

Unit	Unit Title	Recommended Instructional Days
3	Computer Programming and Design Thinking with Sphero indi robots	Trimester 3
<p>Disciplinary Concept:</p> <p>CS DA AP ED</p>	<p>Practice:</p> <p>Fostering an Inclusive Computing and Design Culture</p> <p>Collaborating Around Computing and Design</p> <p>Recognizing and Defining Computational Problems</p> <p>Developing and Using Abstractions</p> <p>Communicating About Computing and Design</p>	<p>Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-CSDT within Unit</p>
<p>Core Idea:</p>	<p>Performance Expectation/s:</p>	
<p>Individuals use computing devices to perform a variety of tasks accurately and quickly. Computing devices interpret and follow the instructions they are given literally.</p> <p>A computing system is composed of software and hardware.</p> <p>Describing a problem is the first step toward finding a solution when computing systems do not work as expected.</p> <p>Individuals collect, use, and display</p>	<p>8.1.2.CS.1: Select and operate computing devices that perform a variety of tasks accurately and quickly based on user needs and preferences.</p> <p>8.1.2.CS.2: Explain the functions of common software and hardware components of computing systems.</p> <p>8.1.2.CS.3: Describe basic hardware and software components of computing systems.</p> <p>8.1.2.DA.1: Collect and present data, including climate change data, in</p>	<p><u>Essential Question/s:</u></p> <p>How do the different parts of an indi robot help it to see, move, and light up?</p> <p>How can following routines and using color tiles help us make indi move direction?</p> <p>How can we use repeating sounds, movements, and pictures to create a special path that helps indi find its way?</p>

<p>data about individuals and the world around them. Data can be used to make predictions about the world. 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. Real-world information can be stored and manipulated in programs as data (e.g., numbers, words, colors, images). Computers follow precise sequences of steps that automate tasks. 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). Engineering design is a creative process for meeting human needs or wants that can result in multiple solutions.</p>	<p>various visual formats. 8.1.2.DA.3: Identify and describe patterns in data visualizations. 8.1.2.AP.1: Model daily processes by creating and following algorithms to complete tasks. 8.1.2.AP.2: Model the way programs store and manipulate data by using numbers or other symbols to represent information. 8.1.2.AP.3: Create programs with sequences and simple loops to accomplish tasks. 8.1.2.AP.5: Describe a program's sequence of events, goals, and expected outcomes. 8.1.2.AP.6: Debug errors in an algorithm or program that includes sequences and simple loops. 8.2.ED.1: Communicate the function of a product or device.</p>	<p>How do things in nature happen again and again, and how can we use that idea to make our own repeating patterns?</p> <p>How does measuring help us understand the world around us?</p> <p><u>Activity Description:</u></p> <p>Meet Sphero indi (access prior knowledge). Reintroduce indi and identify and discuss its parts and their functions. Power on indi and place on a green tile and allow students to observe using their senses (Review Lesson 1: Meet Sphero indi).</p> <p>Help indi move through the classroom at different speeds and explain why we move in the classroom, the hallways, and the playground in different ways (Directions: Lesson1: Routines; Lesson 2: Transitions)</p> <p>Identify key areas and objects in the classroom. Introduce maps using an interactive board to explain the concept and purpose of a map. Work collaboratively to design and test a path for the indi robot (indi Robot classroom map activity; Navigating Our Classroom!) (Directions: Lesson 3: Mini City).</p> <p>Engage in exploration activities. Use a set of multi-colored objects to complete and create new patterns (Patterns & Sequences: Lesson 1: Identifying Patterns).</p> <p>Explore and review patterns. Groups use the ndi student kit and blue and pink color cards to create a four-sided path. Discuss how the indi moved and how to create a loop for indi (Patterns & Sequences: Lesson 2: Looping Patterns).</p> <p>Discuss different natural cycles (day/night, four seasons, water cycle, life cycle of a butterfly, life cycle of a plant). Complete four seasons and day/night worksheets. Create nonlooping paths for ndi and explain what is happening at each step through the natural cycle (Lesson 3: Sequences in Nature).</p>
<p>Social and Emotional Learning: <i>Competencies</i></p>	<p>Social and Emotional Learning: <i>Sub-Competencies</i></p>	

<p>Self-Awareness</p> <p>Self-Management</p> <p>Social Awareness</p> <p>Responsible Decision-Making</p>	<ul style="list-style-type: none"> Recognize one’s feelings and thoughts Recognize the importance of self-confidence in handling daily tasks and challenges Understand and practice strategies for managing one’s own emotions, thoughts, and behaviors Recognize the skills needed to establish and achieve personal and educational goals Recognize and identify the thoughts, feelings, and perspectives of others Demonstrate an understanding of the need for mutual respect when viewpoints differ Demonstrate an awareness of the expectations for social interactions in a variety of settings Develop, implement, and model effective problem-solving and critical thinking skills 	<p>Investigate the fundamental stages of the water cycle (evaporation, condensation, precipitation, and collection) through hands-on interaction with Indi robots. Program the robots to physically model water's movement, reinforcing understanding of these scientific processes. Introduce the concept of climate change at an age-appropriate level, emphasizing its impact on the water cycle. Identify and articulate practical actions to promote water conservation and environmental stewardship (Lesson plan: Indi Robot, Water Cycle, and Climate Change) (Patterns & Sequences: Lesson 3 Sequences in Nature).</p> <p>Engage in exploration activities using various tools to measure. Use color tiles to measure distance and accurately predict how far indi will travel (Measuring: Lesson 1: Simple Distances).</p> <p>Enrichment: Sphero indi Challenge cards</p> <p>Interdisciplinary Connections: ELA R.1.1.6; RF.1.3; SL.1.1; SL.1.1C; SL.1.3; SL.1.5; W.1.8 MATH 1.G.A.1; 1.G.A.2; 1.MD.A.1; 1.MD.A.2; 1.OA.A.1 Science 1-ESS2-1; K-2-ETS1-1;</p>
<p style="text-align: center;">Assessments (Formative) <i>To show evidence of meeting the standard/s, students will successfully engage within:</i></p>		<p style="text-align: center;">Assessments (Summative) <i>To show evidence of meeting the standard/s, students will successfully complete:</i></p>
<p>Formative Assessments:</p> <ul style="list-style-type: none"> Observations Discussions 		<p>Benchmarks:</p> <ul style="list-style-type: none"> Performance Assessment

<ul style="list-style-type: none"> Self Assessments/Reflection Lesson Activity Worksheets/Drawings 		<p>Summative Assessments:</p> <ul style="list-style-type: none"> District/Department Assessments 	
<p>Differentiated Student Access to Content: Teaching and Learning Resources/Materials</p>			
<p>Core Resources</p>	<p>Alternate Core Resources <i>IEP/504/At-Risk/ESL</i></p>	<p>ELL Core Resources</p>	<p>Gifted & Talented Core Resources</p>
<ul style="list-style-type: none"> Sphero indi classroom pack Educator Guide Book Department-created lesson plans 	<ul style="list-style-type: none"> Reteach Sphero indi Guide for Multilingual Learners 	<ul style="list-style-type: none"> Dictionary for native language 	<ul style="list-style-type: none"> Enrichment/Extension activities
<p>Supplemental Resources</p>			
<p>Technology:</p> <ul style="list-style-type: none"> Chromebooks, MacBook Projector Interactive Whiteboard Google Classroom sphero.com/pages/sphero-indi indi robots YouTube (Note: Check links and watch all videos in their entirety before sharing with students) <p>Other:</p> <ul style="list-style-type: none"> Pencils, crayons, markers, paper indi Educator Guide Book indi Beginner Programming Challenge Cards 			
<p>Differentiated Student Access to Content: Recommended Strategies & Techniques</p>			
<p>Core Resources</p>	<p>Alternate Core Resources <i>IEP/504/At-Risk/ESL</i></p>	<p>ELL Core Resources</p>	<p>Gifted & Talented Core</p>

<ul style="list-style-type: none">• Deliver instruction utilizing varied learning styles, including audio, visual, and tactile/kinesthetic, provide individual instruction as needed, modify assessments and/or rubrics, repeat instructions as needed.	<ul style="list-style-type: none">• Special Education: Adhere to IEPs/504s. Utilize a multi-sensory (VAKT) approach during instruction, provide alternate presentations of skills by varying the method (repetition, simple explanations, additional examples, modeling, etc.), modify test content and/or format, allow students to retake test for additional credit, provide additional times and preferential seating as needed, review, restate and repeat directions, provide study guides, and/or break assignments into segments of shorter tasks.• Students at Risk of School Failure: Deliver instruction utilizing varied learning styles including audio, visual, and tactile/kinesthetic, provide individual instruction as needed, modify assessments and/or rubrics, repeat instructions as needed.	<ul style="list-style-type: none">• English Language Learners: Extend time requirements, preferred seating, positive reinforcement, check often for understanding/review, oral/visual directions/prompts when necessary, supplemental materials including use of online or paper bilingual dictionaries, and modified assessment and/or rubric.	<ul style="list-style-type: none">• Provide extension activities related to the topic being discussed. Create an enhanced set of introductory activities, integrate active teaching/learning opportunities, incorporate authentic components, propose interest-based extension activities, and connect students to related talent development opportunities.
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Disciplinary Concept: Creativity and Innovation, Critical Thinking and Problem-solving, Digital Citizenship, Technological Literacy

NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	<i>Core Ideas:</i>	<ul style="list-style-type: none"> Brainstorming can create new, innovative ideas Critical thinkers must first identify a problem then develop a plan to address it to effectively solve the problem. Digital tools have a purpose. Collaboration can simplify the work an individual has to do and sometimes produce a better product.
	<i>Performance Expectation/s:</i>	<ul style="list-style-type: none"> 9.4.2.CI.2; 9.4.2.CT.1; 9.4.2.CT.2; 9.4.2.CT3; 9.4.2.TL.1; 9.4.2.TL.7
	Career Readiness, Life Literacies, & Key Skills Practices	
	<ul style="list-style-type: none"> Act as a responsible and contributing community members and employee. Consider the environmental, social and economic impacts of decisions. Demonstrate creativity and innovation. Utilize critical thinking to make sense of problems and persevere in solving them. Model integrity, ethical leadership, and effective management. Use technology to enhance productivity, increase collaboration and communicate effectively. 	

New Jersey Legislative Statutes and Administrative Code
(place an "X" before each law/statute if/when present within the curriculum map)

Amistad Law: <i>N.J.S.A. 18A 52:16A-88</i>		Holocaust Law: <i>N.J.S.A. 18A:35-28</i>		LGBT and Disabilities Law: <i>N.J.S.A. 18A:35-4.35</i>		Diversity & Inclusion: <i>N.J.S.A. 18A:35-4.36a</i>	X	Standards in Action: <i>Climate Change</i>
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