

| Parallax Inc. | Unit 1 | Unit 2 | Unit 3 | Unit 4 | Unit 5 | Unit 6 | Unit 7 | Unit 8 | Unit 9 | Unit 10 | Unit 11 | Unit 12 | Unit 13 | Unit 14 | Unit 15 | Unit 16 | Unit 17 |
|---|--|---|--|--|--|--|---|--|--|---|---|---|--|---|--|---|--|
| For Scribbler 3 Robot Tutorials with BlocklyProp | Getting Started with BlocklyProp for the S3 | Lights and Sounds: Lights On, Lights Off | Lights & Sounds: Music | Motion: Driving Basics | Motion: Speed Blocks | Motion: Driving Distances | Motion: Turns and Arcs | Motion: Draw Simple Shapes | Motion: Turning Shapes into Art | Sensors: Avoid Obstacles with Infrared | Sensors: Following Visible Light | Sensors: Line Following | Hacker Port Project: External LED | Hacker Port Project: Standard Servo | Hacker Port Project: Standard Servo Pen Lifter | Hacker Port Project: Sense Distance with (PING)) | Hacker Port Project: IR Remote Control |
| Scribbler S3 12-pack Plus | All Parallax hardware needed for this unit is included in the Scribbler S3 Robot 12-pack Plus Kit | | | | | | | | | | | | | | | | |
| Single Scribbler S3 Robot | All the Parallax hardware needed for this unit is included with one Scribbler S3 Robot. | | | | | | | | | | | | 3 pin FF cable (#800-00080) | Parallax Standard Servo (#900-00005) | Parallax Standard Servo (#900-00005) | PING)))Sensor (#281015) & other items | IR Remote (#020-00001) & other items |
| Other items needed | none | none | none | none | none | none | Flat surface with serpentine path drawn on it. | Sharpie pens, paper or poster board | Sharpie pens, paper or poster board, protractor (optional) | Light to medium colored obstacles | Flashlight or small bright lamp. Incandescent works better than LED. | Black electrical tape and posterboard, or printable tracks and clear tape, paper for line sensitivity chart | 220 ohm resistor (#150-02210), 10 k-ohm resistor (#150-01030), LED (#350-00007), masking or electrical tape, large paperclip, aluminum foil | Jumper wire or twist tie | Double sided foam tape, clear tape, marker, scissors, diagonal cutter, safety glasses, twist tie | 3 pin FF extension cable (#900-00080), marker cap or clothespin, tape | Infrared reciever (#350-00039), 200nm FF jumper wires (#800-00062), poster putty or double sided foam tape |
| Approximate time | 60 minutes | 30 minutes | 60 minutes | 30 minutes | 30 minutes | 30 minutes | 30 minutes | 30 minutes | 60 minutes | 60 minutes | 60 minutes | 60 minutes | 60 minutes | 60 minutes | 60 minutes | 60 minutes | 120 minutes |
| Adjustment suggestions | Shorten: IT/Teacher prepare ahead: install BlocklyProp client software on computers; set up up and confirms BlocklyProp accounts for each student; test programming connection on each computer. | Extention: Have students begin to keep track of key vocabulary words as they relate to robotics and programming. | Shorten: Skip the "More Sounds for the S3 module. Extension: Use what you know about the blocks in the sound category to communicate multiple types of specific messages in one program. | Extension: Design a program that provides a visual model of the differences between the Drive and Rotate blocks. | Shorten: Prepare a template of the d=r*t table ahead of time. | Shorten: Create a table to help students keep track of the calculations for rate. | Extension: Create a table comparin turn types include - block name, behavior, usage, limitations, benefits. | Extension: Create programs to draw other shapes. Explore what makes a shape easier or more difficult to program for. | Extension: Paying attention to how modifications impact a program's outcomes, create a list of inputs and their probable outcomes as a quick reference guide for drawing desired shapes. | Extension: Use the infrared sensor to interact with other program components for the S3 (ex. LEDs, motors, sounds) so it will react to its environment. | Extension: Can you find the darkest location in a room? How is sensing darkness the same and different than brightness? | Shorten: Prepare the Line Sensor Reflectivity table ahead of time. Print and connect the track pieces. | Shorten: Focus on hacking with the bumper only. Extension: Design your robot and write a program to roam the room, giving you specific feedback that tells you where the obstacle is in relation to the S3. | Shorten: Prepare the servos with the wire ahead of time and connect the servos to the S3. | Shorten: Attach the servos to the S3 and prepare the pen attachment. | Shorten: Attach the (PING))) Ultrasonic Distance Sensor to the S3. | Shorten: Configure the remote ahead of time. Extension: Design and program the S3 for a functional use of the remote control capabilities of the S3. |
| Skills, concepts, & objectives (students will be able to...) | Log into the BlocklyProp programming tool. Connect the S3 Robot to their computer. Create and run BlocklyProp programs to display data on a terminal, blink the S3's LEDs, and | Describe the function of each LED on the S3. Apply your knowledge of the Wait block, Change LED block and Loop block to create a program that makes a visual light display. | Know how to design a program to play a tone. Create variables and use the Number Value block. | Using simple motor commands, design programs to move and stop the S3 in predictable ways. | Use motor commands to move the S3 in precise and predictable ways by understanding the Drive Speed block and distance formula. Know the difference between blocking and non-blocking commands. | Know the circumference of your S3 wheels and understand the relationship between distance and rate. Understand encoder ticks. Create programs to drive predictable paths and distances using the Drive Distance block. | Know each of the turn blocks and what blocks are better for which types of turns. Create programs to move the S3 through a variety of turn types. | Use motor and control blocks to create efficient programs to draw simple shapes. | Through the use of cloning, create predictable variations to program outcomes using different motor and control blocks. | Use the infrared light sensor and blocks to create a program that provides feedback about its environment. | Use the phototransistor and blocks to create a program that responds to its environment with the use of the Drive blocks. Incorporate if...do...else blocks and comparison blocks (Math) into programs to make complex decisions. | Determine the upper and lower threshold for the line sensor. Use the line sensing capabilities of the S3 to create a program that provides feedback about its environment. Use the line sensing capabilities of the S3 to create a program that follows a line. | Wire and program the S3 to detect an obstacle to the rear of the S3 through the Hacker Port connections. Create a program that allows the S3 to roam and give feedback using bumpers, sensors and external LEDs. | Using the Hacker Port, design a program to hold the servo in 3 specific positions. | Program the S3 to make specified drawings. | Using the Hacker Port, design a program to measure distance with the (PING))) Ultrasonic Distance Sensor. | Configure your remote to work with the S3. Use the remote to operate the S3 LEDs. Create a program to drive the S3 with the remote. |
| Resource link | BlocklyProp Online Programming Tool | Lights and Sounds: Lights On, Lights Off | Lights and Sounds: Let's Make Some Noise | Simple Motion with Motor Blocks: Driving Basics: Drive and Rotate | Simple Motion with Motor Blocks: Driving There and Back Again: Using Speed Blocks | Simple Motion with Motor Blocks: Going the Distance: Using the Drive Distance Block | Simple Motion with Motor Blocks: Turns and Arcs | Simple Motion with Motor Blocks: Draw Simple Shapes | Simple Motion with Motor Blocks: Turning Shapes into Art | Navigating with Sensors: Avoiding Obstacles with Infrared | Navigating with Sensors: Following Visible Light | Navigating with Sensors: Line Following | Hacker Port Expansion: What's a Hacker Port? | Hacker Port Expansion: Controlling a Standard Servo | Hacker Port Expansion: Standard Servo Pen Lifter | Hacker Port Expansion: Sense Distance with a (PING)) | IR Remote control with the S3 |
| Resource link | Getting Started with BlocklyProp for the S3 tutorial | | Scribbler S3 GUI | | | | | | | | YouTube video - Light and Line Following | YouTube video - Light and Line Following | | Pen Lifter Template | | 3 Function Universal Remote | |
| Resource link | Scribbler 3 Robot Block Reference | | | | | | | | | | | Scribbler Printable Line Following Tracks | | YouTube video - Parallax S3 Scribbles 'S3' | | | |
| Resource link | BlocklyProp Programming Environment | | | | | | | | | | | | | YouTube video - Standard Servo Pen Lifter | | | |