Pacing Guide For Computer Science and Design Thinking Curriculum

Grade K-2

Topic	Marking Period	Number of Days
Computing Systems	3	2
Networks and the Internet	3	1
Impacts of Computing	3	1
Data & Analysis	2&3	2
Algorithms & Programming	3	5
Engineering Design	4	4
Interaction of Technology and Human	all	Woven throughout
Nature of Technology	4	2
Effects of Technology on the Natural World	4	2
Ethics & Culture	all	Woven throughout

Written Aug 2022
Reapproved by Board Aug 2026

Alpha Public School
Computer Science and Design Thinking Curriculum Map

Grade: K-2

Standard: 8.1.2	**Content Topic:** Computing Systems

Strand	Disciplinary Core Ideas / Essential Statement	Objective / Performance Expectation	Practice, Skills & Lesson
8.1.2.CS.1	Individuals use computing devices to perform a variety of tasks accurately and quickly. Computing devices interpret and follow the instructions they are given literally.	Select and operate computing devices that perform a variety of tasks accurately and quickly based on user needs and preferences	BeeBot robot *In person programming of robots with directional commands.. *Online https://beebot.terrapinlogo.com/
8.1.2.CS.2	A computing system is composed of software and hardware	Explain the functions of common software and hardware components of computing systems.	Parts of a Chromebook: diagram and scavenger hunt. Google Apps for Education: identify waffle, apps, compare & contrast docs, slides and sheets.
8.1.2.CS.3	Describing a problem is the first step toward finding a solution when computing systems do not work as expected	Describe basic hardware and software problems using accurate terminology	Lesson: Unspotted Bugs Unspotted Bugs

Formative, Summative and Alternative Assessments	Benchmark Assessments	Core Instructional and Supplemental Materials (including various texts at each grade level)
-programming of robots	-scavenger hunts	UnSpotted Bugs Google Apps

Technology	Crosscutting Concepts / Interdisciplinary Connections across grade levels and content areas (at least 1) / Intercultural Statements
https://beebot.terrapinlogo.com/ Google Software	ELA- Google docs

Differentiation (IEPs / 504s)	Differentiation (ELL)	Differentiation (G &T)
-Modify work as needed -teacher will read aloud questions -allow more time if needed, preferential seating	-Modify work as needed -teacher will read aloud questions -allow more time if needed, preferential seating -Provide challenge activities for enrichment	-Provide additional work as needed -Provide challenge activities for enrichment

21st Century Education	Career Education
THEMES: Global Awareness Financial, Economic, Business and Entrepreneurial Literacy Civic Literacy Health Literacy SKILLS: Creativity and Innovation Critical Thinking and Problem Solving Communication and Collaboration Information Literacy Media Literacy ICT Literacy Life and Career Skills	Career Ready Practices describe the career-ready skills that all educators in all content areas should seek to develop in their students. They are practices that have been linked to increase college, career, and life success. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study. CRP1. Act as a responsible and contributing citizen and employee. CRP2. Apply appropriate academic and technical skills. CRP3. Attend to personal health and financial well-being. CRP4. Communicate clearly and effectively and with reason. CRP5. Consider the environmental, social and economic impacts of decisions. CRP6. Demonstrate creativity and innovation. CRP7. Employ valid and reliable research strategies. CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. CRP9. Model integrity, ethical leadership and effective management. CRP10. Plan education and career paths aligned to personal goals. CRP11. Use technology to enhance productivity. CRP12. Work productively in teams while using cultural global competence.

Standard: 8.1.2	**Content Topic:** Networks and the Internet

Strand	Disciplinary Core Ideas / Essential Statement	Objective / Performance Expectation	Practice, Skills & Lesson
8.1.2.NI.1	Computer networks can be used to connect individuals to other individuals, places, information, and ideas. The Internet enables individuals to connect with others worldwide.	Model and describe how individuals use computers to connect to other individuals, places, information, and ideas through a network	Common Sense Education Who Is in Your Online Community? | Common Sense Education
8.1.2.NI.2	Computer networks can be used to connect individuals to other individuals, places, information and ideas. The Internet enables individuals to connect with others worldwide	Describe how the Internet enables individuals to connect with others worldwide	Common Sense Education Who Is in Your Online Community? | Common Sense Education

8.1.2.NI.3	Connecting devices to a network or the Internet provides great benefits, but care must be taken to use authentication measures, such as strong passwords, to protect devices and information from unauthorized access	Create a password that secures access to a device. Explain why it is important to create unique passwords that are not shared with others.	Common Sense Education That's Private! | Common Sense Education
8.1.2.NI.4	Connecting devices to a network or the Internet provides great benefits, but care must be taken to use authentication measures, such as strong passwords to protect devices and information from unauthorized access	Explain why access to devices needs to be secured	Common Sense Education Safety in my online neighborhood Who is in your online community

Formative, Summative and Alternative Assessments	Benchmark Assessments	Core Instructional and Supplemental Materials (including various texts at each grade level)
Discussion Worksheet	Creating a password	Internet articles Common Sense Education

Technology	Crosscutting Concepts / Interdisciplinary Connections across grade levels and content areas (at least 1) / Intercultural Statements
Who Is in Your Online Community? | Common Sense Education That's Private! | Common Sense Education Safety in my online neighborhood Who is in your online community	ELA SS

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Standard: 8.1.2.IC.1	**Content Topic:** Impacts of Computing

Strand	Disciplinary Core Ideas / Essential Statement	Objective / Performance Expectation	Practice, Skills & Lesson
8.1.2.IC.1	Computing technology has positively and negatively changed the way individuals live and work (e.g, entertainment, communication, productivity tools)	Compare how individuals live and work before and after the implementation of new computing technology	Lesson: Trains Then and Now : Phones Then and Now (predict what they *will* look like)

Formative, Summative and Alternative Assessments	Benchmark Assessments	Core Instructional and Supplemental Materials (including various texts at each grade level)
Predictions Pictures	Chart	Picture books

Technology	Crosscutting Concepts / Interdisciplinary Connections across grade levels and content areas (at least 1) / Intercultural Statements
Picture books Internet Pictures	ELA SS

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Standard: 8.1.2	**Content Topic:** Data and Analysis

Strand	Disciplinary Core Ideas / Essential Statement	Objective / Performance Expectation	Practice, Skills & Lesson
8.1.2.DA.1	Individuals collect, use and display data about individuals and the world around them	Collect and present data, including climate change data, in various visual formats	Measuring and graphing data: Heights of students-create a visual. .
8.1.2.DA.2	Computers store data that can be retrieved later. Data can be copied, stored in multiple locations, and retrieved.	Store, copy, search, retrieve, modify and delete data using a computing device	Docs Creation using Chromebook.
8.1.2.DA.3	Data can be used to make predictions about the world	Identify and describe patterns in data visualizations	Track weather temperatures and compare them to historical temperatures. Create an infographic.
8.1.2.DA.4	Data can be used to make predictions about the world	Make predictions based on data using charts or graphs	Use weather charts to make predictions.

Formative, Summative and Alternative Assessments	Benchmark Assessments	Core Instructional and Supplemental Materials (including various texts at each grade level)
Graph Weather tracking	Weather tracking	Weather books

Technology	Crosscutting Concepts / Interdisciplinary Connections across grade levels and content areas (at least 1) / Intercultural Statements
Weather maps Graphs	Science ELA

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Standard: 8.1.2	**Content Topic:** Algorithms and Programming

Strand	Disciplinary Core Ideas / Essential Statement	Objective / Performance Expectation	Practice, Skills & Lesson
8.1.2.AP.1	Individuals develop and follow directions as part of daily life. A sequence of steps can be expressed as an algorithm that a computer can process	Model daily processes by creating and following algorithms to complete tasks	Human Robot: teacher becomes a robot. Class *programs* the robot to draw a smiley face using detailed directions in the algorithm. (Alternate: washing hands algorithm)
8.1.2.AP.2	Real world information can be stored and manipulated in programs as data (e.g., numbers, words, colors, images)	Model the way programs store and manipulate data by using numbers or other symbols to represent information	BeeBot robot *In person programming of robot with directional commands.. *Online https://beebot.terrapinlogo.com/
8.1.2.AP.3	Computers follow precise sequences of steps that automate tasks	Create programs with sequences and simple loops to accomplish tasks	Code.org: various lessons
8.1.2.AP.4	Complex tasks can be broken down into simpler instructions, some of which can be broken down even further	Break down a task into a sequence of steps	Unplugged activities in code.org. Shoe tying, Plant a seed (paper & glue steps in order)
8.1.2.AP.5	People work together to develop programs for a purpose, such as expressing ideas or addressing problems. The development of a program involves identifying a sequence of events, goals, and expected outcomes, and addressing errors (when necessary)	Describe a program's sequence of events, goals and expected outcomes	Code.org course A, B, C
8.1.2.AP.6	People work together to develop programs for a purpose, such as expressing ideas or addressing problems. The development of a program involves identifying a sequence of events, goals, and expected outcomes, and addressing errors (when necessary)	Debug errors in an algorithm or program that includes sequences and simple loops	Code.org various programs. Ozobot Dash/Dot robot coding

Formative, Summative and Alternative Assessments	Benchmark Assessments	Core Instructional and Supplemental Materials (including various texts at each grade level)
Teacher robot Washing hands algorithm Planting a seed project	Bee Bot robot	Planting a seed book Directional books

Technology	Crosscutting Concepts / Interdisciplinary Connections across grade levels and content areas (at least 1) / Intercultural Statements
https://beebot.terrapinlogo.com/ Code.org	Science

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Standard: 8.2.2	**Content Topic:** Engineering Design

Strand	Disciplinary Core Ideas / Essential Statement	Objective / Performance Expectation	Practice, Skills & Lesson
8.2.2.ED.1	Engineering design is a creative process for meeting human needs or wants that can result in multiple solutions.	Communicate the function of a product or device	"How does it work?" (select simple, everyday items & explain how it works) YouTube videos
8.2.2.ED.2	Engineering design is a creative process for meeting human needs or wants that can result in multiple solutions	Collaborate to solve a simple problem, or to illustrate how to build a product using the design process	PBS: Curious George STEM-build a wall
8.2.2.ED.3	Engineering design is a creative process for meeting human needs or wants that can result in multiple solutions	Select and use appropriate tools and materials to build a product using the design process	PBS: Curious George STEM-build a wall *using Keva Planks, newspaper, string, other
8.2.2.ED.4	Limitations (constraints) must be considered when engineering designs	Identify constraints and their role in the engineering design process	PBS: Curious George STEM-build a wall

Formative, Summative and Alternative Assessments	Benchmark Assessments	Core Instructional and Supplemental Materials (including various texts at each grade level)
Explanation projects	Build a wall project	Curious George PBS

Technology	Crosscutting Concepts / Interdisciplinary Connections across grade levels and content areas (at least 1) / Intercultural Statements
PBS- Curious George	Science Math

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Standard: 8.2.2	**Content Topic:** Interaction of Technology and Humans

Strand	Disciplinary Core Ideas / Essential Statement	Objective / Performance Expectation	Practice, Skills & Lesson
8.2.2.ITH.1	Human needs and desires determine which new tools are developed.	Identify products that are designed to meet human wants or needs	PBS: Curious George STEM- Tool Time
8.2.2.ITH.2	Human needs and desires determine which new tools are developed	Explain the purpose of a product and its value	PBS: Curious George STEM
8.2.2.ITH.3	Technology has changed the way people live and work. Various tools can improve daily tasks and quality of life	Identify how technology impacts or improves life	PBS: Full STEAM Ahead -Simple Machines
8.2.2.ITH.4	Technology has changed the way people live and work. Various tools can improve daily tasks and quality of life	Identify how various tools reduce work and improve daily tasks	PBS: Full STEAM Ahead -Simple Machines

8.2.2.ITH.5	Technology has changed the way people live and work. Various tools can improve daily tasks and quality of life	Design a solution to a problem affecting the community in a collaborative team and explain the intended impact of the solution	Trash to Treasure: How can we recycle materials in a purposeful and useful way?

Formative, Summative and Alternative Assessments	Benchmark Assessments	Core Instructional and Supplemental Materials (including various texts at each grade level)
Simple Machines	Recycled projects	PBS Steam ahead Curious George

Technology	Crosscutting Concepts / Interdisciplinary Connections across grade levels and content areas (at least 1) / Intercultural Statements
PBS Full Steam Ahead	Science Math

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Literacy Life and Career Skills	CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. CRP9. Model integrity, ethical leadership and effective management. CRP10. Plan education and career paths aligned to personal goals. CRP11. Use technology to enhance productivity. CRP12. Work productively in teams while using cultural global competence.

Standard: 8.2.2	**Content Topic:** Nature of Technology

Strand	Disciplinary Core Ideas / Essential Statement	Objective / Performance Expectation	Practice, Skills & Lesson
8.2.2.NT.1	Innovation and the improvement of existing technology involves creative thinking	Model and explain how a product works after taking it apart, identifying the relationship of each part, and putting it back together	Student created puzzles. (K)
8.2.2.NT.2	Innovation and the improvement of existing technology involves creative thinking	Brainstorm how to build a product, improve a designed product, fix a product that has stopped working, or solve a simple problem	PBS: Curious George STEM-build a wall *using Keva Planks, newspaper, string, other

Formative, Summative and Alternative Assessments	Benchmark Assessments	Core Instructional and Supplemental Materials (including various texts at each grade level)
Student created puzzles	Build a wall project	PBS Steam ahead Curious George

Technology	Crosscutting Concepts / Interdisciplinary Connections across grade levels and content areas (at least 1) / Intercultural Statements
PBS Steam Ahead	Science Math

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Standard: 8.2.2	**Content Topic:** Effects of Technology on the Natural World

Strand	Disciplinary Core Ideas / Essential Statement	Objective / Performance Expectation	Practice, Skills & Lesson
8.2.2.ETW.1	The use of technology developed for the human designed world can affect the environment, including land, water, air, plants and animals. Technologies that use natural sources can have negative effects on the environment, its quality, and inhabitants. Reusing and recycling materials can save money while preserving natural resources and avoiding damage to the environment.	Classify products as resulting from nature or produced as a result of technology	Tech vs. Nature Venn diagram (Sort and record various materials, ie: cotton balls, ozobot)
8.2.2.ETW.2	The use of technology developed for the human designed world can affect the environment, including land, water, air, plants and animals. Technologies that use natural sources can have negative effects on the environment, its quality, and inhabitants. Reusing and recycling materials can save money while	Identify the natural resources needed to create a product	Exploring Natural Resources and Products

	preserving natural resources and avoiding damage to the environment.		
8.2.2.ETW.3	The use of technology developed for the human designed world can affect the environment, including land, water, air, plants and animals. Technologies that use natural sources can have negative effects on the environment, its quality, and inhabitants. Reusing and recycling materials can save money while preserving natural resources and avoiding damage to the environment.	Describe or model the system used for recycling technology	Recycling learnbright.org
8.2.2.ETW.4	The use of technology developed for the human designed world can affect the environment, including land, water, air, plants and animals. Technologies that use natural sources can have negative effects on the environment, its quality, and inhabitants. Reusing and recycling materials can save money while preserving natural resources and avoiding damage to the environment.	Explain how the disposal of or reusing a product affects the local and global environment	PBSkids.org Elinor Wonders Why: Composting, Litterbug cleanup

Formative, Summative and Alternative Assessments	Benchmark Assessments	Core Instructional and Supplemental Materials (including various texts at each grade level)
Venn Diagram	Cleanup poster	PBS Recycle picture books

Technology	Crosscutting Concepts / Interdisciplinary Connections across grade levels and content areas (at least 1) / Intercultural Statements
https://teaching.betterlesson.com/lesson/637952/exploring-natural-resources-and-products https://learnbright.org/lessons/science/recycling/ https://nj.pbslearningmedia.org/collection/caring-for-the-environment-outdoor-lesson/	Science Math

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Standard: 8.2.2	**Content Topic:** Ethics and Culture

Strand	Disciplinary Core Ideas / Essential Statement	Objective / Performance Expectation	Practice, Skills & Lesson
8.2.2.EC.1	The availability of technology for essential tasks varies in different parts of the world	Identify and compare technology used in different schools, communities, regions and parts of the world	Molly of Denali (First Fish) ~ PBS learning media.

Formative, Summative and Alternative Assessments	Benchmark Assessments	Core Instructional and Supplemental Materials (including various texts at each grade level)
VENN Diagram (Alaska vs NJ)	Picture comparison of tech use.	PBS

Technology	Crosscutting Concepts / Interdisciplinary Connections across grade levels and content areas (at least 1) / Intercultural Statements
Youtube PBS	Social Studies

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