

**FIRST
LEGO
LEAGUE**

CHALLENGE

CLASS PACK GUIDE



Welcome to the Program

Welcome to *FIRST*® and the *FIRST*® LEGO® League program. *FIRST* LEGO League captures children's curiosity and directs it toward discovering the wonders of science and technology. The program was created through a partnership between *FIRST* (For Inspiration and Recognition of Science and Technology) and LEGO® Education. *FIRST* LEGO League has three divisions: Discover, Explore, and Challenge. Your students will take part in the Challenge Class Pack!

Thank you for participating in this innovative STEM program for students. Your students join a global community across more than 110 countries. Its impact is profound and leads to a further progression of STEM exploration, skills, and experiences even after students complete the program.

The Class Pack provides schools with the tools to implement *FIRST* LEGO League Challenge in daily classroom lessons or as a structured after-school program. As the teacher, your role is to facilitate learning for your students and organize your implementation of the program. The guide is designed to help you do this.

This guide also contains information on how students can share their experiences and what they have learned throughout their journey – from highlighting your students' hard work in a classroom showcase to putting on your own school or organization-based *FIRST* LEGO League Challenge event.

The Class Pack Videos show you how to implement the program in the school environment.



Getting Started Checklist

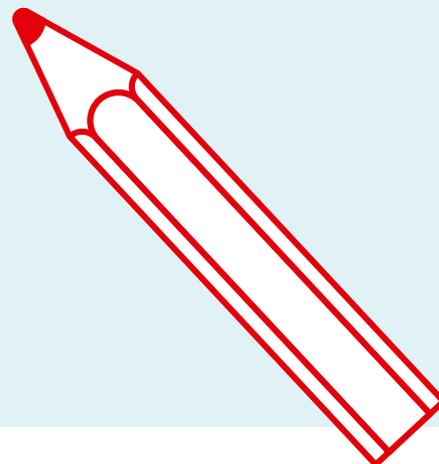
Thank you to all the teachers and youth leaders who will be delivering the *FIRST*® *LEGO*® League Challenge Class Pack to your students.

Please read the *Engineering Notebook* and *Robot Game Rulebook* (these guidebooks are given to the students) and the *Team Meeting Guide*. They are full of very useful information to guide you through the program. After completing the 12 sessions, your students will be prepared to participate in a tournament that celebrates the magnificent achievements made by the teams.



We've created a checklist to guide you toward success. Use this to help you get started.

- Ensure you have received all materials needed to run the program. See page 6 for list.
- Identify the space where you will implement the program and store materials. Think about the robot sets and any assembled models that may need to stay together.
- Think about the size of the event you want to have. Your tournament could be in your classroom or be a bigger event for the whole school.
- Create an implementation plan and timeline for how you will use the program. See pages [7-10](#) for implementation tips.
- Determine who will be participating in the program. Is it your entire class? Will the same materials need to be shared by different classes or other teachers?
- Encourage family and home engagement.
- Determine how you will place the class into teams. The recommended team size is no more than 6 students.



Classroom Implementation

Flexible Implementation

First and foremost, use your professional judgment to augment this program to meet the needs of your students, class space, class timing, and additional curricular requirements. Set student expectations for participation in the program based on the student growth mindset of holistic and STEM skills.

Working in Teams

The sessions in the guidebooks have guided tasks for each student team. Here are the reasons behind this design:

- It ensures an equitable experience for every student in all aspects of the program.
- It provides additional opportunity for collaboration and communication.
- Small groups promote deeper learning of content and build holistic skills to share out learning with other team members.
- Fewer materials are needed, and they can be used by more students.
- Having smaller groups allows for students to get hands-on time with building, coding, and exploration.

How to Run Differentiated Groups

- Physically split the space to facilitate working in small groups.
- Establish norms for movement and talking in small groups.
- Be comfortable with talking and movement within groups.
- Orient students to daily goals for learning using the student outcomes for each session listed in the *Team Meeting Guide*.
- Have individual check-ins with each team at the start of class.
- Determine the length of time for daily tasks ahead of class and share with students.
- End each class with whole group sharing using the guiding questions outlined in the *Team Meeting Guide* as inspiration.

DEMO



You will need to adjust how each session is completed by your students if your designated class time to complete each session is different than the allotted 120 minutes per session outlined in the guides. The length this program will take to complete will depend on time within the day you have available to do *FIRST*® LEGO® League Challenge and how often you will teach this program (daily, weekly, etc.).

Following is a daily lesson planning example for how to adjust the session content to meet a different class time frame. This example is from Session 1 and uses a 50-minute class time.

Day 1 (Session 1)

Time	Activity	Teacher Notes
10 minutes	Introduction Tasks	Review the <i>Team Meeting Guide</i> . Pull up season video on YouTube.
30 minutes	Complete robot tasks on first page of session.	The introductory pages in the <i>Engineering Notebook</i> are important. Provide PDFs of the building instructions to teams.
5 minutes	Reflection Time	Look over the Reflection Questions on the first page of the session in the <i>Engineering Notebook</i> .
5 minutes	Clean Up	Store any relevant LEGO® pieces for the robot in a plastic bag.

Day 2 (Session 1)

Time	Activity	Teacher Notes
5 minutes	Check in with teams.	Review Session outcomes in the <i>Team Meeting Guide</i> .
35 minutes	Complete project tasks on second page of session.	The <i>Robot Game Rulebook</i> is a great resource to also use. It is recommended that the mats are set up on tables in the classroom.
5 minutes	Reflection Time	Look over the Reflection Questions on the second page of the session in the <i>Engineering Notebook</i> .
5 minutes	Clean Up	If models aren't finished, show teams where to place them.

If your school or district is running as a cohort using reusable materials, collaborate with other teachers who will run the program on daily lesson planning and timing.

Classroom Management

Teacher Role

The role of the teacher in a *FIRST*® Class Pack environment is more of a facilitator. Your teaching style should include a focus on developing holistic skills, building STEM confidence, embracing challenging activities and using play, discovery, and exploration.

Important things to consider when using the facilitator mindset is to:

- Reinforce *FIRST* Core Values.
- Ask guiding questions to get students thinking.
- Be comfortable with not having all the answers.
- Let students learn for themselves through problem-solving.
- Create opportunities for students to have ownership of the learning process and outcomes.

- Reflect on student and team goals and how they are working to achieve them.
- Guide students to the resources to help them achieve their goals.
- Celebrate mistakes and see learning opportunities.

Student Growth Mindset

As you guide students through their experience, having the right mindset is important. Creating student ownership of learning can assist with this. Ownership can be achieved by allowing students to focus on the skills they are developing and what they want to achieve and to use their problem-solving skills.

There are no right or wrong solutions, just different ways of solving problems. There is plenty of opportunity for students to enjoy their successes and learn from their mistakes.

As a teacher, if you can establish perseverance and resilience as traits to celebrate and be grateful for, students will be more likely to strive for them. Students need to be challenged just enough that it stretches their minds and creativity without overwhelming them.

Promote inquiry by using open-ended questions that lead to more student discovery and investigation. Use the *FIRST Inspires Inquiry Poster* as a resource for inquiry questions you can use with your students. You can access this poster in the *Class Pack Resources* module in Thinkscope.



Running Your Tournament

Purpose: The school tournament is the culmination and celebration of the teams' work throughout the program.

Check out the Class Pack Tournament video to see how the event can be implemented in the classroom.



PREPARATION (60 minutes before event)

Teacher:

- Set up the space.
- Set up two competition fields for the robot games. Ideally, these will fit on official tables with walls, but it will also work on ordinary school tables or on the ground (with home areas taped off).
- Two teams play at the same time, and there is one mission that crosses over both competition fields.
- Allocate each team an area with a table where they will sit and work during the tournament. They are encouraged to watch the robot games and interact with the other teams.

Teacher/Referee:

- Read the *Robot Game Rulebook* to check the field setup, missions, and rules. Photocopy enough score sheets for use.
- Print/photocopy the score sheet found at the back of the *Robot Game Rulebook*. You will need three copies per team.

Teacher/Judge:

- Decide where the teams will present their work and whether this will be to the whole class or just to the teacher and/or volunteer judge(s).
- Print/photocopy the Class Pack Rubric. You will need one copy per team.
- Look at the formative assessment the teacher has recorded to understand the progress each team has made since the beginning of the program.
- If you have volunteers to help you, the judges should be familiar with the Class Pack Rubric and Judge Questions. Referees should be familiar with the *Robot Game Rulebook* and Robot Game score sheets.

Scaling up from the Classroom

- If you have more than five teams, you can scale up the size of your tournament and use a bigger room.
- If you have additional competition fields, you can set them up as practice tables.
- The teams could do their presentations to judges in a separate room.
- You could provide access to electricity, such as a power strip, so teams can plug in their devices and charge their robots between rounds.
- If there is sufficient capacity, invite parents or other classes so teams can share the excitement with them.
- You could hold this event as a STEM night and invite the whole school and parents.



Types of Events

Concept	School Tournament	Qualifying Tournament
Rubric	Class Pack rubric	Event rubrics
Robot Game	Identical at both event types	
Judging	<ul style="list-style-type: none"> Each of the four <i>FIRST</i>® LEGO® League Challenge areas have equal weighting. Teams will present their Innovation Project and Robot Design solutions and how they applied Core Values throughout their experience as time allows. (Timings will vary.) The teacher will use the Class Pack Rubric, which has categories for the Innovation Project, Robot Design, and Core Values. The teacher/judge will ask questions based on the Class Pack Rubric. The judging session is approximately 10-12 minutes. 	<ul style="list-style-type: none"> Each of the four <i>FIRST</i> LEGO League Challenge areas have equal weighting. There is a single judging session (approximately 30 minutes). Teams will present their Innovation Project and Robot Design solutions and how they applied the Core Values throughout their experience. Judges will use the event rubrics (Innovation Project, Robot Design, Core Values) to evaluate teams for awards. <i>Gracious Professionalism</i>® evaluated at the Robot Game will feed into the team's Core Values performance. Judges will ask questions based on the event rubrics.
Awards	<p>Main Awards: School Champion's, Innovation Project, Core Values, Robot Design, Robot Performance</p> <p>Optional Awards: Engineering Excellence, Breakthrough, Motivate</p>	<p>Required Awards: Champion's, Innovation Project, Core Values, Robot Design, Robot Performance, Coach/Mentor</p> <p>Optional Awards: Engineering Excellence, Breakthrough, Rising All-Star, Motivate</p>
Qualification	It is possible for school team(s) and/or the school champion to progress to a qualifying event through the purchase of a team registration.	Champion's award winners will advance to the next level in tournament structure.



Class Pack Rubric

Team #	Team Name
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Judges are required to tick one box on each separate line to indicate the level the team has achieved.

Innovation Project

		BEGINNING	DEVELOPING	ACCOMPLISHED	EXCEEDS
IDENTIFY	Team has a clearly defined problem that it is well researched.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESIGN	Team generated innovative ideas independently before selecting and planning which one to develop.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CREATE	Team developed an original idea or builds on an existing idea with a prototype model/ drawing to represent their solution.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ITERATE	Team shared their ideas, collected feedback and included improvements in their solution.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COMMUNICATE	Team shared a creative and effective presentation of their current solution and its impact on their users.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Robot Design

IDENTIFY	Team had a clearly defined mission strategy and explored building and coding skills they needed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESIGN	Team produced innovative designs and a clear workplan, seeking guidance as needed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CREATE	Team developed an effective robot and code solution matching their mission strategy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ITERATE	Team repeatedly tested their robot and code to identify areas for improvement and incorporated the findings into their current solution.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COMMUNICATE	Team's explanation of the robot design process was effective and shows how all team members have been involved.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Core Values

DISCOVERY	Team explored new skills and ideas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
INNOVATION	Team used creativity and persistence to solve problems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IMPACT	Team applied what they learned to improve their world.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
INCLUSION	Team demonstrated respect and embraced their differences.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEAMWORK	Team clearly showed they had worked as a team throughout their journey.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FUN	Teams clearly had fun and celebrated what they have achieved.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Feedback Comments

Great Job:

Think About:



Class Pack Judge Questions

Elicit information to complete your rubric with the following questions or prompts.

The color coding corresponds to your rubric and is as follows:

Blue boxes –
Innovation Project

Green boxes –
Robot Design

Red boxes –
Core Values

Innovation Project

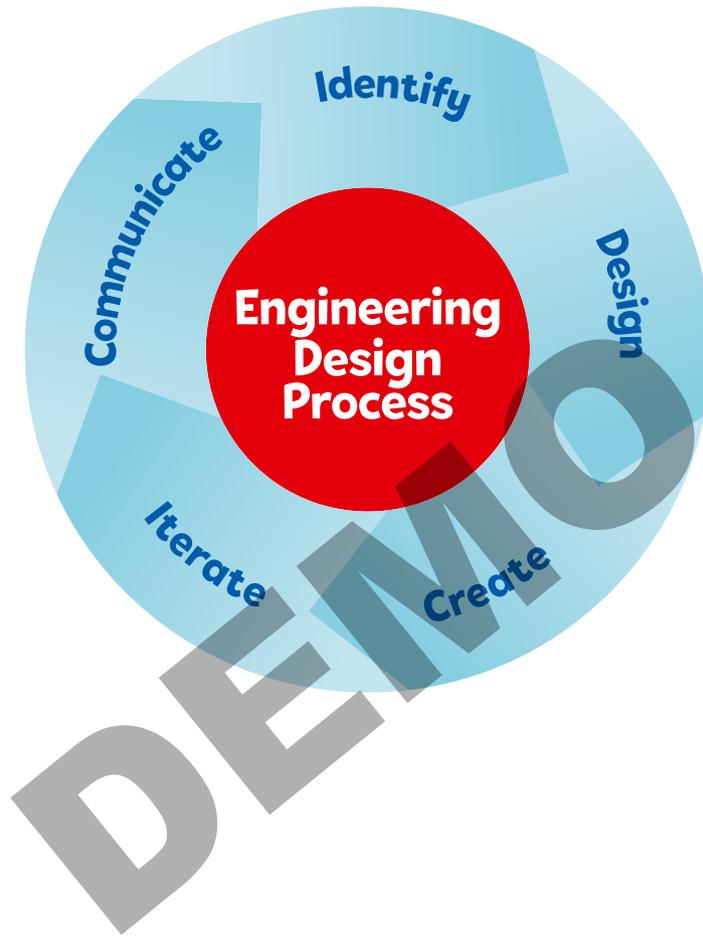
IDENTIFY	Describe the problem that you were trying to solve and the research you did.
DESIGN	Did you have a lot of ideas and what is most innovative thing about the idea you chose?
CREATE	Describe the steps your team took to develop your project solution.
ITERATE	How did your solution improve from the original idea?
COMMUNICATE	How will your solution help others and have an impact on your community?

Robot Design

IDENTIFY	Which missions did you choose and why?
DESIGN	How did you organize building the robot and writing the code?
CREATE	Tell us about how your robot and code work.
ITERATE	Describe one way your robot got better through the season.
COMMUNICATE	Explain the steps your team took to design, build and code your robot.

Core Values

Core Values	Describe the toughest problem you had and how your team solved it.
Many Core Values are also covered in previous questions	Of all the things your team accomplished, what are you most proud of?
	How did you ensure every team member was involved and understood the robot and coding?



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