



# Overview

## CORE VALUES

FIRST® Core Values will be evaluated during the Robot Game matches and during the Innovation Project and Robot Design presentations.



### Your team will:

- Apply **teamwork** and **discovery** to explore the challenge.
- **Innovate** with new ideas about your robot and project.
- Show how your team and your solutions will have an **impact** and be **inclusive!**
- Celebrate by having **fun** in everything you do!

## ROBOT DESIGN

Your team will prepare a short explanation on your Robot Design, programs, and strategy.



### Your team will:

- Identify your mission strategy.
- Design your robot and programs using your work plan.
- Create your robot and coding solution to match your mission strategy.
- Iterate and test your robot and programs.
- Communicate your Robot Design process, your programs, and your robot solution.

## ROBOT GAME

Your team will have three 2.5-minute matches to complete as many missions as possible.



### Your team will:

- Build the mission models and follow the field setup to put the models on the mat.
- Review the missions and rules.
- Design and build a robot.
- Explore building and coding skills while practicing with your robot on the mat.
- Compete at an event!

## INNOVATION PROJECT

Your team will prepare a 5-minute presentation to explain your Innovation Project.



### Your team will:

- Identify and research a problem to solve.
- Design a solution to the problem that helps others or your community.
- Create a model or prototype of your solution.
- Share your ideas, collect feedback, and iterate on your solution.
- Communicate your solution at an event.

# Robot Design and Robot Game

This year's CARGO CONNECT<sup>SM</sup> challenge is for your robot to deliver cargo to different forms of transportation or target locations

around the field. Your robot must activate mission models that represent transportation safety, efficiency, connection, and access.



**START** Design and create a robot that will complete missions in the Robot Game. Your innovative Robot Design, clear mission strategy, and functional programs are key in the CARGO CONNECT<sup>SM</sup> challenge.

## → Build your mission models and identify your mission strategy.

Each mission and model also provides inspiration for possible solutions to your Innovation Project. The missions fit into four categories: safety, efficiency, access, and connections.

## → Design and create your autonomous robot and programs.

Create a work plan for your Robot Design. Build a robot and its attachments using LEGO<sup>®</sup> Education SPIKE<sup>™</sup> Prime or any LEGO<sup>®</sup> MINDSTORMS<sup>®</sup> set. Code your robot to autonomously complete a series of missions in a 2.5-minute Robot Game to score points.

## → Test and iterate on your robot solution to complete missions.

Iterate on your Robot Design and programs with continual testing and improvements.

## → Compete in Robot Game matches.

Your robot starts in the launch area, tries missions in the order chosen by the team, and then returns anywhere into Home. Your team can modify your robot when it is in Home before launching it again. Your team will play multiple matches, but only the highest score matters.

## → Communicate your Robot Design solution at judging.

Prepare a short explanation that clearly explains the process your team used to create your robot and programs and how they work. Make sure your whole team is involved.

# Innovation Project

Everyone depends on the transportation of goods for their daily needs. As more demands are placed on the transportation systems, we will continue to face challenges unless we find new ways, or improve existing ways, to transport products from place to place.

How can you improve the transportation of products? Identify a specific problem within this theme that you want to solve. Then, create or improve a piece of equipment, a technology, or a method of transportation to solve your specific problem.



## START

It starts here, with your critical thinking and imagination leading the way to better transportation journeys for products. Your ideas could help change your community\* – and even the world – in this CARGO CONNECT<sup>SM</sup> challenge.

### → Identify a specific problem related to making the transportation journey of products better.

The Project Sparks (covered in Sessions 1-4) explore some problems related to the challenge. Your Innovation Project could come from a Project Spark, but it doesn't have to. It will help to focus on a particular product and how it is transported.

Think about how access, safety, efficiency, or connections relate to product journeys and see if you can improve any of them for a particular product that you are investigating.

### → Research your problem and your solution ideas.

What solutions already exist? Are there any experts who could help you? Think about the products that are transported in and out of your community. Research some of the journeys the products take to their final destinations.

### → Design and create a new piece of technology, equipment, or method of transportation that could improve the journey of the products.

This will be your Innovation Project solution. Make a model or prototype to show how your solution improves the way the products are transported.

### → Share your ideas, collect feedback, and iterate on your solution.

The more you iterate and develop your ideas, the more you will learn. What impact will your solution have on your community?

### → Create a creative and effective presentation that communicates your solution at an event.

Prepare a 5-minute presentation that clearly explains your Innovation Project solution and its impact on others. Make sure your whole team is involved.

\*Community can be defined as just a town or city or a larger area like a state or country.

