FIRST LEGO LEAGUE CHALLENGE

Engineering Notebook Worksheets

TEAM NAME:
TEAM NUMBER:

Updated: August 2021

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 Unused Capacity					
M03 Unload Cargo Plane					
M04 Transportation Journey					
M05 Switch Engine					

Mission Evaluation	Name:

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Mission	Location from Launch Near/Far	Navigation Easy/Hard	Activation Method	Other Factors	Points
M06 Accident Avoidance					
M07 Unload Cargo Ship					
M08 Air Drop					
M09 Train Tracks					
M10 Sorting Center					

Mission Evaluation	Name:

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Mission	Location from Launch Near/Far	Navigation Easy/Hard	Activation Method	Other Factors	Points
M11 Home Delivery					
M12 Large Delivery					
M13 Platooning Trucks					
M14 Bridge					
M15 Load Cargo					

Mission Evaluation	Name:

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4. Other factors: Are missions in the same location? Require no attachment?

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

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

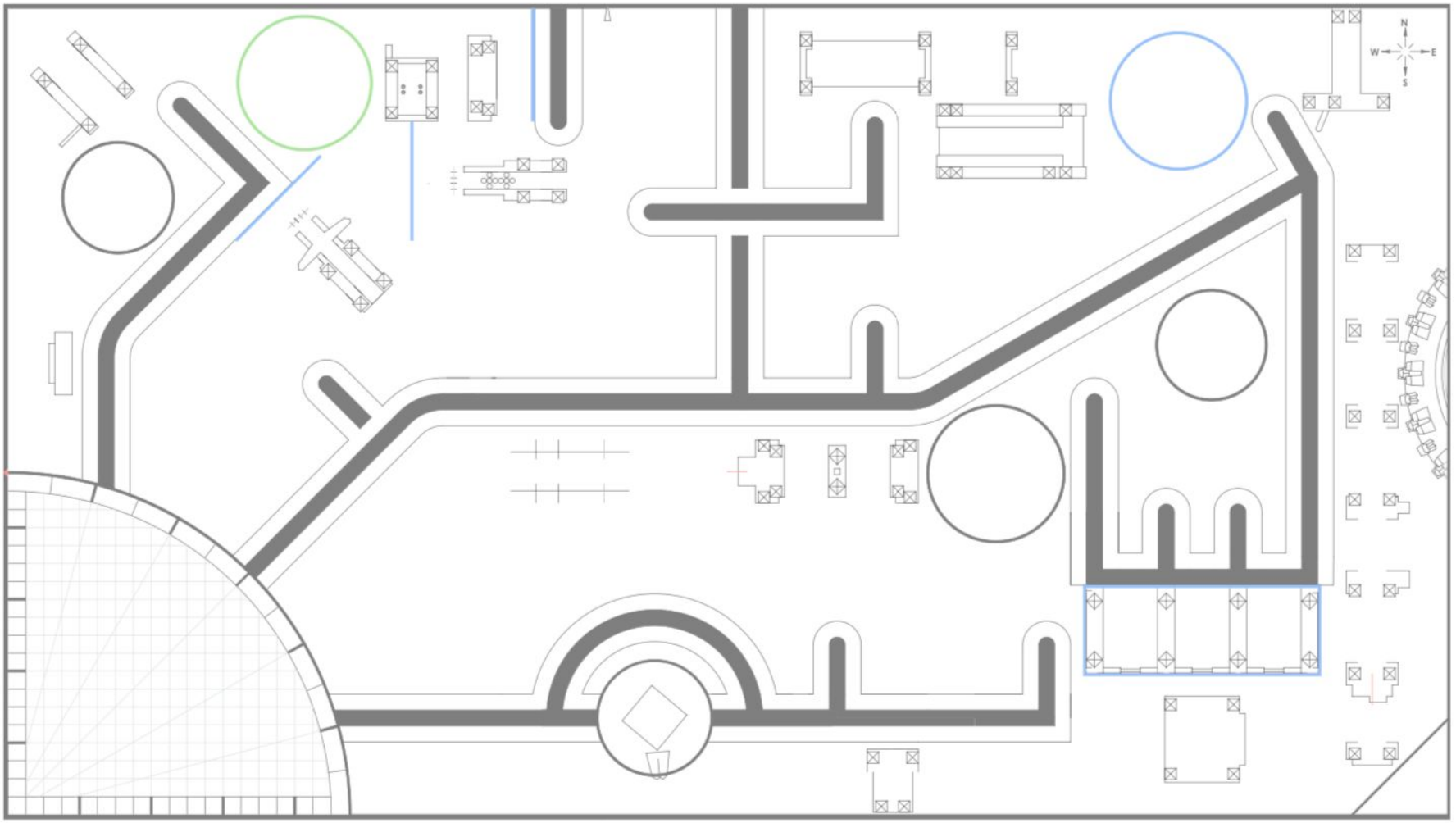

Image Credit: FIRST LEGO League Challenge

Strategy Planning

Name:

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

CARGO CONNECT

Strategy Planning

Name:

Robot Design	Name:

Instructions:

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?

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.

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

Pseudocode	Name:

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

	Test 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											

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?			

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**

Sample Questions	Name:

BEGINNING 1	DEVELOPING 2	ACCOMPLISHED 3	EXCEEDS 4	
			How has the team exceeded?	
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 innovative designs and a clear workplan, seeking 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 effective robot and code solution matching 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 tested their robot and code to identify areas for improvement and incorporated the 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 explanation of the robot design process was effective and showed how all team members 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	☐	

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?

Judging Preparation	Name:

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?