



CHALLENGE



Scope and Sequence: 20-Hour Option

Activity	Description	Hours
Guided Experience	Engineering Notebook: Sessions 1-12	18
Session 1	Robot Lesson 1 and Project Spark 1	1.5
Session 2	Robot Lesson 2 and Project Spark 2	1.5
Session 3	Project Spark 1 and Robot Lesson 1	1.5
Session 4	Project Spark 2 and Robot Lesson 2	1.5
Session 5	Robot Lesson 3 and Pseudocode	1.5
Session 6	Robot Lesson 4 and Choose Problem	1.5
Session 7	Project Research and Robot Lesson 5	1.5
Session 8	Robot Lesson 5 and Project Development	1.5
Session 9	Project Continuation and Solve Missions	1.5
Session 10	Presentation Work and Solve Missions	1.5
Session 11	Prepare Robot and Project Presentations	1.5
Session 12	Practice Presentations and Robot Matches	1.5
Tournament	Present Solutions and Compete in Matches	2

Scope and Sequence: 30-Hour Option

Activity	Description	Hours
Getting Started	LEGO® MINDSTORMS® EV3 Education Activities	3
Activity 1	Hello World	1
Activity 2	Motors and Sensors	1
Activity 3	Get Moving	1
Guided Experience	Engineering Notebook: Sessions 1-8	12
Session 1	Robot Lesson 1 and Project Spark 1	1.5
Session 2	Robot Lesson 2 and Project Spark 2	1.5
Session 3	Project Spark 1 and Robot Lesson 1	1.5
Session 4	Project Spark 2 and Robot Lesson 2	1.5
Session 5	Robot Lesson 3 and Pseudocode	1.5
Session 6	Robot Lesson 4 and Choose Problem	1.5
Session 7	Project Research and Robot Lesson 5	1.5
Session 8	Robot Lesson 5 and Project Development	1.5
Extended Experience	Engineering Notebook: Sessions 9-12	13
Extended Session 9	Project Continuation and Solve Missions • <i>Extended time to solve missions and develop Innovation Project solution.</i>	4
Extended Session 10	Presentation Work and Solve Missions • <i>Extended time to solve missions and work on Innovation Project presentation.</i>	4
Extended Session 11	Prepare Robot and Project Presentations • <i>Extended time to prepare and complete Robot Design and Innovation Project presentations.</i>	3
Extended Session 12	Practice Presentations and Robot Matches • <i>Extended time to practice before tournament.</i>	2
Tournament	Present Solutions and Compete in Matches	2



CHALLENGE



Scope and Sequence: 40-Hour Option

Activity	Description	Hours
Robot Skill Learning	LEGO® Education Unit Plan(s) (<i>options at bottom</i>)	10
Guided Experience	Engineering Notebook: Sessions 1-12	18
Session 1	Robot Lesson 1 and Project Spark 1	1.5
Session 2	Robot Lesson 2 and Project Spark 2	1.5
Session 3	Project Spark 1 and Robot Lesson 1	1.5
Session 4	Project Spark 2 and Robot Lesson 2	1.5
Session 5	Robot Lesson 3 and Pseudocode	1.5
Session 6	Robot Lesson 4 and Choose Problem	1.5
Session 7	Project Research and Robot Lesson 5	1.5
Session 8	Robot Lesson 5 and Project Development	1.5
Session 9	Project Continuation and Solve Missions	1.5
Session 10	Presentation Work and Solve Missions	1.5
Session 11	Prepare Robot and Project Presentations	1.5
Session 12	Practice Presentations and Robot Matches	1.5
Continue Robot Skills	LEGO Education Unit Plan(s) (<i>options at bottom</i>)	10
Tournament	Present Solutions and Compete in Matches	2

LEGO MINDSTORMS® Education EV3 Unit Plans

<u>Robot Trainer</u> (7 Hours)	<u>Engineering Lab</u> (8 Hours)	<u>Coding Activities*</u> (10 Hours)	
<ul style="list-style-type: none"> Moves and Turns Objects and Obstacles Grab and Release Colors and Lines Angles and Patterns The Factory Robot 	<ul style="list-style-type: none"> Trial and Error First Gear Shifting Gears Sliding Down a Slope Free Falling Drive Up a Slope 	<ul style="list-style-type: none"> Autonomous Parking Reversing Safely Automatic Headlights Line Detection 	<ul style="list-style-type: none"> Object Detection Unlocking a Car Cruise Control Roaming Vehicles Autonomous Intersection



CHALLENGE



Scope and Sequence: 60-Hour Option

Activity	Description	Hours
Robot Skill Learning	LEGO® Education Unit Plans (<i>options at bottom</i>)	15
Guided Experience	Engineering Notebook: Sessions 1-12	18
Session 1	Robot Lesson 1 and Project Spark 1	1.5
Session 2	Robot Lesson 2 and Project Spark 2	1.5
Session 3	Project Spark 1 and Robot Lesson 1	1.5
Session 4	Project Spark 2 and Robot Lesson 2	1.5
Session 5	Robot Lesson 3 and Pseudocode	1.5
Session 6	Robot Lesson 4 and Choose Problem	1.5
Session 7	Project Research and Robot Lesson 5	1.5
Session 8	Robot Lesson 5 and Project Development	1.5
Session 9	Project Continuation and Solve Missions	1.5
Session 10	Presentation Work and Solve Missions	1.5
Session 11	Prepare Robot and Project Presentations	1.5
Session 12	Practice Presentations and Robot Matches	1.5
STEM Learning	FIRST @ Home Lessons (<i>listed at bottom</i>)	25
Tournament	Present Solutions and Compete in Matches	2

LEGO MINDSTORMS® Education EV3 Unit Plans

Robot Trainer (7 Hours)	Engineering Lab (8 Hours)	Coding Activities* (10 Hours)	
<ul style="list-style-type: none"> Moves and Turns Objects and Obstacles Grab and Release Colors and Lines Angles and Patterns The Factory Robot 	<ul style="list-style-type: none"> Trial and Error First Gear Shifting Gears Sliding Down a Slope Free Falling Drive Up a Slope 	<ul style="list-style-type: none"> Autonomous Parking Reversing Safely Automatic Headlights Line Detection 	<ul style="list-style-type: none"> Object Detection Unlocking a Car Cruise Control Roaming Vehicles Autonomous Intersection

FIRST @ Home Lessons

Core Values Activities (3 Hours)	Coding Activities (3 Hours)	3D and CAD Activities (3 Hours)
Electronics and Mechanics Activities (3 Hours)	Engineering Design Activities (3 Hours)	Capstone and Additional Activities (10 Hours)



CHALLENGE



Scope and Sequence: 80-Hour Option

Activity	Description	Hours
Robot Skill Learning	LEGO® Education Unit Plans (<i>options at bottom</i>)	25
Guided Experience	Engineering Notebook: Sessions 1-12	28
Session 1	Robot Lesson 1 and Project Spark 1	1.5
Session 2	Robot Lesson 2 and Project Spark 2	1.5
Session 3	Project Spark 1 and Robot Lesson 1	1.5
Session 4	Project Spark 2 and Robot Lesson 2	1.5
Session 5	Robot Lesson 3 and Pseudocode	1.5
Session 6	Robot Lesson 4 and Choose Problem	1.5
Session 7	Project Research and Robot Lesson 5	1.5
Session 8	Robot Lesson 5 and Project Development	1.5
Extended Session 9	Extended Time: Solve missions and develop project solution	3
Extended Session 10	Extended Time: Solve missions and Project Presentation Work	3
Extended Session 11	Extended Time: Develop Robot and Project Presentations	2
Extended Session 12	Extended Practice Presentation Time and Robot Matches	2
STEM Learning	FIRST @ Home Lessons (<i>listed at bottom</i>)	25
Tournament	Present Solutions and Compete in Matches	2

LEGO MINDSTORMS® Education EV3 Unit Plans

Robot Trainer (7 Hours)	Engineering Lab (8 Hours)	Coding Activities* (10 Hours)	
<ul style="list-style-type: none"> Moves and Turns Objects and Obstacles Grab and Release Colors and Lines Angles and Patterns The Factory Robot 	<ul style="list-style-type: none"> Trial and Error First Gear Shifting Gears Sliding Down a Slope Free Falling Drive Up a Slope 	<ul style="list-style-type: none"> Autonomous Parking Reversing Safely Automatic Headlights Line Detection 	<ul style="list-style-type: none"> Object Detection Unlocking a Car Cruise Control Roaming Vehicles Autonomous Intersection

FIRST @ Home Lessons

Core Values Activities (3 Hours)	Coding Activities (3 Hours)	3D and CAD Activities (3 Hours)
Electronics and Mechanics Activities (3 Hours)	Engineering Design Activities (3 Hours)	Capstone and Additional Activities (10 Hours)