ARCS NEWS

Advancing Rural Computer Science

Brought to you by The Center for Educational Partnerships at Old Dominion University

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Announcements

Greetings! As the school year wraps up, we want to send one more huge thank you for all that you do to support students!

We have been busy preparing to enroll some of you in Code VA's K-5 coaches academy, and welcome those of you who completed the academy last summer into our CS Integration microcredentials courses. Please be on the lookout for communications from TCEP@odu.edu about enrollment procedures, stipends, and other details!

We hope you enjoy a peaceful and fun summer, and perhaps see examples of computer science and computational thinking in the many computing devices that bring us together and help us accomplish our summer goals!

The ARCS team

Concept Corner

Computational thinking is an interrelated set of skills and practices for solving complex problems, and a necessity for fully participating in a computational world.

The computers we use are not smart machines. However, they are:

(i) capable of carrying out simple calculation tasks very fast and

(ii) have enormous "memory" which can be used to store, retrieve and utilize data.

Having these two capabilities makes it possible for "smart" humans to use the computers for solving complex problems. This is where computational thinking comes in. Computational thinking skills relate to making efficient use of the capabilities of our computing device to solve complex real-world problems. It is important to note that computational thinking is not just programming.

Programming is the practice of developing a set of instructions that a computer can understand and execute, as well as debugging, organizing, and applying that code to appropriate problem-solving contexts. The skills and practices requiring computational thinking are broader, leveraging concepts and skills from computer science and applying them to other contexts. Examples of such skills include problem abstraction, proper tool selection, problem decomposition, pattern recognition, algorithmic thinking and precise communication of a "method" to solve a problem. All of us use "computational thinking" in solving our day-to-day problems to some extent already. Identifying and listing down all the steps of your favorite baking recipe for a friend is an example. Similarly, implicitly we use computational thinking when deciding on the order in which we would carry out a set of errands (e.g. going to a grocery store, dropping a child to school, meeting a colleague and making it to a doctor's appointment) to minimize the time required for completing all of them.

Pedagogy Pointers

Free unplugged lesson: code.org has excellent free lesson plans, including one focused on computational thinking at an elementary level. This lesson is unplugged and does not require computers for students to use. The lesson includes materials, a teacher guide, and a video. Can be integrated into lessons for many CS SOLs pertaining to Algorithms and Programming.

code.org computational thinking lesson

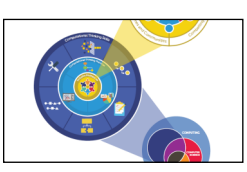
Cross-curricular computational thinking: ctlessons.org is a site jam-packed with cross-curricular ideas for integrating computational thinking into other areas of the curriculum and free lessons. All four core content areas – math, science, social studies, and language arts – are included with examples of lessons and activities. Some content may be too advanced for early elementary students. Can be integrated into lessons for many CS SOLs pertaining to Algorithms and Programming.

ctlessons.org main hub

Computer Science in the Commonwealth

Computational thinking is a building block of computer science. It is the thought process behind creativity and innovation in computer science. It provides guidance in problem-solving and the application of creativity. The four main pillars of computational thinking are abstraction, pattern recognition, decomposition, and algorithm thinking. The utilization of computational thinking can be seen and demonstrated in all academic areas. Instructional resources related to computational thinking can be found on the Virginia Department of Education **GoOpenVA**. Educators are encouraged to not only utilize these resources but to also upload new resources related to computational thinking and computer science for the collective good to expand computer science in the Commonwealth.

Engaging All Learners



This month, our newsletter is focused on computational thinking, a problem-solving process initiated through steps or stages that can be automated for completion by a computing device. However, computational thinking activities can also be "unplugged," making them appropriate for use in solving problems in areas like social studies and literacy in addition to math and science fields. Digital Promise is a non-profit agency whose mission is to promote learning for all students through innovation in education. Digital Promise is committed to expanding opportunities for underserved and underrepresented students to gain experiences in computing, and many of their resources are designed with a diversity, equity and inclusion lens. A great example is their report titled "**Computational Thinking for an Inclusive World: A Resource for Educators to Learn and Lead, Quick Start and Discussion Guide**" a valuable source of information and activities designed to support student engagement in computational thinking.

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