

Middle School (Grades 6–8, Ages 11–14)

Concept	Identifier	Standard
Algorithms & Design	MS-ALG-PS-01	Design an algorithm that includes variables of multiple data types to solve a problem or express an idea.
	MS-ALG-PS-02	Model a given algorithm with a flowchart or pseudocode that includes a combination of control structures and procedures.
	MS-ALG-PS-03	Verify the accuracy of an algorithm for given inputs.
	MS-ALG-PS-04	Justify whether a problem is best solved using procedural instructions, rule-based logic, data-driven methods, or a combination of these approaches.
	MS-ALG-PS-05	Use an AI tool to generate outputs that assist in solving a computational problem.
	MS-ALG-ML-06	Hypothesize how a machine learning model generates classifications or predictions.
	MS-ALG-ML-07	Investigate ways to improve the accuracy of a machine learning model and reduce bias by refining the quality of examples and nonexamples in the training data.
	MS-ALG-ML-08	Evaluate the features and limitations of a machine learning model.
	MS-ALG-IM-09	Evaluate which human-centered design principles are present or missing in an existing computing technology.
	MS-ALG-IM-10	Examine evidence of beneficial and harmful impacts, ethical issues, and biases of algorithms encountered in daily life.
	MS-ALG-IM-11	Modify an algorithm to address a specific societal impact, ethical issue, or bias.
Programming	MS-PRO-PD-12	Use a procedure to structure code for clarity and reusability.
	MS-PRO-PD-13	Use reference documentation in program development.
	MS-PRO-PD-14	Justify the importance of attribution and intellectual property when developing computing technologies.
	MS-PRO-PD-15	Develop a program utilizing inclusive collaboration practices.
	MS-PRO-VD-16	Use variables of multiple data types to store, access, and manipulate data within a program.
	MS-PRO-RD-17	Analyze the roles of iteration, selection, variables, and procedures in a segment of code.
	MS-PRO-RD-18	Analyze AI-generated code for accuracy and usability in a programming project.
	MS-PRO-TR-19	Use systematic strategies to test, refine, and document changes to a computing technology to meet the intended purpose.
	MS-PRO-TR-20	Refine a computing technology based on user feedback to improve its usability and accessibility.
Data & Analysis	MS-DAT-DC-21	Evaluate how different levels of precision and granularity in data collection affect accuracy, storage, and analysis.
	MS-DAT-DC-22	Explain how data and its associated metadata can be used to answer questions.
	MS-DAT-DC-23	Use a computational tool to sort, filter, group, and summarize structured data.
	MS-DAT-DC-24	Analyze options to address a data quality issue.

Concept	Identifier	Standard
Data & Analysis <i>(continued)</i>	MS-DAT-DI-25	Use a computational tool to identify relationships among variables in a dataset and make a classification or prediction.
	MS-DAT-DI-26	Create data visualizations to show how different design choices can impact the interpretation of the same data.
	MS-DAT-DI-27	Summarize a data investigation process, including potential biases, limitations, and supporting evidence.
	MS-DAT-IM-28	Explain the benefits and risks of allowing personal data and metadata to be collected and used in datasets, including issues of data ownership, privacy, and sovereignty.
	MS-DAT-IM-29	Analyze how decisions made at different stages of working with data can lead to biased data, misleading conclusions, and compromised AI models.
Systems & Security	MS-SYS-HW-30	Examine differences between computing systems based on user needs, system requirements, and potential societal, environmental, and ethical impacts.
	MS-SYS-HW-31	Describe computing devices used in various industries, their basic functions, and how they are used to accomplish tasks or solve problems.
	MS-SYS-SE-32	Explain the effects of not using the CIA triad when working with data.
	MS-SYS-SE-33	Evaluate common types of cyber attacks and preventions.
	MS-SYS-NT-34	Model how information in a network is broken down into packets, transmitted between devices, and reassembled.
	MS-SYS-NT-35	Explain how the resilience of the internet depends on interconnected devices and their roles and functions within the network.
	MS-SYS-IM-36	Collaborate to improve the design of a computing system to meet the needs of diverse users.
	MS-SYS-IM-37	Examine how access to computing systems can vary based on personal and social factors, such as physical ability, geographic location, socioeconomic status, and age.
Computing & Society	MS-SOC-HI-38	Compare the roles of individuals, communities, organizations, and governments in shaping computing technologies across major eras in computing history.
	MS-SOC-HI-39	Analyze intended and unintended impacts of a historical computing technology on society and the environment.
	MS-SOC-ET-40	Evaluate when it is appropriate to use AI and other emerging technologies to solve a problem based on their capabilities, limitations, and environmental impacts.
	MS-SOC-ET-41	Evaluate how the decisions made while designing an emerging technology influence user experiences differently across different communities.
	MS-SOC-ET-42	Debate ways an emerging technology impacts the social, cultural, and environmental issues in local communities.
	MS-SOC-HU-43	Analyze how the decisions humans make when using computing technologies have ethical and social consequences.
	MS-SOC-CE-44	Analyze how workers in different careers use computational thinking to solve real-world problems.
	MS-SOC-CE-45	Evaluate how automation in technology can create or replace jobs and change how people work.