

COMPUTER SCIENCE MIDDLE LEVEL

Computer Science – Middle Level builds upon the computer science standards for grade bands K-2 and 3-5, incorporates the computer science standards for grade band 6-8, and helps to provide a seamless transition to introductory high school coursework. The standards focus on Indiana’s Five Core Computer Science Concepts: Data and Information, Computing Devices and Systems, Programs and Algorithms, Networking and Communication, and Impact and Culture. Focusing on these domains offers students the opportunity to experience and apply a variety of computer science concepts in order to build a solid foundation for more advanced and specialized studies.

- DOE Code: 0488
- Recommended Grade Level: 6-8
- Recommended Prerequisites: None

Middle School Curriculum Requirement

After June 30, 2021, each public school, including each charter school, shall include computer science in the public school's curriculum for students in kindergarten through grade 12 (IC 20-30-5-23). 6-8 grade band standards required of every student are indicated in **bold** below. **Similarly, those bolded are the only standards that may be assessed on grade 6 science ILEARN assessments.**

Implementation Guidance

While it is encouraged to integrate computer science concepts into other disciplines, schools may desire to offer computer science as a standalone course to cover required computer science standards or to cover additional topics that an integrated approach may not allow. This course can be offered in a semester-long setting, as well as in a six- or nine-week rotation. Implementation is flexible due to the varying structure and organization of middle schools. Regardless of approach, all required (bold) standards should be covered. Other topics can be covered as implementation allows in order to enhance and deepen the computer science learning experience of students.

Career and Technical Student Organizations (CTSOs)

Career and Technical Student Organizations are considered a powerful instructional tool when integrated into Career and Technical Education programs. They enhance the knowledge and skills students learn in a course by allowing a student to participate in a unique program of career and leadership development. Students should be encouraged to participate in Business Professionals of America, DECA, or Future Business Leaders of America, the CTSOs for this area.

Content Standards

Domain – Data and Information

Standards

- 6-8.DI.1 **Use the basic steps in algorithmic problem-solving to design solutions (e.g., problem statement and exploration, examination of sample instances, design, implementing a solution, testing, and evaluation).**
- 6-8.DI.2 **Describe the process of parallelization as it relates to problem solving.**
- 6-8.DI.3 **Represent data in a variety of ways (e.g., text, sounds, pictures, and numbers), and use different visual representations of problems, structures, and data (e.g., graphs, charts, network diagrams, flowcharts).**
- 6-8.DI.4 **Understand the notion of hierarchy and abstraction in computing including high-level languages, translation, instruction set, and logic circuits.**
- 6-8.DI.5 **Demonstrate interdisciplinary applications of computational thinking and interact with content-specific models and simulations to support learning and research.**
- CSML-1.1 Collect data using computational tools, identify data trends and patterns, and create visual representations of the data to communicate findings.
- CSML-1.2 Analyze data representations to determine the intended purpose.

Domain – Computing Devices and Systems

Standards

- 6-8.CD.1 **Demonstrate an understanding of the relationship between hardware and software.**
- 6-8.CD.2 **Apply troubleshooting strategies to identify and solve routine hardware and software problems that occur during everyday computer use.**
- 6-8.CD.3 **Describe the major components and functions of computer systems and network.**
- 6-8.CD.4 **Describe what distinguishes humans from machines focusing on human intelligence versus machine intelligence and ways we can communicate, as well as ways in which computers use models of intelligent behavior (e.g., robot motion, speech and language understanding, and computer vision).**
- CSML-2.1 Understand how digital information is stored locally and remotely.
- CSML-2.2 Identify how to manipulate a device's system settings.

Domain – Programs and Algorithms

Standards

- 6-8.PA.1 **Select appropriate tools and technology resources to support learning and personal productivity, publish individual products, and design, develop, and publish data, accomplish a variety of tasks, and solve problems.**
- 6-8.PA.2 **Implement problem solutions using a programming language that includes looping behavior, conditional statements, logic, expressions, variables, and functions.**
- 6-8.PA.3 **Demonstrate dispositions amenable to open-ended problem solving and programming (e.g., comfort with complexity, persistence, brainstorming, adaptability, patience, propensity to tinker, creativity, accepting challenge).**

Domain – Networking and Communication

Standards

- 6-8.NC.1 Collaboratively design, develop, publish, and present products (e.g., videos, podcasts, websites) using technology resources that demonstrate and communicate curriculum concepts.**
- 6-8.NC.2 Exhibit dispositions necessary for collaboration: providing useful feedback, integrating feedback, understanding and accepting multiple perspectives, socialization.**
- CSML-4.1 Use the internet as a tool for research, publication, and communication.
- CSML-4.2 Describe how digital information is sent and received across the internet.

Domain – Impact and Culture

Standards

- 6-8.IC.1 Exhibit legal and ethical behaviors when using technology and information and discuss the consequences of misuse.**
- 6-8.IC.2 Analyze the positive and negative impacts of technology on one's personal life, society, and our culture.**
- 6-8.IC.3 Evaluate the accuracy, relevance, appropriateness, comprehensiveness, and biases that occur in electronic information sources.**
- 6-8.IC.4 Describe ethical issues that relate to computers and networks (e.g., security, privacy, ownership, and information sharing), and discuss how unequal distribution of technological resources in a global economy raises issues of equity, access, and power.**
- CSML-5.1 Discuss the management of one's digital footprint, the permanence of actions in the digital world, and implications related to privacy.
- CSML-5.2 Determine strategies to protect sensitive, digital information.
- CSML-5.3 Explore the various domains of computer science, as well as the intersection of computer science and other disciplines..
- CSML-5.4 Investigate how computer science fits into short and long term academic and career goals.