

Computer Security Activities for a Middle School Classroom or Outreach Event (P12 Resource/Curriculum Exchange)

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for a Middle School Classroom or Outreach Event

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Introduction

Children are familiar with the Internet including online shopping, various forms of social media, and video streaming (YouTube, Netflix, etc). However, few understand the computer science concepts within their favorite apps, games, and websites or the digital footprint their actions leave behind.

Purpose

Provide ideas and activities for middle school teachers and CS outreach practitioners to incorporate computer security concepts into their programs.

The purpose of this project is to teach students to understand basic cryptography techniques, how cryptography is used in protecting sensitive data, understand the basics of Internet hygiene, and how social engineering can be used to steal your identity. The lesson is broken into 3 activities: (1) Substitution Ciphers: Caesar Cipher and other Basic Ciphers, (2) Modern Encryption: Public-Key, and (3) Social Engineering: Mortimer's Social Media. In the Substitution Cipher activity, students will learn to use simple ciphers to code and decode messages. This lesson also includes techniques for the creation of strong passwords. The second activity uses a series of locks and boxes to explain how and why data is encrypted on the Internet. The last activity, Mortimer's Social media will consist of two parts. In the

1

ACTIVITIES EASY TO INTEGRATE

Broken into 15-20 minute parts

2

HANDS-ON, INTERACTIVE

Promotes teamwork & problem-solving skills

3

LOW COST

Supplies needed are easily obtainable and inexpensive



Caesar Cipher and other Basic Ciphers

Introduction activity to cryptography



Modern Encryption: Public-Key

Introduction to Public-Key Encryption and how messages are passed securely



Mortimer's Social Media

Illustrates the dangers of posting personal information online

first part, students will be given a simple internet quiz about their favorite hobbies and activities. After answering this quiz, students will examine common security questions for password retrieval and compare it to the internet quiz. Finally, students will be asked to use the Internet to research Mortimer Toad and compile data for a social engineering profile. This activity shows how much information we leave on social media sites and compares it to the information used to answer security questions. Each lesson includes lecture materials and an FAQ.

Objectives

By the end of these activities, students will be able to:

- Use simple substitution and book ciphers to encrypt messages (cryptograms)
- Create reasonably secure passwords
- Recognize questions and techniques used in social engineering profile building
- Recognize the importance of Internet hygiene
- Explain the importance of keeping passwords safe
- Explain how social engineering is used to identify answers to a person's security questions

Activity Instructions, Background, Teacher Scripts, Outside Resources, and FAQs

These low-cost activities are designed to each take only 15-20 minutes and be easy to add to an ongoing class curriculum or done daily during a computer/technology week. Each activity has a complete instruction sheet to be used in the classroom. Additionally, we have provided background information for technical concepts and vocabulary. Activities include a “teacher script” that provides a suggested method of presenting the material to the students. To help the activities be a success, we have included additional outside resources and commonly asked FAQs.

WHERE IS THIS LOCATED?

The authors have created a Google Drive with all the activity information to help teachers successfully integrate these activities into their classrooms. We encourage you to share this information with other teachers!

<https://drive.google.com/open?id=1TP7g5Usqh4mvv8AHadUGyR6BlxzdE4Hs>

Mortimer's Social Media is ready for teachers to use! He is looking forward to meeting your class soon!

