CYBER SHUFFLE

Lesson Description: Students have completed the hand by Wednesday (CIA, Keep It Simple, Think Like an Adversary, and Defense in Depth). Thus, on Wednesday morning, there is an introduction to the 10 cybersecurity first principles. The cybersecurity cards are utilized.

Prerequisite Knowledge: Students should have preliminary knowledge of computer science, cybersecurity, and the principles of the hand.

GenCyber Cybersecurity Concepts: Defense in Depth, Availability, Confidentiality, Think Like an Adversary, Integrity, Keep it Simple

Length of Completion: 55 minutes

Level of Instruction: This lesson is appropriate for middle or high school students. All students, at a novice, intermediate, or advanced level can engage and learn from the 10 cybersecurity first principles.

Applicable First Principles &/or Concepts:

All 10 GenCyber First Principles

Domain Separation	Abstraction
Process Isolation	Data Hiding
Resource Encapsulation	Layering
Modularity	Simplicity
Least Privilege	Minimization

Resources that are Needed: Use the cards provided by NSA.
This lesson is adapted from: https://mlhale.github.io/nebraska-gencyber-modules/intro_to_first_principles/README/

CYBERSECURITY EDUCATION AND RESEARCH CENTER
@ The University of Wyoming
www.uwyo.edu/CEDAR
www.cowpokes.camp
www.uwcedar.io/community/cowpokes/wikis

Accommodations Needed: Written directions are provided to students (either in hard copy or electronically).

LEARNING OUTCOMES

LESSON LEARNING OUTCOMES

- Students will be able to:
    A. identify at least five of the 10 cybersecurity first principles
    B. map the 10 cybersecurity first principles onto the hand
    C. interact with (play) the 10 cybersecurity first principles card game

LESSON DETAILS

Interconnection: This is the third lesson in one morning class where lesson one is "the hand," lesson two is "ethics and CIA," and lesson three is an introduction to the 10 cybersecurty first principles.

Assessment: Formative assessments - The instructor and assistants help with initial mapping and take note of student questions, walk around the room while the students are playing the game, and ask students questions about the 10 cybersecurity first principles.

Extension Activities: Students create a mnemonic device to remember the 10 cybersecurity first principles. If needed Game 2 (described at the end of this lesson) is used.

Differentiated Learning Opportunities: Students may work more in depth with understanding (for advanced learners) or more on the surface with less understanding (for novice learners) in both the mapping and card playing.

Lesson 1 Details:

Warm Up: On board write and let students ponder:
"How are [*pack of cards taped to white board*] and [*drawn hand*] related?"

Lesson:

Mapping the 10 cybersecurity first principles to the hand

- STEP 1: Draw the Hand (again like on day 1)
- STEP 2: Hand out playing cards
- STEP 3: Ask students to read the 10 cybersecurity first principles cards and definitions
- STEP 4: Students work together and match the 10 cybersecurity first principles with the hand (if possible)
- STEP 5: Class discussion on mapping possibilities
- STEP 6: Instructor explanation on why the 10 cybersecurity first principles supplement the hand
- STEP 7: Introduce the card game

Game: Question Cards

- STEP 1: Ask the group of 4 to further split their team into two sub-groups.
  Give each sub-group of 2 a card deck.
  Students in the sub-groups take turns examining the cards with the 10 first principles.

- STEP 2: Use question cards (cards 1-20) of the one of the sub-group's decks as the question stack.
  Shuffle these cards and place them face down in a stack to the left of sub-group 1.

- STEP 3: Turn a question card over...

- STEP 4: Both sub-groups read the question and then place what they think the correct principle card is *face down*.

- STEP 5: When both sub-groups have placed the card down, then both can turn over their cards at the same time.

- STEP 6:
    - If both sub-groups picked the same principle they will put that question card face up -to the right- of the turned up question card area.
    - If the principles don't match, the two sub-groups discuss and reach consensus. The sub-groups may invite the instructor if the mismatch cannot be resolved.
- Repeat steps 3 – 6 for all question cards
- Have students revisit the 10 principles and hand mapping and make adjustments if desired.

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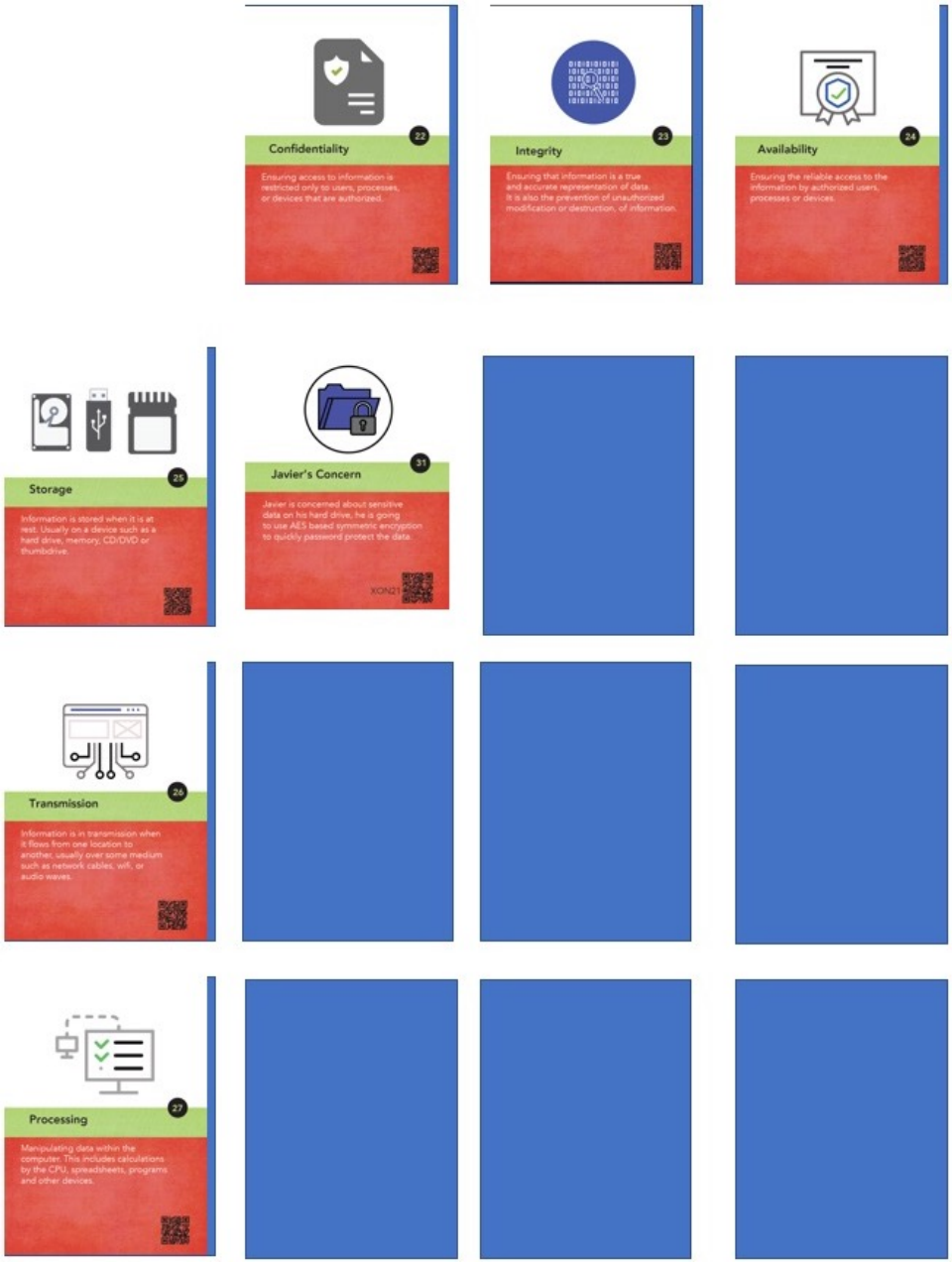
  Check out the UWyo CEDAR created Cybersecurity "Game Mat" (see wiki - www.uwcedar.io/community/cowpokes/wiki)

- **GAME 2 (if needed as <u>extension</u>)**

Game 2: Cybersecurity Matrix

- STEP 1: Have each sub-group identify and examine the following cards… Cards 22, 23, 24 are the expectations of information … Cards 25, 26, 27 are the information states

- STEP 2: Arrange the two sets of cards into a matrix as shown below.



- STEP 3: Have each sub-group identify and examine the following cards… Cards 31 – 39

- STEP 4: Now ask each sub-group to arrange the cards 31-39 as examples that fit at the cross section of the cards in the row and column. In the example below – Card 31 "Javier's Concern" indicates

that he wants to encrypt his hard drive. As such it is put in the first row first column since it cross references storage (hard drive) and encryption (confidentiality).
Ask students to place cards in a Round Robin fashion. Internally discuss and resolve any disagreements. Each team must put all 9 cards down in the matrix within 5 minutes.

- STEP 5: Ask the sub-groups to share their solution. Discuss and resolve any disagreements raised by between the sub-groups using your answer key.

- Now ask the sub-groups to replace the states of information cards with the following cards that represent information countermeasures Cards 28, 29, 30 are information countermeasures

- Repeat above steps

- Now create a matrix for characteristics of information vs. information countermeasures

- Repeat steps 4 and 5