

**FIRST
LEGO
LEAGUE**

DISCOVER

Teacher Guide for Distance Education

Program Modifications for *FIRST LEGO League Discover* for Remote Students



Overview

Due to the COVID-19 pandemic, we anticipate that teachers will encounter unique challenges during the *FIRST* LEGO League Discover PLAYMAKERSSM season. This guide incorporates information from the [Season Guidance for COVID-19 Interruptions](#) and provides specific guidance to help you implement *FIRST* LEGO League Discover with your students remotely. This guide is designed to provide suggestions and options, but it is intentionally not prescriptive. You'll still need to make adaptations based on your schedule, the amount of materials you're able to provide to students participating remotely, and whether you'll be teaching live or asynchronously. Considerations for what is best for your local situation should be prioritized. **Local health and safety regulations and guidance should precede any of the recommendations in this guide.**

Since *FIRST* LEGO League Discover is designed as a Class Pack that provides materials for up to 30 students, this guide is intended to provide additional direction for teachers, administrators, or youth program staff who are coordinating and teaching the program for a group of students in a remote learning environment. If you are a teacher looking for resources to justify participating in *FIRST* LEGO League Discover for your school leadership, you may wish to share this [letter](#) with school administrators.



Use this checklist to help you get started and guide you toward success.

- Review the outcomes your students will achieve through *FIRST* LEGO League Discover. (Page 6)
- Determine how many students will participate in the program at a time – Small groups? Whole class? All classes in your grade?
- Register a *FIRST* LEGO League Discover Class Pack. ([United States and Canada](#) / [All other countries](#))
- Ensure you have received all the materials needed to run the program. (Page 3)
- Determine how you will distribute materials to remote students. (Pages 4-5)
- What remote teaching tools will you use? (Page 6)
- Decide on your schedule. Will you lead the sessions live instruction, recorded videos or written tasks? (Page 7)
- Decide how you will place students into groups. We recommend no more than 4 students per team.
- Consider using *FIRST* LEGO League Discover as a tool for teaching core content ([teaching core content](#)) and for active, hands-on brain breaks.
- Plan a remote celebration event. (Page 10)
- Communicate with families and engage them in *FIRST* LEGO League Discover. (Page 10)



Material Management

Dividing Materials

Dividing materials for use by remote students can be challenging. Prior to putting a materials handling plan in place, it is recommended that you reach out to your school/organization as well as local health offices to determine the guidance for your area for handling shared materials.

For the best experience for your students, *FIRST* recommends having at least one Class Pack set of materials, including printed Team Meeting Guide, printed Engineering Notebooks, Discover sets, Discover More sets, and STEAM Park sets. The suggestions below will help you manage the materials in a remote setting.



Answer these questions to decide how you will divide and rotate materials:

- Will you rotate the materials between students, between classes, or between grade levels?
- How you divide the Discover sets?
- How will you divide the STEAM Park sets?
- What dividing and/or rotating schedule will work for you and your students?

For schools who have multiple grade levels participating in *FIRST* LEGO League Discover, consider combining materials across the grade levels so that each student can receive more DUPLO. For example, if your school purchased enough materials for the Pre-Kindergarten, Kindergarten, and 1st grade classes, you might have the 1st graders start the Discover sessions first.

Tip

If you have multiple grade levels who will be using the Discover materials, begin with the oldest students. First graders and their families are less likely to lose pieces than Pre-K students!

If you plan to share materials between groups of students, allow time and budget for cleaning in between groups of students, inventorying sets, and replacing missing parts. Follow the [LEGO Education Hygiene Guide](#) in addition to any guidance you've been provided by your local health officials to clean and disinfect your classroom and learning materials.

Tip

Send home the materials as close as possible to the day they are needed. The longer the students have the materials, the more likely they are to lose pieces.

- Provide pictures or an [inventory list](#) to help you and your students manage the materials and know what is missing. You may wish to have your students' parents/guardians sign an [agreement](#) about returning materials, including a statement of what happens if any materials are missing.
- When dividing materials, you will not want to use the cardboard boxes that the sets come in for sending materials home. Use plastic storage tubs or resealable bags for affordable and durable packaging.
- Replacement DUPLO elements can be purchased from [LEGO Bricks & Pieces](#). Enter set number 45024 to find STEAM Park pieces.

Material Management

Discover More Set

Each Discover Class Pack comes with 30 Discover More sets. These take-home sets come in their own separate boxes and contain two sets of six bricks – one intended for the student to use and one by a parent/guardian or other family member at home.

Remember all students should receive their own Discover More set. The Discover More sets are intended to stay home and not divided or rotated.



PLAYMAKERS Discover Set

If you have multiple Class Packs for your school/organization, can you combine materials to allow each student to use one full Discover set during the session?

If you do not have enough Discover sets for every student, consider dividing the three parts of the Discover set between three students (slide, hill, climbing wall).



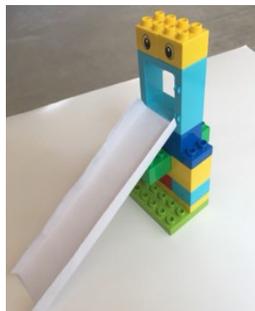
STEAM Park Set

Split one STEAM Park set into no more than four sets to ensure students receive enough pieces for building. Divide the STEAM Park set so that each student gets about the same amount and types of pieces, making sure every student gets some [functional elements](#).

See the recommended [STEAM Park inventory for remote learning](#) for guidance on dividing the set. Provide the inventory sheet with pieces marked with each set to help families manage the pieces and return them at the end of the sessions. If you can split some STEAM Park sets into less than 4 parts, consider giving more elements to students who may not have access to additional materials at home.



Photo credit: Amanda Gibbons, Breitung Township Schools, Kingsford, MI



PLAYMAKERS Discover set made from STEAM Park elements and found items at home

Tip

You could have your students build something like the Discover model using elements from the STEAM Park set. Get creative to replicate the slide by adding plastic dryer vent tubing, a piece of a pool noodle, cardboard or paper.

Material Management

FIRST LEGO League Discover Mat

Each Discover set comes with a durable cardboard mat with an illustrated play space to inspire building. Since you probably will not be able to provide a mat to every student, you can eliminate the mats for building. Instead, show students the [picture of the mat](#) as inspiration for their builds.



You could also have the students make their own mats from poster board. The picture on the mat should be of a place or places where the children think they could play. Mats drawn by students do not have to match the Discover PLAYMAKERS mat and could become a fun project for families or caregivers and students together.

Printed Guides & Handouts

The Six Bricks activities are great resources for parents! In addition to the parent letter, you may wish to send home:

- Images of the [Six Bricks Booklet](#) or [Six Bricks Activity Cards](#) from LEGO Education
- Copies of the Six Bricks pages from the Team Meeting Guide Appendix.
- Links to the Six Bricks activity videos listed in the Additional Resources section
- Printed copies of the PDF of the Team Meeting Guide
- Printed copies of the individual pages of the Engineering Notebook pages to supplement the printed Engineering Notebooks.
 - Two copies of each page will allow students to start over if needed. Blank paper can always be substituted for the Engineering Notebook pages if needed.

Tip

Use the Engineering Notebook pages in Seesaw or other learning management systems to allow students to complete and turn them in digitally.

Supplementary Materials

Teachers can encourage students to use materials they are able to find at home to supplement the Discover and STEAM Park sets. These found materials can allow students to make larger and more detailed builds than they are able to do with only part of a STEAM park set.

Some items that might be used include:

- Paper
- Cardboard
- Boxes
- Canned food
- Other toys
- Anything else available to student

Outcomes

As described in the Team Meeting Guide, students participating in *FIRST* LEGO League Discover in a typical educational setting will work together in teams of four, learning to collaborate and communicate to build, learn and play together. In every session, students are encouraged to work with their teammates listen to each other, take turns, and share ideas and pieces.

While the learning activities may look a bit different remotely, this guide will help you adapt the experience to develop many of the same outcomes as you would see in a traditional educational environment. Even with the limitations of a remote setting, your students can have an amazing hands-on *FIRST* LEGO League Discover experience.



Outcomes Similar to In-Person Learning	Outcomes with Variations for Remote Education
<i>Students will...</i>	
Practice listening to their classmates, wondering, questioning, and posing problems to solve.	May need to meet in small groups with the teacher, other adult, or student mentor to facilitate collaboration between students.
Learn how to make decisions and resolve conflicts as a team.	Must figure out how to divide up parts of their building so that they can go together virtually.
Develop confidence as they present their ideas to their team or the class.	Will not need to share pieces with teammates or work through conflicts that occur when building together.
Build, tinker, and rebuild as they explore STEM concepts such as motion, stability, forces, geometry, and the engineering design process. (See additional STEM concept links in the Standards Alignments and Learning Progression .)	Likely will not have access to all DUPLO elements in the LEGO STEAM Park set.
Take risks and develop persistence as they apply knowledge to express their ideas about the challenge.	May be limited to creating smaller builds with DUPLO elements.
Are recognized and celebrated in a celebration event	Will not meet in-person with families for a collaborative celebration event.

Tools for Remote Instruction

If you are considering leading Discover remotely, you are probably already using a variety of remote instructional tools with your students. Many teachers are required to use the tools approved by their schools and school districts. As you are planning how to lead Discover remotely, decide how you will use your remote instructional tools to support students during the Discover sessions.

Like during other remote instruction, you will want to set meeting norms for your students on how to use digital tools and interact with each other. You may wish to introduce the *FIRST* Core Values to your students and reference them or build the ideas in the *FIRST* Core Values into the behavioral expectations for your class. (See the [FIRST LEGO League Discover PLAYMAKERS video](#) at about 1:45.)

Consider how you will use your school or organization's remote tools during each type of instruction. If you record a video, where will your students find it? If activities are going to be completed independently, will you provide an audio recording of the instructions? What tools will you use to have students share their builds and completed Engineering Notebook pages?

Scheduling

FIRST LEGO League Discover is designed to have 10 sessions that each last about one hour, where the last session is the celebration event. Each session is broken into tasks, including a Six Bricks Warm-Up, introduction, building task, and sharing or Engineering Notebook task, depending on the session. In remote instruction, you will likely need to modify the standard schedule to match your structure. The [Scope and Sequence options](#) provide possible schedules for teachers looking to extend the Discover sessions over more time.

Scheduling Factors to Consider

- What group of students will participate in Discover at any one time?
 - As mentioned above in the Materials Management section, combining materials across groups of students may allow the students to have more materials.
 - Consider time for cleaning, inventory, distribution, and return of materials in your schedule.
- How will you be leading the students through the session?
 - For which sessions or tasks will you deliver live instruction?
 - What sessions or tasks will you record a video to give instructions? What is completed independently? How will students share their builds and completed Engineering Notebook pages?
- Will you break each session into smaller “chunks” or complete the entire session in one block of time?
- What help and guidance will students have available at home?
 - If you know your students have family members to help them, you may be able to assign more tasks to be done independently.
 - If your students will not have family guidance, more of the activities may need to be done during live instruction. Since it’s likely you will have students in various situations, avoid assuming all students will have guidance for independent activities.
- How will you break up the students into groups? Will they all do the sessions at the same time?
 - What will they do in a whole group and what will you lead in small groups?
 - Meeting with small groups for live instruction can take the place of centers in a normal classroom and can encourage student collaboration remotely.



Sample Weekly Schedule

Day	Instruction	Time
Monday	Students pick up any new materials needed for the week. Students watch a video recorded by the teacher on how to do the Six Bricks activity.	10 minutes
Tuesday	Teacher introduces the session during whole class live instruction, including explaining the building task.	10 minutes
Wednesday	Students meet with the teacher for short small group brainstorming sessions. Students decide how they can work together or divide up the building task (for example, each student builds one part of the obstacle course).	10-20 minutes
Thursday	Students work on the building task and complete the Engineering Notebook task independently.	30 minutes
Friday	Students share their work by showing what they built during a whole class meeting and digitally turning in their completed Engineering Notebook page.	30 minutes

Session Modifications

Most of the Discover sessions require little or no change for remote participation. Each session's recommendations assume that students have access to Six Bricks and at least part of a STEAM Park set. For all tasks not done during live instruction, you can ask students to submit pictures, audio recordings, or video of their work.

Used in combination with the Team Meeting Guide, these are recommended best practices for each session:

Session	Recommended Modifications	Recommended Teaching Strategies
1	<p>Tasks: No modifications needed.</p> <p>Materials: If students do not have an entire STEAM Park set, explain what elements students have and how or if you will rotate sets.</p> <p>Additions/Supplements: Ask students to submit a picture of what they build.</p>	<p>Six Bricks Warm-Up: Live or recorded.</p> <p>Task 1: Live instruction recommended if possible. If recorded, the teacher can do the movements or provide instructions to complete the activity with family members.</p> <p>Task 2: Live or recorded instructions, then complete independently.</p>
2	<p>Tasks: No modifications needed.</p> <p>Materials: Students can complete this activity with any amount of DUPLO, including just the Six Bricks.</p> <p>Additions/Supplements: If Task 1 is not done live, ask students to submit their ideas. Have students submit their completed Engineering Notebook pages.</p>	<p>Six Bricks Warm-Up: Live or recorded.</p> <p>Task 1: Live or recorded.</p> <p>Task 2: Live or recorded instructions, then complete independently.</p> <p>Task 3: Independent with live, audio, or video instructions.</p>
3	<p>Tasks: Consider providing the image of the Discover mat and asking students to create their own mat.</p> <p>Materials: If students do not have the whole Discover set, they can make something like the Discover set from whatever DUPLO elements they have. Students can add paper, cardboard, or other material to create the slide.</p> <p>Additions/Supplements: If all students are not provided the Discover mat, have students create their own mat by drawing on poster board.</p>	<p>Six Bricks Warm-Up: Live or recorded.</p> <p>Task 1: Live instruction recommended if possible. If students will be creating their own mat, it can be done after Task 1.</p> <p>Task 2: Live or recorded instructions, then complete independently.</p> <p>Task 3: Students share during live class meeting or through independent submissions.</p>
4	<p>Tasks: No modifications needed.</p> <p>Materials: No modifications needed.</p> <p>Additions/Supplements: If Task 1 is not done live, ask students to submit their ideas. Have students submit their completed Engineering Notebook pages.</p>	<p>Six Bricks Warm-Up: Live or recorded.</p> <p>Task 1: Live instruction recommended if possible. If students will be creating their own mat, it can be done after Task 1.</p> <p>Task 2: Live or recorded instructions, then complete independently.</p> <p>Task 3: Independent with live, audio, or video instructions.</p>
5	<p>Tasks: No modifications needed.</p> <p>Materials: No modifications needed.</p> <p>Additions/Supplements: Ask students to submit their ideas and builds for all three tasks. For an extra challenge, have the students design a game that can be done remotely but still helps them get moving.</p>	<p>Six Bricks Warm-Up: Live or recorded.</p> <p>Task 2: Live or recorded instructions, then complete independently.</p> <p>Task 3: Students share during live class meeting or through independent submissions</p>

Session Modifications

Session	Recommended Modifications	Recommended Teaching Strategies
6	<p>Tasks: No modifications needed. Mention the hill in the Discover set as an example of a ramp.</p> <p>Materials: Have all students create a ramp out of cardstock, wood, or books. The students who have the ramps from the STEAM Park could demonstrate how they work differently.</p> <p>Additions/Supplements: Ask students submit their own ideas and builds for all tasks through pictures, video, or audio recordings.</p>	<p>Six Bricks Warm-Up: Live or recorded.</p> <p>Task 1: Live or recorded.</p> <p>Task 2: Live or recorded instructions, then complete independently.</p> <p>Task 3: Independent with live, audio, or video instructions.</p>
7	<p>Tasks: In Task 3, students can place their models on the Discover mat, mat they created, or complete without a mat. If students have been working independently so far, this session is the time to encourage partnering and collaborating remotely.</p> <p>Materials: If students have all or part of the Discover model (or their own creation) available, encourage them to include it in their improved obstacle courses.</p>	<p>Task 1: Live instruction recommended if possible. Provide specific examples and have the students brainstorm how they can improve their obstacle courses.</p> <p>Task 2: Live or recorded instructions, then complete independently or with a partner or team. Ask students to discuss and decide on improvements to the obstacle courses. For example, one student could improve part of the obstacle course while their partner improves another part.</p> <p>Task 3: Students share during live class meeting or through independent submissions.</p>
8	<p>Tasks: Continue supporting students in learning to collaborate remotely.</p> <p>Materials: If students do not have enough functional pieces from the STEAM Park set available, encourage adding materials from home to help create moving parts.</p>	<p>Six Bricks Warm-Up: If you know your students have adult available to assist at home, you may wish to use the suggested Blind Build. Otherwise, repeat a previous favorite Six Bricks activity.</p> <p>Task 1: Live or recorded instructions, then complete independently or with a partner or team. Meet with them to facilitate brainstorming of what moving parts will be added. Help the students decide how they will divide up their building while still working together.</p> <p>Task 2: Live or recorded instructions, then do independently.</p>
9	<p>Tasks: Continue supporting students in learning to collaborate remotely.</p> <p>Materials: If students do not have enough functional pieces from the STEAM Park set available, encourage adding materials from home to help create moving parts</p> <p>Additions/Supplements: Create merged pictures of independently built models to create pictures of team models.</p>	<p>Six Bricks Warm-Up: Choose an activity during a live session, then complete with live or recorded instructions.</p> <p>Task 1: Consider breaking this task into two small group meetings, with independent building in between. In the first small group meeting, have the students discuss the moving parts and choose their best ideas from the previous sessions. Then decide who will build what parts and how they will work together. Have the students meet in a second small group session to share what they have built and see how their models can be combined</p> <p>Task 2: Students share during live meeting or through independent submissions. If sharing is not happening as an entire class, teachers may choose to have the second small group meeting from Task 1 also serve as Task 2.</p>
10	<p>Tasks: Break the celebration into at least two sessions, so that all preparation happens before the remote celebration event. See the Remote Celebration Event section on next page.</p>	<p>Preparing: Live instruction with whole class or small groups.</p> <p>The Challenge: Teams can use the same models as they created in Session 9 or create new models. If new models are being created, you may wish to meet with teams independently before building.</p> <p>Special Challenge: Meet in small groups of two teams to decide how the models can be combined. Also consider just combining student pictures instead of having two teams attempt to collaborate remotely.</p>

Holding a Remote Celebration Event

The Celebration Event described in session 10 in the Team Meeting Guide may look different for remote students than it would in person. The goal of the event is to have students share their work and feel recognized for what they accomplished during the Discover sessions. For remote students, it may take more time and planning to facilitate the collaboration within and between teams for the celebration.

Here are few ideas to help you plan your remote celebration event:



- Have each student build part of their team's model, then take a picture. Use a picture merging app or tool to virtually combine each child's contribution into a single team model.
- Use the remote meeting tools that your students are familiar with for your celebration event. For example, if your class uses Zoom, it will be easiest for your students and families if they also join your celebration event through Zoom.
- Have students explain what they learned during the sessions, tell about their favorite part of *FIRST LEGO League Discover* or describe their team's model. Parents can share what their students learned or how they grew during *FIRST LEGO League Discover*. Consider asking for parent volunteers to be interviewed in advance to keep the celebration running smoothly.
- Collect student pictures through the sessions, including during class meetings, builds, and Engineering Notebook pages. Share the pictures in a slideshow during the celebration, accompanied by music or explanations.
- Consider including one or more building activities in your remote celebration event. You can ask families to complete a Six Bricks activity, give a short time (5 minutes) to build a representation of something they learned, build as tower as tall as the student, or come up with your own [family building challenges](#).
- Remember to include opportunities for the students to move during your remote celebration event. Many *FIRST LEGO League* events include [a dance party!](#)
- Be sure to recognize the students by awarding them [recognition certificates](#). You can send the certificates digitally, mail printed certificates, or include printed certificates with other materials sent home to students. You may wish to give out the certificates at the same time the materials are returned.

Support for Parents and Caregivers

During distance learning, students may be supported by various adults or older children, including parents, guardians, grandparents, and siblings. Students may move between different situations during the day or during the week. For simplicity, we will refer to "parents," but the term is intended to include everyone who supporting student learning activities.

Parents take on an even more critical role in students' lives during remote instruction. While many parents monitor their children's play and schoolwork, they may not realize the learning and developing that happens through play and they may not be used to playing together. As educators, you can guide your students' families to approach the Discover sessions with a playful mindset. When Discover is done remotely, it can provide additional opportunities for parents to play with children and provide the children more chances to play. The activities can give parents chances to model the Habits of Learning, including creativity, persistence, empathy, and problem solving. [Playing also increases happiness](#) and reduces stress for adults!



Additional Resources

- [Six Bricks Activity Cards \(LEGO Education\)](#)
- [Six Bricks Books](#)
- [Six Bricks videos \(Green Mouse Academy\)](#)
- [Six Bricks videos \(IET\)](#)
- [Six Bricks videos \(Care for Education\)](#)
- [Managing Today's Classroom Resources from LEGO](#)
- [Letter for School Administrators](#)
- [Parent Letter](#)
- [Linking FIRST LEGO League Discover to Core Content](#)
- [Letters and Numbers with Six Bricks](#)
- [FIRST LEGO League Discover Mat](#)