Computer Science Curriculum Alignment

The 2017 K – 8 Computer Science Standards of Learning were designed to be integrated into the instruction in multiple subject areas including mathematics, science, history, English, fine arts, and career and technology courses. This document is designed to provide support to K-8 teachers as they integrate computer science into core areas of instruction. The content area connections serve as guidance for teachers and may not be limited to the connections indicated in the table below.

This document is not a comprehensive list of all Computer Science Standards of Learning. For a complete list of standards, please refer to the Virginia Department of Education website.

Kindergarten

Computer Science Standard	Opportunity for Integration
K.1 The student will construct sets of step-by-step	English: K.1 (oral communication); K.8 (sequence
instructions (algorithms) either independently or	stories using beginning, middle, and end)
collaboratively including sequencing, emphasizing	
the beginning, middle, and end.	Mathematics: K.2 (sequence sets); K.13 (patterns)
	Science: K.1 (across all standards); K.3 (sequencing
	objects); K.9 (patterns in nature); K.10 (change)
	Social Studios: K 1 (socuence quents): K 1
	(collaborating and participating in classroom
K 2 The student will construct programs to	Science: K 3 (sequencing objects)
accomplish tasks as a means of creative expression	Science. R.S (Sequencing objects)
using a block based programming language or	Social Studies: K 1 (collaborating and participating in
unnlugged activities, either independently or	classroom activities)
collaboratively including sequencing emphasizing	
the beginning, middle, and end.	
K.3 The student will create a design document to	English: K.2 (tell stories orally): K.8 (sequence
illustrate thoughts, ideas, and stories in a sequential	stories using beginning, middle, and end); K.11
(step-by-step) manner (e.g., story map, storyboard,	(write in a variety of forms)
and sequential graphic organizer).	
	Social Studies: K.3 (sequence events)
K.4 The student will categorize a group of items	English: K.7 (use adjectives to describe attributes)
based on one attribute or the action of each item,	
with or without a computing device.	Mathematics: K.9 (comparing attributes); K.12 (sort
	and classify)
	Science: K.3 (physical properties); K.6 (senses); K.6
	(classifying living and nonliving)

Computer Science Standard	Opportunity for Integration
	Social Studies: K.1 (classify information); K.3
	(physical properties); K.4 (describe locations using
	positional words)
K.5 The student will identify components of	English: K.7 (expand vocabulary)
computing systems (e.g., keyboard, mouse, desktop	
computer, laptop computer, tablet, and printer).	
K.6 The student will identify, using accurate	English: K.7 (expand vocabulary)
terminology, simple hardware and software	
problems that may occur during use (e.g., app or	
program is not working as expected, no sound is	
coming from a device, device will not turn on).	
K.7 The student will identify what is allowed and	Social Studies: K.7 (school rules)
what is not allowed at school when using	
technology.	
K.9 The student will gather and display data and	Mathematics: K.11 (data collection and
organize it in a chart or graph in order to answer	interpretation)
questions about the data, with or without a	
computing device.	Science: K.1 (across all science standards)
K.10 The student will identify responsible behaviors	English: K.1 (oral communication)
associated with using information and technology.	
	Social Studies: K.10 (good citizenship)
K.11 The student will discuss, in a whole class	English: K.1 (oral communication)
setting, how information can be communicated	
electronically (e.g., email, social media).	Social Studies: K.1 (collaborating and participating in
	classroom activities)

First Grade

Computer Science Standard	Opportunity for Integration
1.1 The student will construct sets of step-by-step	English: 1.1i (giving simple directions); 1.2b (tell
instructions (algorithms) either independently or collaboratively, including	stories in sequential order)
a) sequencing (including ordinal numbers) and; b) simple loops (patterns and repetition).	Mathematics: 1.2c (placing numbers in order); 1.3 (placing numbers in order); 1.14 (growing and repeating patterns)
	Science: 1.1b (planning investigations);
1.2 The student will construct programs to	English: 1.1i (giving simple directions); 1.2b (tell
accomplish tasks as a means of creative expression	stories in sequential order)
using a block based programming language or	
unplugged activities, either independently or	Mathematics: 1.2c (placing numbers in order); 1.3
collaboratively including	(placing numbers in order, ordinal position); 1.14
a) sequencing, ordinal numbers; and	(repeating patterns)

Computer Science Standard	Opportunity for Integration
b) simple loops (patterns and repetition).	Science: 1.1b (planning investigations)
1.3 The student will analyze, correct, and improve	English: 1.6e (reread and self-correct);
(debug) an algorithm that includes sequencing.	Mathematics: 1.14 (growing and repeating patterns)
1.4 The student will plan and create a design	English: 1.12b (use prewriting strategies)
document to illustrate thoughts, ideas, and stories in a sequential (step-by-step) manner (e.g., story map, storyboard, sequential graphic organizer).	Mathematics: 1.3 (ordinal position)
1.5 The student will categorize a group of items based on one or two attributes or the actions of each item with or without a computing device	English: 1.7c (sorting words into categories, defining words by attributes)
	Mathematics: 1.13 (sort and classify concrete objects into appropriate subsets (categories) based on one or two attributes)
	Science: 1.1c (classify objects); 1.3a (classify objects based on physical properties and explain how the objects were classified); 1.4c (plants can be classified); 1.5c (animals can be classified)
1.6 The student will acknowledge that materials are created by others (e.g., author, illustrator).	English: 1.14c (identify pictures, texts, or people as sources of information)
1.8 The student will identify, using accurate terminology, simple hardware and software problems that may occur during use (e.g., app or program is not working as expected, no sound is coming from the device, the device won't turn on).	English: 1.12e (using descriptive words)
1.11 The student will identify and interpret data and organize it in a chart or graph in order to make a prediction, with or without a computing device.	Mathematics: 1.12a (collect and organize data using various forms of data collection and represent data in tables, picture graphs, and object graphs)
	Science: 1.1c (organize and represent various forms of data using tables, picture graphs, and object graphs)
1.12 The student will identify and explain responsible behaviors associated with using information and technology.	Social Studies: 1.1i (create a classroom chart of good citizenship rules to follow during classroom activities); 1.10b,d (recognizing the purpose of rules and taking responsibility for their own actions)

Computer Science Standard	Opportunity for Integration

Second Grade

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Computer Science Standard	Opportunity for Integration
2.1 The student will construct sets of step-by-step	English: 2.1k (give and follow multi-step directions);
instructions (algorithms) both independently and	2.2a (use the story structure of beginning, middle,
collaboratively	and end to tell a story of an experience); 2.10e
a) using sequencing;	(organize writing to include a beginning, middle,
b) using loops (a wide variety of patterns such	and end)
as repeating patterns or growing patterns);	
and,	Mathematics: 2.2 (determining patterns); 2.16
c) identifying events.	(describe the core of a repeating pattern, extend a
	pattern)
	Science: 2.1b (planning investigations); 2.6b
	(analyzing data to recognize patterns)
	Social Studies: 2.1 (creation of sequential timelines
	to show historical thinking)
2.2 The student will construct programs to	English: 2.1k (give and follow multi-step directions);
accomplish tasks as a means of creative expression	2.2a (use the story structure of beginning, middle,
using a block based programming language or	and end to tell a story of an experience); 2.10e
unplugged activities, both independently and	(organize writing to include a beginning, middle,
collaboratively	and end)
a) using sequencing;	
b) using loops (a wide variety of patterns, such	Mathematics: 2.2 (determining patterns); 2.16
as repeating patterns or growing patterns); and	(describe the core of a repeating pattern, extend a
c) identifying events.	pattern)
	Colonna, 2.4h (alamia z investigational), 2.6h
	Science: 2.10 (planning investigations); 2.60
	(analyzing data to recognize patterns)
2.3 The student will analyze correct and improve	English: 2 11 (edit writing for proper use of
(debug) an algorithm that includes sequencing and	capitalization, punctuation, and spelling)
simple loops with or without a computing device	
simple loops, with of without a computing device.	Mathematics: 2 16 (natterns)
2.4 The student will plan and create a design	English: 2.10c (using prewriting strategies)
document to illustrate thoughts, ideas, and stories	
in a sequential (step-by-step) manner (e.g., story	Mathematics: 2.3 (ordinal numbers through 20)
map, storyboard, sequential graphic organizer).	
	Social Studies: 2.1f (create flow charts to show
	change in technology over time)

Computer Science Standard	Opportunity for Integration
2.5 The student will compare and contrast a group	Mathematics: 2.13 (identify and describe solid and
of items based on the attributes or actions of each	plane figures based upon their characteristics)
item, with or without a computing device.	
	Science: 2.3b (describing characteristics of matter);
	2.6a (characteristics of weather)
	Social Studies:
2.6 The student will acknowledge that materials are	English: 2.12f (describing difference between
website)	plagialistit allu using own words)
website).	
2.8 The student will identify, using accurate	English: 2.10h (using descriptive language)
terminology, simple hardware and software	
problems that may occur during use (e.g., app or	
program not working as expected, no sound, device	
won't turn on).	
2.9 The student will explain what is allowed and	Social Studies: 2.11 (rules and laws)
what is not allowed at school associated with the	
use of technology (e.g., class rules).	
2 11 The student will construct and analyze data and	Mathematics: 2,15a (collecting, organizing, and
organize it in a chart or graph in order to make a	representing data in pictographs and bar charts)
prediction, with or without a computing device.	
P	Science: 2.1c (organize and represent data in
	pictographs and bar graphs)
2.12 The student will create a model of a physical	Mathematics: 2.1a (using models to represent
object or process in order to show relationships	relationships in proportionality)
with or without a computing device (e.g., water	
cycle, butterfly life cycle, seasonal weather	Science: 2.3b (model phase changes); 2.4 (modeling
patterns).	the life cycles of plants and animals); 2.6 (modeling
	weather patterns); 2.7 (modeling plant and animal
	benavioral response to seasonal change)
2.13 The student will compare and contrast	Social Studies: 2.1f (create a flow chart to show how
examples of how computing technology has	types of communication and transportation
changed and improved the way people live, work,	developed over time (e.g., the development of
and interact.	communication through letters, the telegraph, the
	telephone, the cell phone) and discuss how each
	invention built upon what came before)
2.14 The student will identify and model responsible	Social Studies: 2.11 (students modeling the
behaviors when using information and technology.	behaviors of good citizens)

Third Grade

Computer Science Standard	Opportunity for Integration
3.1 The student will construct sets of step-by-step instructions (algorithms), both independently and collaboratively	English: 3.1b (presenting instructions); 3.8 (writing structured instructions)
 a) using sequencing; b) using loops (a wide variety of patterns such as repeating patterns or growing patterns); and c) using events. 	Mathematics: 3.16 (identify/create and describe repeating and growing patterns using words, objects, pictures, numbers, and tables)
	Science: 3.1b (planning investigations with procedures); 3.1d (use patterns to draw conclusions)
3.2 The student will construct programs to accomplish tasks as a means of creative expression	English: 3.1b (presenting instructions); 3.8 (writing structured instructions)
 using a block or text based programming language, both independently and collaboratively a) using sequencing; b) using loops (a wide variety of patterns such as repeating patterns or growing patterns); and c) identifying events. 	Mathematics: 3.16 (identify/create and describe repeating and growing patterns using words, objects, pictures, numbers, and tables) Science: 3.1b (planning investigations with
	procedures); 3.1d (use patterns to draw conclusions)
	Social Studies: 3.1 (organizing information into timelines)
3.3 The student will analyze, correct, and improve (debug) an algorithm that includes sequencing, events, and loops	English: 3.9 (editing grammar and spelling resembles the process of debugging)
	Mathematics: 3.3b (solving multistep problems)
3.4 The student will create a plan as part of the iterative design process, independently and/or collaboratively using strategies such as pair	English: 3.8c (use a variety of prewriting strategies to plan and organize writing)
programming (e.g., storyboard, flowchart, pseudo- code, story map).	Science: 3.1a (define a simple problem); 3.1b (use tools and/or materials to design and/or build a device to solve a specific problem); 3.1c (analyze data from tests of an object or tool to determine if it works as intended); 3.1f (communicate design ideas and/or solutions with others)
3.5 The student will compare and contrast a group of items based on attributes or actions classified into at least two sets and two subsets.	English: 3.4 (identifying and classify words based on characteristics)

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	Mathematics: 3.12b (classifying polygons by their
	attributes)
	Science: 3.5a (classifying components of an
	ecosystem)
	Social Studies: 3.1e (classifying ancient cultures by
	their attributes)
3.6 The student will break down (decompose) a	Mathematics: 3.3b (breaking down multi-step
larger problem into smaller sub-problems,	problems)
independently or collaboratively.	
	Science: 3.1a (defining problems)
3.7 The student will give credit to sources when	English: 3.10e,f (review writing to check that the
borrowing or changing ideas (e.g., using information	language and/or thoughts of another author are
and pictures created by others, using music created	given proper credit)
by others, remixing programming projects).	Social Studies: 3.1a (primary and secondary
	sources): 3.1i (accessing variety of media)
3.8 The student will model how a computing system	Mathematics: 3.16 (identify/analyze the patterns
works including input and output.	associated with input/output)
	Science: 3.8a (human activity as input, consequence
	as output)
2.0 The student will identify using accurate	English: 2.10 (using appropriate language): 2.9
terminology simple bardware and software	(importance of communicating with clarity)
problems that may occur during use, and apply	
strategies for solving problems (e.g., rebooting the	
device, checking for power, checking network	
availability, closing and reopening an app).	
3.10 The student will identify problems that relate	Social Studies: 3.1L (classroom activities to
to inappropriate use of computing devices and	demonstrate respect for community rules and
networks.	laws); 3.11a-f (modeling and describing attributes of
3 12 The student will answer questions by using a	A good chizen) Mathematics: 3.15 (collecting, organizing and
computer to observe data in order for the student	interpreting data in pictograph and bar graph)
to draw conclusions and make predictions.	
	Science: 3.1c (analyzing data in pictograph and bar
	graph); 3.1d (use evidence to support a construct or
	support an explanation)
	Social Studies: 3.1c (survey family members to
	determine ways they help their community,

Computer Science Standard	Opportunity for Integration
	country, and world and create a web or a simple bar
	graph to show the results)
3.13 The student will create an artifact using	Mathematics: 3.1a (using models to illustrate
computing systems to model the attributes and	relationships between 100s, 10s, and 1s); 3.4a
behaviors associated with a concept (e.g., day and	(representation of multiplication and division
night, animal life cycles, plant life cycles).	through models)
	Science: 3.1e (use models to demonstrate simple
	phenomena and natural processes); 3.5b (food
	chain models); 3.7c (water cycle modeling)
2.14 The student will identify computing	Science: 2.4 (analogous to adaptations and changes
technologies that have changed the world and	in populations as response to environmental
express how those technologies influence and are	changes)
influenced by, cultural practices.	
	Social Studies: 3.7 (describe how ancient people
	adapted to their environments, focusing on
	technological advancements); 3.3 (Greek and
	Roman innovations and their influences)
3.16 The student will identify social and ethical	Social Studies: 3.11 (role of social norms in relation
issues that relate to computing devices and	to use of computing devices)
networks.	

Fourth Grade

Computer Science Standard	Opportunity for Integration
4.1 The student will construct sets of step-by-step	English: 4.7a (engage in writing of sequences)
instructions (algorithms) both independently and	
collaboratively	Mathematics: 4.1c (students write an algorithm to
a) using sequencing;	round numbers); 4.4d (solving multistep problems)
b) using loops;	4.5c (solving single step problems); 4.6b (solving
c) using variables to store and process data;	multistep problems)
and	
d) performing number calculations on variables	Science: 4.1a (define a simple design problem that
(e.g., addition, subtraction, multiplication and	can be solved through the development of an
division).	object, tool, process or system); 4.1b (planning
	investigations)
	Social Studies: 4.1 (sequencing events in VA history)
4.2 The student will construct programs to	English: 4.7a (engage in writing of sequences)
accomplish a task as a means of creative expression	
using a block or text based programming language,	Mathematics: 4.1c (students write an algorithm to
both independently and collaboratively	round numbers); 4.4d (solving multistep problems);

Computer Science Standard	Opportunity for Integration
a) using sequencing;	4.5c (solving single step problems); 4.6b (solving
b) using loops;	multistep problems); 4.15 (patterns)
c) using variables; and	
d) performing number calculations (e.g.,	Science: 4.1a (define a simple design problem that
addition, subtraction, multiplication and	can be solved through the development of an
division) on variables.	object, tool, process or system); 4.1b (planning
	investigations – writing procedures)
4.3 The student will analyze, correct, and improve	Mathematics: 4.4-4.6 (problem solving techniques)
(debug) an algorithm that includes sequencing,	
events, loops and variables.	Science: 4.1c (analyze data from tests of an object
	or tool to determine if it works as intended)
A 4 The student will exect a star as yout of the	English, 4.7d (using provusiting starts sign)
4.4 The student will create a plan as part of the	ciigiisii. 4.70 (using prewriting strategies)
collaboratively using strategies such as pair	Science: 4.12 (define 2 simple design problem that
programming (e.g. storyboard flowchart pseudo-	can be solved through the development of an
code story man)	object tool process or system): 4 1h (use tools
	and/or materials to design and/or build a device
	that solves a specific problem): 4 1c (analyze data
	from tests of an object or tool to determine if it
	works as intended): 4 1e (identify limitations of a
	model): 4.1f (communicate design ideas or solutions
	to others)
4.5 The student will classify and arrange a group of	English: 4.4b (classifying words by their attributes)
items based on the attributes or actions.	
	Mathematics: 4.11 (characteristics of plane and
	solid figures)
	Science: 4.3d (classification of organisms based
	upon physical characteristics); 4.5b (classify planets
	as terrestrial or gas giants)
4 6 The student will break down (decompose) =	English: 4.4.2. h (broak down contances to five
4.6 The student will break down (decompose) a	english: 4.44,0 (break down sentences to fix
independently and collaboratively	grannia)
	Mathematics: 4.4h (strategies for determining
	sum/difference/product of two whole numbers)
	sum, uncreace, product or two whole numbers)
	Science: 4.1a (define a simple design problem that
	can be solved through the development of an
	object, tool, process or system)

Computer Science Standard	Opportunity for Integration
4.7 The student will give credit to sources when	English: 4.9d, e (avoiding plagiarism, giving credit)
borrowing or changing ideas (e.g., using	
information, pictures created by others, using music	
created by others, remixing programming projects).	
4.8 The student will model how a computing system	Mathematics: 4.15 (use of input tables)
works including input and output, processors and	
sensors.	Science: 4.2a (discussion of the inputs and outputs
	of photosynthesis)
4.0 The student will identify using accurate	English: 4.1g (using specific vosabulary to
4.9 The student will dentify, using accurate	communicate ideas)
problems that may occur during use, and apply	communicate ideas)
strategies for solving problems (e.g. reporting the	
device checking for nower checking for network	
availability closing and reopening an app)	
4.10 The student will identify and explain problems	English: 4.1g (using specific vocabulary to
that relate to inappropriate use of computing	communicate ideas)
devices and networks.	
4.12 The student will use a computer to observe,	English: 4.5 (reading to draw conclusions); 4.7
analyze, and manipulate data in order to draw	(writing to make predictions)
conclusions and make predictions.	
	Mathematics: 4.14 (collecting, organizing,
	representing, and interpreting data in bar and line
	graphs)
	Science: 4.1a (develon hypothesis as cause and
	effect relations): 4 1c (interpreting analyzing and
	evaluating data)
4.13 The student will create an artifact using	Mathematics: 4.2 (modeling fractions and real
computing systems to model the attributes and	numbers); 4.4d (use models to represent
behaviors associated with a concept (e.g., solar	understanding of multiplication); 4.13c (modeling
system).	probability)
	Science: 4.1e (use of models); 4.3b (modeling
	ecosystems); 4.5 (model revolution vs rotation,
	(model sup/moon/oarth relationship): 4.75 (model
	of marine food chain)
	of marine food chain)

Computer Science Standard	Opportunity for Integration
5.1 The student will construct sets of step-by-step	Mathematics: 5.2a (determining inequalities); 5.3
instructions (algorithms) both independently and	(classifying prime/composite/even/odd numbers by
collaboratively,	their characteristics); 5.18 (creating and describing
a) using sequencing;	patterns); 5.19 (describing and using variables)
b) using loops;	
c) using variables to store and process data;	Science: 5.1a (defined design problems that can be
d) performing number calculations on	solved through the development of an object, tool,
variables (addition, subtraction, multiplication	process, or a system); 5.1b (planning investigations
and division); and	and writing procedures)
e) using conditionals (if-statements).	
	Social Studies: VS.1c (create a timeline of events in
	sequence)
5.2 The student will construct programs to	Mathematics: 5.2a (determining inequalities); 5.3
accomplish a task as a means of creative expression	(classifying prime/composite/even/odd numbers by
using a block or text based programming language.	their characteristics): 5.18 (creating and describing
both independently and collaboratively	patterns): 5.19 (describing and using variables)
a) using sequencing:	
b) using loops:	Science: 5.1a (defined design problems that can be
c) using variables:	solved through the development of an object, tool.
d) using mathematical operations (addition.	process, or a system): 5.1b (planning investigations
subtraction. multiplication and division)	and writing procedures)
variable to manipulate a variable: and	
e) using conditionals (if-statements).	Social Studies: VS.1c (create a timeline of events in
	sequence)
5.3 The student will analyze, correct, and improve	English: 5.71 (revising text for clarity and grammar)
(debug) an algorithm that includes sequencing.	
events, loops, conditionals, and variables.	Mathematics: 5.4-5.7 (solving problems, using order
	of operations): 5.18 (number patterns)
	Science: 5.1c (use data to evaluate and refine design
	solutions: 5.1d (generate and compare multiple
	solutions to problems based on whether they meet
	criteria and constraints)
5.4 The student will create a plan as part of the	English: 5.1 (preparing prewriting tools): 5.7c (using
iterative design process, both independently and	a variety of prewriting tools)
collaboratively using strategies such as pair	
programming (e.g. storyboard, flowchart, pseudo-	Science: 5.1a (defined design problems that can be
code story man)	solved through the development of an object tool
	process or a system): 5 1h (planning investigations
	and writing procedures): 5 1c (use data to evaluate
	and refine design solutions): 5.1d (generate and
	compare multiple solutions to problems based on
	whether they meet criteria and constraints): 5.1e
	(identify limitations of models): 5.1f (communicate
	design ideas or solutions to others)
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Computer Science Standard	Opportunity for Integration
5.5 The student will break down (decompose) a	English: 5.1 (working together on presentations,
larger problem into smaller sub-problems, both	splitting up tasks); 5.3b (deconstructing a media
independently and collaboratively.	message into its components)
	Mathematics: 5.4 (distributive property); 5.6 (multi- step problems)
	Science: 5.1c (breaking down data sets to reveal patterns); 5.3c (identifying all forces at work on an object)
5.6 The student will give credit to sources when borrowing or changing ideas (e.g., using information, pictures created by others, using music created by others, remixing programming projects).	English: 5.9d,e (avoid plagiarism by giving credit whenever using another person's media, facts, graphics, music, and quotations)
5.7 The student will model how a computing system works including input and output, processors, sensors and storage.	Mathematics: 5.18 (input/output tables)
5.11 The student will use a computer to observe, analyze, and manipulate data in order to draw	Mathematics: 5.16 (represent data in a number of forms); 5.17 (describing data)
	Science: 5.1a (predict reasonable outcomes based on patterns): 5.1c (using tables and graphs to
	organize and analyze data); 5.1d (constructing and critiquing conclusions and explanations)
	Social Studies: VS.1c (interpreting charts and graphs to glean information)
5.12 The student will create an artifact using computing systems to model the attributes and	Mathematics: 5.6b (solving problems using models)
behaviors associated with a concept (e.g., rocks).	Science: 5.1e (developing and using models); 5.2 (modeling energy transformations); 5.4 (modeling electrical flow); 5.7 (modeling atoms in matter); 5.8 (modeling plate movement)
	Social Studies: VS.1c (using maps and models to analyze historical change); VS.1j (modeling geographic and demographic differences in Virginia's 5 regions)
5.13 The student will use numeric values to represent non-numeric ideas in the computer (e.g., binary, ASCII, pixel attributes such as RGB).	Mathematics: 5.19a (describing a variable as a representation of an unknown quantity)

Computer Science Standard	Opportunity for Integration
5.14 The student will give examples and explain how computer science had changed the world and express how computing technologies influence, and are influenced by, cultural practices.	Science: 5.9 (investigating technological advancement in energy)

Sixth Grade

Computer Science Standard	Opportunity for Integration
6.1 The student will construct programs to accomplish a task as a means of creative expression or scientific exploration using a block based or text based programming language, both independently and collaboratively,	Mathematics: 6.6 (performing operations on integers); 6.13, 6.14 (using variable in expressions to represent values) Science: 6.1a (offer simple solutions to design
 a) combining control structures such as if- statements and loops; and b) creating clearly named variables that represent different data types, including numeric and non-numeric data, and perform operations on their values. 	problems); 6.1b (use tools and materials to design and/or build a device to solve a specific problem; use data to evaluate and refine design solutions); 6.1d (generate and compare multiple solutions to a problem based on whether they meet the criteria or constraints); 6.1d construct explanations that include qualitative or quantitative relationships between variables)
6.2 The student will trace programs to predict outcomes and debug (correct and improve) for correctness.	English: 6.8 (going through the editing process) Science: 6.1c (use data to evaluate and refine design solutions); 6.1d (generate and compare multiple solutions to a problem based on whether they meet the criteria or constraints)
6.3 The student will seek and incorporate feedback from team members and users to refine a program	English: 6.1b,c (working in partnerships and groups)
that meets user needs.	Science: 6.1a (offer solutions to design problems); 6.1b (design/build a device to solve a problem); 6.1d (generate and compare multiple solutions to problems based on how well they meet the criteria and constraints)
6.4 The student will incorporate existing code, media, and libraries into original programs, and give	English: 6.8d,e,f (citing sources, avoiding plagiarism, using Internet responsibly)
attribution.	Science: 6.1f (gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication)

Computer Science Standard	Opportunity for Integration
6.5 The student will design projects that combine hardware and software components to collect and exchange data.	Mathematics: 6.10 (represent and analyze data in circle graphs, bar graphs, pictographs, and line plots)
	Science: 6.1a (offer simple solutions to design problems); 6.1b (use tools and materials to design and/or build a device to solve a specific problem; use data to evaluate and refine design solutions); 6.1d (generate and compare multiple solutions to a problem based on whether they meet the criteria or constraints); 6.1d (construct explanations that include qualitative or quantitative relationships between variables)
6.8 The student will collect data using computational tools then clean and organize to make it more useful and reliable.	Mathematics: 6.11 (categorizing and organizing data); 6.10 (circle graphs, bar graphs, pictographs, line-plots)
	Science: 6.1c (organizing data sets)
6.9 The student will explain the insight and knowledge gained from digitally processed data by	Mathematics: 6.10 (represent data in graph form)
using appropriate visualizations.	Science: 6.1c (construct and interpret graphical representations of data)
6.10 The student will use models and simulations to formulate, refine, and test hypotheses.	Mathematics: 6.5 (using models to represent multiplication and division); 6.7 (using models to derive pi)
	Science: 6.1e (developing and using models); 6.3 (modeling Earth, moon, Sun relationships); 6.4b (modeling Earth's energy budget); 6.6d (modeling water's role in weathering); 6.8 (modeling watershed dynamics)
6.11 The student will explain how computing has impacted innovations in other fields.	Science: 6.2d (examining the role of technological advancement in the furthering of knowledge of solar system)
6.12 The student will explore careers related to data.	English: 6.6 (reading about tech and data jobs)

Seventh Grade

Computer Science Standard	Opportunity for Integration
7.1 The student will construct programs to	Mathematics: 7.1e (determining absolute value);
accomplish a task as a means of creative expression	7.2 (performing operations on rational numbers);
or scientific exploration using a block based or text	7.5 (similarity statements); 7.11 (evaluating
based programming language, both independently	expressions for given replacement values of
and collaboratively,	variables)
a) combining control structures such as if-	
statements and loops including compound	Science: LS.d (offer simple solutions to design
conditionals; and	problems); LS.c (evaluate the accuracy of various
b) creating clearly named variables that	methods for collecting data); LS.c (consider
represent different data types, including	limitations of data analysis and/or seek to improve
numeric and non-numeric data, and perform	precision and accuracy of data)
operations on their values.	
7.2 The student will document programs to make	English: 7.7 (students will use descriptive language
them easier to follow, test, and debug.	to clarify a program): 7.8 (students use editing
	techniques in debugging)
7.3 The student will distribute tasks and maintain a	English: 7.1h (working well within diverse groups)
project timeline when collaboratively developing	
computational artifacts.	Science: LS.1 (collaboratively planning and
	undertaking investigations)
7.4 The student will decompose problems and	English: 7.5e (breaking down a plot into its different
subproblems into parts to facilitate the design.	events)
implementation, and review of programs.	
······································	Mathematics: 7.3 (solving multistep problems): 7.12
	(solving two-step linear equations)
	Science: LS.1a (offer simple solutions to design
	problems): IS 1e construct and use models and
	simulations to illustrate, predict, and/or explain
	observable and unobservable phenomena, life
	processes or mechanisms: IS 3 (using dichotomous
	keys to classify)
7.8 The student will discuss the correctness of a	Mathematics: 7.9 (representing and analyzing data
model representing a system by comparing the	in histograms and other forms)
model's generated results with data that were	
observed in the system being modeled	Science: LS.1c (collecting and analyzing data): LS 1e
	(using and analyzing the limitations of models)
7.9 The student will refine computational models	Science: LS.1 (using engineering design process to
based on the data they have generated.	design and refine models and devices)
7.12 The student will explore careers related to the	English: 7.6 (students can read and research about
Internet.	Internet-related careers)

Computer Science Standard	Opportunity for Integration

Eighth Grade

Computer Science Standard	Opportunity for Integration
8.1 The student will construct programs to	Mathematics: 8.17 (solving multistep linear
accomplish a task as a means of creative expression	equations); 8.18 (solving inequalities)
or scientific exploration using a block based or text	
based programming language, both independently	Science: PS.1a (relationships between variables):
and collaboratively	PS 1a (offer simple solutions to design problems):
a) combining control structures such as if-	PS 1c (use data to evaluate and refine solutions to
statements and loops including posted	host most criteria): DS 1d (generate and compare
conditionals and loops	multiple solutions to problems based on how well
b) using clearly named variables that represent	they meet the criteria and constraints), DC 10
b) using clearly named variables that represent	(new meet the chiena and constraints); PS.10
different data types, including numeric and	(construct, develop, and use models and
non-numeric data, and perform operations on	simulations to illustrate and/or explain observable
their values; and	and unobservable phenomena)
c) create procedures with parameters.	
8.2 The student will systematically test and refine	Science: PS.1 (using engineering design process to
programs using a range of test cases.	design and refine) PS.1c (use data to evaluate and
	refine solutions to best meet criteria); PS.d
	(generate and compare multiple solutions to
	problems based on how well they meet the criteria
	and constraints); PS.1e (construct, develop, and use
	models and simulations to illustrate and/or explain
	observable and unobservable phenomena)
8.3 The student will explain how effective	English: 8.1c,d,e (communicating and working
communication between participants is required for	effectively with group members)
successful collaboration when developing programs.	
	Science: PS.1 (collaboratively planning and
	undertaking investigations)
8.4 The student will use flowcharts and/or pseudo	Mathematics: 8.14b (simplifying algebraic
code to address complex problems as algorithms.	expressions)
	Science: PS.1e (collaboratively planning and
	undertaking investigations)
8.5 The student will, using the elements of	Science: PS.1e (evaluate limitations of models)
computing devices such as primary memory,	
secondary storage, processor, input and output	
devices, and network connectivity; analyze the	

Computer Science Standard	Opportunity for Integration
advantages and limitations of a given computing system.	
8.8 The student will explain the difference between a model and a simulation, and create computational models to conduct simulations.	Science: PS.1e (developing and using models)
8.9 The student will describe tradeoffs between allowing information to be public, and keeping information private.	Social Studies: CE.3b (discussion of the 1 st Amendment in relation to expression of opinion on the Internet)
8.10 The student will evaluate online and print sources for appropriateness and credibility.	English: 8.3b,d,f,g (use media and visual literacy skills to analyze the value of online content) Science: PS.1f (gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication)
8.11 The student will discuss the social impacts and ethical considerations associated with the field of cybersecurity.	English: 8.5 (students could read fiction that addresses issues related to privacy and security)
8.12 The student will explore careers related to the field of cybersecurity.	English: 8.6 (read and research careers in cybersecurity)