SEMtech!

Student Engagement & Mentoring in Technology

## Activity 1: “Encrypt This!” (Plain Text vs. Cipher Text Simulation)

**Objective:** Help learners understand how encryption transforms plain text into ciphertext.

**How it works:**

- Introduce a **simple substitution cipher** (e.g., Caesar cipher with a +3 shift).
- Give each student or team a message in **plain text** (e.g., “Protect the data”).
- Students apply the cipher to convert the message into **ciphertext**.
- Then, students swap messages and attempt to **decrypt** them using the cipher key.

**Discussion Prompt:**

- How did the cipher protect the message?
- What would happen without the key?
- How does this apply to real-world encryption?

**STEM Linkage:** Encourages computational thinking and introduces cryptographic logic in a hands-on way—great for building pre-cybersecurity skills.

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## Activity 2: “Secure or Exposed?” (Data at Rest vs. Data in Transit Role Play)

**Objective:** Differentiate between data at rest and data in transit, and how encryption protects both.

**How it works:**

- Set up two stations:
  1. **Data at Rest** – Data stored on USB drives, hard disks, cloud storage.
  2. **Data in Transit** – Emails, messages, or data traveling across a network.
- Present **scenarios** to the class (e.g., a hospital storing patient records vs. a user submitting credit card info online).
- Students decide:
  - What kind of data scenario is this?
  - Is encryption needed for data at rest, in transit, or both?
  - What tools or technologies could be used (e.g., full-disk encryption, TLS)?

**STEM Linkage:** Develops security reasoning and aligns with practical cybersecurity practices for system administrators and end users.

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## Activity 3: "Encryption Essentials Escape Room"

**Objective:** Reinforce all key concepts (plain vs. cipher text, data types, and encryption use cases) in a collaborative problem-solving format.

**How it works:**

- Create a series of **puzzles or clues**, such as:
  - Decoding a cipher to open a "virtual lock"
  - Identifying whether a scenario describes data at rest or in transit
  - Matching encryption methods to correct use cases
- Teams work through each puzzle to "escape" the digital or classroom-based room.
- Use tools like Google Forms or printable cards for DIY or tech-enhanced delivery.

**Debrief:** Connect each puzzle to a concept covered in Objective 6.6 and ITF+ exam preparation.

**STEM Linkage:** Supports inquiry-based learning and collaborative cybersecurity problem-solving key skills in modern digital environments.