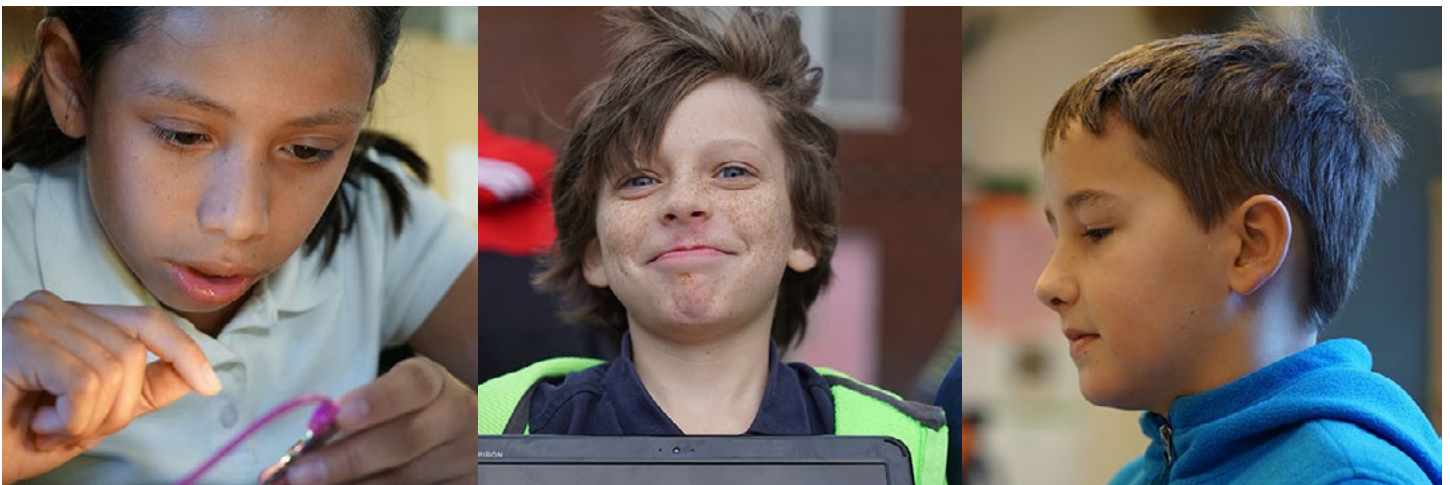# K12 COMPUTER SCIENCE FRAMEWORK

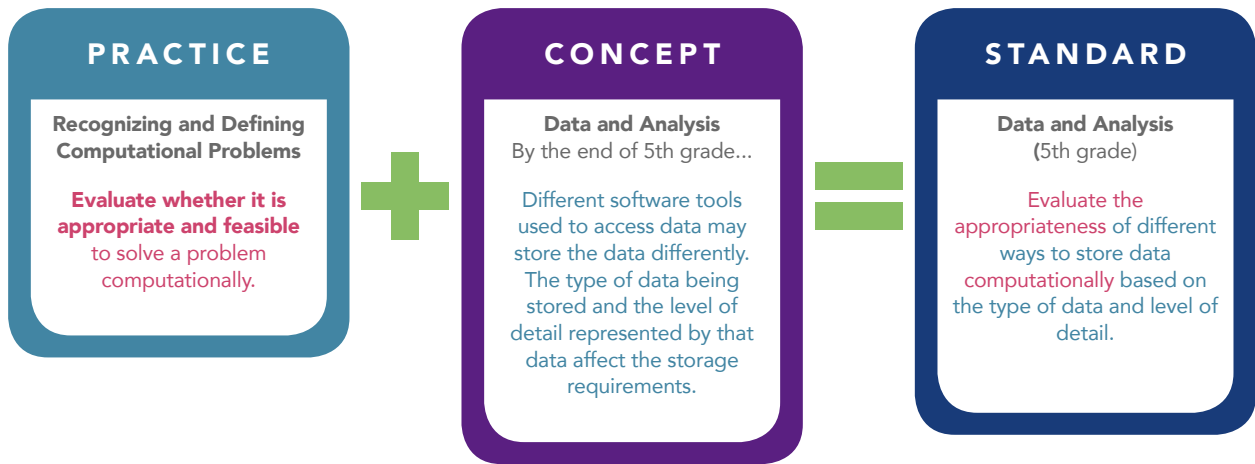## Computer Science: Essential Knowledge for All Students

Computer science is a foundational subject for students' education and their future careers and interests. The purpose of the K–12 Computer Science Framework is to define what every student should learn in computer science to prepare them for the emerging demands of the 21st century—not just to major in computer science or secure jobs as software engineers. For example, computer science requires the development of strong computational thinking skills, which can be applied in science, mathematics, and other subjects. To date, many schools have individually adopted a computer science curriculum without the benefit of a shared vision that includes the insights of educators, experts, or employers. The framework offers guidance that can help states even the playing field and provide all students access to this critical opportunity. Learn more at k12cs.org.

A Framework for K–12 Computer Science

The K–12 Computer Science Framework provides high-level, conceptual guidance for the computer science skills and knowledge students need to build across elementary, middle, and high school. The Association for Computing Machinery, Code.org, Computer Science Teachers Association, Cyber Innovation Center, and National Math and Science Initiative collaborated with more than 50 writers and advisors within the computer science and education community (K–12 teachers, higher education faculty, and researchers), fourteen states (Arkansas, California, Georgia, Idaho, Indiana, Iowa, Maryland, Massachusetts, Nebraska, Nevada, New Jersey, North Carolina, Utah, and Washington), school districts, technology companies, and other organizations to describe the computer science concepts and practices that are essential to the educational success of all students.

PRACTICE		CONCEPT		STANDARD
Recognizing and Defining Computational Problems **Evaluate whether it is appropriate and feasible** to solve a problem computationally.	**+**	**Data and Analysis** By the end of 5th grade... Different software tools used to access data may store the data differently. The type of data being stored and the level of detail represented by that data affect the storage requirements.	**=**	**Data and Analysis** **(**5th grade) Evaluate the appropriateness of different ways to store data computationally based on the type of data and level of detail.

How Can the Framework Help States?

The K–12 Computer Science Framework can facilitate efforts to expand statewide access to computer science. In addition to informing the development of standards, the framework can provide a common foundation for states to build a coherent plan for promoting computer science consisting of curriculum, instruction, professional development, and assessment. Most states do not have K–12 computer science standards nor do they provide necessary professional development. A few states, such as Massachusetts, Arkansas, and Indiana, have developed comprehensive K–12 computer science standards that other states can draw from as examples. Other states, such as South Carolina, Virginia, and Washington, are beginning the standards development process. In addition, the framework is one of multiple inputs into the current revision of the 2011 Computer Science Teachers Association standards.

Framework to Standards

The K–12 Computer Science Framework is not a set of standards; rather, it provides an organizing structure and guidance for states and school districts to create their own standards. The framework's practices (what students do) and concepts (what students know) were developed by experts with feedback from a variety of stakeholders in the computer science education community. The practices and concepts should be integrated to create comprehensive student expectations.

How Can Computer Science Promote Equity?

Computer science can empower individuals to create technologies with broad influence, yet those who create them are often not representative of our society. Women, underrepresented minorities, and people with disabilities bring important perspectives that drive computing innovation. A lack of diverse perspectives constrains the scope of problems being addressed and the ability of new tools and technologies to reach a wide range of people. Computer science skills are critical for success, and as long as there are gaps in access, the skills gap will only get wider. An important part of addressing this lack of diversity is increasing equity and opportunities for all students to learn computer science. The K–12 Computer Science Framework is part of a larger solution to the problem of equity in computer science.