

 Date:	Topic: Smart Phone Control	Time Required: 45 minutes		
🎯 Learning Target/Objectives:				
<ul style="list-style-type: none">• I can configure a mobile application to establish a secure Bluetooth and GPS-linked connection with robotic hardware .• I can manipulate a three-dimensional robotic arm using a two-dimensional interface and touch-drag gestures .• I can distinguish between remote control, creation, and storage modes within a mobile robotics ecosystem				
 Vocabulary:	 Guiding Questions:			
<ul style="list-style-type: none">• Bluetooth Pairing• GPS Service• Model Remote Control• Create Actions• 2D Animation• Custom Actions				
📚 Lesson Design Details:				
<ul style="list-style-type: none">• Activity 1: The Connection Checklist<ul style="list-style-type: none">◦ Focus: Students act as "Technical Support" and create a visual flowchart for pairing the device, highlighting the "Settings" menu fix if the wrong robot model appears.• Activity 2: The Digital Twin Challenge<ul style="list-style-type: none">◦ Focus: Using "Model Remote Control," students must move the physical arm into a specific pose by only touching the 2D animation on the screen. They then compare the digital stance to the physical stance .• Activity 3: Action Group Execution<ul style="list-style-type: none">◦ Focus: Students trigger pre-downloaded action groups and identify which button executes which complex move.				

Key Points (Vocabulary):

- **Bluetooth Pairing:** The process of connecting the smartphone and robot wirelessly through the app's internal search function.
- **GPS Service:** Global Positioning System; required by some mobile operating systems to enable Bluetooth device discovery.
- **Model Remote Control:** An interface mode that combines a 2D screen with buttons to control movement.
- **Create Actions:** A programming mode used to debug, record, and save robotic data.
- **2D Animation:** A digital representation on the screen that mirrors the physical stance of the xArm 1S .
- **Custom Actions:** User-programmed movements stored in the "My Action" folder.

Key Points of Instruction

- **In-App Pairing Only:** Students often try to pair Bluetooth in their phone's main settings menu. Emphasize that they **must** use the flashing Bluetooth icon inside the Wonderbot app to avoid connection errors .
- **Platform Requirements:** Ensure students check their OS version. The app requires Android 7.0 or above, or iOS 9.0 or above.
- **Spatial Mapping:** Instruct students on how the 2D animation works. Dragging specific sections of the digital arm controls specific servos (ID3, ID4, or ID5), while sliders control others (ID1, ID2, and ID6) .
- **Safety Reset:** Teach the "Back to Start" command immediately. This is the primary way to return all servos to their safe, middle position if the robot becomes tangled or unstable.

Teacher's Cheat Sheet

Feature	Requirement / Action
App Name	Wonderbot (App Store for iOS)
OS Requirements	Android 7.0 or above / iOS 9.0 or above
Crucial Pre-step	Turn on Bluetooth AND GPS before opening App
Pairing Protocol	Click flashing Bluetooth icon in App; select "xArm"

Model Selection	If interface is wrong, go to Settings -> choose "xArm"
Reset Command	Click "Back to Start" for middle position
Manual Controls	Drag digital arm (ID3-5) or use left-side buttons (ID1, 2, 6)
Switch Sequence	SELECT (Hold) then START
Reset/Initial Stance	Press "START" once in Action Group Mode

Category	Standard Organization	Standard/Benchmark Code and Description
Technology	ITEEA	STEL-2R: Follow step-by-step instructions to safely use systems and troubleshoot common problems.
Computer Science	NCSOS	HS-CS-02: Design and implement strategies for troubleshooting hardware and software problems.
Engineering	ITEEA	STEL-3H: Optimize a system by identifying and managing various constraints.
Digital Literacy	ISTE	1.1 Empowered Learner: Students leverage technology to take an active role in choosing, achieving, and demonstrating competency in their learning goals.
Computer Science	NCSOS	HS-AP-12: Use and adapt classic algorithms to solve computational problems.