FIRST LEGO LEAGUE EXPLORE

CLASS PACK GUIDE

FIRST

LEGO education

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 Explore 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 Explore 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 Explore event.

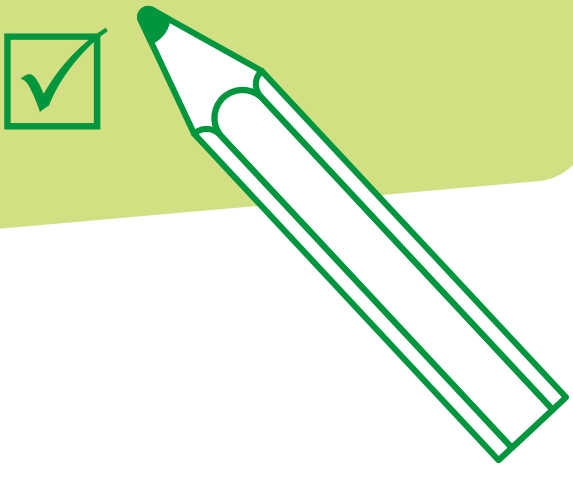
Getting Started Checklist

Thank you to all the teachers and youth leaders who will be delivering the *FIRST*® LEGO® League Explore 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 12 sessions, your students will be prepared to participate in a festival 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 festival 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 8-9 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 4 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:

- Ensures equitable experience for every student in all aspects of the program.
- 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 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 Explore 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 30-minute class time.

Day 1 (Session 1)

Time	Activity	Teacher Notes
10 minutes	Introduction Activity	Review activity listed in Session 1 of the *Team Meeting Guide*.
15 minutes	Complete the first page of Tasks in Session 1.	Each student should fill out the writing and drawing space on the first page of Session 1 in their *Engineering Notebook*.
5 minutes	Clean Up	Show teams where to keep their *Engineering Notebooks*.

Day 2 (Session 1)

Time	Activity	Teacher Notes
5 minutes	Check in with teams.	Review Session outcomes in the *Team Meeting Guide*.
15 minutes	Complete the second page of Tasks in Session 1.	Each student should fill out the drawing space on the second page of Session 1 in their *Engineering Notebook*.
5 minutes	Share Task	Look at Guiding Questions in the Team Meeting Guide.
5 minutes	Clean Up	Look at the Cleanup Pointers in the *Team Meeting Guide*.

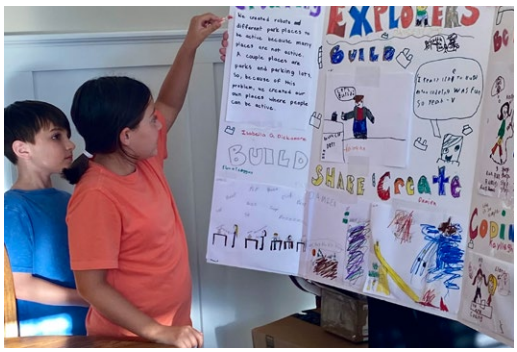
*If your school or district is running as a cohort using reusable materials, collaborate with other teachers who will run the program on daily lesson planning and timing.

FIRST LEGO LEAGUE EXPLORE

CLASS PACK EVENT GUIDANCE

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

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



Running Your Festival

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

PREPARATION (60 minutes before event)

Teacher:

- Set up the space.
- If you have space, set up seating for spectators, team members, and families.
- Allocate each team an area with a table where they will sit and work during the festival and display their team model and poster.
- Get materials ready for additional activities (if desired) for teams to do during the reviewing time.

Teacher/Reviewer:

- 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 reviewers.
- Make sure you have copies of the reviewing sheets and questions (one 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.
- You may want to have additional activities for the teams to do while other teams are being reviewed. This could include free building with LEGO® pieces or STEM-related activities.

Scaling up from the Classroom

- If you have more than 5 teams, you can scale up the size of your festival and use a bigger room.
- The teams could do their presentations to reviewers in a separate room.
- You could provide STEM-related activities for teams.
- 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.

FIRST LEGO LEAGUE

FIRST LEGO LEAGUE EXPLORE

TEAM MEETING GUIDE

MASTER PIECE℠

FIRST

LEGO education

Introduction

Welcome to *FIRST*® LEGO® League Explore!

In *FIRST*® LEGO® League Explore, teams focus on the fundamentals of engineering as they explore real-world problems, learn to design and code, and create unique solutions made with LEGO® bricks and powered by LEGO® Education SPIKE™ Essential.

FIRST LEGO League Explore is one of three divisions by age group of the *FIRST* LEGO League program. This program inspires young people to experiment and grow their confidence, critical thinking, and design skills through hands-on learning. *FIRST* LEGO League was created through an alliance between *FIRST*® and LEGO® Education.

FIRST® IN SHOW℠ presented by Qualcomm and MASTERPIECE℠

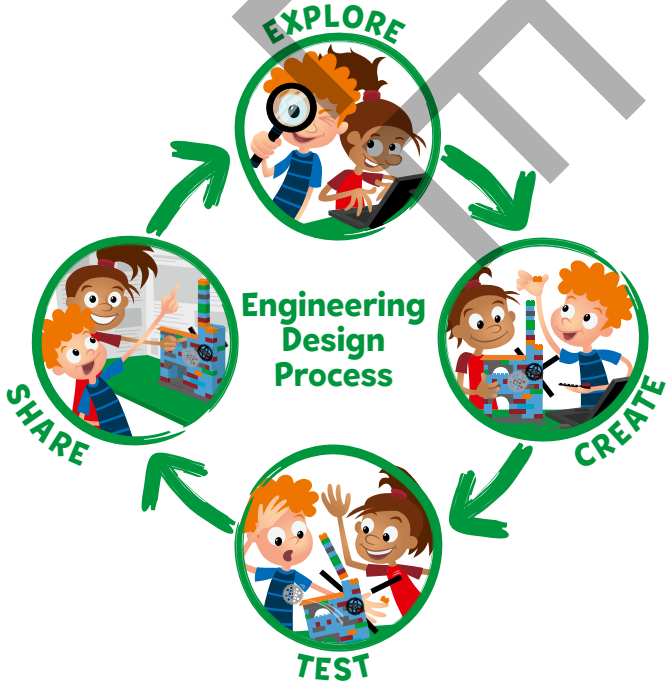
Welcome to the *FIRST*® IN SHOW℠ season presented by Qualcomm. This year's *FIRST* LEGO League challenge is called MASTERPIECE℠. Children will learn about how people's passion for the arts are shared through STEM (Science, Technology, Engineering, and Math).

During each session, they will experience the engineering design process. There is no set order for this process, and they may go through each part several times in a single session. This means that during a session, children will be exploring the theme and ideas, creating solutions, testing them, iterating and changing them, and then sharing what they've learned with others.

Working in Teams

Children work together in teams of up to six members using pieces from the LEGO Education SPIKE™ Essential set, and an Explore set. They will collaborate and communicate to build, learn, and play together.

Children should be encouraged in every session to work with their teammates, listen to each other, take turns, and share ideas and pieces.



What Does the Team Need?

LEGO® Education Set

LEGO® Education SPIKE™ Essential Set

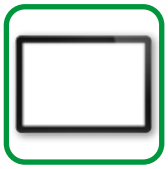
Note: Other LEGO Education sets such as WeDo 2.0 are also allowed.

MASTERPIECE℠ Explore Set

Each team will get one MASTERPIECE℠ Explore set. Leave the LEGO® pieces in their plastic bags until the sessions in which they are needed.

Two printed books contain the building instructions for the Explore model. Bags marked 4 include enough pieces to build two additional basic stage models.

Electronic Device



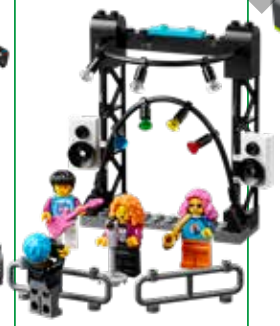
Your team will need a compatible Bluetooth-enabled device like a laptop, tablet, or computer. Scan the QR code to view system requirements and download software.

Scan me for system requirements and software download

Team Poster Supplies

Each team will need a large poster board and various art supplies and materials in Sessions 10-11.

	Basic Stage	Minifigures	Music Concert Pieces	Motor and Hub Pieces	Prototyping Pieces
Bag	1	1	2	3	4
Book	1	1	2	2	-



Tips

- The prototyping pieces and baseplates are used throughout the sessions to build solutions to the design challenges.

Sessions At-A-Glance

Every session starts with an introduction and ends with a share activity. Details for these activities are given in the session pages that follow, along with notes and tips to help you run the session.

	Introduction (5-10 minutes)	Task 1 (15-20 minutes)	Task 2 (15-20 minutes)	Wrap Up (10-15 minutes)
Session 1 Hobbies and Interests	Let's Discover	Explore Season Theme	Build What You Love	Share and Clean-Up
Session 2 Behind the Scenes	Go Team	Build Minifigure Experts	Build a Basic Stage	Share and Clean-Up
Session 3 Sound All Around	Let's Have Fun	Build Music Concert	Build Sound Effects	Share and Clean-Up
Session 4 Theater Technology	Let's Innovate	Do Coding Lesson 1	Build a Theater Stage	Share and Clean-Up
Session 5 Museum Exhibit	Be Inclusive	Do Coding Lesson 2	Build a Museum Exhibit	Share and Clean-Up
Session 6 Visual Effects	Have An Impact	Do Coding Lesson 3	Build a Moving Camera	Share and Clean-Up
Session 7 Setting the Stage	Discovery Build	Design Your Show	Build Your Show	Share and Clean-Up
Sessions 8-9 Team Model	Teamwork and Fun Builds	Design Team Model	Create and Code Team Model	Share and Clean-Up
Sessions 10-11 Team Poster	Innovation and Inclusion Builds	Design Team Poster	Create Team Poster	Share and Clean-Up
Session 12 Prepare for Event	Impact Build	Prepare for Event	Determine What to Share	Share and Clean-Up

Celebrate at a Festival!

Session 1

Outcomes

- The team will use discovery to explore the MASTERPIECE℠ theme and explain how people share what they love to do.
- The team will build a place to share a hobby or interest.

Introduction *(10 minutes)*

Let's Discover

- Read the definition for **discovery** to the team. *(see page 5)*
- Talk about what **discovery** is. Have the team provide examples of this Core Value.
- Extension: Draw yourself using **discovery** on the Core Values page in the *Engineering Notebook*.

Guiding Questions

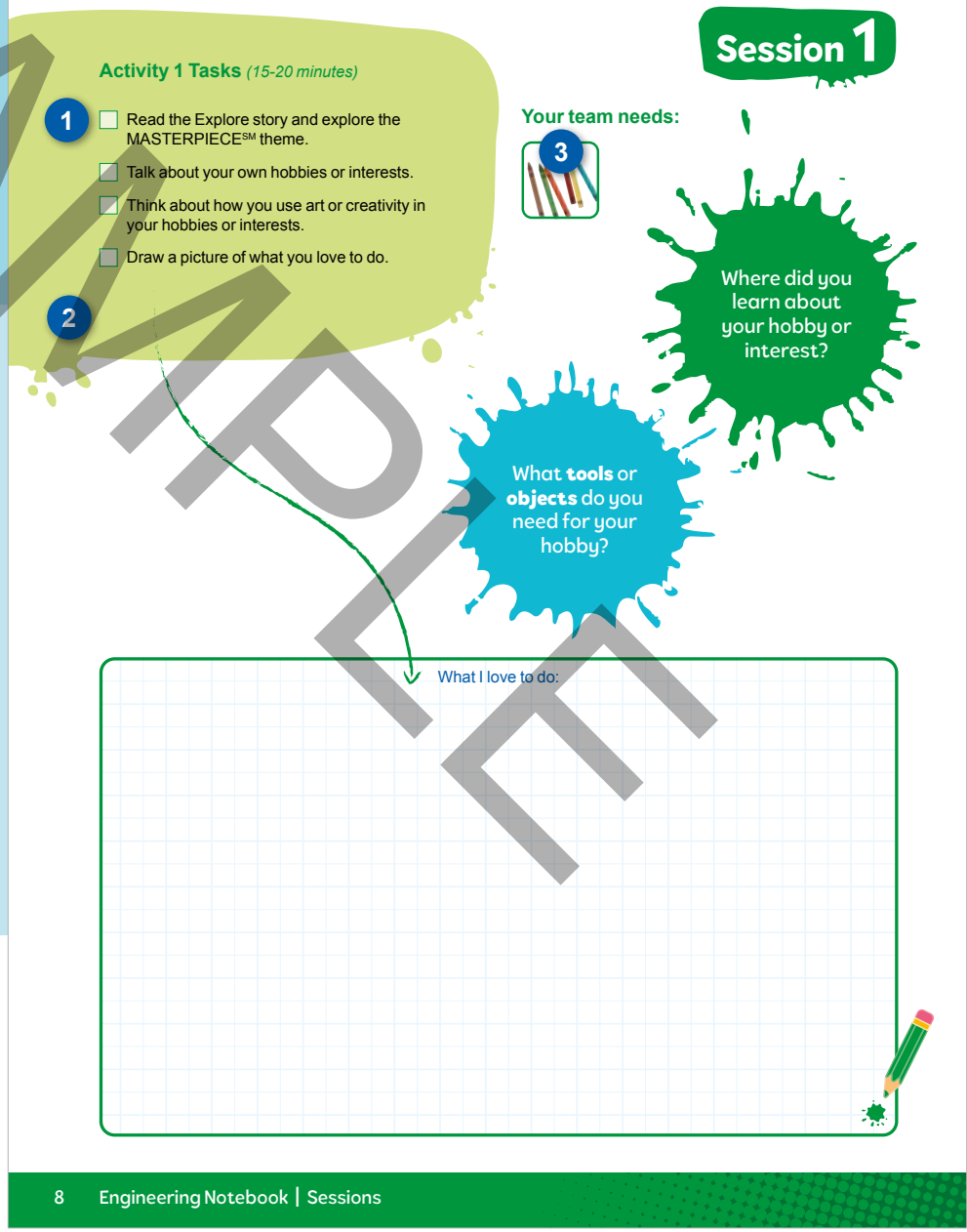
- What did you learn from the Explore story?
- How do you teach people about your interests?
- How do you use creativity in your hobbies?

Session Tips

1. Check out the Multimedia Resources for more resources you can use with your team.
2. You will find various sessions reference different art-related jobs. These jobs are listed on the Career Connections pages in the *Engineering Notebook*.
3. Writing and drawing space is provided throughout the notebook for each child to capture their thoughts and ideas.

Extension

- Research new innovations and emerging technologies in the art and entertainment fields.
- Do a show and tell activity with the team.

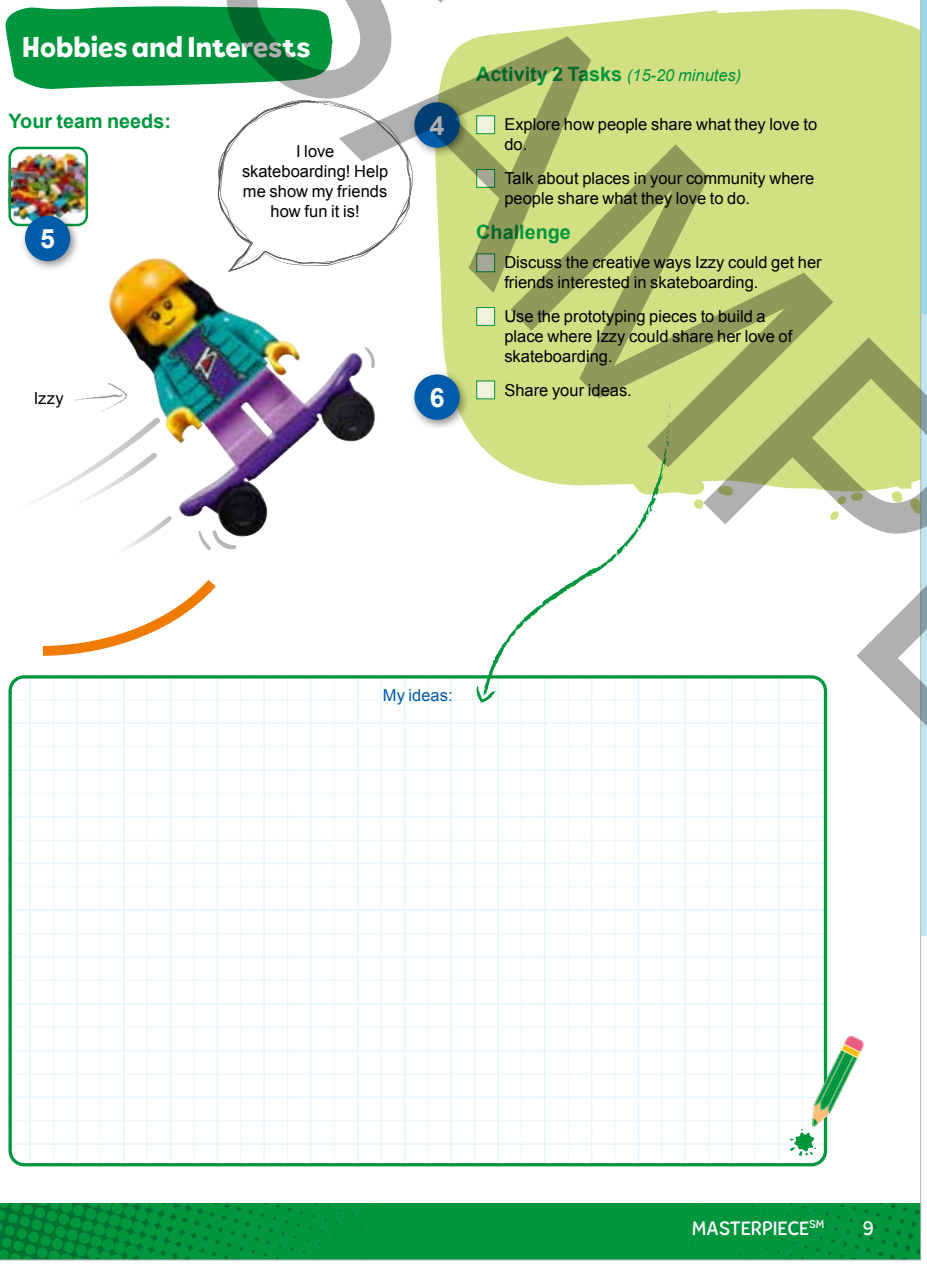


Hobbies and Interests

Share *(10 minutes)*

Have the team:

- Share what they did in the session.
- Explain their hobbies and interests.
- Share how they use art or creativity in their interests.



Guiding Questions

- How do you share what you love to do?
- Where do you go when you want to learn about something new?
- Does the Explore story give you any ideas for Izzy?

Session Tips

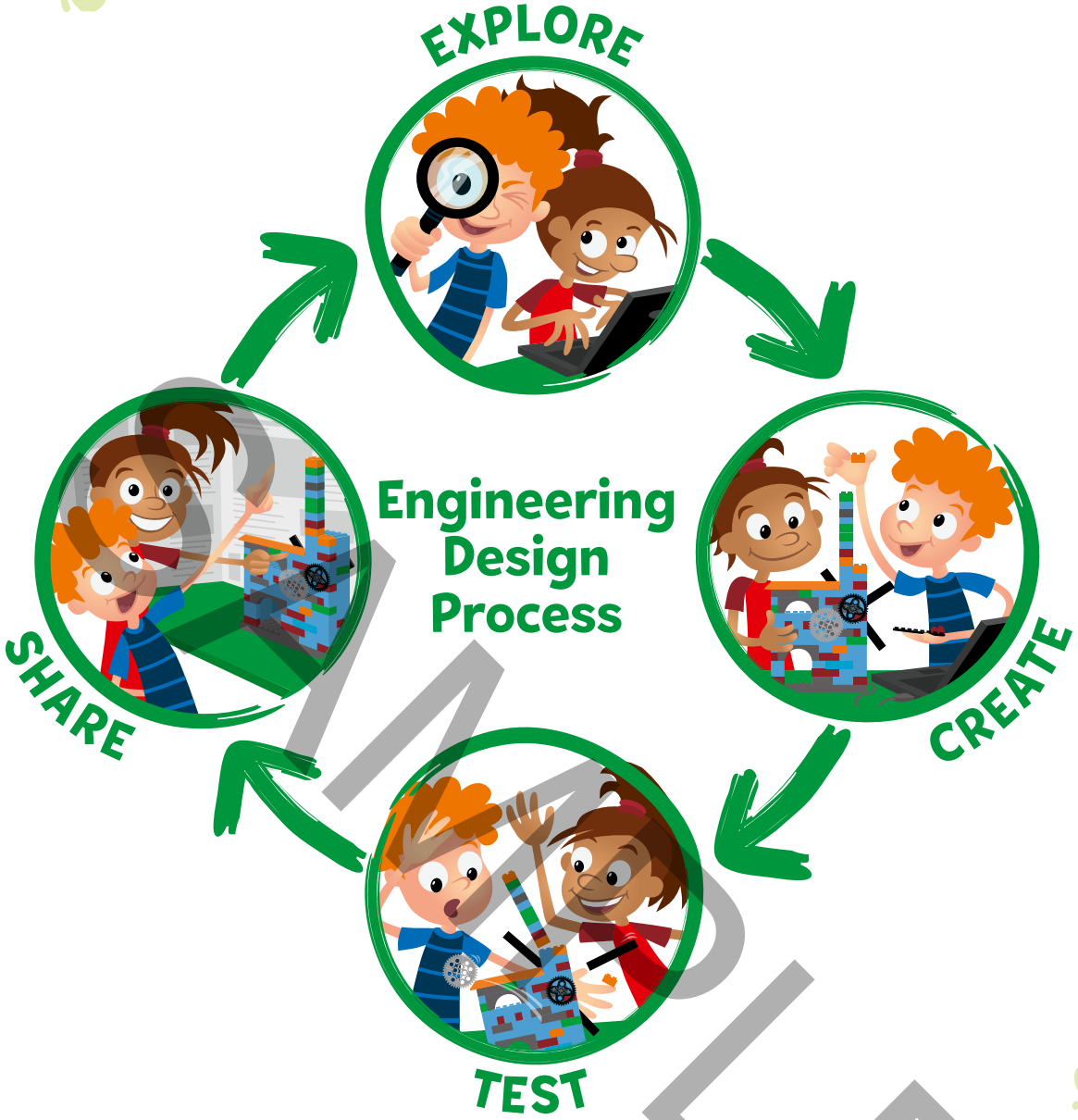
4 Children can set goals and share their progress in their *Engineering Notebook*. Pages 6-7 can be used throughout the season.

5 Give the team the LEGO® prototyping pieces (bags labeled 4) to create their designs. Do NOT open any other bags.

6 At the end of each session, children should share what they have accomplished.

Cleanup

- Anything built with the prototyping pieces should be taken apart.
- Place the prototyping pieces back in the Explore box or in a container labeled “Prototyping Pieces.”



FIRST IN SHOW℠

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FIRST® LEGO® LEAGUE

FIRST LEGO LEAGUE EXPLORE

ENGINEERING NOTEBOOK

MASTER PIECE℠

FIRST®

LEGO education™

Core Values

DISCOVERY

We explore new skills and ideas.

INCLUSION

We respect each other and embrace our differences.

INNOVATION

We use creativity and persistence to solve problems.

TEAMWORK

We are stronger when we work together.

IMPACT

We apply what we learn to improve our world.

FUN

We enjoy and celebrate what we do!

Draw or write an example of your team using each Core Value when directed in the sessions!

You will develop new skills as you work together.

Session 1

Activity 1 Tasks *(15-20 minutes)*

- [ ] Read the Explore story and explore the MASTERPIECE℠ theme.
- [ ] Talk about your own hobbies or interests.
- [ ] Think about how you use art or creativity in your hobbies or interests.
- [ ] Draw a picture of what you love to do.

Your team needs:

Where did you learn about your hobby or interest?

What **tools** or **objects** do you need for your hobby?

What I love to do:

Hobbies and Interests

Your team needs:

I love skateboarding! Help me show my friends how fun it is!

Izzy

Activity 2 Tasks *(15-20 minutes)*

- [ ] Explore how people share what they love to do.
- [ ] Talk about places in your community where people share what they love to do.

Challenge

- [ ] Discuss the creative ways Izzy could get her friends interested in skateboarding.
- [ ] Use the prototyping pieces to build a place where Izzy could share her love of skateboarding.
- [ ] Share your ideas.

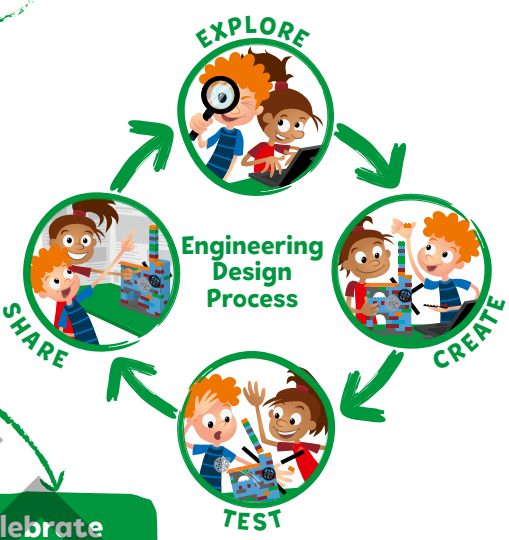
My ideas:

Team Journey

Explore the challenge

Learn about Core Values

Explore, create, test, and share as you go through the sessions



Create team model

Design team poster

Celebrate at an event

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