8th Grade American Online School

COMPUTER SCIENCE CURRICULUM

Digital Literacy, Computational Thinking, and Ethical Tech Use

Version May/2025

1. Introduction

The Role of Computer Science Education in 8th Grade

The 8th Grade Computer Science curriculum empowers students to extend their digital fluency, understand computing systems, and engage with ethical technology practices. Students explore programming, media analysis, data science, and cybersecurity while applying computational thinking to real-world challenges. Emphasis is placed on project-based learning, cross-disciplinary integration, and responsible digital citizenship.

By the end of this course, students will:

✓ **Analyze and manage their own media use with digital wellness in mind.**
✓ **Evaluate online information for accuracy, bias, and source reliability.**
✓ **Create data visualizations and use digital maps for storytelling or analysis.**
✓ **Apply programming concepts to build interactive projects.**
✓ **Practice responsible digital behavior, security, and identity protection.**
✓ **Understand hardware, networks, and the architecture of computing systems.**
✓ **Demonstrate algorithmic thinking in problem-solving scenarios.**

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2. Core Competence Areas

CS.1 Digital Literacy and Critical Media Analysis

Learning Outcomes

By the end of this course, students will be able to:

✓ **Evaluate media for purpose, credibility, and bias.**

✓ **Reflect on digital wellness and media habits.**

Competencies

CS.1.A.1 – Understanding media influence.

- Track and reflect on personal screen time.
- Differentiate between active and passive digital use.
- Analyze emotional and behavioral effects of media.

CS.1.A.2 – Identifying truth and misinformation.

- Practice source evaluation and fact-checking.
- Recognize filter bubbles and disinformation tactics.
- Use verification tools and browser extensions.

CS.2 Geo Data and Digital Mapping

Learning Outcomes

By the end of this unit, students will be able to:

✓ **Collect and visualize geographic data using digital tools.**

✓ **Evaluate location privacy and ethics in geospatial data.**

Competencies

CS.2.A.1 – Applying location-based technologies.

- Use Google Earth, ArcGIS, or equivalent tools.
- Visualize local spatial data in project work.
- Connect geographic data to community needs

CS.2.A.2 – Reflecting on data ethics.

- Understand geolocation tracking and consent.
- Evaluate the risks of geo-tagging and data sharing.
- Compare public and private spatial data access.

CS.3 Programming and Algorithmic Thinking

Learning Outcomes

By the end of this unit, students will be able to:

✓ **Write and debug simple programs.**

✓ **Use variables, loops, and conditionals in interactive design.**

Competencies

CS.3.A.1 – Developing foundational programming skills.

- Code with Scratch, Python, or Replit environments.
- Create stories or games with logic structures.
- Transition between block-based and text-based programming.

CS.3.A.2 – Building and planning projects.

- Use flowcharts and pseudocode for planning.
- Build interactive experiences with user input.
- Reflect on problem-solving and debugging.

CS.4 Cybersecurity and Data Protection

Learning Outcomes

By the end of this unit, students will be able to:

✓ **Practice personal digital safety and ethical tech use.**

✓ **Recognize cybersecurity threats and privacy rights.**

Competencies

CS.4.A.1 – Managing online identity and safety.

- Create strong passwords and use 2FA.
- Identify phishing, malware, and social engineering.
- Adjust privacy settings across platforms.

CS.4.A.2 – Practicing digital responsibility.

- Evaluate data collection and online consent practices.
- Discuss ethical hacking and digital piracy.
- Explore encryption and basic data rights.

CS.5 Information Architecture and Search Optimization

Learning Outcomes

By the end of this unit, students will be able to:

✓ **Conduct refined web searches and organize digital content.**

✓ **Understand how metadata and algorithms shape online experiences.**

Competencies

CS.5.A.1 – Using search and retrieval strategies.

- Apply Boolean logic and advanced search filters.
- Identify algorithmic bias and echo chambers.
- Distinguish indexed from dynamic content.

CS.5.A.2 – Organizing digital data.

- Tag content with metadata and file structures.
- Understand databases and structured retrieval.
- Evaluate digital tools for productivity.

CS.6 Digital Storytelling and Interactive Media

Learning Outcomes

By the end of this unit, students will be able to:

✓ **Plan and create digital stories or interactive experiences.**

✓ **Design user-centered narratives with multimedia integration.**

Competencies

CS.6.A.1 – Designing interactive media.

- Use the Hero's Journey model for digital narratives.
- Incorporate text, audio, video, and interactivity.
- Build branching storylines and user-controlled paths.

CS.6.A.2 – Exploring culture and user experience (UX).

- Analyze diverse perspectives in storytelling.
- Embed empathy and accessibility in design.
- Reflect on representation in media narratives.

CS.7 Digital Citizenship and Community Engagement

Learning Outcomes

By the end of this unit, students will be able to:

✓ **Understand digital rights, identity, and respectful interaction.**

✓ **Participate ethically in digital communities and online discourse.**

Competencies

CS.7.A.1 – Navigating digital communities.

- Define digital footprint and evaluate identity choices.
- Explore tools to combat cyberbullying.
- Understand platform policies and terms of use

CS.7.A.2 – Participating ethically online.

- Practice citation and fair use of media.
- Contribute constructively to digital discussions.
- Design a campaign promoting positive digital behavior.

CS.8 Systems, Hardware, and Emerging Technologies

Learning Outcomes

By the end of this unit, students will be able to:

✓ **Identify key computer components and explain their functions.**

✓ **Understand network basics and emerging technologies.**

Competencies

CS.8.A.1 – Understanding computer architecture.

- Identify and explain the role of CPU, RAM, storage, and GPU.
- Compare different operating systems and interfaces.
- Discuss the lifecycle of electronic devices.

CS.8.A.2 – Exploring emerging tech and sustainability.

- Describe basic networking infrastructure.
- Investigate AI, AR, IoT, and their uses.
- Propose solutions to reduce e-waste.

CS.9 Computational Thinking

Learning Outcomes

By the end of this unit, students will be able to:

✓ **Deconstruct problems and design step-by-step solutions.**

✓ **Use logical reasoning and abstraction in programming.**

Competencies

CS.9.A.1 – Applying computational thinking processes.

- Break problems into parts and identify patterns.
- Use abstraction and flowcharts for clarity.
- Design and analyze simple algorithms.

CS.6.A.2 – Iterating and debugging.

- Refine code through testing and feedback.
- Use loops and conditionals effectively.
- View mistakes as learning opportunities in design cycles.

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3. Assessment and Evaluation

Formative Assessments – Checking Progress Through Interactive Learning

✓ **Daily coding exercises and media analysis discussions.**
✓ **Flowcharts, pseudocode, and idea logs for planning.**
✓ **Peer feedback on early-stage programming.**

Summative Assessments – Final Projects and Exams

✓ **Cumulative unit tests on programming, systems, and ethics.**
✓ **Completed website and interactive coding projects.**
✓ **Analytical tasks on digital media and data ethics.**

Authentic Assessment – Real-World Applications

✓ **Final capstone project with documentation and public presentation.**
✓ **Ethical debate or tech impact reflection.**
✓ **Peer-reviewed digital portfolios and group collaboration reports.**

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4. Instructional Strategies for Online Learning

Inquiry-Based and Thematic Learning

✓ **Analyze real-world challenges such as fake news detection or geolocation apps.**

✓ **Investigate ethical dilemmas and computing innovations.**

Project-Based Learning (PBL)

✓ **Develop digital products solving practical problems.**

✓ **Use design thinking and agile development cycles.**

Technology-Integrated Learning

✓ **Utilize online IDEs (Replit, VS Code), design platforms (Figma, Canva), and browser-based tools.**

✓ **Implement coding journals, debugging logs, and AI-based assistants.**