ECS Priority Strands and Standards

Strand 1: Computer Science Practices
Standard 1: Critical Thinking ● Use the structured problem-solving process to help address new problems. ● View challenges as solvable. ● Decompose or break down larger problems into smaller components.
Standard 4: Collaboration ● Work with others to develop solutions that incorporate all contributors. ● Mediate disagreements and help teammates agree on a common solution. ● Actively contribute to the success of group projects.
Standard 5: Communication ● Structure work so that it can be easily understood by others. ● Consider the perspective and background of your audience when presenting work. ● Provide and accept constructive feedback in order to improve work.

Strand 2: Problem Solving With Computers
Standard 2 ● Students will describe changes technology has made on communication, privacy, and social interactions. ○ Impacts of technology on society from the following perspectives: social, economic, political, legal, ethical and moral issues. ○ Permanence of online information. ○ Consider issues around privacy and collection of data. ○ Methods of communication appropriate for different situations. including appropriate use of social media. ○ Online safety .
Standard 4 ● Students will understand different algorithms used in problem solving. ○ Solve a problem through an iterative process. 1. **Define** - Understand the Problem. 2. **Prepare** - Plan the Solution. (design via pseudocode/flowcharts) 3. **Try** - Carry out the Plan. (Code) 4. **Reflect** - Review and Discuss your Solution. (Testing / Feedback) 5. **Repeat** - Reiterate through the steps until the problem is solved. ○ Explain when a binary search would be more efficient than a linear search. ○ Visualize and compare common sorting algorithms. (e.g. insertion, selection, bubble, quicksort, merge sort)

ECS Priority Strands and Standards

Standard 5

- Students will gain knowledge and skills while considering the social, moral, and ethical impacts of Artificial Intelligence (AI) systems and usage.
    - Students will explain the idea of intelligence specifically as it relates to computers.
    - Students will explain what it means for a machine to learn. (Turing Test)
    - Students will identify the AI being used, such as image recognition, speech recognition, translation.
    - Students will train and test an existing AI system (machine learning).
    - Students will explore and explain the social and ethical impacts of AI (human and algorithmic bias, worker obsolescence through automation, user interface improvements, human/machine augmentation, etc.)
    - Students will gain an understanding of how AI is changing different sectors such as medicine, agriculture, manufacturing, etc.

Strand 3: Web Development

Standard 1: Social Responsibility of Website Development

- Students will understand ethical behavior as it relates to an AUP, Intellectual Property, Netiquette, Respecting Privacy, Anti-Spamming Laws, etc.
- Students will demonstrate knowledge of standard copyright rules.
    - Understand copyright for original creations.
    - Understand the creative commons license
    - Understand when to obtain permission for non-original work.
- Students will identify the use and purpose of acceptable use policy (AUP).
    - Comply with the school's AUP

Standard 3: HTML

- Students will understand that the HTML programming language is used to create all websites on the internet and acts as the structure for a website.
    - Students will code the foundation for a basic webpage including the element tags DOCTYPE, html, head, title, and body.
    - Students will create pages with tags and attributes at the inline level. (DOCTYPE, title, head, body, h1, h2, h6, p, br, etc.)
    - Students will create web pages with text formatting, links, images, and lists.

Standard 4: CSS

- Students will understand that CSS (Cascading Style Sheets) are used to customize the style or looks of a website.
    - Students will apply CSS to a website.

- Apply CSS to an element using an inline style. (An inline style may be used to apply a unique style for a single element.)
- Apply CSS to a website using an external stylesheet. (Best Coding Practice - One file changes the entire website.)

- Students will format web pages using CSS
  - Modify background properties such as color and image.
  - Modify font properties such as font-family, size, and color.
  - Modify border properties such as width, style, and color.
  - Implement tags and classes to modify an HTML element.

Strand 4: Programming and Algorithms
Standard 1: Program Design ● Students will identify how planning strategies (such as flowcharts, storyboards, prototypes or pseudocode) are used when creating a program.
Standard 2: Algorithms ● Define an algorithm as a set of clearly defined, logical steps to solve a problem. ○ Students will describe the steps needed to efficiently solve a non-computing problem using a pseudocode algorithm. ○ Students will examine traditional programming algorithms such as searches, sorts, and minimal spanning trees. ○ Students will examine and formulate algorithms that solve specific problems.
Standard 4: Variables ● Students will understand that variables are named locations in memory. ● Students will be able to identify variables and when they should be used in code.
Standard 5: Loops ● Students will understand that programs use loops (iteration) to be more efficient and avoid code duplication.
Standard 6: Conditionals ● Students will understand that programs use conditionals to perform different computations or actions based on whether a condition is true or false (booleans).
Standard 7: Operators ● Students will understand that programs use mathematical symbols (+, -, *, /, >, <, ==, AND, OR) in a program to perform specific operations (mathematical, relational, or logical) and produce a single result.

ECS Priority Strands and Standards

Standard 8: Functions

- Students will understand that a function is a named block of code that performs a specific task. Functions encourage efficiency, reusability, and readability.

Standard 9: Debugging

- Students will understand that debugging is finding and removing errors from a program so it can operate as intended. Strategies students might learn for debugging could include:
  - Guess and Check.
  - Deactivating sections to identify problematic code.
  - Looking for typos, missing tags, or incorrect syntax.
  - Making the problem smaller - identifying important points. (changing variable values, getting input, etc.)
  - Asking a friend or team member for help.
  - Printing, watching, or changing variable values while the program runs.
  - Using a debugging tool.
  - Thinking about when the code last worked and what has been added since then