

**FIRST  
LEGO  
LEAGUE**

**DISCOVER**

# CLASS PACK GUIDE







**FIRST® LEGO® League  
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The **LEGO** Foundation



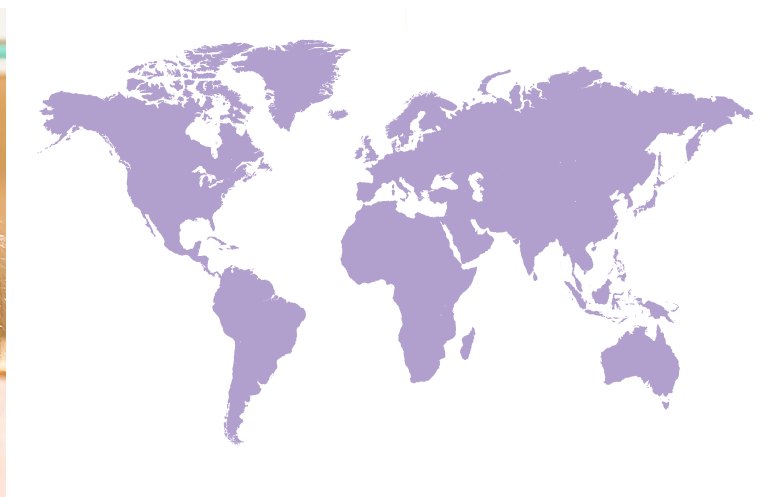
# Welcome to the Program

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 Discover 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 Discover 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 Discover event.



# Getting Started Checklist

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

Please read the *Engineering Notebook* (this guidebook is 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 sessions, your students will be prepared to participate in a celebration that recognizes 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 implement *FIRST* LEGO League Discover.
- Identify the space where you will complete the sessions and store materials between the sessions. Or a place to keep assembled builds between sessions if desired.
- Think about the final celebration event. Will you have it in your classroom and invite the children's families?
- Create a plan. How often during the week will you do the program? Will you complete a whole session at once or split the tasks across different meetings?
- Be sure all materials are unpacked and organized before starting Session 1. You may want to place the pieces into durable plastic storage bins. Get your children familiar with all materials.
- Encourage family and home engagement. Send the Discover More sets home with the children with the Discover More game letter.
- After completing the sessions, have the children participate in an event to celebrate their achievements.





# Material Needs

Look over the following list for what materials and space you will need in your classroom. It is recommended that students work in teams of 4.



Each team will need space to design and build as well as to participate in teamwork activities. This space could be on the floor or using a classroom table.

For each student:

- 1 *Engineering Notebook\**
- 1 Discover More set\*

For each family (send home):

- 1 Discover More Set

For each team (within class):

- LEGO® Education STEAM Park Set
- 1 Discover Set

Classroom space:

- Tables for each team
- Portable or permanent storage

\*Items with an asterisk are consumable each time a team goes through this experience.

## Storage and Material Management

Before you get started with the *FIRST*® LEGO® League Discover content, play a game where the teams identify pieces in their STEAM Park sets. Having students organize the LEGO® sets helps establish your expectations and allows students to take ownership of materials. This activity allows you to start processes and procedures for keeping the sets organized.

After you have gathered or purchased all of the materials your students will need, you could use

plastic storage tubs or other containers to create a kit for each team in your class. You could store the Engineering Notebooks and part of the STEAM Park set inside the container for each team, ensuring that each team is responsible for their materials and they won't get mixed up with others in the classroom.

Alternatively, you could assign and label each STEAM Park set and Discover set with a number, so the students know what materials to grab each time.



### POSSIBLE STORAGE SOLUTIONS





# Family Engagement

Families play a critical role in children's success in life. In *FIRST*® programs, families support their children by providing transportation, snacks, cheering at events, and more. *FIRST* is looking to expand the ways families engage together in *FIRST* programs.



**Family Engagement Resources**



## Discover More Set

As part of Discover Class Pack, every student is provided

a Discover More set that includes two sets of Six Bricks. Developed by The LEGO® Foundation, the sets are a tool for children and their families to practice their memory, movement, creativity and more through short, fun, playful activities using six LEGO® DUPLO® bricks.

## Discover More Game

The Discover More game provides families with all the instructions to play together. To get started, they will need the Discover More Game instructions, a Discover More set, a dice, and a token for each player.



## Family Engagement Night

We encourage all schools to hold a class meeting in which families can hear more about the program, complete family engagement activities, and receive their Discover More sets. You could host the family engagement meeting in the evening and offer snacks and additional activities for families and their children to do.

A family engagement meeting could cover:

- What the program is
- What the habits of learning are
- The celebration event at the end of the program
- The opportunities provided by the program
- The Discover More set and how to support at home



**Families who participate together in *FIRST*® LEGO® League discover the power of curiosity, creativity, and problem solving, building the foundation for life-long confidence in STEM learning.**



# 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 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.







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 60 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 Discover* 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. The ideal scenario is to complete the session in one 60-minute block. This example is from Session 1 and uses a 30-minute class time.

### Day 1 (Session 1)

Time	Activity	Teacher Notes
15 minutes	Introduction	Provide each student with a set of Six Bricks from the Discover sets.
10 minutes	Task 1: Explore	Place vocabulary words on the word wall. Provide examples that relate to the theme.
5 minutes	Clean Up	Show students where to keep their <i>Engineering Notebooks</i> .

### Day 2 (Session 1)

Time	Activity	Teacher Notes
5 minutes	Check-in with class.	Review the Guiding Question and Session Outcomes with class.
15 minutes	Task 2: Create	Guide the students on where you want them to build their creations.
5 minutes	Task 3: Share	Have the students share what they have built.
5 minutes	Clean Up	Leave time for clean-up.

\*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.



# FIRST® LEGO® League Discover Resources

FIRST® has created many resources to help with the implementation of FIRST® LEGO® League Discover in the classroom. These support resources provide different activities and platforms that you can use to engage with your students and extend their STEM learning.



## Kahoot! Series



The FIRST LEGO League Discover Kahoot! series covers topics such as FIRST Core Values, Engineering Design Process, Computational Thinking, and more. These Kahoot! activities are a great way to engage the students in a fun way and introduce them to what FIRST LEGO League Discover is and its main components. Be sure to subscribe to the FIRST community on the Kahoot! page to stay tuned for updates.

## Seesaw Activities



Explore the FIRST LEGO League Discover STEM learning series available in the Seesaw Learning Platform. You can use these activities to engage students in STEM learning, skill-building, and FUN! Lessons cover topics such as engineering, design, Core Values, and more. These activities are easy to implement with limited resources and can either stand-alone or work as a great supplement to a FIRST Class Pack experience.



## Season Resources



Each year, FIRST releases resources specific to the season theme. On the Season Resources page, you will find digital versions of the guidebooks, videos, certificates, and a multitude of support resources including Session Slides and Multimedia Resources.



DISCOVER



# FIRST® Education Resources

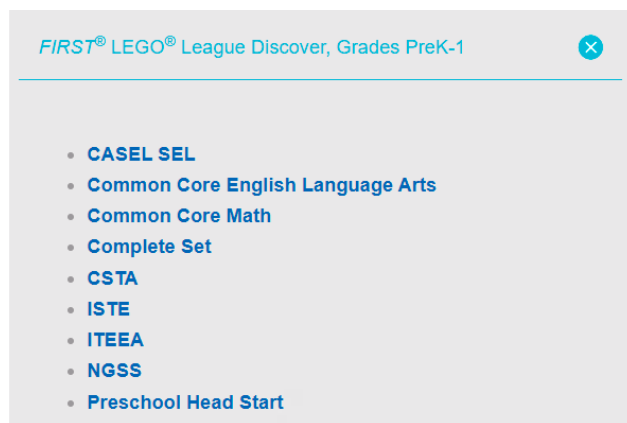
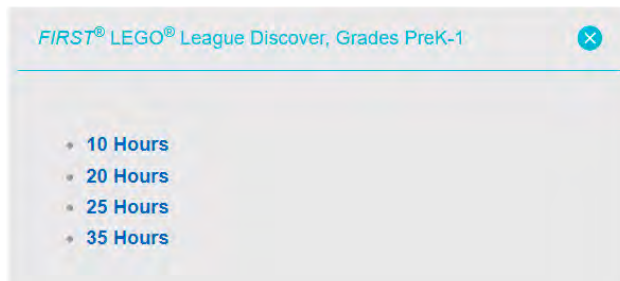


FIRST® Education supports educators by providing additional educator content and resources. Below is a list of the some of the educator resources available.



## Scope and Sequences

FIRST Education has created various scope and sequences to provide options for implementation in the classroom. Detailed documents for each of the scope and sequence options can be found on the FIRST Education website.



## Standards Alignments

FIRST Education has completed an external analysis and mapping of all its programs to national educational standards. Custom alignments have also been completed for various specific states and countries.

Contact [FIRSTeducation@firstinspires.org](mailto:FIRSTeducation@firstinspires.org) to see if alignments are available for your state or location.

## Skills Progression

FIRST has created a learning progression of skills used in FIRST® LEGO® League Discover and their correlation to various subject areas. The document allows teachers to see how FIRST LEGO League Discover can be used across different grades to develop skills.



**FIRST® LEGO® League Discover – Learning Progression**

The FIRST® LEGO® League Discover learning progression below outlines the differences in student learning outcomes for the program by grade level. It articulates the sequencing of learning that is expected with participation in that grade level. It could also occur as a result of multiple years of participation in FIRST programming. Written as a checklist that reflects clearly articulated learning expectations from the perspective of the student to articulate learning while preserving students for more challenging and sophisticated concepts at the next level. The basis is to raise such that students are learning age-appropriate matters, knowledge, and skills that are neither too advanced nor too rudimentary. This progression could be repurposed as a student-facing document to be used as a reflection of learning upon completion of the FIRST LEGO League Discover experience.



Skill Area	Pre-Kindergarten	Kindergarten	Grade 1
	YEAR 1	YEAR 2	YEAR 3
Science	<input type="checkbox"/> I engage in STEM (science, technology, engineering, and math) talk, and observe objects, materials, and events. I ask questions to gather information and make predictions.	<input type="checkbox"/> I observe how different actions of push and pull change the motion of an object and when objects collide, they can change motion.	<input type="checkbox"/> I recognize that bigger pushes and pulls make things speed up or slow down. I can gather evidence from simple tests.
Math	<input type="checkbox"/> Using my LEGO® DUPLO® bricks, I can understand numbers and quantities, and describe, compare, and compose shapes along with representing the physical of objects in space.	<input type="checkbox"/> I can describe attributes of an object such as length and weight. I can compare objects as having more or less than by describing the difference.	<input type="checkbox"/> I can show that I understand how to measure something and build or show objects that have certain shapes using two-dimensional and three-dimensional shapes.
Language and Communication	<input type="checkbox"/> I understand some STEM words and phrases, and I can use them in conversation when responding to simple questions. I can describe my feelings about each session and show how what I have built changes to me.	<input type="checkbox"/> I can ask and answer questions about important details in the Engineering Notebook using new STEM words. I can use details when telling people about my models and what I have built in each session.	<input type="checkbox"/> I can write and understand new STEM words that describe actions that I completed or learned. I can use drawings to help add details to what I share about what I have built and show my ideas clearly.
Engineering Design	<input type="checkbox"/> I generate ideas to solve a problem and choose a variety of ways to plan, create, and build a solution.	<input type="checkbox"/> I can analyze my objects that solve the same problem and compare the strengths and weaknesses of how each performs.	<input type="checkbox"/> I can create a simple sketch, drawing, or physical model to show how my functions and actions in my Discover model function to solve the problem.
Computational Thinking	<input type="checkbox"/> I associate a sequence of events that take to complete daily routines and tasks.	<input type="checkbox"/> I can break down more complex problems into smaller pieces and design simple steps to solve problems.	<input type="checkbox"/> I can recognize patterns and make connections between similar problems. I focus on the important steps in each case and identify information I need to solve the problem.

Contact: Libby Simpson, FIRST Director of Education, [simpson@firstinspires.org](mailto:simpson@firstinspires.org), for additional information.

# Assessment Resources

## Formative Assessments



You can keep track of how your students are progressing against the outcomes for each of the sessions.

## Engineering Notebooks

The *Engineering Notebook* serves as a proof of learning and is a great resource for students to document their journey and the process they went through to create their builds. Encourage them to document Core Values concepts demonstrated throughout their experience.



## Summative Assessments

There are multiple summative assessments within the program. The culminating celebration serves as a capstone of the students' achievements and participation in the program. Evidence of learning includes the final challenge, their *Engineering Notebooks*, and answering questions from the reviewers.

## Public Celebration

During the celebration, student teams will get the chance to complete special challenges demonstrating all they have learned. You will be able to observe and record a summative assessment of how they have done using the reviewing questions.



# LEGO® Education Resources

## Getting Started

LEGO® Education has additional educator content to help with implementation into classrooms. These resources and other relevant content can be used prior to starting the *FIRST*® LEGO® League Discover, during the program, or as an extension once the program is complete.



## Lesson Plans

This program utilizes the complete solution packages that LEGO Education has available. The sets purchased for use with the *FIRST* LEGO League Discover also include additional lesson plans and resources available through the LEGO Learning System and the LEGO Education website.



## LEGO Education Community

LEGO Education has created a community page for educators to support and learn from one another, find inspiration, and to connect with their peers.





# Professional Development Resources

## FIRST® Certified Professional Development



FIRST® offers an immersive learning experience for teachers that will help them acquire or strengthen their facilitation skills for project-based learning and building holistic skills.

FIRST Certified Professional Development is available in both remote and in-person formats. We hold regional sessions at various locations as well as custom sessions for school districts.

FIRST LEGO LEAGUE DISCOVER	FIRST LEGO LEAGUE EXPLORE	FIRST LEGO LEAGUE CHALLENGE
Grades PreK-1	Grades 2-4	Grades 4-8
6 hours	12 hours	14 hours

## Additional Training Opportunities

As part of our commitment to creating a diverse, inclusive, and equitable community for all our participants, FIRST has trainings on how you can inspire the youth voice, create a sense of belonging, and more.



Equity,  
Diversity,  
and Inclusion  
Training

Your local FIRST Program Delivery Partner might offer FIRST training in your area. For information on local training and workshops, you can contact your Program Delivery Partner.



Find Your  
Partner

LEGO® Education offers a personalized learning program that inspires teachers to learn, practice, and master competencies that support playful, hands-on STEAM learning with maximum impact on student outcomes.



LEGO  
Education  
Training

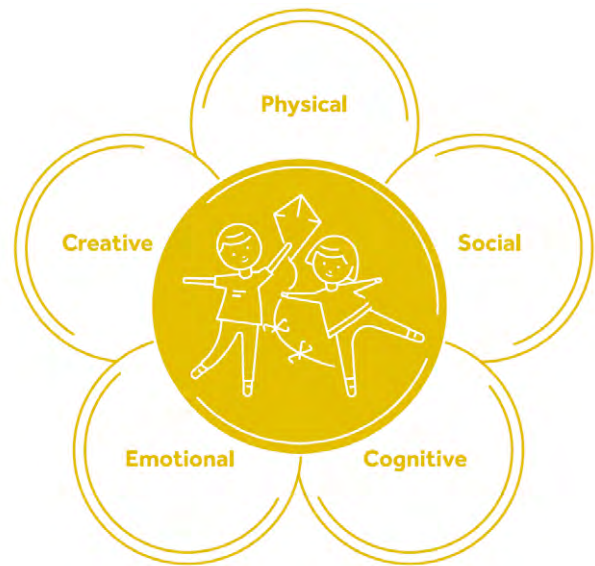


# FIRST® LEGO® League Education Philosophy

FIRST® LEGO® League is a program created through a partnership between FIRST® and LEGO® Education and is infused with the educational philosophies of both organizations. All three divisions of FIRST LEGO League: Discover, Explore, and Challenge, follow these philosophies.

## Learning through Play

This program encourages schools to incorporate play into the learning process throughout all grades. Play has positive impacts on holistic skill development. The guided materials are designed to increase confidence in STEM for both students and teachers. Content is designed with the idea that the teacher does not know all the answers. The materials provided don't give the exact answers but provide guidance and tips to the teacher on how to support their students. It is for the students to determine the way forward in solving the problem through play, discovery, and exploration.



Five Skills for Holistic Development



Intellectual Challenge



Authenticity



Public Product



Collaboration



Project Management



Reflection

Use the *Engineering Design Process* Poster and *Project-Based Learning Mindset* Poster as resources in your classroom for your students. You can access these posters in the *Class Pack Resources* module in Thinkscape.

## Project-Based Learning

FIRST LEGO League is a project-based learning program that creates meaningful, authentic learning opportunities for the students. Students gain knowledge and skills by working toward goals through the investigation of solutions and complex problem-solving.

Key project-based learning elements include:

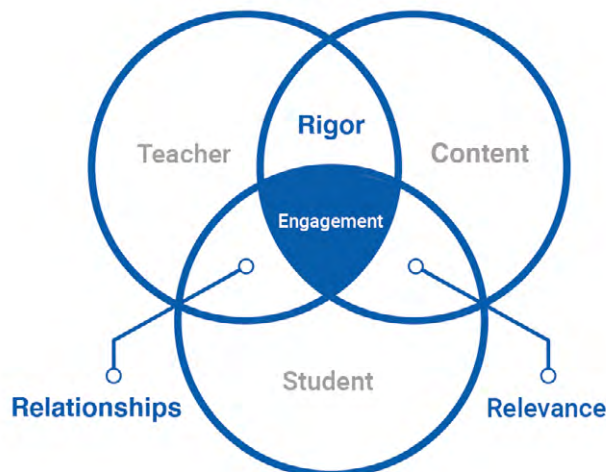
- **Intellectual Challenge:** To start the engineering design process, this program begins with a challenge to solve.
- **Authenticity:** This program features age-appropriate real-world contexts and includes career awareness.
- **Public Product:** Teams present public products as a showcase of work to a public audience.
- **Collaboration:** Teams work together to brainstorm and develop design ideas then make decisions to create public products.
- **Project Management:** Scaffolded through the engineering design process and teams hone these skills throughout their experience.
- **Reflection:** Reflecting on an experience is a key tool that is incorporated after achieving a learning outcome.

## Rigor, Relevance, and Relationships

Through the data of our longitudinal study, it has been proven that experiencing just one year of *FIRST*® LEGO® League has an impact on STEM outcomes for students. These outcomes are manifested by this program's rigorous and relevant content that incorporates relationships within a team and the larger community.

- **Rigor:** The teacher is the facilitator of a student-led, engaging experience involving activities related to robotics, coding, engineering, research, and innovative design.
- **Relevance:** Students acquire technology literacy by experiencing authentic activities with ties to careers that build technical and holistic skills through real-world problem-solving.
- **Relationships:** This program engages students to foster pathways to careers with the mission of building a better society and activating students to action in their communities.

## Rigor, Relevance and Relationships



## Core Values

The *FIRST*® Core Values and ethos are the foundation of the program. For the *FIRST* Core Values to have effect, they must be known and practiced. The Core Values should be woven into all activities, projects, assessments and reflection tools to infuse them into the student learning. The Core Values are used within every step of the engineering design process as teams develop their solutions.

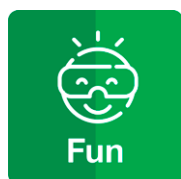
*Gracious Professionalism*® and *Coopertition*® are part of the ethos of *FIRST*. *Gracious Professionalism* is a way of doing things that encourages high-quality work, emphasizes the value of others, and respects individuals and the community. *Coopertition* is displaying unqualified kindness and respect in the face of fierce competition.

The *Core Values* Poster is a great tool to place in your classroom as a reference for your students. You can find this poster in Thinkscope.

To read more about the LEGO® Education Philosophy, scan the QR code.



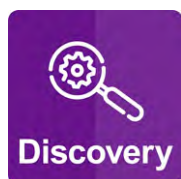
Impact



Fun



Inclusion



Discovery



Teamwork



Innovation



# CLASS PACK EVENT GUIDANCE

## All you need to know about running a celebration in your school.

Follow the advice and teacher tips in this section as you prepare to host your exciting celebration to recognize all the students' achievements at the end of their experience.







## WHAT IS THE CELEBRATION EVENT?

At the end of their experience, all teams should participate in a celebration event. The children will love sharing with others what they have built and learned. It could be held in your usual session meeting space, a classroom, a library, or anywhere else that has appropriate room for the teams to spread out, build, and have fun.

### BEFORE THE EVENT:

- Choose a good space.
- Invite families, caregivers, teachers, and friends.
- Find volunteer reviewers.
- Print reviewing questions.
- Read through the celebration event session information.

### DURING THE EVENT:

- Lay out the mats so two teams can work together.
- Assign at least one reviewer with each pair of teams.
- Get the kids excited for the final challenge.
- Ensure the reviewers talk with the children.
- Hand out certificates at the end.
- Have fun and celebrate children's achievements.

### AFTER THE EVENT:

- Teach the other STEAM Park lessons.
- Continue to teach other STEM activities related to the theme.
- Find opportunities to use the vocabulary learned through the experience.
- Have the children use their teamwork skills in other sessions.



# Sample Celebration Schedule

## Detailed Schedule

8:30-9:00	Setup
9:00-9:10	Introduction
9:10-9:15	Transition
9:15-9:35	Final Challenge
9:35-9:45	Special Challenge

Reviewing of teams occurs during the challenges

9:45-9:50	Transition
9:50-10:00	Celebration
10:00-10:30	Cleanup

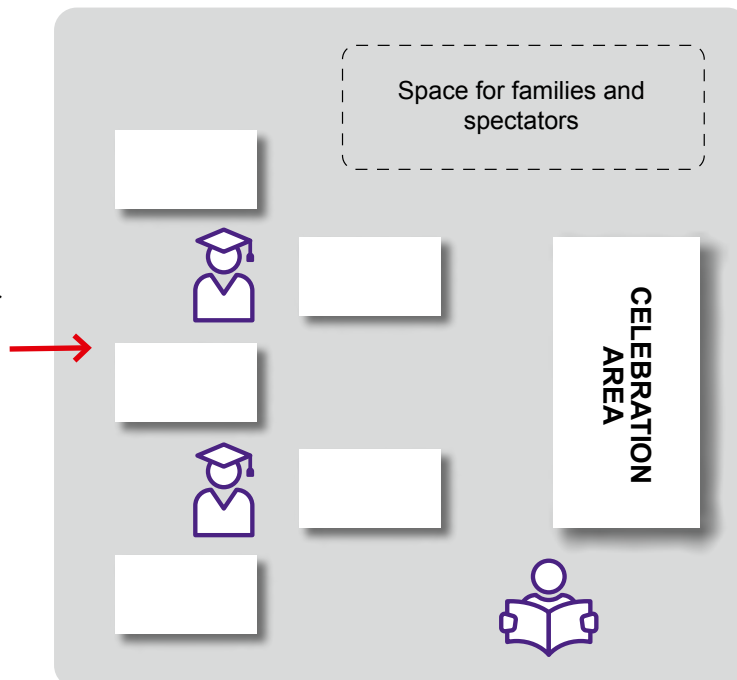
All times are flexible and can be changed to suit your school schedule.

A celebration can be delivered across multiple class periods, after school, or on the weekend.

## Celebration Setup

### Layout of Your Space

Team area with tables or space on the floor where teams build their solutions for their challenges. To do the special challenge, two teams will need to be close enough to connect their two builds.





# Running Your Celebration

Purpose: The school celebration is the culmination of the children's work throughout the program.

## Setup (30 minutes)

Set up the space. Plan for an open area for the children to build their designs for the challenges. Also, include space for families and other spectators. Make sure you have the reviewing sheets for the adult reviewers.

## Introduction (10 minutes)

Welcome the children to the event and tell them what they will do during the session. They will use their ideas to build their team model together, share their Engineering Notebooks, and solve a special challenge. Show the *FIRST® LEGO® League Teamwork Makes the Dream Work* video. Encourage a FUN atmosphere.

## Final Challenge (20 minutes)

At the event, have the teams complete the final challenge that is listed in the *Team Meeting Guide*. The final challenge changes every season.

## Special Challenge (10 minutes)

Match up two teams and have them solve the special challenge together. The special challenge is listed in the *Team Meeting Guide*. The special challenge changes every season.

## Reviewing the Teams (during the event)

The reviewers should visit the teams during the challenge, talking with them, asking questions and seeing their *Engineering Notebooks*. Encourage the adults to interact with the children. They should ask about what the teams have done throughout the program.

## Celebration (10 minutes)

While the building, problem-solving, and reviewing are the most important part of how the event works, you should allow plenty of time to celebrate each team's achievements in front of everyone at the event. A list of awards that you could give the teams is provided on the next page.

## Cleanup (30 minutes)

Organize teams to clean up the classroom and put away their materials.

### Tips

- 1 It is important teams can relate what they do at the event to the sessions they have completed.
- 2 If possible, assign at least one adult to each pair of teams. They can help the teams stay on task and talk with them. The reviewers will decide on awards for each team.
- 3 For the celebration, print certificates for every child. Have the children come up one at a time, or in their team, to be recognized and applauded. A great *FIRST® LEGO® League Discover* event always ends in a celebration.



# Reviewing Questions

You can use these questions to start conversations with the children at the celebration event. Have the children explain their journeys, what they learned and created.

## Final Challenge

- Your design and build.
- Why you built it that way.
- How you decided what you wanted to build.
- How it works.
- The STEAM Park pieces you used to make something move.

## Special Challenge

- How you solved the special challenge.
- What you built to connect the two team models.
- How you decided how to connect your team models together.

## Working as a Team

- How you worked together.
- The job do you had on your team.
- How you shared ideas in your team.
- How you worked as a team.

## Awards

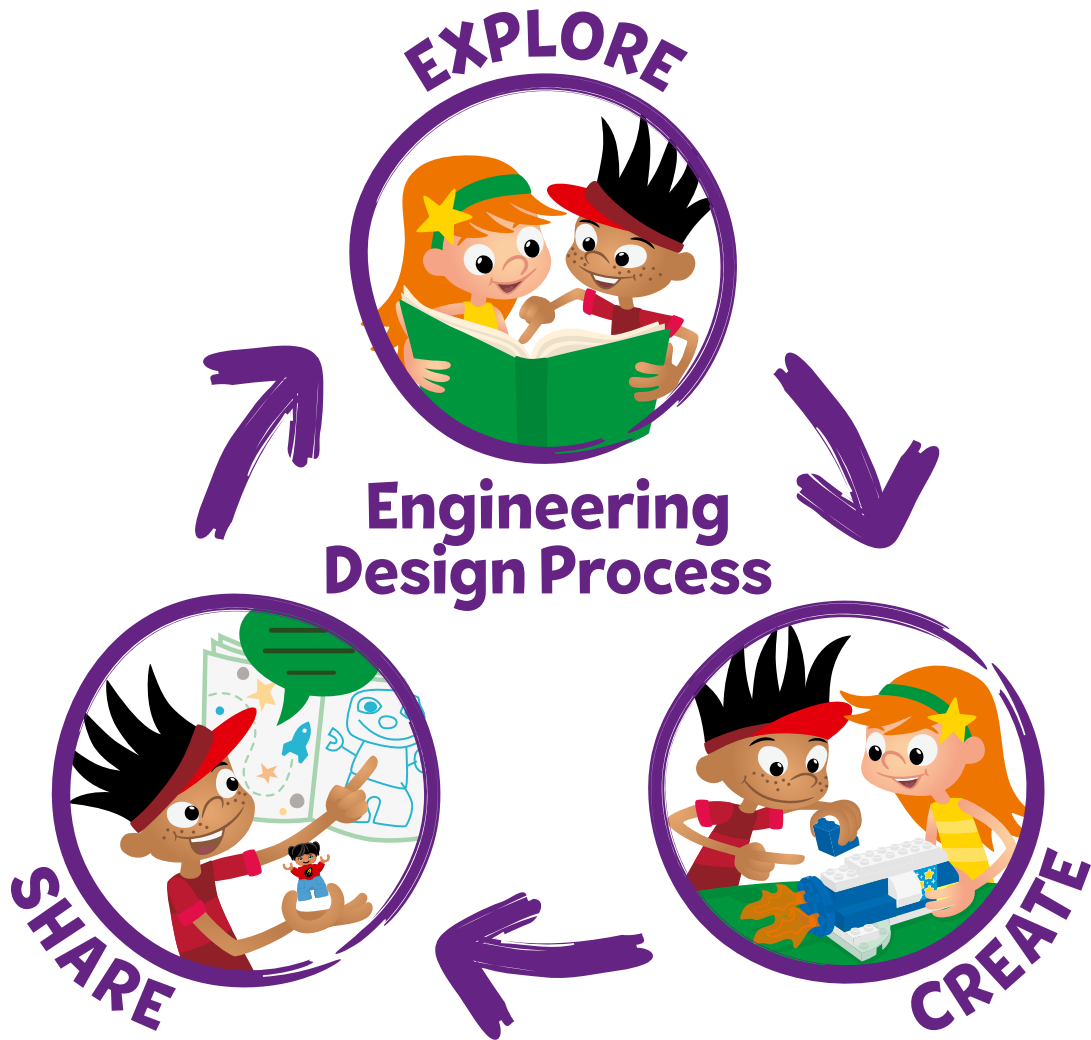
Every team should win an award, and more than one team can win the same award.

Choose from this list of official Discover awards:

- Cooperative Builders
- Creative Designers
- Super Problem-Solvers
- Amazing Inventors
- Expert Explainers







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