

FIRST LEGO LEAGUE CHALLENGE

Engineering Notebook Worksheets



TEAM NAME: TEAM NUMBER:

Updated: August 2022

As you complete the Mission Strategy charts on the next few pages, you will need to know where each mission is and how you score points for completing the mission. The diagram below shows you the location of each mission so that you can consider if and how they may be grouped together.



Image Credit: FIRST LEGO League Challenge

- 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 Oil Platform					
M03 Energy Storage					
M04 Solar Farm					
M05 Smart Grid					

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Strategy Planning

Name:

Trace the path that the robot will take each time it leaves launch (use a new color for each path) ч. Ч Instructions:

Compare your strategy with others on your team and reach a consensus



Image Credit: FIRST LEGO League Challenge





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Strategy Planning

Name:





Image Credit: FIRST LEGO League Challenge

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- 1. Review the rules for the robot game. Are these 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?	

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- 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.

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

- 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

- 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

	⊺est 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8	Test 9	Test 10	Total
Ex. M00	Yes	No	No	Yes	No	No	Yes	No	No	Yes	4/10
Points											12

Attachment Evolution Na	ame:
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?			

Robot Presentation

Name:

- 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

Make sure you communicate all aspects of the rubric. Be as specific as possible, give examples and show evidence.

BEGINNING 1	DEVELOPING 2	ACCOMPLISHED 3	EXCEEDS 4					
			How has the team exceeded?					
IDENTIFY – Team had a clearly d	IDENTIFY – Team had a clearly defined mission strategy and explored building and coding skills they needed.							
Unclear mission strategy	Partially clear mission strategy	Clear mission strategy						
Limited evidence of building and coding skills in all team members	Inconsistent evidence of building and coding skills in all team members	Consistent evidence of building and coding skills in all team members						
DESIGN – Team produced innova	tive designs and a clear workplan, see	king guidance as needed.						
Minimal evidence of an effective plan	Partial evidence of an effective plan	Clear evidence of an effective plan						
Minimal explanation of robot and code's innovative features	Partial explanation of robot and code's innovative features	Clear explanation of robot and code's innovative features						
CREATE – Team developed an ef	fective robot and code solution matchin	ng their mission strategy.						
Limited explanation of their robot and its attachment and sensor functionality	Simple explanation of their robot and its attachment and sensor functionality	Detailed explanation of their robot and its attachment and sensor functionality						
Unclear explanation of how code makes their robot act	Partially clear explanation of how code makes their robot act	Clear explanation of how code makes their robot act						
ITERATE – Team repeatedly teste	ed their robot and code to identify areas	s for improvement and incorporated the	e findings into their current solution.					
Minimal evidence of testing their robot and code	Partial evidence of testing their robot and code	Clear evidence of testing their robot and code						
Minimal evidence their robot and code was improved	Partial evidence their robot and code was improved	Clear evidence their robot and code was improved						
COMMUNICATE – Team's expla	anation of the robot design process wa	s effective and showed how all team m	nembers have been involved.					
Unclear explanation of robot design process	Partially clear explanation of robot design process	Clear explanation of robot design process						
Minimal evidence that all team members were involved	Partial evidence that all team members were involved	Clear evidence that all team members were involved						

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 an 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?	