

To: USD 261 BOE and Dr. Burke, Superintendent of Schools

From: Dr. Michael Maurer – Principal, Haysville Middle School

RE: Computer Science Discoveries Course (from Code.org as a New Elective Course)

Date: February 25, 2019

History/Relevance: If the purpose of school is to develop human potential, it is our responsibility to teach children these skills so they can navigate anything the world throws at them. There are four skills we know all children should have to be prepared for the “real” world: creativity, communication, collaboration, and critical thinking.

Coding is a perfect platform to teach these skills. Coding is the computer language used to develop apps, websites and software. Without it, we’d have none of the major technology we’ve come to rely on such as Facebook, smartphones, web browsers, or even internet content. It all runs on code. In today’s economy, there is an urgent need for individuals with coding skills to meet the demands of a burgeoning technology industry.

Coding is introduced at the elementary level, so the natural flow should include a middle level learning opportunity. Then at Campus High School; programming is a detailed and analytical discipline training students to work through unique situations solving real life situations on a global scale. Any exposure to coding is a positive for the children served, specifically those with the desire to enter the computer science courses at Campus High School.

Code.org is a free online program currently being offered at Haysville Middle School as a nine-week enrichment class at the seventh grade level. One hundred ninety students enrolled in this enrichment class this year. This included: 49 in 1st nine weeks, 49 in 2nd nine weeks, 46 in 3rd 9 weeks, and 46 in 4th nine weeks. These numbers do not include the approximate 50 children who wanted this learning opportunity unable to gain such access, and these numbers represent only one of the three grade levels served at Haysville Middle School. It is our projection; the numbers would triple if introduced as an elective class open to all grade levels.

What: Computer Science Discoveries, to follow suit with the online component. Code.org Middle School Educator Resources include: Computer Science Discoveries, Express Course, Computer Science in Science, and Computer Science in Algebra. (Brief samples attached.)

Why: During our enrichment classes, students showed a steady interest in the coding course. This opportunity will provide students with the ability to continue to develop skills in coding.

Where: This course would be an additional elective offering at Haysville Middle School.

When: This course would be available for student enrollment in the 2019-2020 school year.

How: The additional elective course would be offered at Haysville Middle School through the Computer Science department. This course would be taught through the online program at Code.org. The curriculum, online student learning platform, and year round support are available to all schools at no charge.

Who: This course would provide another elective option for students in 6th through 8th grades.

How Much: There would be one additional staff member at Haysville Middle School as well as a one-time professional development cost of \$1,800 (plus travel).

If you have any questions, please contact, Dr. Michael Maurer, at mmaurer@usd261.com or 316-554-2251. Thank you in advance for your consideration.

Computer Science Discoveries

Version: '18-'19

Computer Science Discoveries (CS Discoveries) is an introductory computer science course that empowers students to create authentic artifacts and engage with computer science as a medium for creativity, communication, problem solving, and fun.

CSD Unit 1 - Problem Solving ('18-'19)

Unit 1 is a highly interactive and collaborative introduction to the field of computer science, as framed within the broader pursuit of solving problems. You'll practice using a problem solving process to address a series of puzzles, challenges, and real world scenarios. Next, you'll learn how computers input, output, store, and process information to help humans solve problems. The unit concludes with a project in which you design an application that helps solve a problem of your choosing.

Go to Unit

CSD Unit 2 - Web Development ('18-'19)

In Unit 2, you'll learn how to create and share the content on your own web pages. After deciding what content you want to share with the world, you'll learn how to structure and style your pages using HTML and CSS. You'll also practice valuable programming skills such as debugging and commenting. By the end of the unit, you'll have a personal website that you can publish to the Internet.

Go to Unit

CSD Unit 3 - Animations and Games ('18-'19)

In Unit 3, you'll build on your coding experience as you program animations, interactive art, and games in Game Lab. The unit starts off with simple shapes and builds up to more sophisticated sprite-based games, using the same programming concepts and the design process computer scientists use daily. In the final project, you'll develop a personalized, interactive program.

Go to Unit

CSD Unit 4 - The Design Process ('18-'19)

Unit 4 introduces the broader social impacts of computing. Through a series of design challenges, you will learn how to better understand the needs of others while developing a solution to a problem. The second half of the unit consists of an iterative team project, during which teams have the opportunity to identify a need that they care about, prototype solutions both on paper and in App Lab, and test solutions with real users to get feedback and drive further iteration.

Go to Unit

CSD Unit 5 - Data and Society ('18-'19)

Unit 5 is about the importance of data in solving problems and highlights how computers can help in this process. The first chapter explores different systems used to represent information in a computer and the challenges and tradeoffs posed by using them. In the second chapter you'll learn how collections of data are used to solve problems, and how computers help to automate the steps of this process. The chapter concludes by considering how the data problem solving process can be applied to an area of your choosing.

Go to Unit

CSD Unit 6 - Physical Computing ('18-'19)

UNIT 1: PROBLEM SOLVING

Lesson 1: Intro to Problem Solving

Standards Alignment

CSTA K-12 Computer Science Standards (2017)

AP - Algorithms & Programming

- **1B-AP-08** - Compare and refine multiple algorithms for the same task and determine which is the most appropriate.
- **1B-AP-11** - Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process.
- **1B-AP-16** - Take on varying roles, with teacher guidance, when collaborating with peers during the design, implementation and review stages of program development.

Lesson 2: The Problem Solving Process

Standards Alignment

CSTA K-12 Computer Science Standards (2017)

AP - Algorithms & Programming

- **1B-AP-08** - Compare and refine multiple algorithms for the same task and determine which is the most appropriate.
- **1B-AP-11** - Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process.

Lesson 3: Exploring Problem Solving

Standards Alignment

CSTA K-12 Computer Science Standards (2017)

AP - Algorithms & Programming

- **1B-AP-08** - Compare and refine multiple algorithms for the same task and determine which is the most appropriate.
- **1B-AP-11** - Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process.
- **1B-AP-16** - Take on varying roles, with teacher guidance, when collaborating with peers during the design, implementation and review stages of program development.

Lesson 4: What is a Computer?

Standards Alignment

CSTA K-12 Computer Science Standards (2017)

CS - Computing Systems

- **1B-CS-01** - Describe how internal and external parts of computing devices function to form a system.

Lesson 5: Input and Output

Standards Alignment

CSTA K-12 Computer Science Standards (2017)

CS - Computing Systems