

Course Title

# IAA STEAM 8



# INNOVATIVE ARTS ACADEMY

Course Overview

This course integrates visual arts with science, technology, and engineering to foster interdisciplinary thinking and creative problem-solving. Students will explore how artistic expression and technological innovation are intertwined, influencing and reflecting the world around us. Through hands-on projects, collaborative work, and critical analysis, students will develop skills in design, communication, and evaluation across disciplines.

Unit Title

Introduction to Robotics & Creative Design

Time Frame

11 sessions



Unit Title

Creative Code: Robotics, Art & Social Impact

Time Frame

11 sessions



Unit Title

EcoTech: Robotics, Art & Sustainable Innovation

Time Frame

11 sessions



Unit Title

Designing Change: Critical Thinking, Aesthetics & Innovation in STEAM

Time Frame

12 Sessions



Focus of the Unit

In this introductory unit, students will explore the fundamentals of robotics and design thinking through hands-on use of Sphero Bolt robots and 3Doodler pens. They'll learn to code basic robotic behaviors and apply the creative process to design and build physical elements, recognizing the shared stages of ideation, creation, and iteration in both engineering and art.

Focus of the Unit

In this unit, students will explore how art and technology intersect to influence society. Using advanced programming with Sphero Bolt and the Sphero Edu app, students will develop computational thinking and problem-solving skills while analyzing how visual design and digital tools can communicate ideas, values, and social messages.

Focus of the Unit

In this unit, students will use the engineering design process to build and program robotic solutions that address real-world environmental challenges. By combining Creator Mini-Bots, Sphero Bolt programming, and artistic design, students will explore how technology and creativity can promote sustainability and inspire action around issues like resource use and human impact.

Focus of the Unit

In this culminating unit, students will apply critical thinking, design, and technical skills to develop interdisciplinary projects that address real-world challenges. They will engage in formal critique, reflect on the impact of personal, historical, and technical choices, and explore how creative problem-solving and technology can influence and communicate ideas effectively.

Board Approved 8/2025

**Unit Title**

**Introduction to Robotics & Creative Design**

**Time Frame**

11 sessions



**INNOVATIVE**  
ARTS ACADEMY

**Essential Question(s)**



- How do artists and engineers use similar processes to bring ideas to life?
- How can we use robotics and 3D design to solve problems or tell stories?
- Why is planning, testing, and revising important in both art and technology?

**Focus of the Unit**



In this introductory unit, students will explore the fundamentals of robotics and design thinking through hands-on use of Sphero Bolt robots and 3Doodler pens. They'll learn to code basic robotic behaviors and apply the creative process to design and build physical elements, recognizing the shared stages of ideation, creation, and iteration in both engineering and art.

**Standards**

- Apply technological design to solve problems (S8.A.2.1.1-1.5) [centralvalleysd.org+5ixl.com+5pa.gov+5pa.gov](http://centralvalleysd.org+5ixl.com+5pa.gov+5pa.gov)
- Understand the role of models and systems in engineering (S8.A.3.1-3.2)
- Emphasis on the iterative design process mirrors scientific and technological practices (S8.A.2)

**Learning Targets**

I can program a Sphero BOLT robot using Draw and Block Canvas interfaces to control its movement, lights, and sounds

**Learning Targets**

I can plan, create, and refine physical designs using a 3Doodler Start pen to enhance robotic challenges and explorations

**Learning Targets**

I can manipulate elements of design like line and shape through physical creation to support an artistic or engineering outcome

**Learning Targets**

I can use tools and materials safely as part of a design process



**Resources**

**Sphero Bolt Robots, Sphero Edu App, 3Doodler Start Pens + Filament, Design Thinking Graphic Organizers, Student Journals, Chromebooks**

<b>Unit Title</b>	<b>Creative Code: Robotics, Art &amp; Social Impact</b>
<b>Time Frame</b>	11 sessions



**INNOVATIVE**  
ARTS ACADEMY

	<b>Essential Question(s)</b>
	<ul style="list-style-type: none"> <li>• How can we use art and technology to express ideas and influence others?</li> <li>• What makes a digital message powerful or effective?</li> <li>• How does coding help us bring creative ideas to life in meaningful ways?</li> </ul>

	<b>Focus of the Unit</b>
	<p>In this unit, students will explore how art and technology intersect to influence society. Using advanced programming with Sphero Bolt and the Sphero Edu app, students will develop computational thinking and problem-solving skills while analyzing how visual design and digital tools can communicate ideas, values, and social messages.</p>

<b>Standards</b>	<ul style="list-style-type: none"> <li>• S8.A.1-1.4: Analyze systems and models—students critique how their designs and code function to influence audiences.</li> <li>• S8.A.2.1: Apply technological design to solve problems—students deliberately use design elements and programming to convey specific ideas.</li> </ul>
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<b>Learning Targets</b>
<p>I can apply computational thinking principles such as decomposition, pattern recognition, abstraction, and algorithmic design to solve programming challenges with Sphero BOLT</p>

<b>Learning Targets</b>
<p>I can debug my programs by locating and troubleshooting errors, ensuring they run as intended</p>

<b>Learning Targets</b>
<p>I can transition between block-based and text-based (JavaScript) programming environments, understanding the syntax and purpose of each</p>

<b>Learning Targets</b>
<p>I can use infrared (IR) sensors to enable communication and interaction between multiple Sphero BOLT robots</p>



<b>Resources</b>	<p><b>Sphero Bolt Robots, Sphero Edu App (Block &amp; Text), Visual Design Toolkit (Elements &amp; Principles), Google Slides or Canva, Art Materials (Markers, Mixed Media), Chromebooks</b></p>
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<b>Unit Title</b>	<b>EcoTech: Robotics, Art &amp; Sustainable Innovation</b>
<b>Time Frame</b>	11 sessions



**INNOVATIVE**  
ARTS ACADEMY

	<b>Essential Question(s)</b>
	<ul style="list-style-type: none"> <li>• How can robotics and design be used to solve environmental problems?</li> <li>• What responsibilities do we have when designing for sustainability?</li> <li>• How can art and technology work together to inspire environmental change?</li> </ul>

	<b>Focus of the Unit</b>
	<p>In this unit, students will use the engineering design process to build and program robotic solutions that address real-world environmental challenges. By combining Creator Mini-Bots, Sphero Bolt programming, and artistic design, students will explore how technology and creativity can promote sustainability and inspire action around issues like resource use and human impact.</p>

<b>Standards</b>	<ul style="list-style-type: none"> <li>• Engage with the full engineering design process (S8.A.2.1) <a href="http://pa.gov">pa.gov</a></li> <li>• Explore natural and human-made systems; analyze their interactions (S8.A.3.1–3.3)</li> <li>• Address sustainability and human impact on ecosystems (S8.B.3.3 and S8.D.1.2)</li> </ul>
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<b>Learning Targets</b>
I can apply the engineering design process to define, design, build, test, and refine robotic solutions using Creator Mini-Bots and Sphero BOLT robots
<b>Learning Targets</b>
I can collaborate with peers to explore and invent unique solutions to engineering problems

<b>Learning Targets</b>
I can program robots to interact with their environment by utilizing various sensors (e.g., line sensors for Mini-Bots, light, accelerometer, gyroscope for BOLT) to gather data and control behavior
<b>Learning Targets</b>
I can iteratively test and modify my robotic designs and programs based on collected data to achieve optimal performance



<b>Resources</b>	<b>Creator Mini-Bots Kits, Sphero Bolt Robots, Sphero Edu App, Recyclable &amp; Sustainable Materials, Poster Boards or Canva, Chromebooks</b>
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<b>Unit Title</b>	<b>Designing Change: Critical Thinking, Aesthetics &amp; Innovation in STEAM</b>
<b>Time Frame</b>	12 sessions



**INNOVATIVE**  
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	<b>Essential Question(s)</b>
	<ul style="list-style-type: none"> <li>• What makes a STEAM project both innovative and meaningful?</li> <li>• How do our design choices affect how others experience or value our work?</li> <li>• How can we use feedback and reflection to improve our ideas and outcomes?</li> </ul>

	<b>Focus of the Unit</b>
	<p>In this culminating unit, students will apply critical thinking, design, and technical skills to develop interdisciplinary projects that address real-world challenges. They will engage in formal critique, reflect on the impact of personal, historical, and technical choices, and explore how creative problem-solving and technology can influence and communicate ideas effectively.</p>

<b>Standards</b>	<p>Develop evidence-based evaluations of projects and systems (S8.A.1, S8.A.2, S8.A.3)          Reflect on personal, historical, and technical contexts in design—aligned with S8.A.1.2 (analyze impacts of science and technology)</p>
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<b>Learning Targets</b>
<p>I can evaluate the societal, cultural, and environmental impacts of technological solutions, considering ethical implications and sustainable practices</p>

<b>Learning Targets</b>
<p>I can collaborate with others using contemporary technologies to create artistic and technological works</p>

<b>Learning Targets</b>
<p>I can create multimedia presentations that effectively communicate the design process, functionalities, and impacts of my robotic and engineered solutions, incorporating visual, auditory, and textual elements</p>

<b>Learning Targets</b>
<p>I can develop and present a personal vision or address a social issue through the creation of an integrated STEAM project</p>



<b>Resources</b>	<b>Google Slides and Canva, Student journals, Graphic Organizers, Chromebooks</b>
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