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| **Lesson Title :** How do I keep my information safe? | **Unit #:**  **1** | **Lesson #:**  **2** | **Activity #:**  **5** |
| **Activity Title: When is it ethical to use cryptography?** |

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| **Estimated Lesson Duration:** | **7 Days** |
| **Estimated Activity Duration:** | **1 Day** |

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| **Setting:** | **Classroom** |

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| **Activity Objectives:** |

Student will

1. respond to historical ethical dilemmas involving cryptography.

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| **Activity Guiding Questions:** |

1. When throughout history have ethics intersected with cryptography?
2. What criteria should we use to evaluate the ethics of cryptography and cyber security?

| **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 New Learning Standards for Science (ONLS)** |
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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)** |

| **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, ONLS and/or CCSS):** |

[CCSS.ELA-LITERACY.RI.6.1](http://www.corestandards.org/ELA-Literacy/RI/6/1/)  
Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.

[CCSS.ELA-LITERACY.W.6.1](http://www.corestandards.org/ELA-Literacy/W/6/1/)  
Write arguments to support claims with clear reasons and relevant evidence.

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

Handouts with a variety of ethical dilemmas related to cryptography and cyber security listed.

Large signs (Ethical, Not Ethical) to along a fairly empty wall of the classroom.

**Resource:**

Core 6 Book that describes the Top Hat Organizer

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| **Teacher Advance Preparation:** |

* Printout enough handouts for every student.
* Divide students into groups of 3-4.
* Hang “Ethical” sign on the far left corner along a generally empty wall and the “Not Ethical” sign in the right corner of the same wall.

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| **Activity Procedures:** |

Day 1: Ethical Considerations

1. Introduce the “Coventry Dilemma” to the whole class, tell each group that they are the Primer Minister of England, during World War II, and that they have received intelligence from the broken Engima code that the Germans plan to bomb Coventry tonight. They have 5 minutes to decide whether to alert Coventry to the attack and try to evacuate or to safeguard the broken code.
2. Take a tally on the board to see how many would let the Germans bomb Coventry, and how many would try to save it.
3. Give every student a handout with a variety of ethical dilemmas related to cryptography and cyber security.
4. Assign one dilemma per group. Explain that each group will have 5 minutes to discuss their dilemma and come up with a resolution, which will be shared with the class.
5. Have students complete the ~~Top Hat Organizer~~ Description Organizer ~~and respond to their chart in a one paragraph persuasive writing to defend their stance~~ on their own.
   1. After 5 minutes, allow students to share their writing with a partner then revise their writing for 2 minutes.
6. ~~Each group should assign a recorder to takes notes on their group discussion, to be turned in at the end of class (see “Group Notes Sheet”).~~
7. ~~After the 5 minutes are up, have groups present their dilemma, resolution, and criteria along with any special considerations (3-4 minutes each). After each presentation, have students rate the ethical dilemma by standing along the sliding scale.~~
8. ~~Host a brief discussion/debate to allow students to defend their position and address the positions of others.~~
9. Once groups have determined their solutions, divide the class into new groups so one person from each group can share their ideas with the others. Allow students to address their classmates’ final decision.
10. Have students choose one other dilemma from their group discussion to compare/contrast with their team’s dilemma. Complete a Top Hat Organizer to compare/contrast and write a 1 paragraph reflection defending their stance on the question, “Are the dilemmas more similar or different from each other and how does that affect the final decision/outcome proposed by each team.
11. Discuss the historical decision Churchill made to allow the city to undergo attack.

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

Use student presentations on the ethical dilemmas.

Students’ stance and arguments/justifications of ethical rating.

**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.

Core 6 writing will be collected and scored according to the middle school writing rubric.

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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. |

Allowing the teams to break up and discuss allowed more students to participate and discuss the dilemmas. As a result, the students had great in-depth discussions over the issues.

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

The changes made to the original lesson really added depth to the students’ conversations.