

Step Into Computer Science (Pilot)

Overview: This year-long course equips students with the foundational knowledge of computational thinking and computer science. Through interactive exercises using block-based programming, students will delve into the exciting world of coding, where they will create animations, games, art, and stories, fostering creativity and problem-solving skills.

Throughout the course, participants will gain a solid understanding of the basics of programming, laying the groundwork for more advanced studies in computer science. Emphasis will be placed on applying computational thinking to real-life situations, allowing students to see the practical applications of the concepts they learn.

Objectives:

- Develop problem solving skills while learning how computers process information to solve problems. Know the basic parts and functions of the computer.
- Create and share content on individual web pages while exploring the impact of sharing on-line information and learning to think critically about on-line content. Learn the basic differences between spreadsheets, documents, presentations, and image usage while developing their webpage.
- Create images, animation, art, stories, and games while developing computational thinking skills and exploring programming concepts and the design process computer scientists use on a daily basis.
- Consider the social impacts of computing as they develop solutions to needs in the community using the design process.
- Discover the importance of using data to solve problems and the way computers aid in this process.
- Explore the role of physical devices in computing while creating programs that utilize micro:bits and developing prototypes using the design process.
- Develop a machine learning projects and apps using real world data and solving community problems.

Assessments: Project rubrics, pre-post test, mini-quizzes and/ or exit tickets

Course Essentials:

Equipment	Cost/Unit
	TBD
Computer or laptop	
Other Materials	Reusable: \$1000 Consumable: (up to \$300 per year, replace as needed)

First Semester Course Outline

Unit 1: Problem-solving	Introduction to problem solving and computer science. Using various challenges to learn how to problem solve effectively. Explore what is a computer and how do they help people solve problems. Consider online safety and responsible use of technology. Project.
Unit 2: Web page development and common computer applications	Explore the role of the web, and the impact of information sharing on-line. Learn how to be a more critical on-line content consumers and consider intellectual property. Skill building with debugging. HTML, CSS, image usage, spreadsheets, presentations, and documents. Project

Unit 3: Interactive animations and games	Interactive animation and game development. Investigate animation and game design, coordinate systems, shapes, using sprites, and design process while exploring computational thinking and programming skills such as debugging, sequencing, variables, randomness, conditionals, inputs, functions, etc.
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Second Semester Course Outline

Unit 4: Data	What is data, and how do computers represent data. Students use data sets to solve problems. Explore patterns, binary and ASCII representation. Understand the importance of data privacy. Students experiment with making decisions with data and computers, including big data and machine learning.
Unit 5: Physical computing and the design process	Students explore the design process. Research and Understanding the users needs and design constraints, prototype, testing and debugging, feedback. Teamwork and collaboration practices. App lab usage explored. Javascript. Micro:bit parts and functions. Makecode and extensions. Physical inputs and outputs, sensors, variables, algorithms and conditionals. Collecting data.
Unit 6: Machine learning and AI	What is artificial intelligence? What is machine learning? Using the design process to train a computer to solve problems. Metal models and numerical models are explained and explored. Patterns in data discussed. Algorithms ad classification. Model bias is explored, and the ethics for using AI. Project.