



WALNUT HIGH SCHOOL
PROJECT LEAD THE WAY
Computer Science

PLTW COMPUTER SCIENCE PROGRAM OBJECTIVES

- PLTW Computer Science empowers students to become creators, instead of merely consumers, of the technology.
- The program's courses engage students in compelling, real-world challenges.
- As students work together to design solutions, they learn computational thinking – not just how to code.
- Students take away in-demand knowledge and skills they will use in high school and for the rest of their lives.
- Courses are project-based with collaboration as a focus point of instruction.
- National End of Course Assessments



FOUR COURSE SEQUENCE

- 9th Grade – Computer Science Essentials :
 - UNIT 1:
 - Work with MIT App Inventor to create basic apps through block-based programming.
 - Coding fundamentals
 - Introduced to essential computational thinking practices as they create, test and refine computational artifacts of Android™ apps.
 - UNIT 2:
 - Transition to Text-based Coding – students will create in blocks but see the same code in a text-based language.
 - Investigate careers in computer science
 - UNIT 3:
 - Learn how client-side and server-side connections make the Web work.
 - Be introduced to the Python® programming language in the collaborative Cloud9 development environment.
 - UNIT 4:
 - Students will apply collaboration, technical and communication skills they have developed to solve an authentic problem relevant to them.

FOUR COURSE SEQUENCE

- 10th Grade – AP Computer Science Principles :
 - UNIT 1:
 - Build algorithmic thinking and ability to use abstraction.
 - Creativity is emphasized as they work with Scratch™, App Inventor, and Python® programming languages.
 - Create original code and read and modify code provided from other sources.
 - The Agile software development process is emphasized.
 - UNIT 2:
 - Students use PHP and SQL to structure and access a database hosted on a remote server.
 - Learn how HTML and CSS direct client the computer to render a page.
 - Experiment with JavaScript programming language to provide dynamic content.
 - History and workings of the Internet are explored.
 - Issues of security, privacy and democracy are studied.
 - Career paths in cybersecurity, web development and information technology are highlighted.
 - UNIT 3:
 - Students create visualizations to analyze large sets of data relevant to themselves and interpret the patterns they uncover.
 - Use statistics to deepen the meaning of knowledge gained by visualization.
 - UNIT 4:
 - Research the impact of computer modeling and simulation due to the rapid increase in computational power.
 - Experiment with materials designed to illuminate the rise of intelligent and complex behavior from simple rules and seemingly unintelligent agents.
 - Final project students present the artifacts produced for the College Board AP Create & Explore Performance Tasks.
- *AP CSP Endorsed – PLTW is recognized by the College Board as endorsed provider of curriculum and professional development for AP Computer Science Principles. This affirms that all components of the PLTW CSP's offerings are aligned to the AP Curriculum Framework and the AP CSP Assessment.*

FOUR COURSE SEQUENCE

- 11th Grade – AP Computer Science A :
 - UNIT 1:
 - Provides a primer in the basics of the Java programming language and object oriented programming (OOP).
 - UNIT 2:
 - Work with fragments, mastering encapsulation, and design and implement apps that utilize the most common and useful interface elements.
 - UNIT 3:
 - Students reach a level of understanding of Google's Android™ libraries that allow them to create apps that use a broad range of mobile features.
 - UNIT 4:
 - Students explore array algorithms, two-dimensional arrays, class design, inheritance, and polymorphism using a game called Concentration.
 - Students create a simple text-based version of the game, explore various array algorithms, and modify the game to create a variant of the game called Sevens.
- *AP CSA Endorsed – PLTW is recognized by the College Board as endorsed provider of curriculum and professional development for AP Computer Science A. This affirms that all components of the PLTW CSA's offerings are aligned to the AP Curriculum Framework and the AP CSA Assessment.*

FOUR COURSE SEQUENCE

- 12th Grade – Cybersecurity:
 - UNIT 1: Personal Security
 - Learn the basic concepts of cybersecurity by leveraging their familiarity with technology they use everyday.
 - Explore the risks associated with how they use their email, personal files and social networking habits.
 - UNIT 2: System Security
 - Learn how to assess the value of information security and delve deeper into types of malware.
 - Learn the security vulnerabilities of web services and how to secure an Ecommerce site.
 - UNIT 3: Network Security
 - Learn the technical aspects of a highly networked world and the risks to information we all share.
 - Learn operating system and networking concepts, security frameworks, and packet analysis.
 - Learn the types of malware that can attack systems on a network and how to secure and protect a system against them.
 - UNIT 4: Applied Security
 - Explore cybersecurity in an applied filed.
 - Learn methods of cryptography & practice basic tenants of digital forensics.
 - Final project may include processing a crime scene to solve the mystery and explore the possible consequences of the crime.

HOW TO APPLY?

- Requirements:
 - Algebra 1 or Higher During 8th Grade
 - Have a 2.50 GPA or Higher 8th Grade
- Applications are due by **February 1, 2019** to **Walnut High School**.
- 60 spots available – applications will be time stamped.

INTERNATIONAL BACCALAUREATE CAREER-RELATED PROGRAM (IBCP)- PLTW COMPUTER SCIENCE

- The IBCP is a program that incorporates the vision and educational principles of the IB into a unique program specifically developed for students who wish to engage in career-related learning.
- Stanford University Admissions Officer, Debra Von Bargen talks about the value of the IB Career-Related Programme to students as they enter the university– Walnut High School Website (walnuths.org), IB page for videos.



THE IBCP CONSISTS OF TWO COMPONENTS:

- An International Baccalaureate component – this is completed during the **junior** and **senior** year
- A career-related component – the career component at Walnut High School is the PLTW Computer Science program – this part of the program begins the freshman year

THE IB COMPONENT – JUNIOR AND SENIOR YEAR

- Students will take a minimum of 2 IB courses – they CAN take more IB classes depending on their interests and their class schedule
- Students CAN take AP courses while doing the IBCP – students will need to plan with their GLC to include AP courses in their schedule
 - Many HL IB courses are also AP courses in the first year (example: Bio HL – the first year is AP Bio)

THE IB COMPONENT CONTINUED:

Students will also take:

- **Personal and Professionals Skills:** Students participate in a course that emphasizes critical thinking, a study of ethics, problem-solving and the acquisition of practical skills valuable for both college and career. This course is taken during the spring of the junior year and the fall of the senior year.
- **A World Language:** Students must improve their language proficiency in a chosen foreign language.

THE IB COMPONENT CONTINUED:

In addition, students will participate in:

- **Community and service:** Students participate in unpaid and voluntary activities that help the community and that have a learning benefit to the student. Volunteer activities occur on a regular, on-going basis over the junior and senior year.
- **Reflective project:** Students must research and write a paper based on some ethical question that has come from their career-related studies. Students work on the project over the junior and senior years.
- Students are provided an advisor to guide them through the process of Community and Service and their Reflective Project.

HOW CAN IBCP BENEFIT STUDENTS?

- IBCP students are part of an actual IB program.
- Universities including the UCs look favorably upon students who are part of an IB program during the admissions process
- The PLTW classes that the students take as part of the IBCP program can also receive college credit depending on the university – call the admissions offices of universities that your student is interested in attending (check PLTW.org under college and university partners)
- Some colleges offer scholarships for PLTW students – again, call the admissions offices of potential colleges