

Computer Science Essentials offers a focused curriculum designed around foundational computer science concepts, including computer systems, programming, networks, and data management. The course also introduces students to foundational computer science skills such as coding, troubleshooting, and being a responsible digital citizen.

Course topics include the history and impact of computers; careers in computer science; computing laws and ethics; bias and equity issues in computing; algorithms and coding; data storage, organization, and analysis; hardware and software; robotics; networks and the internet; cybersecurity and online safety; website design; and the use of abstraction in computing. Students discover new concepts through guided instruction and confirm their understanding in an interactive, feedback-rich environment.

A variety of activities encourage students to explore different aspects of computer science. Lab activities guide students through coding their own programs. Project and Explore activities reinforce critical thinking, research, writing, and communication skills. In addition, Project activities guide students through the development of different types of computer artifacts. In Discussions, students conduct research on current computing topics and then exchange ideas with their peers. Practice activities provide additional opportunities for students to apply learned concepts and practice their writing, reasoning, and computer literacy skills.

This course is built to state standards.

Length: Two Semesters

UNIT 1: COMPUTERS AND SOCIETY

LESSON 1: THE BEDROCK OF COMPUTER SCIENCE

Study: The Impact of Computers

Learn how computers affect your world in various ways.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: The Impact of Computers

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Study: Pursuing a Career in Computing

Learn about different careers in computing.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Pursuing a Career in Computing

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Explore: Research Computing Careers

Research computing careers that interest you.

Duration: 1 hr 30 mins Scoring: 30 points

LESSON 2: USING COMPUTERS TO COLLABORATE

Study: Collaborative Tools

Learn about technological tools you can use to work collaboratively.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Collaborative Tools

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Project: Collaborative Project

Use collaborative tools to communicate and work with others.

Duration: 4 hrs Scoring: 50 points

LESSON 3: COMPUTERS AND SOCIETY WRAP-UP

Review: Computers and Society

Review what you have learned.

Duration: 1 hr Scoring: 0 points

Test (CS): Computers and Society

Take a computer-scored test to assess what you have learned in this unit.

Duration: 0 hrs 30 mins Scoring: 50 points

UNIT 2: PROGRAMMING

LESSON 1: ALGORITHMS

Study: Introduction to Algorithms

Learn how algorithms can solve computational problems.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Introduction to Algorithms

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Practice: Developing an Algorithm and a Prototype

Answer open-response questions to assess your understanding of the material.

Duration: 0 hrs 40 mins Scoring: 40 points

LESSON 2: PROGRAMMING WITH MAKECODE ARCADE

Study: Introduction to MakeCode Arcade

Learn how to use the MakeCode Arcade coding platform to program a simple game.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Introduction to MakeCode Arcade

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Practice: Troubleshooting Challenge

Answer open-response questions to assess your understanding of the material.

Duration: 0 hrs 40 mins Scoring: 40 points

LESSON 3: PROGRAMMING CONCEPTS

Study: Controls

Learn some coding methods to control a computer program.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Controls

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Study: Modularity

Learn how to code a program in a modular fashion.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Modularity

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Study: Variables and Arrays

Learn the advantages of using arrays over simple variables to organize data in a computer program.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Variables and Arrays

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Practice: Programming Challenge

Answer open-response questions to assess your understanding of the material.

Duration: 0 hrs 40 mins Scoring: 40 points

LESSON 4: DESIGN YOUR OWN GAME

Study: Plan Your Game

Learn the stages of game design.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Plan Your Game

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Project: Create a Game Design Document

Create a game design document.

Duration: 4 hrs Scoring: 50 points

Lab: Part 1: Program Your Game

Use MakeCode Arcade to program a game.

Duration: 3 hrs 20 mins Scoring: 40 points

LESSON 5: PROGRAMMING WRAP-UP

Review: Programming

Review what you have learned.

Duration: 1 hr Scoring: 0 points

Test (CS): Programming

Take a computer-scored test to assess what you have learned in this unit.

Duration: 0 hrs 30 mins Scoring: 50 points

UNIT 3: DIGITAL INFORMATION

LESSON 1: DATA

Study: Types of Data

Learn about different types of digital data.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Types of Data

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Study: Storing Data

Learn about different methods of storing and organizing digital data.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Storing Data

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Practice: Translating Data

Answer open-response questions to assess your understanding of the material.

Duration: 0 hrs 40 mins Scoring: 40 points

LESSON 2: COLLECTING, VISUALIZING, AND ANALYZING DATA

Study: Data Collection

Learn ways to collect data and create a program that organizes information in a spreadsheet.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Data Collection

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Study: Data Analysis and Visualization

Learn techniques to analyze and display data.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Data Analysis

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Project: Interactive Data Project

Create an interactive visual presentation and computational model using data you collected.

Duration: 4 hrs Scoring: 50 points

LESSON 3: DIGITAL INFORMATION WRAP-UP

Review: Digital Information

Review what you have learned.

Duration: 1 hr Scoring: 0 points

Test (CS): Digital Information

Take a computer-scored test to assess what you have learned in this unit.

Duration: 0 hrs 30 mins Scoring: 50 points

UNIT 4: DEVELOPING PROGRAMS FOR EVERYONE

LESSON 1: THE IMPACT OF ALGORITHMS ON THE WORLD

Study: Algorithms Designed for All

Learn how algorithms can affect the world.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Algorithms Designed for All

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Discuss: How Do Algorithms Impact the World?

Research and discuss how algorithms affect different groups of people.

Duration: 0 hrs 45 mins Scoring: 20 points

LESSON 2: REVISING YOUR GAME FOR A LARGER AUDIENCE

Study: Programming for Bias, Equity, and Accessibility

Learn methods you can use to make programs more equitable and accessible.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Programming for Bias, Equity, and Accessibility

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Lab: Part 2: Revising Your Game

Revise a program to make it more equitable and accessible.

Duration: 3 hrs 20 mins Scoring: 40 points

LESSON 3: DEVELOPING PROGRAMS FOR EVERYONE WRAP-UP

Review: Developing Programs for Everyone

Review what you have learned.

Duration: 1 hr Scoring: 0 points

Test (CS): Developing Programs for Everyone

Take a computer-scored test to assess what you have learned in this unit.

Duration: 0 hrs 30 mins Scoring: 50 points

UNIT 5: SEMESTER WRAP-UP

LESSON 1: SEMESTER WRAP-UP

Review: Semester Review

Review what you have learned.

Duration: 1 hr Scoring: 0 points

Exam: Semester Computer-Scored Exam

Take a computer-scored exam to demonstrate your mastery of concepts and skills covered in this semester.

Duration: 0 hrs 40 mins Scoring: 50 points

Final Exam: Semester Teacher-Scored Exam

Take a teacher-scored exam to demonstrate your mastery of concepts and skills covered in this semester.

Duration: 0 hrs 40 mins Scoring: 50 points

UNIT 6: COMPUTING SYSTEMS

LESSON 1: THE COMPUTER

Study: The History of Computing Systems

Learn the history of computing systems.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: The History of Computing Systems

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Study: Abstraction and Computing Systems

Learn how abstraction improves the usability of computing systems.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Abstraction and Computing Systems

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 2: HARDWARE AND SOFTWARE

Study: Hardware

Learn about computer hardware.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Hardware

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Study: Software

Learn about computer software.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Software

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Practice: Designing a Computer Configuration

Answer open-response questions to assess your understanding of the material.

Duration: 0 hrs 40 mins Scoring: 40 points

LESSON 3: ROBOTICS AND TROUBLESHOOTING

Study: Robotics

Learn about robotics.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Robotics

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Study: Design and Troubleshooting Strategies

Learn design and troubleshooting strategies for robots and other computing systems.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Design and Troubleshooting Strategies

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Lab: Robot Troubleshooting Challenge

Develop troubleshooting strategies used to fix a virtual robot.

Duration: 3 hrs 20 mins Scoring: 40 points

LESSON 4: COMPUTING SYSTEMS WRAP-UP

Review: Computing Systems

Review what you have learned.

Duration: 1 hr Scoring: 0 points

Test (CS): Computing Systems

Take a computer-scored test to assess what you have learned in this unit.

Duration: 0 hrs 30 mins Scoring: 50 points

UNIT 7: THE INTERNET

LESSON 1: STRUCTURE OF THE INTERNET

Study: Networks

Learn about computer networks.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Networks

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Study: The Internet

Learn about the structure of the internet.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: The Internet

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 2: CYBERSECURITY

Study: Identifying Digital Threats

Learn about different digital threats and how to guard against them.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Identifying Digital Threats

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Study: Cryptography

Learn about cryptography.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Cryptography

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Project: Cybersecurity Simulation

Protect a fictional company from digital threats.

Duration: 4 hrs Scoring: 50 points

LESSON 3: FUNDAMENTALS OF WEB DESIGN

Study: Introduction to Web Design

Learn web design basics.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Introduction to Web Design

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Project: Designing a Website

Design your own website.

Duration: 4 hrs Scoring: 50 points

LESSON 4: THE INTERNET WRAP-UP

Review: The Internet

Review what you have learned.

Duration: 1 hr Scoring: 0 points

Test (CS): The Internet

Take a computer-scored test to assess what you have learned in this unit.

Duration: 0 hrs 30 mins Scoring: 50 points

UNIT 8: YOUR DIGITAL RESPONSIBILITY

LESSON 1: SAFETY, LAW, AND ETHICS

Study: Online Safety and Privacy

Learn techniques for protecting your digital identity online.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Online Safety and Privacy

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Study: Computing Law & Ethics

Learn about computing laws and ethics.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Computing Law & Ethics

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Discuss: Intellectual Property

Discuss the impacts of intellectual property laws.

Duration: 0 hrs 45 mins Scoring: 20 points

LESSON 2: EMERGING TECHNOLOGIES

Study: Emerging Technologies

Learn about emerging technologies.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Emerging Technologies

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Project: Impacts of Emerging Technologies

Explore the impacts of emerging technologies.

Duration: 4 hrs Scoring: 50 points

LESSON 3: SOCIAL MEDIA

Study: Using Social Media

Learn about some of the impacts of social media.

Duration: 0 hrs 45 mins Scoring: 0 points

Quiz: Using Social Media

Take a quiz to assess your understanding of the material.

Duration: 0 hrs 20 mins Scoring: 20 points

Discuss: The Impacts of Social Media

Discuss some of the impacts of social media.

Duration: 0 hrs 45 mins Scoring: 20 points

Project: Your Digital Footprint

Explore your digital footprint.

Duration: 4 hrs Scoring: 50 points

LESSON 4: YOUR DIGITAL RESPONSIBILITY WRAP-UP

Review: Your Digital Responsibility

Review what you have learned.

Duration: 1 hr Scoring: 0 points

Test (CS): Your Digital Responsibility

Take a computer-scored test to assess what you have learned in this unit.

Duration: 0 hrs 30 mins Scoring: 50 points

UNIT 9: SEMESTER WRAP-UP

LESSON 1: SEMESTER WRAP-UP

Review: Semester Review

Review what you have learned.

Duration: 1 hr Scoring: 0 points

Exam: Semester Computer-Scored Exam

Take a computer-scored exam to demonstrate your mastery of concepts and skills covered in this semester.

Duration: 0 hrs 40 mins Scoring: 50 points

Final Exam: Semester Teacher-Scored Exam

Take a teacher-scored exam to demonstrate your mastery of concepts and skills covered in this semester.

Duration: 0 hrs 40 mins Scoring: 50 points