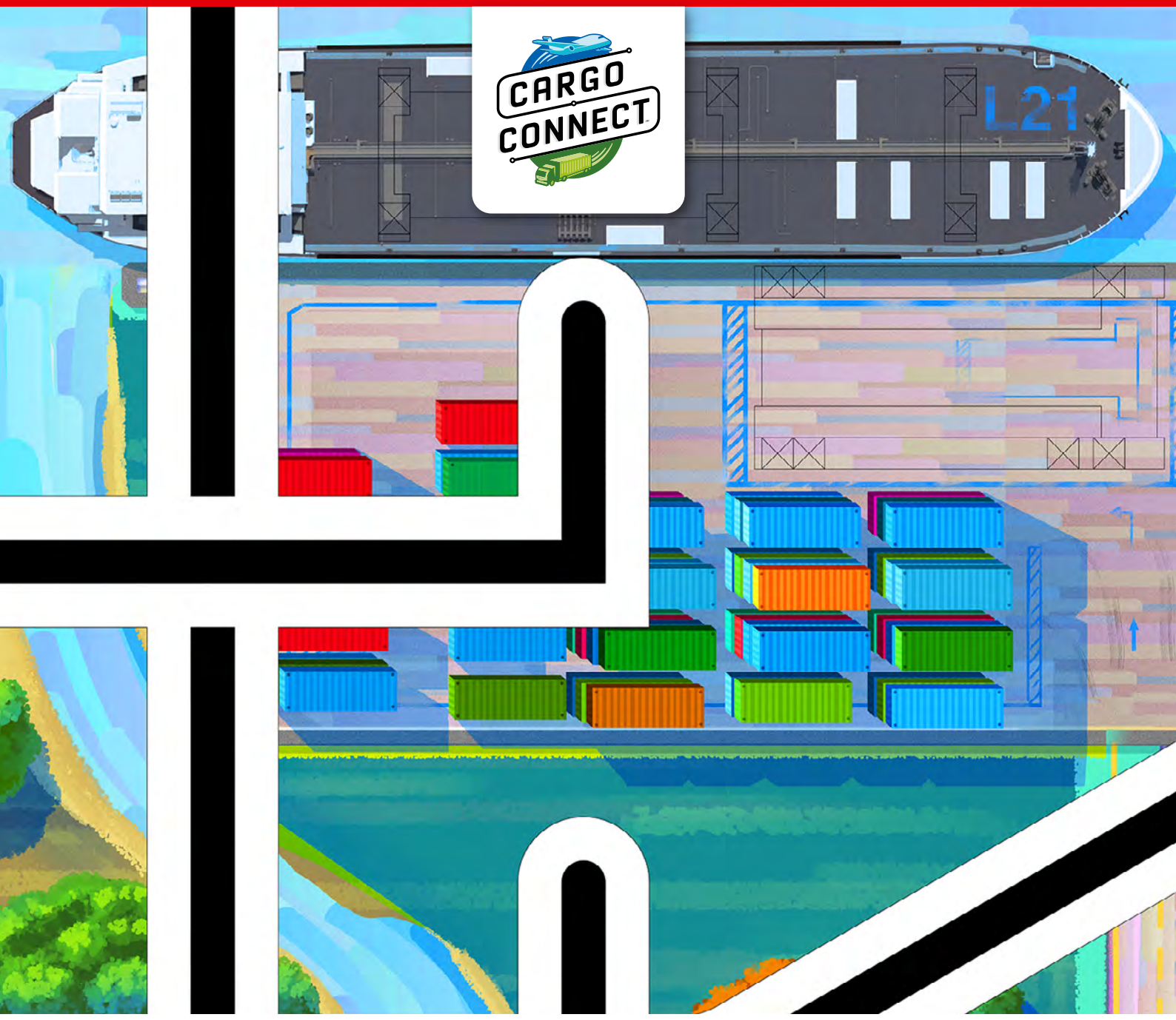
FIRST LEGO LEAGUE CHALLENGE

ENGINEERING NOTEBOOK



FIRST

LEGO education

Welcome!

Use the sessions in this *Engineering Notebook* as a guide for your team's journey through the *FIRST*® FORWARD℠ season and CARGO CONNECT℠ challenge. Use the Core Values and the **engineering design process** throughout your team journey. Have lots of fun as you develop new skills and work together. This notebook is a great resource to share at your judging event, but it isn't required.

Be sure to record what you learn and reflect on how your team collaborated to achieve your goals. Showcase your team's amazing work on your robot, Innovation Project, and Core Values at your event and judging session. Remember, what your team discovers is more important than what you win. Check out the Career Connections pages at the end of this guide for real-life examples of transportation jobs!

FIRST® Core Values

Teamwork — We found we were stronger when we worked together.

Inclusion — We embraced our differences and ensured we all felt welcomed.

Innovation — We applied what we learned to improve our world.

Fun — We enjoyed and celebrated what we did!

Discovery — We explored new skills and ideas.

Impact — We used creativity and persistence to solve problems.

Gracious Professionalism® is a way of doing things that encourages high-quality work, emphasizes the value of others, and respects individuals and the community. We express our Core Values through *Gracious Professionalism*, and this will be evaluated during Robot Game matches. The team can demonstrate *Coopertition*® by showing that learning is more important than winning and they can help others even as they compete.

FIRST® LEGO® League Challenge 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.

Team Journey

Using Engineering Design Process

Session 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.

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.

Getting Started: Start Here, Motors and Sensors

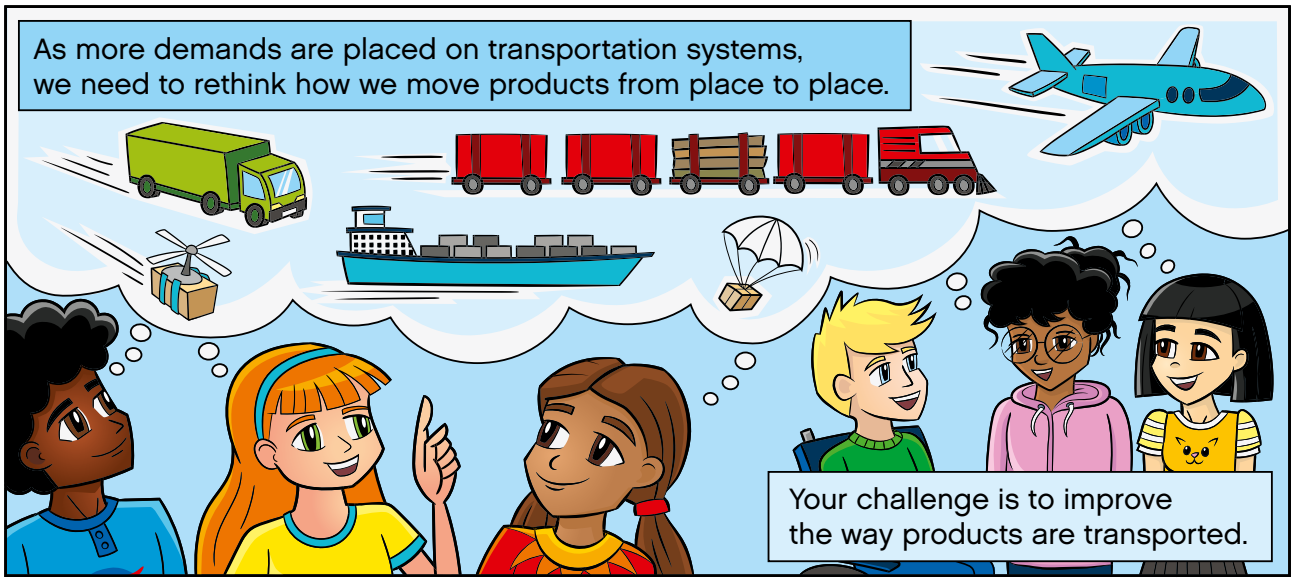
- [ ] Identify the building and coding skills you learned in the lesson that will help you solve missions.

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?

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

Our Notes:



CARGO CONNECT℠

FIRST® FORWARD℠ PRESENTED BY Qualcomm