

TEALS Program

Computer science in every high school



Build and grow computer science
in your school with TEALS

How can TEALS help your school build and grow its computer science (CS) program?



Professional Development
from trained technology professionals on a volunteer basis who are partnered with teachers to provide instruction and support.



Curricula and Resources
developed by experienced educators and computer science professionals, designed specifically for high school teachers and students.



A Clear Pathway for Students
to learn computational thinking, problem solving, programming, and computer science concepts that are applicable in whatever field they enter.



A Community for Teachers
to build their CS teaching capacity through ongoing training, instructional resources, and a network of support.

Learn more about Microsoft Philanthropies TEALS (Technology Education and Literacy in Schools) Program support model, curricula resources, and apply to be a partner school at: tealsk12.org/schools/

“ As a former high school teacher and software engineer, I started TEALS because I wanted to ensure that teachers had access to tech industry experts who would work directly with and support them every step of the way. TEALS creates teaching teams where industry professionals work together with teachers to build content expertise and confidence in CS, resulting in thriving CS programs in schools. ”

Kevin Wang, TEALS founder



1/3 of students in the TEALS program are female and **1/3** are under represented minorities

TEALS offers 3 support models

| Goal | Build | | Grow |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Help a classroom teacher master computer science content and increase computer science (CS) teaching capacity. Work toward CS program growth. | | Grow computer science program, increase enrollment, improve student engagement, and create new CS sections. |
| Support Model | #1 Co-Teaching | #2 Lab Support | #3 Classroom Enrichment |
| TEALS Volunteer Role All volunteers have professional or academic CS backgrounds. Their role is to provide CS expertise and support the classroom teacher in learning and/or teaching course content. | Volunteers provide most CS classroom instruction. Provide professional development to teachers. Volunteers also assist with labs and assignment grading. | Volunteers support classroom teacher and students during instruction, lab assistance, and help with grading assignments. | Range from assisting with lab/ assignments/grading 2-4 times a week to consulting visits with the teacher in or out of class, as defined by the classroom teacher, subject to volunteer availability. |
| Teacher Role The classroom teacher is responsible for the students and the classroom management. Teachers coordinate the volunteer team. | Classroom teacher learns CS and gradually leads lessons with support and guidance from volunteers. | Classroom teacher leads 85%+ of in-class lessons and grading. | Classroom teacher leads class 100% of the time and asks for volunteer help when necessary. |
| Teacher Experience with Computer Science All models require teachers to have two years of professional teaching experience. | New to CS (two years or less) | 2+ years of CS experience* or demonstrated mastery of the majority of CS course content | 3+ years with CS experience or demonstrated mastery of CS course content and able to quickly help students debug assignments and projects |
| Teacher Time Commitment | New partner teachers required to attend up to 40 hours. Returning teachers will be required to attend up to 14 hours. | All partner teachers will be required to attend up to 14 hours. | All partner teachers will be required to attend up to 14 hours. |
| Curricula Supported | TEALS curricula | TEALS curricula, TEALS-approved partner curricula | TEALS curricula, TEALS-approved partner curricula, approved school created curricula |
| # of Volunteers | 2-4 | 1-2 | 1-2 |
| Individual Volunteer Frequency | 1-2 volunteers/class period, 4-5x/week | 1 volunteer/class period, 2-5x/week | Dependent on teacher needs, range from 1-3x a month or as needed |
| School Cost | Expense reimbursement | | Expense reimbursement |
| Class Meeting Time | Concludes by 9:30am | | Based on teacher need and volunteer availability |

* Teachers may also enter Lab Support only model based on successful completion of a TEALS-approved professional development workshop.



All TEALS curricula options include:

- Daily lesson plans
- Student lab handouts
- Project specifications and grading rubrics
- Access to nationwide community of tech volunteers and teachers learning CS

All TEALS curricula are available for free, non-commercial use.

“The rigorous curriculum, the trained CS professional, and the teacher-facilitator make the remote engagement effective. The classroom is no longer bound by four walls.”

Mr. Martinez at Clint ISD Early College Academy

The Rural and Distance Classroom

Since its start in a rural town in Kentucky, the Rural and Distance program has grown to reach 90+ schools across the United States through a program built with students from rural areas in mind. Volunteers join Rural and Distance classrooms using a video conferencing platform to instruct and guide them through their Computer Science curriculum. While working on labs and projects, students share their screen to receive one on one instruction from volunteers. Additionally, Rural and Distance Teaching Volunteers, classroom teachers and IT liaisons will receive training and resources to help build a robust virtual classroom experience for your students.

What will we need?

Rural and Distance schools are asked to provide classroom cameras, integrated speakers and microphones, webcams and headsets to ensure a strong classroom experience.

25%
of TEALS schools
will be rural
by the start of the
2020-2021 school year



TEALS Support Models:

- ✓ Co-teach
- ✓ Lab Support
- ✓ Classroom Enrichment

Introduction to Computer Science

The Introduction to Computer Science

curriculum is a flexible and approachable course adapted from a university-level CS course for a wide range of high school students from diverse backgrounds. The course has been successfully implemented in hundreds of high schools.

Introduction to Computer Science is an engaging course that explores a variety of basic computational thinking and programming concepts through a project-based learning environment. Every unit culminates in a comprehensive project and roughly 75% of student time is spent building projects and practicing the skills they are learning.

Visual and approachable

This course uses Snap!, an approachable visual block-based programming language with a robust tool set, perfect for introducing students to coding for the first time.

Flexible implementations

The Introduction to CS course can be offered as a semester-long course offered twice in a single school year or as a year-long course with an expanded curriculum. The year-long class transitions to text-based programming using the beginner-friendly Python language in the second semester.

SEMESTER 1: Snap! Introduction to Programming Concepts

| Unit | Project |
|--------------------------------|---------------------------------|
| 1: Snap! Basics | Storytelling |
| 2: Variables and customization | Pong |
| 3: Loops | Platform game |
| 4: Lists | Guess My Word |
| 5: Cloning | Space Invaders |
| 6: Final project | Student designed final projects |

SEMESTER 2: Python - An Introduction to Text-Based Programming

| Unit | Project |
|---------------------------|----------------------------------------|
| 1: Introduction to Python | Mad Libs |
| 2: Data types | Text-based adventure game |
| 3: Functions | Oregon Trail |
| 4: Loops | Tic-tac-toe |
| 5: Sounds in Python | EarSketch: music-based project |
| 6: Dictionaries | Guess Who? (20 question guessing game) |
| 7: Objects | Python Pokémon |
| 8: Final project | Student designed final project |

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AP Computer Science A

AP Computer Science A is equivalent to a first-semester, college-level course in computer science for CS majors. The course introduces students to computer science using the industry-standard Java programming language and presents fundamental topics that include problem solving, algorithms, and abstraction.

AP CS A, much like the intro course was adapted for high schools from college-level curricula and has been successfully

implemented in hundreds of high schools. AP CS A introduces students to the importance of resilience and project planning through the implementation of several large-scale and complex projects. The daily student-centered lesson plans emphasize practice through working on problems, group activities, labs, and projects that help integrate the learning objectives.

TEALS AP CS A offers an approachable, project-based curriculum.

TEALS: AP CS A Overview

| Unit | Project |
|----------------------------------------------|--------------------------------------------------|
| 1: Intro to Java and static methods | Family letters & the house that Jack built |
| 2: For loops and data types | Hourglass |
| 3: Conditionals, while loops, string parsing | FracCalc |
| 4: Arrays and arraylists | AP magpie activity |
| 5: Objects | AP picture lab |
| 6: Inheritance, polymorphism, interfaces | Text excel, shapes, sports manager |
| 7: Searching and sorting | AP elevens activity |
| 8: Recursion | Tower of Hanoi, MergeSort |
| 9: AP review | Barron AP review |
| 10: After the AP exam | AI, Space battle arena, TEALS Minecraft modeling |

97%

of teachers report increased CS content knowledge and the ability to teach with greater independence after **two years with TEALS**

Almost **500** high schools
27 states

+ DC + British Columbia

16,000

students taught in the **2017-18** school year

TEALS Support Models:

- ✓ Lab Support
- ✓ Classroom Enrichment

AP CS Principles

The AP Computer Science Principles course centers on computational thinking practice and seven big ideas. The end of year AP assessment is a mix of multiple choice questions and two performance tasks created during the school year. All AP CS Principles classes will cover the same content but differ in how they approach teaching the content. Here is a breakdown of the common computational thinking practices and seven big ideas each course must cover:

| Computational Thinking Practices | Big Ideas |
|----------------------------------|----------------------|
| Connecting computing | Creativity |
| Creating computational artifacts | Abstraction |
| Abstracting | Data and Information |
| Analyzing problems and artifacts | Algorithms |
| Communicating | Programming |
| Collaborating | The Internet |
| | Global Impact |

TEALS has partnered with the following CS Principles providers and provides TEALS lab support for these classes. You will need to apply to TEALS separately from the curricular partner.

| Partner | Location | Language |
|--------------------------------------|----------|---------------|
| Berkeley BJC | National | Snap! |
| Code.org | National | App Lab |
| National Math and Science Initiative | National | Uses Code.org |
| Project Lead the Way | National | Python |
| Mobile CSP | National | App Inventor |
| UTeach | Texas | Processing |

Please visit tealsk12.org/schools for the most up-to-date list of approved curricula and partners.

3 out of 4
students have
recommended **TEALS CS**
courses to their classmates

650k
volunteer hours
=
\$156m
in value provided to schools

TEALS Support Models:

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Advanced Topics & Projects in Computer Science

Advanced Topics and Projects is a course for students who have successfully completed AP computer science A, and received a 4 or 5 on the exam. TEALS can support this program in schools that have multiple sections of Introduction to CS and AP CS already established.

The course is flexible and project-based, with a concentration in data structures and other CS topics guided by industry volunteers and culminating in a major capstone project. TEALS volunteers provide mentoring and technical guidance. Past student projects have included a phone-based student voting system and advanced app development with projects submitted to the Congressional App Challenge.



“Working alongside professionals gives students that added insight into what does it mean to be a software engineer.”

Maggie T, Teacher

“The volunteers came into the classroom with respect for what I knew about teaching and meeting the needs of students, while they brought content expertise.”

Doug, veteran teacher with 35 years of experience teaching math

Comparing AP CS A and AP CSP

The College Board offers two AP computer science courses: **AP Computer Science A (AP CS A)** and the **AP Computer Science Principles (AP CSP)**. Both courses are rigorous and focus on computational and critical thinking as well as general problem solving.

The two courses are complementary and schools are encouraged to offer both. Students can take the courses in any order, though TEALS advises students to take AP CSP first, if available. In short, AP CS A is the more traditional college level CS course aimed at CS majors, while AP CSP is the course that is closer to a collegiate survey CS course.

Unlike Calculus AB and BC, for example, AP CSP is not a subset of AP CS A. Teacher preparation for both courses is intensive. AP CSP requires broader knowledge in seven computer science disciplines, whereas AP CS A requires deeper knowledge of Java concepts and implementation.

| | AP Computer Science A | AP Computer Science Principles |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Course content | Curriculum is focused on object-oriented programming and problem solving. Java is the designated programming language | Curriculum is built around fundamentals of computing including problem solving, working with data, understanding the Internet, global impact, and programming |
| Course intent | Encourages skill development among students considering a career in computer science or other STEM fields | Encourages a broader participation in the study of computer science and other STEM fields, including AP Computer Science A |
| Assessment experience | Multiple-choice and free-response questions (written exam) | Multiple-choice questions (written exam); two performance tasks students complete in class, during the course to demonstrate the skills they have developed |
| TEALS support model | TEALS offers three levels of support: Co-teaching, Lab Support, and Classroom Enrichment | TEALS offers Lab Support and Classroom Enrichment |
| Curriculum provider | TEALS offers full AP CS A curriculum materials | TEALS-supported partner organizations' curricula. Classroom teacher attends professional development offered by partner organization prior to beginning TEALS partnership |
| AP CS exam | Both courses successfully prepare students to take AP Computer Science exam | |

TEALS' Impact on Students

TEALS is dedicated to empowering students to use computer science to impact the world. In TEALS classes students are introduced to computational thinking, problem solving, and programming skills that are important to every industry. To help students take the next step, TEALS has developed a variety of resources that provide insight on college and career pathways in computer science fields, support a community of learning by connecting current and former TEALS students, build awareness and excitement around computer science, and promote opportunities for students to apply their computational skills and gain professional experience.

Learn more about these exciting resources at tealsk12.org/students

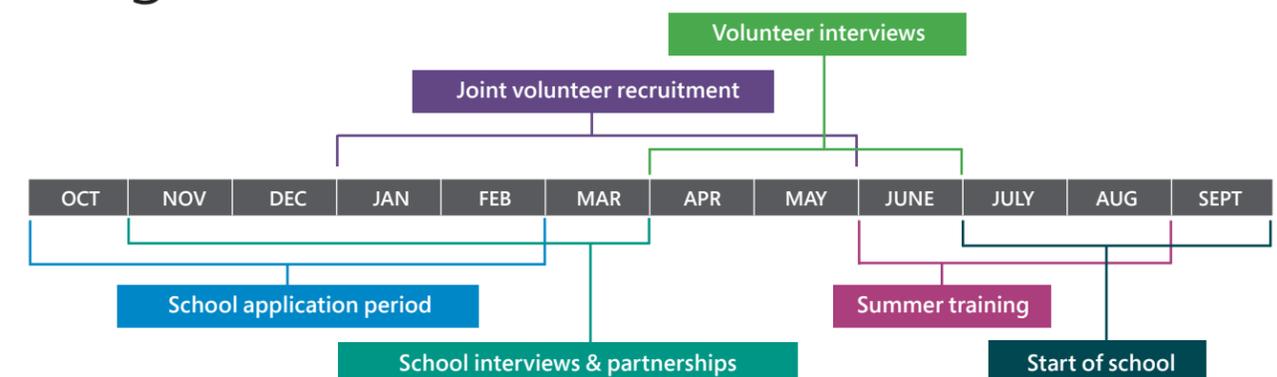
How do I bring TEALS to my school?

step 1 Review the various TEALS volunteer support models and curricula options.

step 2 Submit your application at: tealsk12.org/schools

step 3 A TEALS Regional Manager will reach out to you to discuss the right curricula and support model for your school. If your school is accepted, you'll be asked to sign a partnership agreement and prepare for the school year as outlined in the implementation guide.

Program Timeline



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tealsk12.org

