

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

Makerspace Block: \_\_\_\_\_

## One Board Chair Challenge



We will be following the Engineering Design Process (EDP) while we are working on this project. With the EDP you will; identify the problem to be solved, research the problem, develop a series of possible solutions, determine the best solution, build the prototype, test the prototype, communicate the results, and, if time permits, redesign the prototype.

### Step #1 - Identify the Problem:

*To design a robust, semi-portable, and aesthetically pleasing sitting device (i.e. chair, stool, bench, etc...) using only one 1" thick x 6" wide x 8' long pine board (all measurements are only approximate).*

Your design may incorporate other elements and materials other than the pine board such as screws, nails, wood glue, and textiles, but you may not use any additional lumber other than the provided board.

You will need to model the final design prior to being given the green light to build the prototype. You will want to focus on the following parameters while you design your sitting device (these are in order from most important to least important).

1. Safety and Proper Use of Makerspace Tools (make sure you pick a design that can be accomplished with what we have in the Makerspace classroom)
2. Structural Integrity
3. Aesthetics of design
4. Portability
5. Finished quality of final work

**The primary focus with this project is to demonstrate your understanding of and ability to use the woodworking tools in the Makerspace shop in a safe and efficient manner.**

### Step #2 - Research the Problem:

After we have identified the exact problem we will need to look into what others have already done to solve the problem. Research will be the primary starting point for you to develop a functioning prototype. I suggest you search “simple wood chair designs”, “one board chair designs”, “easy wooden stool design”, and so on. You will come up with a ton of possible solutions, but this is only a guide for you to apply your own thoughts and ideas. I want you to come up with **at least** five (5) possible solutions. Use the space provided below to identify these possible solutions.

Web Address	Chair / Stool / Sitting Device Description	Notes on the design

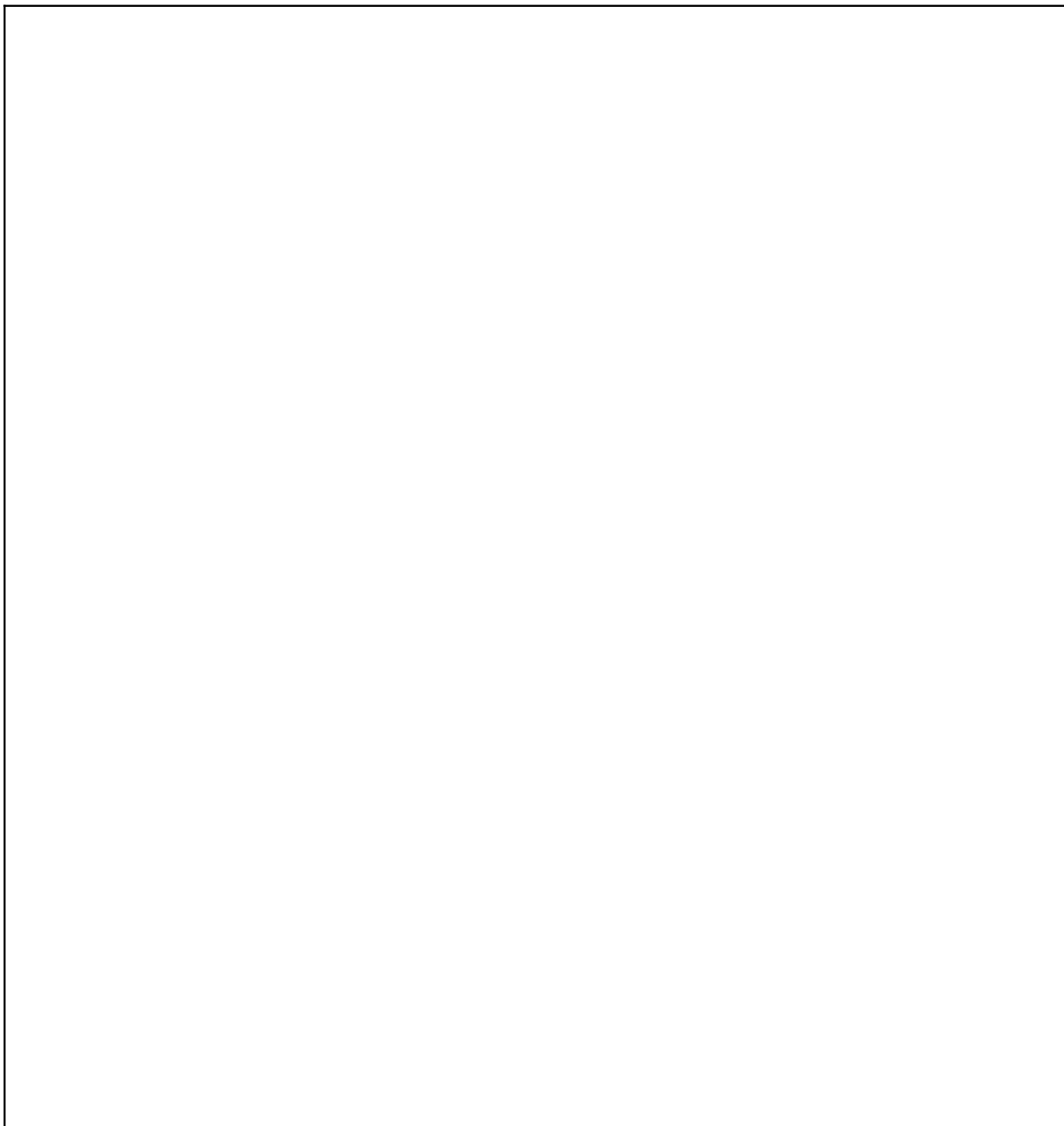
Of all of the solutions you found to solve this problem, which solution(s) do you think is/are the best. Please explain in the space below:

### Step #3 - Develop Possible Solutions:

Now that you have completed the necessary research, at least enough for the moment, you will need to start determining the best solution(s) for your prototype. Let's get a rough idea of what your sitting device is going to look like based upon the research you have completed. Complete the table below with details on your initial design ideas. Be as specific as possible with your specifications in the suggested design area. Explain *why* you chose those specifications in the justification for design space.

<b>Design Parameter</b>	<b>Suggested Design</b>	<b>Justification for Design</b>
Overall Shape of the chair / sitting device		
Rough Dimensions of the chair / sitting device		
Anticipated joinery methods for the chair / sitting device		

**Rough Sketches:** Use the space below to upload a picture of the rough sketches you completed during the research process of your sitting device. These can be rough sketches and literally a page of your ideas.



### Choose Best Solution:

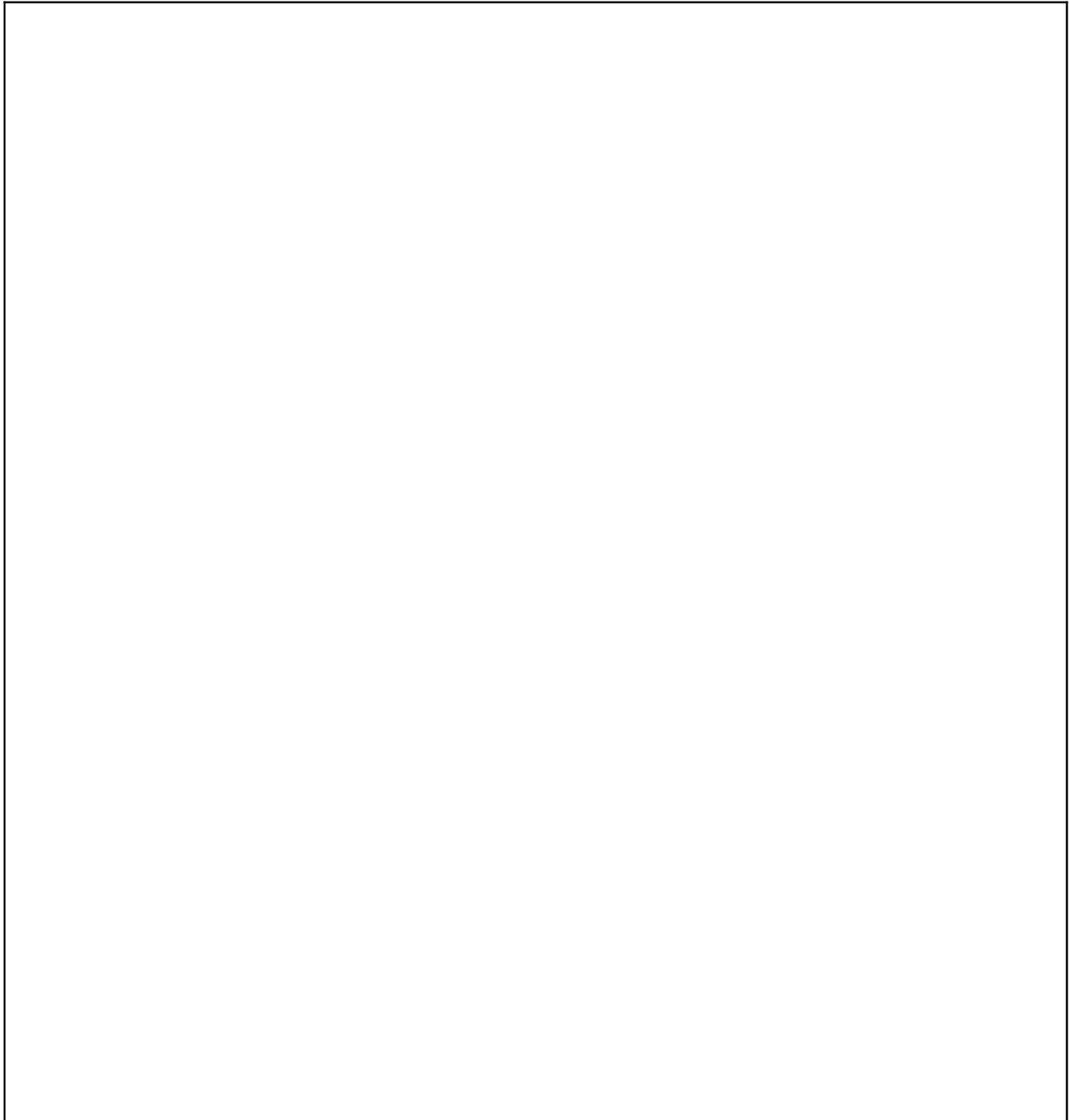
Now that you have had some time to develop your ideas of what your chair / sitting device is going to look like you can narrow it down to a more specific prototype design. The final prototype should be built with these parameters in mind (these are in order from most important to least important).

1. Safety and Proper Use of Makerspace Tools (make sure you pick a design that can be accomplished with what we have in the Makerspace classroom)
2. Structural Integrity
3. Aesthetics of design
4. Portability
5. Finished quality of final work

Use the space below to explain the specific aspects of your final chair / sitting device design:

Design Aspect	Details on Design Aspect
How many parts will your chair be made of? Please list the name of each part and how many of each you will have.	
What joinery methods are you using to put your piece of furniture together?	
What will be the height of your chair's seat? How will you make it comfortable for the person sitting in it?	
How will you ensure that you are able to cut all parts from the board that has been provided to you? Are you making templates? Models?	

**Final Sketches:** Use the space below to upload a picture of the sketch of what your chair will look like. Include three (3) views (top, front, side) to give us the best idea of what your final prototype will look like. You are also encouraged to include an isometric (3D) view of your design (but only if you feel up to the challenge). You should label your sketch with any pertinent details / information and you should include the final dimensions.



**You will need to get full approval before you move on to the next phase of this project (building your chair / sitting device). Please present your finished design to Mr. Stark. This means you should have this packet completed up to this point along with a complete set of final drawings.**

Name: \_\_\_\_\_ Block: \_\_\_\_\_ One Board Chair Challenge

Grading Parameter		Excellent / Complete		Good / Mostly Complete		Fair / Partially Complete	M
Properly completed EDP / Design	20	All components including sketches complete	X	N/A	X	N/A	0
Safety and Proper Use of Makerspace Tools	20	Student exhibited safety and proper use of tools throughout the entire project	17	Student exhibited safety and proper use of tools throughout most of the project. Needed reminders / refreshers	14	Student needed multiple reminders on proper safety and use of tools in shop	0
Structural Integrity	15	Final build had complete structural integrity and was able to safely support Mr. Stark's weight	12	Final build had good structural integrity overall and only showed some weakness. Was able to support Mr. Stark's weight.	11	Final build is not structurally sound to the necessary degree. Will not / would not support Mr. Stark's weight.	0
Aesthetics of design	15	Final build is attractive and is unique and very appealing to the eye. Demonstrates student thought and effort.	12	Final build is overall attractive and demonstrates student thought and effort overall.	11	Final build is functional but is not particularly attractive in appearance.	0
Portability	15	Final build can easily be moved around the room and could even be moved easily to other rooms or new locations.	12	Final build is mostly portable and clearly shows some thought in overall portability.	11	Final build is not particularly portable or easily transported.	0
Finished quality of final work	20	The final work is of a high quality all around and demonstrates a high level of student effort and ability.	17	The final work is of a good overall quality and demonstrates a good amount of student effort and ability.	14	Final build doesn't show as much as effort as expected given the overall time allowed to work on the project.	0
Documented Building Process	20	Student provided excellent details and images of the entire building process.	17	Student provided good details and images of the entire building process.	14	Student provided fair details and images of the entire building process.	0

Final Score: \_\_\_\_\_ / 125

### **Prototype:**

Congratulations! Your client (teacher) has given you approval to move on to the prototyping phase of this project. This means that you have supplied your client with sufficient information and a set of quality drawings.

Use your notes and final drawings to build your prototype. You can only use the provided 1x6x8' pine board to build the main structure of your chair / sitting device but you can use additional components provided in the classroom such as screws, wood glue, additional fasteners, and textiles. You can use any of the tools you have learned how to operate in the Makerspace classroom along with additional tools that I can teach you to use on an individual basis (i.e. jigsaw, circular saw, orbital sander, coping saw, etc...).

As you build your project you should document the entire process using your phone / computer to take photos. Additionally, you should take notes on the building process in the space provided below:

Notes on Building Process: