(http://csmatters.org/pd-new)   C - 02a

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Cybersecurity and Cryptography (online)

Unit Concept Lessons

Revision Date: Sep 10, 2019
Duration: 120 50-minute sessions

Lesson Summary

Summary: Teachers will learn about cybersecurity and cryptography. They will journal about the trust system of the Internet. They will be assigned notes to take on a news article about cyber attacks. Next, they will prepare a presentation about the attack. Finally, they will independently explore two lessons.

Objectives: Teachers will:

- Learn about cybersecurity, cryptography, and cyber attacks.
- Learn about the trust model of the internet.
- Independently explore lessons 3.11 and 3.12

Outline:

(Total: 120 minutes)

1. Introduction
2. Journal Activity
3. News Article Activity
4. Group Activity
5. Think & Write
6. Independent Exploration

Learning Objectives

Teacher Resources

CL02_Cybersecurity and Cryptography Folder (https://drive.google.com/open?
id=0B5vAY-fhOT-iZ2xMV1ludmJkM3c)

Lesson Plan

TOTAL: 120 minutes

Introduction

Watch the Code.org Video on The Internet: cybersecurity and crime
(https://www.youtube.com/watch?
v=AuYNXgO_f3Y&list=PLzdnOPI1iJNfMRZm5DDxco3UdsFegvuB7&index=7)

Journal on Hacking and the Trust System

Hacking:

Find answers to these questions:

1. What different kinds of hackers are there? How are they different from each other?
2. Why do hackers hack?
3. Why do kids want to be hackers?
4. Are the consequences of hacking always bad? Give an example of a specific hacking
   incident and its consequence.

-- This might be a good opportunity to take a more diversity-minded approach. Not all students
may find talk of hackers interesting.

The Trust System:
   "The Internet was originally designed to be used by a group of people who trusted each other.
This means that it was not built with security in mind, but rather openness and sharing. Now that
anybody can access the Internet, users cannot trust everybody else they are connected to. This
means that security measures must be put in place to protect users and systems."

   Post your answers to these in the discussion group:

1. What do you think your students should know about hacking?
2. Agree or disagree with the claim about the trust system and provide details to support your
   answer.

Activity 1

Find a current (within the last few years) news article about a cyber attack or vulnerability. List:

* the type
* definition
* impact of the cyber attack.

Post a brief 2-3 sentence summary with either a question about something you don't understand
or a description of a similar cyber attack that you uncover.

Activity 2

Prepare a short presentation (2-3 slides) on a cyber attack. Post it to the discussion board.

- Requirements:
    - The Internet
    - Software
    - Hardware
    - People
    - How was the cyber attack named?
    - What is the process of the cyber attack? Please include the following terms in the process description:
    - Create a visual that illustrates the attack or act out cyber attack process.

Think & Write

Consider potential security concerns and means of protection of student data. This is a subject that students can relate to so take some time to read up on possible problems and solutions so you will be able to lead a class discussion.

Student data (i.e. courses, grades, attendance, home address, birth date, etc.) is stored in a database which make it easily accessible to teachers, administrators, and other staff from any computer connected to the Internet.

- What security concerns does this raise?
- What can be done to protect student data?

Share what you have learned in the discussion group.

Independent Exploration

Examine lessons 3-11, 3-12, and all of the available resources, considering relevant pedagogical questions as you examine the materials.

- How will you incorporate your teaching style and personality?
- What instructional methods will you add?
- What additional resources will you add?
- Take a look at the KhanAcademy (https://www.khanacademy.org/computing/computer-science/cryptography/crypt/v/intro-to-cryptography) Cryptography course.
    - How do you envision using this resource in the classroom?
    - Will it span beyond this lesson?

(http://www.umbc.edu/) (http://www.umd.edu/)

(http://www.nsf.gov/)

Authored by: CS Matters in Maryland

Website: csmatters.org (http://csmatters.org)

Email: csmattersinmaryland@gmail.com (mailto:csmattersinmaryland@gmail.com)