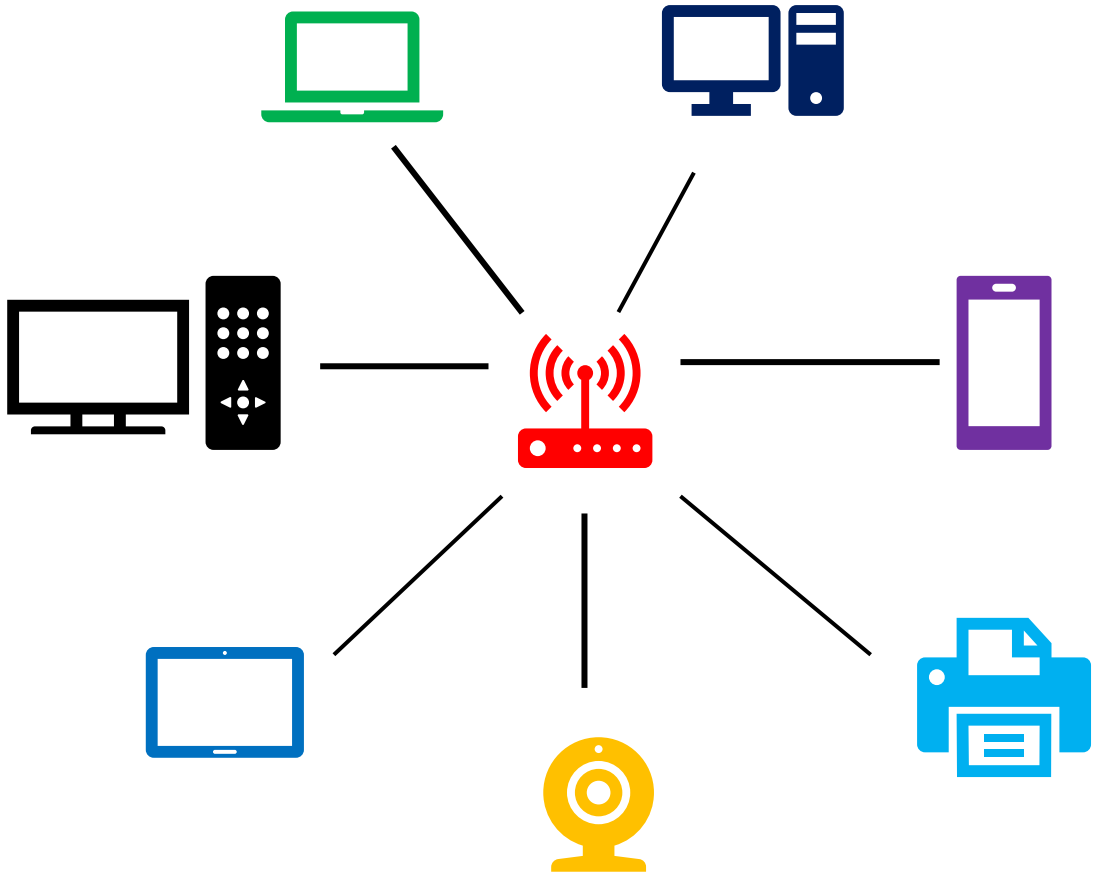
Computer Networks

Connecting Our World

Local Area Network (LAN)

A local area network connects computers and devices such as printers, televisions, home security systems, etc. in a small configuration (limited area) such as a home, school or an office. Each device on the network is called a node.

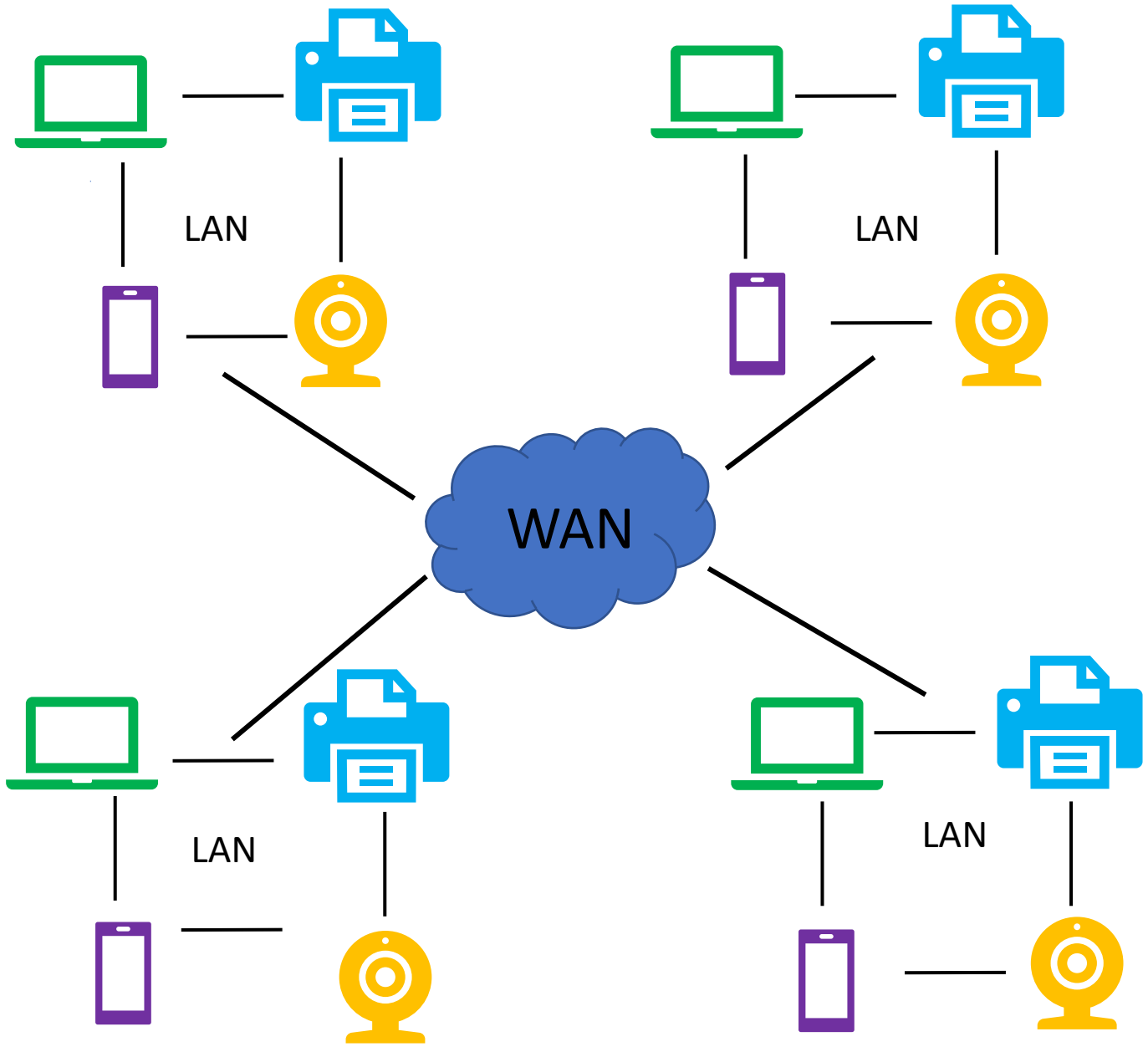
The function of a network is to ensure end to end connectivity.



National Tech Express. Retrieved from http://www.scorelift.com/resources/types-of-computer-networks.html

Wide Area Network (WAN)

A wide area network covers a large geographic area and consists of a communications channel that combines telephone lines, cable, and airwaves. A WAN can connect many LANS and is often provided by utility companies such as a telephone or cable company.



National Tech Express. Retrieved from http://www.scorelift.com/resources/types-of-computer-networks.html

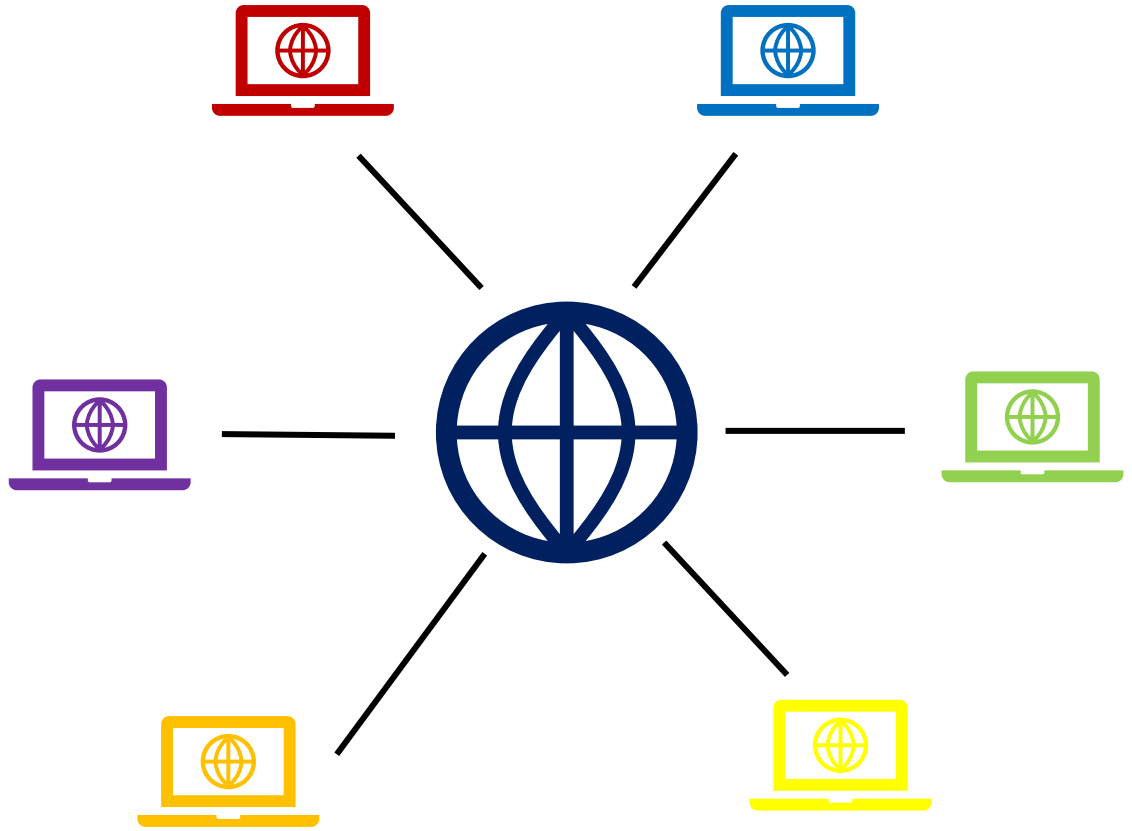
Internet

The internet connects computer systems across the world. It is made up of high bandwidth data lines that are connected to internet hubs that distribute data to locations such as web servers and ISP’s. Computers connect to local networks to gain access to the internet.

Tech Terms. Retrieved from https://techterms.com/definition/internet

Global Area Network (GAN)

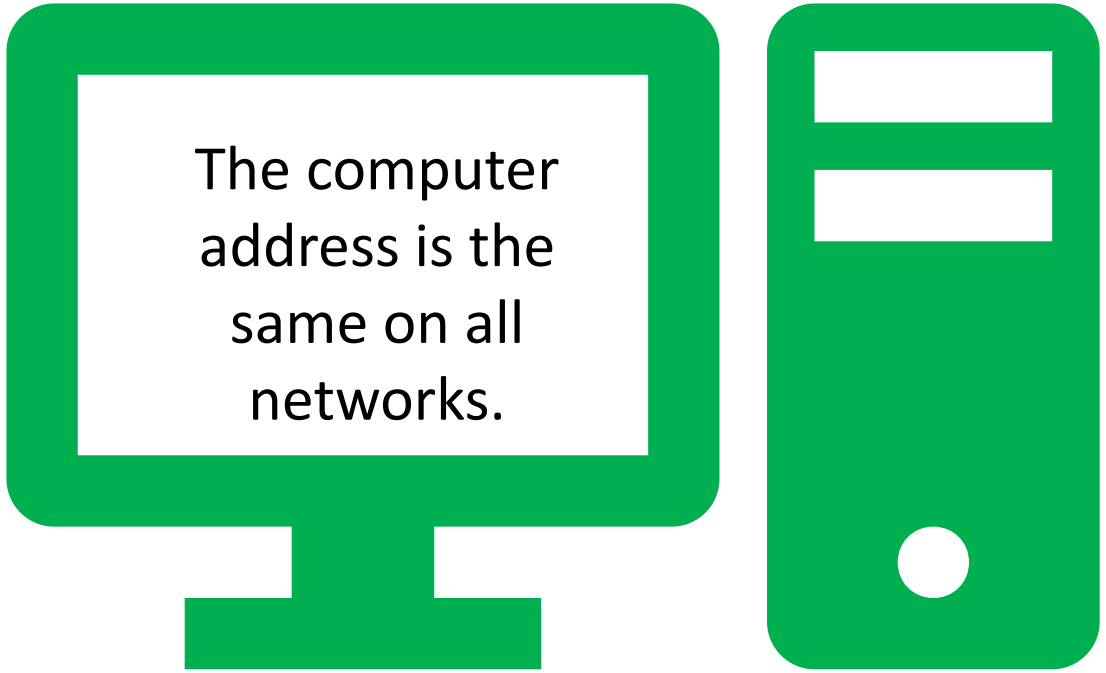
A global area network is composed of many networks across a large geographic area. The internet is a GAN. The global network allows computers to send messages to each other without being near each other.



Technopedia. Retrieved from https://www.techopedia.com/definition/7368/global-area-network-gan

Computers and Networks

Computer addresses identify devices on networks.
Computer addresses remain the same on a LAN, WAN, GAN, and Internet.



Kaspersky. Retrieved from https://www.kaspersky.com/resource-center/definitions/what-is-an-ip-address

References

- National Tech Express. Retrieved from http://www.scorelift.com/resources/types-of-computer-networks.html
- National Tech Express. Retrieved from Tech Terms. Retrieved from https://techterms.com/definition/internet
- Technopedia. Retrieved from https://www.techopedia.com/definition/7368/global-area-network-gan
- Technopedia. Retrieved from https://www.techopedia.com/definition/7368/global-area-network-gan
- Music: https://www.bensound.com

Local Area Network (LAN)

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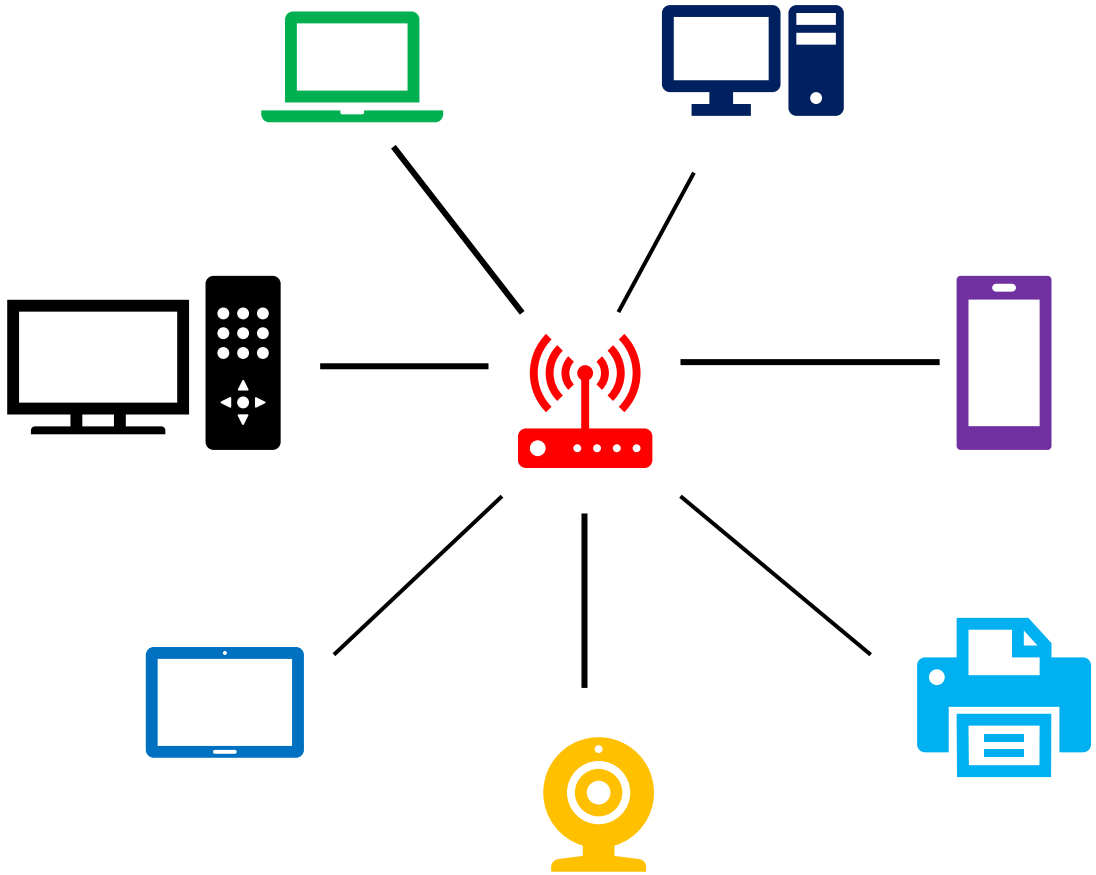
The function of a network is to ensure end to end connectivity.



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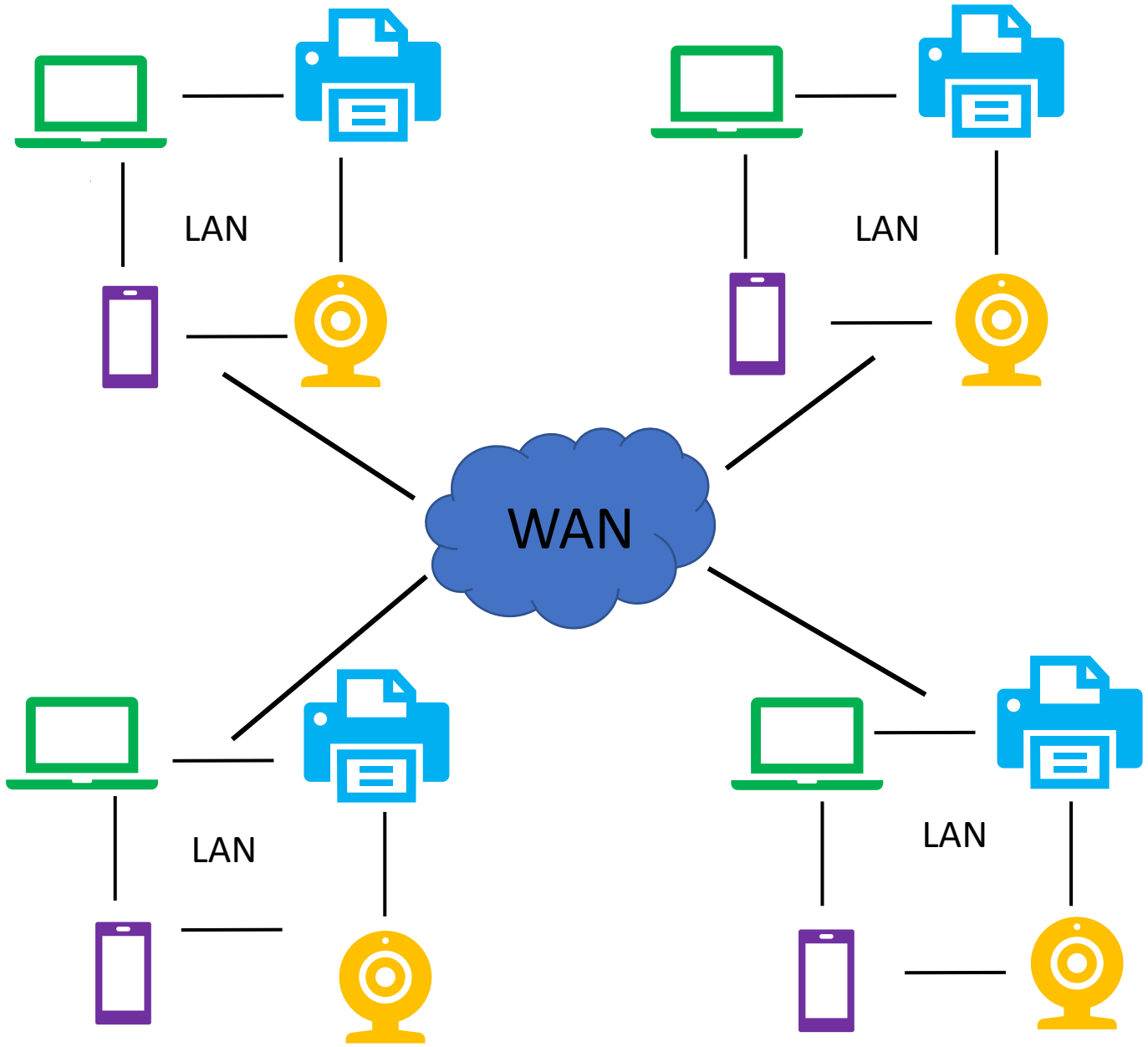

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Internet

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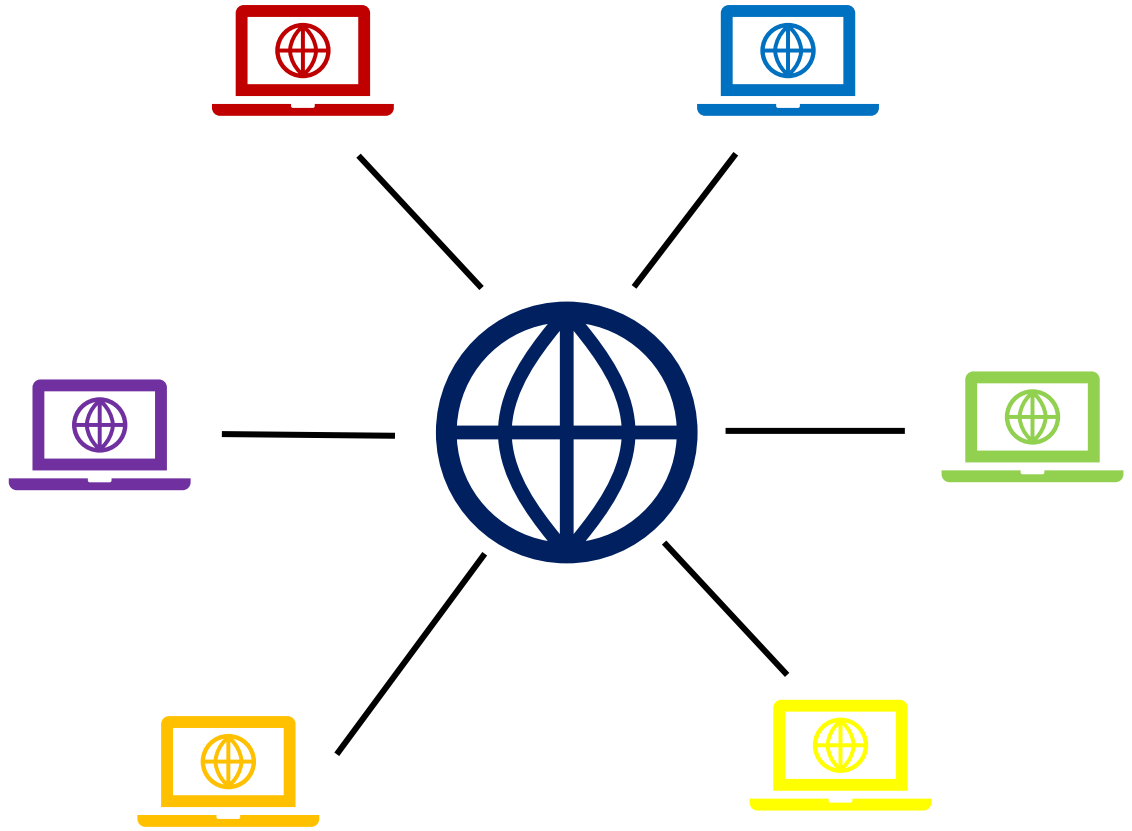
Tech Terms. Retrieved from https://techterms.com/definition/internet

Global Area Network (GAN)

A global area network is composed of many networks across a large geographic area. The internet is a GAN. The global network allows computers to send messages to each other without being near each other.



Technopedia. Retrieved from https://www.techopedia.com/definition/7368/global-area-network-gan

Computers and Networks

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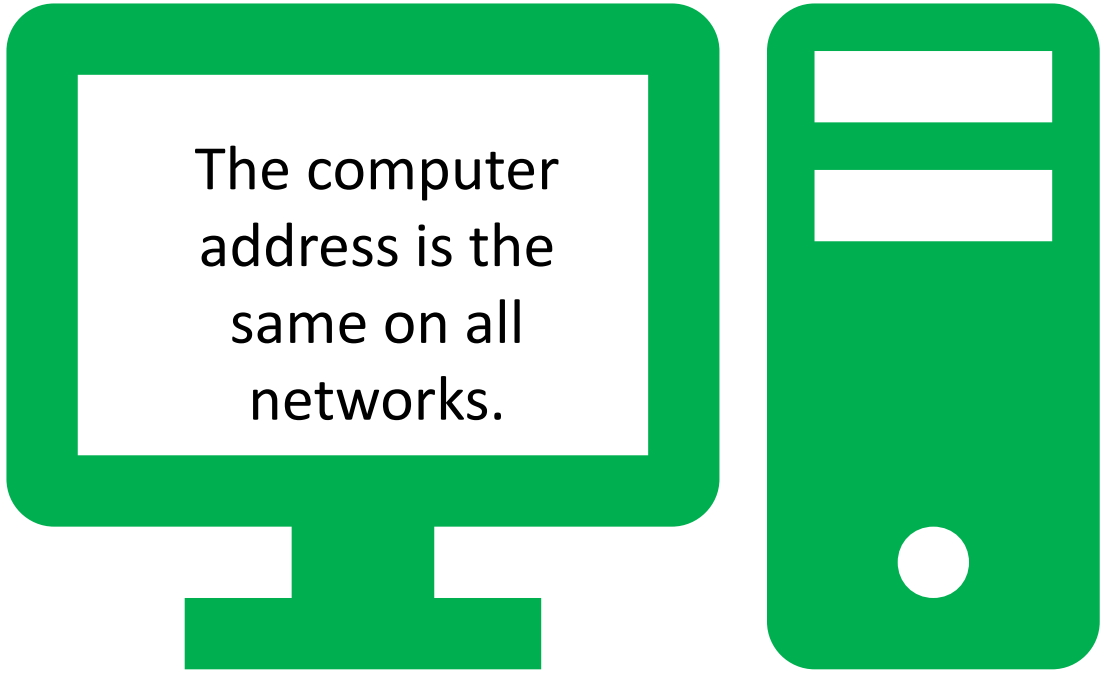
Computer addresses remain the same on a LAN, WAN, GAN, and Internet.



Kaspersky. Retrieved from https://www.kaspersky.com/resource-center/definitions/what-is-an-ip-address

References

- National Tech Express. Retrieved from http://www.scorelift.com/resources/types-of-computer-networks.html
- National Tech Express. Retrieved from Tech Terms. Retrieved from https://techterms.com/definition/internet
- Technopedia. Retrieved from https://www.techopedia.com/definition/7368/global-area-network-gan
- Technopedia. Retrieved from https://www.techopedia.com/definition/7368/global-area-network-gan
- Music: https://www.bensound.com

SNIC Teacher Competency 5. Curricular Alignment and Curriculum Framework

The information contained on the next few pages will help you as you begin to develop your lesson plan for this course, including the following information for this competency:

- Computer Science SOL vertical alignment (K-5)
- Background information and Essential Skills, Questions, and Vocabulary (Curriculum Framework)

SNIC Teacher Competency 5. CS SOL Vertical Alignment (K-5)

The attached file illustrates the vertical alignment of this CS SOL competency across K-5 grade span. The yellow highlighted areas indicate the CS standards with which this teacher competency align. The light blue shaded areas indicate introductory level skills and the dark blue shaded areas indicate proficiency of the standards.

Please note that this vertical alignment document was developed by TCEP faculty and has not been vetted by the VDOE or CodeVA.

SNIC Vertical Alignment 5.pdf (https://canvas.odu.edu/courses/185315/files/44844936/download?wrap=1) (https://canvas.odu.edu/courses/185315/files/44844936/download?download_frd=1)

Computer Science SOLs	Grade					
	K	1	2	3	4	5
Discuss, in a whole class setting, how information can be communicated electronically (e.g., email, social media, video conferencing, blogging). K.11, 1.13, 2.15						
Discuss in partners and as a class that information can be transmitted using computing devices via a network (e.g., email, blogging, video messaging). 3.17						
Identify and explain different ways information can be transmitted using computing devices via a network (e.g., email, images, and videos). 4.18						
Compare and contrast the difference between a local network and a worldwide network. 5.17						
Light blue – Introduction Dark blue - Proficient						

SNIC Teacher Competency 5. Additional Resources

Here are some additional resources that may be of interest to you. Please note that ODU is not responsible for the content contained on external sites.
***We recommend that you right click on the links and choose "Open in New Tab" for best viewing.**

(https://www.guru99.com/types-of-computer-network.html)

Types of Computer Networks: LAN, MAN, WAN, VPN

What Are the Important Types of Computer Networks? There are various types of computer networks available. We can categorize them according to their size as well as their purpose. The size of a networ

(https://www.guru99.com/types-of-computer-network.html)

https://ecomputernotes.com/computernetworkingnotes/computer-network/what-is-a-computer-network (https://ecomputernotes.com/computernetworkingnotes/computer-network/what-is-a-computer-network)

SNIC Teacher Competency 6. Identify problems related to inappropriate use of computing devices and networks

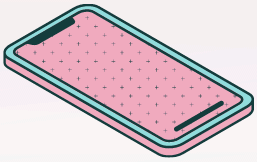
This teacher competency is aligned with the following Computer Science SOLs:

- CS 1.9 The student will describe what is allowed and what is not allowed at school associated with the use of technology.
- CS 2.9 The student will explain what is allowed and what is not allowed at school associated with the use of technology (e.g., class rules).
- CS 3.10 The student will identify problems that relate to inappropriate use of computing devices and networks.
- CS 4.10 The student will identify and explain problems that relate to inappropriate use of computing devices and networks.
- CS 5.9 The student will evaluate and solve problems that relate to inappropriate use of computing devices and networks.

Appropriate Uses of Devices and Networks

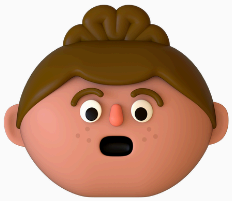
COMPUTING DEVICES AND NETWORKS

USE WITH CARE AND KINDNESS



We have access to more network-connected devices than ever before, helping us to find information and communicate with others...BUT

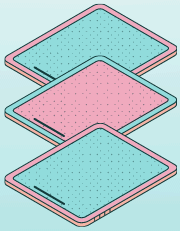
Personal information can be used against you - be careful about what you share, and who can see it!



Cyberbullying can happen across many online platforms, during and outside of school. This can have serious mental and physical impacts.

Power up your privacy - use strong passwords and limit sharing settings to keep your information secure!

Be kind - use devices and networks to work together, and don't say things online that you wouldn't say in person!



Network-connected devices can make our lives easier, but come with an important responsibility - that we use them carefully and kindly!

Use Comparison

MISUSE

VERSUS

APPROPRIATE USE

OF SCHOOL
COMPUTING DEVICES AND NETWORKS

Sharing sensitive information publicly, or using insecure devices or programs	Sharing data with appropriate parties, using secure methods
Personal shopping	Purchasing classroom supplies
Clicking unknown or unverified links	Accessing trusted sites; looking for security indicators (lock icon, https)
Promoting businesses or political candidates	Promoting curricular or co-curricular events

SNIC Teacher Competency 6. CS SOL Vertical Alignment (K-5)

The attached file illustrates the vertical alignment of this CS SOL competency across K-5 grade span. The yellow highlighted areas indicate the CS standards with which this teacher competency align. The light blue shaded areas indicate introductory level skills and the dark blue shaded areas indicate proficiency of the standards.

Please note that this vertical alignment document was developed by TCEP faculty and has not been vetted by the VDOE or CodeVA.

SNIC Vertical Alignment 6.pdf (https://canvas.odu.edu/courses/185315/files/44844898/download?wrap=1) (https://canvas.odu.edu/courses/185315/files/44844898/download?download_frd=1)

Computer Science SOLs	Grade					
	K	1	2	3	4	5
Identify what is allowed and what is not allowed at school when using technology. 1.9, 2.9						
Identify personal information (e.g., address, telephone number, and name) and the importance of protecting personal information online. K.8						
Identify and use strong passwords, explain why strong passwords should be used (e.g., protect name, address, and telephone number). 1.10, 2.10						
Identify problems that relate to inappropriate use of computing devices and networks. 3.10, 4.10, 5.9 (Evaluate & solve problems)						
Create examples of strong passwords, explain why strong passwords should be used, and demonstrate proper use and protection of personal passwords. 3.11, 4.11, 5.10 (Determine whether passwords are strong)						
Light blue – Introduction Dark blue - Proficient						

SNIC Teacher Competency 6. CS Cross-Curricular Alignment (K-5)

Listed below are some suggested areas of integration from the VDOE, but this is not an exhaustive list. What areas do you see for cross-curricular alignment?

Computer Science Standard	Opportunity for Integration
2.9 The student will explain what is allowed and what is not allowed at school associated with the use of technology (e.g., class rules).	Social Studies: 2.11 (rules and laws)
3.10 The student will identify problems that relate to inappropriate use of computing devices and networks.	Social Studies: 3.1L (classroom activities to demonstrate respect for community rules and laws); 3.11a-f (modeling and describing attributes of a good citizen)
4.10 The student will identify and explain problems that relate to inappropriate use of computing devices and networks.	English: 4.1g (using specific vocabulary to communicate ideas)

SNIC Teacher Competency 6. Additional Resources

Here are some additional resources that may be of interest to you. Please note that ODU is not responsible for the content contained on external sites.
***We recommend that you right click on the links and choose "Open in New Tab" for best viewing.**

Using Technology to Hurt Others (https://www.rainn.org/safe-tech) (RAINN, 2021)

Seven Deadly Sins of Social Networking Security (https://www.csoonline.com/article/2124134/seven-deadly-sins-of-social-networking-security.html) (IDG Communications Inc., 2009)

Top 10 Internet Safety Rules & What Not to Do Online (https://www.kaspersky.com/resource-center/preemptive-safety/top-10-preemptive-safety-rules-and-what-not-to-do-online?PID=9069228&CJ_CID=5250933&CJ_PID=9069228&CJ_CID_NAME=Bing+Rebates+by+Microsoft&utm_source=CJ&utm_medium=affiliate&CJEVENT=6f1fd7e4a53d11eb83e102540a82b821&utm_campaign=9069228) (Kaspersky Lab, 2021)

Published | Preview | Assign To | Edit

SNIC Module 2 Quiz

This mini-quiz is optional but recommended as completion will help prepare you for the final assessment for this course.
You can take the quiz up to three times.

Quiz Type	Graded Quiz
Points	70
Assignment Group	Imported Assignments
Shuffle Answers	No
Time Limit	No Time Limit
Multiple Attempts	Yes
Score to Keep	
Attempts	3
View Responses	Always
Show Correct Answers	Immediately
One Question at a Time	No
Require Respondus LockDown Browser	No
Required to View Quiz Results	No

Due	For	Available from	Until
-	Everyone	-	-

Preview

Return to Course Materials (Module 2)

Congratulations, you have completed this module! Click here to return to **Course Materials (https://canvas.odu.edu/courses/185315/pages/systems-networks-and-cybersecurity-modules)** .

Systems Networks and Cybersecurity Module 3

Use the "Next" button below to navigate through this module.

SNIC Module 3 includes the following:

SNIC Teacher Competency 7. Identify personal private information and the importance of protecting that information.

This teacher competency is aligned with the following Computer Science SOLs:

- CS K.8 The student will identify personal information (e.g., address, telephone number, and name) and the importance of protecting personal information online.

SNIC Teacher Competency 8. Identify and use strong passwords.

This teacher competency is aligned with the following Computer Science SOLs:

- CS 1.10 The student will identify and use strong passwords, explain why strong passwords should be used (e.g., protect name, address, and telephone number).
- CS 2.10 The student will identify and create strong passwords, explain why strong passwords should be used. (e.g., Protect name, address, and telephone number).
- CS 3.11 The student will create examples of strong passwords, explain why strong passwords should be used, and demonstrate proper use and protection of personal passwords.
- CS 4.11 The student will create examples of strong passwords, explain why strong passwords should be used, and demonstrate proper use and protection of personal passwords.
- CS 5.10 The student will determine whether passwords are strong, explain why strong passwords should be used, and demonstrate proper use and protection of personal passwords.

SNIC Teacher Competency 9. Explain why strong passwords should be used.

This teacher competency is aligned with the following Computer Science SOLs:

- CS 1.10 The student will identify and use strong passwords, explain why strong passwords should be used (e.g., protect name, address, and telephone number).
- CS 2.10 The student will identify and create strong passwords, explain why strong passwords should be used. (e.g., Protect name, address, and telephone number).
- CS 3.11 The student will create examples of strong passwords, explain why strong passwords should be used, and demonstrate proper use and protection of personal passwords.
- CS 4.11 The student will create examples of strong passwords, explain why strong passwords should be used, and demonstrate proper use and protection of personal passwords.
- CS 5.10 The student will determine whether passwords are strong, explain why strong passwords should be used, and demonstrate proper use and protection of personal passwords.

SNIC Module 3 Quiz

SNIC Teacher Competency 7. Identify personal private information and the importance of protecting that information

This teacher competency is aligned with the following Computer Science SOLs:

- CS K.8 The student will identify personal information (e.g., address, telephone number, and name) and the importance of protecting personal information online.

What is Private and Personal Information and why protect it?

Watch Video (http://www.youtube.com/watch?v=MjPpG2e71Ec)

Private and Personal Information

Duration: 1:37
User: n/a - **Added:** 8/21/18

While this video is aimed at young students, the information and advice provided are valuable to internet users of any age.

SNIC Teacher Competency 7. Curricular Alignment and Curriculum Framework

The information contained on the next few pages will help you as you begin to develop your lesson plan for this course, including the following information for this competency:

- Computer Science SOL vertical alignment (K-5)
- Background information and Essential Skills, Questions, and Vocabulary (Curriculum Framework)

SNIC Teacher Competency 7. CS SOL Vertical Alignment (K-5)

The attached file illustrates the vertical alignment of this CS SOL competency across K-5 grade span. The yellow highlighted areas indicate the CS standards with which this teacher competency align. The light blue shaded areas indicate introductory level skills and the dark blue shaded areas indicate proficiency of the standards.

Please note that this vertical alignment document was developed by TCEP faculty and has not been vetted by the VDOE or CodeVA.

SNIC Vertical Alignment 7.pdf (https://canvas.odu.edu/courses/185315/files/44844951/download?wrap=1) **(https://canvas.odu.edu/courses/185315/files/44844951/download?download_frd=1)**

Computer Science SOLs	Grade					
	K	1	2	3	4	5
Identify what is allowed and what is not allowed at school when using technology. 1.9, 2.9						
Identify personal information (e.g., address, telephone number, and name) and the importance of protecting personal information online. K.8						
Identify and use strong passwords, explain why strong passwords should be used (e.g., protect name, address, and telephone number). 1.10, 2.10						
Identify problems that relate to inappropriate use of computing devices and networks. 3.10, 4.10, 5.9 (Evaluate & solve problems)						
Create examples of strong passwords, explain why strong passwords should be used, and demonstrate proper use and protection of personal passwords. 3.11, 4.11, 5.10 (Determine whether passwords are strong)						
Light blue – Introduction Dark blue - Proficient						

SNIC Teacher Competency 7. Additional Resources

Here are some additional resources that may be of interest to you. Please note that ODU is not responsible for the content contained on external sites.
***We recommend that you right click on the links and choose "Open in New Tab" for best viewing.**

10 Tips for Safe Computing (https://www.foxnews.com/opinion/10-tips-for-safe-computing) (Myers, 2015)

Personally Identifiable Information (https://www.investopedia.com/terms/p/personally-identifiable-information-pii.asp) (Frankenfield, 2021)

SNIC Teacher Competency 8. Curricular Alignment and Curriculum Framework

The information contained on the next few pages will help you as you begin to develop your lesson plan for this course, including the following information for this competency:

- Computer Science SOL vertical alignment (K-5)
- Background information and Essential Skills, Questions, and Vocabulary (Curriculum Framework)

SNIC Teacher Competency 8. CS SOL Vertical Alignment (K-5)

The attached file illustrates the vertical alignment of this CS SOL competency across K-5 grade span. The yellow highlighted areas indicate the CS standards with which this teacher competency align. The light blue shaded areas indicate introductory level skills and the dark blue shaded areas indicate proficiency of the standards.

Please note that this vertical alignment document was developed by TCEP faculty and has not been vetted by the VDOE or CodeVA.

SNIC Vertical Alignment 8 and 9.pdf
(https://canvas.odu.edu/courses/185315/files/44844937/download?wrap=1)
(https://canvas.odu.edu/courses/185315/files/44844937/download?download_frd=1)

Computer Science SOLs	Grade					
	K	1	2	3	4	5
Identify what is allowed and what is not allowed at school when using technology. 1.9, 2.9						
Identify personal information (e.g., address, telephone number, and name) and the importance of protecting personal information online. K.8						
Identify and use strong passwords, explain why strong passwords should be used (e.g., protect name, address, and telephone number). 1.10, 2.10						
Identify problems that relate to inappropriate use of computing devices and networks. 3.10, 4.10, 5.9 (Evaluate & solve problems)						
Create examples of strong passwords, explain why strong passwords should be used, and demonstrate proper use and protection of personal passwords. 3.11, 4.11, 5.10 (Determine whether passwords are strong)						
Light blue – Introduction Dark blue - Proficient						

SNIC Teacher Competency 8. Additional Resources

Here are some additional resources that may be of interest to you. Please note that ODU is not responsible for the content contained on external sites.

***We recommend that you right click on the links and choose "Open in New Tab" for best viewing.**

Create a strong password & a more secure account - Google Account Help (https://support.google.com/accounts/answer/32040?hl=en#zippy=%2Cmake-your-password-unique%2Cavoid-personal-info-common-words%2Cmake-your-password-longer-more-memorable%2Chide-written-passwords)

https://www.webroot.com/us/en/resources/tips-articles/how-do-i-create-a-strong-password (https://www.webroot.com/us/en/resources/tips-articles/how-do-i-create-a-strong-password)

https://www.cnet.com/how-to/best-password-manager/ (https://www.cnet.com/how-to/best-password-manager/)

SNIC Teacher Competency 9. Explain why strong passwords should be used

This teacher competency is aligned with the following Computer Science SOLs:

- CS 1.10 The student will identify and use strong passwords, explain why strong passwords should be used (e.g., protect name, address, and telephone number).
- CS 2.10 The student will identify and create strong passwords, explain why strong passwords should be used. (e.g., Protect name, address, and telephone number).
- CS 3.11 The student will create examples of strong passwords, explain why strong passwords should be used, and demonstrate proper use and protection of personal passwords.
- CS 4.11 The student will create examples of strong passwords, explain why strong passwords should be used, and demonstrate proper use and protection of personal passwords.
- CS 5.10 The student will determine whether passwords are strong, explain why strong passwords should be used, and demonstrate proper use and protection of personal passwords.

Using Strong Passwords

Why should you use strong passwords?

When passwords aren't easily found, people with malicious intend can use brute force to try every word in the dictionary in multiple languages. They will also use common password techniques like replacing "a" with "@" ,"i" with "1" and using capital letters. A common password like "password" is only slightly less secure than "P@ssW0rd".

Online accounts like email and social media are often compromised and people with malicious intent can get their hands on lists of usernames or passwords. If the information identifies the user, it can be used to try to hack into other accounts, like secondary emails or bank accounts. This is why unique passwords for each account are important.

SNIC Teacher Competency 9. Curricular Alignment and Curriculum Framework

The information contained on the next few pages will help you as you begin to develop your lesson plan for this course, including the following information for this competency:

- Computer Science SOL vertical alignment (K-5)
- Background information and Essential Skills, Questions, and Vocabulary (Curriculum Framework)

SNIC Teacher Competency 9. CS SOL Vertical Alignment (K-5)

The attached file illustrates the vertical alignment of this CS SOL competency across K-5 grade span. The yellow highlighted areas indicate the CS standards with which this teacher competency align. The light blue shaded areas indicate introductory level skills and the dark blue shaded areas indicate proficiency of the standards.

Please note that this vertical alignment document was developed by TCEP faculty and has not been vetted by the VDOE or CodeVA.

SNIC Vertical Alignment 8 and 9.pdf
(https://canvas.odu.edu/courses/185315/files/44844937/download?wrap=1)
(https://canvas.odu.edu/courses/185315/files/44844937/download?download_frd=1)

Computer Science SOLs	Grade					
	K	1	2	3	4	5
Identify what is allowed and what is not allowed at school when using technology. 1.9, 2.9						
Identify personal information (e.g., address, telephone number, and name) and the importance of protecting personal information online. K.8						
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Light blue – Introduction Dark blue - Proficient						

SNIC Teacher Competency 9. Additional Resources

Here are some additional resources that may be of interest to you. Please note that ODU is not responsible for the content contained on external sites.
***We recommend that you right click on the links and choose "Open in New Tab" for best viewing.**

https://www.cisecurity.org/newsletter/why-strong-unique-passwords-matter/ (https://www.cisecurity.org/newsletter/why-strong-unique-passwords-matter/)

Published | Preview | Assign To | Edit

SNIC Module 3 Quiz

This mini-quiz is optional but recommended as completion will help prepare you for the final assessment for this course.
You can take the quiz up to three times.

Quiz Type	Graded Quiz
Points	70
Assignment Group	Imported Assignments
Shuffle Answers	No
Time Limit	No Time Limit
Multiple Attempts	Yes
Score to Keep	
Attempts	3
View Responses	Always
Show Correct Answers	Immediately
One Question at a Time	No
Require Respondus LockDown Browser	No
Required to View Quiz Results	No

Due	For	Available from	Until
-	Everyone	-	-

Preview

Return to Course Materials (Module 3)

Congratulations, you have completed this module!

Click here to return to **Course Materials. (https://canvas.odu.edu/courses/185315/pages/systems-networks-and-cybersecurity-modules)**

Click here to proceed to the **Lesson Plan Assignment materials (https://canvas.odu.edu/courses/185315/pages/lesson-planning-instructions-and-resources)** .

Click here to proceed to the **Final Assessment (https://canvas.odu.edu/courses/185315/quizzes/690522)** for this course.

Lesson Planning Instructions and Resources

In addition to completing the Final Assessment for this microcredential, you also need to submit a lesson plan that incorporates the CS SOL standards covered in this course along with a self-reflection statement.

This page contains information designed to assist you in this assignment.

Instructions for the assignment:

1. Select a grade level appropriate Computer Science standard or standards associated with any of the modules contained in this microcredential and design a lesson for your students using the 5E lesson format. The lesson can include computer science standards integrated with a core content area standard or computer science standards only.
2. Use the information contained in the Curricular Alignment and Curriculum Framework sections of the modules as well as the Lesson Plan Organizer, Blooms Taxonomy chart and Lesson Plan Checklist, all included in this module, to assist you in your lesson design.
3. Design your final lesson on the Lesson Plan Template (also included in this module) and save your lesson plan as Your Name_Lesson Title.
4. Need additional help? See the two sample lesson plans in this module to get you started.
5. Complete your Self-Reflection (see instructions on the next page in this module) and save as YourName_Reflection.
6. Upload your lesson plan and self reflection using the "Lesson Plan Submission" link below.

Click here to submit your Lesson Plan Assignment (https://canvas.odu.edu/courses/185315/assignments/2703136) or navigate through this module and submit where instructed.

Lesson Plan Brainstorm

Fill in the icons with a lesson component ideas

Engage: How will I capture student's interest?

Explore: Describe hands-on / minds-on activities students will be doing. List "Big Idea" questions.

Explain: What techniques can I use to help students connect the exploration to the concept?

Elaborate: What vocabulary will be introduced? How will the knowledge be applied to daily life?

Evaluate: How will students demonstrate that they have achieved the lesson objective?

ARCS Microcredential Lesson Plan Self-Reflection Instructions

Please submit a statement of self-reflection for the lesson plan assignment for this course. Your self-reflection should be in narrative format and be no longer than 250 words.

There is no template for this part of the assignment, but please ensure that all of the following are present:

- Reflection offers insight into why the topic(s) and SOL(s) were chosen as the focus of the lesson.
- Reflection describes how the teacher drew on their content knowledge to design the lesson.
- Reflection describes how teacher drew on their pedagogical knowledge to design the lesson.
- Reflection describes how the lesson could be modified to support one or more groups of diverse learners.

ARCS Microcredential Lesson Rubric

Part A. Lesson Plan Format and Instructional Goals

Teacher competency:	**Pass**
The lesson plan follows the 5E lesson format.	All of the following are present: ☐ The lesson is organized in the 5E format. ☐ All of the E sections are present: Engage, Explore, Explain, Elaborate, and Evaluate. ☐ The topic of the lesson is evident in all of the E sections.
The lesson plan includes instructional goals and objectives, sometimes referred to as Learning Targets.	All of the following are present: ☐ Instructional goals/objectives are clearly labeled. ☐ What the learner will know and be able to do are clearly stated. ☐ The Evaluate section addresses students' acquisition of the instructional goals and objectives.

Part B. SOL Content Selection and Integration

Teacher competency:	**Pass**
The lesson is designed around a Virginia Computer Science SOL. A content area SOL is optional except in the Lesson Integration Microcredential.	All of the following are present: ☐ The grade level CS SOL is clearly identified. ☐ Key vocabulary terms are presented. ☐ The Engage or Explore portions of the lesson allow students to enact the CS Standard, Skills and Concepts.
**Lesson Integration Microcredential Lesson Plan: The lesson includes a content area SOL as well as a CS SOL.	All of the following are present: ☐ The grade level content area SOL (e.g. math, science) is clearly identified. ☐ Key vocabulary terms for the content area SOL are presented. ☐ Two or more portions of the lesson plan allow students to enact CS and content area Standards, Skills, and Concepts.

Part C. Instructional Delivery

Teacher competency:	Pass
The lesson describes grade level appropriate instructional strategies.	All of the following are present: ☐ For each of the 5E sections, an appropriate instructional strategy is described. ☐ For each of the 5E sections, the lesson plan includes information about anticipated teacher and student behavior. ☐ The instructional strategies allow for the student to demonstrate the actions listed in the SOL (e.g. create, construct).
The lesson includes appropriate materials and technology.	All of the following are present: ☐ Materials (and technology, if needed) are developmentally appropriate. ☐ All necessary materials (and technology, if needed) are clearly listed. ☐ The selected materials (and technology, if needed) enhance learning.

Part D. Teacher reflection

Teacher competency:	Pass
A statement is included in which the teacher reflects on their own areas of professional growth.	All of the following are present: ☐ Reflection offers insight into why the topic(s) and SOL(s) were chosen as the focus of the lesson. ☐ Reflection describes how the teacher drew on their content knowledge to design the lesson. ☐ Reflection describes how teacher drew on their pedagogical knowledge to design the lesson. ☐ Reflection describes how the lesson could be modified to support one or more groups of diverse learners.

ARCS Lesson Plan Template

Lesson Title:	**Duration:**
CS Standard:	**Content area standard (if applicable):**
Essential Question(s):	
Student Objectives: I can …	
Vocabulary:	
Differentiation strategies:	
Resources:	
Engage:	
Explore:	
Explain:	
Elaborate:	
Evaluate:	

Attachments (as needed)

Student materials

Published | Preview | Assign To | Edit

SNIC Final Assessment

This assessment is designed to test your content knowledge for the Computing Systems, Networks and the Internet, and Cybersecurity microcredential course. You must earn at least 80 percent to receive a passing score.
You may take the test up to three times.

Quiz Type	Graded Quiz
Points	96
Assignment Group	Imported Assignments
Shuffle Answers	No
Time Limit	No Time Limit
Multiple Attempts	Yes
Score to Keep	
Attempts	3
View Responses	Always
Show Correct Answers	Immediately
One Question at a Time	No
Require Respondus LockDown Browser	No
Required to View Quiz Results	No

Due	For	Available from	Until
-	Everyone	-	-

Preview

SNIC Final Assessment

This is a preview of the published version of the quiz

Started: Sep 19 at 12:21pm

Quiz Instructions

This assessment is designed to test your content knowledge for the Computing Systems, Networks and the Internet, and Cybersecurity microcredential course. You must earn at least 80 percent to receive a passing score.
You may take the test up to three times.

Question 1 4 pts
All of the following are components of a computing system except for…

- Mouse
- Monitor
- Surge protector
- Router

Question 2 4 pts
Which of the following can NOT be used to move the cursor on a screen?

- Keyboard
- Mouse
- Trackpad
- Microphone

Question 3 4 pts
Classify the following elements of a computing system as either hardware or software.

Keyboard

[Choose]

Operating system [Choose]

Printer [Choose]

Web browser [Choose]

Question 4 4 pts

Classify the following elements of a computing system as either input or output devices.

Mouse [Choose]

Probe [Choose]

Speakers [Choose]

Projector [Choose]

Question 5 4 pts

Computing system components can act as both input and output devices.

- True
- False

Question 6 4 pts

Which choice best explains the difference between a computing system and a computing network?

- Computing networks are made up of multiple computers where computing systems are a single computer
- Computing systems can not allow for messages to be sent from end to end
- Computing systems focus multiple components or devices for a common purpose

Computing networks are flexible in scale where systems are limited to just local pieces

Question 7 4 pts

Which of the following is NOT a good method to troubleshoot a website not functioning properly?

Close and reopen the web browser

Reboot the computer

Ask a colleague

Eject any external devices

Question 8 4 pts

Mrs. Williams's second grade class is using programmable robots to navigate a maze, but they will not power on. The problem Is most likely...

A software issue

A hardware issue

Both

Neither

Question 9 4 pts

After a power surge, Mrs. Brown notices her laptop will not connect to the school's WiFi. The first step she should try to troubleshoot is...

Reinstall her operating system

Replace a server

Flip the circuit breaker

Reboot her laptop

Question 10 4 pts

Which of the following digital communication methods are considered to be asynchronous? Check all that apply.

- [ ] Email
- [ ] Video meeting (e.g., Zoom)
- [ ] Chat room
- [ ] Text message

Question 11 4 pts

What is an advantage of synchronous video conferencing (e.g., Zoom)?

- ○ Visibility of nonverbal face cues
- ○ Ability to send a carefully crafted answer
- ○ Freedom to work while not online
- ○ Flexibility to participate at any time

Question 12 4 pts

A local network within a house may include a variety of devices such as computers, printers, and routers.

- ○ True
- ○ False

Question 13 4 pts

Which of the following statements is false regarding computing devices and their connection to networks?

- ○ Computers connect to local networks to gain access to the internet
- ○ Global networks allow messages to be sent from computer to computer without being near each other
- ○ A primary function of any network is to ensure end to end connectivity

Computers have separate addresses for local networks and global networks

Question 14 4 pts

Which of the following could NOT be caused by inappropriate use of computing devices on a network?

A power outage prevents all internet access

A computer virus spreads among computers within a school

A student's private information is displayed online

Copyright material is shared among teachers

Question 15 4 pts

Mary uses her school email and sends a message asking if anyone is interested in joining her Multi-Level Marketing team. This is an inappropriate use of school hardware.

True

False

Question 16 4 pts

Why is it inappropriate to use a school-issued device to shop online at work?

Better sales can be obtained after school hours

It takes time away from professional work

Students may see your purchase history

School internet access is often slower than home access

Question 17 4 pts

Which of the following personal descriptors would be classified as private information?

I. Email Address

II. Twitter Handle

III. Birthday

○ I only

○ III only

○ II and III

○ I, II, and III

Question 18 4 pts

What is a risk posed by releasing personal private information?

○ Getting a bad grade on an assignment

○ Receiving a spam email

○ Getting tagged in a social media post

○ Having a threat sent from your email address

Question 19 4 pts

How could you recognize that your personal private information has been compromised?

○ New accounts have been created in your name

○ You receive advertisement emails from a website

○ You no longer receive emails

○ You are tagged in multiple social media posts

Question 20 4 pts

Which of the following is the strongest password?

○ password

Virginia4!

ComputerScience

g$9Hdf(3dF@

Question 21 4 pts

What are common attributes of a strong password? Check all that apply.

Contains a number

Contains both upper and lowercase letters

Contains a special symbol

Contains easily remembered words

Question 22 4 pts

Passphrases allow for more secure passwords that are easier to remember.

True

False

Question 23 4 pts

Rate the password “12341234” on its strength.

Very Weak

Weak

Strong

Very strong

Question 24 4 pts

What are considered good practices when using passwords? Check all that apply.

- [ ] Using the same password for multiple accounts
- [ ] Using password management software (e.g., LastPass)
- [ ] Having a file containing your passwords
- [ ] Using two-factor authentication if available

Not saved Submit Quiz