

**FIRST®
LEGO®
LEAGUE
CHALLENGE**

ENGINEERING NOTEBOOK

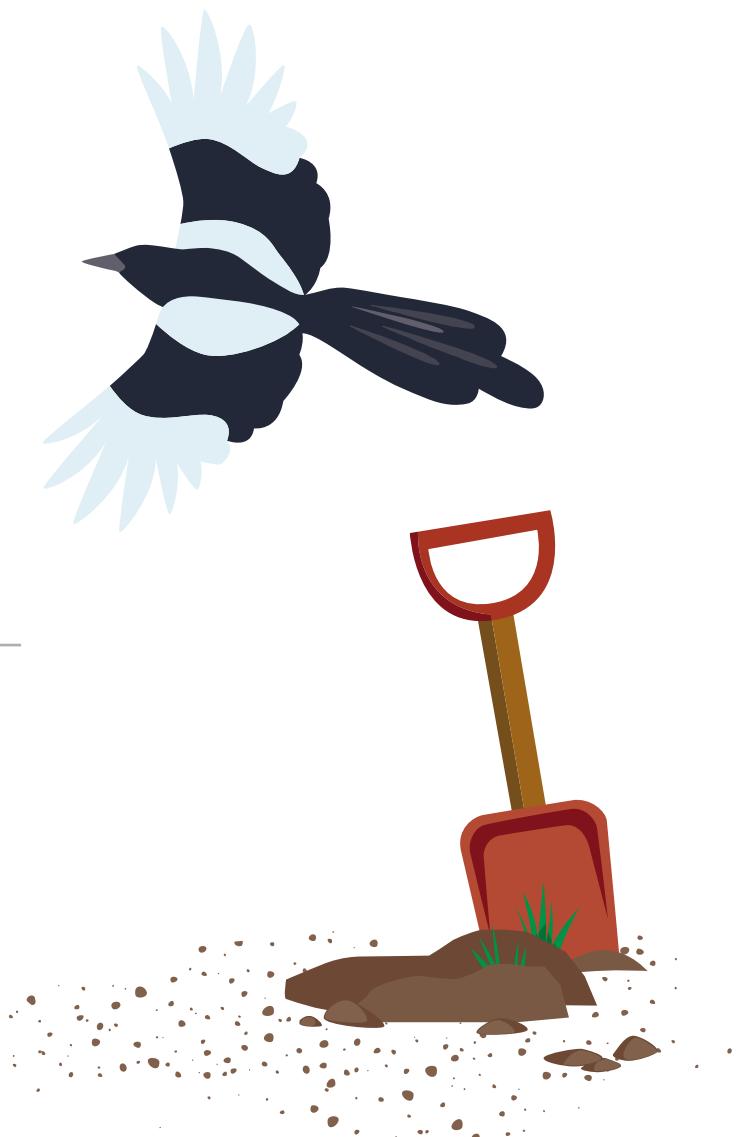


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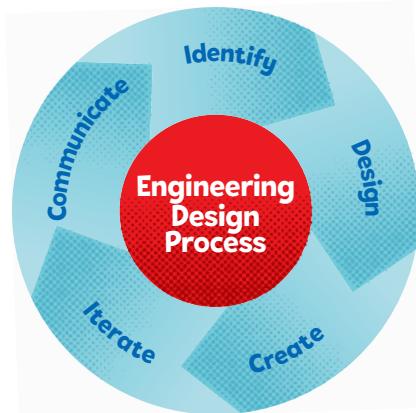
CHALLENGE DIVISION SPONSOR



Welcome!

Use the sessions in this *Engineering Notebook* as a guide for your team's journey through the *FIRST® AGE™* presented by Qualcomm season and *UNEARTHED™* challenge.

Use the *FIRST Core Values* and the **engineering design process** throughout your team journey. Have lots of fun as you develop new skills and work together! This notebook is a great resource to share at your judging event, but it isn't required to do. Check out careers related to the season theme at the end of this notebook.



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.



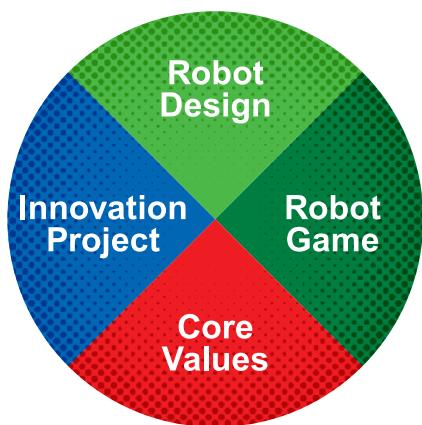
We enjoy and celebrate what we do!



We explore new skills and ideas.



We use creativity and persistence to solve problems.



Each of the four equally weighted parts of *FIRST® LEGO® League Challenge* accounts for 25% of your total performance at your event.

At the event, your team will present your robot design and innovation project work to the judges during the judging session, and your robot performance will be evaluated at the robot game. Core Values are evaluated in all parts of your work, and you will receive scores from the judges and referees for how you apply them.

We express our Core Values through *Gracious Professionalism®* and *Coopertition®*, and this will be evaluated during robot game matches.

Gracious Professionalism is a way of doing things that encourages high-quality work, emphasizes the value of others, and respects individuals and the community.

Coopertition shows that learning is more important than winning. Teams can help others even as they compete.

Robot Design and Robot Game

Get ready to dig deep into history as this year's UNEARTHED™ robot game takes you on an exciting archaeological adventure. Your team will explore a dig site, carefully excavating artifacts hidden beneath layers of rock and soil and uncovering clues that reveal stories of past civilizations.

As you journey farther into the dig, you'll encounter more challenging terrain, including fragile ruins and delicate artifacts that require precision to retrieve without damage. Along the way, you'll decode mysteries and help to share the stories they tell.

Prepare to *unearth* hidden treasures and piece together the past as you embark on this thrilling journey of discovery!

Design and create a robot that will complete missions in the robot game.

Build your mission models and identify your mission strategy.

Each mission and model connect to discoveries and tools found on an archaeological dig site. It's up to your team which missions you will attempt, and you can attempt them in any order. Remember that the models and missions can also serve as inspiration for your innovation project topic.

Design and create your autonomous robot and programs.

Create a plan for your robot design that is supported by your mission strategy. Build a robot and any attachments using LEGO® Education SPIKE™ Prime or any permitted LEGO Education-compatible set. Code your robot to complete a series of missions autonomously in a 2.5-minute robot game to score points.

Test and iterate on your robot solution to complete missions.

Iterate on your robot design and programs with continual testing and improvements. Be sure to record the changes you make along the way, including what works and what doesn't work. These notes will be helpful for your team as you progress through the season and for when you share your robot design with the judges.

Communicate your robot design process.

Use the rubrics to help you prepare a short presentation that clearly explains the process your team used to create your robot and programs and how they work. Include how each person on the team contributed and what skills they learned along the way.

Compete in robot game matches.

Whether practicing or competing, your robot starts in a launch area. Your team can attempt missions in any order and return the robot to either home location. Your team will play three matches, but only your highest score is used for awards.



Innovation Project

Archaeologists use the archaeological process to reconstruct and understand the artifacts they have unearthed. Whether they are excavating a site or studying materials in a laboratory, it takes people

working together with technology to find the clues needed to understand how past generations lived, learned, and celebrated.

In the UNEARTHED™ season, your team's challenge is to identify a problem faced by archaeologists and propose a solution that can help.

Start here . . .

Identify and research a problem faced by archaeologists.

Use the Project Sparks page to guide your selection of an archaeological problem.

Conduct research to explore the existing solutions to that problem. What has already been tried? What challenges remain? Try to use a variety of sources to support your work.

You may want to create something new, apply existing technology from another field of study, or improve on an existing solution; that's what innovation is all about.

Develop a plan to improve your ideas. It may be necessary to change or update parts of your solution as you learn more from testing your ideas or sharing them with others.



Think about . . .

Review the rubrics and the judging flowchart.

At the event, you will have a limited amount of time to share how you developed your solution, including what you learned in research and testing. The rubrics help your team understand what to focus on when presenting to the judges. They will be interested in the progress you and your team have made this season, even if the work is still underway.

Create a prototype model or drawing that represents your innovative solution to help explain it to others and to the judges. Keep in mind that whether your problem is big or small, the impact of your solution could be huge.

Before the event . . .

Prepare a live presentation to communicate your solution.

Think about how your team will summarize your work. The judges will ask questions when they want to know more and will provide the team with feedback. Your presentation should explain the problem you selected, the research you did, and how you developed your solution.

To help the judges understand your team's journey, highlight how you used Core Values to make progress and solve challenges along the way. Finish by sharing how your innovative solution would help archaeologists piece together the stories of the past.

Make sure your whole team is involved in sharing your progress. Check out our event preparation video found in the season resources to learn more about the judging session.

Project Sparks

Archaeological Process

Identify Site

During an excursion, the team discovers an ancient map leading them to believe more artifacts will be found nearby.

How will the archaeology team identify where additional artifacts are located?



Survey & Map

Members of the excavation team want to explore nearby caves and account for changes in the landscape that occurred over time.

How can the team use technology to create a modern-day map of the cave and full site?



Excavate

Once excavation begins, the team starts to find artifacts related to everyday life. Some are sturdy and large, like millstones used to process grains, and others are smaller, like coins and beads.

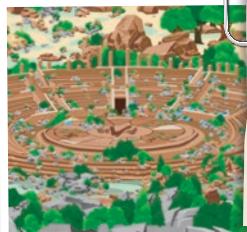
What tools can the team use to get these items out of the ground without damaging or losing any of them?



Reconstruct & Restore

The archaeologists have evidence that the people who once lived here were very connected to water and all it would provide. Parts of sculptures found near a forum depict animals from the water, but locating all the pieces and restoring them will be a significant challenge.

How can the team improve the restoration process?



Share & Publish

What solutions exist to solve the problems described in the field notes? Has your team encountered a different problem in the field of archaeology?

An artifact was discovered that has left everyone on the team wanting to know more, but not every mystery can be solved by one team on its own.

How can archaeologists work with teams in other careers to solve the mysteries together?



Challenge Story



Team Progress

Come back to this page throughout your season to update your team's goals and share your progress.

START HERE

My goals for this season are . . .

HALFWAY THERE

So far, I have learned . . .

I want to learn more about . . .

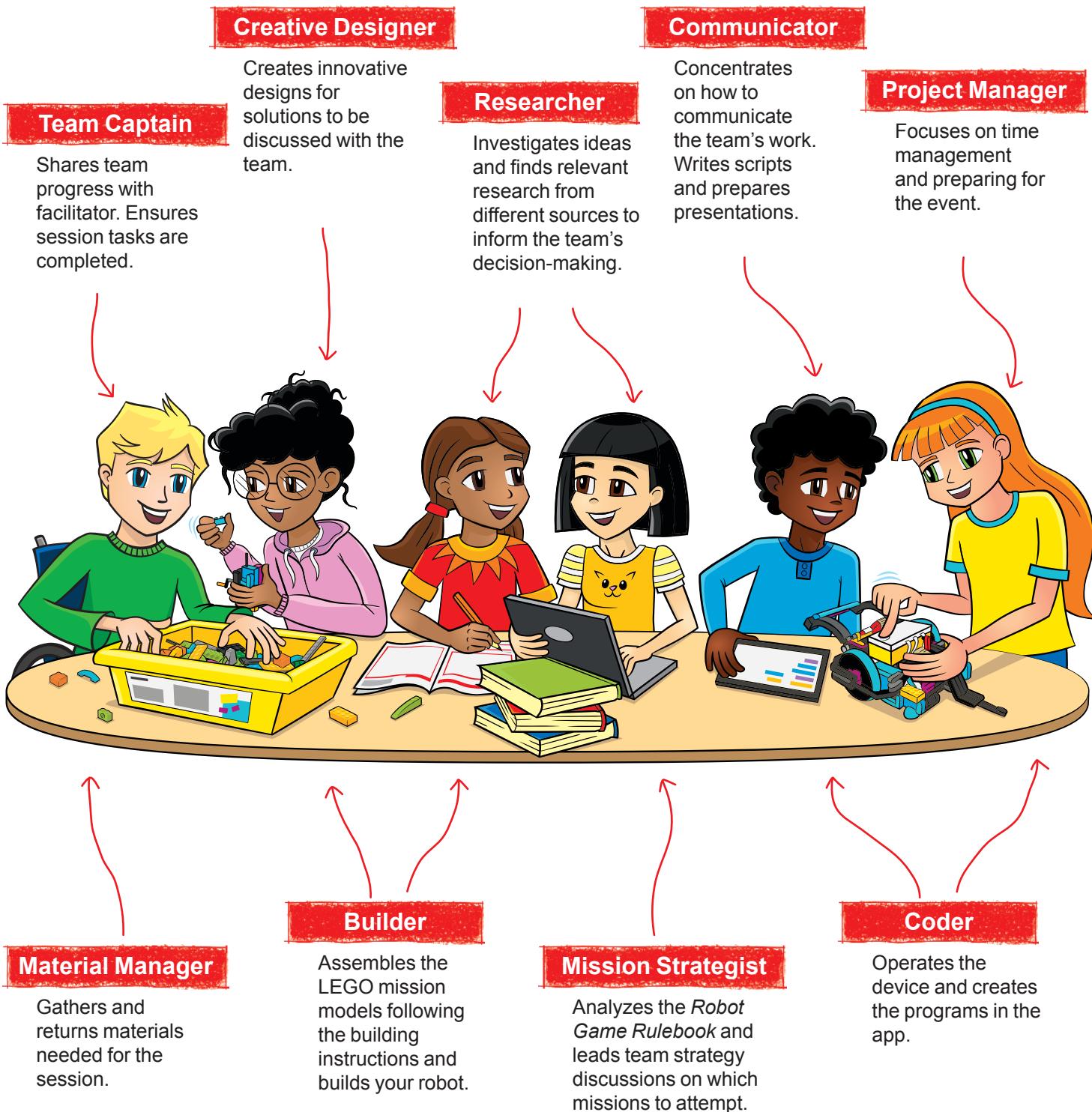
EVENT TIME

I am proud of my team because we . . .

Team Roles

Here are sample roles your team can use during the sessions. Everyone on the team should experience each role throughout their *FIRST® LEGO® League*

Challenge experience. The goal is to build your team to be confident and capable in all aspects of *FIRST LEGO League Challenge*.



→ Introduction

- Get to know your team members and select your team name.
- Watch the season videos and read pages 3-9 to learn how FIRST® LEGO® League Challenge works and about the UNEARTHED™ robot game and innovation project.

→ Tasks

- Learn more about the season theme by building the robot game mission models.
- Place each model where it belongs on the Challenge mat. Read page 7 of the *Robot Game Rulebook* to learn how to set up the table.
- Explore how the models work. Connect them to the Project Sparks on page 6.
- Use the space on this page to write notes about the mission models or to answer the reflection questions.

→ Share

- Discuss the reflection questions.
- Get together at the mat. Talk about how the mission models connect to the UNEARTHED theme.
- Clean up your space.

→ Reflection Questions

- What ideas does your team have after reading about the innovation project?
- How do the mission models relate to the Challenge story or Project Sparks?
- Which mission models look interesting to you?

Session 1

Record information about your team here.

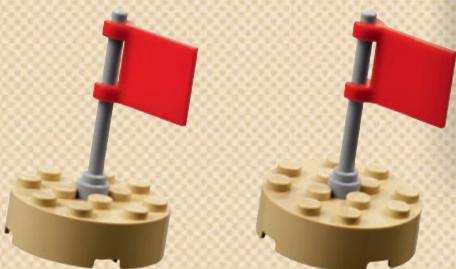
Our notes:

Tips

- Use the checkboxes to mark when you are finished with a task.
- During each meeting, record what you have learned and what you want to improve.



The *Robot Game Rulebook* is a great resource to use throughout the season.



Session 2

Discovery: We explore new skills and ideas.

Our notes:

Tips

Planning is important to keep your team and ideas organized.

Use these goal prompts for inspiration!

We will use Core Values to ...

We want to experience ...

We want our robot to ...

We want our innovation project to ...



→ Introduction

- Think about how you will use the Core Value of **discovery** in your team's journey.
- Record what your goals are and what you hope to learn on the Team Progress sheet on page 8.

→ Tasks

- Open the SPIKE™ app. Click the Start button.
- Find your lesson.



**Tutorial Activities:
1-6 (optional)**



**Competition Ready
Unit: Training
Camp 1: Driving Around**

- Use the skills you learned to navigate your robot to one of the mission models.
- Determine what **coding** and **building** skills you can apply in the robot game. Use the notes section to record your ideas.
- As you navigate around the mat, talk with your team about any innovation project ideas sparked by the mission models.

→ Share

- Discuss the reflection questions.
- Get together at the mat. Share the robot skills you learned in this session.
- Clean up your space.

→ Reflection Questions

- How can aiming your robot at a model help your team in the robot game?
- How did you use the **engineering design process** in this session?
- What Project Sparks interest your team? Does your team want to explore a different problem?

Session 3

→ Introduction

- Review the innovation project page and the Project Sparks.
- Share your ideas for the project with your team. Make sure everyone has a chance to share.

→ Tasks

- Record your team's problem statement.
- Open the SPIKE™ app. Find your lesson.



Competition Ready Unit: Training Camp 2: Playing with Objects

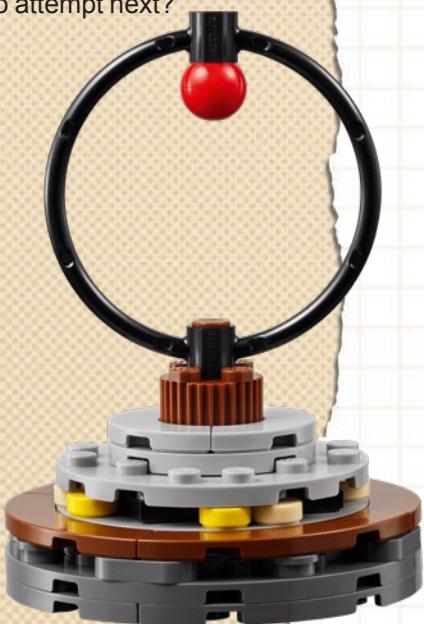
- Reflect on the skills you learned in this unit. Talk about how they will help you in the robot game.
- Try it out! See if you can code your robot to attempt a mission.

→ Share

- Discuss the reflection questions.
- Get together at the mat. Share the robot skills you learned in this session.
- Clean up your space.

→ Reflection Questions

- What additional research is necessary to select an idea for the project?
- What objects does your robot need to avoid in the robot game?
- What missions does your team want to attempt next?



Project Spark ideas:

Problem statement:

Tips

- A problem statement describes the problem that your team wants to solve.
- Consider why the problem exists, why it is important to fix, and who would be affected if the problem were solved.
- You can select one of the Project Sparks or your own idea for the innovation project.



Session 4

Innovation project problem ideas:

Our notes:

→ Introduction

- Work as a team to identify what kind of research is needed to learn about existing solutions.
- Determine how your team will use the information collected to create your innovation project solution.

→ Tasks

- Open the SPIKE™ app. Find your lesson.



Competition Ready
Unit: Training Camp 3:
Reacting to Lines

- Reflect on the skills you learned in this unit. Talk about how they will help you in the robot game.
- Try it out! See if you can use the skills you learned to attempt another mission.

→ Share

- Discuss the reflection questions.
- Get together at the mat. Share the robot skills you learned in this session.
- Clean up your space.

→ Reflection Questions

- How will your team record your research on your project problem?
- How did testing your program help make your robot more accurate?
- How could you use the lines on the mat in your **mission strategy**?

Tips

Recording your progress will help you build a strategy for the game. As you try to complete missions in the robot game, record what works and what your team wants to improve.



→ Introduction

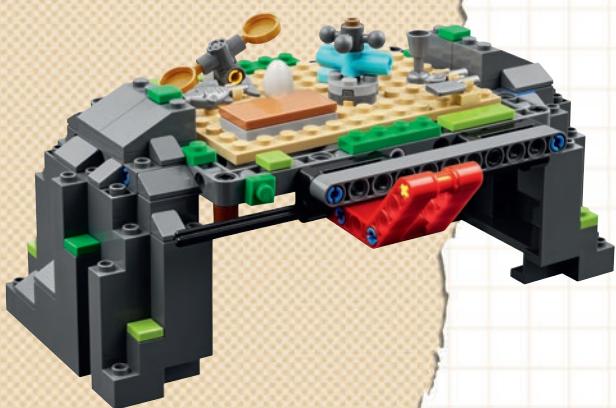
- Think about **teamwork** and your team. Talk about ways your team has been learning and working together.

→ Tasks

- Continue to research the problem you have chosen.
- Decide whether your team will propose a new solution or improve an existing one.
- Use this page to capture your research.
- Select a solution to develop with your team.

Tips

- Existing solutions could be adapted and combined with other ideas to create a unique solution to the team's problem.
- List what you learned and the resources you used to learn about the problem (for example, books, news articles, or interviews).



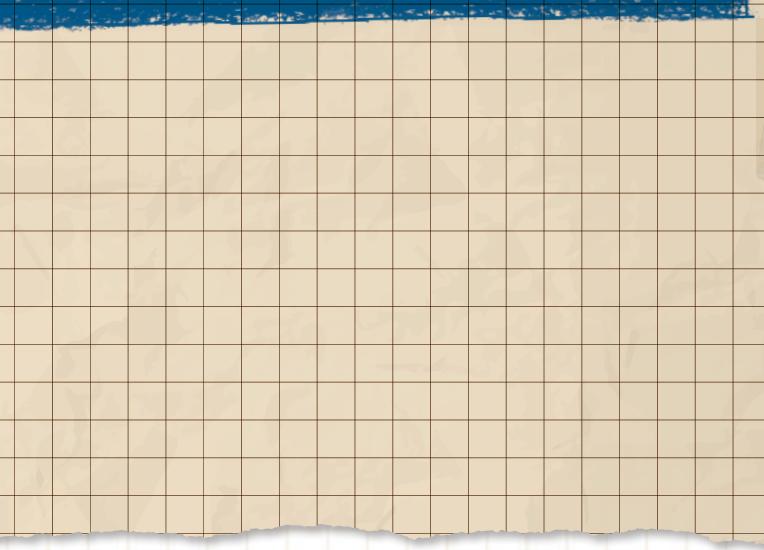
Session 5

Teamwork: We are stronger when we work together.

John

Research sources and details:

Solution ideas:



Guided mission notes:

→ Tasks

- Open the SPIKE™ app.
Find your lesson.



**Competition Ready
Unit: Guided Mission**



**Competition Ready Unit:
Assembling an Advanced
Driving Base (optional)**

- Have fun practicing the guided mission until it works consistently.
- Continue to practice completing other missions in the robot game.

→ Share

- Discuss the reflection questions.
- Get together at the mat. Share the robot skills you learned in this session.
- Clean up your space.

→ Reflection Questions

- Is there someone your team can talk to about the problem you selected? What questions would you ask them?
- How will your team work together to develop an innovative solution to the problem?
- What does the guided mission teach you about **Coopertition**®?
- How does the engineering design process help you create a strategy for solving missions in the robot game?

Tips

Coopertition means that teams help and cooperate with each other, even as they compete.

Session 6

→ Introduction

- Talk about what your team has learned so far and what you still want to explore.
- Complete the “Halfway There” section of the Team Progress sheet on page 8.

→ Tasks

- Make a plan for how you will develop a solution to your problem. Use the Innovation Project Planning sheet on page 29 as a tool.
- Use a variety of sources and keep track of them in this *Engineering Notebook*.
- Determine what materials might be needed to create a prototype of your solution.

Tips

- Use different types of sources, such as trustworthy websites, videos, books, or experts.
- Look at the innovation project rubric to learn what the judges will ask about your solution.



What does our team need to spend more time on?

Innovation project notes:

Robot game strategy notes:



→ Tasks

- Review the “Robot Game Missions” video and *Robot Game Rulebook*.
- Discuss which missions your team has attempted so far and which missions you want to try. Start to develop a **mission strategy**.
- Come up with a plan to test and improve your robot.
- Complete the Pseudocode sheet on page 28 for a selected mission.
- Upload your program ideas to your robot using the SPIKE™ app and see if they work.
- Continue to practice completing missions in the robot game.

→ Share

- Discuss the reflection questions.
- Get together at the mat. Share the robot skills you learned in this session.
- Clean up your space.

→ Reflection Questions

- How can documenting your progress with the innovation project help during your team’s judging session at the event?
- What are your innovative ideas to solve the problem?
- How can your robot’s attachments and program support your team’s mission strategy?
- How can you iterate and improve your robot design used in previous tasks?

Tips

- A mission strategy determines which missions to attempt and the order you will attempt them.
- Pseudocode is a written description of the steps for your planned robot program.
- Think about what attachments and sensors you will use during the game and if you will need to change them.

→ Introduction

- Think about **Gracious Professionalism®**. Talk about ways your team demonstrates this in everything you do.

→ Tasks

- Continue to develop your innovation project solution.
- Draw your solution and explain how it solves the problem.
- Create a prototype model or detailed drawing of your solution. The prototype does not need to be functional, but it should help explain your solution to others.
- Continue to document the process you use to develop your solution on the Innovation Project Planning sheet and throughout this *Engineering Notebook*.

Session 7

Gracious Professionalism:

We show high-quality work, emphasize the value of others, and respect individuals and the community.

Innovation project solution drawing and description:

Tips

- Gracious Professionalism is a way of doing high-quality work, valuing others, and respecting individuals and the community.
- Look over page 18 in the Robot Game Rulebook to see how Gracious Professionalism is scored during the robot game.
- Your model or drawing could be created with LEGO® bricks, art supplies, or in a digital program.

Robot design notes:

→ Tasks

- Continue to test and improve your robot and its attachments to complete missions in the robot game.
- Create a program for each new mission you attempt or combine mission solutions into one program.
- Revisit previous lessons to develop your coding skills or work on solving the missions.

→ Share

- Discuss the reflection questions.
- Get together at the mat. Share the robot skills you practiced in this session and the work completed on the innovation project.
- Clean up your space.

→ Reflection Questions

- Can you describe your solution in a way that is easy for others to understand?
- How can you improve your drawing or prototype so it represents your solution?
- Who can you share your solution with for feedback?
- How can you iterate and improve your robot design or your attachments?
- How are you using the engineering design process to develop your mission strategy?

Tips

- You can improve the robot used in the previous sessions or create a new design.
- Practice explaining how the program on your device is making your robot move.

→ Introduction

- Reflect on **Coopertition®**.
Talk about ways your team will demonstrate this when competing against other teams.

→ Tasks

- Share and collect feedback on your ideas.
- Decide what feedback to use to iterate on your solution.
- Determine if you can do any testing of your solution.

Tips

- Coopertition shows that learning is more important than winning.
- Seeking advice from others, including other teams, is a great way to learn and improve your skills.

Session 8

Coopertition: We show that learning is more important than winning. We help others even as we compete.

Project feedback:

Robot and attachment design notes:

You could ...

- Describe the attachments you built.
- Explain your different programs and what the robot will do.
- Explain your robot design while looking at the rubric criteria.

→ Tasks

- Choose another robot game mission to work on.
- Think about how each new mission fits into your mission strategy.
- Iterate and refine your program so your robot completes the mission reliably.
- Be sure to document your design process and testing for each mission!

→ Share

- Discuss the reflection questions.
- Get together at the mat. Share the robot skills you practiced in this session and the work completed on the innovation project.
- Clean up your space.

→ Reflection Questions

- How has your innovation project solution changed after sharing it with others?
- How will you know if your solution is going to make a positive impact on others?
- How has your team used Core Values to develop your robot and project solution?
- In what order will you run the missions in the robot game?

Tips

- It can take lots of practice to build the attachments you need to complete missions.
- Document the changes and improvements you make and share them with judges at the event.

Session 9

→ Introduction

- Think about **innovation** and your team. Talk about examples of how your team has been creative and solved problems.

→ Tasks

- Think about your robot mission strategy on the mat and the missions you will solve.
- Continue to create a solution for each mission as time allows.
- Iterate and improve your robot design and innovation project solutions. Be sure to document what happens in each step.

→ Share

- Discuss the reflection questions.
- Get together at the mat. Share the robot skills you practiced in this session and the work completed on the innovation project.
- Clean up your space.

→ Reflection Questions

- How will your team demonstrate Core Values at the event?
- How will your team explain what is innovative about your solution to the judges?
- What features on your robot show your building skills?
- What changes have you made to your innovation project and robot design based on feedback and testing?

Tips

Your team's Core Values are evaluated on the robot design and innovation project rubrics. Visit page 3 to see all Core Values listed.

Innovation: We use creativity and persistence to solve problems.

Iterations and improvements:

Session 10

Impact: We apply what we learn to improve our world.

Presentation outline:

→ Introduction

- Think about **impact** and your team. Talk about examples of how your team has had a positive influence on you and others.

→ Tasks

- Plan out your project presentation. Refer to the innovation project rubric for what to include in your presentation.
- Write out your innovation project presentation script.
- Create any props or displays that you need. Engaging your audience can help ensure they remember your key points.
- Continue to create, test, and iterate on your robot solution.
- Continue practicing 2.5-minute robot games with all the missions you have worked on.

→ Share

- Discuss the reflection questions.
- Get together at the mat. Share the robot skills you practiced in this session and the work completed on the innovation project.
- Clean up your space.

→ Reflection Questions

- How did your team decide which missions to attempt?
- What is your team most proud of in your work on the project and robot design?
- What skills have you developed throughout your FIRST® LEGO® League experience?

Tips

- Your team will have 5 minutes to present your project solution.
- Create an outline to make sure you are sharing what the judges need to hear. Look at the rubrics and the judging session flowchart for support.

Session 11

→ Introduction

- Think about **inclusion** and your team. Talk about examples of how your team makes sure everyone is respected and their voices are heard.
- Complete the “Event Time” section of the Team Progress sheet on page 8.

→ Tasks

- Continue working on your innovation project presentation.
- Plan and write out your robot design explanation. Refer to the robot design rubric for what to cover.
- Make sure to share how each member of the team contributed to the project and robot design.
- Practice your full explanation.

→ Share

- Discuss the reflection questions.
- Practice your project presentation and collect feedback.
- Clean up your space.

→ Reflection Questions

- What will you do if a mission does not work during a match?
- How are everyone’s contributions recognized in the presentation?
- How has FIRST® LEGO® League made a difference for you?

Tips

- It’s important to share the progress your team has made and the lessons you have learned during the judging session.
- Have fun with your project presentation.

Inclusion: We respect each other and embrace our differences.

Robot design explanation outline:

Session 12

Fun: We enjoy and celebrate what we do!

Presentation feedback:

→ Introduction

- Reflect on how your team has had **fun** while exploring the season theme. Talk about examples of how your team has had **fun** throughout this experience.
- Look at your team's goals listed on page 8. Did you achieve them?

→ Tasks

- Rehearse your full presentation communicating your innovation project and robot design work.
- Collect feedback on your presentation from your coach, a mentor, or another team.
- Practice multiple 2.5-minute robot game matches and calculate the points you score.
- Review page 26, Prepare for Your Event, and page 27, Rubrics & Scoresheets.

→ Share

- Discuss the reflection questions.
- Review the judging rubrics and robot game scoresheet.
- Practice presenting your project and robot design explanation.
- Clean up your space.

→ Reflection Questions

- What is your plan for having your team's robot attachments ready for the robot game?
- What has your team accomplished?

Tips

- Demonstrate your Core Values during the entire event.
- Plan to talk about your robot design and game strategy without the robot game field.
- You can continue solving missions and working on your innovation project before your event!

Prepare for Your Event

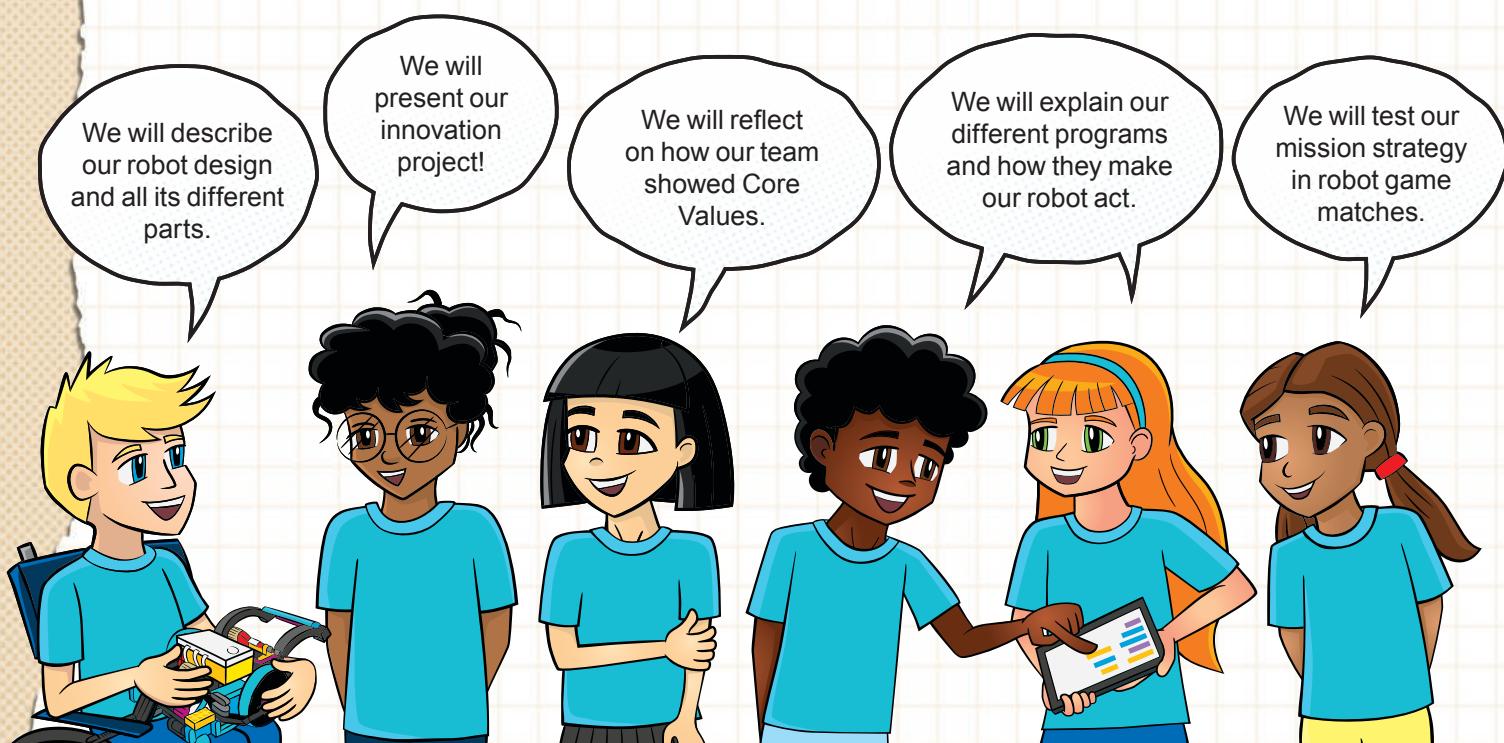
- Make a packing list.** You'll at least need your robot and attachments, device with your programs, chargers, project and judging materials (poster, model, or visuals), and any team notes.
- Practice and plan the day.** Review the event schedule and practice your innovation project and robot design presentations. Decide who will present each part during judging and confirm who will do what at the robot game.
- Think about your innovation project.** Can you describe the problem you chose and how it connects to the season theme? How did you share your solution and iterate based on feedback? What is innovative about your solution and how could it help others?
- Think about your robot design and mission strategy.** Which missions did your team attempt to solve and what resources helped you learn how to build and code your robot? How will you describe what each member of your team contributed and the improvements you made along the way?
- Reflect on the Core Values your team has used.** Think back on your season and be ready to share how your team worked together, overcame challenges, and what you learned from your journey.

Tips for a Great Event Day

- Stay organized by knowing your schedule and where you need to be. Arrive on time, keep track of your materials, and be ready for your judging session and robot game matches.
- Support your teammates and communicate clearly. Encourage each other, solve problems together, and remember that teamwork is one of your biggest strengths.
- Be flexible and stay positive. Not everything may go as planned, but how you respond to challenges shows your *Gracious Professionalism*®.
- Most importantly, have fun and celebrate your hard work! Take pride in what you've accomplished this season and enjoy the experience of sharing it with others.



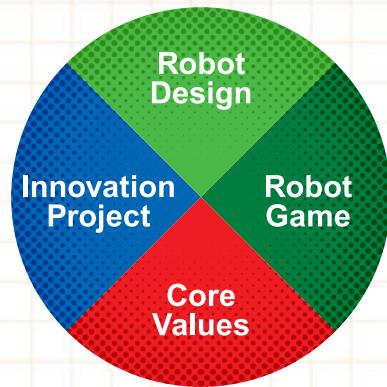
Watch this video to prepare for your event.



Rubrics & Scoresheets

FIRST® LEGO® League is evaluated equally in four areas: Core Values, Innovation Project, Robot Design, and Robot Game. Judges will use rubrics and referees will use scoresheets to assess your work and provide feedback.

The rubrics outline what judges are looking for during your session, and the flowchart shows the order you should present your work. It is your team's job to explain everything to the judges during the session. Judges may ask questions to learn more and will give feedback at the end of the session.



Judging Session Feedback

Instructions
This sheet will be used to record written feedback following the Innovation Project presentation and demonstration. Please use the following questions to guide your feedback. You can also add your own questions and include them in the notes section at the end of the sheet.

Great job! Think about...

Core Values: How did the team demonstrate teamwork, discovery, inclusion, innovation, impact, and fun in their work?

Innovation Project: How can the team identify and expand learning outcomes connected to the season theme?

Robot Design: How did the team approach solving robot game missions using building and coding?

If there is a candidate for one of these areas, please list the appropriate box. Check with your team members to make sure they agree.

Breakthrough Award - A team that makes significant progress on their confirmation and visibility in a new area.
 Moving the World - A team that pushes the limits and explores great things from the outside.
 Meltawts - A team that embodies the culture of FIRST LEGO League through their building, spirit, and attitude.

Innovation Project

Instructions
Team should communicate to the judges their achievement in each of the following criteria. This sheet will be used to record written feedback following the Innovation Project presentation and demonstration. You can also add your own questions and include them in the notes section at the end of the sheet.

BRILLIANT **DEVELOPING** **ACCOMPLISHED** **EXCELLED**

IDENTIFY: Team has clearly defined problem that they want to solve.

Clearest definition of problem
 Partial definition of problem
 Clear definition of problem
 Best definition of problem

DESIGN: Team worked together while creating a project plan or developing their idea.

Clearest explanation of all steps
 Partial explanation of all steps
 Clearest explanation of all steps
 Best explanation of all steps

CREATE: Team invested an original idea or a design or a strategy with a problem statement to implement their solution.

Clearest explanation of how it will work
 Partial explanation of how it will work
 Clearest explanation of how it will work
 Best explanation of how it will work

ITERATE: Team shared their idea with others, collected feedback, and included improvements in their solution.

Clearest sharing of their idea
 Partial sharing of their idea
 Clearest sharing of their idea
 Best sharing of their idea

COMMUNICATE: Team shared an effective communication of their solutions, its impact on others, and celebrated their team's progress.

Clearest communication of their solutions
 Partial communication of their solutions
 Clearest communication of their solutions
 Best communication of their solutions

Robot Design

Instructions
Team should communicate to the judges their achievement in each of the following criteria. This sheet will be used to record written feedback following the Robot Design presentation and demonstration. You can also add your own questions and include them in the notes section at the end of the sheet.

BRILLIANT **DEVELOPING** **ACCOMPLISHED** **EXCELLED**

IDENTIFY: Team determined which mission is the easiest, simplest, building and coding mission, and why it was the best.

Clearest mission of what is easiest
 Partial mission of what is easiest
 Clearest mission of what is easiest
 Best mission of what is easiest

DESIGN: Team invested time and effort into the design and development of their robot model.

Clearest explanation of what is being built and how it will work
 Partial explanation of what is being built and how it will work
 Clearest explanation of what is being built and how it will work
 Best explanation of what is being built and how it will work

CREATE: Team invested original design in their robot and how it is according to their design strategy.

Clearest explanation of what is being built and how it will work
 Partial explanation of what is being built and how it will work
 Clearest explanation of what is being built and how it will work
 Best explanation of what is being built and how it will work

ITERATE: Team invested time and effort into the design and development of their robot model.

Clearest explanation of what is being built and how it will work
 Partial explanation of what is being built and how it will work
 Clearest explanation of what is being built and how it will work
 Best explanation of what is being built and how it will work

PERFORM: Team invested time and effort into the design and development of their robot model.

Clearest explanation of what is being built and how it will work
 Partial explanation of what is being built and how it will work
 Clearest explanation of what is being built and how it will work
 Best explanation of what is being built and how it will work

COMMUNICATE: Team effectively communicated the results of their robot design process to their audience.

Clearest communication of their robot design process
 Partial communication of their robot design process
 Clearest communication of their robot design process
 Best communication of their robot design process

Class Pack Rubric

Instructions
Judges are required to tick one box or mark separate line to indicate the level the team has achieved.

DISCOVERY **INNOVATION** **IMPACT** **INCLUSION** **TEAMWORK** **GRACIOUS PROFESSIONALISM**

Robot Design

IDENTIFY Team clearly defined problem that they want to solve.

DESIGN Team invested time and effort into the design and development of their robot model.

CREATE Team invested original design in their robot and how it is according to their design strategy.

ITERATE Team invested time and effort into the design and development of their robot model.

COMMUNICATE Team effectively communicated the results of their robot design process to their audience.

Core Values

DISCOVERY Team explored new interests.

INNOVATION Team invested time and effort into their innovation.

IMPACT Team invested time and effort into improving their world.

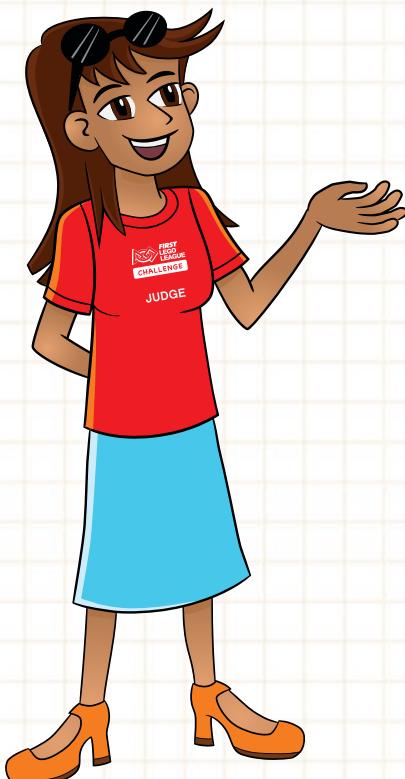
INCLUSION Team demonstrated respect and understanding their differences.

TEAMWORK Team showed that their team and their community were important to their success.

GRACIOUS PROFESSIONALISM Team showed that their team had strong character traits.

Judging Rubrics

Class Pack Rubric



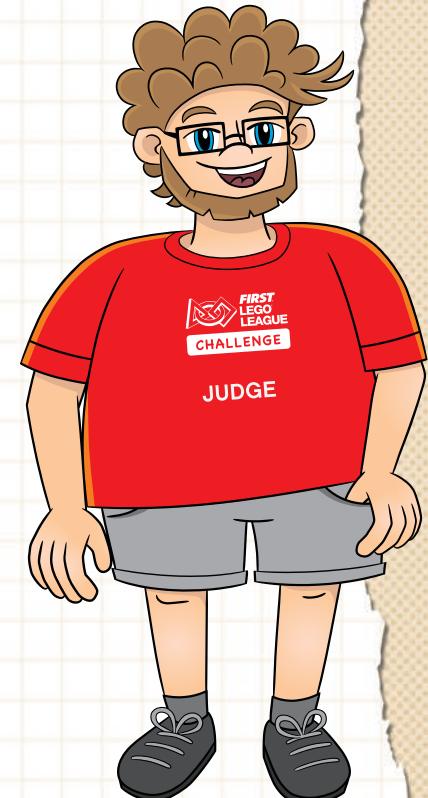
During the robot game, referees will use scoresheets to record your results. You'll have multiple matches to try your mission strategy, and only your highest score will count.

Core Values are evaluated both in judging and during the robot game. In the judging session, your team will share how you applied Core Values throughout your season. During the robot game, referees will observe how your team demonstrates *Gracious Professionalism*®.

Make sure you review the rubrics and scoresheets before your event. Understanding how you are evaluated will help your team compete confidently.



Judging and Scoring Materials



Pseudocode

Mission Name:

Mission Number:

CODING STEPS

Write out the moves the robot should make to complete the mission.

Move 1

Move 6

Move 2

Move 7

Move 3

Move 8

Move 4

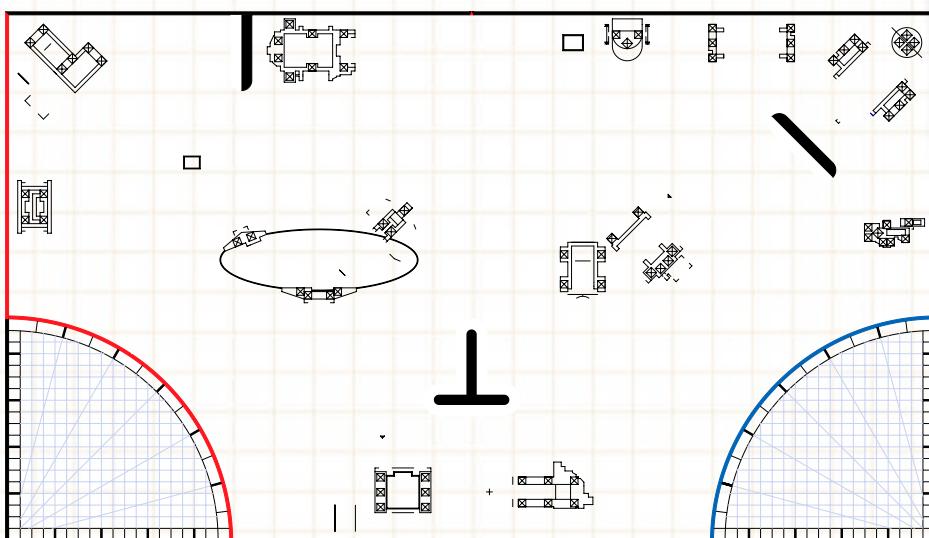
Move 9

Move 5

Move 10

ROBOT PATH DIAGRAM

Draw the route your robot will take to complete the mission.



Go to the app and start a new project. Explore which coding blocks will move your robot the same way as your planned coding steps would move it.

Complete this page in Session 6.

Innovation Project Planning

PROCESS

Describe the process you followed to develop your innovative solution.

SOURCES

Write down where you got your information, and include details such as the title, author, or website.

1.

2.

3.

Complete this page in Session 6.

Robot Design Notes

Careers and Technology

Career
Resources



Archaeologist

Archaeologists are storytellers of the past. Archaeologists do lots of different jobs to help people learn about the past. They may do research, excavate or dig up treasures from underground, study in a lab, or manage collections of ancient artifacts.



Lab Technician

Lab technicians help organize the items that archaeologists find. They carefully clean and measure the objects, and sometimes they put broken pieces back together like a puzzle. Microscopes, cameras, and 3D printers are some of the equipment that may be used in the lab.



Anthropologist

Anthropologists are interested in how people lived in the past. They work closely with archaeologists to study human history and how people have changed over time. They study human-made artifacts and use clues from the site to interpret how the objects were used long ago.



Site Manager

The site manager makes sure everything runs smoothly at the dig site. They help keep the people and supplies organized so the team can work efficiently. If something exciting happens, the site manager might be the first person called.



Conservator

A conservator is an expert in fixing and protecting artifacts so they can be studied for a long time. When artifacts are found by archaeologists, they might be dirty, damaged, or in multiple pieces. Conservators may have to work quickly because some artifacts will fall apart if they are not treated carefully.



Geologist

Geologists help at dig sites because they are experts in rocks and soil. They can use technology to figure out how old the rocks are to help understand how the site has changed over time.



Team Journey



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