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, and Happy New Year!

We hope you and your students had a relaxing and rejuvenating winter break and were able to enjoy celebrating the New Year.

This month, our theme is gaming. What is your favorite game to play with a computing device? How have games changed since you first played? What games do your students play? Scroll down for some interesting facts about gaming as well as some game-related resources that align with the VDOE Standards.

As ever, please feel free to reach out to us via **TCEP@odu.edu**.

The ARCS Team

Concept Corner
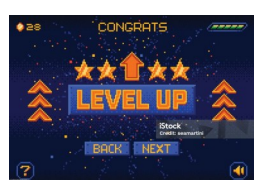
Recent developments and innovations in computer science don't only impact our lives by solving large problems, making tasks faster, and getting us more connected – they also bring new forms of entertainment. One form of this entertainment that has made one of the largest societal and cultural impacts is gaming. This industry was valued at over $214 billion globally in 2023, with an annual revenue of $365.6 billion! The number of gamers was projected to grow to $3.07 billion globally by the end of 2023. For more gaming statistics **click here.**

Whether played on a personal computer (PC), PlayStation, Xbox, or Nintendo console, video games have become a thrilling and immersive pastime for many of us. These games apply multiple concepts in computer science. Every shape, movement, and sound effect is programmed using computer code. Concepts in geometry and mathematics facilitate quality of the appearance of 3-D objects and their movement. The program in the game responds to decisions made by players and can take the game down many different paths. In many cases, players face opponents that are controlled by the computer (reasonably called a "computer" opponent). This computer player makes its next move by collecting data on the human player's actions, analyzing their patterns, and predicting what move the player may do next and acting accordingly to stay competitive. Also, regarding online multiplayer games, a secure network is required to assure that players stay connected with each other and experience fast game response and accurate interaction. In this network, there usually is a central "server" that connects every player's console and waits for enough players to connect to start a game. All in all, modern games require the contribution of hundreds, if not thousands, of developers and experts in various fields, both in computer science and in mathematics.

Pedagogy Pointers
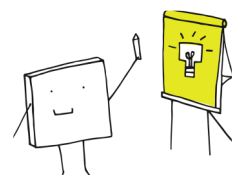
Free Platform: **Gamefroot** offers a free version of its game-designing platform that allows students to use basic coding skills to design games that students can play. International curriculum guides and many related **educator resources** are freely available and can be adapted to Virginia standards. Aligns with CS 2.1-3, 3.1-3, 4.1-3, and 5.1-3. For students without much prior coding experience, consider encouraging them to try **Blockly Games** or Minecraft (via Code.Org's **Minecraft Hour of Tutorials**).

This MIT **student-friendly video lesson** to help students understand how games connect to coding languages like Python and Scratch. Parallels to language arts are drawn throughout the lesson to help students understand how coding is a language. Aligns with CS K.1-3, 1.1-3, 2.1-3, 3.1-3, 4.1-3, and 5.1-3.

Computer Science in the Commonwealth

VDOE Computer Science Standards of Learning

In 2017, the Virginia Department of Education adopted Computer Science Standards of Learning (SOL) to identify academic content for essential components of the computer science curriculum at different grade levels. Standards are identified for kindergarten through grade eight and a core set of middle and high school elective courses. Virginia is one of the first states to have K-12 standards and is leading the way in student workforce readiness. Revisions of these standards are anticipated in 2024.

There is currently no SOL test associated with computer science instruction; however, these standards are intended to provide students with a detailed understanding of the study of computers and algorithmic processes, including their principles, their hardware and software designs, their applications, and their impact on society. Click **here** to view the CS standards for your grade level.

Engaging All Learners

Gaming can be an effective instructional tool for a variety of content areas and is a great way to integrate computer science skills with core curricular areas. Gaming has been shown to increase engagement and promote social and emotional learning among students across K-12, with increases observed for problem solving and critical thinking skills as well as improved academic achievement overall. However, before we introduce strategies such as gaming into our classrooms, we need to ensure that the games are appropriate for all learners. For example, the games you select should be available in multiple languages and should offer differentiated support to reach students at various stages of learning.

WIDA is an initiative of the University of Wisconsin – Madison that offers resources for teachers, students, and families to support learning among diverse populations, particularly those whose primary language is one other than English. **Click here** to visit the WIDA site to learn more about creating an inclusive elementary classroom, whether you are teaching in a face-to-face or virtual/hybrid environment.

Old Dominion University

The Center for Educational Partnerships

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