ILEARN Computer Science Item Specifications

Standard	
Standard	**6-8.CD.2** Systematically identify and fix problems (troubleshoot) with computing devices and their components (e.g., checklist, decision tree, flowchart).
Practices	*Recognizing and Defining Computational Problems:* Students can describe an issue they are having with technology. *Developing and Using Abstractions:* Students think about how they solved similar technology issues with other types of hardware and software. Students create abstractions (generalizations) about how an issue might be resolved. *Testing and Refining Computational Artifacts:* Students troubleshoot computer programs and solutions.
Clarifications	Students follow a checklist, decision tree, or flowchart to troubleshoot a problem with a computing device.
Content Limits	Students do not have to develop or create the systematic solution.
Expected Vocabulary	Troubleshoot, computing device, flowchart
Not Expected Vocabulary	Systematically identify, decision tree
Phenomena/Context	
Phenomena/Context	Students are provided with a computer issue, such as not turning on, a black screen, unreadable font, or input hardware not functioning.
Task Demands	• Find the recommended solution using a flow chart. • Identify the problem that a solution solved using a flow chart. • Identify an incorrect application of a decision tree. • Determine whether the proposed solution solves the original problem.

ILEARN Computer Science Item Specifications

Standard	
Standard	**6-8.CD.3** Recommend improvements to the design of computing devices, based on analysis of how users interact with the devices.
Practices	*Fostering an Inclusive Computing Culture:* By thinking about how the design of computing devices work with different users, students learn to think about how computing devices can be inclusive or not. *Recognizing and Defining Computational Problems:* Students recognize that the design of a computing device does not work as intended for all users. *Testing and Refining Computational Artifacts:* Students provide recommendations to improve computing devices.
Clarifications	Students identify and observe challenges to using computing devices and recommend improvements.
Content Limits	Obstacles/challenges and recommendations/improvements will be provided.
Expected Vocabulary	Computing device, user, challenges, recommendations
Not Expected Vocabulary	Interface, temporary solution
Phenomena/Context	
Phenomena/Context	Students asked to observe an environment and consider why people might not be participating on devices or why they might be struggling with usage (e.g., limited mobility, different abilities - visual, hearing).
Task Demands	Students choose recommended improvements that address specific user challenges. Students differentiate between design improvements and temporary solutions to solve a challenge involving a computing device.
Example Item	A student is using a Chromebook. The battery doesn't last very long. Which is a design improvement that would improve the user's experience using the Chromebook? ● **Add a battery saving mode.** ● Buy more charging cables. ● Designate charging times. ● Turn the device off when not in use.

ILEARN Computer Science Item Specifications

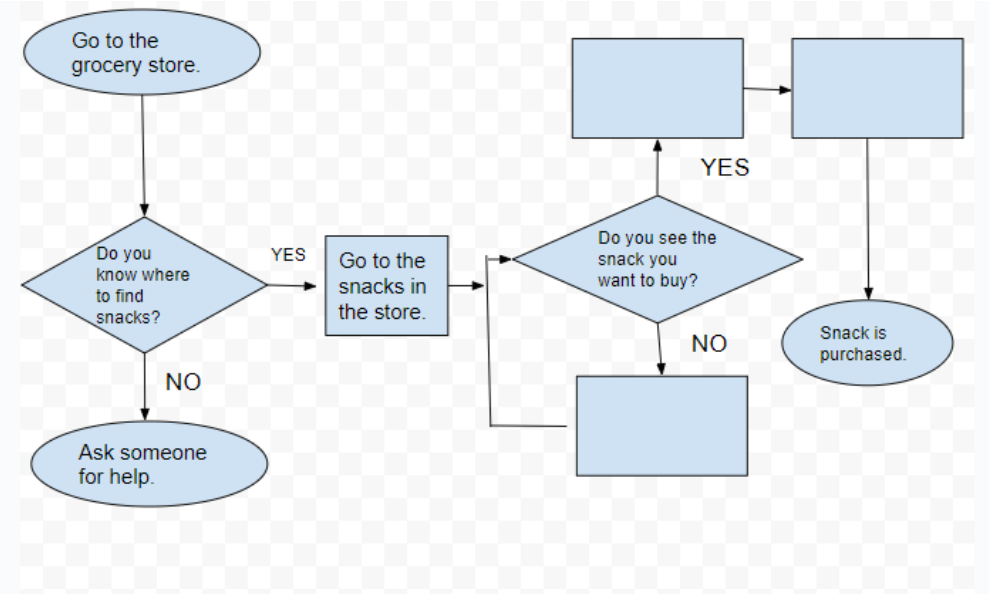
Standard	
Standard	**6-8.CD.4** Describe what distinguishes humans from machines focusing on ways we can communicate, as well as ways in which computers use models of intelligent behavior (e.g., robot motion, speech and language understanding, and computer vision).
Practices	*Recognizing and Defining Computational Problems*: As students note the misunderstandings by machine intelligence, they identify the limitations.
Clarifications	Items should focus on differences between communicating as a machine and communicating as a human.
Content Limits	Students do not need to know how the "model of intelligent behavior" provided works or is developed.
Expected Vocabulary	Machine intelligence, human intelligence, Artificial Intelligence (AI), input/output
Not Expected Vocabulary	Query, model
Phenomena/Context	
Phenomena/Context	Students are provided with different scenarios where they can compare human intelligence with machine intelligence.
Task Demands	Students identify the initial human search query given a list of search results. Students classify responses as machine, human, or both. Students identify additional inputs a machine would need in order to solve a problem.
Example Item	A sixth grade student used a browser to search for a topic for their science report. The results are below: ● "The atmosphere of Jupiter is …" ● "Gas giants are not only large, their atmospheres are massive." ● "Jupiter was first classified as a gas giant when…" Which of the following could have been their search query? ○ Solar system ○ Jupiter's size ○ Jupiter's moons ○ **Atmosphere of Jupiter**

ILEARN Computer Science Item Specifications

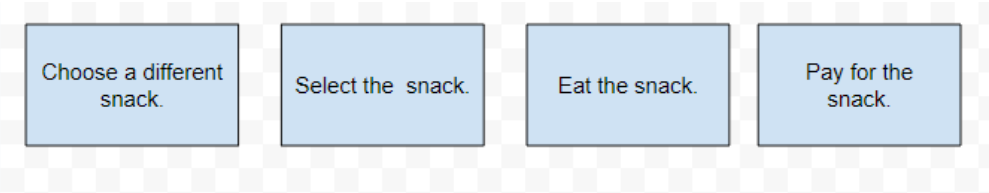
Standard	
Standard	**6-8.DI.3** Describe that data can be represented in multiple encoding schemes such as binary, RGB values, hexadecimal codes.
Practices	*Communicating about Computing:* Students recognize that data can be represented in different ways.
Clarifications	None
Content Limits	All code that students are expected to interact with must be provided as a key. Limited to binary systems (i.e., 0/1), lights on/lights off, switch on/switch off, Morse code.
Expected Vocabulary	Binary
Not Expected Vocabulary	Encoding scheme, RGB values
Phenomena/Context	
Phenomena/Context	None
Task Demands	Students identify examples and non-examples of binary systems.

ILEARN Computer Science Item Specifications

Standard	
Standard	**6-8.DI.4** Create visuals such as flowcharts, diagrams, pseudocode to represent complex problems as algorithms.
Practices	*Recognizing and Defining Computational Problems*: Students can effectively develop a flowchart or diagram to represent complex problems as algorithms. *Developing and Using Abstractions*: Students represent complex problems in abstract ways such as using flowcharts and diagrams.
Clarifications	Students will complete flowcharts to represent complex problems as algorithms.
Content Limits	Writing pseudocode is above the expectation for a sixth grade student. Students do not develop flowcharts from start to finish, but complete them.
Expected Vocabulary	Flowchart, diagram, algorithms, debugging
Not Expected Vocabulary	None
Phenomena/Context	
Phenomena/Context	Students are provided with complex problems that relate to grade-level science or computer science situations. Students are provided with full or partially-completed flowcharts or other diagrams.
Task Demands	Students complete a flowchart or diagram. Students interpret the steps of a flowchart to determine if it represents and/or solves the problem.
Example Item	The flowchart represents the process of buying a snack at the store.



Drag and drop the correct steps to complete the flowchart.



ILEARN Computer Science Item Specifications

Standard	
Standard	**6-8.IC.2** Discuss issues of bias and accessibility in the design of existing technologies.
Practices	*Recognizing and Defining Computational Problems:* Students are able to see and communicate issues of bias and accessibility in technologies. *Communicating about Computing:* Students discuss issues they see with regards to bias and accessibility in the technologies they use daily.
Clarifications	None
Content Limits	Students are not required to discuss ethical use of Artificial Intelligence (AI) in developing technologies.
Expected Vocabulary	Bias, accessibility, technologies
Phenomena/Context	
Phenomena/Context	Universal design in architecture involves planning buildings that are accessible rather than retrofitting buildings with ramps, wide doors, etc. Technology can be designed to be accessible for a wider range of users.
Task Demands	Students identify specific bias and accessibility issues present in a given design. Students develop ways to improve technology design to address the broadest group of users.

ILEARN Computer Science Item Specifications

Standard	
Standard	**6-8.IC.4** Describe tradeoffs between allowing information to be public and keeping information private and secure.
Practices	*Fostering an Inclusive Computing Culture:* Students understand when it is safe and when it is dangerous to make information public. *Recognizing and Defining Computational Problems:* Students describe the pros and cons of making information public.
Clarifications	None
Content Limits	The setting and information must be age-appropriate.
Expected Vocabulary	Information, public, private, share
Not Expected Vocabulary	Secure
Phenomena/Context	
Phenomena/Context	Students are provided with a context where information might be shared in an online situation.
Task Demands	Students determine which information may be public or should be private given a specific situation.

ILEARN Computer Science Item Specifications

Standard	
Standard	**6-8.NI.1** Explain how physical and cybersecurity measures protect electronic information.
Practices	*Communicating about Computing:* Students explain physical cybersecurity measures applicable in different situations.
Clarifications	None
Content Limits	Students do not classify security measures as physical security versus cybersecurity.
Expected Vocabulary	Cybersecurity, electronic information
Not Expected Vocabulary	Network system, malware, ransomware, phishing, data security, firewall, virus
Phenomena/Context	
Phenomena/Context	None
Task Demands	Students identify different physical or cybersecurity measures that protect electronic information.
Example Item	What is one way you can protect your computer from viruses? **a. Never click email links or open attachments from people you don't know.** b. Always remember to log off when you are finished using the computer. c. Do nothing because your computer will protect itself. d. Visit the first website you see in a web search.

ILEARN Computer Science Item Specifications

Standard	
Standard	**6-8.PA.4** Document programs in order to make them easier to follow, test, and debug.
Practices	*Recognizing and Defining Computational Problems*: Students recognize issues associated with not effectively documenting computer programs. *Creating Computational Artifacts*: Students have to create computational artifacts to be able to document them.
Clarifications	None
Content Limits	Program codes (e.g., code blocks) will be written in plain English or clearly defined within the item stim. For example, “start,” “repeat,” “move forward,” “end.” Students do not have to create their own computer program documentation, but must be able to identify and explain what documentation/commenting is.
Expected Vocabulary	Document, program, test, debug
Not Expected Vocabulary	None
Phenomena/Context	
Phenomena/Context	Students are provided computer program documentation (code and/or notes).
Task Demands	Students break down a code program into smaller parts and explain what each part does in the code. Students suggest improvements or solutions to coding problems using provided code documentation. Students confirm a program runs as intended using provided code documentation.