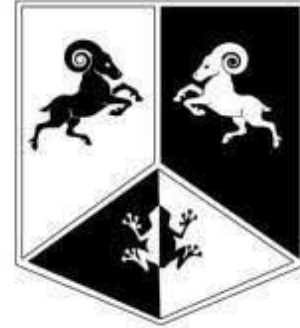# K-12 STEM Computer Science:
Comparing Alternatives

October 2, 2019

2019-2023 Strategic Plan Goals and Strategies

Curriculum, Instruction, and Assessment - Goal Statement 2:

By 2022 the District will develop and consistently implement a K-12 STEM (Science, Technology, Engineering and Math) program.

- *Ascertain budget implications for a K-12 STEM program,and prepare detailed recommendations for use during budget consideration/cycle for fiscal year 2021.*

Bootstrap

BOOTSTRAP
Equity • Scale • Rigor

Research-based curricular modules for grades 6-12. Our materials reinforce core concepts from algebra, enabling non-CS teachers to adopt our introductory materials while delivering rigorous and engaging computing content drawn from CS classes at universities like Brown, WPI, and Northeastern.

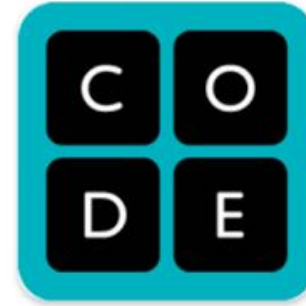Recommended Grades: 6-12

Format: Integrated

PD: Introductory Workshop

Courses: Bootstrap Algebra, Bootstrap Data Science, Bootstrap Reactive, and Bootstrap Physics

Cost: Free

Code.org

Code.org

Code.org® is a nonprofit dedicated to expanding access to computer science in schools and increasing participation by women and underrepresented minorities.

Recommended Grades: K-12

Format: Courses
- CS Discoveries: Taught as a 1 or 2 semester course (or 50+ course hours)
- CS Principles: Can be taught as an AP or non-AP class, Requires a full year to teach (or 100+ course hours)

Cost: Free

PD: 5 days of summer PD and additional school year trainings

Recommended Code.org Courses

	Elementary school						Middle school			High school			
K	1	2	3	4	5	6	7	8	9	10	11	12

CS Principles ▾

CS Discoveries ▾

CS Fundamentals ▾

Pre-reader Express ▾ CS Fundamentals: Express ▾

Professional Learning for all grade levels   Learn more

CodeHS

Kodable is a complete K-5 curriculum taking students from learning to think like a programmer in Kindergarten to writing real JavaScript by 5th grade. Kodable's curriculum is aligned to K-5 standards which are a roadmap for developing the whole student through computer science. Kodable provides easy to follow lesson plans focused on student outcomes so teachers can teach their students to code.

CodeHS is a comprehensive teaching platform for helping schools teach computer science. We provide web-based curriculum, teacher tools and resources, and professional development. By leveraging CodeHS' web-based platform, teachers can access all of the tools they need to teach great middle school or high school computer science courses, all in one place.

CodeHS

Recommended 6-12 (Kodeable, K-5 Partner)

Format: Course Specific at 6-12

Courses: 28+

Cost: Tiered Pricing - Free (Beta)/Pro/Site Licence

	1 Year	3 Year
1 Pro Section	$2,400	$2,600
1 Teacher Silver Licence	$6,500	$7,300
Any Teacher Gold Licence	$9,700	$10,300

CodeHS Courses

Introductory Courses

Intro to Computer Science in JavaScript

Intro to Computer Science in Python

Computing Ideas

Web Design

World of Computing

Introduction to the Internet

AP-Level Courses

AP® Computer Science A

AP® Computer Science A Review Course

AP Computer Science Principles

AP Computer Science Principles Review Course

Professional Development Courses

Teaching Intro Computer Science

Teaching Intro Computer Science 2

Teaching AP Computer Science Principles

Teaching AP® Computer Science A

Middle School Courses

Intro to Programming with Karel the Dog

Intro to Python with Tracy

Web Design

Computing Ideas

Creative Computing

World of Computing

Introduction to the Internet

Supplementary Courses

Video Game Design

Introduction to SQL

AP® Computer Science A Review Course

Functional Programming in Elm

Introduction to Virtual Reality

Creative Computing

Cybersecurity

Mobile Apps

CodeHS New Hampshire 6-12 Computer Science Curriculum Pathway

Here are the CodeHS courses that align with New Hampshire middle school and high school computer science state standards.

5th	6th	7th	8th	9th	10th	11th	12th
World of Computing							
	Introduction to the Internet						
	New Hampshire Course 2						
		Web Design (Matisse)					
				New Hampshire Course 3A			
				Intro to Computer Science in Python (Rainforest)			
						New Hampshire Course 3B	
					AP Computer Science Principles		
					Introduction to Cybersecurity (Vigenere)		
						AP Computer Science A (Nitro)	

CoderZ

CoderZ is an online STEM learning environment where students worldwide engage in Robotics and Computer Science Education (CSEd) by coding virtual 3D robots.

Recommended Grades: 5-12

Format: Modules 15 Hours/45 Hours

Courses: Cyber Robotics 101 and Coding Robotics

PD: Getting Ready to Teach CS (Python) and Getting Ready to Teach AP CS Principles

Cost:
IHG
 School Bundle $2,800
CoderZ 102 HS $2,200
Total: $5,000

Edhesive

The Edhesive curriculum, includes both video and text based lessonts for many lessons. No lesson planning is required.

Recommended Grades: 6-12

Format: Course Specific

Courses:

Explorations Coding 1 & 2 - Cost: $500-$2,500 (Based on Number of Students)

Introduction to Computer Science $2,000, AP Computer Principles, AP Computer Science A (Java), AP Statistics $2,500 per AP

PD: Getting Ready to Teach CS (Block Based, Python) and Getting Ready to Teach AP CS Principles - Cost: $500-$1,000

Total: $8,000 w/1 AP Course

Project Lead the Way: Computer Science

PLTW Computer Science empowers students to become creators, instead of merely consumers, of the technology all around them.

The program's interdisciplinary courses engage students in compelling, real-world challenges. As students work together to design solutions, they learn computational thinking – not just how to code – and become better thinkers and communicators. Students take from the courses in-demand knowledge and skills they will use in high school and for the rest of their lives, on any career path they take.

	K-5	6-8	9-12
Computer Science	K. Animals and Algorithms 1. Animated Storytelling 2. Grids and Games 3. Programming Patterns 4. Input/Output: Computer Systems 5. Infection: Modeling and Simulation	Computer Science for Innovators and Makers App Creators	Computer Science Essentials Computer Science Principles Computer Science A Cybersecurity *(Beta release 2018-19)*

Project Lead the Way:

Cost:

Launch (elementary) - CS

Gateway (middle school) - 2 Modules:

App Creators and Design and Modeling

PLTW Launch (PreK-5)	$3,558.50
Equipment and Supplies for Selected Modules (5)	
Equipment and Supplies	$2,308.50
Professional Development	
Professional Development Registration	$500.00
Annual Participation Fee	$750.00
PLTW Gateway (6-8)	$9,558.00
App Creators	
Equipment and Supplies	$821.00
Professional Development Registration	$1,200.00
Computer Science for Innovators and Makers	
Equipment and Supplies	$5,587.00
Professional Development Registration	$1,200.00
Annual Participation Fee	$750.00

Project Lead the Way:

Cost:

PLTW (high school) -

Equipment and Supplies Subtotal	$8,361.79
Professional Development Subtotal	$4,800.00
Participation Fee Subtotal	$2,000.00
Total	**$15,161.79**

Two Modules: Computer Science A and Computer Science Essentials

Cost and Standards Analysis

	Cost	Grade Levels (Standards)
Bootstrap	Free	6-12 (CCSS)
Code.org	Free	K-12 (CCSS/NGSS *Connected*)
CodeHS	$2,400 - $10,300	(K-5) 6-12 (CCSS/NGSS) College Board
CoderZ	$5,000	5-12 (CCSS/NGSS) College Board
Edhesive	$8,000	6-12 (CSTA) College Board
PLTW	$28,278.29	K-12 (NGSS/CCSS) College Board

Determining Factors in making a Recommendation

- A program that spanned grades K-12
- Focused on Computer Science
- Aligned with CCSS and NGSS
- Feedback from teachers and administration
- Format is not a stand alone, isolated program
- Teachers supported through PD