



HINGHAM PUBLIC SCHOOLS

220 Central Street • Hingham, Massachusetts 02043

781-741-1500 VOICE • 781-749-7457 FAX

January 2018

Dear Community,

The purpose of this *Dear Community Letter* is to share some exciting new developments in our district with regards to computer science and digital literacy. Hingham Public Schools has embarked on a strategic, multi-year initiative to best integrate computer science and digital literacy throughout our K-12 curriculum, complementing and expanding our existing technology programming. The overarching goal of the initiative is to ensure that Hingham students possess the skills and habits of mind to make fluent use of computers and other digital technology to create, problem-solve and express their knowledge. Rather than only being consumers of technology, students will now also be empowered to innovate, further their curiosity, and solve complex problems.

Why Computer Science and Digital Literacy?

In 2016, the Massachusetts Department of Elementary and Secondary Education adopted a new Digital Literacy and Computer Science Framework (DLCS), a document that outlines a coherent progression of core computer science content and digital literacy skills developed over the K-12 grade span. In outlining the rationale for the new framework, DESE states that *“the ability to effectively use and manipulate technology to solve complex problems is the new literacy skill of the twenty-first century.”* These digital literacy skills provide exciting avenues to enable innovation and creativity in the learning environment and are essential for college and career readiness.

The DLCS framework also highlights the interdisciplinary nature of digital literacy and computer science, stating that *“much of the knowledge, skills, and dispositions central to digital literacy and computer science, such as computational thinking, also apply to other subjects, including, but not limited to, science, technology and engineering and mathematics.”* Thus, a comprehensive K-12 curriculum should not treat computer science and digital literacy as isolated or specialized skills, but rather cross-curricular tools that are embedded across disciplines.

Computer Science and Digital Literacy Concepts and Skills

The DLCS framework outlines core concepts in four strands (Computing and Society, Digital Tools and Collaboration, Computing Systems, and Computational Thinking) and includes topics such as the following: safety and security; interpersonal and societal impact; collaboration and communication; and human and computer partnerships.

Computational thinking is at the heart of computer science, incorporating skills such as abstraction, algorithm use, data manipulation, programming, modeling and simulation. Computational thinking, and in particular the skill of computer programming/coding, enables students to formulate a problem and express a solution such that a computer (or human) can effectively carry it out. Students can use coding as a tool to illustrate abstract

concepts in disciplines such as math and science. For example, students might use code to generate simulations in chemistry or illustrate algebraic equations.

Digital literacy skills support collaboration, communication, and research, allowing students to create and publish artifacts to convey knowledge and contribute to the learning of others. Digital literacy skills have obvious cross-cutting connections among disciplines and are at the foundation of living and working in the modern world.

HPS K-12 Computer Science & Digital Literacy Initiative

Hingham Public Schools has initiated a strategic, multi-year implementation plan to ensure that all students receive access to a rigorous course of study in digital literacy and computer science. Immediate goals include providing direct instruction in computer science, through our K-5 computer science special and secondary elective courses, while longer term goals include a broader integration and immersion of computer science across the K-12 curriculum. The Hingham Education Foundation has been a key partner in funding this work, with an eye toward long-term sustainability in implementation.

2017-2018

In 2017-2018, all students in the district's elementary program will receive direct instruction in the new computer science curriculum as part of the core elementary program. During their computer "specialist" time taught by the elementary computer science teachers, K-5 students will engage with carefully researched tools, selected to support the progression of student skill in computational thinking.

Grade K-1: Students in K-1 will work with *Beebots*, autonomous robots that allow students to problem solve and explore concepts such as planning, sequencing, and collaboration.

Grades 2-3: Grades 2-3 will explore *Osmo Coding & Coding Jam*, a tablet-based system that allows students to engage in two types of computer science experiences. *Osmo Coding*, is a block-based coding system designed to engage students in programming skills such as sequences, loops, and conditionals. *Osmo Coding Jam* allows students to apply computer programming skills to compose music.

Grades 4-5: *Dash and Dot* are app-controlled robots allowing students in Grades 4-5 to use a variety of block based coding tools (Wonder, Blockly) to continue skill development of sequences, loops, and conditionals, and engage in more sophisticated computer coding functions.

In 2018-2019, once K-5 students have gained proficiency in the existing tools, additional devices and programs will be incorporated to round out the K-5 computer science special. We are grateful to Hingham Education Foundation for providing support and funding for the devices and related technology.

At the middle school level, direct instruction in computer science is offered through study of Javascript in Grade 6 STEM and an after school Coding Club. The district is currently exploring expansion of the STEM program into Grades 7-8. At HHS, current computer science courses include Computer Programming and Tech Squad electives, as well as AP Computer Science offered through Virtual High School, and a high school Coding Club. Research and development is in progress to review the middle and high school schedules to determine the most effective way to ensure that all secondary students receive instruction in DLCS.

2018-2019 & Beyond

In 2018-2019, the initiative will expand to focus on the integration and immersion of computer science and digital literacy throughout the K-12 curriculum. The district is currently researching partners such as Tufts Center for Engineering Education Outreach, ScratchEd, Project Growing Up Thinking Scientifically and Project Lead the Way, to provide expertise and professional development as we seek to “home-grow” integrated lessons and immersive opportunities that support our existing robust curriculum.

In 2018-2019, we will recruit a pilot cohort of teachers to take the first step in making our vision of computer science integration and immersion a reality. Interested teachers from each grade level and academic discipline will form the cohort and will receive in-depth training from our selected partners. The pilot teachers will then develop and implement lessons that authentically integrate computer science and digital literacy throughout the curriculum. It is our vision that students will apply principles from DLCS to “show us what they know” in new and creative ways across disciplines.

In subsequent years, the training and pilot lessons will be expanded to additional teachers, with a goal of full scale K-12 implementation.

Conclusion

Hingham Public Schools has embarked on a strategic, multi-year initiative to best integrate computer science and digital literacy throughout our K-12 curriculum. Our work, fully funded in partnership with the Hingham Education Foundation, will endeavor to ensure that Hingham students possess the skills and habits of mind to make fluent use of computers and other digital technology to create, problem-solve and express their knowledge.

For additional information, please see our website:

<http://hinghamschools.com/academic-programs/computer-science/> or feel free to contact your building principal, Kathryn Roberts, K-12 Director of Science, ([kroberts@hinghamschools.org](mailto: kroberts@hinghamschools.org)) or Dr. James M. LaBillois, Assistant Superintendent of Schools. ([jlabillois@hinghamschools.org](mailto: jlabillois@hinghamschools.org)).