		PK/K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Middle School	High School
Algorithms & Design	Algorithmic Problem Solving	EK-ALG-PS-01: Carry out algorithms in daily activities.	E1-ALG-PS-01: Decompose a problem or task into individual parts to develop an algorithm.	E2-ALG-PS-01: Create an algorithm that includes sequence, events, and iteration to solve a problem or express an idea.	E3-ALG-PS-01: Create an algorithm that includes a combination of sequence, events, iteration, and selection to solve a problem or express an idea.	E4-ALG-PS-01: Create a written representation of an algorithm that includes a combination of sequence, events, iteration, and selection to solve a problem or express an idea.	E5-ALG-PS-01: Create a visual representation of an algorithm that includes variables and a combination of sequence, events, iteration, and selection to solve a problem or express an idea.	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.	HS-ALG-PS-01: Design an algorithm using appropriate data structures to solve a problem or express an idea. HS-ALG-PS-02: Optimize the design of an algorithm using procedural abstraction and control structures. HS-ALG-PS-03: Evaluate algorithms for efficiency, correctness, and clarity, using metrics or test cases. HS-ALG-PS-04: Describe the differences between deterministic and probabilistic algorithms. HS-ALG-PS-05: Evaluate AI-generated output to assess bias, accuracy, and potential harms.
	Machine Learning	EK-ALG-ML-02: Recognize attributes of objects to notice patterns and make decisions.	E1-ALG-ML-02: Recognize that AI systems are technologies that use patterns in data to make decisions or generate new things.	E2-ALG-ML-02: Examine how data is used to train a machine learning model.	E3-ALG-ML-02: Investigate how a machine learning model can change when new data is added to a training set.	E4-ALG-ML-02: Analyze relationships between the properties of training data and a machine learning model's output.	E5-ALG-ML-02: Train a machine learning model to make a classification or prediction.	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.	HS-ALG-ML-06: Justify the selection of a type of AI algorithm to accomplish a task. HS-ALG-ML-07: Evaluate training data by examining its source, quality, representativeness, potential biases, and privacy implications. HS-ALG-ML-08: Develop a machine learning model for a chosen task using appropriate data and tools.
	Impacts of Algorithms & Design	EK-ALG-IM-03: Describe how people create algorithms to solve problems.	E1-ALG-IM-03: Explain how a change to an algorithm leads to a different outcome.	E2-ALG-IM-03: Describe how an algorithm might impact peers in varied situations.	E3-ALG-IM-03: Compare how different algorithms may affect outcomes, situations, and people with a wide range of needs.	E4-ALG-IM-03: Evaluate how different algorithms for solving the same problem produce outcomes that may benefit or disadvantage different groups of people.	E5-ALG-IM-03: Articulate how human-centered design principles are incorporated into the development of a computing technology.	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.	HS-ALG-IM-09: Design a computing technology using human-centered design principles. HS-ALG-IM-10: Evaluate the ethical implications, societal impacts, and potential biases of rule-based and data-driven algorithms. HS-ALG-IM-11: Articulate the values embedded in the design of an algorithmic system.

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Programming	**Program Development**	EK-PRO-PD-04: Create a sequence of commands to solve a problem or express an idea.	E1-PRO-PD-04: Create code from an algorithm that includes sequence to solve a problem or express an idea.	E2-PRO-PD-04: Create code from an algorithm that includes sequence, events, and iteration to solve a problem or express an idea.	E3-PRO-PD-04: Develop code from a student-created algorithm that includes a combination of sequence, events, iteration, and selection to solve a problem or express an idea. E3-PRO-PD-05: Use constructive feedback to improve a program.	E4-PRO-PD-04: Compare different programming solutions to the same problem based on correctness and clarity. E4-PRO-PD-05: Collaborate with a team by offering a meaningful contribution to creating a program.	E5-PRO-PD-04: Create a novel program by modifying or combining elements of existing programs. E5-PRO-PD-05: Construct individual components of a program that are collaboratively assembled into a programming project.	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.	HS-PRO-PD-12: Create a modular program that uses procedures, external libraries, or objects to improve reusability and readability. HS-PRO-PD-13: Use documentation, libraries, application programming interfaces (APIs), and other tools in program development. HS-PRO-PD-14: Apply appropriate attribution of intellectual property when developing a computing technology. HS-PRO-PD-15: Collaborate on a programming project using a defined workflow that includes design documentation and clear task roles.
	Variables & Data Storage	EK-PRO-VD-05: Identify everyday gestures and symbols that represent information people use to make choices.	E1-PRO-VD-05: Identify terms that refer to data values that change over time in everyday life.	E2-PRO-VD-05: Label different representations of information with a name and whether its value is constant or changes.	E3-PRO-VD-06: Identify the variables being stored and manipulated in a program.	E4-PRO-VD-06: Trace how data flows and changes variable values in a program.	E5-PRO-VD-06: Use variables to store, compare, and modify data within a program.	MS-PRO-VD-16: Use variables of multiple data types to store, access, and manipulate data within a program.	HS-PRO-VD-16: Create a program that uses appropriate data structures to store, access, and manipulate data.
	Reading & Documenting	EK-PRO-RD-06: Describe how a sequence of commands completes a task.	E1-PRO-RD-06: Explain the function of code that includes an event and sequence.	E2-PRO-RD-06: Explain the steps taken to create a program.	E3-PRO-RD-07: Articulate how a specific segment of code contributes to the overall purpose of a program.	E4-PRO-RD-07: Document a program to clarify its functionality.	E5-PRO-RD-07: Create embedded or external documentation for a programming project.	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.	HS-PRO-RD-17: Analyze how a segment of code works, including the role of parameters, return values, and data structures. HS-PRO-RD-18: Evaluate AI-generated code for accuracy, reliability, and alignment with program requirements.
	Testing & Refining	EK-PRO-TR-07: Identify a step in a sequence of commands that does not work as expected.	E1-PRO-TR-07: Debug a program that includes a sequence of commands.	E2-PRO-TR-07: Debug a program that includes sequence, events, and iteration.	E3-PRO-TR-08: Debug a program that includes a combination of sequence, events, iteration, and selection.	E4-PRO-TR-08: Debug a program incrementally and repeatedly throughout the development process.	E5-PRO-TR-08: Debug a program using systematic strategies.	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.	HS-PRO-TR-19: Evaluate a computing technology's alignment with design specifications and responsible design values, including its correctness, effectiveness, and user experience. HS-PRO-TR-20: Refine a computing technology based on user feedback, testing results, and responsible design values to improve its effectiveness and impact.

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Data & Analysis	Data Collection & Preparation	EK-DAT-DC-08: Use collected data to help answer questions.	E1-DAT-DC-08: Use multiple methods to collect both numeric and non-numeric data to help answer questions.	E2-DAT-DC-08: Compare numeric and non-numeric types of data in terms of how they are collected and what information they provide.	E3-DAT-DC-09: Evaluate numeric and non-numeric data for accuracy and completeness.	E4-DAT-DC-09: Organize collected data into a table using a computational tool, with rows representing records and columns representing attributes.	E5-DAT-DC-09: Use computational tools to collect and organize different types of data.	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.	HS-DAT-DC-21: Use a computational tool to generate simulated data that fits certain parameters for use in a simulation. HS-DAT-DC-22: Create a data dictionary that describes the name, type, and allowable values for each attribute and the logical relationships between variables in a dataset. HS-DAT-DC-23: Use a computational tool to clean and organize text-based data. HS-DAT-DC-24: Evaluate different approaches to verifying consistency and compliance with expected data types, values, and ranges.
	Data Investigation	EK-DAT-DI-09: Investigate a question that can be answered by collecting data in students' everyday environments.	E1-DAT-DI-09: Compare a question that can be answered through a data investigation and a question that can be answered through other means.	E2-DAT-DI-09: Develop a question that can be answered with data.	E3-DAT-DI-10: Investigate a data question involving relationships between multiple attributes.	E4-DAT-DI-10: Create an explanation that includes at least one data visualization to report the process and results of a data investigation.	E5-DAT-DI-10: Analyze a dataset to identify the nature and possible sources of variability in the data.	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.	HS-DAT-DI-25: Create a data visualization of a multivariate dataset to answer a question or make a classification or prediction. HS-DAT-DI-26: Evaluate a data simulation or visualization to answer a data question, inform decision-making, and identify potential limitations.
	Impacts of Data Science	EK-DAT-IM-10: Investigate how data can help a person make informed decisions in everyday life.	E1-DAT-IM-10: Examine a variety of data questions that address the needs of a person or community.	E2-DAT-IM-10: Distinguish between data collection approaches, including those that may lead to inaccurate or biased data.	E3-DAT-IM-11: Design a data collection process that addresses the needs of people from different backgrounds or groups.	E4-DAT-IM-11: Investigate how data collected about people may affect individuals and groups.	E5-DAT-IM-11: Analyze the benefits and risks of a computing technology that uses collected data.	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.	HS-DAT-IM-27: Evaluate the societal, environmental, and ethical implications of large-scale data collection and processing, including within AI applications. HS-DAT-IM-28: Debate the efficacy of a policy or regulation to ensure responsible data use.

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Systems & Security	Hardware & Software	EK-SYS-HW-11: Examine the use of tools to accomplish a task or solve a problem for different users.	E1-SYS-HW-11: Describe the purpose of basic hardware components of a computing system, using accurate terminology.	E2-SYS-HW-11: Explain how the basic hardware components of a computing system work together to perform input and output (I/O) operations.	E3-SYS-HW-12: Describe the role of software in a computing system to accomplish tasks or solve problems.	E4-SYS-HW-12: Apply a basic troubleshooting process to identify and fix common hardware and software issues.	E5-SYS-HW-12: Explain how hardware and software components of a computing system work together to perform input and output operations, processing, and storage.	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.	HS-SYS-HW-29: Differentiate an operating system as a special type of software that manages both the hardware and other software components of a computing system, including handling memory and peripherals. HS-SYS-HW-30: Demonstrate the capabilities and limitations of a physical or simulated computing device to address a task or problem.
	Security	EK-SYS-SE-12: Differentiate between public and private information.	E1-SYS-SE-12: Describe how to keep devices and online accounts safe from unauthorized access.	E2-SYS-SE-12: Explain how online actions have real-world consequences.	E3-SYS-SE-13: Evaluate how sharing information online might reveal personally identifiable information and other details.	E4-SYS-SE-13: Distinguish between authentication and authorization in protecting devices and private information.	E5-SYS-SE-13: Describe the concepts of the CIA triad and how each component is important in protecting information.	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.	HS-SYS-SE-31: Identify different types of cybersecurity and physical security measures and the trade-offs for users, data, and devices. HS-SYS-SE-32: Classify the causes and impacts of security breaches and social engineering attacks for individuals, industries, communities, and governments. HS-SYS-SE-33: Formulate a solution to a security flaw in a given system.
	Networks				E3-SYS-NT-14: Explain how people access the internet to gain information and communicate with each other.	E4-SYS-NT-14: Compare wired and wireless methods that computing devices use to connect to the internet.	E5-SYS-NT-14: Distinguish between the components of wired and wireless networks.	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.	HS-SYS-NT-34: Diagram a network of computing systems, including hardware and software. HS-SYS-NT-35: Analyze how the internet functions as a network of networks and how it differs from other types of networks.
	Impacts of Computing Systems	EK-SYS-IM-13: Identify responsible behavior when using computing systems and digital tools.	E1-SYS-IM-13: Describe an individual's role in responsibly using computing systems and digital tools.	E2-SYS-IM-13: Describe the benefits and harms that arise from an individual's use of computing systems and digital tools.	E3-SYS-IM-15: Describe how widely used computing systems may impact an individual's life and community.	E4-SYS-IM-15: Investigate the impacts of widely used computing systems on natural resources and the environment.	E5-SYS-IM-15: Examine how computing systems impact culture and the ways people live and work.	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.	HS-SYS-IM-36: Evaluate the rationale behind a law or policy governing the design and use of computing systems. HS-SYS-IM-37: Investigate how computing systems and infrastructure impact society and the environment, identifying who is affected and why.

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Computing & Society	History of Computing	EK-SOC-HI-14: Identify computing technologies used in daily life that have changed over time.	E1-SOC-HI-14: Compare how an everyday activity changed after a specific computing technology was introduced.	E2-SOC-HI-14: Analyze the ways that people from different cultures, backgrounds, and time periods have designed computing technologies to help them solve problems and express ideas.	E3-SOC-HI-16: Examine how computing innovations have changed the ways people live, work, or communicate over time.	E4-SOC-HI-16: Investigate the contributions of diverse individuals and communities in the history of computing.	E5-SOC-HI-16: Analyze how the inclusion or exclusion of diverse individuals and communities has shaped the design, development, and societal impact of computing technologies.	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.	HS-SOC-HI-38: Analyze the historical trajectory of a specific computing technology and how its development is linked to societal and environmental factors. HS-SOC-HI-39: Propose modifications to an existing policy or piece of legislation that encourages ethical innovation and minimizes societal risks associated with technology.
	Emerging Technologies				E3-SOC-ET-17: Describe how new technologies create both benefits and risks in personal and family life.	E4-SOC-ET-17: Analyze how the limitations of existing technologies can lead to emerging technologies.	E5-SOC-ET-17: Examine how people decide whether or not to use emerging technologies.	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.	HS-SOC-ET-40: Evaluate the fundamental technological differences between an emerging technology and established technologies and how those differences influence computing. HS-SOC-ET-41: Evaluate the societal and environmental impacts of an emerging technology, including those that lead to inequities in access and outcomes. HS-SOC-ET-42: Design a conceptual solution to a real-world problem using an emerging technology, analyzing its potential benefits and harms.
	Humans & Computing	EK-SOC-HU-15: Explain that people design and develop computing technologies.	E1-SOC-HU-15: Differentiate between activities that humans do well and activities that computing technologies do well.	E2-SOC-HU-15: Investigate situations where humans have created computing technologies to solve problems.	E3-SOC-HU-18: Examine why people design and build computing technologies.	E4-SOC-HU-18: Distinguish between human learning and machine learning processes.	E5-SOC-HU-18: Evaluate when it is appropriate to use or not use computing technologies to solve a problem.	MS-SOC-HU-43: Analyze how the decisions humans make when using computing technologies have ethical and social consequences.	HS-SOC-HU-43: Evaluate how human choices in using, designing, deploying, and regulating computing technologies have risks, benefits, and long-term impacts. HS-SOC-HU-44: Debate perspectives on differences between human and artificial intelligence and their implications for consciousness, ethics, and human responsibility.
	Career Exploration	EK-SOC-CE-16: Identify how people use digital devices at home, at school, and at work.	E1-SOC-CE-16: Describe how computing is used by people at home, at school, and in the community.	E2-SOC-CE-16: Investigate how personal interests connect to computing in different industries and careers.	E3-SOC-CE-19: Explain how people in different industries use computing technologies and skills to accomplish their work.	E4-SOC-CE-19: Investigate how the workforce adopts new computing technologies and continues to update their computing skills.	E5-SOC-CE-19: Examine how professionals collaborate while using computing technologies to solve problems.	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.	HS-SOC-CE-45: Analyze how diverse teams of people use computational thinking and computing technologies to solve problems and express ideas. HS-SOC-CE-46: Connect computing knowledge and skills acquired to students' personal goals and career aspirations.

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