

**FIRST  
LEGO  
LEAGUE**

EXPLORE

# TEAM MEETING GUIDE



PRESENTED BY:



**HANDS ON  
TECHNOLOGY**



Dear teams,

We are the non-profit association HANDS on TECHNOLOGY e.V. Since our foundation in 2002, we have successfully supported STEM education and have organized research and robotics tournaments. We conduct FIRST LEGO League in Germany, Austria and Switzerland.

We are really happy that you will join us this season! On behalf of our whole team and the board, we would like to wish lots of fun, memorable moments and a lot of success while planning,

building, tinkering and testing as well as at your exhibition!

Your team at



For more information, go to [www.hands-on-technology.org](http://www.hands-on-technology.org)



EXPLORE



FIRST® LEGO® LEAGUE GLOBAL SPONSORS



The LEGO Foundation

# 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,

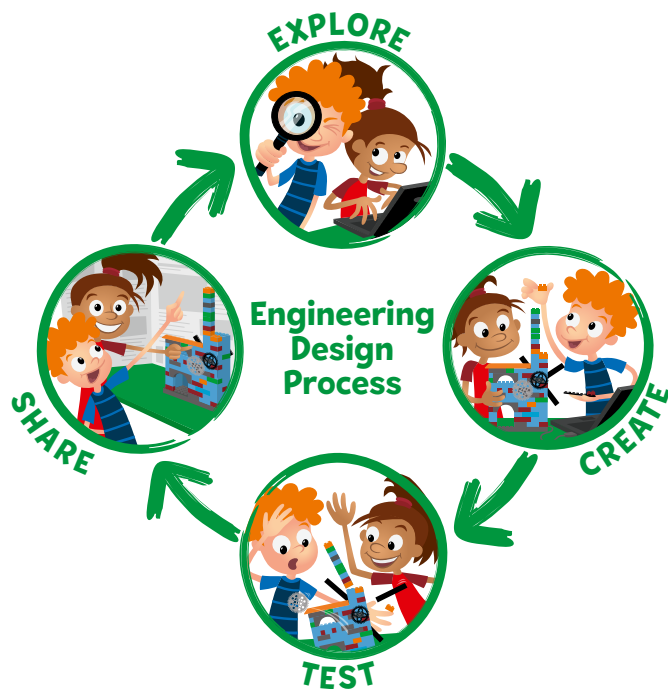
creating solutions, testing them, iterating and changing them, and then sharing what they've learned with others.



## 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.

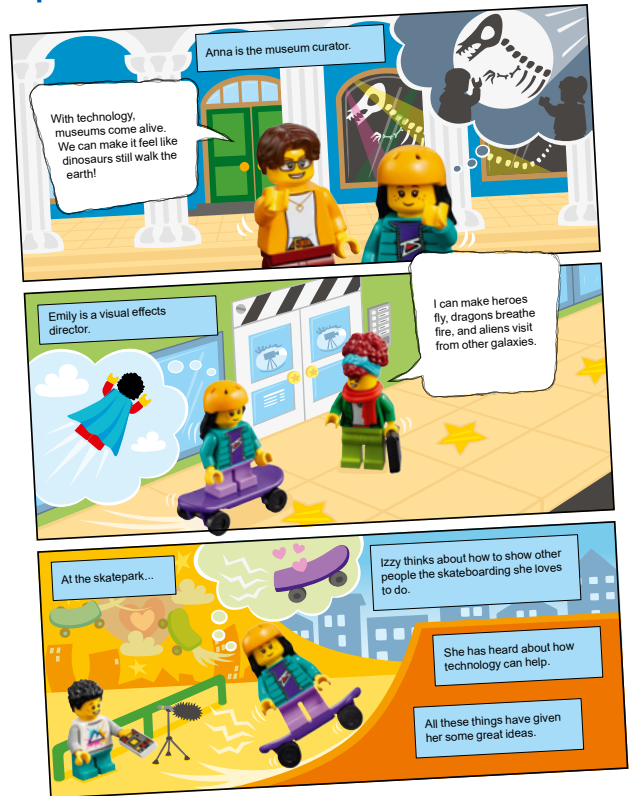


# Explore Story

## Explore Story



## Explore Story



## Explore

Welcome to MASTERPIECE<sup>SM</sup>! The children will explore how people share their hobbies and interests in creative and captivating ways. They will learn about different places where people share their talents or go to enjoy a show. Experts from a variety of backgrounds are involved in every step of putting on a show from stage managers to performers. They'll learn how to share their own interests and build a place of their own design.

## Create and Test

The children will build stages where different types of performances can take place. They will explore coding and motorizing their team model. They will add lights and sounds to their model to make it stand out and be engaging for the audience.

## Share

The children will record their ideas and designs in their *Engineering Notebooks*. They will share their builds and what they learned with others. Finally, they will participate in the festival, where they share their team posters and team models with reviewers, families, and friends. Most importantly they will...

...HAVE FUN!

# Playful Learning in Action

## FIRST® Core Values

The *FIRST*® Core Values are the cornerstones of the program. They are among the fundamental elements of *FIRST*® LEGO® League.

By embracing the Core Values, children use discovery and exploration of the theme in each session and learn that helping one another is the foundation

of teamwork. It is important that the children have fun. The more playful the sessions are, the more motivated the children will be.



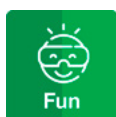
We are stronger when we work together.



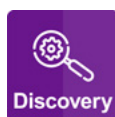
We respect each other and embrace our differences.



We apply what we learn to improve our world.



We enjoy and celebrate what we do!



We explore new skills and ideas.



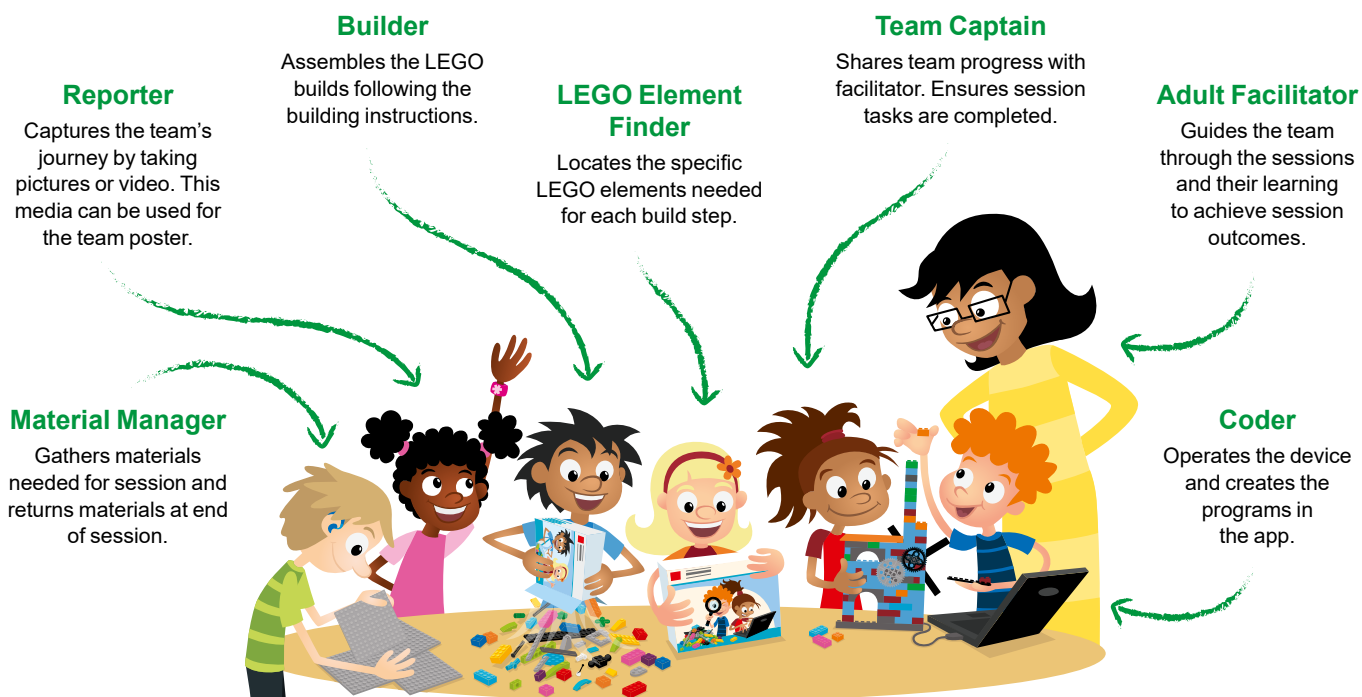
We use creativity and persistence to solve problems.

## Team Roles

Here are sample team roles to use during the sessions. Everyone could experience each role multiple times throughout their *FIRST* LEGO League Explore experience.

Using roles helps the team function more efficiently and ensures that everyone on the team is engaged. Some roles, like the builder and coder, could be filled by multiple

children during a session when the experience is designed for a pair of children.



# 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.



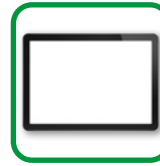
## MASTERPIECE™ Explore Set

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
<b>Bag</b>	1	1	2	3	4
<b>Book</b>	1	1	2	2	-



### Tips

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

# Management Tips



## FACILITATOR TIPS

- Determine your timeline. How often will you meet and for how long? How many meetings will you have before your festival?
- Set team guidelines, procedures, and expected behaviors for your meetings.
- Get into the mindset that the team will be doing the work. You will facilitate their journey and remove any major obstacles.
- Guide your team as they work independently through the tasks provided in each session.
- Use the guiding questions in the sessions to provide focus and direction to the team.
- Jobs are listed in some sessions that connect to the Career Connections pages in the back of the *Engineering Notebook*.
- Teammates should be encouraged to work with each other, listen to each other, take turns, and share ideas.



## ENGINEERING NOTEBOOK TIPS

- Read the *Engineering Notebook* carefully. The team will share the notebooks and work on them collaboratively.
- The notebook contains relevant information and guides the team through the sessions.
- The tips in this *Team Meeting Guide* will direct you how to support each session.
- As facilitator, help guide the team members in the performance of their roles during each session.
- Team roles are outlined in the *Engineering Notebook*. Using roles helps your team function more efficiently and ensures that everyone on the team is involved.



## MATERIAL MANAGEMENT

- Place any extra or found LEGO pieces in a cup. Have children who are missing pieces come to the cup to look for them.
- Wait to dismiss your team until you look over their LEGO set.
- The lid of the LEGO set can be used as a tray to keep pieces from rolling away.
- Use bags or containers to store any unfinished builds or assembled models.
- Designate a storage space for the built mission models and mat.
- The Material Manager role can help with the process of clearing away and storing materials.



# 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.

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

**Celebrate at a Festival!**



# Pre-Session Checkpoint

Read the student *Engineering Notebook* and this *Team Meeting Guide* before starting the sessions. They are full of very useful information to guide you through this experience. Use this checkpoint to help you get started and guide you toward success.



- Ensure you have received all materials needed to implement the program. See [page 6](#) for what you need.
- Identify the space you will use and where to store materials between sessions.
- Think about your final event. Do you need to register for your partner event or are you having your own classroom festival? See [page 30](#) for more details.
- Create a plan for how you will use the program. How often during the week will you do it? How many weeks will it last?
- Make sure you have a Bluetooth-enabled device with the SPIKE™ app installed.
- Unpack the SPIKE™ Essential set (if not already done) and sort the LEGO® elements into the tray before Session 1. Make sure the hub is updated and fully charged or has batteries in it.
- Familiarize yourself with the contents of the Explore set.
- Explore the *FIRST*® Core Values. These are the essential foundation of *FIRST*.
- Watch the *FIRST*® LEGO® League Explore season videos on the official *FIRST* LEGO League YouTube channel.
- The team could complete the Getting Started activities in the app so that they gain experience in building and coding before starting the sessions.
- Share theme-related vocabulary with the team. Words could include *performance*, *exhibit*, *artifacts*, *visual effects*, *special effects*, and *audience*.
- Encourage the team to use the Team Progress page found in their *Engineering Notebook* throughout the sessions to help them keep track of their goals.

# Session Checkpoint

- Session 1 – Team learned about each others' hobbies and interests.
- Session 2-3 – Team built the Explore model.
- Session 3 – Team generated ideas for how technology can help share what they love to do.
- Session 4-6 – Team demonstrated they can build and code the SPIKE Essential models.
- Session 8-9 – Team designed and built their team model.
- Session 10-11 – Team prepared their team poster and are prepared for the festival.



Scan me  
for helpful  
resources

# Session 1

## Outcomes

- The team will use discovery to explore the MASTERPIECE<sup>SM</sup> 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.



### Activity 1 Tasks (15-20 minutes)

- 1  Read the Explore story and explore the MASTERPIECE<sup>SM</sup> 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:



## Session 1

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



## 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.

## Hobbies and Interests

Your team needs:



5



Izzy

### Activity 2 Tasks (15-20 minutes)

- 4  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.
- 6  Share your ideas.

My ideas:

## 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."

# Session 2

## Outcomes

- The team will build the basic stage and minifigures in Bag 1.
- The team will explore different jobs in the arts and tools or objects used.

## Introduction (10 minutes)

### Go Team

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

## Guiding Questions

- What do you think could happen on the stage?
- What do the icons on the mat represent?
- What would you showcase on the stage?

## Session Tips

- 1 You will find the estimated timing in the lesson for each page's tasks. This is to assist with children's self-regulation.
- 2 The team will need Book 1 and Bag 1 from the Explore set.
- 3 The team will add the music concert pieces to the basic stage in Session 3.

## Extension

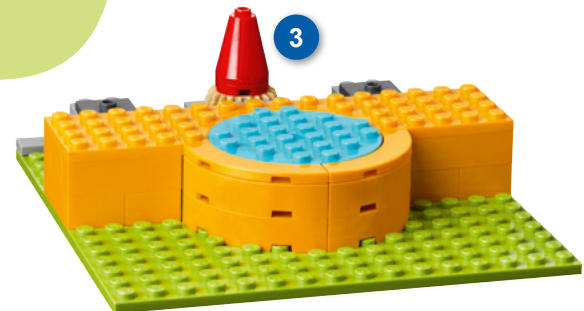
- Explore different jobs and careers related to the arts.
- Research what it takes to become and expert in one of the jobs that was discussed.

# Session 2

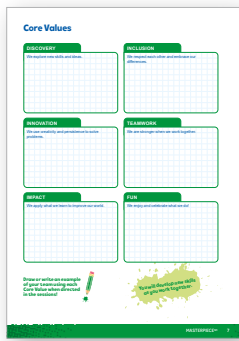
## 1 Activity 1 Tasks (15-20 minutes)

- 2  Follow the building instructions in Book 1 to make the basic stage.
- Talk about what you would share if you were on the stage.
- Identify the icons on the mat. Think about what the icons represent.
- Move the stage to different icons on the mat and discuss what could be shared there.

### Your team needs:



# Behind the Scenes



Complete the Core Values page throughout the sessions during the Introduction activities.

## Share (10 minutes)

Have the team:

- Share what they did in the session.
- Share what they learned about the experts in the Explore story.
- Demonstrate how the different minifigure items could be used.
- Describe their scene for the Explore story.

## Behind the Scenes

Your team needs:



Which experts could help make my skateboarding show more exciting?



### Activity 2 Tasks (15-20 minutes)

- Follow the building instructions in Book 1 to make the minifigures.
- Explore the minifigure items.
- 4**  Re-read the Explore story (p. 4-5). Explain how the characters might use one or more of the items to help them in their job.

### 5 Challenge

- Using the minifigures and stage, build another scene for the Explore story that shows the stage being used in a different way.
- Share your scene and explain what is happening.

**6**

My ideas:

My ideas:

## Guiding Questions

- How would the characters in the Explore story use the minifigure items?
- What scene are you going to create on your stage?

## Session Tips

- 4** The team could also think of other jobs that are related to concert venues, museums, or theaters.
- 5** Challenges are provided for the team to go further with the session tasks.
- 6** The team can build their stage model on the mat to help contain the materials.

## Cleanup

- The basic stage should stay assembled.
- Anything built with the prototyping pieces should be taken apart.

# Session 3

## Outcomes

- The team will add the music concert pieces to the basic stage.
- The team will identify different ways sound is used to help make an impact on an audience.

## Introduction (10 minutes)

### Let's Have Fun

- Read the definition for **fun** to the team. (see [page 5](#))
- Talk about what **fun** is. Have the team provide examples of this Core Value.
- Extension: Have everyone draw a picture of an example of **fun** on the Core Values page in their *Engineering Notebook*.

## Guiding Questions

- What kind of music do you like to listen to?
- What instruments do you see in the music concert pieces?
- What kind of technology is used in the music industry?

## Session Tips

- 1 The team will need Book 2 and Bag 2 located in the Explore set.
- 2 The children can decide how to arrange the performers on the stage.
- 3 Questions in the *Engineering Notebook* are meant to start a discussion or generate ideas.

## Extension

- Interview someone in the music industry (i.e., singer, songwriter, music teacher).
- Collect sounds using a recording app and ask the children to identify them.

# Session 3

## Activity 1 Tasks (15-20 minutes)

- 1  Follow the building instructions in Book 2 to build the music concert pieces.
- 2  Add the music concert pieces to the basic stage you built last session.  
 Place the concert stage on the mat near the music notes.  
 Discuss how sound or music is used to help performers entertain their audience.

### Your team needs:



3

What kind of technology is used in the music industry?

What instruments have you seen being played during a concert?



Scan me to see a video of the music concert model!



# Sound All Around



The MASTERPIECE<sup>SM</sup> Explore story page provides the season theme and the problem the team will solve.

## Share (10 minutes)

Have the team:

- Share what they did in the session.
- Demonstrate how the concert stage works.
- Explain how sound is used to make an impact for an audience.
- Show different examples of sounds icons on the mat.

## Sound All Around

Your team needs:



What skills and what technology do you need as a sound engineer? Find out more on page 30!

6

I think Izzy should skateboard to exciting music or some cool sound effects!



Noah

### Activity 2 Tasks (15-20 minutes)

- 4  Identify the concert pieces that were added to the basic stage.
- 5  Discuss what other technology you would like to add to the concert stage.

### Challenge

- Build examples of the additional technology using the prototyping pieces and add them to the stage.
- Share the technology represented in your model.

My ideas:

## Guiding Questions

- What pieces of technology do you see that were added to the stage?
- What technology would you like to add to the stage?
- What sounds would you feature on your stage?

## Session Tips

- 4 Examples of the technology include the lights, speakers, and other music equipment.
- 5 Share photos of music venues in your community that the children may have seen before.
- 6 Children can find more information on the careers mentioned in the *Engineering Notebook* on pages 30-31.

## Cleanup

- The stage can remain assembled. Bag 4 contains enough pieces for two additional stages. Another stage will be needed in Session 7.
- Anything built with the prototyping pieces should be taken apart.

# Session 4

## Outcomes

- The team will build the LEGO® model from the lesson and explore motor coding blocks.
- The team will identify creative ways stages are used in a theater.

## Introduction (10 minutes)

### Let's Innovate

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

## Guiding Questions

- Can you build and code the LEGO model using motor blocks?
- How do you change the program so the LEGO model moves in a different way?
- What kind of technology is used in a theater?

## Session Tips

- 1 Walk the team through how to access their appropriate lesson in the app.
- 2 If your team is new to coding, you could have them complete the getting started tutorials.
- 3 The team will only use their LEGO Education SPIKE™ Essential set for this session. They won't use anything from the Explore set or Explore model.

## Extension

- Research the theaters that exist in your community and discuss what kind of performances take place there.
- Identify who the audience is for different types of theaters.

### Activity 1 Tasks (15-20 minutes)

- 1  Open the SPIKE™ Essential app. Complete your lesson.
- Make the model go in a different direction or rotate at a different speed.
- Write down your ideas below for how to change the program.
- Modify the program based on your ideas.
- Run your new program. See what happens.

## Session 4

### Your team needs:



### Your lesson:



This kind of technology would be great to use in a theater!



Write your ideas!



# Theater Technology



The Team Journey page on the back cover of the *Engineering Notebook* provides an overview of the team experience.

## Share (10 minutes)

Have the team:

- Share what they did in the session.
- Show the motor coding skills they learned.
- Explain how technology is used to make an impact for an audience.
- Show different examples of theater icons on the mat.

## Theater Technology

Your team needs:



A rotating or revolving stage can make it easier to move props or scenery.

What responsibilities does a stage manager have in a theater?  
Find out more on page 30!



### Activity 2 Tasks (15-20 minutes)

- 4  Modify the SPIKE model from the previous task so that it represents a rotating stage.
- Open the SPIKE™ Essential app.
- Change the program to make the stage rotate every 10 seconds. Try it out!

### Challenge

- 5  Build two different scenes on your rotating stage. The scenes can be about what you love to do!
- 6  Place your stage on the mat. You could use the theater icons as building locations!
- Share the scenes you built and explain how you coded the model.

## Guiding Questions

- Can you add something to your model so it looks like a stage?
- Can you modify the program to make it rotate every 10 seconds?
- What will your team feature on the stage?

## Session Tips

- 4 The team will determine how to change motor direction and motor speed.
- 5 Teams should use pieces from the SPIKE™ Essential set to build their stage.
- 6 Teams can use the minifigures found in the SPIKE Essential set.

## Cleanup

- Everything built in this session should be taken apart and returned to the LEGO® Education SPIKE Essential set.
- Return minifigures to the Explore set.
- Fold the mat and store it in a place where it won't get damaged.



# Session 5

## Outcomes

- The team will build the LEGO® model from the lesson and explore the use of lights and sensors.
- The team will identify how lights and sounds are used to make a museum exhibit interactive.

## Introduction (10 minutes)

### Be Inclusive

- Read the definition for **inclusion** to the team. (see [page 5](#))
- Talk about what **inclusion** is. Have the team provide examples of this Core Value.
- Extension: Draw an engineer showing **inclusion** on the Core Values page in the *Engineering Notebook*.

## Guiding Questions

- How do you change the program so the LEGO model plays a different light?
- Can you code the model to make a different sound?
- What kind of technology is used in a museum?

## Session Tips

- 1 The team will learn about and use light and sound blocks.
- 2 The team should focus on light blocks in this activity. They will experiment with sound blocks in the next activity.
- 3 There are different sensors provided in the LEGO Education SPIKE™ Essential set that the team could try to incorporate.

## Extension

- Have the team complete another lesson from the SPIKE Essential app like the Trash Monster Machine.

# Session 5

## Activity 1 Tasks (15-20 minutes)

- 1  Open the SPIKE™ Essential app. Complete your lesson.
- 2  Code the model to flash a light when a team member approaches the sensor.
- 3  Modify the program based on your ideas and test it out!

### Challenge

- 2  Code the model to display a different light pattern that is unique to your team.

### Your team needs:



### Your lesson:



FIRST® LEGO® League  
Explore Unit:  
Lesson 2

Lights and sounds can help a museum exhibit be more interactive!



Anna

Write your ideas!

Show how you include everyone's awesome ideas!

# Museum Exhibit



## Share (10 minutes)

Have the team:

- Share what they did in the session.
- Show the sensor coding skills they learned.
- Demonstrate how they modified the model and code so that light and sound is triggered by a sensor.

## Museum Exhibit

Your team needs:



A light show could help Izzy's skateboard skills really stand out!

How could I use technology like this in a museum exhibit? Check out page 31.



### Activity 2 Tasks (15-20 minutes)

- Modify the SPIKE model from the previous task so that it represents a museum exhibit.
  - Open the SPIKE™ Essential app.
  - Change the program so that it displays a new light pattern. Try it out!

### Challenge

- Change the program so that the model will play a sound when someone approaches your exhibit.
  - Share what you built and explain how you coded the model.

Draw your ideas!

6

Modify the program to create a unique light pattern!

## Guiding Questions

- Can you modify your model so it looks like something you would see in a museum?
- Can you activate your light pattern with a new sensor?
- Can you use light and sound in the model?

## Session Tips

- The team could build anything they might find in a museum (i.e., sculpture, artifact, exhibit).
- The team will apply the coding concept of light, sound, and sensor blocks.
- The Ideas space can be used to write down the coding steps planned or which coding blocks the team will change.

## Cleanup

- Everything built in this session should be taken apart and returned to the LEGO Education SPIKE Essential set.
- For easier material management, keep the pieces from the Explore set separate from the SPIKE Essential set.

# Session 6

## Outcomes

- The team will build the LEGO® model from the lesson and code the robot to drive.
- The team will apply their coding and building skills to change the existing robot into a vehicle with a camera.

## Introduction (10 minutes)

### Have an Impact

- Read the definition for **impact** to the team. (see [page 5](#))
- Talk about what **impact** is. Have the team provide examples of this Core Value.
- Extension: Draw an inventor having an **impact** on the Core Values page in the *Engineering Notebook*.

## Guiding Questions

- How do you change the program so the LEGO robot moves differently?
- Can you modify the robot so that it drives with four wheels?
- What kind of technology is used to create visual effects?

## Session Tips

- 1 The team will create their first mobile robot. Make sure the team watches where the robot drives so that it does not fall if placed on a table.
- 2 The team could code the robot to drive to different icons on the mat.
- 3 The team could practice coding the robot to turn.

## Extension

- Identify popular vehicles in movies and attempt to recreate them.
- Modify the vehicle so that it drives with three wheels.

# Session 6


### Activity 1 Tasks (15-20 minutes)

- 1  Open the SPIKE™ Essential app. Complete your lesson.
- 2  Code the model to move backward.
- 2  Write down your ideas for how to change the program below.
- Change the existing program based on your ideas. Test it out!


**Challenge**

- Modify the model so that it has four wheels.


**Your team needs:**



**Your lesson:**



FIRST® LEGO® League  
Explore Unit:  
**Lesson 3**




I think we can capture some great images of Izzy skateboarding!

I use technology to help get an exciting visual image. Check out page 30!

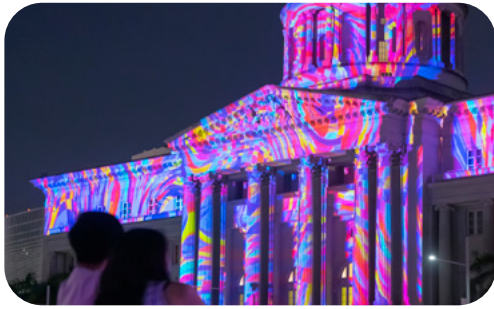
← Emily

Write your ideas!

3



# Visual Effects



## Share (10 minutes)

Have the team:

- Share what they did in the session.
- Share how they have applied coding skills learned in previous sessions to make a moving camera.
- Share how their moving camera was built.

## Visual Effects

Your team needs:



### Activity 2 Tasks (15-20 minutes)

- 4  Modify the SPIKE model from the previous task so that it represents a vehicle with a camera.
- Open the SPIKE™ Essential app.
- Change the program so that the vehicle drives slowly. Try it out!

### Challenge

- 5  Pick two icons on the mat that Izzy should skate between.
- Change the program for your vehicle to move between the two icons.
- Share how you coded your moving camera.

6

Can your camera keep up with me?



Actors and athletes are two examples of people that could be filmed with moving cameras. See page 31 for more!

## Guiding Questions

- How can you modify the robot design so that it hold a camera?
- Can you code the robot to stop at specific icon on the mat?
- Can you code the robot to drive at different speeds?

## Session Tips

- 4 You may want to limit the team to only using pieces from the LEGO® Education SPIKE™ Essential set.
- 5 The team can practice positioning the robot so that it reaches a specific icon.
- 6 You could place an obstacle on the mat to encourage teams to code their robot to turn.

## Cleanup

- Make sure the pieces used from the LEGO Education SPIKE Essential set are returned.
- If any materials from the Explore set were used, make sure they are returned.

# Session 7

## Outcomes

- The team will combine the basic stage model with the motor and hub.
- The team will apply all their coding and building knowledge to create their own stage.

## Introduction (10 minutes)

### Discovery Build

- Have the team provide examples of how they have used **discovery** throughout the sessions.
- Have the team create a build from the prototyping pieces representing this Core Value or examples of the team using **discovery**.

## Guiding Questions

- How can you motorize the basic stage?
- What will you add to your stage to make it unique to your team?
- Where will your model go on the mat?

## Session Tips

- 1 The motorization pieces are found in Bag 3.
- 2 The team should motorize the basic stage and write a program that will make it turn.
- 3 The team could also incorporate other moving pieces into their model.

## Extension

- Explore what museums in your community are displaying and recreate them using the prototyping pieces.
- Research theaters in your community and build their features into the team model.

# Session 7

## Activity 1 Tasks (15-20 minutes)

- 1  Build the motor and hub base following instructions in Book 2.
- 1  Connect the motor and hub to the basic stage model from Session 2.
- 2  Open the SPIKE™ Essential app. Try the program provided in Book 2 to motorize your model.
- 2  Write a new program to rotate the center of the stage where the performer stands.

## Challenge

- 3  Pick a hobby or interest you and your team want to share on the stage. Draw your ideas for how you could do this below!

## Your team needs:



Scan me to see a video of the motorized music concert model!

Draw your ideas!

# Setting the Stage



## Share (10 minutes)

Have the team:

- Share what they did in the session.
- Show how they have applied coding skills learned in previous sessions to make their model move.
- Demonstrate how their stage engages an audience.

## Setting the Stage

Your team needs:



Will you build a museum exhibit, a concert, or a play?

### Activity 2 Tasks (15-20 minutes)

- Decide where on the mat you will build your model.
- Use the prototyping pieces to add to your stage and make it exciting for an audience!

### Challenge

- Change the model and the program to show off a different hobby or interest.
- Share your build and explain the different kinds of technology you used.

## Guiding Questions

- Who will be coming to watch the show or interact with the exhibits?
- Can you use the ramps in your design?
- Can you code the stage to flash lights, play sounds, and move?

## Session Tips

- 4 Help the team identify an audience and think about what their needs will be when attending the show.
- 5 The team could be challenged to modify their model based on a different spot on the mat.
- 6 Identify places in your school or community that are designed to be accessible to all people.

## Cleanup

- Make sure unused pieces from the LEGO® Education SPIKE™ Essential set are returned.
- The motor and hub can remain attached to the stage model.

How can you redesign the model or change the program?

# Sessions 8 & 9

## Outcomes

- The team will draw their team model design and label its required parts.
- The team will create a team model to showcase a talent or interest that uses technology in creative ways.

## Introduction (10 minutes)

### Teamwork and Fun Builds

- Have the team provide examples of how they have used **teamwork** (Session 8) and **fun** (Session 9) throughout the sessions.
- Have the team create a build from the prototyping pieces representing this Core Value or examples of the team using **teamwork** and **fun**.

## Guiding Questions

- How will you plan out your design for your team model?
- What do you think is the most important part of your team model?
- How will your team model help you share your interests with others?

## Session Tips

- 1 The team will need all parts of their Explore model and the mat.
- 2 Each team member could build a part of the team model using a baseplate.
- 3 The team model can use extra LEGO® bricks, minifigures, baseplates, and other LEGO elements. You may NOT use glue, paint, or art supplies.

## Extension

- Create a detailed, labeled drawing of your team model and all its parts.
- Research theaters in your community and build their features into the team model.

### Session Tasks (80-100 minutes)

- 1  Design a team model that shows how technology helps you share what you love to do.  
 Brainstorm your solutions.
- 2  Explore the list of required parts on the next page.  
 Draw your team model design and label the required parts.
- 3  Create your team model together. Use the mat and build the different parts of your show!

## Sessions 8 & 9

### Your team needs:



Build a team model of a place where an audience is immersed by a concert, performance, or exhibit.

### Draw your team model on the mat.





# Team Model



## Share (10 minutes)

Have the team:

- Share what they did at the end of each session.
- Explain the program and how the motor, sensor and light are used in the model.
- Review the list of required parts and identify them on the team model.
- Demonstrate how the team model works.

## Team Model

### Requirements

6

Be sure to include a hobby or interest, a light or sound feature, and an audience.

Include all parts of the Explore model.

Motorize the Explore model.

4

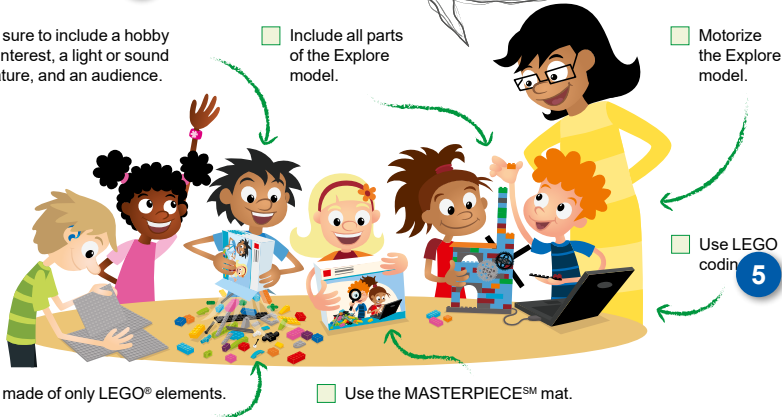
Be made of only LEGO® elements.

Use the MASTERPIECE™ mat.

Use LEGO coding

5

Build a team model that represents a unique way to share your team's hobbies and interests with others.



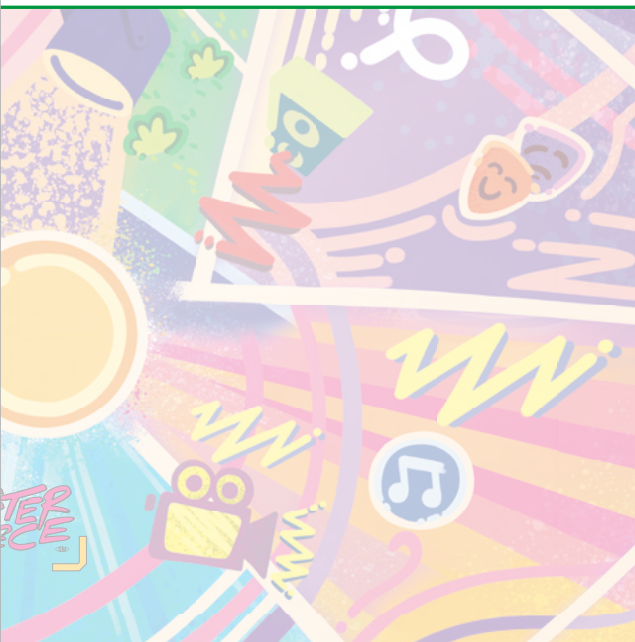
## Guiding Questions

- What the strengths and the weaknesses of your design?
- How can you motorize part of your team model?
- How does your team model show your interest or hobby in a new or unique way?

## Session Tips

- 4 The team model should be able to fit on a table and be easily transportable.
- 5 The team will apply coding concepts throughout the sessions to create their programs.
- 6 The team should incorporate all parts of the Explore model into their team model as well as the Explore mat.

Label the required parts of your team model.



## Cleanup

- The team model will remain assembled from this point forward until the event.
- Check that any unused pieces from the LEGO® Education SPIKE™ Essential set are returned to it.

# Sessions 10 & 11

## Outcomes

- The team will create a plan for what they will include on their team poster.
- The team will design and create their team poster.

## Introduction (10 minutes)

### Innovation and Inclusion Builds

- Have the team provide examples of how they have used **innovation** (Session 10) and **inclusion** (Session 11).
- Have the team create a build from the prototyping pieces representing this Core Value or examples of the team using **innovation** and **inclusion**.

## Guiding Questions

- What different topics did you explore?
- What did you create and build?
- Can you showcase what you did in previous sessions on your poster?

## Session Tips

- 1 You will need to provide a large poster board and various art supplies. A trifold poster board works well.
- 2 The goal is for the team to create the poster themselves. You can support them and provide insight.
- 3 The team can look back at the Team Journey and Core Values pages in their *Engineering Notebooks*.

## Extension

- Look back at the extensions in Sessions 1-4 to further explore the season theme.
- The Multimedia Resources also have additional activities you could do with your team.

## Session Tasks (80-100 minutes)

- 1  Find your poster board and art supplies.  
 Brainstorm what to put on your poster.
- 2  Use the next page as a draft for your ideas.  
 Work together to create your team poster. Teamwork!
- 3  You can use words, drawings, and photos on your poster.

## Sessions 10 & 11

### Your team needs:

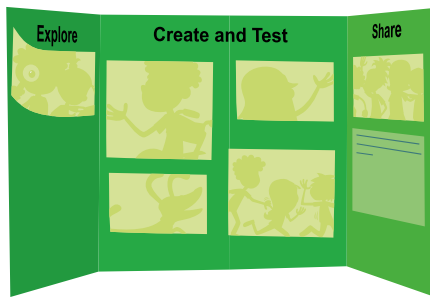


Congratulations on all you have learned. Now, make a team poster to share about it!

Describe your team journey throughout the sessions.



# Team Poster



## Share (10 minutes)

Have the team:

- Share what they did at the end of each session.
- Show their team poster design.
- Explain their team journey.
- Demonstrate how they will present their team poster.

## Team Poster

Here's your chance to capture ideas for your team poster.

Sample Topics: *Explore, Create, Test, Share, Core Values, Team Journey*

4

5

6

## Guiding Questions

- How can you show your team journey on the poster?
- What will you include on your team poster?
- How will each person on the team share about the poster?

## Session Tips

- 4 Sample topics for the poster are provided for the students. They can choose to include whatever they want!
- 5 Provide extra scrap paper for the team to draw and write their ideas for their team poster.
- 6 Two boxes would fit on each fold on a trifold poster board.

## Cleanup

- Make sure you have a safe place to store the poster, especially if it needs to lay open to dry.
- You may need extra time at the end of each session to clean up the art supplies.

# Session 12

## Outcomes

- The team will reflect on their MASTERPIECE<sup>SM</sup> experience.
- The team will create a plan for what to share at their final event.

## Introduction (10 minutes)

### Impact Build

- Have the team provide examples of how they have had an **impact** throughout the sessions.
- Have the team create a build from the prototyping pieces representing this Core Value or examples of how the team has had an **impact**.

## Guiding Questions

- Can you explain the code you created for your motorized part?
- How does your team model relate to the MASTERPIECE<sup>SM</sup> theme?
- Can you share about your team's journey?

## Session Tips

- 1 Go over with the team the questions about the team model, the team poster and the teamwork and look for possible answers with them. So they can practice for the interview with the reviewers.
- 2 Also ask the team a few questions of your own.
- 3 If the team does not participate in an official exhibition, they can present their results e.g. at the school or in front of parents.

## Extension

- Present your presentation to another team, class, or group of adults.
- Ask for feedback to make improvements before your final event.

## Tasks (40 minutes)

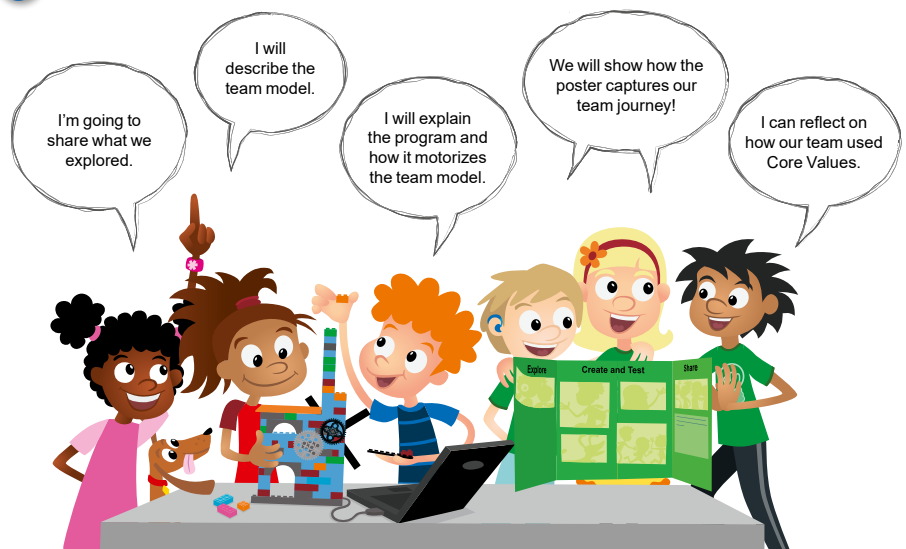
- 1  Gather your completed team model and team poster.  
 Talk about what your team would like to share at your event!  
 Complete the next page to prepare for your event.
- 2  Look over the reviewing sheet with your coach.  
 Practice your presentation.  
 Communicate what you have learned with others.

## Session 12

You will be taking part in a FIRST® LEGO® League Explore Festival. Invite your family and friends to your special event!

Share what you have learned and how your team had fun!

## 3 Sample Festival Roles



# Prepare for Event



## Share (10 minutes)

Have the team:

- Practice their team poster presentation.
- Practice their team model presentation.

## Prepare for Event

Consider what you will share at the event.

4

- Can you describe your team model?
- Explain how your team used innovation and creativity to share what you love to do.

- What part of your team model is motorized?
- How did you code your motorized part?

5

Let's celebrate how well we all worked together! It is much more fun when everyone on the team is included.

- What did you learn about the season challenge?
- How did you use Core Values?

- What did you include in your team poster?
- How does the poster show your team journey?



## Guiding Questions

- How will you present your poster and model at the event?
- How do we show Core Values?
- What does your team need for the event?

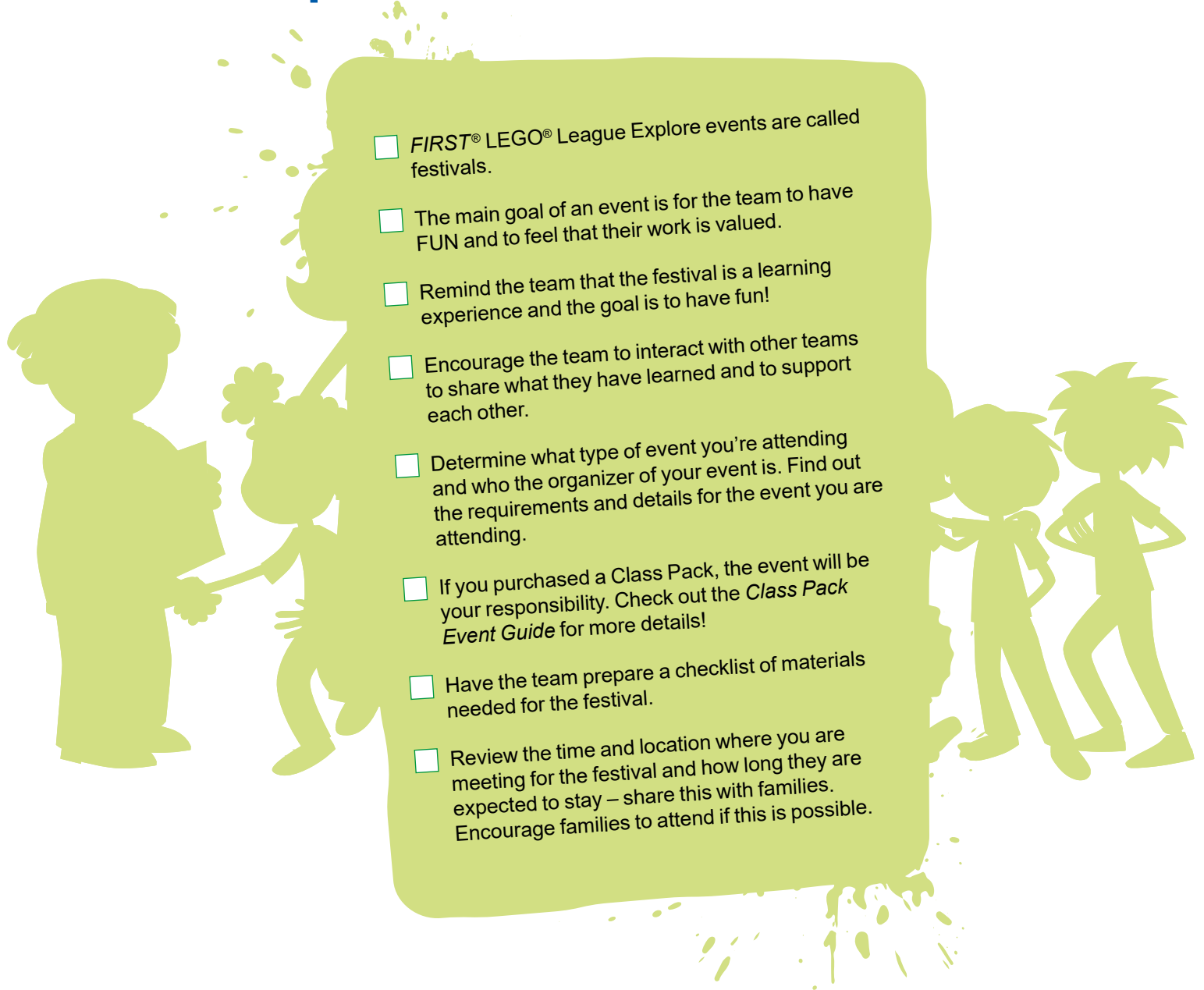
## Session Tips

- 4 Every question on this page doesn't need to be answered. They are just to help your team feel ready for the event.
- 5 You could have the team practice their presentation by presenting to others before their event.
- 6 Your team could register for an Explore festival or you can run your own festival.

## Cleanup

- Make sure the team model and team poster are stored and ready to be transported to the event.
- Check that you have the device, charging cord, and fully charged battery for the event.

# Event Preparation

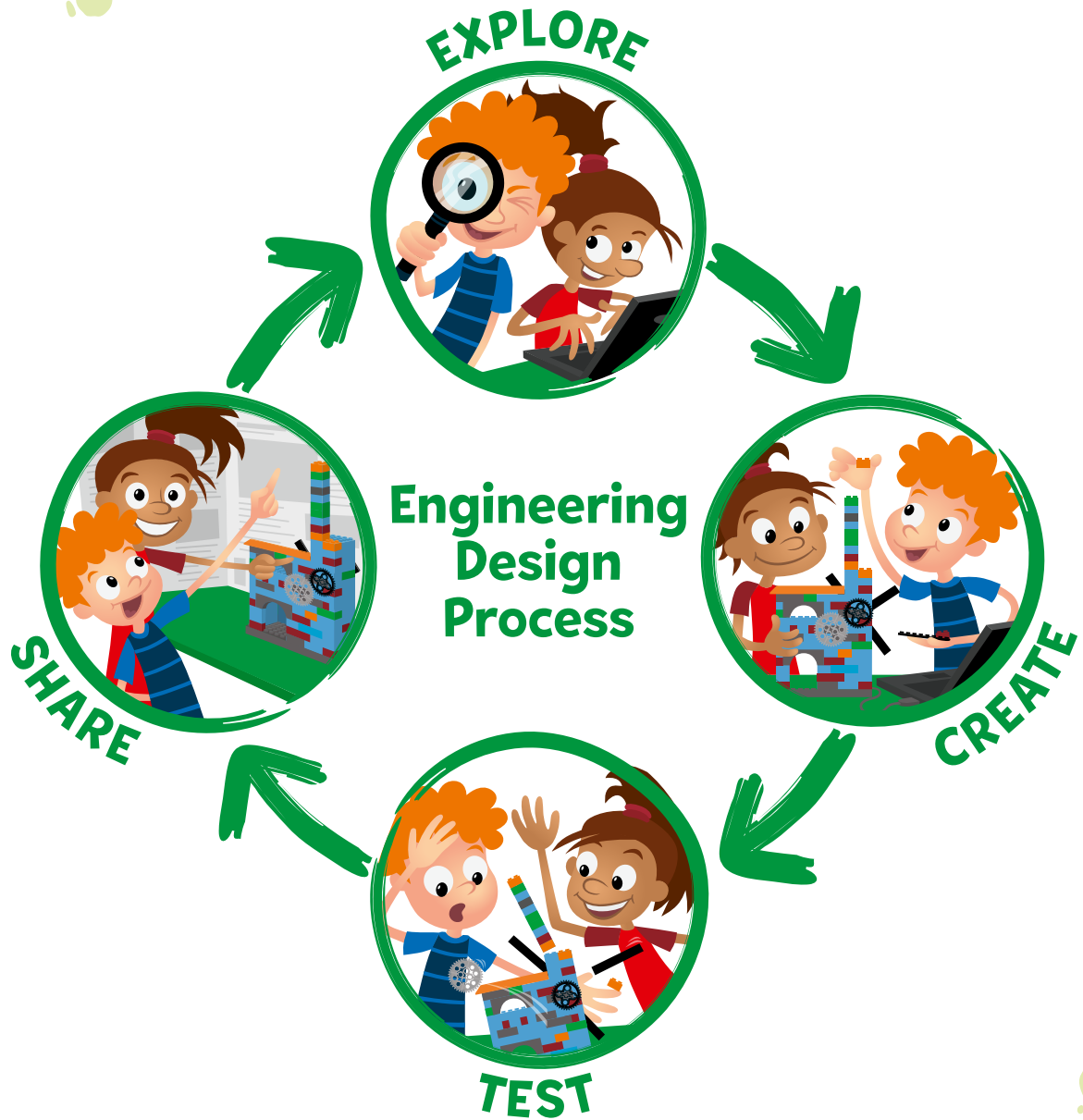
- 
- FIRST*® *LEGO*® League Explore events are called festivals.
  - The main goal of an event is for the team to have FUN and to feel that their work is valued.
  - Remind the team that the festival is a learning experience and the goal is to have fun!
  - Encourage the team to interact with other teams to share what they have learned and to support each other.
  - Determine what type of event you're attending and who the organizer of your event is. Find out the requirements and details for the event you are attending.
  - If you purchased a Class Pack, the event will be your responsibility. Check out the *Class Pack Event Guide* for more details!
  - Have the team prepare a checklist of materials needed for the festival.
  - Review the time and location where you are meeting for the festival and how long they are expected to stay – share this with families. Encourage families to attend if this is possible.

## Events Complete and All Done?

Here are some tips for wrapping up after the last event your team will participate in:

- Clean up and take apart the team model. Make sure SPIKE™ Essential elements go back to their set.
- Inventory the SPIKE Essential set to make sure all the pieces are there.
- Decide what to do with Explore set elements.
- Allow time for the team to reflect on their experience.
- Hold a team celebration and give out certificates!





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LEAGUE**

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