



STEM School Chattanooga

Mini-PBL

Course: Tech-Time Mini-PBL: Sphero Robotics Mini-Golf Competition

Tech-Time

Standards (Learning Targets)

Innovation, Collaboration, Critical Thinking,

Grade Level	Grade level 9th	Unit Length	_4_ Weeks (length of unit)
Mini-PBL Overview	In this unit students will design a technology based Mini Golf course. To accomplish this goal, students will build and code 15 Sphero Robots using the Lightning Labs app on their ipads . In addition, each group of students will also design a mini-golf course.. The students will program their robot to navigate their designed course and challenge other groups to complete their courses as well . Each course will have a “high score” (quickest completion time) that each team can compete against.		
Mini-PBL Driving Question	How can we, as Computer programmers, program sphero robots, that can navigate a mini golf course?		
Hook Event	Hook Event will include a Sphero 2.0 commercial https://youtu.be/1S5lUDvlu3A Teacher will use video above to kick start the unit and then show rubric.		
Scaffolding Activities	This section should include the scaffolding activities used throughout the mini-pbl. The activities listed should fall into the following categories: Class Activities • SPHERO BASICS - Sphero basics, installation of Lightning Labs app. • SPHERO CODING 101 - Introduction to coding with Sphero. • OVERVIEW - Presentation of required products: Robot code checkpoints, Robot coded, team logo, team poster, team designed course, rubric review. • STUDENT CONTRACTS- Students will create contracts that include deadlines based on the rubric calendar, behavior consequences, what do during disagreements of ideas, and jobs.		

	Station Activities - MINI-GOLF COURSE BRAINSTORM: students design a mini golf course on paper and create prototypes to test before creating their final design. Workshops - LOGO DESIGN - Team logo building workshop, using a vinyl cutter to create team logo stickers. Logos are given out to other teams who code their team’s robot to complete your groups maze. - POSTER DESIGN-Poster design workshop. Posters are used to promote your team’s maze and to post logos earned from completing another team’s maze. Poster should be 2’ by 3’. Focus Groups - CODING SPHERO - Sphero coding 101 for groups who need help. - COURSE DESIGN - Groups meet with teacher to go over Mini-Golf paper prototype design, create course using shop tools, code robot using Sphero Lightning Lab to complete your own maze with code only. Code your Sphero to complete other groups mazes to earn their teams Logo Design for your Poster. Mini-PBL Teams - TEAM TIME - Groups will include 2 or 3 members per Sphero Robot- Jobs will include: a coder, course designer, and poster/logo creator. Digital Resources - Sphero quick start manual - https://sphero.zendesk.com/hc/en-us/articles/204392150-Sphero-Quick-Start-Guide - Sphero tutorial - Basic Movment - https://youtu.be/QtfNYp3pS00																				
Calendar Overview	<table><tr><th>Monday</th><th>Tuesday</th><th>Wednesday</th><th>Thursday</th><th>Friday</th></tr><tr><td> - HOOK - SPHERO BASICS - OVERVIEW </td><td> - STUDENT CONTRACTS - SPHERO BASICS </td><td> - SPHERO CODING 101 </td><td> - TEAM TIME - CODING SPHERO - MINI GOLF COURSE BRAINSTORMING </td><td> - MINI GOLF COURSE BRAINSTORMING - TEAM TIME - COURSE DESIGN </td></tr><tr><td> - TEAM TIME - COURSE DESIGN </td><td> - LOGO DESIGN - POSTER DESIGN - TEAM TIME - COURSE DESIGN </td><td> - LOGO DESIGN - POSTER DESIGN - TEAM TIME - COURSE DESIGN </td><td> - LOGO DESIGN - POSTER DESIGN - TEAM TIME - COURSE DESIGN - POSTER-DUE* - LOGO - DUE* </td><td> - TEAM TIME - COURSE DESIGN </td></tr><tr><td> - TEAM TIME - COURSE DESIGN </td><td> - TEAM TIME - COURSE DESIGN </td><td> - TEAM TIME - COURSE DESIGN </td><td> - TEAM TIME - COURSE DESIGN </td><td> - SHOWCASE </td></tr></table>	Monday	Tuesday	Wednesday	Thursday	Friday	- HOOK - SPHERO BASICS - OVERVIEW	- STUDENT CONTRACTS - SPHERO BASICS	SPHERO CODING 101	- TEAM TIME - CODING SPHERO - MINI GOLF COURSE BRAINSTORMING	- MINI GOLF COURSE BRAINSTORMING - TEAM TIME - COURSE DESIGN	- TEAM TIME - COURSE DESIGN	- LOGO DESIGN - POSTER DESIGN - TEAM TIME - COURSE DESIGN	- LOGO DESIGN - POSTER DESIGN - TEAM TIME - COURSE DESIGN	- LOGO DESIGN - POSTER DESIGN - TEAM TIME - COURSE DESIGN - POSTER-DUE* - LOGO - DUE*	- TEAM TIME - COURSE DESIGN	- TEAM TIME - COURSE DESIGN	- TEAM TIME - COURSE DESIGN	- TEAM TIME - COURSE DESIGN	- TEAM TIME - COURSE DESIGN	SHOWCASE
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Culminating Event	Product 1 sphero robot, 1-14 codes to participate in the group stations, 1 mini-golf course., 1 course poster, 1 team poster and 14 team logo stickers. Showcase - Classroom will be setup like a mini-golf course. Students will bring in their coded robot, team posters and logo stickers. Group designed courses will be played for team logo stickers. The team with the greatest amount of logo stickers wins the competition. - The final showcase will include setting the room up in two rows facing each other. Teams will use their team posters to earn logo stickers for each of the 14 courses. 1 member from each group will run their station, 1 member go around the room running their robot code to complete other groups courses to earn stickers, in addition the team posters will be placed around the room.																				

Common Assessment					
		Mini-PBL Rubric		Mini-PBL: _____ Student: _____ Date: _____	
		Advanced	Proficient	Needs Improvement	
		List the Standards (Learning Targets)	1) Team poster should include 14 individual areas to place earned pins. 2) Course poster should include course map, hints and strategies for completing the course. 3) Course should include 1 simple machine that a robot could activate to create an event, (ie open drawbridge, release blocks,	1) Team must create 1 team poster. Poster must be no larger than 2 feet by 2 feet. 2) Team must create 1 course poster for their team created mini golf course. Poster must have graphics that are size appropriate for a 2 foot by 3 foot poster. 3) Team must create 1 mini golf hole using a 4 x 4 sheet of plywood.	
		Coding (21 st Century Skills)	1) Program the Sphero Robot to complete at least 6 mini golf courses that were created by other teams.	Program Sphero Robot to move: 1) 1 foot forward 2) 4 foot square perimeter 3) Move in the shape of a triangle that has 2' legs 4) Robot must complete team built course 5) Robot must complete at least 1 other course created by another team.	
		Minimum Requirement Components: Must be included to be graded	1. Program movement of a Sphero Robot 2. Create 1 course poster 3. Create 1 team banner 4. Create a team logo sticker 5. Create 1 team course		
Grades	• If the Mini-PBL work is all advanced according to the rubric criteria above, the grade is a 100. • If the work meets all the proficient criteria and not all of the advanced criteria, the grade is an 85. • If the work does not meet all of the proficient criteria, the grade is a 50. • If the grade does not meet the minimum requirements, the grade is a 0.				
Vocabulary					
	Content Area - Computer Programming (Tech Time)	1. Engineering 2. Coding 3. Looping 4. Graphic Design 5. Program 6. Play/Pause 7. Wait 8. Move 9. Switch			