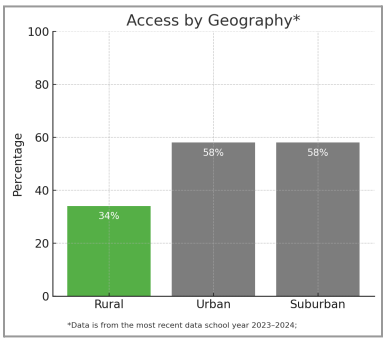
CS4NorCal
Computer Science and STEM Education Rural Implementation Project

Spotlight on Shasta County

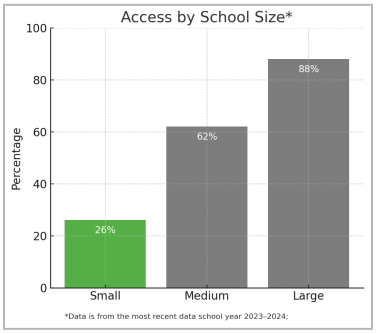
September 2025

This brief shines a spotlight on Modoc County's implementation of computer science (CS) pathways in partnership with the **Small School Districts' Association's** federally funded **CS4NorCal project**.



About This Project

Rural school districts in California face challenges that urban and suburban areas cannot imagine. Limited tax bases, vast geographic areas, and higher costs of service delivery mean these districts operate on razor-thin budgets even in the best of times. One result is that these districts and their students **lack access to computer science education**.



CS4NorCal, a professional learning and research project serving over 100 schools in Glenn, Lassen, Modoc, Plumas, Shasta and Siskiyou counties, promotes equitable access to computer science education for small and rural schools in Northern California. The project, started in June 2021, brings resources and builds capacity and partnerships to create opportunities to establish CS pathways in similar districts throughout the state. It is sponsored by the Small School Districts' Association and funded by a $4 million federal grant.

Shasta County Overview

Shasta County, one of California's original counties, was home to nearly 500 indigenous tribe who established flourishing communities along the Sacramento River and a robust trading system. The Gold Rush of 1848-1849 brought a large influx of settlers who engaged in vigilante and state-sanctioned clashes with the tribes. The logging, farming and mining industries played significant roles in the county's development along with the arrival of the Central Pacific Railroad in 1868.

The county encompasses the northern reaches of the Sacramento Valley and parts of the Cascade Range and, with 182,155 residents, is the most populous in northern California. The county seat, Redding, is a regional urban center, but much of the county remains rural and remote, surrounded by mountains to the north, west and east. Much of the county is dedicated to agriculture, natural parks, forests and recreational areas. Shasta Lake, in the central part of the county, is the largest reservoir in California and the source of water for agriculture and municipal use throughout the state's massive Central Valley. Economic and workforce drivers in the county include health care and social assistance, retail,

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public administration and industries that support tourism, particularly outdoor activities such as hiking, fishing, and boating. Shasta is a stronghold of the revived Jefferson State proposal for parts of Northern California and Southern Oregon to form a new state.

Per the US Census Bureau, Shasta County's median age of 42.1 years is greater than the California median age of 38 years. About 88% of the population identifies as White and 8% as Hispanic. The county's median income of $75,949 lags behind the state's median income of $95,521 and the poverty rate (12.6%) is slightly higher than the state rate (12%). Approximately 23% of Shasta residents have a bachelor's degree, compared to 37% statewide.

The Shasta County Office of Education (SCOE) serves 24 public school districts, 50% of which include a single K-8 school. All told, 91 educational entities enroll approximately 26,000 students. The districts are:

- Anderson Union High
- Bella Vista Elementary
- Black Butte Union Elementary
- Cascade Union Elementary
- Castle Rock Union Elementary
- Columbia Elementary
- Cottonwood Union Elementary
- Enterprise Elementary
- Fall River Joint Unified
- French Gulch-Whiskeytown Elementary
- Gateway Unified
- Grant Elementary
- Happy Valley Union Elementary
- Igo, Ono, Platina Union Elementary
- Junction Elementary
- Millville Elementary
- Mountain Union Elementary
- North Cow Creek Elementary
- Oak Run Elementary
- Pacheco Union Elementary
- Redding Elementary
- Shasta Union Elementary
- Shasta Union High
- Whitmore Union Elementary

The schools include 54 traditional schools, seven continuation/alternative high schools, 10 community day schools, and 15 charter schools. *(Other educational entities participating in CS4NorCal included the juvenile court school, Head Start and two county or district special programs.)* The districts range in size from 15 students (French Gulch-Whiskeytown Elementary) to about 5500 students (Shasta Union High). The households of four districts (total population 5,695) meet or exceed the state's broadband rate of 91.5%, while all others are at or below 90%. In two districts (French Gulch-Whiskeytown and Igo, Ono, Platina, combined enrollment 44), the broadband rate is below 75%. (Source: National Center for Education Statistics.)

In 2018, prior to joining the CS4NorCal project, nine Shasta County schools serving grades 9-12 *(including continuation, community day and adult schools*) offered a computer science course (Computer Science for California - The Data) and an average of 2% of Shasta County high school

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students were enrolled in a computer science course. Nonetheless, in 2020, SCOE leaders recognized an interest in building on interest in CS instruction that had resulted from STEM grants and after-school robotics programs. Despite the strong interest, they also perceived challenges including:

- Lack of an existing program to develop CS pathways at the COE level and minimal knowledge of CS standards.
- Competition with a focus on math and literacy.
- Some reticence to using technology in the classroom & lack of tech support in small districts.
- The possibility that the smallest schools might lack the staffing capacity to implement CS instruction.

In spite of these challenges, SCOE hoped to leverage several assets. In addition to prior STEM-CS grants, the county hosted a popular regional STEM Career Day for high school freshmen and some schools participated annually in Hour of Code.

Shasta County Participation in CS4NorCal

As of the summer of 2024, 159 educators *(including teachers, administrators and district office staff)* have participated in at least one CS4NorCal professional learning event. Participants in CS4NorCal represent 46 of 87 (53%) county schools and four educational support programs operated by non-district entities. Participation was particularly strong in events hosted in Redding, although educators from Shasta County also traveled to workshops in Sacramento and Anaheim, CA.

Professional Learning Experiences *(note: some educators participated in more than one workshop)*			
Elementary Grades • *Elementary 4 Computing, Year 1* • *Elementary 4 Computing, Year 2* • *Other virtual elementary workshops*	**Secondary Grades** • *Bootstrap Algebra* • *Computer Science Discoveries* • *Computer Science Principles* • *Computer Science Integration* • *Exploring Computer Science* • *Implementing 4 Impact*	**Other** • *CS Equity for Administrators* • *Counselors 4 Computing* • *Regional orientation workshops*	**Community of Practice** • *Far North Chapter of the Computer Science Teachers Association (CSTA)*
39 participants	**62** participants	**50** participants	**80** participants

What is Working? What are the Promising Practices in Shasta County?

Schools in the county's urban and suburban communities in – and around – Redding enthusiastically jumped into CS4NorCal starting in the summer of 2021 led by the Redding Elementary School District (RESD) and Shasta Union High School District. RESD Superintendent Rob Adams, now retired, and SUHSD Associate Superintendent Leo Perez led the charge. Smaller and more rural schools gradually joined the project, particularly in 2023 and 2024. Interestingly, participants from several

> ***In talking about CS availability, Rob Adams asked "Why not here? Why should our kids be behind the 8 ball because of where we live?"***
>
> Rob Adams, retired Superintendent of Redding Elementary School District

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non-traditional educational entities also participated, including the regional Head Start preschool and the county juvenile court school. Featuring both the initiative and passion of individual teachers and forward-thinking administrators, implementation of computer science in Shasta County is taking hold. Districts and/or schools where robust CS instruction has taken root include:

- Redding Elementary School District
- Shasta Union High School District
- Redding School of the Arts
- Tree of Life International Charter School
- Rocky Point Charter School
- Pacheco Elementary School
- Northern Summit Charter School
- Buckeye School of the Arts
- Redding STEM Academy
- North Cow Creek Elementary School
- Shasta View High School

Implementation Approaches

Individual teachers demonstrate a variety of ways to incorporate CS at their schools. Brian Gaddy is the catalyst at Enterprise High School. Currently, he has five preps and, in addition to teaching a standalone CS course, he integrates it into engineering, computer-assisted design, physics and earth science courses. Why? ***"There's just a level of excitement when students get to use computer science as a tool,"*** *he explained.* ***"They get more excited about their lessons. They are so engaged and aren't wasting time in class."*** He noted that students feel immediate gratification when they create something – like an app or a robot.

One of Mr. Gaddy's innovations is to establish CS connections to core content taught by colleagues, including Claire Walker, who teaches math. Students in Mr. Gaddy's earth science course use a micro:bit to collect data about a real-world situation, specifically an urban earthquake. They take the data to Ms. Walker's course, plot it and create a mathematical model and, then, use that data with Mr. Gaddy to make predictions about how certain buildings might collapse during an earthquake. He has a goal to provide mini-units to other teachers to increase their capacity to integrate CS into their core subjects.

Sierra Tompkins, a third-grade teacher at Rocky Point Charter School, is an example of a teacher who picked up computer science through the influence of her peers. Several colleagues had attended CS4NorCal Community of Practice meetings during the 2023-24 school year and planned to attend Summer of CS in 2024. *"I thought that sounded pretty cool,"* she said, and decided to join them. ***"I always try to be super open to trying new things because I know that sometimes it can get boring as a student if you just have the same stuff every single year."*** Ms. Tompkins started with 30 minutes of CS activity from Minecraft, Code.org and Music Lab a week, usually after students finished PE, and found them to be ***"super engaged." "It's so fun to see students collaborating,"*** *she continued.* ***"They want to come to school more!"*** In addition to Ms. Tompkins, nine other Rocky Point educators have participated in CS4NorCal.

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> ***"So, they are writing, they are coding and they are using all the different parts of their brains in one class period. They don't even realize it!"***
>
> Brandi Holloway, Teacher, Pacheco Elementary School

The impetus for Brandi Holloway, a middle school instructor at Pacheco Elementary school, to teach computer science was an expectation that she offer an elective course during the upcoming school year. The subject matter was up to her. ***"Let me find something new that I haven't done,"*** *she thought.* ***"I had so much fun by the end of the summer workshop!"*** In 2023-24, Pacheco included a trimester of CS as part of its required elective wheel. It proved so popular, that Ms. Holloway was able to offer CS as a year-long standalone elective in 2024-25. She incorporates project-based learning in which students use Micro:bits to collect data outside the classroom and journal about what they are learning.

Emerging Multi-grade CS Pathways

California adopted K-12 CS standards in 2018 that describe concepts and practices articulated across four grade bands from pre-K to grade 12. The guidelines for the standards also stipulate that standalone CS courses for students in grades 9-12 be compatible with University of California a-g courses and Career Technical Education pathways. One of the principles underlying the development of the standards states that ***"every student should have continuous opportunities and multiple entry points to engage in computer science education."*** In service of these objectives, CS4NorCal has encouraged and nurtured emerging multi-grade pathways in its participating counties. In small, rural communities, a multi-grade continuum of CS instruction might occur in a single K-8 or K-12 school or between multiple elementary and secondary school districts.

Shasta County features several examples of emerging multi-grade pathways, primarily in the city of Redding, but also in some of the outlying rural and suburban communities. One example is Redding School of the Arts (RSA), a TK-12 school with eight CS4NorCal participants, including Executive Director Lane Carlson. The school has employed a variety of approaches for incorporating CS, including integration with core content, elective courses (*such as robotics, digital arts and film production*) and an after-school club.

Students and their parents have expressed interest and students are demonstrating a high level of engagement. Mr. Carlson noted that the ***"arts are very much into creative expression. I see CS as a neat, modern version of creative expression and a tool that our kids can walk away with."*** Cathy Song teaches AP computer science at the high school level and a project-based middle school CS elective course that prepared students for a western regional drone competition. ***"The entire curriculum is so fun!"*** she said. Six additional RSA teachers have participated in CS4NorCal and are incorporating CS into their instruction.

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On a larger scale, the Shasta Union High School District (SUHSD) and a number of its feeder elementary districts epitomize how CS can become an integral part of a student's K-12 education. Twenty-five teachers of grades 9-12, 31 teachers of grades TK-8 and five school and district administrators and one high school counselor have participated in CS4NorCal, representing 19 TK-8 schools and four high schools.

> ***"The days that students are offered computer science at the elementary schools are some of the highest attendance days!"***
>
> Brian Selke, Traveling Teacher, Redding Elementary School District

The Redding Elementary School District, home to 10 schools, utilizes a "traveling teacher" – Brian Selke – who teaches CS to third-, fourth- and fifth-grade students at three K-5 sites in the morning and at Sequoia middle school in the afternoon. In the elementary space, his project-based curriculum cycles through several weeks of core CS concepts, robotics and block-based programming. At Sequoia Middle School, CS is incorporated into a year-long robotics elective. He estimates that about half of his sixth-grade CS students were once his students in elementary school, demonstrating a direct pathway connection.

Like his peers at other Shasta County schools, Mr. Selke observes a correlation between CS and student engagement. ***"This is the best time of their day. Students run to class, competing to see who gets there first."*** He attributes this excitement to their desire to ***"create…whether it's a digital creation or a physical artifact like a robot."*** One of his colleagues, Kristie Lindley, concurs and has been inspired to add CS to her third-grade class. ***"I try to use coding as a motivation for students to get other work completed,"*** *she said.* ***"They love computer science."*** She illustrated this point by recounting her students' experience participating in Hour of Code: ***"They all stood up and cheered at the end and asked when can we do it again?"***

Upon advancing to SUHSD, students have a number of opportunities to experience computer science. In addition to the courses taught by Brian Gaddy and his colleagues at Enterprise High School, CS is featured at both Foothill and Shasta high schools. In Brett Hodges' Exploring Engineering course at Foothill, students create an algorithm in block code with Micro:bits. They also work with Micro:bits in a response-to-intervention elective offered by science teacher Rob Ady.

Meanwhile, at Shasta, Doug Taylor uses the *Bootstrap Algebra* curriculum, which integrates CS, in his ninth-grade math essentials course, while Brian Grigsby incorporates CS via augmented reality, hands-on projects and design challenges in his Space Science and Engineering/Industrial Robotics courses.

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A guiding hand for SUHSD's commitment to computer science has been Associate Superintendent Leo Perez. When CS4NorCal started as a research and innovation project five years ago, Mr. Perez knew that at least one of the district's schools had to be in the pilot cohort. Shasta was that school while Enterprise and Foothill came along two years later. Mr. Perez's approach was to target teachers who might be interested – ***"the low-hanging fruit."*** These included math and business teachers whose credentials were a clean fit with computer science. ***"The idea was picking key players so that they would share it with others in their departments,"*** *he said.* ***"They would be like the kindling to a larger fire."***

He advocates for giving teachers permission to be ***"creative and try different things"*** in order to engage kids. Mr. Perez is supported by his Board and notes that one part of the district's vision is to prepare students to be forward-thinking. ***"Today's graduates are going to be doing jobs that don't exist,"*** *he said, including jobs that are technology-driven.* ***"We've got to be more focused on teaching kids how to be critical thinkers and how to access the information they need to solve challenges."***

CS Champions

In order to develop local capacity to sustain CS pathways, CS4NorCal targeted County Offices of Education (COE) to serve as the hub of activity for computer science education – including representation on the project Steering Committee and Professional Learning (PL) Task Force. Each COE was asked to identify one person to serve as its CS Champion and Shasta COE was fortunate to have four representatives led by Math and STEM Coordinator Sherry Rodgers, who served on the Task Force for nearly five years and coordinated recruitment for CS4NorCal from districts and schools. Ms. Rodgers, a math specialist, and her colleagues Nate Fairchild (science) and Sarah Kohlbeck (EdTech) participated in at least one CS workshop to build a knowledge base that would help them support participating teachers.

Ms. Rodgers, like district and school leaders, underscored the power of school-level CS Champions. ***"You know, they are the ones with boots on the ground,"*** *she said.* ***"A bright spot for me (participating in CS4NorCal) was getting to know our star CS teachers and seeing their energy."*** Aside from developing teacher leaders, she has three recommendations for other COEs trying to develop CS pathways:

- Find high-quality professional learning, perhaps from a regional COE, that includes a community of practice that supports a network of CS teachers.
- Create a promotional video of local teachers and administrators who are implementing a CS talking about their approaches.
- If possible, designate someone at the COE as the local CS subject-matter expert.

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In Conclusion

Shasta County provides a diverse variety of lessons about how to build CS pathways. These include:

- Integrate CS into other core content as a potential way to start.
- Let go of your trepidation – whether you are a teacher or an administrator – and start "slow and simple."
- Consider the interests of your students (and their parents!). Build on what they like – game and art design, app and music creation, robotics and drones.
- For administrators, recruit creative teachers with the passion to try new things. Give them the space and resources to explore and implement CS. Their enthusiasm will spread.
- Measure student engagement including attendance trends.
- Use computer science as a means to develop students' critical thinking and problem solving skills.

Tree of Life International Charter School in the town of Anderson exemplifies many of these learnings. School administrator Deb Wallace acknowledges that when Tree of Life, a TK-8 Spanish/English immersion school, joined CS4NorCal in 2022 ***"we were not equipped to go in that direction."***

A year later, though, middle school teacher Sonsoles Abbott stepped up. ***"I don't have any background in CS, but I liked the idea of integration," she said. "I liked that I could learn one small thing that I could literally do the next day in my science or Spanish courses."*** Later that year, Ms. Abbott started after-school robotics and drone activities, as well as a Girls Who Code club. ***"All of our students can participate. They are all part of the team. They all contribute,"*** *she said.* ***"They love it sometimes too much! They want to come (to my classroom) during recess or lunch to create things."***

Both Ms. Wallace and Ms. Abbott note that CS gives students the opportunity to develop skills they will need in the future, including communication, collaboration, leadership and solving "real problems." They want to spread this opportunity to students in elementary grades and Ms. Abbott will teach kindergarten in 2025-26 while her colleague Natasha Heinneinke teaches CS in 5th grade. Meanwhile, a $140,000 K-12 Strong Workforce Program grant will support the school's implementation of a 6-8 STEAM program, which will incorporate CS in the exploration of agriculture and health sciences careers.

CS4NorCal will continue to collect and analyze data from participating teachers and schools in other participating counties. Project leaders will share that information via future editions of Project Highlights. In the meantime, to learn more about how schools are providing CS instruction, visit CS4NorCal's interactive Implementation Dashboard at:
https://lookerstudio.google.com/reporting/90b34553-bb57-4969-84fe-7af0d3a9c6e4/page/5iGTD

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