These Standards are aspirational and dependent on sustained professional development (PD) and learning. We intend to provide a level of specificity that both offers sufficient guidance to novice CS teachers while allowing experienced CS teachers space for professional growth. This is critical because CS teachers enter the field from many different areas of specialization, and their preparation varies significantly. Each indicator is not an expectation of current knowledge, but instead a roadmap to help teachers from multiple entry points identify strengths and areas of need. We hope teachers use this information to seek out targeted professional development opportunities to increase their mastery.

Audience

These Standards are designed for both novice and experienced teachers who primarily teach computer science. While we anticipate that many in the CS education community will find value in these Standards, we designed them for a few specific audiences:

▶ **Schools of education** will use these Standards to develop new or refine existing *pre-service* programs.

▶ **PD providers** will use these Standards to develop new or refine existing *in-service* professional learning programs.

▶ **State, district, and site leaders** will use these Standards to develop pathways for certification and support their CS teachers in setting and meeting professional learning goals.

▶ **K-12 CS teachers** will use these Standards to reflect on their own strengths and areas of growth, set professional goals, and identify targeted PD opportunities to meet these goals.

Development

The *CSTA Standards for CS Teachers* are written and maintained by teacher members of the Computer Science Teachers Association (CSTA), a nonprofit organization dedicated to empowering, engaging, and advocating for K-12 CS teachers worldwide. These Standards were first created and published by the International Society for Technology in Education (ISTE) in 2003 as the *Standards for CS Educators*, last updated in 2011, and rewritten in 2019 in partnership with ISTE, for release in 2020.
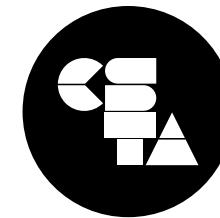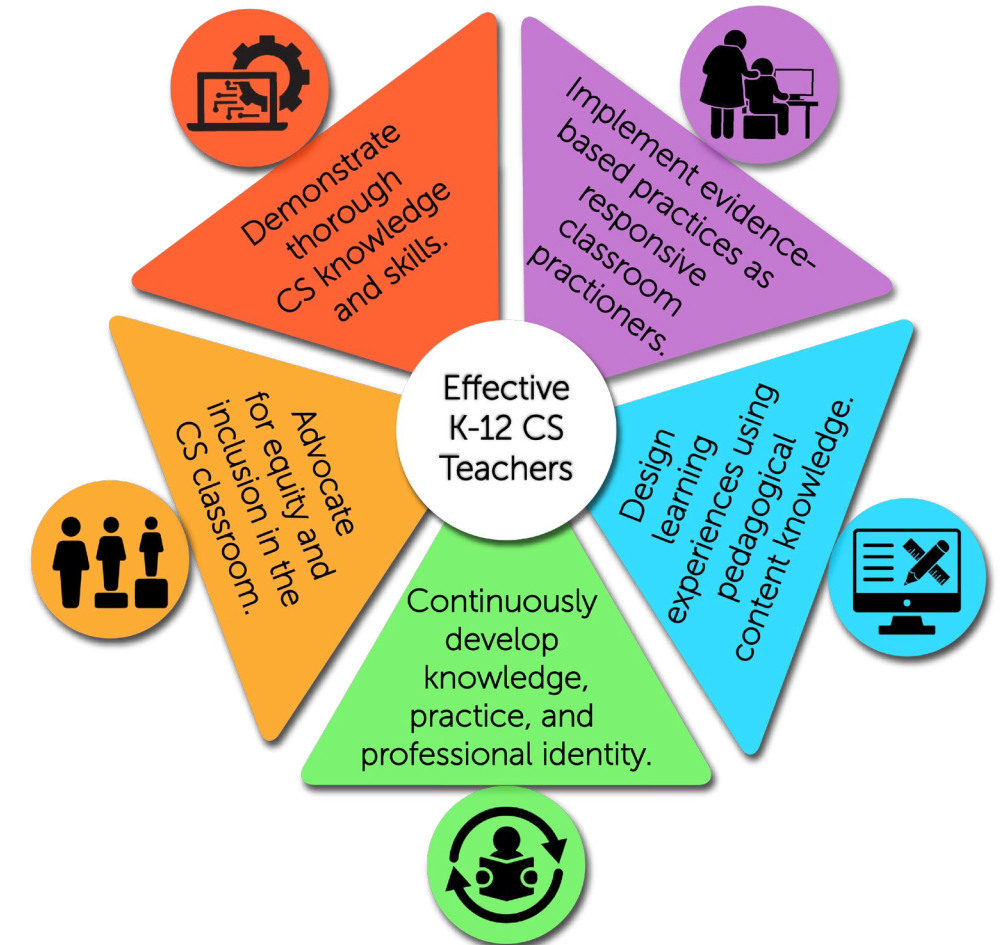
2020 CSTA Standards for Computer Science Teachers

The field of computer science (CS) education has rapidly accelerated over the past two decades. Throughout this movement, we have learned a great deal about effective K-12 CS instruction. By publishing this new version of *Standards for CS Teachers*, we aim to complement the universal outcomes for student learning delineated in the *K-12 CS Framework* and *CSTA K-12 CS Standards*. The *Standards for CS Teachers* establish robust benchmarks for the teachers who prepare their students to meet these learning outcomes.

Purpose

These Standards are designed to provide clear guidance around effective and equitable CS instruction in support of rigorous CS education for all K-12 students. The purpose is to:

▶ explain what CS teachers should know and be able to do in the classroom,

▶ provide aspirational goals to guide teachers' professional learning and to continuously develop their teaching practice from novice to master CS teacher, and

▶ establish benchmarks for professional development (PD) providers as they craft CS PD experiences.

Effective K-12 CS Teachers
- Demonstrate thorough CS knowledge and skills.
- Implement evidence-based practices as responsive classroom practitioners.
- Design learning experiences using pedagogical content knowledge.
- Continuously develop knowledge, practice, and professional identity.
- Advocate for equity and inclusion in the CS classroom.

Vision

Effective CS teachers must have thorough content knowledge and skills in computer science and understand the student learning progression.* They must also continuously refine their pedagogical content knowledge (PCK) and skills to support all students in meeting learning outcomes.

* These Standards do not attempt to define all content knowledge and skills that CS teachers should have. Rather, they reference the *K-12 CS Framework* and *CSTA K-12 CS Standards*, which provide curricular guidance on CS learning objectives and outline the foundation for a complete CS curriculum and its implementation at the K-12 level.

A full version of these Standards, with supplementary information and resources, is available online at
http://csteachers.org/teacherstandards

Standard 1. CS Knowledge & Skills

Effective CS teachers demonstrate and continuously develop thorough knowledge of CS content. They demonstrate proficiency with the CS concepts of the grade bands they teach, and they integrate these concepts with CS practices, including computational thinking. They also understand the progression of content before and after the grade bands they teach.

1a. Apply CS practices

1b. Apply knowledge of computing systems

1c. Model networks and the Internet

1d. Use and analyze data

1e. Develop programs and interpret algorithms

1f. Analyze impacts of computing

Standard 2. Equity and Inclusion

Effective CS teachers proactively advocate for equity and inclusion in the CS classroom. They work towards an intentional, equity-focused vision to improve access, engagement, and achievement for all of their students in CS.

2a. Examine issues of equity in CS

2b. Minimize threats to inclusion

2c. Represent diverse perspectives

2d. Use data for decision-making to improve equity

2e. Use accessible instructional materials

Standard 3. Professional Growth and Identity

Effective CS teachers continuously develop their knowledge, practice, and professional identity to keep pace with the rapidly evolving discipline. They participate in the larger CS education community and collaborate with others to develop the skills that enable all students to succeed in their classes.

3a. Pursue targeted professional development

3b. Model continuous learning

3c. Examine and counteract personal bias

3d. Commit to the mission of CS for all students

3e. Leverage community resources

3f. Participate in CS professional learning communities

Standard 4. Instructional Design

Effective CS teachers design learning experiences that engage students in problem solving and creative expression through CS, using pedagogical content knowledge (PCK). They plan to meet the varied learning, cultural, linguistic, and motivational needs of individual students in order to build student self-efficacy and capacity in CS.

4a. Analyze CS curricula

4b. Develop standards-aligned learning experiences

4c. Design inclusive learning experiences

4d. Build connections between CS and other disciplines

4e. Plan projects that have personal meaning to students

4f. Plan instruction to foster student understanding

4g. Inform instruction through assessment
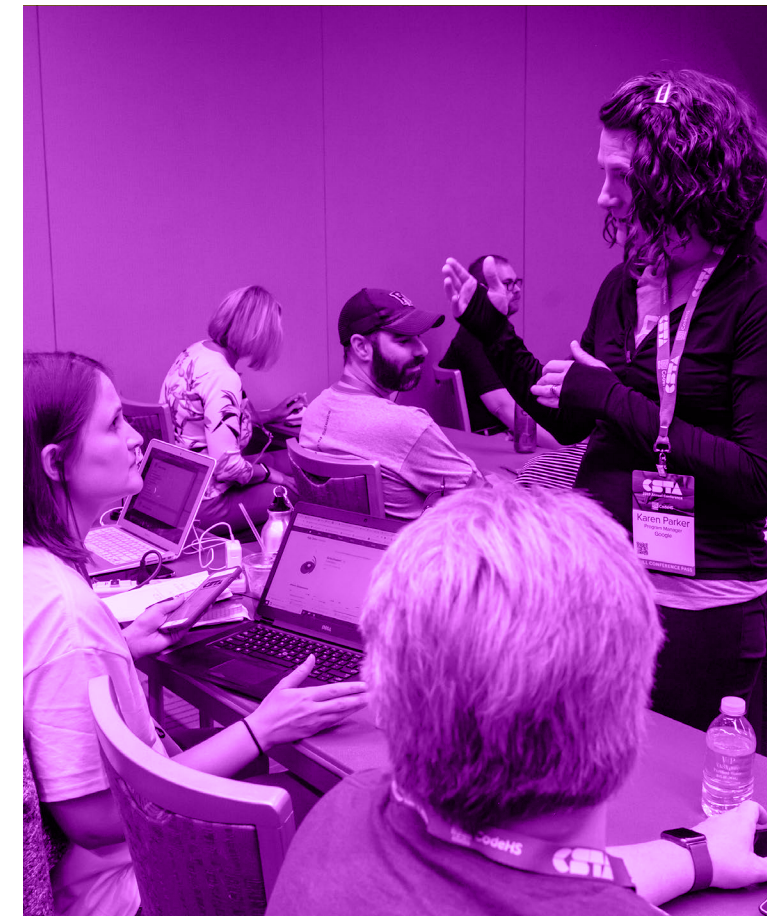
Standard 5. Classroom Practice

Effective CS teachers are responsive classroom practitioners who implement evidence-based pedagogy to facilitate meaningful experiences and produce empowered learners of CS.

5a. Use inquiry to facilitate student learning

5b. Cultivate a positive classroom climate

5c. Promote student self-efficacy

5d. Support student collaboration

5e. Encourage student communication

5f. Guide students' use of feedback