The two charts compare the Hardware and Software of EV3 and SPIKE Prime. This document is maintained by Sanjay and Arvind Seshan (EV3Lessons.com/FLLTutorials.com/PrimeLessons.org/Share and Learn) and will be updated if new information is obtained.

One platform is not clearly superior to another and the purpose is not to recommend one over another. We have tried to be as factual as possible. Data is based on publicly available information and from actual use of both systems and all three programming languages. We suggest you use the data, try it out and make an educated decision for your team or school.

HARDWARE				
		EV3-G	EV3 CLASSROOM (SCRATCH)	SPIKE PRIME
Motors		EV3 Large (2 in base kit) Speed: 160RPM Torque: 20Ncm EV3 Medium (1 in base kit) Speed: 240RPM Torque: 8Ncm Relative motor encoders		SPIKE Large (1 in base kit, 1 in expansion) Speed: 175RPM Torque: 8Ncm SPIKE Medium (2 in base kit) Speed: 135RPM Torque: 3.5Ncm Built-in absolute encoders Square form factor
Sensors	**Touch / Force**	Simple pressed/released analog sensor		Sampling rate: 100Hz Touch sensing: 0-2mm Force sensing; 2-8mm Output resolution: 0.1 newton Accuracy: +/- 0.65 newton
	Ultrasonic / Distance	Sample rate: 67Hz Resolution: 1mm Accuracy: +/- 1cm Max distance: 250cm Lights: on/blinking		Sampling rate: 100Hz Resolution: 1mm Max distance: 200cm Lights: 4 controllable segments Entrance angle: 35 degrees
	Gyro	Single axis Gyro Sample rate: 1000 Hz Accuracy: +/- 3 degrees Max rate: 440 degrees/second Modes: rate, angle, rate & angle Known drift/lag issues		Built-in 6-axis Gyro (3 axis gyro + 3 axis accelerometer) No significant drift, may have some lag
	Color	sample rate: 1000 Hz optimal distance: 4-12mm (0.5 - 1.5 LEGO modules) colors detected: 7 LED color: red (reflected),		sample rate: 100 Hz Optimal distance: 16mm (2 LEGO modules) Colors detected: 8 LED color: white
	Infrared	Proximity, Beacon and Remote support		N/A
Brick/Hub		Linux-based 300Mhz ARM9, 64MB Display (178 by 128) 4 sensor ports/4 motor ports NXT/EV3 connectors 5 brick buttons USB host port for WiFi other peripherals USB client port and Bluetooth for PC connections ~30 second boot time ~25 second shutdown time Removable, rechargeable battery in expansion kit. Charger port on battery. Battery can be charged separate from brick. On brick programming, port view, motor control		MicroPython Embedded OS 100MHz M4 processor, 32MB storage 5x5 Light Matrix 6 motor/sensor ports LEGO Power Functions 2.0 (LPF2) connectors 2 brick buttons built-in 6-axis gyro No USB host port USB client and Bluetooth/BLE 4.2 for PC connections ~5 second boot time ~3 second shutdown time Removable rechargeable battery with charger port on Hub. Battery must be in hub to charge On brick motor control

SOFTWARE				
		EV3-G	EV3 CLASSROOM (SCRATCH)	SPIKE PRIME
Motor		Separate large/medium motor blocks Can set power, duration, brake mode in single block Must code your own stall detection	Same motor block for all motors Must use separate block to specify brake mode Must code your own stall detection	Same motor block for all motors Must use separate block to specify brake mode. Can set default speed, brake modes Built-in stall detection that can be turned on/off
Movement		Can set motor ports, power, duration, brake mode in single block. Create your own Move Centimeters as a MyBlock.	Must use separate block to specify brake mode & ports . Can set default speed, brake modes , & ports. Create your own Move Centimeters as a MyBlock.	Built-in stall detection that can be turned on/off Built-in Move Centimeters. Must be configured for wheel size.
Sounds / Display / Lights		Can display image at x,y with support for custom images/image editor Draw line, circle, rectangle, point, text anywhere on screen Brick lights – 3 colors, on/off & pulsing	Can display predefined image full screen Draw text anywhere on screen Brick lights – 3 colors, on/off & pulsing	Can draw image on 5x5 display Can display scrolling text Brick lights - 6 colors, on/off, in addition some sensor lights can be controlled (e.g. distance)
Sensors	General	Wait , read and compare sensor blocks	Wait , read and compare sensor blocks	Only read and compare sensor blocks. Must combine with generic wait block
	Touch / Force	Pressed, released, bumped	Pressed, released	Pressed, hard-pressed, released (about 60% pressed in is "hard pressed' Newtons & % pressed (out of a total of 10)
	Ultrasonic / Distance	Centimeters, Inches Presence (passive) Single measure/continous	Centimeters, Inches	Centimeters, inches, %age (distance out of a total of 200); can control lights - 4 segments
	Gyro	Rate and angle (yaw)	Rate and angle (yaw)	3 axis angle (yaw, pitch, roll) - rate only shown in dashboard 3 axis accelerometer - orientation, shaking, tapped, falling - raw values only shown in dashboard
	Color	Ambient, color & reflected modes; built in calibration blocks; 7 colors	Ambient, color & reflected modes; built in calibration; 7 colors	Color & reflected modes; no calibration block; 8 colors
	Buttons	Pressed, released, bumped	Pressed, released	Pressed, released
	Infrared	Proximity, beacon and remote support	Proximity, beacon and remote support	N/A
My Blocks		My Blocks that have been created can be used across different program files in the same project. My blocks can have inputs and outputs.	My Blocks can only be used in a single project. Note that projects do not contain multiple programs. My blocks only have inputs. Outputs must be passed through global variables.	My Blocks can only be used in a single project. Note that projects do not contain multiple programs. My blocks only have inputs. Outputs must be passed through global variables.
Parallel Code		Parallel Beams	Events and messages	Events and messages
Variables		Text, numeric, logic variables Numeric array, logic array	Variables types are auto-detected, can be text or numeric Lists	Variables types are auto-detected, can be text or numeric Lists
Math / Operators		Simple and complex math operators/comparisons Text switches and merge	Simple and complex math operators/comparisons Text merge, extract single character, substring, length	Simple and complex math operators/comparisons Text merge, extract single character, substring, length
Files		Read, write, delete	No Files	No Files
Other		Ability to see running block when connected Data wires Datalogging Bluetooth messaging Daisy chain Tablet and Chromebook versions (called "EV3 Programming") has a limited set of blocks Can import third-party blocks	Unclear how to import third-party blocks	Monitors for variables during run Manually assigned brick Project "numbers" - easy to find All platforms have identical experience. Unclear how to import third-party blocks

Download Links

	EV3-G Software	EV3 Classroom/LEGO MINDSTORMS Home	SPIKE Prime
		* Select Mac OS for Mac version of EV3 Classroom	
Education	https://education.lego.com/en-us/downloads/mindstorms-ev3/software	https://education.lego.com/en-us/downloads/mindstorms-ev3/software	https://education.lego.com/en-us/downloads/spike-prime/software
Retail	https://www.lego.com/en-us/themes/mindstorms/downloads	https://www.lego.com/en-us/themes/mindstorms/downloads	
	https://education.lego.com/en-us/downloads/retiredproducts/mindstorms-ev3-lab/software		
Retired Mac software	Select Mac OS 10.13 or older: https://www.lego.com/en-us/themes/mindstorms/downloads		