Ohio’s Learning Standards

Computer Science, Grade 6

ADOPTED 2022

Ohio | Department of Education

Grade 6 Standards

COMPUTING SYSTEMS

Devices

CS.D.6.a Identify the benefits and limitations of a given computing device's functions (including individual components) to explain how the functions and components work together to create the computing system.

Hardware and Software

CS.HS.6.a Identify ways that hardware and software work together as a system to collect and exchange data.

Troubleshooting

CS.T.6.a Use a systematic process to identify and evaluate the source of a routine computing problem. Select the best solution to solve the computing problem and communicate the solution to others.

NETWORKS AND THE INTERNET

Networking

NI.N.6.a Identify the role of hardware components to understand the infrastructure of networks and the internet (including cloud servers).

NI.N.6.b Identify protocols (i.e., rules) and explain why they are used to transmit data across networks and the internet.

Cybersecurity

NI.C.6.a Identify cybersecurity concerns and measures needed to protect electronic information.

NI.C.6.b Identify the different types of malware to understand threats to data security.

NI.C.6.c Identify ways to protect private information.

Internet of Things (IoT)

NI.IOT.6.a Define and explore aspects of embedded devices, smart devices and intelligent devices and the way they record, observe and mimic human habits.

NI.IOT.6.b Identify and define blockchains to recognize how every device made has unique identifiers and the weaknesses that allow programmers and hackers to see personally identifiable information.

DATA AND ANALYSIS

Data Collection and Storage

DA.DCS.6.a Identify and use an appropriate digital data collection tool to compile information.

DA.DCS.6.b Select and utilize appropriate file formats to organize collected data.

DA.DCS.6.c Utilize a file structure to logically organize data to support individual and collaborative work.

Visualization and Communication

DA.VC.6.a Identify and label patterns in models or representations to infer connections between data sets.

DA.VC.6.b Create a spreadsheet utilizing formulas, functions and graphs to represent and analyze data.

Inference and Modeling

DA.IM.6.a Identify and utilize data sets to support or refute a hypothesis.

ALGORITHMIC THINKING AND PROGRAMMING

Algorithms

ATP.A.6.a Compare and refine multiple algorithms for the same task to determine which is the most efficient.

Variables and Data Representation

ATP.VDR.6.a Identify unknown values that need to be represented by a variable within a multi-step process.

ATP.VDR.6.b Create variables and use them within a multi-step process.

Control Structures
ATP.CS.6.a Identify and trace decisions and loops that exist in a multi-step process within a program.

Modularity
ATP.M.6.a Decompose problems into parts to facilitate the design, implementation and review of programs.

Program Development
ATP.PD.6.a Write code that utilizes algorithms, variables and control structures to solve problems or as a creative expression.

ATP.PD.6.b Test and trace to debug and refine code.

ARTIFICIAL INTELLIGENCE

Perception
AI.P.6.a Give examples of different types of computer perception that can extract meaning from sensory signals to understand how computers collect information from sensors.

AI.P.6.b Give examples of how humans combine information from multiple modalities to understand how computers use sensors to collect data.

AI.P.6.c Give examples of different types of computer perception that can extract meaning from sensory signals to show the connection between sensors and computer perception.

AI.P.6.d Classify a given image (e.g., "traffic scene", "nature scene", "social gathering", etc.) and then describe the kinds of knowledge a computer would need in order to understand scenes of this type to utilize the image in an algorithm.

Representation & Reasoning
AI.RR.6.a Illustrate how a computer can solve a maze, find a route on a map or reason about concepts in a knowledge graph by drawing a search tree.

Machine Learning
AI.ML.6.a Contrast the unique characteristics of human learning with the ways machine learning systems operate to identify the limitations of machine learning.

AI.ML.6.b Illustrate the structure of a neural network to describe how its parts form a set of functions that compute an output.

Natural Interactions
AI.NI.6.a Individually and collaboratively compare language processing algorithms to solve a problem based on a given criteria (e.g., time, resource, accessibility).

AI.NI.6.b Identify and describe how computers mimic human behavior to better serve humans.

Societal Impacts
AI.SI.6.a Identify and explain how humans have control in curating training datasets to identify bias in machine learning.

AI.SI.6.b Identify and explain how algorithmic bias impacts artificial intelligence systems to prevent bias in future datasets.

IMPACTS OF COMPUTING

Culture
IC.Cu.6.a Identify the change that current technologies have on people's everyday activities to understand the impact within a society.

IC.Cu.6.b Identify issues of bias and accessibility in the design of existing technologies to address equality and equity in society.

IC.Cu.6.c Identify and explore careers related to the field of computer science.

Social Interactions
IC.SI.6.a Analyze and present beneficial and harmful effects of electronic communications to understand their impacts on interpersonal, global, economic, political, business and cultural interactions.

Safety, Law and Ethics

IC.SLE.6.a Describe tradeoffs between allowing information to be public and keeping information private and secure to inform decision-making.

IC.SLE.6.b Identify the social and economic implications of privacy in the context of safety, law or ethics to understand how privacy impacts these areas.

IC.SLE.6.c Evaluate the development of new technologies in communication, entertainment and business to understand the impact.

IC.SLE.6.d Provide appropriate credit when using resources or artifacts that are not our own.

IC.SLE.6.e Differentiate between the appropriate and inappropriate content on the internet and identify unethical and illegal online behavior.