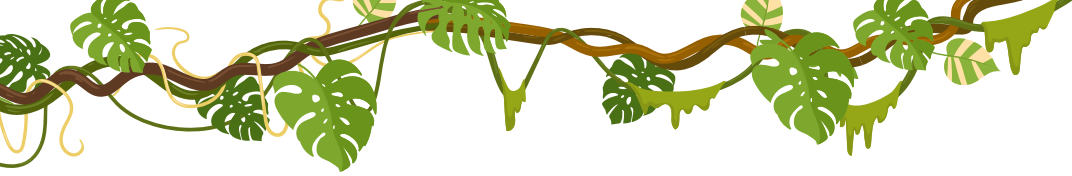


**FIRST
LEGO
LEAGUE**

EXPLORE

TEAM MEETING GUIDE





***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 two 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® CANOPY™ and BIOGLOW™

Biodiversity shows the health of our planet by how plants, animals, and ecosystems work together. Similarly, the **FIRST LEGO League** community shows how powerful teamwork can be. When people with different ideas and skills collaborate, they can solve bigger problems. Scientists and engineers around the world help protect nature by observing animals, monitoring plant diversity, and creating technology inspired by the natural world.

This season, **FIRST** teams and supporters will take inspiration from the natural world and from one another. Using STEM, teamwork, and creativity, participants will explore how they can support biodiversity, strengthen communities, and help build a healthier, more connected planet. Together, we can learn from nature and design a thriving future for our shared home.



Explore, Create, Test, & Share

Explore: This season, children will explore the biodiversity of the rainforest, build creatures, and discover how plants and animals support healthy ecosystems. They should read the **Explore story** found in the *Engineering Notebook* and imagine what the team of scientists are learning while studying in the treetops. Encourage children to ask questions about the theme and make real-world connections to the models they build.

Create & Test: The children will build modular animals, a large tree, and tools used to study the rainforest. They will also explore coding as they motorize parts of their team model toward the end of their experience. Encourage children to build freely and change their models as they have new ideas or when they've learned something new.

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



Playful Learning in Action

The Coach's Role

As a coach in *FIRST*® LEGO® League Explore, your job is to guide and support your team while allowing the children to take ownership of their learning. The team will rely on you to help them stay focused, ask guiding questions, and provide tools or resources when needed.

You don't need to be an engineering expert or a seasoned educator – your goal is to create a space where curiosity thrives and every child feels empowered to contribute.

Coaches in *FIRST* LEGO League Explore will:

- **Facilitate Play and Learning:** Guide the team as they explore STEM concepts using the Explore Set and create their team model and poster.
- **Promote Teamwork:** Encourage team members to share ideas, take turns, and collaborate as they work together.
- **Champion Core Values:** Model the *FIRST*® Core Values and recognize how teams apply them throughout each session.
- **Prepare the Team:** Help the team prepare to present their team model and poster at the festival, ensuring they're ready to share what they've learned and created.
- **Be a Role Model:** Celebrate every step of progress, no matter how small, and encourage the team to embrace new ideas and challenges.

Explore Story



The Explore story is a wordless comic used throughout the sessions to inspire creativity and spark discussions about the season's theme. Teams are encouraged to interpret the images to create their own imaginative story and to connect what they build to the story the images tell. There is no right or wrong way to interpret the Explore story, and teams can use it as much or as little as they like.

Have the team look closely at each scene and think about what the characters might be feeling, saying, or doing. What clues can they find in their expressions, actions, and backgrounds? What might have happened before this moment, and what could happen next?

Explore Team Model

In the BIOGLOW™ season, the challenge is for the Explore team model to feature:

- A plant or animal that the team designed
- A job related to the rainforest
- A tool or piece of technology used to study biodiversity

Tip

The Explore story is also found on page 4 of the *Engineering Notebook*.

FIRST® Core Values

The *FIRST*® Core Values are fundamental to *FIRST* and unique to its programs. They emphasize friendly collaboration, respect for the contributions of others, teamwork, learning, and community involvement and are part of our commitment to fostering, cultivating, and preserving a culture of equity, diversity, and inclusion.

Our community expresses the *FIRST* philosophies of *Gracious Professionalism*® and *Coopertition*® through the *FIRST* Core Values.



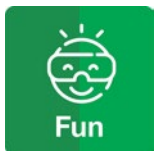
We are stronger when we work together.



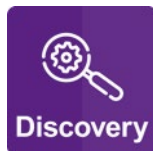
We respect each other and embrace our differences.



We apply what we learn to improve our world.



We enjoy and celebrate what we do!



We explore new skills and ideas.

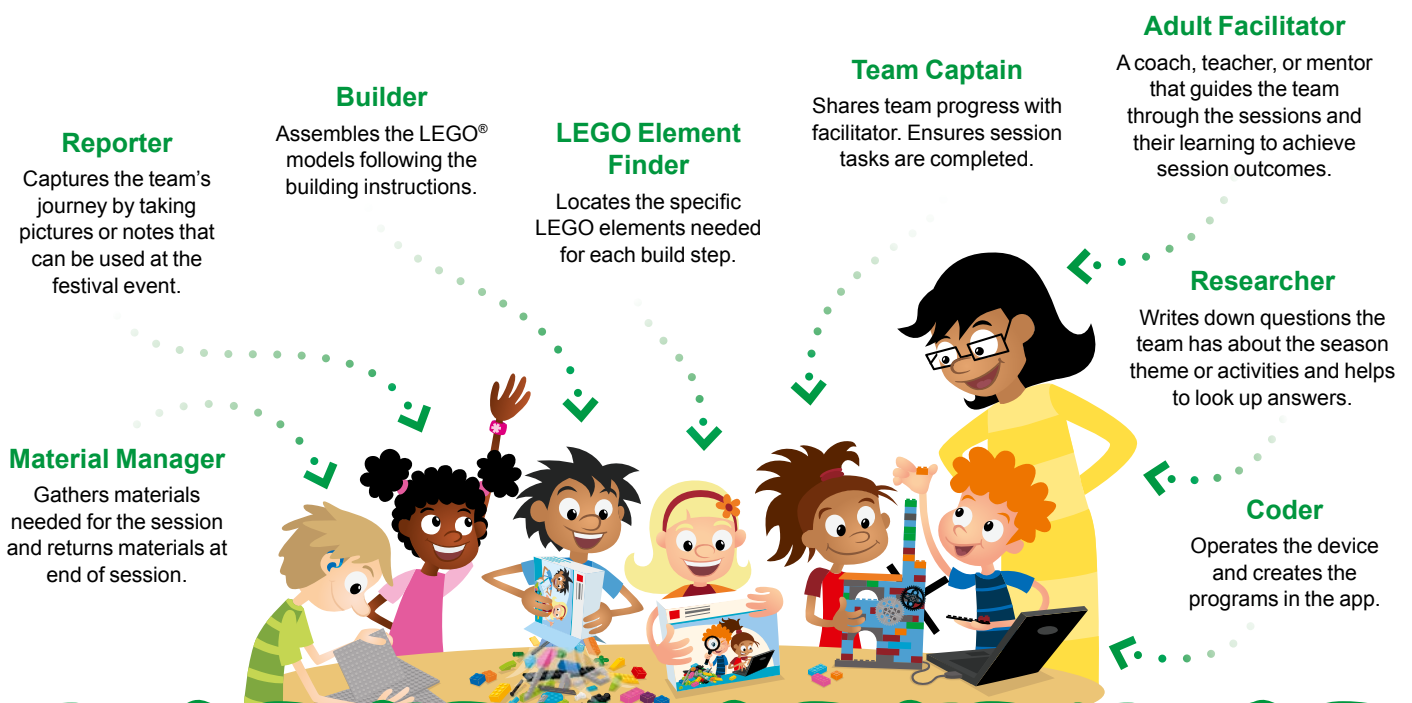


We use creativity and persistence to solve problems.

Explore Team Model

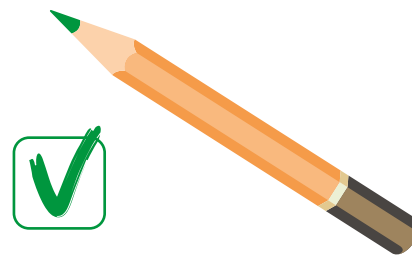
Using roles helps the team function more efficiently and ensures that everyone on the team is engaged. Team members can use these suggested roles throughout their sessions or create their own. Make sure that every team member has the chance to try each role during the season, allowing them to explore different tasks and responsibilities.

Some roles, such as builder or coder, could be filled by multiple team members during a session. Each team member could also experience a role multiple times throughout their *FIRST*® LEGO® League Explore experience.



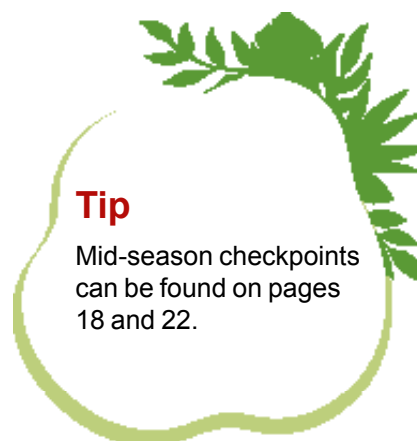
Pre-Season Checkpoint

Use this checkpoint to help you get ready for your first session with the team.



- ☐ Read the **Engineering Notebook** and all pages of this **Team Meeting Guide**. These guides are full of helpful tips and resources to guide you through the sessions.
- ☐ Ensure you have received all materials needed to implement the program. See page 8 for what you need.
- ☐ Make sure you have a Bluetooth-enabled device with the **SPIKE™ app** installed.
- ☐ Identify the space where you will meet and how you will store materials between the sessions.
- ☐ Decide how often your team will meet. Communicate this schedule with team members and families.
- ☐ Think about your **festival**. Do you need to register for a local event, or are you having your own classroom festival? Share the date and details of the festival with families and caregivers. See page 30 for more details.
- ☐ Unpack the **SPIKE Essential** set and sort the LEGO® elements into the tray before Session 1. Make sure the hub is updated and fully charged.
- ☐ Explore the **FIRST® Core Values**. They are the essential foundation of **FIRST** programs.

- ☐ Familiarize yourself with the contents of the **Explore Set** and watch the **FIRST® LEGO® League** Explore **season videos** on the **FIRST LEGO League** YouTube channel.
- ☐ Browse the available content on the **Explore Season Resources** page and **Multimedia Resources** list.
- ☐ Coaches and team members could complete the **Tutorial Activities** in the SPIKE app so that they gain experience in building and coding before the sessions. This is especially helpful if you are new to the program.

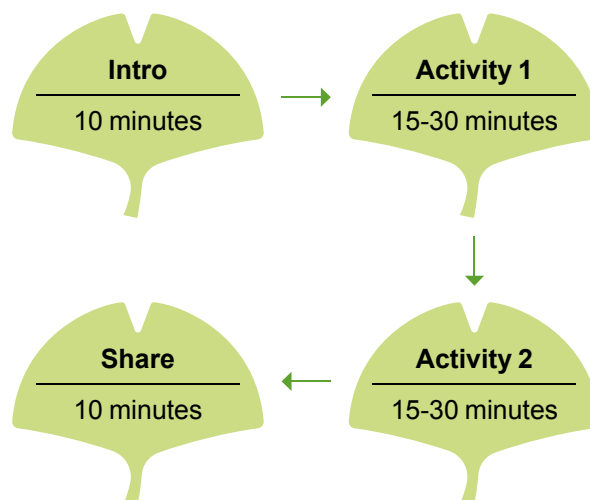


Tip

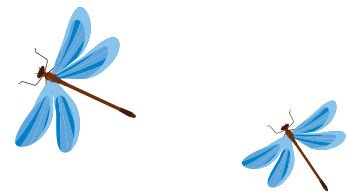
Mid-season checkpoints can be found on pages 18 and 22.

Session Timing

Suggested times for each session can be found on the Sessions at a Glance page. You might find that you need more or less time to explore and complete the activities and challenge tasks within a session. Be flexible and remember that you can split the tasks up over multiple team meetings if needed.



Sessions at a Glance



Session tasks can be split over two or more meetings.

Recommended: 60 minutes each

Session 1: Canopy Connections

- Explore BIOGLOW™ theme
- Build models from Explore Set

Session 2: Creature Creators

- Build models from Explore Set
- Create new animals

Recommended: 60-75 minutes each

Session 3: Animal Alarm

- Coding Lesson 1 (Animal Alarm)
- Coding challenge

Session 4: Treehouse Camp

- Coding Lesson 2 (Treehouse Camp)
- Coding challenge

Session 5: Science Helpers

- Build models from Explore Set
- Code the lift model

Session 6: Research Tools

- Build models from Explore Set
- Code the research device

Session 7: Dream Treehouse

- Design and build a research station
- Explore tools used to study the rainforest

Recommended: 90 minutes each

Session 8: Team Model

- Design team model
- Build team model

Session 9: Team Poster

- Design team poster
- Create team poster

Session 10: Prepare for Your Event

- Finish team model and poster
- Practice sharing

What Does the Team Need?

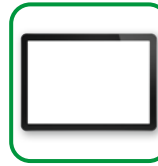
LEGO® Education Set

The LEGO® Education SPIKE™ Essential set, with its motor, sensor, and hub, is the set referenced throughout the sessions in this guide.

Note: This program and sessions are designed for use with SPIKE Essential. Other LEGO Education sets are allowed, but specific instructions may vary.

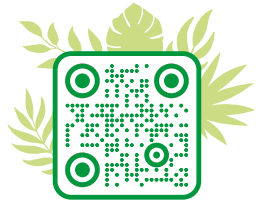


Electronic Device



Your team will need at least one compatible Bluetooth-enabled device like a laptop, tablet, or computer to run the LEGO® Education SPIKE™ app.

Scan the QR code to view system requirements and download the SPIKE app.



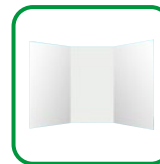
Engineering Notebooks

Each team member needs their own *Engineering Notebook* to record their ideas and progress. The *Engineering Notebook* contains session tasks, jobs and technology, and relevant information to guide teams through the sessions.



Team Poster Supplies

Each team will need a poster board and various art supplies in Sessions 9-10 to complete their team poster. These supplies can also be used in earlier sessions to record team progress.



BIOGLOW™ Explore Set

Each team will need one Explore Set, which includes the Explore models, mat, building instructions, and prototyping pieces.

Leave the LEGO pieces in their numbered bags until the team reaches the sessions that need them.



Note: a table showing the book and bag numbers for the models in the Explore set can be found on page 31.



Team Management Tips

Session Planning

- The **suggested session lengths** are flexible. Your team may need more or less time to complete tasks. Feel free to revisit previous sessions as many times as needed to meet the session outcomes.
- Use the **mid-season checkpoints** on pages 18 and 22 to track your team's progress and ensure they're on the right path. These checkpoints will help to get your team ready for the festival event.
- Ask open-ended questions to help keep the team focused and encourage deeper thinking. You can find **guiding questions** within each session to spark discussion.
- Explore **jobs and technology** on pages 5, 28, and 29 of the *Engineering Notebook* to help team members link their activities to real-world jobs.
- Remember, the team members should do the work. Your role as a coach is to guide, encourage, and remove obstacles, enabling them to lead their own exploration journey.

Building and Coding

- Encourage team members to refer to the **building and coding instructions** while working on the Explore models and check their work as they go.
- There's no right or wrong way to approach **creative building**. Let the team use their imagination and focus on connecting to the season theme and exploring new ideas along the way.
- Remind teams to embrace the **engineering design process**. Encourage them to modify and improve their designs throughout the season. The process is outlined on the back of their *Engineering Notebooks*.



Scan here for the
Multimedia Resources.

Material Management

- Make sure to **charge electronic devices** and **store all materials** in a designated space between sessions. This will keep everything organized and ready for the next meeting.
- Keep **extra LEGO® pieces** in a shared container so team members can easily access them if they are missing elements during building.
- Use bags, bins, or the set's lid to **store unfinished builds** or keep loose pieces organized and prevent them from getting lost during the session.

Facilitating Teamwork

- Help the team practice taking turns and **resolve conflicts** by encouraging open communication and kindness. Step in to guide the conversation when needed but let the team work toward their own solutions.
- Plan **team-building activities** to help build collaboration, respect, and use of the *FIRST®* Core Values.
- Consider printing or having the team create their own **Core Values posters** to display during sessions. This visual reminder will help them reflect on these principles as they work together.

Support Resources

- Take advantage of the **Multimedia Resources** list, **Session Slides**, and the **Season Resources** page. These tools provide additional support and can enhance your team's learning experience.
- Remember, your **local Program Delivery Partner** is here to help! Reach out to them for local resources, including coach meetings or support groups. Connecting with other coaches can offer valuable insights and ideas for running your sessions.



Session 1

Outcomes

- The team will use discovery to explore the BIOGLOW™ theme and share what they know about biodiversity.
- The team will build the tree model from the Explore Set.
- The team will share what they built to tell their story.

→ Guiding Questions

- What do you know about biodiversity?
- What does a wildlife biologist do?
- What do you think is happening in the Explore story?

→ Session Tips

- 1 **Biodiversity** describes all the living things in an area. The students will learn about and discuss rainforest biodiversity.
- 2 Use the Multimedia Resources to find example photos, websites, and other activities related to the sessions.
- 3 The Explore story on page 4 is a wordless comic referenced throughout the sessions to inspire creativity and spark discussions about the season's theme.
- 4 Writing and drawing space is provided throughout the *Engineering Notebook* for each team member to capture their ideas.

Introduction

Let's discover!

- Introduce the *FIRST*® Core Values. Read the definition for *discovery* to the team from page 5.
- Have the team provide examples of how they have used discovery.
- Get the teams excited to start their BIOGLOW™ journey!

A list of materials needed for each activity can be found here.

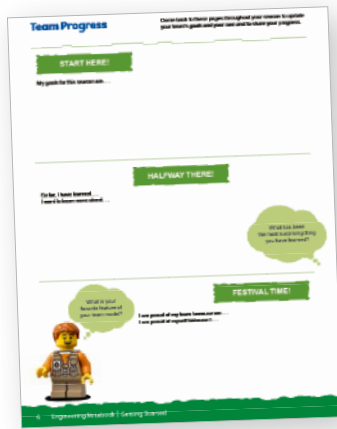
Session 1

Your team needs:

- 1 What words do you know that relate to the rainforest?
- 2 **Activity 1 Tasks**
 - ☐ Look at the Explore story on page 4. Look closely at each picture and think about what the characters/animals might be thinking or doing.
 - ☐ Share what you know about the rainforest and biodiversity with your team.
 - ☐ Write or draw what your team shared.
 - ☐ List your team goals on page 6.
- 3 What happened in the Explore story?

Rainforests have many kinds of plants and animals.

- 4



Have the team set some goals for the season. They can share what they hope to discover about biodiversity or about building and coding.

Canopy Connections

Share

Have the team:

- Talk about what they think happened in the Explore story.
- Share what they know about animals in the rainforest.

Each session has guiding questions to help you facilitate discussion with the team.

Your team needs:



Canopy Connections

→ Activity 2 Tasks

- 5 ☐ Build the tree model from the Explore Set using Book 1 and Bags 1-3. Talk to your team about the different layers of the tree you built. What animals live on the forest floor? What animals live in the canopy?
- 6 ☐
- **Challenge**
- ☐ Change the tree model by moving the leaves to new places.
- 7 ☐ Draw or describe the animals you talked about with your team.

What kinds of animals live in trees?



Look at the layers of the rainforest on page 30.

Trees in the rainforest can grow tall and form a canopy.

→ Guiding Questions

- What are the different layers of the rainforest?
- What kinds of animals live in trees?
- Why do you think some animals live on the forest floor while others live high up in the canopy?

→ Session Tips

- 5 The team could rearrange the pieces on the tree to create a specific animal habitat.
- 6 The layers of the rainforest can be found on page 30 of the *Engineering Notebook*.
- 7 Encourage the children to share what they built and to explain where animals could live in the tree.

→ Clean Up

- Keep the tree model assembled for use in the upcoming sessions.

Session 2

Outcomes

- The team will build the animals from the Explore set
- The team will create new animals.

Introduction

Make an impact!

- Read the definition of *impact* to the team from page 5.
- Talk about what impact is. Have the team provide examples of how they use this Core Value.

Talk to the team about camouflage and how animals use it to hide.

→ Guiding Questions

- What colors and patterns do you notice on the animals?
- How do the animal's body parts help it survive in the rainforest?
- Where in the rainforest do these animals live?

→ Session Tips

- 1 Use Bags 4-6 and Book 2 to build the animals.
- 2 You could divide the team into pairs so each can build a different animal.
- 3 Lead a discussion about each of the animals and what makes them different.

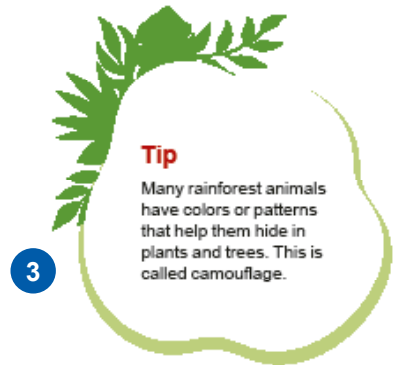
Session 2

Your team needs:



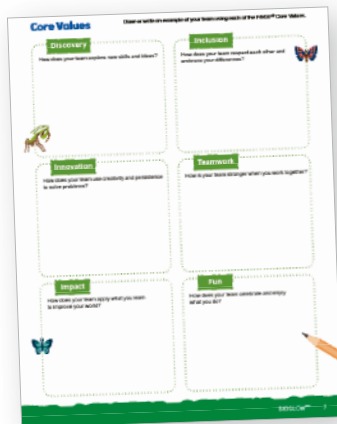
→ Activity 1 Tasks

- 1 ☐ Use Book 2 and Bags 4-6 to build the animals in the Explore Set.
- 2 ☐ Talk to your team about the animals you built. Can you describe them? What makes them different from each other?
☐ Talk to your team about where these animals live in the rainforest.
☐ Label the parts of the animals below.



**Add labels to the different animal parts.
Do they have wings? Eyes? Legs? What else?**





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

Creature Creators

Share

Have the team:

- Talk about the difference between the animal models.
- Label the animal habitats in their *Engineering Notebooks*.

Your team needs:



4

How can you change the animals you built?

5

6

Tip

Many frogs have bright colors that warn other animals to stay away.

Creature Creators

Activity 2 Tasks

- ☐ Place the Explore mat on a flat surface.
- ☐ Look at the mat and decide with your team where each of the animals might live.
- ☐ Tell a story with your team about one of the animals.

Challenge

- ☐ Change one of the animals you built by swapping its pieces with other animals' pieces.
- ☐ Think about where this new kind of animal would live on the mat.
- ☐ Tell a story about the new kind of animal you created. What would you call this animal? What does it like to eat? How does it move? Is it friendly to other animals? Label the mat to show where this animal would live.



→ Guiding Questions

- Where would your new animal live on the mat?
- What behaviors does your new animal have?
- What area of the mat would be the best place for your animal to live?

→ Session Tips

- 4 The team can build on the Explore Mat during any of the sessions. You can also use the back of the box to create a more immersive play experience.
- 5 Encourage the team to explain why they chose a specific area of the mat for their animal to live.
- 6 There are no wrong ways to design a new animal. Have the team be as creative as they want when building.

→ Clean Up

- Fold the mat and store it to keep it from being damaged.
- The animal models can be restored to their original design or kept in their

Make sure to charge your LEGO® Education set for the next session!

Session 3

Outcomes

- The team will build the LEGO® model from the lesson and explore sensor blocks.
- The team will learn about how biologists detect animals in the rainforest.

→ Guiding Questions

- Which blocks can you use to code the LEGO model?
- How do you change the program so the model shows a different color?

→ Session Tips

- 1 The team will use only their SPIKE Essential set for Activity 1.
- 2 If your team is new to coding, you could have them complete the Tutorial Activities in the app.
- 3 Lessons can be found in the FIRST® LEGO® League Explore Unit. Show the team how to access the Animal Alarm lesson in the app.

Introduction

Teamwork makes the dream work!

- Read the definition of *teamwork* to the team from page 5.
- Talk about what teamwork is. Have the team provide examples of how they use this Core Value.

Tell the team they will use their device and the SPIKE™ app in this session to code a motor.

Session 3

Your team needs: 1

2 → Activity 1 Tasks

- ☐ Open the SPIKE app on your team's device.
- 3** ☐ Complete Coding Lesson 1 in the FIRST® LEGO® League Explore Unit—Animal Alarm.
- ☐ Change the program so the color changes when one of the animals from the Explore Set moves in front of the sensor.
- ☐ Write your ideas below.

Write your program here:

Tip

Scientists can learn which animals live nearby by listening to their sounds.

12 Engineering Notebook | Sessions

Animal Alarm

Share

Have the team:

- Share the light and sound coding skills they learned.
- Talk about how scientists could detect animals with light or sound.

Your team needs:



What animal sounds could you hear in the rainforest?



Animal Alarm

4 → Activity 2 Tasks

- ☐ Try the other sound blocks for the Animal Alarm.
- ☐ Record a new animal sound using the microphone icon.
- ☐ Change the program so your new sound plays when the animal moves by the sensor.

→ Challenge

- ☐ Create a sound for each new animal you built.
- ☐ Place the Animal Alarm and the animals you built on the mat.
- ☐ Change the program so the model will play a sound when the animal is detected by the sensor.
- ☐ Tell a story about the new animal. Why does it make that sound?

Check your program here:

→ Guiding Questions

- What kinds of sounds might you hear in the rainforest?
- How can you test your program to make sure the sound plays at the right time?

→ Session Tips

- 4** The team should focus on using the sound blocks in this activity.
- 5** The team should determine how to record sounds using their device. If recording is not possible, try the sounds provided in the app.
- 6** The team can use the creatures they designed to test the Animal Alarm.

→ Clean Up

- Everything built in this session should be taken apart and returned to storage.
- Make sure to charge your LEGO® Education set for the next session.

Session 4

Introduction

Have fun!

- How do the students define *fun*?
- Talk about how the team has fun. Have the team share examples of this Core Value.

Outcomes

- The team will build the LEGO® model from the lesson and explore motor-coding blocks.
- The team will discuss how scientists can observe and learn about wildlife from treehouses.

Tell the team they will use their device and the SPIKE™ app to have fun exploring motor blocks in this session.

→ Guiding Questions

- How can you change the program so the LEGO model opens slowly?
- How can you code the model to make a sound?
- What kind of animals could you watch from a treehouse?

→ Session Tips

- 1 The team should focus on using the motor blocks in this activity.
- 2 Questions and tips in the *Engineering Notebook* are meant to start a discussion and generate ideas.
- 3 Give the team time to experiment with the program and different coding options.

Session 4

Your team needs:



1 → Activity 1 Tasks

- ☐ Open the SPIKE app on your team's device.
 - ☐ Complete Coding Lesson 2 in the FIRST LEGO League Explore Unit – Treehouse Camp.
- ### 3
- ☐ Change the program so the treehouse roof can open slowly.
 - ☐ Talk with your team about how this model could help a scientist in the rainforest.
 - ☐ Write your ideas below.



A scientist could use the treehouse to:

2

Tip

Some people travel to the rainforest to study animals and plants where they live.



The Explore story can be revisited to stimulate conversation or generate ideas.

Treehouse Camp

Share

Have the team:

- Share the motor-coding skills they learned.
- Share how people study biodiversity in the rainforest.

Your team needs:



Treehouse Camp

4 → Activity 2 Tasks

- ☐ Use the SPIKE Essential set to change the Treehouse Camp model so that it can blend into the rainforest.
- ☐ Place the model on the Explore Mat.

5 → Challenge

- ☐ Change the program so the model will open for 5 seconds and then close for 5 seconds.
- ☐ Make the program repeat two or three times.
- ☐ Share what you built and explain how you coded the model.

6

Check your program here:



Scientists must be patient and quiet to watch animals safely.

To learn more about motors, try the Arctic Ride lesson in the SPIKE app.

→ Guiding Questions

- How can you change the model so it can be hidden in the rainforest?
- Where could you observe the most animals on the mat?
- How did you include your team members' ideas?

→ Session Tips

- 4 Use the SPIKE Essential set to modify the model.
- 5 Try to keep the Explore Set separate from the other materials.
- 6 You could challenge the team to change the amount of time the model will stay open or closed.

→ Clean Up

- Everything built in this session should be taken apart and returned to storage
- Make sure to charge your LEGO® Education set for the next session.

Session 5

Outcomes

- The team will build the lift platform model and use the provided code.
- The team will talk about how people collaborate to study the rainforest.

→ Guiding Questions

- Can you describe what will happen to the lift if you use the provided code?
- How could a scientist use a lift to learn more about biodiversity in the rainforest?
- What other tools could be used to study the rainforest?

→ Session Tips

- 1 Tell the team to watch their model so that it does not fall off the table.
- 2 The team should take turns making changes to the program.
- 3 The team will use the Explore set and SPIKE Essential set for this activity.

Mid-season Checkpoint:

- ☐ The team has built the tree and lifting platform models.
- ☐ The team has developed building and coding skills after completing the SPIKE Essential lessons.
- ☐ The team can describe reasons people study biodiversity in the rainforest.

Introduction

Be innovative!

- Read the definition for *innovation* to the team from page 5.
- Talk about what innovation is. Have the team provide an example of this Core Value.

Tell the team they will use their device and the SPIKE™ app to code the lift platform model.



Your team needs: 3



→ Activity 1 Tasks

- 1
 - ☐ Use the building instructions in Book 2 and Bag 7 to build the lifting platform.
 - ☐ Add a scientist to the platform.
 - ☐ Open the SPIKE app on your team's device.
 - ☐ Try the program provided in the box below to activate the lift and raise the scientist.
- 2
 - ☐ Talk with your team about how this model could help a scientist in the rainforest.
 - ☐ Write your ideas below.



A scientist could use this model to:

Sample Code



Tip

Discoveries made by scientists can protect the rainforest and its animals.



The Engineering Design Process is on the back of the *Engineering Notebook*. Ask the children how they are using this process.

Science Helpers

Share

Have the team:

- Share how they applied coding skills in this session.
- Share how scientists collaborate and share their knowledge with each other.

Your team needs:



Science Helpers

4

→ Activity 2 Tasks

- ☐ Find or rebuild the tree model from Session 1.
- ☐ Change the lifting platform so that it can be used in the rainforest.

5

→ Challenge

- ☐ Place the tree model and lifting platform on the mat.
- ☐ Add two scientists to the platform.
- ☐ Decide with your team what the scientists want to research in the tree.
- ☐ Change the program for your lifting platform so it can raise and lower the scientists safely.
- ☐ Share what you built and explain how you coded the model.

6

Write your program here:

Tip

Scientists often work in teams to share their knowledge and skills.

→ Guiding Questions

- What are some other ways a lifting platform could be used in the rainforest?
- Why is it important for scientists to share their knowledge and skills with each other?
- How can you code the model to raise it to a different height?

→ Session Tips

- 4 If the tree model built in Session 1 was disassembled, ask the team to rebuild it before proceeding to the next task.
- 5 Use the Multimedia Resources to find example photos, websites, and other activities related to the sessions.
- 6 The team should practice positioning the lifting platform to reach different areas of the tree.

→ Clean Up

- Keep the tree and the lifting models assembled for use in later sessions.
- Make sure to charge your LEGO® Education set for the next session.

Session 6

Outcomes

- The team will build tools used by scientists to study animals in the rainforest.
- The team will add the sensor and hub to the research device model.

Introduction

Be inclusive!

- Read the definition for *inclusion* to the team from page 5.
- Talk about what inclusion is. Have the team provide examples of this Core Value.

The team will use their device and the SPIKE™ app in this session to modify their research device.

→ Guiding Questions

- What are some tools that are used to study the rainforest?
- How do scientists use the tools you talked about with your team?
- Which tools will you draw or describe in your *Engineering Notebook*?

→ Session Tips

- 1 Encourage the team to build tools using the prototyping pieces.
- 2 The team could test the tool with the animals they built in Session 2.
- 3 Ask the children to use words they have learned in previous sessions.

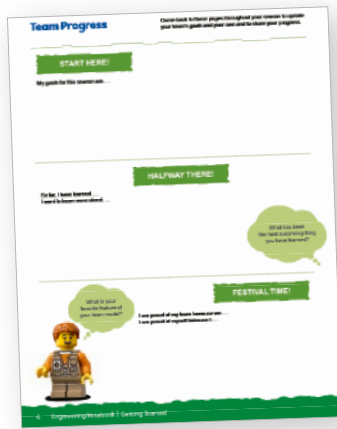
→ Activity 1 Tasks

- 1 ☐ Talk to your team about tools used to study the rainforest. What tools are needed for animal observation? What tools are used to document or study plants? Write your ideas below.
- 2 ☐ Select a tool to build with your team. Use the prototyping pieces in Bag 9-13 to create a tool used in the rainforest. Put the tool on the mat.

Your team needs:

Tools used to study animals in the rainforest are:

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Engineering Notebook | Sessions



Have the team revisit their goals page in their *Engineering Notebooks* to share what they've learned so far and reflect on their progress.

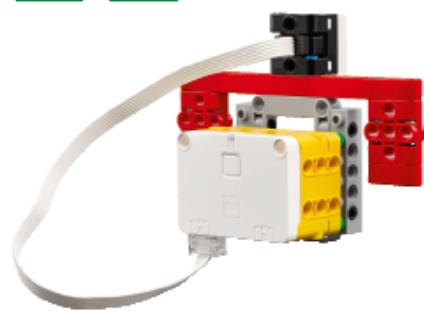
Research Tools

Share

Have the team:

- Talk about the tools and technology used to work in the rainforest.
- Share what they have learned about biodiversity so far.

Your team needs:



Research Tools

→ Activity 2 Tasks

- ☐ Use the building instructions in Book 2 and bag 8 to build the research device.
- ☐ Open the SPIKE app on your team's device.
- ☐ Try the program provided in the box below to activate the research device.
- ☐ Take turns moving the research device to different places on the mat. What does it do?

→ Challenge

- ☐ Change the program for the research device so it is activated by a different color. What does it do when used on the animals you built?
- ☐ Write your ideas below.

→ Guiding Questions

- Why do scientists use cameras to learn about nature?
- What other technology could you use in the rainforest?
- What are some jobs that study biodiversity in the rainforest?

→ Session Tips

- The team should try the code provided in the *Engineering Notebook*.
- Use the building instructions in Book 2 to attach the sensor and hub to the research device model.
- Teams will learn about more jobs in the next session. There are jobs listed on pages 5, 28 and 29 in the *Engineering Notebook*.

→ Clean Up

- Keep the research device assembled.
- Make sure to charge your LEGO® Education set for the next session.

Write your program here:

Sample Code



Scientists use notebooks, cameras, and listening tools to learn without hurting nature.

- Look at the jobs on pages 5, 28, and 29 to see what tools and technology are used to learn about the rainforest.

Session 7

Outcomes

- The team will learn about jobs that study biodiversity.
- The team will design a treehouse where scientists can conduct their work.

→ Guiding Questions

- What jobs support biodiversity in the rainforest?
- What are some animals that people like to study?
- What job studies wild animals in the rainforest?

→ Session Tips

- 1 The team could add on to the tree model from the Explore Set.
- 2 Use the Multimedia Resources to find example photos, websites, and other activities related to the sessions.
- 3 Use the prototyping pieces and other parts of the Explore Set to have the team build examples of different tools used for the jobs they discuss.

Mid-season Checkpoint:

- ☐ The team has practiced attaching the hub and attachments to the research device and explored ways to code it.
- ☐ The team has explored tools, technology, and jobs related to biodiversity.
- ☐ Register for a festival event and share details with families and caregivers.

Introduction

Model discovery!

- Have the team provide examples of how they have used discovery throughout the sessions.
- Have the team build something using the prototyping pieces representing this Core Value.

The team will use create a treehouse and add a scientist with tools.



Session 7

Your team needs:



2

→ Activity 1 Tasks

- ☐ Read about the jobs on page 5, 28 and 29.
- ☐ Design a treehouse where a wildlife biologist can safely watch animals. Choose an animal to study. What tools does the scientist need?
- ☐ Write or draw your ideas below.
- ☐ Use the prototyping pieces to build the treehouse your team designed.

My ideas:





Tip
A research station high up in a rainforest could help people study animals and plants that live in the treetops.

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Dream Treehouse

Share

Have the team:

- Talk about the jobs and technology used to study biodiversity.
- Share what they learned about the jobs in their *Engineering Notebook*.

Your team needs:



Dream Treehouse

4 → Activity 2 Tasks

- ☐ Talk about the tools you learned used to study animals.
- ☐ Record your ideas below.
- ☐ Use the prototyping pieces to build a tool or technology for the treehouse.

→ Challenge

- ☐ Add a plant scientist, or botanist, to the treehouse.
- ☐ Change the treehouse so that it has tools to study plants.
- ☐ Share what you built with your team.

6

Tip 5

Nature is always changing. Scientists study biodiversity to learn about those changes and help keep rainforests and other ecosystems healthy.



My ideas:



→ Guiding Questions

- What kind of skills are needed for these jobs?
- Pick two jobs. How are these jobs different?
- What else would you want to learn about biodiversity or the rainforest?

→ Session Tips

- 4 The team could rebuild tools they discussed in a previous session.
- 5 You could take a walk outside to look at plants and ask the team what tools they would need to learn more about them.
- 6 Use the SPIKE™ Essential set in Activity 2 and return the pieces to storage at the end of the session.

→ Clean Up

- Everything built in this session should be taken apart and returned to storage.
- Store the SPIKE Essential set and the Explore Set separately.

Session 8

Outcomes

- The team will draw their team model and label the different parts.
- The team will create a team model to share what they learned about biodiversity throughout the sessions.

→ Guiding Questions

- How will you plan your design for your team model?
- What do you think is the most important part of your team model and why?
- What part of your team model are you most proud of?

→ Session Tips

- 1 The team will need all parts of the Explore Set and the mat.
- 2 Each member could build part of the team model and work as a group to put them together on the mat.
- 3 The team model can be made only of LEGO® bricks, minifigures, baseplates, and other LEGO elements.

Create the team model over two meetings and allow the children to be creative.

Introduction

Model teamwork and fun!

- Have the team provide examples of how they have used teamwork and fun throughout the sessions.
- Have the team build something using the prototyping pieces representing these Core Values.

Tell the team they will build their team model and think about what they plan to share with the reviewers at the festival.

Session 8

Your team needs: 1

→ Activity 1 Tasks

- ☐ Talk to your team about what you have learned about biodiversity.
- ☐ Check the team model requirements on the next page.
- ☐ Draw your ideas for your team model below. Label the different parts.

→ Activity 2 Tasks

- ☐ Create your team model together on the Explore mat.
- ☐ Talk about the different parts of your model.

2

Tip

It's time to build your team model! Your team model will be presented to reviewers at the festival.

3 Draw and label your team model:



Team Model

Share

Have the team:

- Review the list of required parts and identify them on the team model.
- Demonstrate and explain their team model.

Team Model

Requirements

- ☐ Include all parts of the Explore Set and mat.

4

5

6

- ☐ Use only LEGO® elements.

- ☐ Use SPIKE Essential to motorize any part of your model.



Feature the following on your team model:

- ☐ A plant or animal that your team designed
- ☐ A job related to the rainforest
- ☐ A tool or piece of technology used to study biodiversity

→ Guiding Questions

- What are the strengths of your design?
- What part of the model will you code and motorize?
- What will you want to share with reviewers at the festival?

→ Session Tips

- 4 The team model should be able to fit on a table and be easy to move.
- 5 The team should apply the coding concepts learned throughout the sessions to activate their model.
- 6 The team can choose to motorize any part of their team model.

→ Clean Up

- The team model should stay assembled for the festival.
- Organize unused pieces of the SPIKE™ Essential set and Explore Set and return them to storage.

Session 9

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.
- The team will practice presenting their poster.

→ Guiding Questions

- What topics do you want to include on the team poster?
- What pictures could you draw or add to your poster?
- How can you show what you learned?

→ Session Tips

- 1 You will need to provide a large poster board and various art supplies. A trifold poster board works well.
- 2 The team should 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* for ideas.

Create the team poster over two meetings and allow the children to be creative.

Introduction

Model innovation and inclusion!

- Have the team provide examples of how they have used innovation and inclusion throughout the sessions.
- Have the team build something using the prototyping pieces representing these Core Values.

The team will create a team poster and think about what they plan to share with the reviewers at the festival.

Your team needs: 1

→ Activity 1 Tasks

- ☐ Talk to your team about what you will include on your team poster.
- ☐ Use the next page to write your ideas.

→ Activity 2 Tasks

- ☐ Decide how your team will create the poster and determine what supplies you will need.
- ☐ Gather your poster board and supplies.
- ☐ Create your team poster. The whole team should help create it.

2

3 Your team poster should describe your team's journey throughout the sessions.

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Team Poster

Share

Have the team:

- Share their team poster design and contents.
- Demonstrate how they will share their poster and model with the reviewers.

Team Poster

Include these items on your team poster:

- ☐ How you worked together as a team
- ☐ What you learned about biodiversity
- ☐ What you built as your team model
- ☐ Anything else you want to share!

4

5

6

In the next session, you will prepare for the Explore Festival. You should have your team model and team poster completed.



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→ Guiding Questions

- What do you want the reviewers to know about your poster?
- How will each person talk about the poster?

→ Session Tips

- 4 Sample topics for the poster are provided for the students. However, they can choose to include anything they feel is necessary.
- 5 Provide extra paper for the team to draw and write their ideas for their team poster.
- 6 Look ahead to Session 10 to see what the team should plan to share with reviewers.

→ Clean Up

- Find a safe place to store the poster.

Session 10

Outcomes

- The team will reflect on their BIOGLOW™ experience.
- The team will create a plan and practice what they will share at the festival.

→ Guiding Questions

- How has the team demonstrated Core Values?
- How will you present your poster and model at the festival?
- What else does the team need before the event?

→ Session Tips

- 1 Go over the reviewing sheet and explain the reviewing process with the team.
- 2 Ask the team the reviewing questions and practice the responses they would give.
- 3 A festival is a critical part of the FIRST® LEGO® League Explore experience. If you are unable to attend, plan a celebration of your own. Class Pack teachers can use the *Class Pack Guide* to plan their event.

Introduction

Model impact!

- Have the team provide examples of how they have had an impact throughout the sessions.
- Have the team build something using the prototyping pieces representing this Core Value.

The team should have a completed team model and team poster and should use this session to prepare what to share with reviewers.

1 → Activity Tasks

- ☐ Gather your completed team model and team poster.
- ☐ Talk about how your team will share what you learned with the reviewers.
- ☐ Complete the next page.

It's almost time for the FIRST LEGO League Explore Festival!

At the festival, reviewers will ask you about what you learned.

The reviewers will ask questions about your team model and your team poster.

The reviewers will tell you and your teammates what they liked and have some ideas about what you could do next.

3 Sample Festival Roles

I'm going to share what we explored.

I will describe the team model.

I will explain the program and how it motorizes the team model.

We will show how the poster captures our team journey!

I can reflect on how our team used Core Values.

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

Festival Preparation

FIRST® LEGO® League Explore events are called festivals.

The goal of an Explore festival is for the team to celebrate their hard work and share what they have learned with others. Here's a helpful checklist to help your team prepare.

- ☐ Determine what type of event you're attending and who is organizing it. If you purchased a Class Pack, organizing the festival event will be your responsibility. Check out the **Class Pack Guide** for more details.
- ☐ Review the time and location where you are meeting for the festival and how long teams are expected to stay – share this information with families. Encourage families and caregivers to attend if possible.
- ☐ Remind the team that the festival is a learning experience and the goal is to have fun! The festival will end in an **award ceremony** where each team is celebrated for their amazing achievements.
- ☐ Go over the **reviewing documents** with the team. Let them know the reviewers will ask questions about what the team has been working on and will be excited to hear about what they learned.
- ☐ Remind team members to fill out page 27 of the *Engineering Notebook* to plan what they will share at the festival event.
- ☐ Encourage the team to interact with other teams at the festival to share what they have learned and to support each other.
- ☐ Have the team prepare a **checklist of materials** needed for the festival. Teams will need to bring their team model, poster, and LEGO® Education set.



Reviewing Process

At the festival, teams present their team model and poster, sharing their design process and what they've learned about the season's theme. Volunteer reviewers engage with the teams by asking questions and offering positive feedback.

The **reviewing sheet** is used to provide supportive feedback to teams, ensuring that every team feels proud of their achievements while reinforcing the **FIRST® Core Values**. Reviewers also use this sheet to determine which awards each team will win.



Scan here for festival resources and to download the reviewing documents.

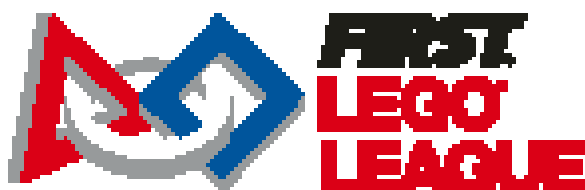
What's Next?

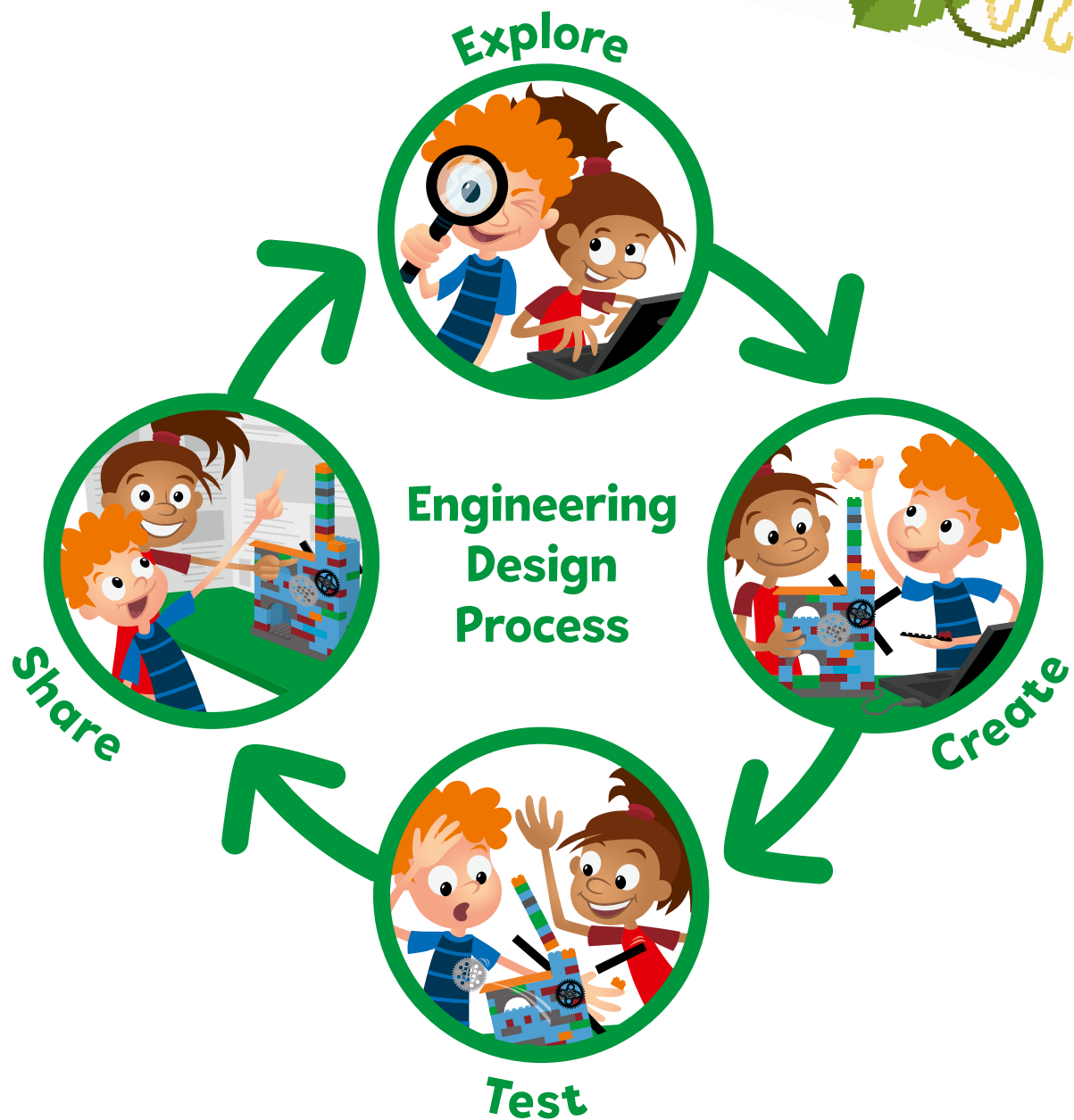
Are your events complete? Are you finished with your BIOGLOW™ season?

Here are some tips for wrapping up after the team's last event:

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

	Tree	Animals	Lift	Research Device	Prototyping Pieces
Book	1	2	2	2	-
Bag(s)	1-3	4-6	7	8	9-12
					





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