

## PASmart - Targeted Grant Alternative Workshop

### Scope and Sequence

#### **Overview**

BLaST IU17 is offering a CS Bootcamp to assist schools within the region in implementing computer science across curricular content areas for students from K-8. With the explosive growth and interest in computer science, the CS education community has been asked significant questions from the K-12 community in hopes to close the skills gap, in which within the next decade 70% of new jobs will require skills in science, technology, engineering and mathematics (STEM).

Yet, educators continue to wonder what should students learn in a K-12 computer science pathway? When should they learn particular concepts? How do you implement computer science for all students? How can computer science be integrated into other subjects? This workshop series will prepare educators to implement CS in their coursework with *all* students. BLaST IU17 has developed a sequence of robotics activities to accompany computational thinking activities. The progression of activities are meant to complement already established curriculum choices such as Code.org's CS Fundamentals and Discoveries, Apple's Everyone Can Code, and Google's CS First. The use of physical objects moves the activities from the device screen to the concrete world. The sequence moves students from kindergarten through 8th grade. Educators who participate in the entire series will be prepared to integrate CS activities into the core curriculum.

#### **Philosophy of this Workshop Series**

BLaST IU17 believes in the 4 strands of STEM: Code, Build, Design, Create. Each of these strands is tied to a different pedagogical foundation. **Code** is based upon the [CS Framework](#) and [Computational Thinking](#). **Build** is based upon the [Engineering Design Process](#). **Design** is based on [Design Thinking](#) from d.school at Stanford. **Create** is based upon the [ISTE Standards for Students](#) -- Creative Communicator, Global Collaborator, and Knowledge Constructor. Students need a variety of experiences in order to find their passion. Truly rich experiences will combine different strands together in a project-based environment. Participants in this workshop series will actively engage in each of the strands throughout.

**Participants:** This offering is intended to support K-8 educators who currently or will soon teach computer science. Educators do not need prior experience with computer science and do not need to be a stand-alone CS course. It is strongly suggested that districts send no less than 2 educators and an administrator.

## ***Day 1 - The Deep Dive into the CS Framework and CT Competencies***

### *Workshop Description:*

The CS education community has developed the K-12 Computer Science Framework, a high-level guide for states or districts who want to design curriculum, standards, assessments, or teacher development programs. The framework identifies the core concepts and practices in grades 2, 5, 8, and 12. Educators will take a deep dive to identify each of the 5 core concepts and 7 CS practices. While engaging in CS unplugged activities, educators will identify the key vocabulary and concepts needed by students to invest themselves in computational thinking. Adhering to the belief that STEM and CS are for all students, participants will be given time to work with the MTSS framework and identify how to bring CS to everyone. In addition, participants will learn how to use Botley and unplugged activities to work with early learners and non-readers to incorporate computational thinking and basic sequencing skills using Botley, Mouse & Code, and Ozobots.

*Technology: Botley, Mouse & Code, Ozobots*

*Targeted Grade Bands: K-8*

*\*\*SCRIPT training is a strongly recommended prerequisite*

## ***Day 2 - Block-Based Coding***

### *Workshop Description*

Block-based coding is a perfect transition for students to learn how coding can be seen on a computer screen to how it can be used to move physical objects. Bring your computer and come learn how to use block-based coding with different types of apps and devices. Beginning with Scratch is a perfect entry point to block coding. Participants will take away specific activities and tools for employing block-based coding. In addition, they will understand the connection between block-based coding and the CSTA standards and where it fits into their curriculum.

*Technology: Scratch*

*Targeted Grade Bands: K-4*

Additionally, participants will learn how to use Ozobots to code both on paper and through the online platform, Ozoblockly. Participants will make connections from the software and robotics to their CS Framework document. While using Sphero and Dash, participants will learn the principles of loops and if/then/else.

*Technology: Ozobots (Ozoblockly), Sphero, Dash*

*Targeted Grade Bands: K-8*

Implementation Begins: Participants will begin field testing CS activities with their students. A virtual space will be identified for participants to share experiences and best practices.

### **Day 3 - Coding Physical Objects**

#### *Workshop Description*

Coding takes place on the screen, but excitement builds when students can see the objects they program to move in real space. In this session, we will explore how to combine physical objects such as Bloxels, Edison, and Mico:bits to create an unlimited set of possibilities. Participants will engage in design thinking and the engineering process while employing computational thinking in a project-based environment. At the end of the workshop, participants will understand how to code robotics separately and in combination with one another. Bloxels will be used to model video gaming using creativity and critical thinking. Finally, participants will examine online resources for integration of activities into all curricular areas and align their work to the CS Framework document from Day 1.

*Technology: Bloxels, Micro:bit, Edison*

*Targeted Grade Band: 3-7*

### **Day 4 - Internet of Things**

#### *Workshop Description*

This full-day workshop is designed to show teachers how they can incorporate multiple robotics platforms into one coding environment. Beginning with a study into SAMs Labs (K-3 and 5-8). Participants will use the Workbench Platform to create something with SAMs Labs and potentially the use of Arduinos. Finally, participants will examine online resources for integration of activities into all curricular areas and align with their work to the CS Framework document from Day 1.

*Technology: SAM Labs, Arduino, Micro:bit*

*Targeted Grade Bands: K-8*

### **Day 5 - CS Curriculum Writing and Integration**

#### *Workshop Description*

At the end of this series, it is time to design curriculum activities embedded into the core curriculum. We will explore how to leverage CS activities to embed into ELA, Math, and Science at grade-appropriate points. Participants will engage in curriculum redesigns to ensure either a dedicated course structure or a series of experiences spread throughout the year. We will engage in dialogue and design solutions to engage underrepresented groups and extend CS learning beyond the classroom walls. Participants will create a CS Framework spreadsheet that identifies 'I know' statements from the Standards and 'I can' statements from the CS Practices. They will also compose a list of age-appropriate vocabulary during the standards review. A critical element will be to link the Pennsylvania Career Education and Work Standards into the CS activities developed. Finally, educators will establish rubrics that align with the CS Framework and pedagogical foundation of the 4 strands of STEM.

*Technology: None*

*Targeted Grade Bands: K-8*



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**Additional Supports:** Districts can also purchase coaching days to support teachers integrating CS activities following the second workshop.

**Budget Cost:**

*\*Budgets should include either substitute costs or stipends for teachers*

*\*Budgets may also include mileage for educators to attend the training*

**Tentative Workshop Dates:**

Option 1: Summer CS Bootcamp (one week in August)

**Dates: August 10, 2020 - August 14, 2020**

Option 2: School-year CS Bootcamp (one day per month, November to March)

Dates: TBD

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