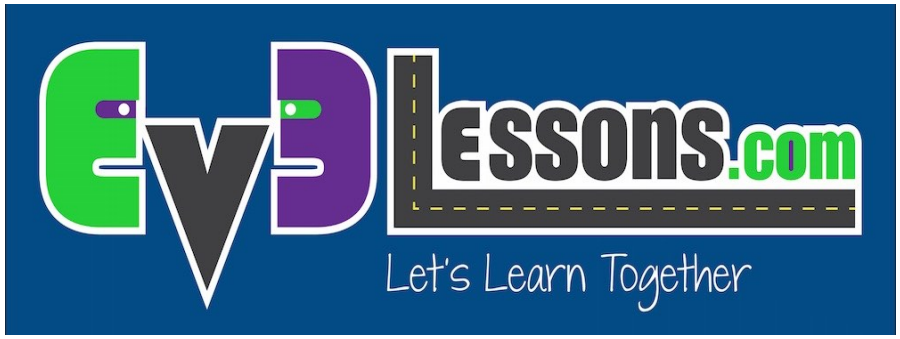


How to Use EV3 Lessons

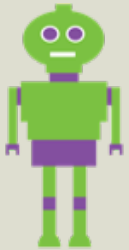
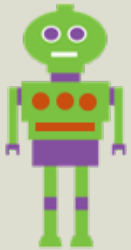
OVERALL STRUCTURE

- **Beginner Lessons:** These lessons will teach you to move and turn the robot, use the sensors, and use loops and switches.
- **Intermediate Lessons:** These lessons introduce more advanced programming techniques such as My Blocks, variables, parallel beams, calibration and math/logic blocks.
- **Advanced Lessons:** These lessons assume that you are comfortable using all the blocks in the EV3 environment. The advanced lessons teach you to more sophisticated programs such as menu systems, proportional line followers, squaring on lines and stall detection techniques.
- Beginner Lessons are designed to be done in order. Intermediate and Advanced Lessons may be done out of order. Lessons usually mention specific pre-requisites when needed.
- If you print the lessons out, make sure to return to the site often to check the date on the bottom of the page to make sure you have the latest version of the lesson.
- To be notified of updates, new lessons and more, go to Contacts.

LESSON STRUCTURE

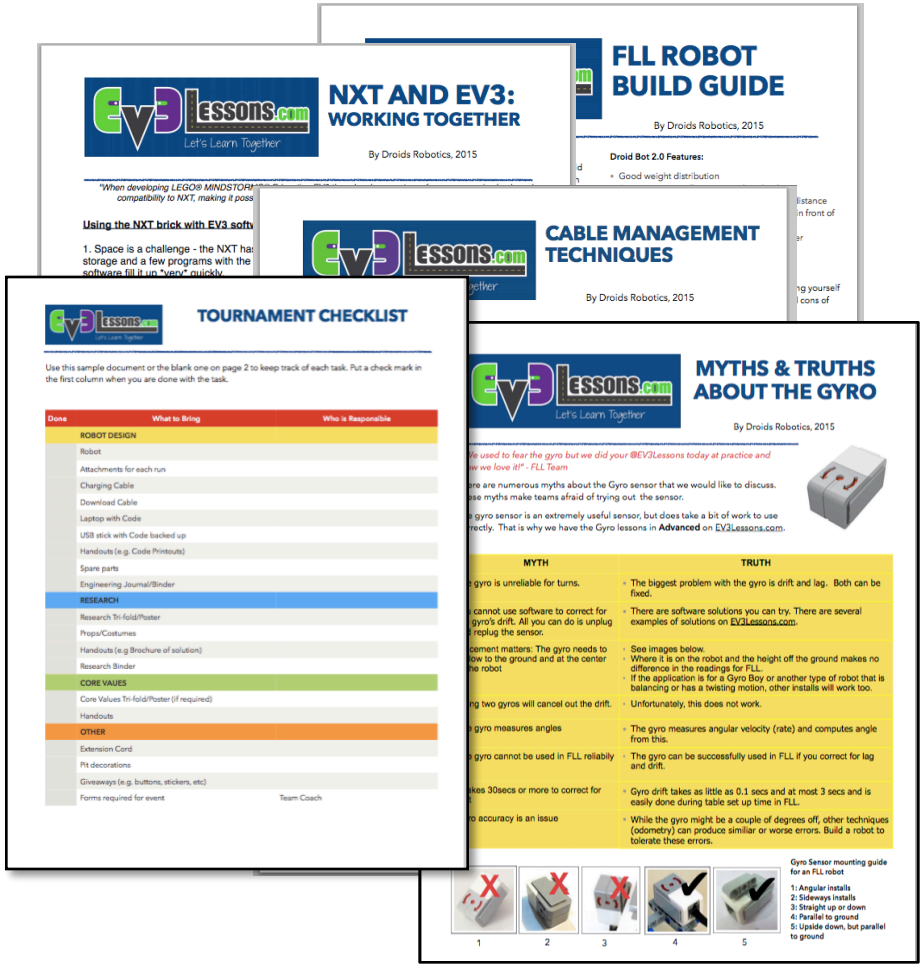
1. Each lesson starts with a list of objectives and ends with a challenge
2. In most lessons, we provide hints in the form of Pseudocode. Students who need a hint should look at the Pseudocode.
3. We provide a challenge solution as well (both as a screenshot as well as in EV3 Code)
4. A discussion guide is included after the challenge that will help understand the main objectives
5. Many lessons have companion worksheets for students. More will be added over time.

PROGRAMMING LESSONS

Beginner	Intermediate	Advanced
		
• Build a Base Robot • Introduction to Brick/Software • Moving Straight • Port View • Pseudocode • Turning • Displaying Text and Graphics • Touch Sensor • Color Sensor • Loops • Switches • Ultrasonic Sensor • Basic Line Follower • Moving an Object • Basic Sequencer • Final Challenge	• Brick Buttons as Sensors • Data Wires • My Blocks with Inputs and Outputs • Moving with My Blocks • Turning with My Blocks • Color Line Follower with My Blocks • Infrared Sensor • Debugging • Move Blocks • Reliability • Color Sensor Calibration • Variables • Logic Operations and Decision Making • Parallel Beams	• Parallel Beams Synchronization • Arrays • Proportional Control • Proportional Line Follower • Proportional 2 Color Line Follower • Ramping Up • Gyro Sensor • Gyro Sensor Turns • Gyro Move Straight and Wall Follow • Squaring on Lines • Stall Detection • Menu System • Data Logging

QUICK GUIDES

These provide quick information on a variety of useful topics. Use them as you need – as handouts or as discussion guides



1. Cable Management 1
2. Cable Management 2
3. FLL Robot Build Guide
4. Using Gears with the EV3
5. One Minute Line Follower
6. Using Sensors: Move Until
7. Color Sensor: Shielding and Calibration
8. My Blocks
9. Myths & Truths About the Gyro
10. Truth About Turns: Pivot Turns
11. Using Comments to Improve Code
12. Engineering Notebook and Sample
13. LEGO CAD & Robot Build Instructions
14. Robot Game Strategy, Strategy Deck
15. Mission Planning Worksheet
16. Learning FLL Runs
17. Edu vs. Home Edition Software
18. EV3 and NXT Compatibiltiy
19. Updating Software/Firmware Home Edition
20. Updating Software/Firmware Edu Edition
21. LEGO Organization Systems
22. Roles and Responsibilities
23. Tournament Checklist

RESOURCES

The resources page contains lots of useful material for FIRST LEGO League teams:

1) **Trash Trek Scorer**
2) **Interactive Sketch Planner**
3) **Wheel Converter**
4) **Core Value Activities**
5) **….**