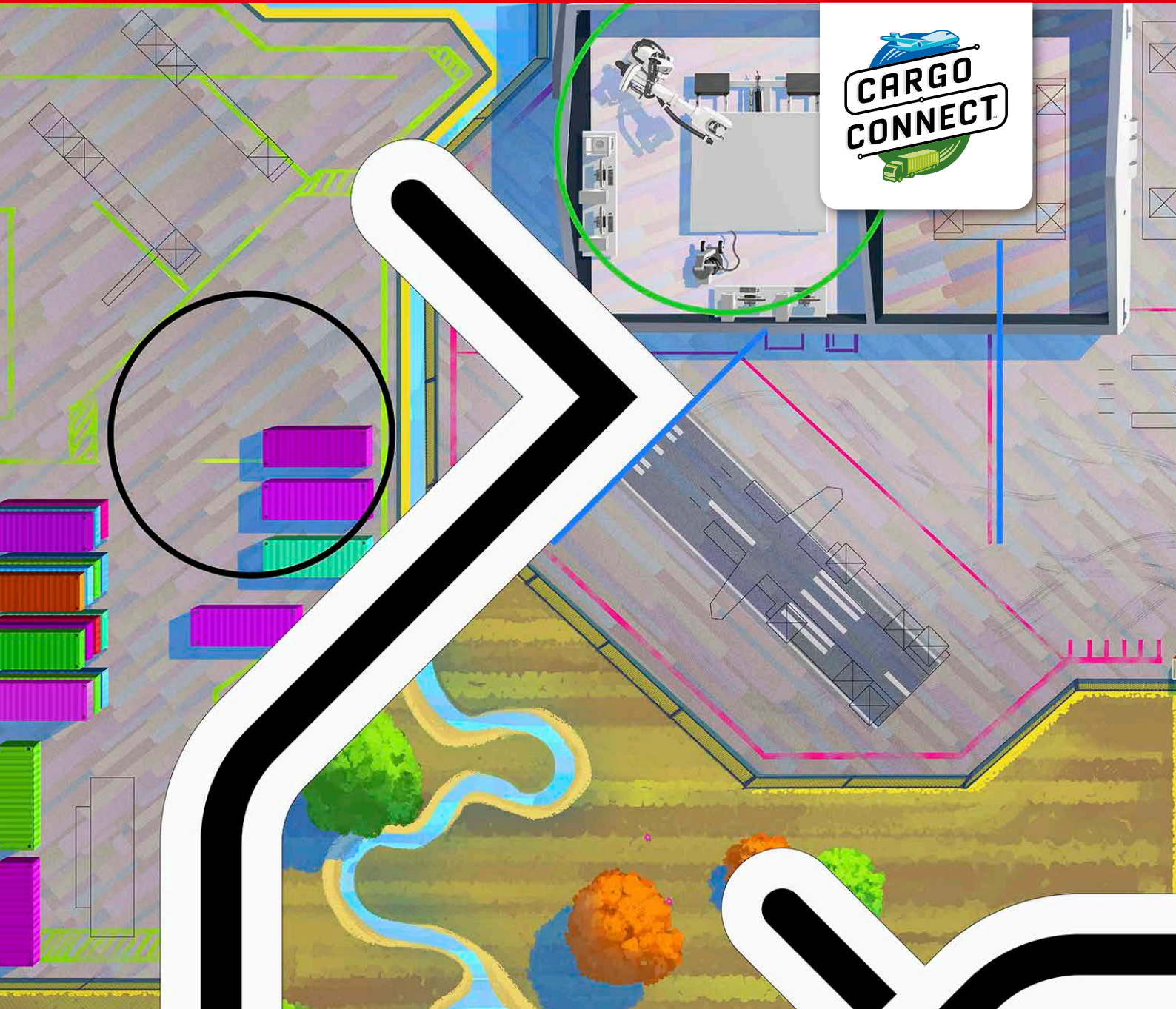




# TEAM MEETING GUIDE



# Introduction to **FIRST**® **LEGO**® League Challenge

Friendly competition is at the heart of **FIRST**® **LEGO**® League Challenge, as teams of up to 10 children engage in research, problem-solving, coding, and engineering – building and programming a LEGO® robot that navigates the missions of the Robot Game. Teams also participate in an Innovation Project to identify and solve a relevant real-world problem.

**FIRST** LEGO League Challenge is one of three divisions by age group of the **FIRST** LEGO League program. This program inspires young people to experiment and grow their confidence, critical thinking, and design skills through hands-on STEM learning. **FIRST** LEGO League was created through an alliance between **FIRST** and LEGO® Education.



## Welcome to **FIRST**® **FORWARD**™ and **CARGO CONNECT**™

Welcome to the **FIRST**® **FORWARD**™ season. This year's **FIRST** LEGO League challenge is called **CARGO CONNECT**™. Children will learn about how cargo is transported, sorted, and delivered to its destinations. As more demands are placed on transportation systems, the children need to rethink how cargo

is transported from place to place. We have the power to build a path forward and invent the future of transportation. And it starts here, with you.

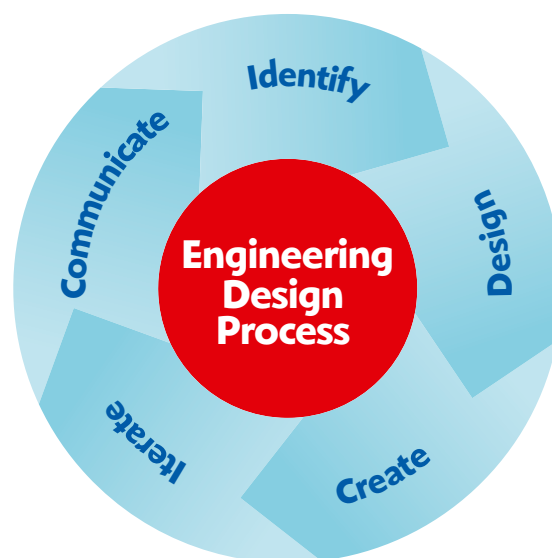
During the sessions, the team will experience the **engineering design process**. The team will identify, design, and create

solutions and test, iterate, and improve them. The team will then share and communicate what they learned with others. The rubrics used in judging capture the engineering design process used to create both the robot and Innovation Project solutions.

## Working as a Team

The team will create their robot to compete in the Robot Game and design their Innovation Project solution. Teammates should be encouraged to work with each other, listen to each other, take turns, and share ideas.

Team roles are outlined in the *Engineering Notebook*. Using roles helps your team function more efficiently and ensures that everyone on the team is involved.



# What Does the Team Need?

## LEGO® Education Robot Set

### LEGO Education SPIKE™ Prime



Core set

Expansion set  
(recommended)

### LEGO MINDSTORMS® Education EV3



Core set

Expansion set (recommended)

## Electronic Devices

Each team will need two compatible devices such as a laptop, tablet, or computer. Prior to starting Session 1, you need to download the appropriate software (LEGO® Education SPIKE™ Prime or LEGO®

MINDSTORMS® Education EV3 Classroom) onto the hardware device. To view system requirements and download software, visit [legoeducation.com/downloads](https://legoeducation.com/downloads).



## CARGO CONNECT™ Challenge Set

This challenge set comes in a box that contains the mission models, challenge mat, and some miscellaneous pieces. The team should build the models very carefully using the building instructions. This is completed during Sessions 1-4: [firstlegoleague.org/season#resources](https://firstlegoleague.org/season#resources). The miscellaneous items include 3M™ Dual Lock™ Reclosable Fasteners, coach pins, and season tiles for the team members.

## Challenge Mat and Table

Set up a table with the challenge mat in your classroom or meeting space. Even if you cannot build the whole table, building just the four walls will be useful. It is also possible to use the mat on the floor. Find out more, including how to build the table, at [firstlegoleague.org/season#resources](https://firstlegoleague.org/season#resources).



# Session Layout

EVERY SESSION STARTS WITH AN INTRODUCTION AND ENDS WITH A SHARE ACTIVITY. DETAILS FOR THESE ACTIVITIES ARE GIVEN IN THE SESSION PAGES THAT FOLLOW, ALONG WITH NOTES AND TIPS TO HELP YOU RUN THE SESSION.

	Introduction (10 minutes)	Team Tasks (100 minutes)		Share (10 minutes)
Session 1	Introduction to Challenge	Robot Lesson 1	Efficiency Project Spark	Share
Session 2	Inclusion Examples	Robot Lesson 2	Safety Project Spark	Share
Session 3	Goals and Processes	Robot Lesson 3	Access Project Spark	Share
Session 4	Discovery Examples	Robot Lesson 4	Connections Project Spark	Share
Session 5	Team Name and Logo	Guided Mission	Identify Project	Share
Session 6	Teamwork Examples	Pseudocode and Mission Strategy	Project Planning	Share
Session 7	<i>Gracious Professionalism</i> <sup>®</sup>	Solve Missions	Develop Project Solution	Share
Session 8	<i>Coopertition</i> <sup>®</sup> Examples	Solve Missions	Evaluate and Test Project Solution	Share
Session 9	Innovation Examples	Iterate and Improve Robot Solution	Iterate and Improve Project Solution	Share
Session 10	Impact Examples	Iterate and Improve Robot Solution	Plan Project Presentation	Share
Session 11	Team Playing Card	Plan Robot Design Explanation	Practice Project Presentation	Share
Session 12	Fun Examples	Practice Robot Game Matches	Practice Full Presentation	Share

# Session 1

## Outcomes

- The team will learn how to connect and use the sensors and motors.
- The team will make connections from the mission models to the Efficiency Project Spark ideas.

ESTIMATED TIMES ARE PROVIDED FOR EACH PART OF THE SESSION.

- 1 Share the season videos on the *FIRST*® LEGO® League YouTube Channel with the team.
- 2 Two devices are suggested, one for the robot and one for project work. Additional devices for the mission model building are useful.
- 3 Activities in the sessions are for LEGO Education SPIKE™ PRIME app or MINDSTORMS® Education EV3 Classroom app.
- 4 Make sure the controller and device are plugged in and charging at the end of the session.
- 5 Robot Game Connection: Have the team plan for how to get the robot to a model or target area.

### 1 → Introduction (10 minutes)

- Read pages 4-9 explaining how *FIRST*® LEGO® League Challenge works.
- Now that you have read about CARGO CONNECT™, you are ready to get started.

### 2 → Tasks (50 minutes)

- Open the SPIKE™ Prime or EV3 Classroom app. Find your lesson.



#### Robot Trainer Unit: Moves and Turns

Complete the Getting Started activities before this session.

3



#### Getting Started: Start Here, Motors and Sensors

4

- Identify the building and coding skills you learned in the lesson that will help you solve missions.

5

### → Reflection Questions

- Can you use your fantastic coding skills to navigate your robot to a model on the mat?
- Can your robot already complete any of the missions?

## Session 1

What are the four parts of *FIRST* LEGO League Challenge?

EVERY SESSION HAS AN INTRODUCTION PROMPT AND SPACE TO DOCUMENT THE TEAM'S RESPONSES.

Our Notes:

OPEN SPACE IS PROVIDED IN THE ENGINEERING NOTEBOOK EACH SESSION FOR THE TEAM TO COLLABORATIVELY CAPTURE THEIR THOUGHTS, IDEAS, DIAGRAMS, AND NOTES.

SOME SESSIONS WILL HAVE HELPFUL TIPS FOR THE TEAM.

Read over the *Robot Game Rulebook* for all the details on the missions.



# Efficiency

## Facilitator Tips

Each session in this guide is two hours. If needed, split each session into two separate 60-minute meetings by having the team complete each page in a 60-minute meeting.

SEE PAGE 3 IN THE ROBOT GAME RULEBOOK FOR A SUMMARY PAGE OF THE MISSION MODELS AND THEIR BAG NUMBERS.

## Efficiency

### Project Spark

Being more efficient with the way we transport cargo is beneficial for many reasons.

How can you make the journey of cargo more efficient?

#### Think about...

- The cost of transporting cargo.
- The time it takes to transport cargo.
- The energy used to transport cargo.
- Ensuring cargo arrives undamaged.

*The models you built this session relate to missions in the Robot Game that represent improving the efficiency of transporting cargo.*

Our Ideas:

PROJECT SPARKS PROVIDE THE TEAM WITH IDEAS FOR THEIR INNOVATION PROJECT AND HOW THE MISSION MODELS CONNECT TO THE THEME.

THE TEAM CAN USE THESE REFLECTION QUESTIONS DURING THE SHARE TIME. SHARING AT THE END IS AN IMPORTANT WAY FOR THE TEAM TO SUMMARIZE AND REFLECT.



Use the QR code on the mat to find the building instructions.

### → Tasks

(50 minutes)

- Read the Project Spark.
- 6  Build the Efficiency models in Bags 1-4 using Building Instruction Books 1-4.
- 7  Check out the *Robot Game Rulebook*. This will be a great resource throughout the sessions.
- Review the missions that relate to the models you built.
- Discuss how the mission models are linked to the Project Spark.
- 8  Brainstorm and record your ideas that relate to this Project Spark.

### → Share

(10 minutes)

- Get together at the mat.
- 9  Place each model where it belongs. Refer to the Field Setup section in the *Robot Game Rulebook*.
- Show the robot skills you learned.
- Show how the models work and explain how they relate to the Project Spark.
- Discuss the reflection questions.
- 10  Clean up your space.

### → Reflection Questions

- Do any of the mission models make you think of good ideas for the Innovation Project?
- What could you create that would improve the efficiency of transporting a particular product?

- 6 Provide the digital building instructions Books 1-4 to the team. Find them at [firstlegoleague.org/season#resources](http://firstlegoleague.org/season#resources).
- 7 The team will need Bags 1-4 from the Challenge set. Larger pieces may be in an unnumbered LEGO® bag.
- 8 Have the team record their brainstorming ideas as a bulleted list in the *Engineering Notebook* or in another location.
- 9 Place the completed models on the mat with Dual Lock™ according to the field setup in the *Robot Game Rulebook*.
- 10 Allow time for cleanup and place any unfinished models and their pieces in a sealed plastic bag.

