



# *FIRST* LEGO LEAGUE CHALLENGE

## Engineering Notebook Worksheets



**TEAM NAME:**

**TEAM NUMBER:**

**Updated: August 2022**

# Mission Evaluation

Name: \_\_\_\_\_

## Instructions:

1. Read the rules and then fill in the information in the chart.
2. Use the information to create a Strategy for your team (Page 6)
3. Activation Method: How is the mission activated? Push/Pull/Lift/Lower/Deliver?
4. Other factors: Are missions in the same location? Require no attachment?



Mission	Location on field	Navigation Easy/Hard	Mission Activation Method	Other Factors to Consider	Points
M01 Innovation Project Model					
M02					
M03					
M04					
M05					

# Mission Evaluation

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Mission	Location from Launch Near/Far	Navigation Easy/Hard	Activation Method	Other Factors	Points
M06					
M07					
M08					
M09					
M10					

# Mission Evaluation

Name:

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Mission	Location from Launch Near/Far	Navigation Easy/Hard	Activation Method	Other Factors	Points
M11					
M12					
M13					
M14					
M15					

# Mission Evaluation

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Mission	Location from Launch Near/Far	Navigation Easy/Hard	Activation Method	Other Factors	Points
M16					
M17					



**Update on August 2, 2022**

**Instructions:**

1. Trace the path that the robot will take each time it leaves launch (use a new color for each path)
2. Compare your strategy with others on your team and reach a consensus

Image Credit: FIRST LEGO League Challenge

## Instructions:

1. Trace the path that the robot will take each time it leaves launch (use a new color for each path)
2. Compare your strategy with others on your team and reach a consensus



Image Credit: FIRST LEGO League Challenge

## Instructions:

1. Review the rules for the robot game. Are there any rules that will restrict your design? Is there a size limit?
2. Think about all the missions your team decided to do. Will it need to go over something or reach high up?
3. Think about the paths your team decided to go on. Will it need to line follow? Where will it align?
4. Discuss with the rest of your team and then build a base robot to match the features you want and need.

**What features should the robot have?**

**What sensors do we need?**

**What are some mechanisms that can solve the mission?**



# Robot Testing

Name: \_\_\_\_\_

## Instructions:

1. If you design more than one robot, use this chart to compare them. At the top of each column, describe your robot
2. Come up with some basic tests to compare the robot designs. Can this robot move straight accurately? Can it turn consistently? Can it line follow? Can it detect a line? Did the robot move as intended?
3. Discuss which robot performed the best to help you pick the best design for your team.

	<b>Robot 1:</b> Wheels: Size: Sensors: Motors:	<b>Robot 2:</b> Wheels: Size: Sensors: Motors:	<b>Robot 3:</b> Wheels: Size: Sensors: Motors:
Move Straight 50cm			
<b>Overall: Speed Balance</b>			

## Instructions:

1. Time to plan. For each path your team picked to go on, write out the pseudocode for the robot. Once the robot launches, how will it travel to the mission model and activate it? E.g. Move forward 30cm, turn 90 degrees left, etc
2. Write down each step the robot would take in plain English. Later, programmers can convert this into code
3. Add as many rows as needed

Setup	Location of robot in launch:
Step	Instruction
1	
2	
3	
4	
5	
6	
7	
8	

## Pseudocode

Name:

Step

Instruction

## Reliability

**Name:**

## Instructions:

1. Run each mission 10 times and see how reliable it was
2. Work on your solution until it becomes more reliable
3. Use FLLTutorial's Scorer to score your runs

[illegible]

## Attachment Evolution

Name:

Date:

Mission Name:

### Describe Attachment Features

### Image

### What changes were made and why?

## Attachment Testing

**Name:**

**Date:**

**Mission Name:**

**Attachment Tested**

	Test 1	Test 2	Test 3
What worked well?			
What did not work?			
Next steps: What will you change or modify?			

1. Write a script for your robot design presentation
2. Remember to discuss all aspects of the rubric
3. Remember to show your robot, explain your code and refer to documentation to demonstrate your iterative design process

BEGINNING 1	DEVELOPING 2	ACCOMPLISHED 3	EXCEEDS 4	
			How has the team exceeded?	
<b>IDENTIFY</b> – Team had a clearly defined mission strategy and explored building and coding skills they needed.				
<input type="checkbox"/> Unclear mission strategy	<input type="checkbox"/> Partially clear mission strategy	<input type="checkbox"/> Clear mission strategy	<input type="checkbox"/>	
<input type="checkbox"/> Limited evidence of building and coding skills in all team members	<input type="checkbox"/> Inconsistent evidence of building and coding skills in all team members	<input type="checkbox"/> Consistent evidence of building and coding skills in all team members	<input type="checkbox"/>	
<b>DESIGN</b> – Team produced innovative designs and a clear workplan, seeking guidance as needed.				
<input type="checkbox"/> Minimal evidence of an effective plan	<input type="checkbox"/> Partial evidence of an effective plan	<input type="checkbox"/> Clear evidence of an effective plan	<input type="checkbox"/>	
<input type="checkbox"/> Minimal explanation of robot and code's innovative features	<input type="checkbox"/> Partial explanation of robot and code's innovative features	<input type="checkbox"/> Clear explanation of robot and code's innovative features	<input type="checkbox"/>	
<b>CREATE</b> – Team developed an effective robot and code solution matching their mission strategy.				
<input type="checkbox"/> Limited explanation of their robot and its attachment and sensor functionality	<input type="checkbox"/> Simple explanation of their robot and its attachment and sensor functionality	<input type="checkbox"/> Detailed explanation of their robot and its attachment and sensor functionality	<input type="checkbox"/>	
<input type="checkbox"/> Unclear explanation of how code makes their robot act	<input type="checkbox"/> Partially clear explanation of how code makes their robot act	<input type="checkbox"/> Clear explanation of how code makes their robot act	<input type="checkbox"/>	
<b>ITERATE</b> – Team repeatedly tested their robot and code to identify areas for improvement and incorporated the findings into their current solution.				
<input type="checkbox"/> Minimal evidence of testing their robot and code	<input type="checkbox"/> Partial evidence of testing their robot and code	<input type="checkbox"/> Clear evidence of testing their robot and code	<input type="checkbox"/>	
<input type="checkbox"/> Minimal evidence their robot and code was improved	<input type="checkbox"/> Partial evidence their robot and code was improved	<input type="checkbox"/> Clear evidence their robot and code was improved	<input type="checkbox"/>	
<b>COMMUNICATE</b> – Team's explanation of the robot design process was effective and showed how all team members have been involved.				
<input type="checkbox"/> Unclear explanation of robot design process	<input type="checkbox"/> Partially clear explanation of robot design process	<input type="checkbox"/> Clear explanation of robot design process	<input type="checkbox"/>	
<input type="checkbox"/> Minimal evidence that all team members were involved	<input type="checkbox"/> Partial evidence that all team members were involved	<input type="checkbox"/> Clear evidence that all team members were involved	<input type="checkbox"/>	



## Sample Questions

**Name:**

**How did your team divide the work?**

**Did everyone learn to build and program?**

**How did you test your robot? Did you make any changes to it?**

Look at the rubrics. Think about how you will address each area.

**IDENTIFY:** Explain what your team's strategy is and how you came up with your team's strategy?

**DESIGN:** What are the key features of your robot and code? What makes it innovative and reliable?

**ITERATE:** How did you come up with that design? How did you test and modify your code and robot?