Computer Science Implementation Framework

Grade 4

2026

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Background

Louisiana Act 541 (2022), the Computer Science Education Act, aimed to establish a comprehensive and seamless statewide computer science education program across all educational levels to meet the demands of a dynamic economy. To achieve this goal, Act 541 created the Computer Science Education Advisory Commission (CSEAC). CSEAC was responsible for advising the State Board of Elementary and Secondary Education (BESE) through the state Department of Education (LDOE) to develop and implement a state action plan for delivering education in computer science in all public schools.

The first key action within the Louisiana K-12 Computer Science Education Plan calls for establishing content standards for computer science. From May to August 2024, the K-12 Computer Standards Writing Committee drafted student-centered and developmentally appropriate computer science standards within defined grade bands: elementary (K-5), middle school (6-8), and high school (9-12). These standards were carefully designed to reflect the increasing complexity and depth of understanding expected as students progress through each educational stage, with a focus on analytical and critical thinking skills, digital literacy, digital citizenship, and technology skills. In October 2024, BESE approved the K-12 Louisiana Student Standards for Computer Science. These standards now serve as a guiding framework to support high-quality computer science instruction in Louisiana.

To support standards implementation, the Louisiana K-12 Computer Science Education Plan also calls for the development of computer science frameworks for standards implementation, which show the overlap with existing content standards.

Purpose of the Frameworks

The frameworks support Key Action 1 of the Louisiana K-12 Computer Science Education Plan by providing guidance for integrating the K-12 Louisiana Student Standards for Computer Science into existing instruction, emphasizing the connections between computer science, math, and science. By utilizing the frameworks, teachers will equip students with essential analytical thinking, digital literacy, and technology skills needed for success in society and future career opportunities.

Connections between Computer Science, Mathematics, and Science

A key feature of the Computer Science Implementation Frameworks highlights the connections between the K-12 Louisiana Student Standards for Computer Science and mathematics and science instruction. Many computer science concepts, such as sequencing, patterns, and logic, align with mathematical reasoning and scientific inquiry. Computational thinking strategies, such as decomposition and algorithmic thinking, support problem-solving approaches in math and science. Integrating computer science within mathematics and science helps students see connections between the content areas, encouraging students to view technology as a tool for solving real-world problems in a variety of professional fields.

Finding Connections to Core Content Areas

In elementary education, computer science implementation emphasizes integrating computer science across content areas. Computer science standards provide the foundation for teachers to identify and incorporate cross-disciplinary computer science content opportunities within lessons and content skills.

Unpacking the Standards

Computer science standards are essential for effective computer science implementation. When considering which computer science standards best fit a lesson, summarize the standard's ultimate purpose or goals by asking, “What should students accomplish by the end of grade 5 to master this standard?” Identifying the underlying skill or content required to master the standard helps in determining its best fit within a specific content area.

Finding Connections

Connecting standards to the real world makes standards more meaningful and relevant to students. Making connections between computer science standards and content or skills in another content standards demonstrates the real-world applications of computer science. Connections may be found between computer science core practices and practices of another content area. Computer science skills also reinforce skills emphasized in other content areas. For a full explanation of the core concepts and core practices of the computer science standards, see the K-12 Louisiana Student Standards for Computer Science.

Computational Thinking Skills

Computational thinking involves breaking down complex problems into smaller, manageable parts (decomposition), recognizing patterns (pattern recognition), creating step-by-step solutions (algorithms), and generalizing solutions to other problems (abstraction). These skills are not exclusive to computer science; they are applicable in other content areas including math and science. By understanding computational thinking, teachers can identify opportunities to apply these problem-solving strategies in multiple contexts.

Computational Thinking Practice	In Mathematics	In Science
Abstraction	Represent concepts using visualizations such as graphs, charts, or diagrams.	Create simplified simulations of complex scientific phenomena.
Algorithmic Thinking	Create step-by-step instructions for solving problems or geometric constructions.	Create models of scientific processes like the water cycle or food chain.
Decomposition	Break down multi-step word problems into smaller, manageable parts.	Break down complex investigations into smaller, testable hypotheses.
Pattern Recognition	Identify number patterns, geometric patterns, or patterns in data sets.	Identify patterns in data, such as weather, animal behavior, or plant growth.

Components of the Computer Science Implementation Framework

Complexity Statements

Complexity statements clarify the increasing depth and rigor of learning expectations within a content standard as students progress through each grade level. These statements break down each standard into a vertical progression of learning within the grade band and ensure an age-appropriate level of knowledge for each standard. Standards and complexity statements allow flexibility and guidance to implement instruction at each grade band and each grade level, depending on a particular school's or system's implementation plan.

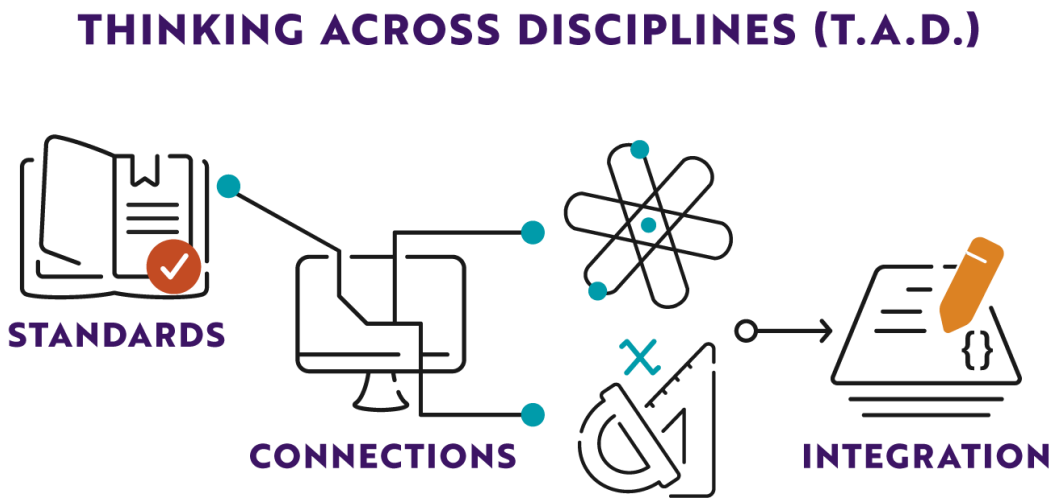
Complexity statements are foundational for effectively integrating computer science by providing a clear, grade-level-specific model for instruction. By outlining the increasing depth and rigor of learning expectations across grade levels, these statements ensure computer science concepts are introduced and reinforced in a developmentally appropriate manner, preventing both over- and under-challenging students. This clarity in learning goals empowers teachers to create integrated lessons that are both effective and appropriately challenging, ultimately fostering a deeper, more interconnected understanding across all disciplines.

Example

E.NI.1A. Explain how networks connect computers to other computing systems and the internet.	
Grade	**Complexity Statement**
K	Define what a network is and how it is used to connect to other people and places around the world.
1	Compare and contrast wireless versus plugged-in networks.
2	Model and describe how computers break down data to share on networks.
3	Explain how data is transmitted in packets.
4	**Create a model demonstrating how information is shared within a network.**
5	Diagram and summarize how data can be shared between multiple networks and users via the Internet.

Thinking Across Disciplines

Thinking Across Disciplines (T.A.D.) is a systemic approach guiding the integration of computer science concepts and practices into other content areas.



The T.A.D. Process

Initially, teachers gain a thorough understanding of the computer science standards for their grade band and the overarching core practices. Next, teachers identify meaningful connections between the standards and practices of computer science and those of other content areas, such as math and science. Finally, teachers create or modify existing lessons and activities that blend computer science concepts with existing instruction.

Benefits of T.A.D.

This interdisciplinary approach makes learning more relevant and engaging for students by demonstrating the practical applications of computer science in real-world contexts. It also reinforces critical thinking, problem-solving, and computational thinking skills, which transfer across multiple disciplines. The computer science implementation frameworks contain examples of the T.A.D. process as a starting point for teachers to discover their own connections between computer science and other content areas.

Core Concept 1: Computing Systems (CS)

Overview

Students interact with a wide variety of computers each day. Computers are devices that can collect, store, analyze, and act upon information in ways that can positively and negatively affect human capabilities. Humans (users) operate, program, and maintain the physical components (or hardware) and instructions (or software) that make up a computer. The hardware, software, and users are collectively called computing systems. Users leverage their understanding of hardware and software to resolve problems within computing systems in a process called troubleshooting.

Elementary Standards for Core Concept 1: Computing Systems

Subconcepts and Core Practices	Elementary (K-5)
Subconcept 1: **Hardware and Software** *Core Practices:* *Collaborating Around Computing;* *Recognizing and Defining Computational Problems;* *Communicating about Computing*	E.CS.1A. Identify and select the appropriate hardware to complete computing tasks.
	E.CS.1B. Identify and select the appropriate software to complete computing tasks.
	E.CS.1C. Evaluate hardware and software types to meet users' needs in completing various computing tasks.
Subconcept 2: **Troubleshooting** *Core Practices:* *Collaborating Around Computing;* *Recognizing and Defining Computational Problems;* *Testing and Refining Computation Artifacts;* *Communicating about Computing*	E.CS.2A. Propose potential ways to address computing problems using appropriate hardware or software.

Complexity Statements

Core Concept 1: Computing Systems

Complexity statements for the standards included in **Core Concept 1: Computing Systems** break down each standard into manageable, age-appropriate components. This breakdown ensures that instruction fits the developmental needs of students at each grade level. For instance, kindergarten focuses on describing the basic uses of hardware and software, but by grade 5 students justify and apply knowledge of hardware and software to navigate complex scenarios. Grade 5 students might analyze a scenario where a computer program runs slowly and propose a plan to troubleshoot whether the issue stems from the hardware (like insufficient memory) or the software (like too many applications running).

E.CS.1A. Identify and select the appropriate hardware to complete computing tasks.	
Grade	**Complexity Statement**
K	Describe the ways people use hardware to perform computing tasks (e.g., keyboard, mouse, monitors, laptops, tablets).
1	Explain how common hardware pieces function.
2	Compare and contrast the functions and uses of various hardware.
3	Identify the appropriate hardware to complete a given task.
4	**Analyze the capabilities and limitations of hardware for a particular use in a given scenario.**
5	Justify and use the proper hardware to complete a given task.

E.CS.1B. Identify and select the appropriate software to complete computing tasks.	
Grade	**Complexity Statement**
K	Describe the ways people use software to perform computing tasks.
1	Explain the function of common software components.
2	Compare and contrast the functions and uses of various software.
3	Identify the appropriate software to complete a given task.
4	**Analyze the capabilities and limitations of software for a particular use in a given scenario.**

E.CS.1B. Identify and select the appropriate software to complete computing tasks.	
Grade	**Complexity Statement**
5	Justify and use the proper software to complete a given task.

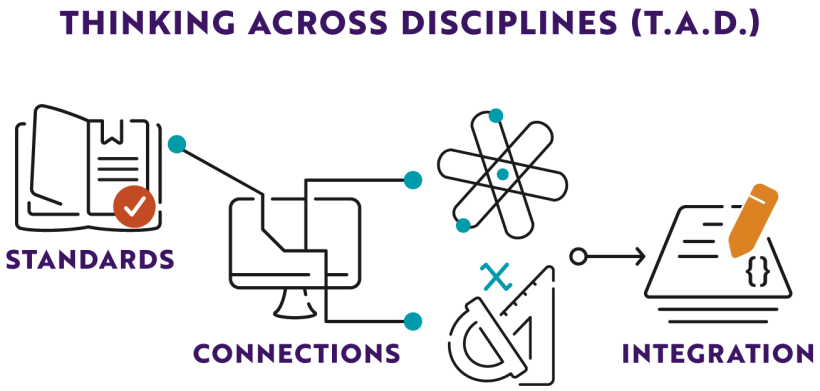
E.CS.1C. Evaluate hardware and software types to meet users' needs in completing various computing tasks.	
Grade	**Complexity Statement**
K	Identify ways that computing devices help users accomplish simple tasks.
1	Identify the basic hardware and software used to meet users' needs for common tasks.
2	Describe the function of the hardware and software in accomplishing a specific task when given a scenario.
3	Describe the limitations of certain computing devices in given scenarios.
4	**Determine the most appropriate hardware and software to accomplish a task when given a scenario.**
5	Evaluate a user's unique needs and recommend the most appropriate hardware and software in a given scenario.

E.CS.2A. Propose potential ways to address computing problems using appropriate hardware or software.	
Grade	**Complexity Statement**
K	Identify a basic hardware problem.
1	Identify a basic software problem.
2	Differentiate between a hardware problem and a software problem using observations.
3	Describe and hypothesize causes for a basic hardware problem and a basic software problem.
4	**Describe the appropriate user response to correct a basic hardware or software error when given an error message.**

E.CS.2A. Propose potential ways to address computing problems using appropriate hardware or software.	
Grade	**Complexity Statement**
5	Propose and test a plan to address basic computing problems using hardware or software when given various error messages.

Thinking Across Disciplines in Grade 4

Core Concept 1: Computing Systems



The standards in **Core Concept 1: Computing Systems** build student understanding of the hardware and software that make up computers and guide the intentional and effective use of these tools.

- **Problem-solving** is a skill emphasized across many content areas. Students need to be able to understand and address problems of various kinds to strengthen analytical abilities. Troubleshooting issues that emerge when using computers provides a new context for students to practice problem-solving skills.
- Evaluating hardware and software applications and selecting the best tools to meet specific user needs requires **critical thinking**. Strong critical thinking skills allow students to draw informed conclusions, make reliable recommendations, and justify their decisions.
- Understanding the purpose and function of hardware and software supports effective technology integration from early stages of education. Developing **competence and familiarity with technology** equips students for success in both the workforce and higher education. A solid foundation in hardware, software, and troubleshooting deepens students' knowledge of technology tools and their applications.

T.A.D. Examples

Standard	**E.CS.1A. Identify and select the appropriate hardware to complete computing tasks.** **Complexity Statement:** Analyze the capabilities and limitations of hardware for a particular use in a given scenario. **Core Practices:** Collaborating Around Computing; Recognizing and Defining Computation Problems; Communicating about Computing
Connections	**Mathematics** 4.MD.C.6 Measure angles in whole-number degrees using a protractor. 4.MP.5 Use appropriate tools strategically. **Science** 4-PS3-2 Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
Integration	Just as students use a protractor to measure angles accurately in math, they learn to identify and select appropriate computing hardware for specific tasks. For instance, when measuring angles digitally, a student might choose a tablet with a stylus over a standard mouse because the stylus offers greater precision, demonstrating strategic tool selection across disciplines. As students investigate how energy transfers through sound, light, heat, or electricity, they also consider which hardware tools best support their observations. For example, when exploring sound energy, a student may choose to use a microphone connected to a computer to capture and analyze sound waves, recognizing the microphone as the appropriate hardware for the task.

Standard	**E.CS.1B. Identify and select the appropriate software to complete computing tasks.** **Complexity Statement:** Analyze the capabilities and limitations of software for a particular use in a given scenario. **Core Practices:** Collaborating Around Computing; Recognizing and Defining Computation Problems; Communicating about Computing
Connections	**Mathematics** 4.MD.C.6 Measure angles in whole-number degrees using a protractor. **Science** 4-PS 3-2 Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

Integration	Just as students select a protractor to measure angles accurately, they also learn to choose appropriate software to support their work. For instance, a student collecting and analyzing angle measurements in mathematics or experiment results in science might use a digital spreadsheet instead of paper to organize data and perform calculations more efficiently, demonstrating thoughtful software selection.

Standard	**E.CS.1C. Evaluate hardware and software types to meet users' needs in completing various computing tasks.** **Complexity Statement:** Determine the most appropriate hardware and software to accomplish a task when given a scenario. **Core Practices:** Collaborating Around Computing; Recognizing and Defining Computation Problems; Communicating about Computing
Connections	**Mathematics** 4.MP.5 Use appropriate tools strategically. **Science** 4-ESS3-1 Earth and Human Activity: Obtain and combine information to describe that energy and fuels are derived from renewable and non-renewable resources and how their uses affect the environment.
Integration	When solving mathematical problems, collecting data, or presenting research, students must evaluate which tools best meet the needs of the task. For example, a student researching renewable and non-renewable energy sources may choose presentation software over a physical project board to more easily organize, update, and share their findings — demonstrating strategic tool use and thoughtful evaluation of software options.

Standard	**E.CS.2A. Propose potential ways to address computing problems using appropriate hardware or software.** **Complexity Statement:** Describe the appropriate user response to correct a basic hardware or software error when given an error message. **Core Practices:** Collaborating Around Computing; Recognizing and Defining Computational Problems; Communicating about Computing
Connections	**Mathematics** 4.MP.1 Make sense of problems and persevere in solving them.

Integration	As students learn to make sense of problems and persevere in solving them, they also consider how different tools can support their solutions. For example, when encountering a computing problem, a student may propose using a specific app or device that best fits the task, showing how thoughtful problem-solving involves evaluating and selecting appropriate hardware or software.

Core Concept 2: Networks and the Internet (NI)

Overview

Computing systems typically do not operate in isolation. Networks connect computers to share information and resources and are integral to computer and data science. Networks enable critical communication for the computing systems that drive our economy and career sectors. The increased level of connectivity brought about by the internet provides fast and secure communication that facilitates innovation.

Elementary Standards for Core Concept 2: Networks and the Internet

Subconcepts and Core Practices	Elementary (K-5)
Subconcept 1: Hardware and Network Communication *Core Practices: Fostering responsible cyber citizenship; Collaborating around computing; Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing*	E.NI.1A. Explain how networks connect computers to other computing systems and the internet.
Subconcept 2: Cybersecurity *Core Practices: Fostering responsible cyber citizenship; Collaborating around computing; Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing*	E.NI.2A. Describe personally identifiable information (PII) and identify practices for when and where sharing PII is appropriate.
	E.NI.2B. Identify ways to maintain data security when using networks.

Complexity Statements

Core Concept 2: Networks and the Internet

Complexity statements for the standards included in **Core Concept 2: Networks and the Internet** break down each standard into manageable, age-appropriate components. This breakdown ensures that instruction fits the developmental needs of students at each grade level. For instance, kindergarten focuses on defining basic network concepts and distinguishing between public and private information. By grade 5, students diagram network interactions and analyze the complexities of data sharing across networks, including the importance of responsible online behavior and security practices.

E.NI.1A. Explain how networks connect computers to other computing systems and the internet.	
Grade	**Complexity Statement**
K	Define what a network is and how it is used to connect to other people and places around the world.
1	Compare and contrast wireless versus plugged-in networks.
2	Model and describe how computers break down data to share on networks.
3	Explain how data is transmitted in packets.
4	**Create a model depicting how information is shared within a network.**
5	Diagram and summarize how data can be shared between multiple networks and users via the Internet.

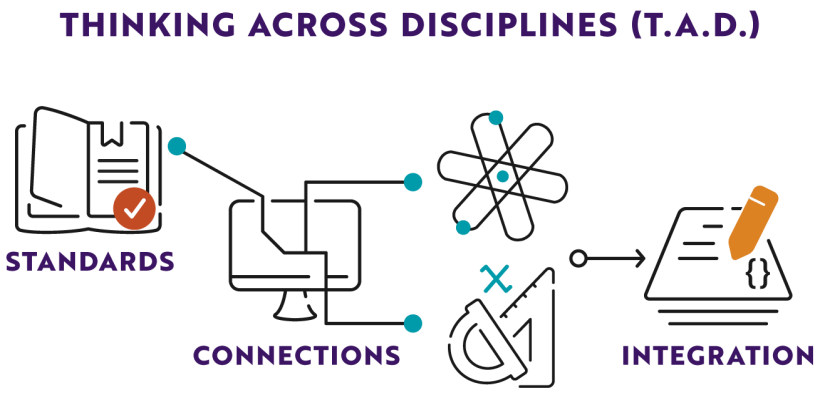
E.NI.2A. Describe personally identifiable information (PII) and identify practices for when and where sharing PII is appropriate.	
Grade	**Complexity Statement**
K	Distinguish between public and private information.
1	Define personally identifiable information (PII).
2	Evaluate the risks and benefits of sharing PII.
3	Evaluate mechanisms of password generation and best practices for password management.
4	**Describe the role of authentication and authorization.**

E.NI.2A. Describe personally identifiable information (PII) and identify practices for when and where sharing PII is appropriate.	
Grade	**Complexity Statement**
5	Identify and determine the appropriate resources and individuals to notify if PII is inappropriately shared.

E.NI.2B. Identify ways to maintain data security when using networks.	
Grade	**Complexity Statement**
K	Describe how usernames and passwords protect information and network access.
1	Distinguish between the six top-level domains and describe what information they share.
2	Identify and classify a network as secure or insecure in a given scenario.
3	Identify and assess when an email is a phishing attempt within the examples.
4	**Explain what antivirus software is and how it protects a user, network, and data sharing.**
5	Explain the ways a student can protect their home and school networks.

Thinking Across Disciplines in Grade 4

Core Concept 2: Networks and the Internet



The standards in **Core Concept 2: Networks and the Internet** develop an understanding of how networks connect computers to the Internet and other computing systems, along with safe practices for sharing personally identifiable information. These skills are tied to concepts teachers already address in their classrooms.

- **Obtaining, evaluating, and communicating information** is an interdisciplinary skill. Understanding how information is transmitted through a network safely strengthens the ability to obtain, evaluate, and communicate information electronically.
- Explaining safe practices for sharing personally identifiable information on a network requires **critical thinking** to evaluate what information is appropriate to share, when to share it, and how to do so responsibly. This decision-making process supports the development of responsible technology use.
- Maintaining data security when using networks involves recognizing common risks and applying strategies to protect sensitive information. Practicing data protection builds **digital responsibility** and supports safer online interactions.

T.A.D. Examples

Standard	**E.NI.1A. Explain how networks connect computers to other computing systems and the internet.** **Complexity Statement:** Create a model depicting how information is shared within a network. **Core Practices:** Fostering responsible cyber citizenship; Collaborating around computing; Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing
Connections	**Science** 4-PS3-2 Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. **Science** 4-PS3-1 Use evidence to construct an explanation relating the speed of an object to the energy of that object.
Integration	As students explore how energy transfers through light, heat, sound, or electricity, they can model how networks transfer information using similar principles. For example, students might send messages through a simple circuit acting as a network, observing how energy flows from a sender to a receiver. They can then compare this to how data moves through computing networks — faster speeds requiring more energy — drawing parallels between physical energy transfer and digital communication systems.

Standard	**E.NI.2A. Describe personally identifiable information (PII) and identify practices for when and where sharing PII is appropriate.** **Complexity Statement:** Describe the role of authentication and authorization. **Core Practices:** Fostering responsible cyber citizenship; Collaborating around computing; Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing
Connections	**Mathematics** 4.OA.B.4A Using whole numbers in the range 1-100, find all factor pairs for a given whole number.

Integration	When finding factor pairs for whole numbers, students may complete and share a digital worksheet using a login system. This process involves authentication (logging in with a username and password) and authorization (granting a classmate access to review their work). Through this activity, students experience how protecting personally identifiable information and managing access are part of responsible digital practices.

Standard	**E.NI.2B. Identify ways to maintain data security when using networks.** **Complexity Statement:** Explain what antivirus software is and how it protects a user, network, and data sharing. **Core Practices:** Fostering responsible cyber citizenship; Collaborating around computing; Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing
Connections	**Science** Science & Engineering Practices 1: Asking questions and defining problems
Integration	Just as students ask questions about how to prevent the spread of germs, they can explore how antivirus software protects computers and networks from digital threats. While using technology, students can discuss how tools like antivirus programs help maintain data security — drawing parallels between protecting human health and protecting digital information.

Core Concept 3: Data and Analysis (DA)

Overview

Computing systems function by processing and storing data. Data is abundant due to the growing number of connected devices worldwide. As the volume of data expands, so does the demand for accurate and efficient data analysis methods. Data science is the cross-disciplinary use of data to inform decision-making, test hypotheses, predict trends, and develop precise models that drive innovation across industries.

Elementary Standards for Core Concept 3: Data and Analysis

Subconcepts and Core Practices	Elementary (K-5)
Subconcept 1: Data Representation *Core Practices: Collaborating around computing; Recognizing and defining computational problems; Creating computational artifacts*	E.DA.1A. Organize and present data visually to highlight relationships and support claims.
	E.DA.1B. Classify types of data and describe the attributes used to sort data.
Subconcept 2: Data Collection *Core Practices: Fostering responsible cyber citizenship; Collaborating around computing; Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing*	E.DA.2A. Select the appropriate data collection tool and technique to gather data to support a claim or communicate information.
	E.DA.2B. Describe and collect data utilizing the appropriate units of measure and discuss how data format impacts a computing system.
Subconcept 3: Data Storage *Core Practices: Fostering responsible cyber citizenship; Collaborating around computing; Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing*	E.DA.3A. Compare and contrast ways to store data using technology.
	E.DA.3B. Explain how to save and name data, search for data, retrieve data, modify data, and delete data using a computing device.
Subconcept 4: Visualizations and Transformations *Core Practices: Creating computational artifacts; Communicating about computing*	E.DA.4A. Organize and present data visually in at least three ways to highlight relationships and evaluate a claim.

	E.DA.4B. Evaluate data quality and clean data when indicated using the criteria of validity, accuracy, completeness, consistency, and uniformity.
Subconcept 5: Inference and Models *Core Practices: Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing*	E.DA.5A. Utilize data to create models, answer investigative questions, and make predictions.
	E.DA.5B. Analyze data for patterns and relationships.

Complexity Statements

Core Concept 3: Data and Analysis

Complexity statements for the standards included in **Core Concept 3: Data and Analysis** break down each standard into manageable, age-appropriate components. This breakdown ensures that instruction fits the developmental needs of students at each grade level. For instance, in kindergarten, the focus is on classifying and counting data into simple categories, while by grade 5, students analyze multiple types of data to support claims, compare different datasets for accuracy, and generate appropriate computational visualizations to explain their findings.

E.DA.1A. Organize and present data visually to highlight relationships and support claims.	
Grade	**Complexity Statement**
K	Sort objects into given categories based on attributes. Determine the total count for each category and enter counts into a data table on the computer with teacher support.
1	Organize, represent, and interpret data with up to three categories based on common attributes using computational tools
2	Create bar graphs (with single-unit scale) to represent a data set with up to four categories using computational tools.
3	Create scaled bar graphs representing a data set with more than four categories using computational tools
4	**Compare computationally generated graphs (e.g., bar and pie) to their corresponding data tables to validate their accuracy.**
5	Generate line graphs from data that is collected and entered into data tables to support claims using computational tools.

E.DA.1B. Classify types of data and describe the attributes used to sort data.	
Grade	**Complexity Statement**
K	Explain what the term data means and give examples.
1	Select the appropriate type of data to support or disprove a claim.
2	Define and describe digital, non-digital, numerical, text-based, audio, visual, and video data types.

E.DA.1B. Classify types of data and describe the attributes used to sort data.	
Grade	**Complexity Statement**
3	Evaluate the tradeoffs of using one data type over another to support or refute a given claim.
4	**Analyze two or more types of data to support or disprove a claim.**
5	Identify specific types of data, such as metadata, and explain what the information means, including its application.

E.DA.2A. Select the appropriate data collection tool and technique to gather data to support a claim or communicate information.	
Grade	**Complexity Statement**
K	Collect and organize data computationally in a table or chart with support.
1	Identify and use the appropriate digital tool (e.g., thermometer, scale, probe) to collect various data computationally in tables or charts with support.
2	Collect and compile data computationally to evaluate a claim's validity.
3	Create and implement practices for collecting valid and accurate data using a data-gathering tool.
4	**Compare and contrast various data sets collected for accuracy and describe potential sources of instrumentation error.**
5	Compare and contrast data sets collected from two or more instruments and use the data to support a claim.

E.DA.2B. Describe and collect data utilizing the appropriate units of measure and discuss how data format impacts a computing system.	
Grade	**Complexity Statement**
K	Define and describe various measurable attributes of objects and practice comparing two or more objects with a common attribute.
1	Generate measurement data by measuring the lengths of various objects, then record the data computationally with units of support.

E.DA.2B. Describe and collect data utilizing the appropriate units of measure and discuss how data format impacts a computing system.	
Grade	**Complexity Statement**
2	Sort data within tables based on their units of measure from various sources and tools.
3	Describe how user errors in data entry can change or alter the computing system outputs, with examples of impacts on real-world business problems.
4	**Practice entering data in fraction and decimal format using computational tools. Compare and contrast fraction and decimal notations in computing for accuracy.**
5	Convert among different-sized standard measurement units within a given measurement system, and explain why the data entry format can impact how a computing program can access the use of data.

E.DA.3A. Compare and contrast ways to store data using technology.	
Grade	**Complexity Statement**
K	Apply the process to save a data file in a computing system.
1	Apply the process of saving and naming a computational data file on an external storage device.
2	Describe the cybersecurity risks of using external data storage devices with a computing system.
3	Explain what cloud data storage is and compare it to external storage devices.
4	**Explain and apply the appropriate data units (e.g., bits, bytes, kilobytes, megabytes, gigabytes, terabytes) to numerical quantities of data.**
5	Compare and contrast the storage size capacity for computational storage devices and select the appropriate format for given tasks.

E.DA.3B. Explain how to save and name data, search for data, retrieve data, modify data, and delete data using a computing device.	
Grade	**Complexity Statement**
K	Locate and open a data file on a computing system.

E.DA.3B. Explain how to save and name data, search for data, retrieve data, modify data, and delete data using a computing device.	
Grade	**Complexity Statement**
1	Locate the proper computing application and create a new file.
2	Explain how to delete a file and return or recover the file if accidentally deleted.
3	Design and apply a file naming structure to organize computational data for sharing with others so they can use and locate the files.
4	**Modify the names of files and describe why file naming is connected to function in school or workplace settings.**
5	Compare and contrast the uses and data stored on the file types: JPEG, GIF, PDG, DOC, or DOCX, XLS, or DLSX, PPT or PPTX, MP3, and WAV.

E.DA.4A. Organize and present data visually in at least three ways to highlight relationships and evaluate a claim.	
Grade	**Complexity Statement**
K	Describe patterns of similarity to organize data into countable amounts and record them in a computational data tool.
1	Generate numerical predictions (based on prior experiences) and compare them with data collected from a tool (observed data) in a computational table and on bar graphs.
2	Collect data and record it in a computational table. Use the table to generate a bar graph and a pie graph. Utilize the three data visualizations to evaluate a claim.
3	Create a computational data table using data visualizations (e.g., graphs or pie charts) from multiple data collection events on the same phenomenon. Analyze newly created data tables for patterns and hypothesize what they mean for the phenomenon.
4	**Collect and use data to generate the appropriate computational visualizations (e.g., data table, bar, pie, line graph) to explain a hypothesis.**
5	Collect at least five data sets and use computational tools to create visualizations. Compare and contrast visualizations, findings, and conclusions with those of peers.

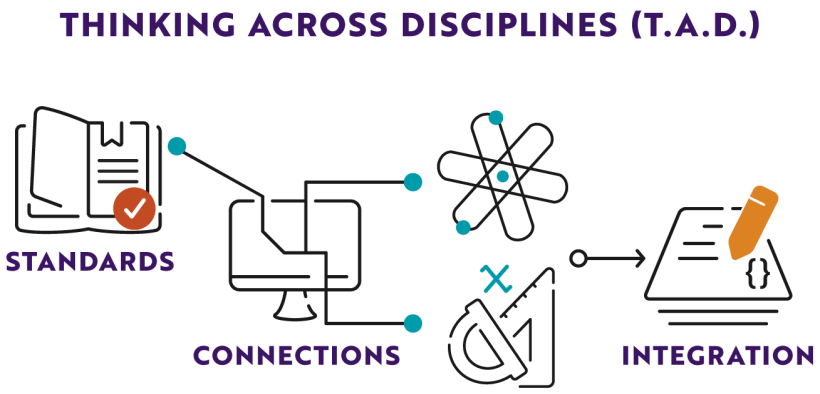
E.DA.4B. Evaluate data quality and clean data when indicated using the criteria of validity, accuracy, completeness, consistency, and uniformity.	
Grade	**Complexity Statement**
K	Recognize data used to determine valid groupings.
1	Recognize the need for consistency and completeness when evaluating data.
2	Propose and design a protocol for collecting data, ensuring that it is valid, consistently measured, and complete.
3	Measure and estimate liquid volumes and masses of objects using standard units of grams, kilograms, and liters, and record the data computationally.
4	**Sort and analyze a given data set containing various units and decimals for accuracy using computational tools. Explain and justify data conversions or strategies.**
5	Evaluate a data set, within the constraints of a scenario, for the criteria of validity, accuracy, completeness, consistency, and uniformity. Explain any issues with the data set and propose corrections.

E.DA.5A. Utilize data to create models, answer investigative questions, and make predictions.	
Grade	**Complexity Statement**
K	Use computational tools to create and describe shapes.
1	Use computational tools to create partitions of circles and rectangles into two and four equal shares. Understand that decomposing into more equal shares creates smaller ones.
2	Plan and create a computational artifact to illustrate thoughts, ideas, and problems in a sequential (step-by-step) manner.
3	Use a computational data artifact to make predictions and judge if there is enough data to support a claim.
4	**Recreate sample shapes computationally, and classify two-dimensional shapes based on the presence or absence of parallel or perpendicular lines or the presence or absence of angles of a specified size. Draw a line and test if symmetry is possible for each figure.**
5	Represent real-world and mathematical problems by creating a data table and graphing points in the first quadrant of the coordinate plane using computational tools. Interpret coordinate values of points in the context of the situation or examining a statement for validity.

E.DA.5B. Analyze data for patterns and relationships.	
Grade	**Complexity Statement**
K	Classify and count objects into given observable categories, then use a computational data table to record data.
1	Organize, represent, and interpret data with up to three categories, then ask and answer questions about the data.
2	Create a square or rectangular geometric shape using a repeat function using block-based code. Explain the relationship between adding more or less than four repeats and the picture's outcome.
3	Create computational addition or multiplication tables and identify arithmetic patterns. Apply the patterns identified to predict the next three outcomes.
4	**Generate a number pattern that follows a given code rule using block-based coding.**
5	Generate numerical patterns based on rules using block-based code. Identify relationships between terms and use computational tools to create a table and graph of the resulting ordered pairs.

Thinking Across Disciplines in Grade 4

Core Concept 3: Data and Analysis



The standards in **Core Concept 3: Data and Analysis** focus on collecting and representing digital data, understanding how data is stored, and creating and analyzing computational data for pattern recognition. These skills are closely tied to concepts teachers already address in their classrooms.

- Organizing and representing data visually in different formats strengthens the ability to **highlight relationships and support conclusions**. This skill enhances communication and interpretation of complex information.
- Drawing conclusions based on evidence depends on understanding various data types and using data to make and support claims. Strengthening this skill supports **evidence-based reasoning**.
- Classifying data and choosing appropriate collection methods support accurate analysis and deepen understanding of content. These practices promote **thoughtful data use** in scientific investigations, social research, math applications, and more.
- Analyzing digital data for patterns and relationships enhances **informational literacy** by reinforcing the ability to locate, use, and evaluate data effectively. This skill develops **critical thinking** and reasoning abilities necessary for making predictions, constructing explanations, and creating models, supporting inquiry and problem-solving processes.

T.A.D. Examples

Standard	**E.DA.1A. Organize and present data visually to highlight relationships and support claims.** **Complexity Statement:** Compare computationally generated graphs (e.g., bar and pie) to their corresponding data tables to validate their accuracy. **Core Practices:** Collaborating around computing; Recognizing and defining computational problems; Creating computational artifacts
Connections	**Science** 4-ESS2-2 Analyze and interpret data from maps to describe patterns of Earth's features.
Integration	As students analyze data from maps to identify patterns in Earth's features, they can use digital tools to organize and present the information visually. For example, a student might compare a data table to a graph created from that same data to better highlight patterns, which reinforces how visual representations can support scientific claims and deepen data analysis.

Standard	**E.DA.1B. Classify types of data and describe the attributes used to sort data.** **Complexity Statement:** Analyze two or more types of data to support or disprove a claim. **Core Practices:** Collaborating around computing; Recognizing and defining computational problems; Creating computational artifacts
Connections	**Science** 4-ESS2-1 Plan and conduct investigations on the effects of water, ice, wind, and vegetation on the relative rate of weathering and erosion.
Integration	As students investigate the effects of water, ice, wind, and vegetation on weathering and erosion, they can classify and use multiple types of data (such as numerical measurements and written observations) to support or challenge a claim. This reinforces the importance of recognizing data types and sorting them by relevant attributes to strengthen scientific reasoning.

Standard	**E.DA.2A. Select the appropriate data collection tool and technique to gather data to support a claim or communicate information.** **Complexity Statement:** Compare and contrast various data sets collected for accuracy and describe potential sources of instrumentation error. **Core Practices:** Fostering responsible cyber citizenship; Collaborating around computing; Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing
Connections	**Science** Science & Engineering Practices 4: Analyzing and interpreting data
Integration	When analyzing and interpreting data, students learn to recognize possible causes of inaccuracy, such as outliers from instrumentation error. For example, while reviewing measurements from scientific tools, students can evaluate which data collection methods were used and determine whether the tools or techniques selected were appropriate, reinforcing the connection between accurate data gathering and reliable analysis.

Standard	**E.DA.2B. Describe and collect data utilizing the appropriate units of measure and discuss how data format impacts a computing system.** **Complexity Statement:** Practice entering data in fraction and decimal format using computational tools. Compare and contrast fraction and decimal notations in computing for accuracy. **Core Practices:** Fostering responsible cyber citizenship; Collaborating around computing; Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing
Connections	**Mathematics** 4.NF.C Understand decimal notation for fractions, and compare decimal fractions.
Integration	Grade 4 students solve problems involving measurement and convert fractions into decimal forms. These skills can be used to enter data in decimal notation. For example, they might measure objects and enter lengths using both fraction and decimal notation, recognizing how choosing different data formats affects how computing systems store and process information.

Standard	**E.DA.3A. Compare and contrast ways to store data using technology.** **Complexity Statement:** Explain and apply the appropriate data units (e.g., bits, bytes, kilobytes, megabytes, gigabytes, terabytes) to numerical quantities of data. **Core Practices:** Fostering responsible cyber citizenship; Collaborating around computing; Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing
Connections	**Mathematics** 4.OA.A.3 Solve multi-step word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. *Example: Twenty-five people are going to the movies. Four people fit in each car. How many cars are needed to get all 25 people to the theater at the same time?*
Integration	Students apply multi-step problem-solving skills to understand data storage units and capacities. For example, when calculating if John has enough computer storage for a 24-megabyte file, students use operations and estimation to determine how much additional space is needed, while also comparing different data storage methods and units to deepen their understanding of digital information.

Standard	**E.DA.3B. Explain how to save and name data, search for data, retrieve data, modify data, and delete data using a computing device.** **Complexity Statement:** Modify the names of files and describe why file naming is connected to function in school or workplace settings. **Core Practices:** Fostering responsible cyber citizenship; Collaborating around computing; Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing
Connections	**Science** 4-PS3-1 Use evidence to construct an explanation relating the speed of an object to the energy of that object.
Integration	When constructing explanations about how an object's speed relates to its energy, students practice organizing their work by saving digital files with clear, relevant names. For example, naming a document "LastName_FirstName_SpeedEnergyExplanation" helps students efficiently locate and manage their data, reinforcing good digital habits alongside scientific inquiry.

Standard	**E.DA.4A. Organize and present data visually in at least three ways to highlight relationships and evaluate a claim.** **Complexity Statement:** Collect and use data to generate the appropriate computational visualizations (e.g., data table, bar, pie, line graph) to explain a hypothesis. **Core Practices:** Creating computational artifacts; Communicating about computing
Connections	**Science** Science & Engineering Practices 4: Analyzing and interpreting data
Integration	Collecting and interpreting data supports effective communication. Students can select from various computational tools (such as word processors, spreadsheets, or online graphing platforms) to organize and present data visually in multiple formats, enhancing their ability to highlight relationships and evaluate scientific claims.

Standard	**E.DA.4B. Evaluate data quality and clean data when indicated using the criteria of validity, accuracy, completeness, consistency, and uniformity.** **Complexity Statement:** Sort and analyze a given data set containing various units and decimals for accuracy using computational tools. Explain and justify data conversions or strategies. **Core Practices:** Creating computational artifacts; Communicating about computing
Connections	**Mathematics** 4.MD.A Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.
Integration	Converting measurements from larger to smaller units can be done computationally to analyze the data. Students solve measurement conversion problems by entering data into digital tools such as spreadsheets or forms. They then sort and review the data to evaluate its quality by checking for accuracy and consistency, and make corrections as needed. This process reinforces both math skills and data management practices.

Standard	**E.DA.5A. Utilize data to create models, answer investigative questions, and make predictions.** **Complexity Statement:** Recreate sample shapes computationally, and classify two-dimensional shapes based on the presence or absence of parallel or perpendicular lines or the presence or absence of angles of a specified size. Draw a line and test if symmetry is possible for each figure. **Core Practices:** Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing
Connections	**Mathematics** 4.G.A.2 Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.
Integration	Students use block-based coding platforms to create two-dimensional figures such as right triangles and parallelograms by programming the angles and lines. They can then review each other's code to predict and classify shapes based on properties like parallel or perpendicular lines and specific angle measures, combining geometric reasoning with computational modeling.

Standard	**E.DA.5B. Analyze data for patterns and relationships.** **Complexity Statement:** Generate a number pattern that follows a given code rule using block-based coding. **Core Practices:** Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing
Connections	**Science** 4-PS3-1 Use evidence to construct an explanation relating the speed of an object to the energy of that object.
Integration	Students use block-based coding platforms to create animations that illustrate the relationship between an object's speed and its energy. For example, they can program moving objects whose speed changes, accompanied by visual indicators such as a speedometer or energy bar that grows with increased speed. This activity helps students analyze patterns and relationships between speed and energy through computational modeling.

Core Concept 4: Algorithms and Programming (AP)

Overview

An algorithm is a sequence of steps designed to accomplish a specific task. Algorithms are translated into programs, or code, to provide instructions for computing systems. Algorithms and programs control all computing systems, empowering people to communicate with the world in novel ways and solve compelling problems. The development process to create meaningful and efficient programs involves choosing which information to use, how to process the data, and how to store the information. The decomposition of more significant problems into simpler ones, combined with recombining existing solutions and analyzing various solutions, helps determine the most appropriate solution to a problem.

Elementary Standards for Core Concept 4: Algorithms and Programming

Subconcepts and Core Practices	Elementary (K-5)
Subconcept 1: Variables and Algorithms *Core Practices: Collaborating around computing; Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing*	E.AP.1A. Create clearly named variables representing different data types and perform operations on the variables' values.
	E.AP.1B. Create, use, and apply an algorithm to complete a task. Compare the results of algorithm usage trials and refine the algorithm.
Subconcept 2: Control Structures *Core Practices: Collaborating around computing; Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing*	E.AP.2A. Define what a control structure is and create programs that include sequences, conditionals, events, and loops.
Subconcept 3: Modularity *Core Practices: Collaborating around computing; Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing*	E.AP.3A. Define and apply decomposition to a complex problem in order to create smaller subproblems that can be solved through step-by-step instructions.
	E.AP.3B. Modify, remix, or incorporate parts of an existing problem's solution to develop something new or add more advanced features to a program.

Subconcept 4: Program Development *Core Practices: Fostering responsible cyber citizenship; Collaborating around computing; Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing*	E.AP.4A. Create a simple program to achieve a goal with expected outcomes.
	E.AP.4B. Test and debug a program or algorithm to ensure the program produces the intended outcome.
	E.AP.4C. Collaborate with a team of peers to design, implement, test, and review the stages of program development.
	E.AP.4D. Identify intellectual property rights and apply the appropriate attribution when creating or remixing programs.
	E.AP.4E. Describe and justify the steps taken and choices made during a program's development.
	E.AP.4F. Using an iterative process, test a program step-by-step and document areas of refinement.

Complexity Statements

Core Concept 4: Algorithms and Programming

Complexity statements for the standards included in **Core Concept 4: Algorithms and Programming** break down each standard into manageable, age-appropriate components. This breakdown ensures that instruction fits the developmental needs of students at each grade level. For instance, in kindergarten, the focus is on creating simple step-by-step plans and understanding basic sequencing, while by grade 5, students create efficient algorithms by structuring repeated actions, decomposing complex tasks into manageable steps, and designing multi-step programs using block-based coding to create animations or solve problems with various constraints.

E.AP.1A. Create clearly named variables representing different data types and perform operations on the variables' values.

Grade	Complexity Statement
K	Count and group items under broad categorical (variable) names.
1	Understand subtraction as an unknown-addend problem.
2	Use addition and subtraction to solve word problems involving situations of adding to, taking from, putting together, taking apart and comparing, with unknowns in all positions.
3	Solve real-world problems involving perimeters of polygons, including finding the perimeter given the side lengths and finding an unknown side length.
4	**Use the area and perimeter formulas to write math sentences for rectangles in real-world and mathematical problems with variables used to represent unknown factors.**
5	Represent unknown quantities in equations with a letter. Define what a variable is and why a letter can be utilized as a placeholder or representative of the numerical value.

E.AP.1B. Create, use, and apply an algorithm to complete a task. Compare the results of algorithm usage trials and refine the algorithm.

Grade	Complexity Statement
K	Create an algorithm with set step-by-step stages to complete a task.
1	Apply the properties of operations to add and subtract.
2	Identify the various ways groups are formed, draw arrays, and create math sentences.

E.AP.1B. Create, use, and apply an algorithm to complete a task. Compare the results of algorithm usage trials and refine the algorithm.	
Grade	**Complexity Statement**
3	Solve problems involving the four operations, and identify and explain patterns in arithmetic.
4	**Develop and refine algorithms to solve multi-step word problems involving only whole numbers. Represent the unknown quantity with a letter.**
5	Create efficient algorithms by structuring repeated actions using parentheses or brackets and optimizing lengthy instructions into simpler equations using multiplication, addition, and subtraction.

E.AP.2A. Define what a control structure is and create programs that include sequences, conditionals, events, and loops.	
Grade	**Complexity Statement**
K	Code a character or robot using block-based programming to follow a teacher-specified path with simple instructions. Explain the function of each command.
1	Code a character or robot using block-based programming to follow a teacher-specified sequence of multi-step instructions that include stops, starts, and turns. Define control structure and give examples.
2	Code a character or robot using block-based programming to make the figure move using loops for iteration. Define and explain the control structures.
3	Code a character or robot using block-based programming to make the figure move based on conditionals. Define and explain conditionals.
4	**Code a character or robot using block-based programming to make the figure move using different control structures to achieve a teacher-specified, complex task. Compare and contrast the control structures.**
5	Use block-based coding to create a solution to a complex task. Test and compare the solution and use of control structures with peers for efficiency.

E.AP.3A. Define and apply decomposition to a complex problem in order to create smaller subproblems that can be solved through step-by-step instructions.	
Grade	**Complexity Statement**
K	Divide a task into smaller parts with teacher assistance. Identify the steps to solve the smaller parts.
1	Define decomposition and apply it to fact, families (e.g., given three numbers, students explore the four ways to write them to achieve correct addition and subtraction questions). Explain thinking.
2	Apply the decomposing and composing subtraction strategy to work with three-digit numbers.
3	Diagram and determine the appropriate steps to achieve a mathematical solution to a multi-step word problem.
4	**Compare color bar models, addends, unit fraction addition formulas, and number bond charts to decompose fractions and explain the reasoning for each model.**
5	Decompose and create steps for solving complex problems that address various constraints such as cost, efficiency, length of time, number of people needed, etc.

E.AP.3B. Modify, remix, or incorporate parts of an existing problem's solution to develop something new or add more advanced features to a program.	
Grade	**Complexity Statement**
K	Practice analytical and sequential reasoning by reconstructing a process from out-of-order images. After sequencing, justify the arrangement to peers. Reconstruct the correct sequence of the images illustrating a process, then justify the arrangement to peers.
1	Code a character or robot using block-based programming to make the figure move using stops, starts, and turns. Reorganize the steps to make the figure return to its starting point.
2	Diagram and code multi-step word problems using block-based programming to move a figure or robot.
3	Collaborate to design and implement a step-by-step plan for completing a task. Exchange plans, test, and provide feedback to peers to refine the plan.
4	**Design a step-by-step plan (algorithm) to draw a polygon. Collaborate with peers to combine and improve these plans, then modify the best plan to create different polygons.**

E.AP.3B. Modify, remix, or incorporate parts of an existing problem's solution to develop something new or add more advanced features to a program.	
Grade	**Complexity Statement**
5	Modify pre-existing code by decomposing and identifying reusable parts to develop something new or add more advanced features.

E.AP.4A. Create a simple program to achieve a goal with expected outcomes.	
Grade	**Complexity Statement**
K	Create a step-by-step plan using pictures.
1	Sort and organize the appropriate written steps to solve the problem when given a scenario.
2	Create written steps to solve the problem in a given scenario with minimal prompting from the teacher.
3	Collaborate to propose solutions for each stage of a multi-stage problem or scenario.
4	**Collaborate to code solutions for each stage of a multi-stage problem or scenario.**
5	Create and propose a program to solve a problem with expected outcomes.

E.AP.4B. Test and debug a program or algorithm to ensure the program produces the intended outcome.	
Grade	**Complexity Statement**
K	Identify the errors and propose fixes to a process modeled by pictures with guidance from the teacher.
1	Test multistep, block-based code intended to make a figure or robot move in a specified sequence, but contains flaws. Debug the code and work towards achieving the intended outcome.
2	Test multi-step, block-based code intended to make a figure or robot move, but contains flawed loops. Work with a partner to debug, test, and explain how to correct the loops.
3	Test a multi-step, block-based code intended to make a figure or robot move, but contains flawed conditionals. Work with a partner to debug, test, and explain how to correct the conditionals.

E.AP.4B. Test and debug a program or algorithm to ensure the program produces the intended outcome.	
Grade	**Complexity Statement**
4	**Test block-based code that includes multi-step instructions and flawed control structures to make a figure move. With a partner, debug the code to explain how to properly correct this control structure, then test the program.**
5	Create and test a solution to a complex task using block-based coding. Then modify the code to include up to four (documented) errors. Then trade programs with a peer. Test and debug the code. Identify and explain any challenges.

E.AP.4C. Collaborate with a team of peers to design, implement, test, and review the stages of program development.	
Grade	**Complexity Statement**
K	Define what a programmer is and apply what they do by modeling the creation of a simple step-by-step program to accomplish a task.
1	Collaborate to complete an outcome-driven coding task following the steps of planning, designing, and testing to a simple code sequence using block-based coding or written steps.
2	Decompose a problem and propose a solution by creating a flowchart. Use the flowchart as a model to code the solution.
3	Collaborate with peers to test and debug. Once complete, write a story that provides an overview of the code's function and how to resolve errors.
4	**Summarize the functions of an existing program's code.**
5	Document the stages of the program development process while creating a coded solution to a scenario.

E.AP.4D. Identify intellectual property rights and apply the appropriate attribution when creating or remixing programs.	
Grade	**Complexity Statement**
K	Model and discuss when students should ask permission to use an item belonging to someone else to establish the meaning of ownership and appropriate sharing.

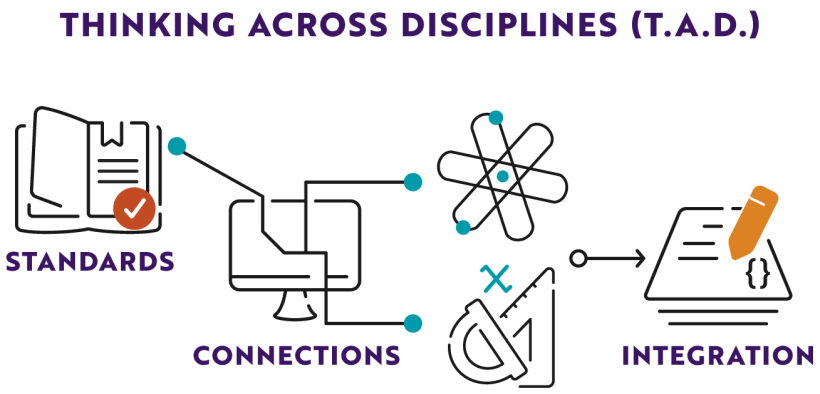
E.AP.4D. Identify intellectual property rights and apply the appropriate attribution when creating or remixing programs.	
Grade	**Complexity Statement**
1	Define digital ownership with teacher guidance. Identify common intellectual property symbols and text for copyright, patent, and trademark.
2	Define and identify examples of attribution, plagiarism, and piracy in computing and digital media visuals.
3	Analyze examples of plagiarism, copyright infringement, piracy, trademark infringement, and patent violation. Determine if inappropriate use has occurred and why.
4	**Define and describe the public domain. Research and explain the consequences for violating attribution laws.**
5	Define and model appropriate attribution for using another programmer's code by sharing code with peers and following appropriate attribution guidelines.

E.AP.4E. Describe and justify the steps taken and choices made during a program's development.	
Grade	**Complexity Statement**
K	Sequence steps to a familiar process using images and collaboratively discuss the reasoning behind the chosen order.
1	Draw and create the steps of a familiar process. Exchange work with a peer and add additional step drawings on sticky notes to the author's work. Justify the changes made to the original sequence.
2	Compare and contrast the steps of solving a math problem or doing a science lab with the steps of coding. Explain the choices made in each situation and how they can impact the task.
3	Create a group presentation on how to modify erroneous code to debug a program.
4	**Define commenting on code with examples. Using a program that has multiple errors (printed on paper), annotate changes or suggestions to debug the code on the margins of the paper.**
5	Define clarity in written comments for other programmers. Given several examples and non-examples of annotated code, test each and provide written feedback on the effectiveness of the annotations.

E.AP.4F. Using an iterative process, test a program step-by-step and document areas of refinement.	
Grade	**Complexity Statement**
K	Examine a process that is lengthy and capable of being shortened with teacher guidance. Identify which parts can be removed to shorten the process and still attain the objective.
1	Define and apply the term iterative process. Through multiple rounds of testing and refinement, collectively develop an optimized solution to a problem.
2	Using the iterative process, refine an error-filled code in groups. Document the changes and compare the work with another set of peers. As a class, identify and describe similarities and differences in the strategies tried and why.
3	Partner to test and debug multi-step, block-based code containing flawed conditionals, loops, and sequences intended for a figure or robot movement, and complete a specified task. Explain modifications.
4	**Use common testing strategies to test and refine previously created student code. Target a specific area of improvement and justify modifications.**
5	Collaborate to iteratively improve a complex, multi-step program. Document all modifications and provide justification.

Thinking Across Disciplines in Grade 4

Core Concept 4: Algorithms and Programming



The standards included in **Core Concept 4: Algorithms and Programming** focus on the foundational programming skills, including creating and manipulating variables, designing and refining algorithms to solve tasks, and understanding control structures. These standards emphasize problem-solving through decomposition, writing, testing, debugging, and collaborating on programs while promoting ethical practices through proper attribution. These skills are closely tied to concepts teachers already address in their classrooms.

- Through decomposition, students break complex problems into smaller, manageable pieces solvable with step-by-step instructions, providing a practical context for practicing **problem-solving skills**. Additionally, using an iterative approach to test, refine, and improve solutions cultivates persistence and adaptability in problem-solving.
- When working with a team of peers, students build **collaboration skills** that support academic growth as well as social and emotional development. The collaborative development of solutions enhances collective creativity. Using the work of others and respecting intellectual property supports academic integrity in creating and modifying work.
- **Computational thinking** is a way of expressing solutions to problems as steps that can be carried out. Just as computers need step-by-step instructions to process information, humans use similar processes to complete tasks.

T.A.D. Examples

Standard	**E.AP.1A. Create clearly named variables representing different data types and perform operations on the variables' values.** **Complexity Statement:** Use the area and perimeter formulas to write math sentences for rectangles in real-world and mathematical problems with variables used to represent unknown factors. **Core Practices:** Collaborating around computing; Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing
Connections	**Mathematics** 4.OA.A Use the four operations with whole numbers to solve problems.
Integration	A variable is often used where students need to "fill in the blank" with a number to solve a problem. Students use variables to represent unknown values when solving problems, such as finding "n" in the equation 7 × n = 35. In coding, they create clearly named variables to store data and perform operations, reinforcing how variables function both in math and programming contexts.

Standard	**E.AP.1B. Create, use, and apply an algorithm to complete a task. Compare the results of algorithm usage trials and refine the algorithm.** **Complexity Statement:** Develop and refine algorithms to solve multi-step word problems involving only whole numbers. Represent the unknown quantity with a letter. **Core Practices:** Collaborating around computing; Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing
Connections	**Mathematics** 4.OA.A.3 Solve multi-step problems posed with whole numbers and having whole-numbers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies, including rounding.

Integration	Solving problems in both mathematics and computer science requires logical thinking and a structured approach. In the classroom, students solve multi-step math problems by outlining each step needed to reach a solution, using strategies such as equations, estimation, or mental math. In parallel, they apply the concept of algorithms in computer science by creating and following step-by-step instructions to complete tasks. After testing their approach, they compare results and refine their methods. This process helps reinforce problem-solving skills and supports the development of logical reasoning across both subjects.

Standard	**E.AP.2A. Define what a control structure is and create programs that include sequences, conditionals, events, and loops.** **Complexity Statement:** Code a character or robot using block-based programming to make the figure move using different control structures to achieve a teacher-specified, complex task. Compare and contrast the control structures. **Core Practices:** Collaborating around computing; Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing
Connections	**Mathematics** 4.G.A Draw and identify lines and angles, and classify shapes by properties of their lines and angles.
Integration	Combining geometry with programming helps students connect mathematical concepts to real-world applications of computer science. As students explore two-dimensional shapes, they can write algorithms to draw polygons and use a physical robot or an online simulation to visualize the path of the shape. For example, students create block-based code using loops to draw a square, reinforcing their understanding of equal angles and line lengths. This activity allows students to apply their knowledge of lines and angles while practicing control structures such as sequences, loops, and events in programming.

Standard	**E.AP.3A. Define and apply decomposition to a complex problem in order to create smaller subproblems that can be solved through step-by-step instructions.** **Complexity Statement:** Compare color bar models, addends, unit fraction addition formulas, and number bond charts to decompose fractions and explain the reasoning for each model. **Core Practices:** Collaborating around computing; Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing
Connections	**Mathematics** 4.NF.A Extend understanding of fraction equivalence and ordering.
Integration	Just as complex problems can be broken into smaller, manageable subproblems solved step-by-step (through a process known as decomposition), students use color bar models to decompose fractions. For example, they explore how different fractions combine or break down to form a whole or another fraction, applying problem decomposition skills from math and computer science.

Standard	**E.AP.3B. Modify, remix, or incorporate parts of an existing problem's solution to develop something new or add more advanced features to a program.** **Complexity Statement:** Design a step-by-step plan (algorithm) to draw a polygon. Collaborate with peers to combine and improve these plans, then modify the best plan to create different polygons. **Core Practices:** Collaborating around computing; Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing
Connections	**Mathematics** 4.G.A Draw and identify lines and angles, and classify shapes by properties of their lines and angles.
Integration	Creating a step-by-step plan (or algorithm) to draw polygons helps students and teachers identify understanding and address misconceptions. For example, students write algorithms to draw polygons, then collaborate to assess and modify these algorithms, remixing and enhancing solutions to create different shapes while applying geometric concepts of lines and angles.

Standard	**E.AP.4A. Create a simple program to achieve a goal with expected outcomes.** **Complexity Statement:** Collaborate to code solutions for each stage of a multi-stage problem or scenario. **Core Practices:** Fostering responsible cyber citizenship; Collaborating around computing; Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing
Connections	**Mathematics** 4.G.A Draw and identify lines and angles, and classify shapes by properties of their lines and angles.
Integration	Collaborating to propose solutions is an important skill used in each core content. As an example, students could collaborate to design a house using polygons, with each group coding a different part. After creating their shapes, they propose ways to combine the polygons into a complete house and provide peer feedback on each other's algorithms, developing problem-solving and programming skills alongside geometric understanding.

Standard	**E.AP.4B. Test and debug a program or algorithm to ensure the program produces the intended outcome.** **Complexity Statement:** Test block-based code that includes multi-step instructions and flawed control structures to make a figure move. With a partner, debug the code to explain how to properly correct this control structure, then test the program. **Core Practices:** Fostering responsible cyber citizenship; Collaborating around computing; Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing
Connections	**Mathematics** 4.OA.B.4.D Determine whether a given whole number is prime or composite.
Integration	As students begin learning about prime and composite numbers, they can apply this understanding in a coding context to reinforce both content areas. For example, students can analyze a block-based program designed to move a figure forward if the input is a prime number and backward if it is composite. When the figure does not move as expected, students investigate the code to identify logic or syntax errors. Through this process, they debug the algorithm, apply their knowledge of prime and composite numbers, and strengthen problem-solving and computational thinking skills.

Standard	**E.AP.4C. Collaborate with a team of peers to design, implement, test, and review the stages of program development.** **Complexity Statement:** Summarize the functions of an existing program's code. **Core Practices:** Fostering responsible cyber citizenship; Collaborating around computing; Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing
Connections	**Science** Science & Engineering Practices 1: Asking questions and defining problems
Integration	Most people have experienced a time when a device or software needed to be updated. If using computational devices in the classroom, chances are the device has needed to be updated. When devices or software require updates, students discuss how programmers review and improve programs by identifying problems and implementing fixes. This process parallels software updates and bug fixes on everyday devices like cell phones, illustrating the stages of program development and collaboration in problem-solving.

Standard	**E.AP.4D. Identify intellectual property rights and apply the appropriate attribution when creating or remixing programs.** **Complexity Statement:** Define and describe the public domain. Research and explain the consequences for violating attribution laws. **Core Practices:** Fostering responsible cyber citizenship; Collaborating around computing; Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing
Connections	**Science** Science & Engineering Practices 8: Obtaining, evaluating, and communicating information
Integration	Obtaining, evaluating, and communicating information from online sources is an important scientific skill. Students need to be able to research information, evaluate the validity of the information, and properly attribute the source of information. For example, students research topics using online sources, learning to evaluate the validity of information and distinguish between public domain and copyrighted content. They apply appropriate attribution when creating or remixing digital work, understanding intellectual property rights and the importance of giving proper credit.

Standard	**E.AP.4E. Describe and justify the steps taken and choices made during a program's development.** **Complexity Statement:** Define commenting on code with examples. Using a program that has multiple errors (printed on paper), annotate changes or suggestions to debug the code on the margins of the paper. **Core Practices:** Fostering responsible cyber citizenship; Collaborating around computing; Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing
Connections	**Mathematics** 4.G.A Draw and identify lines and angles, and classify shapes by properties of their lines and angles.
Integration	As students create code, it is important to be able to identify bugs (or errors) in the code and understand ways to correct the errors. An example is students reviewing block code intended to draw a square that contains errors. Using their understanding of angles and shape properties, they identify bugs, annotate corrections, and explain the reasoning behind their debugging process.

Standard	**E.AP.4F. Using an iterative process, test a program step-by-step and document areas of refinement.** **Complexity Statement:** Use common testing strategies to test and refine previously created student code. Target a specific area of improvement and justify modifications. **Core Practices:** Fostering responsible cyber citizenship; Collaborating around computing; Recognizing and defining computational problems; Developing and using abstractions; Creating computational artifacts; Testing and refining computational artifacts; Communicating about computing
Connections	**Mathematics** 4.G.A Draw and identify lines and angles, and classify shapes by properties of their lines and angles.
Integration	Designing a program is an ongoing, cyclical process that involves creating, testing, gathering feedback, and making refinements. In mathematics, as students work with block coding to create specific angles, they apply this iterative approach by testing their programs step-by-step. During testing, students document areas where the code could be improved and make adjustments, reinforcing their understanding of geometric concepts and programming practices simultaneously.

Core Concept 5: Impacts of Computing (IC)

Overview

The impacts of computing can be positive and negative, enabling innovation, communication, and access to information, while also raising concerns around ethics, privacy, and fairness. Individuals and communities not only shape computing systems through interactions, behaviors, industry practices, and laws, but are also shaped by interactions with computing systems. Computer and data science create new means of communication by accelerating information exchange and establishing cyberspace as a dynamic workspace for individuals.

Elementary Standards for Core Concept 5: Impacts of Computing

Subconcepts and Core Practices	Elementary (K-5)
Subconcept 1: Intellectual Achievements *Core Practices: Fostering responsible cyber citizenship; Collaborating around computing; Testing and refining computational artifacts; Communicating about computing*	E.IC.1A. Describe how computing has changed the ways people live and work.
Subconcept 2: Social Interaction *Core Practices: Fostering responsible cyber citizenship; Collaborating around computing; Testing and refining computational artifacts; Communicating about computing*	E.IC.2A. Identify and describe examples of appropriate versus inappropriate computer communications.
	E.IC.2B. Identify examples of cyberbullying with age-appropriate responses.
Subconcept 2: Laws, Safety, and Industry Practices *Core Practices: Fostering responsible cyber citizenship; Collaborating around computing; Testing and refining computational artifacts; Communicating about computing*	E.IC.3A. Explain how online actions have real-world consequences and that laws and rules may also apply online.
	E.IC.3B. Describe the safe versus unsafe uses of computing systems at age-appropriate levels.
	E.IC.3C. Explain how the school and school system's computing rules and policies keep students safe.

Complexity Statements

Core Concept 5: Impacts of Computing

Complexity statements for the standards under **Core Concept 5: Impacts of Computing** break down each standard into manageable, age-appropriate components. This breakdown ensures that instruction fits the developmental needs of students at each grade level. For instance, in kindergarten, the focus is on understanding basic computer usage rules and recognizing how computing systems are used daily. By grade 5, students describe modifications to increase usability and accessibility, explain age restrictions on digital communication, and model appropriate online behaviors and responses to issues like cyberbullying.

E.IC.1A. Describe how computing has changed the ways people live and work.	
Grade	**Complexity Statement**
K	List and describe ways that computing systems are used by students every day. With teacher guidance, identify how selected examples may decrease student workload.
1	Sketch or list all of the computing systems that are in the classroom and one other school location. In groups, collaboratively discuss how these systems and students interact.
2	Compare and contrast doing a task with and without computing systems (e.g., reading a story from a book versus on a digital screen) and discuss the pros and cons of the task completion each way.
3	Explain how an invention has changed through the addition of a computing system (e.g., electric power, a car, the telephone, or an airplane).
4	**Identify and describe a career that relies on technology.**
5	Describe the ways that computing systems can be modified to increase usability and accessibility.

E.IC.2A. Identify and describe examples of appropriate versus inappropriate computer communications.	
Grade	**Complexity Statement**
K	Discuss and model working respectfully and responsibly.
1	Explain when to and when not to share login information.
2	Create a class list of feedback comments that offer constructive feedback and practice using them in class.

E.IC.2A. Identify and describe examples of appropriate versus inappropriate computer communications.	
Grade	**Complexity Statement**
3	Collaborate as a group to design a digital presentation and have students point out, critique, and suggest feedback to peers via comments.
4	**Examine computational communication examples and identify where appropriate and inappropriate comments are made.**
5	Explain why certain digital communication applications are age-restricted.

E.IC.2B. Identify examples of cyberbullying with age-appropriate responses.	
Grade	**Complexity Statement**
K	Describe what cyberbullying is and who to tell if it happens.
1	Identify ways to respond to inappropriate cyber-communication.
2	Explain who bystanders, allies, and upstanders are with example scenarios.
3	Classify examples of online behaviors as either being cyberbullying or a normal part of the computing conversation.
4	**Explain what responsible digital citizenship is.**
5	Create presentations on what to do and who to contact if you are cyberbullied.

E.IC.3A. Explain how online actions have real-world consequences and that laws and rules may also apply online.	
Grade	**Complexity Statement**
K	Explain that there are rules for using computers in comparison to real-world classroom rules and examples.
1	Describe how making threats or using abusive language can lead to legal consequences.
2	Explain why it is not acceptable to purchase items online without the proper permissions.

E.IC.3A. Explain how online actions have real-world consequences and that laws and rules may also apply online.	
Grade	**Complexity Statement**
3	Define copyright and explain why permission is needed before using protected intellectual property such as images and digital media.
4	**Describe what unauthorized access is and how participating in it can lead to legal repercussions (e.g., hacking, jailbreaking phones, illegal sharing of copyrighted materials).**
5	Research relevant computing laws and create awareness posters for peers.

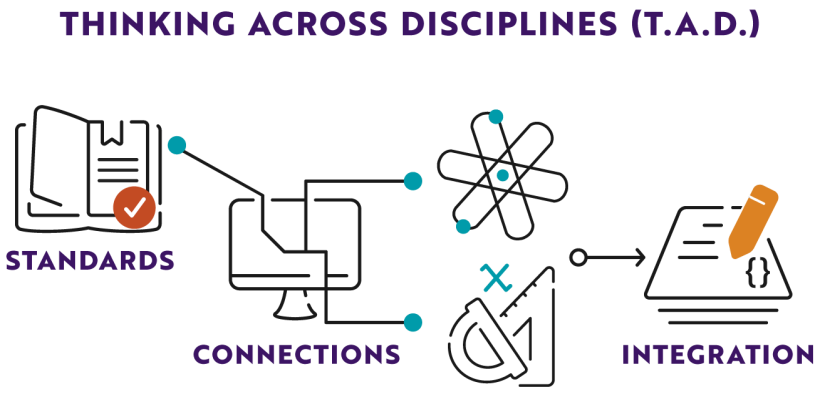
E.IC.3B. Describe the safe versus unsafe uses of computing systems at age-appropriate levels.	
Grade	**Complexity Statement**
K	Review and list responsible and safe online behaviors each time computing systems are used.
1	Explain why clicking on pop-up ads is unsafe.
2	List and categorize safe versus unsafe uses of computing systems.
3	Propose and apply collaborative computing norms for group projects.
4	**Describe what computer viruses are and how to protect against them.**
5	Explain the risks of responding to or chatting with unknown individuals online.

E.IC.3C. Explain how the school and school system's computing rules and policies keep students safe.	
Grade	**Complexity Statement**
K	Discuss and model the rules for computer use at school.
1	Explain why the use of another student's login is not allowed.
2	Identify and discuss the appropriate use of the Internet under the school's computer usage rules.

E.IC.3C. Explain how the school and school system's computing rules and policies keep students safe.	
Grade	**Complexity Statement**
3	Classify computer usage examples as appropriate or inappropriate under the school's computer usage plan.
4	**Explain why downloading or uploading programs puts all users of the school's computer network at risk.**
5	Describe and model the appropriate behaviors and practices for participating in virtual calls, collaborating with peers, and making public presentations.

Thinking Across Disciplines in Grade 4

Core Concept 5: Impacts of Computing



The standards in **Core Concept 5: Impacts of Computing** promote digital citizenship, online safety, and responsible computing practices. These standards emphasize understanding the impact of computing on daily life and work, recognizing appropriate and inappropriate online behavior, and addressing issues like cyberbullying with effective responses. Additionally, they highlight the importance of understanding online consequences, adhering to laws and rules, and following school policies to ensure safe and ethical use of technology. These skills are tied to concepts teachers already address in their classrooms.

- Interacting responsibly online in a safe environment builds upon student **communication skills**. Understanding safe and appropriate online behavior and the impacts of unethical behavior support effective communication strategies.
- **Responsibility and accountability** represent essential life skills that apply in both physical and digital contexts. Understanding responsible computing practices and the consequences of unethical behavior reinforces ethical decision-making.
- Distinguishing safe versus unsafe uses of computing systems at developmentally appropriate levels enables **critical judgment and decision-making skills** that protect personal information, maintain security, and promote responsible participation in digital environments.

T.A.D. Examples

Standard	**E.IC.1A. Describe how computing has changed the ways people live and work.** **Complexity Statement:** Identify and describe a career that relies on technology. **Core Practices:** Fostering responsible cyber citizenship; Collaborating around computing; Testing and refining computational artifacts; Communicating about computing
Connections	**Science** 4-PS3-4 Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.
Integration	Computing devices play an important role in converting energy from one form to another, such as electrical energy into light or sound. In science class, as students design and test devices that demonstrate energy conversion, they can also explore how similar technologies are used in real-world settings. This provides an opportunity to identify careers that rely on these types of technologies, helping students make connections between classroom learning and how computing has changed the way people live and work.

Standard	**E.IC.2A. Identify and describe examples of appropriate versus inappropriate computer communications.** **Complexity Statement:** Examine computational communication examples and identify where appropriate and inappropriate comments are made. **Core Practices:** Fostering responsible cyber citizenship; Collaborating around computing; Testing and refining computational artifacts; Communicating about computing
Connections	**Science** Science & Engineering Practices 8: Obtaining, evaluating, and communicating information
Integration	As students engage with others through computer-based platforms, whether offering peer feedback, participating in discussions, or submitting assignments, it is essential to teach responsible interaction. For example, during a classroom activity where students provide feedback on one another's work, teachers can facilitate conversations about what constitutes appropriate versus inappropriate comments. Presenting sample comments for evaluation helps students build the skills to communicate respectfully and effectively online.

Standard	**E.IC.2B. Identify examples of cyberbullying with age-appropriate responses.** **Complexity Statement:** Explain what responsible digital citizenship is. **Core Practices:** Fostering responsible cyber citizenship; Collaborating around computing; Testing and refining computational artifacts; Communicating about computing
Connections	**Science** Science & Engineering Practices 8: Obtaining, evaluating, and communicating information
Integration	As students increasingly interact in online environments — whether through educational tools, games, or social media — it becomes essential to teach responsible digital citizenship. Responsible digital citizenship means using the internet in ways that are legal, safe, and respectful. Teachers can introduce this concept during peer feedback activities by discussing how to communicate responsibly online. Extend the conversation to platforms students may encounter, such as YouTube or social media, and guide students in identifying respectful behavior and recognizing inappropriate or harmful interactions, such as cyberbullying. Provide age-appropriate strategies for responding to and reporting cyberbullying when it occurs.

Standard	**E.IC.3A. Explain how online actions have real-world consequences and that laws and rules may also apply online.** **Complexity Statement:** Describe what unauthorized access is and how participating in it can lead to legal repercussions (e.g., hacking, jailbreaking phones, illegal sharing of copyrighted materials). **Core Practices:** Fostering responsible cyber citizenship; Collaborating around computing; Testing and refining computational artifacts; Communicating about computing
Connections	**Science** Science & Engineering Practices 8: Obtaining, evaluating, and communicating information

Integration	Digital tools are an important part of students' learning environments, and understanding responsible digital citizenship includes recognizing that actions taken online can have real-world consequences. When students log into school accounts, it is an opportunity to introduce concepts such as authorized versus unauthorized access. For example, explain that logging into someone else's account without permission, even as a joke, is a form of unauthorized access and can lead to disciplinary action or legal consequences. Real-world examples may include stories of individuals facing consequences for hacking into social media accounts or school systems. These discussions help students understand that online behaviors are governed by rules and laws, just like behaviors in the physical world.

Standard	**E.IC.3B. Describe the safe versus unsafe uses of computing systems at age-appropriate levels.** **Complexity Statement:** Describe what computer viruses are and how to protect against them. **Core Practices:** Fostering responsible cyber citizenship; Collaborating around computing; Testing and refining computational artifacts; Communicating about computing
Connections	**Science** Science & Engineering Practices 1: Asking questions and defining problems
Integration	Students regularly use digital tools to support learning, making it important to understand how to use computing systems safely. Just as germs can make people sick, computer viruses can harm devices and compromise users' information. While using technology in the classroom, teachers can guide discussions about what computer viruses are, how they spread, and why safe computing practices are necessary. These conversations can include how antivirus software helps protect devices and why students should avoid unsafe behaviors like clicking unknown links or downloading unverified files. Through these discussions, students learn to recognize the difference between safe and unsafe uses of computing systems.

Standard	**E.IC.3C. Explain how the school and school system's computing rules and policies keep students safe.** **Complexity Statement:** Explain why downloading or uploading programs puts all users of the school's computer network at risk. **Core Practices:** Fostering responsible cyber citizenship; Collaborating around computing; Testing and refining computational artifacts; Communicating about computing

Connections	**Science** Science & Engineering Practices 8: Obtaining, evaluating, and communicating information
Integration	Students researching topics in science on school computers have an opportunity to learn about computer safety and why it is important. As students gather information online, they might encounter a prompt or link to download a program (perhaps one for energy calculations or organizing research). When conducting online research, teachers should ensure students know not to download just any program. School computer policies prohibit unauthorized downloads and uploads because these programs can contain harmful viruses or malware. Malicious software can spread across the entire interconnected school network, potentially disrupting or damaging computing systems, files, and data for all users. Adhering to the school's policies when obtaining and evaluating online information ensures a safe computing environment for the entire school community.