

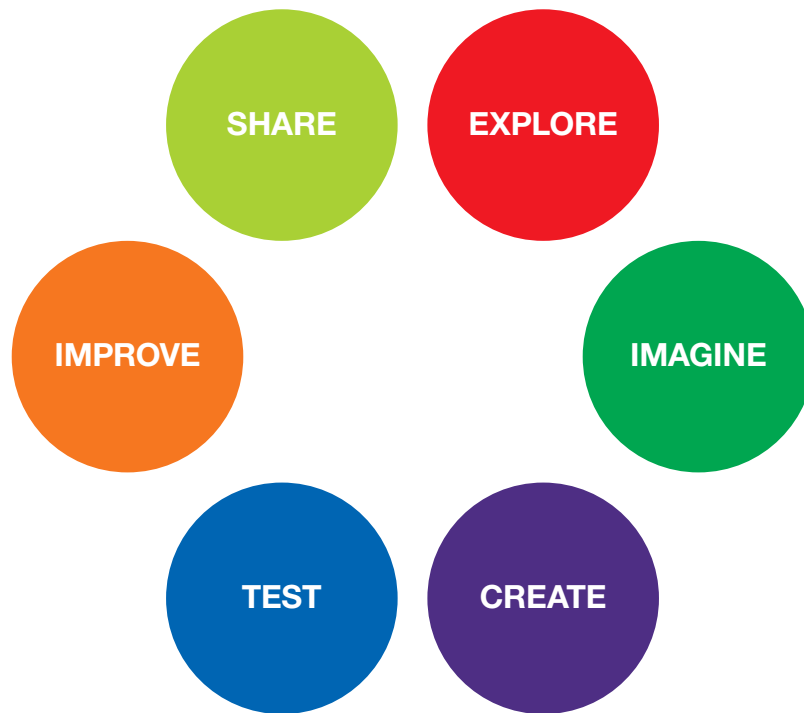
**FIRST
LEGO
LEAGUE**

Engineering Notebook



Engineering Design Process

This optional tool will help you track your work through the season.



EXPLORE

Identify the problem. Research if this problem has been approached before and how? What are the constraints, or limitations, to this problem?

IMAGINE

What are some possible solutions? Plan and draw it out. Brainstorm these solutions and choose what you believe to be the best one.

CREATE

List all the materials and equipment you may need and then bring your plan to life.

TEST

Test out your plan! Define what worked and what did not. Identify any new or remaining issues.

IMPROVE

Brainstorm what might work better and modify your design to include these changes. Test it out.

SHARE

Share your work with others.

Brainstorming

Name: _____

Date: _____



EXPLORE

Identify a specific problem you want to solve.

After you have selected a problem, find out about any solutions that people are already using to try to fix it. What are the constraints to this problem?

Think about the following questions as you create your plan:

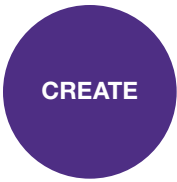
1. Why does this problem still exist?
2. Why aren't the current solutions good enough?
3. What could be improved?



IMAGINE

Using your list from above, brainstorm and design a solution to your problem. Any solution is a good start. Your ultimate goal is to design an innovative solution by improving something that already exists, using something that exists in a new way, or inventing something totally new.

Describe what you need, how it might work and draw it.



CREATE

Time to bring your FIRST® LEGO® League Project plan to life.
Before you begin, list any materials you may need in the space below.

List of Materials



TEST

Now it is time to test your Project!
While you are testing your creation, keep in mind any additional problems you encounter. There will always be room for additional improvements.
Using the space below, describe what worked and what didn't.

What Worked?

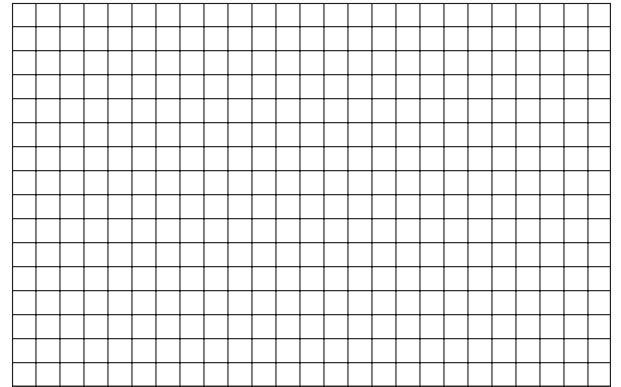
What Didn't?



IMPROVE

Using your list from above, brainstorm and design a solution to your problem. Any solution is a good start. Your ultimate goal is to design an innovative solution by improving something that already exists, using something that exists in a new way, or inventing something totally new.

Describe how it might work, and draw it.



SHARE

Share your work with others.

With whom did you share your work?

Engineers and many others use an engineering design process repeatedly to improve the quality of their creation(s).
Remember: There is always room for improvement.

Mission Planning

Name: _____

Date: _____


EXPLORE
EXPLORE

Take some time to explore the Robot Game Rules and Missions. Analyze the field.

Begin by identifying a specific Mission(s) you want to solve.

What are some obstacles you may encounter?

Think about the following questions as you create your plan:

1. Which Missions are located near each other on the table?
2. Which Missions have similar mechanisms?
3. Which Missions could be grouped together for maximum points?

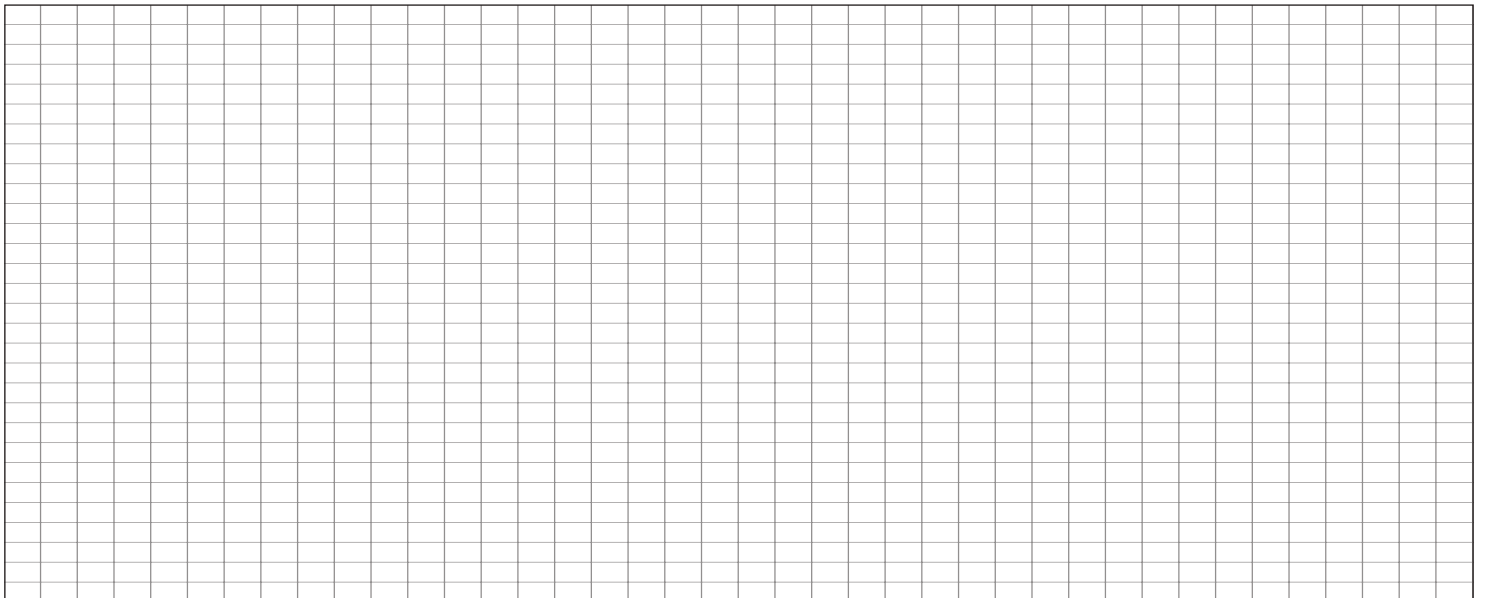

IMAGINE
IMAGINE

Using your list from above, begin to map out your path.

Brainstorm and design a possible a solution to a Mission or Missions and consider how you might program the Robot to accomplish your idea. Any solution is a good start.

Describe how it might work, and draw it.

Using a pencil, draw the path you think your robot should take to complete each Mission on the grid below. Make sure to label each step in detail below.



IMAGINE continued

Using the map you created on the previous page, describe what attachments you might use, and how you might program the Robot to achieve this desired plan



CREATE

Time to bring your FIRST® LEGO® League Robot to life.

List any parts you may need in the space below.

Motor(s)

Sensor(s)

Other Bricks/Elements

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TEST

Now it is time to test your Robot.

While you are testing your creation, keep in mind any additional problems you encounter.

There will always be room for additional improvements.

Using the space below, define what worked and what didn't.

What Worked?

What Didn't?

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IMPROVE

Using the list you created on the previous page, it's time to start improving your Project.

Brainstorm and design a solution to the problems you encountered. Begin listing and drawing how you might modify your design to include these changes.

Once you feel your list is complete, implement these changes and test it.

Describe how it might work, and draw it.

Horizontal lines for writing a description.

Grid for drawing.



SHARE

Share your work with others.

With whom did you share your work?

Horizontal lines for writing the name of the person(s) shared with.

Engineers and many others use an engineering design process repeatedly to improve the quality of their creation(s).

Remember: There is always room for improvement.

Continue Your Work

Use this space to use the engineering design process to continue working on your Robot design and program or you Project solution.

Name: _____

Date: _____



ASK

Identify Problem and Research

Constraints



IMAGINE

Brainstorm Possible Solutions

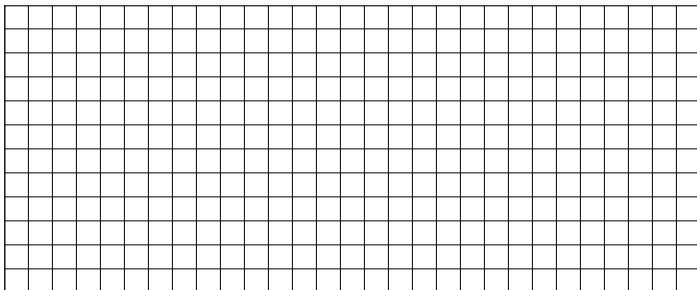
Choose what you believe to be the best one.



PLAN

Materials and Equipment

Draw it.



TEST

Bring your plan to life and test it.



SHARE

Share your work with others.

With whom did you share your work?



IMPROVE

What Worked/Didn't?

Possible Solutions or Refinements

Brainstorm and Plan It

Draw it

Bring your plan to life and test it out!



SHARE

Share your work with others.

With whom did you share your work?

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Remember: *There is always room for improvement.*



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