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CYBER SECURITY BOOT CAMP

Physical, Web and Network Security

Session 5

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Teacher Lesson Plan

Session Name:

Physical, Web, and Network Security

Summary:

Better level of security is achieved by implementing layers of security in cyber world. This session is subdivided into three sections: physical, web, and network security. This sessions provides information to students on the importance of physical security in the world of cyber security, including secure home, office, or enterprise that has security guards, fences, wall, camera systems, drones, biometrics, and more. Web security is as important as physical, as a hackable website or application is easier for hackers to breach as it does not require physical presence. Network security controls who and why someone needs to reach your business computer systems, phone systems, or physical systems. Firewalls and similar systems determine who has the right to come in and go out of a network, for how long, and how much they can utilize on the networks.

Time Allotment:

75 minutes

Learning Objectives:

- Physical security in Cyber Security
- Buildings, Guards, Badging Systems, Biometrics including retina scans, fingerprints
- Web & Application security
- Security scanning of code, finding vulnerabilities in code, is your code hackable
- Network & access control
- Firewalls, Access Controls Lists, Do you want or need access to data to do your job?

Supplies:

- Scrap paper / notepad to take notes
- Laptop / computer with Internet access to research topic of selected project

Learning Activities:

- (2 - 5 minutes) - Teacher Introduction

  Introduce yourself to students if you are new to the classroom. If you are continuing from a previous session, start with welcome back.

- (2 - 5 minutes) - Volunteer Introductions

  Introduce any new volunteers that might be present. Teachers will be provided with a quick bio of each volunteer who are helping in the classroom. Only new volunteers need to be introduced.

- (5 minutes) - Session overview

  Provide students session overview. Describe how session is divided into three subsections that covers physical security, web security, and network security. Inform students that each of these security mechanisms are important as multiple layers of security is very effective to keeping bad guys out and good people safe.

- (5 minutes) - Video - Security at Google Data Center

  https://youtu.be/XZmGGAbHqa0?t=44

- (10 minutes) - Physical Security
  - *Start with discussion on why physical security is important in cyber security*
  - *House without door does not provide security*
  - *A door with 10 locks is now a pain for the owner to get in*
  - *A datacenter with glass windows is not secure*
  - *Discuss vault doors, brick / concrete walls, bulletproof security guard shacks, camera systems, biometrics.*
  - *Re-enforce the topic that physical security is as important as cyber security. What if a bad person can just pick up a laptop from your house and walk away, all the additional security measures like passwords and firewalls are now useless?*

- (5 minutes) - Video, physical locks are secure?

  https://www.youtube.com/watch?v=Mz5IOFK38nU

- (5 minutes) - Student Activity: How secure is your home?

  Have volunteers pass worksheet to students.

  Students will work in group of 3-5 to list topics / mechanisms that make their home or school secure from bad people. Remind students that this is strictly physical security activity. This activity will not include network security of their home or school, and should only discuss items that apply to physical security of their home.

- (5 minutes) - Class discussion on activity findings.

  Select one or two groups and discuss their findings.

- (3 minutes) - Video on web application hacking

  https://youtu.be/5ADO1E-NAG4?t=25

  Videos discovers everything about a website

  Tools used are free: Kali Linux, Nessus, WhatWeb (open-source)

- (10 minutes) - Web & Application Security
  - *Now that we know what physical security is, now it's time to discuss web, operating systems, and application security*
  - *Discuss how easy it is to hack websites, applications, and operating systems as they don't require physical access*
  - *Hackers can just send a specially crafted email with a links that can infect your computer and make it accessible to bad people*
  - *Hackers can collect keystrokes with virtual keyloggers, watch everything you do on the computer, and even turn on microphone and camera on your computer without your knowledge or approval.*

- *Give brief explanation of terms like: Malware, Ransomware, Viruses*
- *Give brief explanation on how anti-virus and other security programs can help*
- *Teach students why it is important to thoroughly read email before clicking on links, and installing programs that can potentially infect your computer, slow it down, and expose all your systems in your house to hackers.*
- *Difference between HTTP and HTTPS (plain text websites vs. secure sites)*
- *It is important to develop code that is secure.*

- (5 minutes) - Research security applications for Windows?

  Pass blank papers to students to take notes for this activity. Internet research is involved. Students can use their cell-phones, or laptops to access Internet.

  Have students work in group of 3-4 to come up with at least two security applications for Windows based computers that have features like anti-virus, anti-malware, and anti-ransomware protection. Examples can be McAfee, Microsoft Security Essentials, Norton.

- (5 minutes) - Class discussion on activity findings.

  Select one or two applications and discuss with class. Get class engaged by asking what they found, and are there programs that offer layers of protection.

- (5 minutes) - Student Activity: Dude! Where is my firewall?

  Give examples like, a firewall might be in their Wi-Fi access point. Is it managed by Comcast, AT&T, or themselves?

  Provide students with activity worksheet and ask them to draw a conceptual diagram of what a firewall is and where does it reside at their home network. Does their home even have a firewall.

  Review a few diagrams with class.

- (10 minutes) - Network Security
    - *Provide an overview of what a firewall does to protect your home network, school network, and enterprise networks.*
    - *Use example of a firewall in house construction, or building construction. A firewall between a garage and a room protects the room from fire that started in garage.*
    - *Use terms like, doors in a house to teach students how a user from behind the firewall can reach Internet, and discuss in-bound traffic as allowing a friend to visit. Are all friends good? So be careful who you give the key to your front door.*
    - *Different types of firewalls - hardware, software, virtual. Discuss how they are different and alike at same time.*
    - *Discuss extended features of modern day firewalls - protection from spyware, zero-day attacks, malware, viruses, and more.*
- (5 minutes) Wrap Up

    Remind students about importance of:

    Physical Security

    Web & Application Security

    Network Security
- (2 minutes) - Session Feedback

    Have volunteers distribute feedback form to students, and give them a few minutes to fill out the survey.

    Volunteers to collect feedback forms and save them for event manager.
- (2 minutes) - What's next?

    Inform students to head back to cafeteria for snacks / break, and remind them to use restroom before next session starts.