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| **Lesson Title :** Attack & Defense | **Unit #:**  1 | **Lesson #:**  2 | **Activity #:**  4 |
| **Activity Title:** Attack & Defense |

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| **Estimated Lesson Duration:** | 7 days |
| **Estimated Activity Duration:** | 5 days |

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| **Setting:** | Classroom |

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| **Activity Objectives:** |

Given lines of code from earlier in the year (Mad Lib Project), students will be able to:

1. Locate exploitable vulnerabilities
2. Change code to ensure safer security protocols

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| **Activity Guiding Questions:** |

1. How can you locate places where vulnerabilities could occur?
2. How can hackers exploit unsafe code?

| **Next Generation Science Standards (NGSS)** | |
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| **Science and Engineering Practices (Check all that apply)** | **Crosscutting Concepts (Check all that apply)** |
| ☐ Asking questions (for science) and defining problems (for engineering) | ☐ Patterns |
| ☐ Developing and using models | ☐ Cause and effect |
| ☐ Planning and carrying out investigations | ☐ Scale, proportion, and quantity |
| ☐ Analyzing and interpreting data | ☐ Systems and system models |
| ☐ Using mathematics and computational thinking | ☐ Energy and matter: Flows, cycles, and conservation |
| ☐ Constructing explanations (for science) and designing solutions (for engineering) | ☐ Structure and function. |
| ☐ Engaging in argument from evidence | ☐ Stability and change. |
| ☐ Obtaining, evaluating, and communicating information |  |

| **Ohio’s Learning Standards for Science (OLS)** |
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| **Expectations for Learning - Cognitive Demands (Check all that apply)** |
| ☐ Designing Technological/Engineering Solutions Using Science concepts **(T)** |
| ☐ Demonstrating Science Knowledge **(D)** |
| ☐ Interpreting and Communicating Science Concepts **(C)** |
| ☐ Recalling Accurate Science **(R)** |

| **Ohio’s Learning Standards for Math (OLS) and/or**  **Common Core State Standards -- Mathematics (CCSS)** | |
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| **Standards for Mathematical Practice (Check all that apply)** | |
| ☒ Make sense of problems and persevere in solving them | ☒ Useappropriate tools strategically |
| ☒ Reason abstractly and quantitatively | ☒ Attendto precision |
| ☒ Construct viable arguments and critique the reasoning of others | ☒ Look for and make use of structure |
| ☒ Model with mathematics | ☒ Look for and express regularity in repeated reasoning |

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| **Unit Academic Standards (NGSS, OLS and/or CCSS):** |

* Foster increases in the number of Ohio citizens studying and working in STEM fields
* Foster increases in all students developing stronger skills in problem solving, innovation, and teamwork

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| **Materials**: (Link Handouts, Power Points, Resources, Websites, Supplies) |

* Computer
* Code from earlier in the year (Mad Lib Project)
* Vulnerabilities and Attack Notes from Activity #2

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| **Teacher Advance Preparation:** |

* None

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| **Activity Procedures:** |

* Day 1 - Introduce students to challenge
  + Students will analyze their own code and reflect on possible vulnerabilities
* Day 2 – Partner Attack
  + Students will get back into their groups and attempt to locate vulnerabilities in their group’s projects. A point is given to each person who locates a viable vulnerabilities that was not located by the original owner in Day 1.

**Formative Assessments:** Link the items in the Activities that will be used as formative assessments.

* Teacher will constantly walking around to help students troubleshoot problems and guide them in the critical thinking process
  + This will be an informal way to formatively assess the students

**Summative Assessments:** These are optional; there may be summative assessments at the end of a set of Activities or only at the end of the entire Unit.

* Post-test on final day

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| **Differentiation:** Describe how you modified parts of the Lesson to support the needs of different learners.  Refer to Activity Template for details. |

* Students will be put in teams to account for different teaching styles to create balanced teams

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| **Reflection:** Reflect upon the successes and shortcomings of the lesson. |

This activity required significant change after I decided to change activity three because we no longer changed the Attack & Defense game and therefore could not play the Attack & Defense game. This proved to be a minor change because the objectives were still the same. Students still practiced their new knowledge of security protocols by applying it to a previous project that they did in class. Although students were not actively writing security protocols into their code, they were simulating an IT person that would ensure safety protocols be taken effectively. These applications were more significant anyways because they applied their security protocols to a project they were familiar with and had already been working on. The changes that were made worked very well and I plan on continuing them next year as well. This lesson of applying security protocols can continually be used with future projects.