Impacts of Computing and Cybersecurity
Module 5 Lessons 5.6, 5.9, 5.10 and 5.14-5.16

Context of the Lesson

The Big Idea: Students will reflect on the impacts of computing including how they impact cultural practices, pervasiveness in daily life, and the social and ethical issues relating to computing devices.

Prerequisite Knowledge and Skills:

- Knowledge of computing devices
- Using computing devices for everyday tasks
- Basic understanding of computing networks
- Basic understanding of how use computing devices
- Basic understanding of what not to do using computing devices

Connections to SOLs:

- Computer Science 5.6
- Computer Science 5.9
- Computer Science 5.10
- Computer Science 5.14-5.16
- Computer Technology 3-5.11
- Computer Technology 6-8.3
- English 5.9(d) and 5.9(e)

Objectives of the Lesson

Learning Targets (I can...):

- I can give examples and explain how computer science has changed the world
- I can express how computing technologies influence, and are influenced by, cultural practices
- I can evaluate and describe the positive and negative impacts of the pervasiveness of computers and computing in daily life (e.g., downloading videos and audio files, electronic appliances, wireless Internet, mobile computing devices, GPS systems, wearables computing)
- I can explain social and ethical issues that relate to computing devices and networks
- I can give credit to sources when borrowing or changing ideas (e.g., using information, pictures created by others, using music created by others, remixing programming projects)
- I can evaluate and solve problems that relate to inappropriate use of computing devices and networks
- I can determine whether passwords are strong, explain why strong passwords should be used, and demonstrate proper use and protection of personal passwords

Formative Assessment

- Extended time on assignment
- Verbal testing
- Selective student seating
- Group and individual activities
- Instructional aids
- Written testing

Materials

- Visual Aid for instructor to write on (e.g., chalkboard, projector, dry erase board, easel)
- Handouts and writing utensil for students (optional)
- Computer (optional)
- Means to play video (optional)

Lesson Structure and Activities

Warm Up *[5-10min]* , answers to be written out by instructor on visual aid

Ask: What are some computing devices we use every day?

- Responses will vary. (Computers, cell phones, GPS, wearables, doorbells, security cameras, video game consuls, streaming devices/sticks etc.)

Remind students of unconventional computing devices and ask for some outside of the box thinking:

- Responses will vary. (Traffic lights, credit card readers, ATM machines, automobiles, airplanes, etc.)

Explain to students that the adaption of computing devices into everyday life has changed the world and we are going to be talking and thinking about that today.

Launch (Engage) *[5-10min]* :Teacher Directed Instruction:

Computer Science is the study of how we use computing technology to solve human problems. Everyday computing devices are used to make everyday tasks accessible, easier, and more efficient. Culture refers to characteristic patterns of attitudes, values, beliefs, and behaviors shared by members of a society or population. Computing devices and technologies have had impacts on cultural practices and norms.

Computing devices have allowed communication to become more efficient. Email, texting, Video Conferencing, and phone calls can now all be done on a small, lightweight, and portable device such as a cell phone, pda, ipad/ipod, tablet, etc.

Ask: What were some ways of communicating before computing devices?

- Responses will vary. (physical mail, telegraph, landline phone, in person communication)

Explain to students that the adaption of computing devices into everyday life for the most part has made real-time communication more affordable (i.e., no need to fly across the country to see someone's face for a conversation as you can now use video conferencing) and more efficient (i.e., no need to wait for a physical letter to arrive in order to convey a message when you can text and email), and more accessible.

Computing devices have also made access to information more accessible. Information can include videos, audio, documents, etc. The ease of access to information in some ways has reduced the cost of knowledge. For example, some schools post videos of their lectures online and anyone in the world can have access to the knowledge the teacher is teaching without needing a teacher physically present in their location. Additionally, individuals can post videos on platforms such as YouTube on how to build or repair something and anyone that would like to learn how to build or repair that item can watch and attempt it themselves.

Ask: What were some other positive ways computing technologies have changed the world?

- Responses will vary.

Computing affects many aspects of the world in both positive and negative ways at local, national, and global levels. Individuals and communities influence computing through their behaviors and cultural and social interactions, and in turn, computing influences new cultural practices. An informed and responsible person should understand the social implications of the digital world, including equity and access to computing.

The adaption of computing devices and technology into everyday life have changed cultural practices. For example, with the adoption of email and text, messages can be sent in real-time at any hour of the day, not just business hours. With the ease of access to information, information and answers are expected to be readily available (i.e., googling an answer, finding specific video and being able to watch it). No more driving to a video store to rent a movie when you can queue it from your home on your streaming device, no more driving to a store to buy your favorite musicians CD when you can get the MP3 from your device, and no more having to watch a favorite TV show when it airs on TV when you can DVR or stream it later.

Computing technology has positively and negatively changed the way people live and work. Computing devices can be used for entertainment and as productivity tools, and they can affect relationships and lifestyles. Computing devices, such as fitness trackers, can motivate a more active lifestyle by monitoring physical activity. On the other hand, passively consuming media from computing devices may lead to a more sedentary lifestyle. In the past, the most popular form of communication was to send mail via the postal service. Now, more people send emails or text messages.

However, with the introduction of these computing device in our everyday lives, new challenges have presented themselves. With communication more efficient using computing technologies, individuals appear "always available."

Ask: How many of you have ever been asked, "Why didn't you respond to my text message or email" when the text/email was sent within an hour or two?

- This is to gauge audience attention

The development and modification of computing technology is driven by people's needs and wants and can affect groups differently. Computing technologies influence, and are influenced by, cultural practices. New computing technology is created and existing technologies are modified to increase their benefits (for example, Internet search recommendations), decrease their risks (for example, autonomous cars), and meet societal demands (for example, smartphone apps). Increased Internet access and speed have allowed people to share cultural information but have also affected the practice of traditional cultural customs.

Computing devices and technologies have become pervasive in everyday life. Checking a phone too often can be distracting and can negatively impact a learning environment. However, in cases of emergencies there are numerous benefits to having a phone nearby and being able to quickly communicate with someone.
Ask: Using the list of computing devices discussed earlier and written on the visual aid, as a group discuss at least a positive and negative affect the device has had in everyday life.

- Responses will vary.

There are numerous social and ethical issues that relate to computing devices and networks. Ethical complications arise from the opportunities provided by computing. The ease of sending and receiving copies of media on the Internet, such as video, photos, and music, creates the opportunity for unauthorized use, such as online piracy, and disregard of copyrights, such as lack of attribution. Online piracy, the illegal copying of materials, is facilitated by the ability to make identical-quality copies of digital media with little effort. Other topics related to copyright are plagiarism, fair use, and properly citing online sources. Some such as plagiarism and copyright infringement have existed before computing technology, but have become more common and widespread. Software piracy is the unauthorized copying of software for person use or use by others and includes plagiarism of all or part of code that belongs to anyone else. Plagiarism is taking (the work or an idea of someone else) and pass it off as one's own. With the ease of access to information, plagiarism (i.e., copying and pasting) has become easy to do. "Fair use" is the doctrine that brief excerpts of copyright material may, under certain circumstances, be quoted verbatim for purposes such as criticism, news reporting, teaching, and research, without the need for permission from or payment to the copyright holder, using a citation that gives credit to sources when borrowing or changing other people's ideas.

Ask: When using information created by others such as using a picture created by someone else, using a sentence created by someone else, a sample of music created by someone else, or a video by someone else, what must be done in order to not plagiarize their work?

- Answer: you must give credit to sources when borrowing or changing ideas that others have created.

Sometimes people behave differently online than they do in person. When speaking face to face, tone of voice and emotions are easier to interpret than when speaking using text.

Ask: Raise your hand if when speaking someone using messages you didn't know they were upset or you were upset but they didn't know.

- This is to gauge audience attention.

To get around this social issue many people use emoji's when text messaging. An emoji is a small digital image or icon used to express an idea, emotion, etc., in electronic communication.

Computing has positively and negatively changed the way people communicate. People can have access to information and each other instantly, anywhere, and at any time, but they are at the risk of cyberbullying and reduced privacy. Online communication facilitates positive interactions, such as sharing ideas with many people, but the public and anonymous nature of online communication also allows intimidating and inappropriate behavior in the form of cyberbullying. Privacy should be considered when posting information online; such information can persist for a long time and be accessed by others, even unintended viewers.

Cyberbullying is bullying that takes place over digital devices like cell phones, computers, and tablets. Cyberbullying can occur through SMS, Text, and apps, or online in social media, forums, or gaming where people can view, participate in, or share content. Cyberbullying includes sending, posting, or sharing negative, harmful, false, or mean content about someone else. It can include sharing personal or private information about someone else causing embarrassment or humiliation. Some cyberbullying crosses the line into unlawful or criminal behavior.

Ask: Who has had their feelings hurt by something they read online?

- This is to gauge audience attention.

Not everyone will react to a particular situation the same way, but just because a reaction is different from our own, that doesn't mean we should discount others' feelings. Words, whether typed or spoken, can impact how someone else feels.

Ask: How should we treat people we talk to online?

- Responses will vary. (behave appropriate in virtual groups and be proactive in preventing bullying behavior in an environment that provides anonymity to bullies, communicate respect for people when participating in group online learning activities)

Privacy should be considered when posting information online; such information can persist for a long time and be accessed by others, even unintended viewers.

Purposeful and accidental illegal activity has become easier and more widespread with the mass adaption of computing devices and technologies into everyday life. Computers can be used for unethical and illegal means. For example, hacking or gaining access into another person's device and information without their permission has become prevalent.
Ask: What are some things you can do to prevent someone hacking or gaining access to your information?

- Responses will vary. (anti-virus software, strong passwords, don't give out personal information such as name, address, phone number online or to strangers)

Connecting devices to a network or the Internet provides great benefit, care must be taken to use authentication measures, such as strong passwords, to protect devices and information from unauthorized access. Authentication is the ability to verify the identity of a person or entity. Usernames and passwords, such as those on computing devices or Wi-Fi networks, provide a way of authenticating a user's identity. Because computers make guessing weak passwords easy, strong passwords have characteristics that make them more time-intensive to break.

People use computing technology in ways that can help or hurt themselves or others. Harmful behaviors, such as sharing private information and interacting with strangers, should be recognized and avoided. Using computers comes with a level of responsibility, such as not sharing login information, keeping passwords private, and logging off when finished. Rules guiding interactions in the world, such as "stranger danger," apply to online environments as well.

Information can be protected using various security measures. These measures can be physical and/or digital. An offline backup of data is useful in case of an online security breach. A variety of software applications can monitor and address viruses and malware and alert users to their presence. Security measures can be applied to a network or individual devices on a network. Confidentiality refers to the protection of information from disclosure to unauthorized individuals, systems, or entities.

[Source: https://k12cs.org/wp-content/uploads/2016/09/K%E2%80%9312-CS-Framework-Statements-Concepts-View.pdf]

Explore *[25min]* :Joint/Guided Practice | Student Practice:

Group activity building off the lecture discussed above. Different activities to choose from with different topics and difficulty levels.

Password Strength lesson (Difficulty level: for less experienced in computing technology)

Stronger, more secure online passwords are a good idea for everyone. But how can we help kids create better passwords and actually remember them? Use the tips in this lesson to help kids make passwords that are both secure and memorable.

Students will be able to:
Define the term "password" and describe a password's purpose.
Understand why a strong password is important.
Practice creating a memorable and strong password.

Link to handouts, PowerPoint, and lesson plan:
https://www.commonsense.org/education/digital-citizenship/lesson/password-power-up

Copyright Lesson

Standards Image
It's common for kids to use images they find online, for school projects or just for fun. But kids don't often understand which images are OK to use and which ones aren't. Help your students learn about the rights and responsibilities they have when it comes to the images they create and use.

Students will be able to:
Define "copyright" and explain how it applies to creative work.
Describe their rights and responsibilities as creators.
Apply copyright principles to real-life scenarios.

Link to handouts, PowerPoint, and lesson plan:
https://www.commonsense.org/education/digital-citizenship/lesson/a-creators-rights-and-responsibilities

Sharing Information Online (Difficulty level: for moderate experience in computing technology)

It's in our students' nature to share and connect with others. But sharing online comes with some risks. How can we help kids build strong, positive, and safe relationships online? Help your students learn the difference between what's personal and what best left private is.

Students will be able to:
Identify the reasons why people share information about themselves online.
Explain the difference between private and personal information.
Explain why it is risky to share private information online.

Link to handouts, PowerPoint, video, and lesson plan:
https://www.commonsense.org/education/digital-citizenship/lesson/private-and-personal-information

Cyberbullying lesson

Let's face it: Some online spaces can be full of negative, rude, or downright mean behavior. But what counts as cyberbullying? Help your students learn what is -- and what isn't -- cyberbullying, and give them the tools they'll need to combat the problem.

Students will be able to:
Recognize similarities and differences between in-person bullying, cyberbullying, and being mean.
Empathize with the targets of cyberbullying.
Identify strategies for dealing with cyberbullying and ways they can be an upstander for those being bullied.

Link to handouts, PowerPoint, video, and lesson plan:

https://www.commonsense.org/education/digital-citizenship/lesson/whats-cyberbullying

Clickbait lesson

The internet is full of catchy headlines and outrageous images, all to make us curious and get our attention. But kids don't usually realize: What you click on isn't always what you get. Show your students the best ways to avoid clickbait online.

Students will be able to:
Define "the curiosity gap."
Explain how clickbait uses the curiosity gap to get your attention.
Use strategies for avoiding clickbait.

Link to handouts, PowerPoint, video, and lesson plan:
https://www.commonsense.org/education/digital-citizenship/lesson/you-wont-believe-this

Chatroom safety

Kids make friends everywhere they go -- including online. But are all of these friendships the same? How can kids start online friendships and also learn ways to stay safe? Help your students understand both the benefits and the risks of online-only friendships.

Students will be able to:
Compare and contrast different kinds of online-only friendships.
Describe the benefits and risks of online-only friendships.
Describe how to respond to an online-only friend if the friend asks something that makes them uncomfortable.

Link to handouts, PowerPoint, video, and lesson plan:
https://www.commonsense.org/education/digital-citizenship/lesson/digital-friendships

Summarize *[15min]* :Debrief :

Small Group or individual exercise. Ask these questions, give time for answer, entire group discussion of answers.

- Ask: Give at least 3 examples and explain how computer science has changed the world
- Ask: Give at least 2 examples of how computing technologies influence, and are influenced by, cultural practices.
- Ask: Give at least 2 examples of positive and 2 examples of negative impacts of the pervasiveness of computers and computing in daily life.
- Ask: Give at least 2 examples of social and ethical issues that relate to computing devices and networks.
- Ask: How can use or modify someone else's work without plagiarizing?
- Ask: When using computing devices, give at least 3 examples of how you can protect private information.

Extensions:	