Within this area you can place your logo and the logos of your local sponsors. It’s not allowed to alter either the global sponsor area below or the front and back covers of the guides.
Welcome to the RePLAY℠ Challenge!

Your team can have up to 10 students. We want everyone to experience all the different parts of the program. Sometimes, you will split into two groups and work on different things such as the robot and project. Each group will have an Engineering Notebook. Always remember to share what you have learned with the whole team.

Team Members

<table>
<thead>
<tr>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
<td>4.</td>
</tr>
<tr>
<td>5.</td>
<td>5.</td>
</tr>
</tbody>
</table>

Program Overview

CORE VALUES
Your team will demonstrate FIRST® Core Values throughout your season and beyond!

ROBOT DESIGN
Your team will prepare a short presentation on your robot design, programs, and strategy.

ROBOT GAME
Your team will practice the 2.5-minute matches to complete as many missions as possible.

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

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!

Your team will:
• Design and build your robot.
• Program it to solve Robot Game missions.
• Explain how your robot will act based on the code you wrote.
• Describe your strategies for the Robot Game.

Your team will:
• Strategize which Robot Game missions to solve.
• Design any attachments your robot will need to complete the missions.
• Test and refine your programs and robot design.
• Compete at an event!

Your team will:
• Design a solution to the problem for your community.
• Share your ideas, learn from others, and improve your solution.
• Pitch your solution at an event.

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!

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!

Team Members

<table>
<thead>
<tr>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
<td>4.</td>
</tr>
<tr>
<td>5.</td>
<td>5.</td>
</tr>
</tbody>
</table>
All around us, there are opportunities to play and be active — from open parks to cement courts, in our classrooms, and even when we’re waiting in line. But more and more people are not active enough.

So May asks...

Playing makes being active more fun. You get creative when you want to play, and it's this creativity — your creativity — that can help motivate us to be more active.

Let’s ask people we know!

So, how are we going to solve these challenges? How and where can we help people be more active?

Reward them!

The Park Bench

On the bus

Let’s ask people we know!

Playing makes being active more fun. You get creative when you want to play, and it’s this creativity — your creativity — that can help motivate us to be more active.
RePLAYSM Innovation Project

All around us, there are opportunities to play and be active – from open parks to cement courts, in our classrooms, and even when we’re waiting in line. But more and more people are not active enough. Playing makes being active more fun. You get creative when you want to play, and it’s this creativity that can help motivate us to be more active.

START
It starts here, with your critical thinking and imagination leading the way toward fun and active lifestyles for everyone!

➡ Identify a specific problem linked to people not being active enough.
The Project Sparks explore some problems related to the challenge. Your Innovation Project could come from a Project Spark, but it doesn’t have to.

➡ Research your problem and your solution ideas.
What solutions already exist? Are there any experts who could help you?

➡ Design a new piece of technology or improve an existing one.
This is your project solution. Make a model or prototype to show how your solution helps people be active.

➡ Share your solution, collect feedback and iterate on your design.
The more you iterate, the more you will learn. What impact will your solution have on your community?

➡ Pitch your solution at an event.
Prepare a 5-minute presentation that clearly explains your work. Make sure your whole team is involved.

Community can be defined as just your town or city or larger area like your state or country.

Core Values
Use the Core Values to guide your team through your journey. Have lots of FUN as you develop new skills and work together.

<table>
<thead>
<tr>
<th>DISCOVERY</th>
<th>We explore new skills and ideas.</th>
</tr>
</thead>
<tbody>
<tr>
<td>INCLUSION</td>
<td>We respect each other and embrace our differences.</td>
</tr>
<tr>
<td>INNOVATION</td>
<td>We use creativity and persistence to solve problems.</td>
</tr>
<tr>
<td>TEAMWORK</td>
<td>We are stronger when we work together.</td>
</tr>
<tr>
<td>IMPACT</td>
<td>We apply what we learn to improve our world.</td>
</tr>
<tr>
<td>FUN</td>
<td>We enjoy and celebrate what we do!</td>
</tr>
<tr>
<td>COOPERTITION®</td>
<td>We show that learning is more important than winning. We help others even as we compete.</td>
</tr>
<tr>
<td>GRACIOUS PROFESSIONALISM®</td>
<td>We show good work, highlight the value of others, and respect others and the community.</td>
</tr>
</tbody>
</table>

START
It starts here, with your critical thinking and imagination leading the way toward fun and active lifestyles for everyone!

You will complete this page throughout the sessions!
Find Robot Lessons and Building Instructions

Find the App

Find the Lobby

Find the Unit

Find the Lessons

You will build the mission models in Sessions 1-4!

Find Building Instructions:
firstlegoleague.org/missionmodelbuildinginstructions

Robot Lessons

Select the appropriate lessons for the robot set you are using. These lessons will be completed during the sessions.

LEGO Education SPIKE™ Prime

Lesson 1
• Open the Start tab then select Getting Started.
  • Do Lesson 1 Start Here.

Lesson 2
• Open the Unit Plans tab and select Competition Ready.
  • Do Steps 1-4 of the Training Camp 1 Lesson.

Lesson 3
• Open the Unit Plans tab and select Competition Ready.
  • Do Steps 1-5 of the Assembling an Advanced Driving Base Lesson.

Lesson 4
• Open the Unit Plans tab and select Competition Ready.
  • Do Steps 1-5 of the My Code, Our Program Lesson.

Lesson 5
• Open the Unit Plans tab and select Competition Ready.
  • Do the Guided Mission Lesson.

LEGO® MINDSTORMS® Education EV3 Classroom

Lesson 1
• Open the Start tab then select Getting Started.
  • Do Lesson 1 Hello World.

Lesson 2
• Open the Unit Plans tab and select Robot Trainer.
  • Do Steps 2-4 of the Moves and Turns Lesson.

Lesson 3
• Open the Unit Plans tab and select Robot Trainer.
  • Do Steps 2-4 of the Objects and Obstacles Lesson.
  • Do Steps 2-4 of the Grab and Release Lesson.

Lesson 4
• Open the Unit Plans tab and select Robot Trainer.
  • Do Steps 2-4 of the Lines and Color Lesson.

Lesson 5
• Open the Unit Plans tab and select Robot Trainer.
  • Do the Angles and Patterns Lesson.

LEGO MINDSTORMS® Education EV3 Classroom

Lesson 1
• Open the Start tab then select Getting Started.
  • Do Lesson 1 Hello World.

Lesson 2
• Open the Unit Plans tab and select Robot Trainer.
  • Do Steps 2-4 of the Moves and Turns Lesson.

Lesson 3
• Open the Unit Plans tab and select Robot Trainer.
  • Do Steps 2-4 of the Objects and Obstacles Lesson.
  • Do Steps 2-4 of the Grab and Release Lesson.

Lesson 4
• Open the Unit Plans tab and select Robot Trainer.
  • Do Steps 2-4 of the Lines and Color Lesson.

Lesson 5
• Open the Unit Plans tab and select Robot Trainer.
  • Do the Angles and Patterns Lesson.
Project Spark 1

Problem
People struggle to find suitable spaces to get outside, play, and keep fit. How can you change an inactive space to an active space? You could use everyday items you find lying around to get people active and playing or specifically design a piece of equipment that enables everyone to participate and be active together.

These models have been designed to show some equipment that can help with this problem.

Project Spark 2

Problem
Many people are not active enough to stay fit. How can you motivate them to play actively? You could encourage people with FUN experiences or give them rewards for doing exercise. Putting equipment in unexpected places can help.

These models have been designed to show some pieces of technology that are linked to this problem.

### Project Spark 1

| M08 | Game Cubes (Bag 1) |
| M09 | Tire Flip (Bag 7) |
| M10 | Cell Phone (Bag 1) |
| M11 | Treadmill (Bag 7) |
| M12 | Row Machine (Bag 6) |
| M13 | Weight Machine (Bag 6) |

### Project Spark 2

| M02 | Step Counter (Bag 4) |
| M03 | Slide (Bag 4) |
| M04 | Bench (Bag 3) |
| M05 | Basketball (Bag 3) |
| M06 | Pull-Up Bar (Bag 2) |
| M07 | Boccia Share (Bag 5) |
| M08 | Boccia Aim & Frame (Bag 5) |
| M09 | Boccia Aim & Frame (Bag 5) |
| M10 | M06 Pull-Up Bar (Bag 2) |
| M11 | M02 Step Counter (Bag 4) |
| M12 | M05 Basketball (Bag 3) |
| M13 | M06 Pull-Up Bar (Bag 2) |
| M14 | M08 Boccia Share (Bag 5) |

---

Turn your cell phones off and spend time finding new ways to enjoy playing outside. Build in Session 1

You don’t need special weights to practice your strength training. These old tires can be repurposed for the task. Build in Session 1

You don’t actually need to go anywhere when you have a run on this treadmill. You can stay safe and play! Build in Session 4

You don’t have to run; walking is also great exercise, and counting your steps can motivate you to be more active. Build in Session 2

A discarded milk crate hung on a lamppost can be turned into a fun game of basketball. Build in Session 3

You don’t have to run; walking is also great exercise, and counting your steps can motivate you to be more active. Build in Session 2

Lifting your own body weight by doing pull-ups on any suitable bar will keep you fit and strong. Build in Session 3

Sliding down is so much fun that you don’t mind the effort it takes to climb up to the top. Playing on exciting equipment is a great way to stay fit. Build in Session 2

Keeping busy by collecting and delivering items is a fun way stay active. All that exercise is great for your heart! Build in Session 2

Gym equipment in the park is a great way to encourage people who would not normally use the gym to have a go! Build in Session 4

You don’t have to run; walking is also great exercise, and counting your steps can motivate you to be more active. Build in Session 2

Sliding down is so much fun that you don’t mind the effort it takes to climb up to the top. Playing on exciting equipment is a great way to stay fit. Build in Session 2

Keeping busy by collecting and delivering items is a fun way stay active. All that exercise is great for your heart! Build in Session 2

Gym equipment in the park is a great way to encourage people who would not normally use the gym to have a go! Build in Session 4

---

Build in Session 1

Build in Session 2

Build in Session 3

Build in Session 4
The team will build a robot using LEGO® elements and technology. They program it to autonomously complete a series of missions in a 2.5-minute Robot Game to score points. The robot starts in the launch area, tries missions in the order chosen by the team, and then returns anywhere into home.

The team can modify the robot when it is in home before launching it again. If needed, the robot can be brought home by hand, but the team will lose a precision token. The team will play several matches but only the highest score matters.

Use this page to help you set up the mission models on the field. Be sure to check the Robot Game Rulebook for more details.

**Robot Game Missions**

Full mission descriptions and Robot Game rules are in Robot Game Rulebook.

<table>
<thead>
<tr>
<th>Mission No.</th>
<th>Name</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>M00</td>
<td>Equipment Inspection Bonus</td>
<td>“Doing the same with less” can save time and space.</td>
<td>25</td>
</tr>
<tr>
<td>M01</td>
<td>Innovation Project</td>
<td>The robot moves your Innovation Project model onto the RePLAYSM logo or the gray area around the bench (M04).</td>
<td>20</td>
</tr>
<tr>
<td>M02</td>
<td>Step Counter</td>
<td>The robot slides the step counter slow and steady. The farther the “walk,” the better.</td>
<td>10-20</td>
</tr>
<tr>
<td>M03</td>
<td>Slide</td>
<td>The robot slides the people down the slide and moves them to other areas.</td>
<td>5-50</td>
</tr>
<tr>
<td>M04</td>
<td>Bench</td>
<td>The robot removes the back rest, flattens the bench, and gets cubes into the hopscotch spaces.</td>
<td>10-65</td>
</tr>
<tr>
<td>M05</td>
<td>Basketball</td>
<td>The robot raises the crate up the post and gets a cube into it.</td>
<td>15-40</td>
</tr>
<tr>
<td>M06</td>
<td>Pull-Up Bar</td>
<td>The robot passes completely under the bar any time. Separately, it is held off the mat by the bar at the end of the match.</td>
<td>15-45</td>
</tr>
<tr>
<td>M07</td>
<td>Robot Dance</td>
<td>The robot is dancing on the dance floor at the end of the match.</td>
<td>20</td>
</tr>
<tr>
<td>M08</td>
<td>Boccia</td>
<td>Boccia is an interactive mission with the opposing team. Talk with the other team so the robots send matching colored cubes onto the opposite field.</td>
<td>5-110</td>
</tr>
<tr>
<td>M09</td>
<td>Tire Flip</td>
<td>The robot flips tires so their white centers face up and moves them into the large target circle.</td>
<td>10-35</td>
</tr>
<tr>
<td>M10</td>
<td>Cell Phone</td>
<td>The robot flips the cell phone white side up.</td>
<td>15</td>
</tr>
<tr>
<td>M11</td>
<td>Treadmill</td>
<td>The robot spins the rollers to move the pointer as far clockwise as possible.</td>
<td>5-30</td>
</tr>
<tr>
<td>M12</td>
<td>Row Machine</td>
<td>The robot moves the free wheel out of the large circle and into its small target circle.</td>
<td>15-30</td>
</tr>
<tr>
<td>M13</td>
<td>Weight Machine</td>
<td>Before the match, you hand select the machine’s lever setting. During the match, the robot moves the lever until the little yellow stopper falls.</td>
<td>10-20</td>
</tr>
<tr>
<td>M14</td>
<td>Health Units</td>
<td>The robot collects health units from around the field and moves them to target areas.</td>
<td>5-60</td>
</tr>
<tr>
<td>M15</td>
<td>Precision Tokens</td>
<td>The less you interrupt the robot outside home, the more points you keep.</td>
<td>5-60</td>
</tr>
</tbody>
</table>
How to Follow the Sessions

The following 12 sessions will prepare you to share your team journey at a tournament. Be sure to record what you learn and reflect on how you collaborate to achieve your goals. Be ready to showcase your work on the robot, Innovation Project, and Core Values.

Each session has instructions of tasks that you will complete:

- Red headers represent Core Values activities.
- Green headers represent Robot Game activities.
- Blue headers represent Innovation Project activities.

Use the open grid lines to write down your thoughts and draw your ideas.

**TEAM GOALS**

What do you hope to achieve? You can use these prompts as inspiration:

We will use Core Values to… We aspire to… We plan to… We want to help… We want to experience… We want our robot to… We want our Innovation Project to…

1. 
2. 
3. 

You will fill out your team goals in Session 3!

**Introduction**

- Watch the RePLAYSM Season Launch video.
- Read pages 4-7.
- Split your team into two groups.

**Group 1**

- Read and complete Robot Lesson 1 on page 11. Refer to page 10 to start!
- Check out pages 14-15. These will be a great resource throughout the sessions.

**Group 2**

- Read Project Spark 1 on page 12.
- Build the Session 1 models.
- Find the missions that relate to the models you built.
- Discuss how the models are linked to the problem presented.
- Brainstorm other solutions to the problem.
- Make a list of your amazing ideas.

**Share**

- Get your team together at the mat.
- Position each model where it belongs.
- Group 1: Show the robot skills you learned.
- Group 2: Show how the models work.
- Discuss the questions below.

**ROBOT**

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

**PROJECT**

- Do any of the mission models make you think of good ideas for the project?
- Are there any spaces in your community where people could be more active?
Introduction

- Read Core Values page 9. Think about Inclusion and your team.
- Record ways you make sure everyone is respected and their voices are heard.

Group 1

- Read and complete Robot Lesson 2 on page 11 (SPIKE™ Prime: 2A).

Group 2

- Read Project Spark 2 on page 13.
- Build the Session 2 models.
- Find the missions that relate to the models you built.
- Discuss how the models are linked to the problem presented.
- Draw your solution for a piece of equipment or technology that could inspire people to be active.
- In your drawing, include how your design works and label its parts.

Share

- Get your team together at the mat.
- Position each model where it belongs.
- Group 1: Show the robot skills you learned.
- Group 2: Show how the models work.
- Discuss the questions.
- Dismantle your robot when you’re done.

ROBOT

- How can you aim your robot toward a model?
- How can you make your robot go the right distance to reach a model?

PROJECT

- Can you think of any interesting ways to motivate people to exercise?
- Is there a particular problem that is stopping people from being active in your community?

Session 2

Introduction

- Discuss as a team the goals you want to achieve for the season.
- Record these team goals on page 16.
- Talk about what processes your team will follow and determine responsibilities.

Group 1

- Read Project Spark 1 on page 12.
- Build the Session 3 models.
- Find the missions that relate to the models you built.
- Discuss how the models are linked to the problem presented.
- Brainstorm other solutions to the problem presented in the Project Spark.
- Make a list of your amazing ideas.

Group 2

- Read and complete Robot Lesson 1 on page 11. Refer to page 10 to start!
- Check out pages 14-15. These will be a great resource throughout the sessions.

Share

- Get your team together at the mat.
- Position each model where it belongs.
- Group 1: Show the robot skills you learned.
- Group 2: Show how the models work.
- Discuss the questions.
- Dismantle your robot when you’re done.

ROBOT

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

PROJECT

- Can you think of any interesting ways to motivate people to exercise?
- Is there a particular problem that is stopping people from being active in your community?
- Are there any spaces in your community where people could be more active?
- Do any of the models make you think of good ideas for the project?
Introduction
- Refer to Core Values page 9. Think about Discovery and your team.
- Record ways your team has learned new skills and ideas.

Group 1
- Read Project Spark 2 on page 13.
- Build the Session 4 models.
- Find the missions that relate to the models you built.
- Discuss how the models are linked to the problem presented.
- Draw your solution for a piece of equipment or technology that could inspire people to be active.
- In your drawing, include how your design works and label its parts.

Group 2
- Read and complete Robot Lesson 2 on page 11 (SPIKE™ Prime: 2B).

Share
- Get your team together at the mat.
- Position each model where it belongs.
- Group 1: Show how the models work.
- Group 2: Show the robot skills learned.
- Discuss the questions.

Session 4

Introduction
- Work together to create a team name!
- Design a poster of your name as a logo.
- Be sure each person gets to contribute to the poster!

Team
- Read and complete Robot Lesson 3 on page 11.
- MINDSTORMS®: Take turns coding the robot and show what it can do.
- SPIKE™ Prime: Build your new robot and create a code to get it moving.

Team
- Watch The Missions part of the Season Launch video again.
- Discuss which missions your team will tackle first.
- Work together to complete Pseudocode page 30.

Share
- Get your team together at the mat.
- Review your Pseudocode page when you look at the mat.
- Make changes to your page if necessary.
- Discuss the questions.

Session 5

Introduction
- Plan what your robot needs to do to complete the first mission your team has chosen.
- Where does the robot start?

ROBOT
- How can you aim your robot toward a mission?
- How can you make your robot go the right distance to reach a model?

PROJECT
- Can you think of any ways to motivate people to exercise?
- Is there a particular problem that is stopping people from being active in your community?

ROBOT
- Are the extra LEGO® pieces you need to add to your robot quick and easy to attach?
Introduction
- Refer to Core Values page 9. Think about Teamwork and your team.
- Record ways your team has learned to work together.

Team
- Read and complete Robot Lesson 4 on page 11.
- Take turns to download your programs onto the robot and show what it can do.

Team
- Read RePLAYSM Innovation Project page 8 and the Project Spark pages 12-13.
- Think about the great solutions you have come up with in the previous sessions.
- Identify the problem you will solve.
- Record your problem statement.

Share
- Get your team together at the mat.
- Show the team any new coding skills you learned.
- Discuss the questions.

Session 6

Introduction
- Refer to Core Values page 9. Think about Coopertition® and Gracious Professionalism®.
- Record ways your team will demonstrate these at events.

Group 1
- Begin the development of your project.
- Research your problem and any existing solutions.
- Investigate your solution ideas.
- Use Research page 31 as a tool.
- Be sure to use a variety of sources and keep track of them.

Group 2
- Read and complete Robot Lesson 5 on page 11 and the Guided Mission page 33.
- Have fun practicing this guided mission until it works perfectly!

Share
- Get your team together at the mat.
- Group 1: Explain what you discovered in your research.
- Discuss any solution ideas.
- Group 2: Show how your robot scores points on the guided mission.

Session 7

ROBOT
- Can you follow how the code on your device is making your robot move?
- How do you plan to talk with the other team at the Robot Game about the guided mission?

PROJECT
- Are there existing solutions to your identified problem that you could improve?
- Do you have brand-new solution ideas to your problem?

YOUR PROBLEM STATEMENT
Are you working together and helping each other?

What does the guided mission show you about Coopertition?
Session 8

- **Introduction**
  - Refer to Core Values page 9. Think about **Innovation** and your team.
  - Record ways your team has been creative and solved problems.

- **Innovation Project Group**
  - Make a plan to share about your solution with others!
  - Evaluate what you created last session. Iterate and improve if needed.
  - Determine if you can do any testing.
  - Use the white bricks from bag 8 to build a model that represents your solution.

- **Robot Group**
  - Decide which mission to tackle next.
  - Build any attachments you need.
  - Time to code! Refine your code so the robot completes the mission reliably.
  - Be sure to document your design process and testing for each mission!

- **Share**
  - Get your team together at the mat.
  - Group 1: Show how your robot scores points on the guided mission.
  - Group 2: Discuss your research and your project solution.

---

Session 9

- **Introduction**
  - Decide as a team what your project solution will be based on your identified problem.

- **Group 1**
  - Read and complete Robot Lesson 5 on page 11 and the Guided Mission page 33.
  - Have fun practicing this guided mission until it works perfectly!

- **Group 2**
  - Research your selected solution. Record it on page 31.
  - Create your project solution using Project Development page 32 as a tool.
  - Sketch your solution. Label the parts and how it will work.
  - Describe your solution and how it solves the problem.
  - Document the process used to develop your solution.

- **Share**
  - Get your team together at the mat.
  - Group 1: Show how your robot scores points on the guided mission.
  - Group 2: Discuss your research and your project solution.

---

**ROBOT**
- Can you follow how the code on your device is making your robot move?
- How do you plan to talk with the other team at the Robot Game about the guided mission?

**PROJECT**
- Can you describe your awesome solution and how it solves the problem?
- Does your solution involve a piece of equipment or technology?
- Is the program for each mission saved on your computer?
- In what order will you run the missions in the Robot Game?

**ROBOT**
- Is the program for each mission saved on your computer?
- How could you realistically implement your project solution?
- Could your project solution be manufactured, and what would it cost?

**PROJECT**
- Can you describe your awesome solution and how it solves the problem?
- Does your solution involve a piece of equipment or technology?
- Is the program for each mission saved on your computer?
Introduction
- Refer to Core Values page 9. Think about Impact and your team.
- Record ways your team had a positive influence on each other and others.

Innovation Project Group
- Plan out your project presentation. Refer to the rubric for what to cover.
- Write out your Innovation Project presentation script.
- Make any props or displays that you need. Be engaging and creative!

Robot Group
- Continue working on your project presentation. Be clear and organized!
- Plan out what each person on the team will say.
- Use the white brick model of your project solution in Mission 1.
- Program the robot to complete this mission.
- Plan out your robot design presentation. Refer to the rubric for what to cover.
- Write out your robot design presentation script.
- Practice your presentation.

Share
- Get your team together at the mat.
- Discuss the project presentation work completed.
- Discuss what missions you have completed.
- Discuss how everyone can be involved in both presentations.

How can your project solution help your community?

ROBOT
- What features on your robot show good mechanical design?
- How did you decide which missions to tackle?

PROJECT
- What are you going to build with your white bricks to represent your solution?
- Have you made changes to your solution based on advice from others during sharing?
- Are all the different LEGO pieces you need to attach to the robot for each mission ready?
- Do you have a plan for what to do if one mission does not work?

Share
- Discuss the project presentation and each person’s role.
- Run a practice 2.5-minute match and tell what missions are done. Discuss the robot design presentation.
- Decide what else needs to be done.

ROBOT
- Have you organized for everyone to have a speaking part in the project presentation?
- Have you told everyone to speak loudly, SMILE, and have FUN?
### Session 12

**Prepare for Your Event**

- Consider your team’s journey throughout the sessions and season. Did you face any challenges? How did you overcome them?
- Reflect on the Core Values you used in the Introduction activities. How have you applied the Core Values?
- Think about how you shared at the end of each session. How can you share your work with the judges in a similar way?
- Look over the goals you wrote on page 16. Did you meet your goals? Why or why not?
- Talk about the programs you’ve created for your robot. How would you explain them to a judge who may not know your software?
- Think about all the work you’ve done on the Innovation Project. Can you think of creative ways to showcase all your hard work?

**Have More Time?**

Continue solving missions and working on your project before your event!

**WHAT TO EXPECT AT YOUR EVENT**

- Your team should have FUN at the event and integrate Core Values into everything you do.
- Your whole team will meet with the judges in a single meeting to share your team’s journey throughout the season. Think about where you started out and where you are now. Think about what you have accomplished and what challenges you have faced and overcome.
- You will share about your team’s Innovation Project, Robot Design, and how your team incorporated Core Values throughout your experience.
- During the Robot Game, two team members will run the robot at the mat during each 2.5-minute robot match. You can tag in other team members for different missions.

**Team**

- Rehearse your Innovation Project presentation.
- Demonstrate Core Values when you present!
- Practice your Robot Design presentation.
- Be sure to mention how your team has used Core Values!
- Hold practice 2.5-minute Robot Game matches.

**Share**

- Review all the rubrics.
- Provide helpful feedback on each presentation based on the rubrics.

**Introduction**

- Refer to Core Values page 9. Think about FUN and your team.
- Record ways your team has had fun throughout this experience.

**Have you had a great time in FIRST® LEGO® League Challenge?**

- We will present our Innovation Project!
- I will describe our robot’s design and all its different parts.
- I will explain our different programs and how they make the robot act.
- I will talk about what we have learned.
- I will reflect on how our team demonstrated Core Values in all we did.

**Appendix**

- Consider your team’s journey throughout the season. Think about where you started out and where you are now. Think about what you have accomplished and what challenges you have faced and overcome.
- Reflect on the Core Values you used in the Introduction activities. How have you applied the Core Values?
- Think about how you shared at the end of each session. How can you share your work with the judges in a similar way?
- Look over the goals you wrote on page 16. Did you meet your goals? Why or why not?
- Talk about the programs you’ve created for your robot. How would you explain them to a judge who may not know your software?
- Think about all the work you’ve done on the Innovation Project. Can you think of creative ways to showcase all your hard work?
**Pseudocode**

**Mission Name:**

**Mission Number:**

**CODING STEPS**

Write out the moves the robot should make to complete the mission.

<table>
<thead>
<tr>
<th>Move 1</th>
<th>Move 2</th>
<th>Move 3</th>
<th>Move 4</th>
<th>Move 5</th>
<th>Move 6</th>
<th>Move 7</th>
<th>Move 8</th>
<th>Move 9</th>
<th>Move 10</th>
</tr>
</thead>
</table>

**ROBOT PATH DIAGRAM**

Draw the route your robot will take to complete the mission.

![Robot Path Diagram]

| Pseudocode is written steps for your planned code! |

**Research**

Use this page to document the research you do on the project problem and solution. Use extra pages as needed to capture your research.

**PROBLEM AND SOLUTION ANALYSIS**

Record important information here.

<table>
<thead>
<tr>
<th>Guiding Questions:</th>
</tr>
</thead>
<tbody>
<tr>
<td>What information are you looking for?</td>
</tr>
<tr>
<td>Does this source have information relevant to your project?</td>
</tr>
<tr>
<td>Can you use different types of sources such as the Internet, books, and experts?</td>
</tr>
<tr>
<td>Is this a good and accurate source of information?</td>
</tr>
</tbody>
</table>

**GUIDING QUESTIONS**

- What information are you looking for?
- Does this source have information relevant to your project?
- Can you use different types of sources such as the Internet, books, and experts?
- Is this a good and accurate source of information?

**SOURCES**

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

1. 
2. 
3. 

You will complete this page in Sessions 7-8.
Project Development

Use this page to develop your project solution and the process you use to create it.

**DRAWING**

Sketch your solution and label its parts.

**DESCRIPTION**

Explain your solution and describe how it solves the problem.

**PROCESS**

Describe the process you followed to develop your solution.

---

Guided Mission

Being active and playing together is great fun. We can help get people active by designing games and activities that can be played by everyone. Boccia is a great example, and it is one of the competitive sports in the Olympics.

Like all the mission models on the FIRST® LEGO® League competition field, the Boccia models in Mission 8 (M08) might inspire you to think of a solution for your Innovation Project.

To help you learn about using a color sensor to follow lines on the mat, we have created a guided mission lesson. You need to read Lesson 5 on page 11. This will direct you to the app for either SPIKE™ Prime or LEGO MINDSTORMS® Education EV3 Classroom.

**M08** Game Cubes (Bag 1)  
Boccia Share (Bag 5)  
Boccia Aim & Frame (Bag 5)

This game can be played anywhere you can draw a target on the ground. The launcher is designed to make it easy for anyone to play.

In the app, you will:

• Modify the robot you have been working on.
• Build a special attachment to help you solve the mission.
• Start the robot in the right position in the launch area.
• Download the program that solves this mission.
• Run the robot and watch it complete the mission and score the points.
• Apply your new line-following skill to reach the treadmill model.
• Think about how to incorporate the Boccia mission into your 2.5-minute Robot Game round.
Jay Flores  
Global STEM Ambassador  

Where I work: Rockwell Automation  

My FIRST® connection: I helped design the FIRST Robotics Competition experience and help FIRST create the strategies to reach more kids.  

Fun facts about me: I was on two athletic competition TV shows: Exatlón Estados Unidos on Telemundo (2019) and BattleFrog League Championship on ESPN (2016).  

My STEM superhero: FIRST® LEGO® League students who are solving real problems in their community.  

Advice to teams: Invent the change you want to see in the world!  

Javion Mosley  
Mechanical Engineering Senior  

Where I work: Rockwell Automation  

My FIRST® connection: Riverside Robotigers 2830 mentor, FIRST alumni  

Fun facts about me: I like to travel a lot and experience as many new things as I can. I was also a Rockwell Automation intern in China.  

My STEM superhero: Wilbur and Orville Wright. I have an admiration for flight.  

Advice to teams: FIRST is a great opportunity to get your first steps in engineering. Treat it as part of your building blocks for your future as the steps you take today will affect your outcome tomorrow.  

Leanne Cushing  
Mechanical Engineer  

Where I work: Bellwether Coffee  

My FIRST® connection: I did FIRST Robotics Competition in high school, and with the help of my mentors, I learned that mechanical design was the one thing I’m good at and love doing.  

Fun facts about me: Most of my spare time is dedicated to Battlebots and my team, Valkyrie, where we design, build, and compete with our 250 lb robot on Discovery Channel.  

My STEM superhero: Bill Nye, for his love of entertaining combined with his love of engineering and teaching. He showed me you could be entertaining, social, and brainy. He fed a lot of my curiosity and taught me so much when I was little.  

Advice to teams: Passion isn’t perfection. Be your own favorite version of yourself; don’t let other people tell you who to be or what you can or cannot do. Don’t talk yourself out of trying something new. Worst case, you have a new opinion or story to share.  

Pedro Alejandro Yang  
Manager  

Where I work: LEGO® Education  

My FIRST® connection: I work in LEGO Education’s competition team, and we are a Strategic Partner of FIRST.  

Fun facts about me: I played badminton in the 2004 Summer Olympics. My hobby is to cook recipes that famous chefs post on YouTube.  

My STEM superhero: Woodie Flowers. Even though he was a STEM advocate, he also acknowledged the human empathy factor for people to succeed, thus inventing what we know today in our FIRST LEGO League community as Gracious Professionalism®.  

Advice to teams: It’s not about winning, but the learnings and friends you make in your journey.
All around us, there are opportunities to play and be active — from open parks to cement courts, in our classrooms, and even when we’re waiting in line. But more and more people are not active enough.

So Maya asks...

Playing makes being active more fun. You get creative when you want to play, and it’s this creativity — your creativity — that can help motivate us to be more active.

Let’s ask people we know!

How and where can we help people be more active?

So, how are we going to solve these challenges?

Get them motivated!

Reward them!

The park bench

On the bus

Playing makes being active more fun. You get creative when you want to play, and it’s this creativity — your creativity — that can help motivate us to be more active.