“Intro to Computer Science Tour”
Grade 6-8: Overview for Teachers

**Purpose of the Unit:**
This unit is designed to give middle school students (grades 6-8) an understanding of the use and applications of computers onboard Navy ships like the Midway. In particular, as it related to the everyday actions of those who served onboard the USS Midway when she was an active ship in the United States Navy.

**Objective:**
Students will be introduced how computers, computing systems, hardware, software, cybersecurity, and data analysis were used onboard the Midway. Students will discuss the qualities and attributes that make computer use on a Navy ship both similar and different than applications in a business, office, or home setting.

**Overview:**

- The topics covered align and support the California Computer Science standards.
  - **NOTE:** *The California Computer Science Standards are based on and closely mirror the National Computer Science Standards.*
- Students will take “virtual visits” to the USS Midway Museum by watching several videos. Each video focuses on a specific compartment explaining its function, task or chore that the sailors performed in them. This will serve as a foundation and topic of discussion as to why there are differences between Navy and personal computer hardware and applications.
- By learning what task or chore was carried out in a specific space on the ship, the associated computer science topic will make more sense and framed within a context.
CA Computer Science Standards:

- **6-8.CS.1 (Computing Systems – Devices)**
  - Design modifications to computing devices in order to improve the ways users interact with the devices.
  - Computing devices can extend the abilities of humans, but design considerations are critical to make these devices useful. Students suggest modifications to the design of computing devices and describe how these modifications would improve usability.

- **6-8.CS.2 (Computing Systems – Hardware & Software)**
  - Design a project that combines hardware and software components to collect and exchange data.
  - Collecting and exchanging data involves input, output, storage, and processing. When possible, students select the components for their project designs by considering tradeoffs between factors such as functionality, cost, size, speed, accessibility, and aesthetics. Students do not need to implement their project design in order to meet this standard.

- **6-8.NI.5 (Networks & Internet – Cybersecurity)**
  - Explain potential security threats and security measures to mitigate threats.
  - Cybersecurity is an important field of study and it is valuable for students to understand the need for protecting sensitive data. Students identify multiple methods for protecting data and articulate the value and appropriateness for each method. Students are not expected to implement or explain the implementation of such technologies.

- **6-8.NI.6 (Networks & Internet – Cybersecurity)**
  - Apply multiple methods of information protection to model the secure transmission of information.
  - Digital information is protected using a variety of cryptographic techniques. Cryptography is essential to many models of cybersecurity. At its core, cryptography has a mathematical foundation. Cryptographic encryption can be as simple as letter substitution or as complicated as modern methods used to secure networks and the Internet. Students encode and decode messages using encryption methods and explore different levels of complexity used to hide or secure information.

- **6-8.DA.7 (Data & Analysis – Storage)**
  - Represent data in multiple ways.
  - Computers store data as sequences of 0’s and 1’s (bits). Software translates to and from this low-level representation to higher levels that are understandable by people. Furthermore, higher level data can be represented in multiple ways, such as the digital display of a color and its corresponding numeric RGB value, or a bar graph, a pie chart, and table representation of the same data in a spreadsheet.

- **6-8.IC.20 (Impacts of Computing – Culture)**
  - Compare tradeoffs associated with computing technologies that affect people’s everyday activities and career options.
  - Advancements in computer technology are neither wholly positive nor negative. However, the ways that people use computing technologies have tradeoffs. Students consider current events related to broad ideas, including privacy, communication, and automation.