

ENGINEERING NOTEBOOK







WELCOME!

Use the sessions in this *Engineering Notebook* as a guide for your team's journey through the *FIRST*[®] ENERGIZESM season presented by Qualcomm and SUPERPOWEREDSM 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. Check out careers related to the season theme at the end of this notebook.



FIRST® Core Values



Gracious Professionalism[®] is a way of doing things that encourages high-quality work, emphasizes the value of others, and respects individuals and the community.

Coopertition[®] is showing that learning is more important than winning. Teams can help others even as they compete. We express our Core Values through *Gracious Professionalism*, and this will be evaluated during Robot Game matches.

Identify Ways to Solve the Challenge



FIRST[®] LEGO[®] League Challenge Overview

CORE VALUES

Demonstrate *FIRST*[®] **Core Values** in everything you do. Your team will be evaluated during the Robot Game and the judging session.



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 presentation on your robot design, programs, and strategy.

ROBOT GAME

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

Your team will:

Identify your mission strategy.

- **Design** your robot and programs and create an effective plan.
- Create your robot and coding solution.
- Iterate, test, and improve your robot and program.
- Communicate your robot design process and everyone's contributions.

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!

Your team will:

- Identify and research a problem to solve.
- **Design** a new solution or improve an existing one based on your selected idea, brainstorming, and plan.
- Create a model, drawing, or prototype.
- **Iterate** on your solution by sharing it with others and collecting feedback.
- Communicate your solution's impact.

INNOVATION PROJECT

Your team will prepare a live, engaging presentation to explain the work you have done on your Innovation Project.









 Watch the season videos and read pages 3-9 on how *FIRST*[®] LEGO[®] League Challenge works and the SUPERPOWEREDSM challenge.

→ Tasks (50-60 minutes)

Open the SPIKE[™] Prime app. Find your lesson.



Getting Started Activities: 1-6

- Identify the missions that could be solved with the coding skills learned in this lesson.
- Check out the *Robot Game Rulebook* for mission details.
- Try it out! See if you can use the skills you learned to complete a mission.

→ Reflection Questions

- How could stopping a motor help you solve a mission with your robot?
- What do you know about energy? What are resources that can help you learn more?



The Robot Game Rulebook is a The Robot Game Rulebook is a great resource to use throughout the sessions.

Session 1

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

Our Notes:



- Think about some goals you want to achieve. These can grow and change throughout your journey.
- Use the engineering design process and try out using team roles listed on page 8 in this session.

→ Tasks (50-60 minutes)

Open the SPIKE[™] Prime app. Find your lesson.



Competition Ready Unit: Training Camp 1: Driving Around

- Determine what coding and building skills you can apply in the Robot Game.
- Try it out! See if you can use the skills you learned to drive your robot to one of the mission models.

➔ Reflection Questions

- How can you aim your robot toward a model?
- How did you use the engineering design process and team roles in this session?





Use these goal prompts for inspiration!

We will use Core Values to . . .

We want to experience . . .

We want our robot to . . .

We want our Innovation Project to . . .



Pseudocode

Mission Name:

Mission Number:



ROBOT PATH DIAGRAM



Go to the app and start a new project. Explore which coding blocks will move your robot the same way as your planned coding steps would move it.

Complete this page in Session 6.

Innovation Project Planning

PROCESS

Describe the process you followed to develop your innovative solution.

SOURCES

Write down where you got your information. Include details such as the title, author, and website.

1.

2.

0	
3	

Prepare for Your Event

Make a list of what you need to bring to your event. Read over the event day schedule.

Reflect on the Core Values your team has used.

Can you provide examples of your team using Core Values and demonstrating *Gracious Professionalism*[®]?

Think about all the work you've done on the Innovation Project.

What to Expect at Your Event,

How will you present the problem you researched? How will you explain the process used to create and iterate on your Innovation Project solutions?

 Your team should have fun and show team spirit and enthusiasm at the event. Be sure to show Core

Talk about the programs you've created for your robot.

How do your programs match your mission strategy? How do your programs make your robot act?

Think about your Robot Design.

How will you explain the design process and plan used to create and test your robot?

Think about your team.

How will each person on the team participate in the live presentation and show their knowledge?

