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Traditional Craft Heritage Training , Design & Marketing in Jordan and Syria  
(HANDS)

**Project Number: 610238-EPP-1-2019-1-JO-EPPKA2-CBHE-JP**

## Building Constructions (2)

Course Offered by: ZUJ, UJ, HU, JUST, MU, ABU, TU

module2

### Responsible partner(s):

Training and Technical Group (TTG)

Scientific and Supervising Committee (SC)

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## CONTENTS

- COURSE DESCRIPTION
- STUDY PLAN
- REQUIRED PROJECTS WITH DETAILED DESCRIPTION  
(SAMPLES OF STUDENTS' WORK DURING PREVIOUS YEARS)
- STUDENT'S PROJECT

## **COURSE LEARNING OUTCOMES:**

### **BASED ON NAAB STUDENT PERFORMANCE CRITERIA:**

**B.7 Building Envelope Systems and Assemblies: Understanding of the basic principles involved in the appropriate selection and application of building envelope systems relative to fundamental performance, aesthetics, moisture transfer, durability, and energy and material resources.**

**B.8 Building Materials and Assemblies: Understanding of the basic principles used in the appropriate selection of interior and exterior construction materials, finishes, products, components, and assemblies based on their inherent performance, including environmental impact and reuse.**



## COURSE DESCRIPTION

A continuation of the building constructions courses focuses on various types of finishing materials and its construction methods.

This course is divided into two parts: **theoretical and practical**.

## LEARNING OUTCOMES FOR THIS CLASS:

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*Technical:*



- The theoretical part focuses on the basic information which is related to the major finishes of the following building components: floors, roofs, walls and partitions, doors and windows, stairs and lifts, and building services including the kitchens and bathrooms.

*Aesthetic:*



- The practical part deals with the relevant construction details of the finishing of the studied building components.

## INTRODUCTION

### What is the importance of shop drawings for the architect?

#### 7 tasks for shop drawings

Shop drawings represent the main factor for what is implemented on the ground and nothing is implemented except through studied engineering drawings so as not to make errors and have detailed information for all parts of the project to be implemented, so its importance can be summarized in some points:

1. Organization and arrangement of work.
- 2- Determine the materials supplied to the site.
3. Make any amendments to the project.
4. Inventory.
5. Determine the tasks of each individual.
- 6- Documentation of the terms of the contract.
- 7- Sometimes help in real estate marketing

## INTRODUCTION

- The difference between design plans and actionable plans?

Design Plans: **what to do diagrams**

that is, it explains the content of the work scope of work while giving basic information about the workshop drawings: they are how to do

that is, they are diagrams that explain all the fully detailed details of the work as well as all the fully dimensioned required to carry out the work .

## INTRODUCTION

- **The difference between Shop Drawings and As-built Drawings?**

First: The Shop Drawing is executive plans, meaning that they are before implementation because it is expected that we will face problems that hinder the implementation process that we cannot solve by structural panels only, so we resort to Shop Drawing, which includes all dimensions and uniqueness of iron and places of connections.

- 1- Implemented before the start of the project
- 2- Includes the necessary details for the construction of all structural elements
- 3- Useful in the implementation work is easy to read and understand the paintings

### Second: As-built Drawing

Drawings according to what has been implemented, meaning that they are done after the end of the project and differ from shop drawings in that they are done before implementation, for implementation on the basis of them, but may arise during implementation, especially in the paths and places of electrical works were not taken into account or a conflict with other works and the course of these works was modified so they are lifted from nature after the completion of their implementation and the work of plans with the final status As built drawings and have all the fine details of dimensions and sizes In order to make it easier for the building user later maintenance work.

- 1- Implemented after the end of the project
2. Includes details executed on the ground
- 3- It will be used in the maintenance work of the project in the future.



## INTRODUCTION

- **Benefits of Shop Drawings**

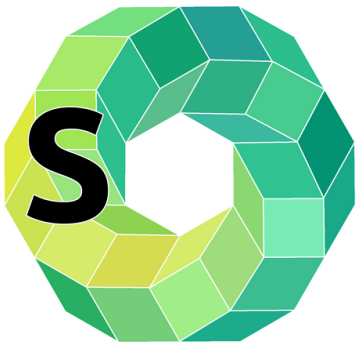
Among the benefits of shop drawings for any engineering project:

- Considered the reference plan for that project
- Study the executive and detailed plans of the various parts of the project, make observations on them (if any), propose appropriate amendments to them and approve them.
- Review and match the architectural plans on all other plans, review the quantities contained in the contract with the plans, and amend the necessary.
- Planning, general supervision and development of programs and policies to avoid any delay in the completion of the project.
- Supervising the implementation of the project in its various stages in accordance with the conditions, specifications and executive plans.

## STUDY PLAN

### FOR THE THEORETICAL PART

- Lecture 1 (week 1).  
Introduction to Technical Drawing
- Lecture 2 (week 2).  
staircase
- Lecture 3 (week 3).  
elevator, escalator
- Lecture 4 (week 4).  
interior walls
- Lecture 5 (week 5).  
interior walls, site plan
- Lecture 6 (week 6).  
interior walls, Introduction to Elevations
- Lecture 7, (week 7).  
foundation & roof



## STUDY PLAN

### FOR THE THEORETICAL PART

- Lecture 9 (week 9)  
**windows**
- Lecture 9 (week 10+11)  
**kitchen + bathroom**
- Lecture 12 - (week 12)  
**material**
- Presentation Drawings

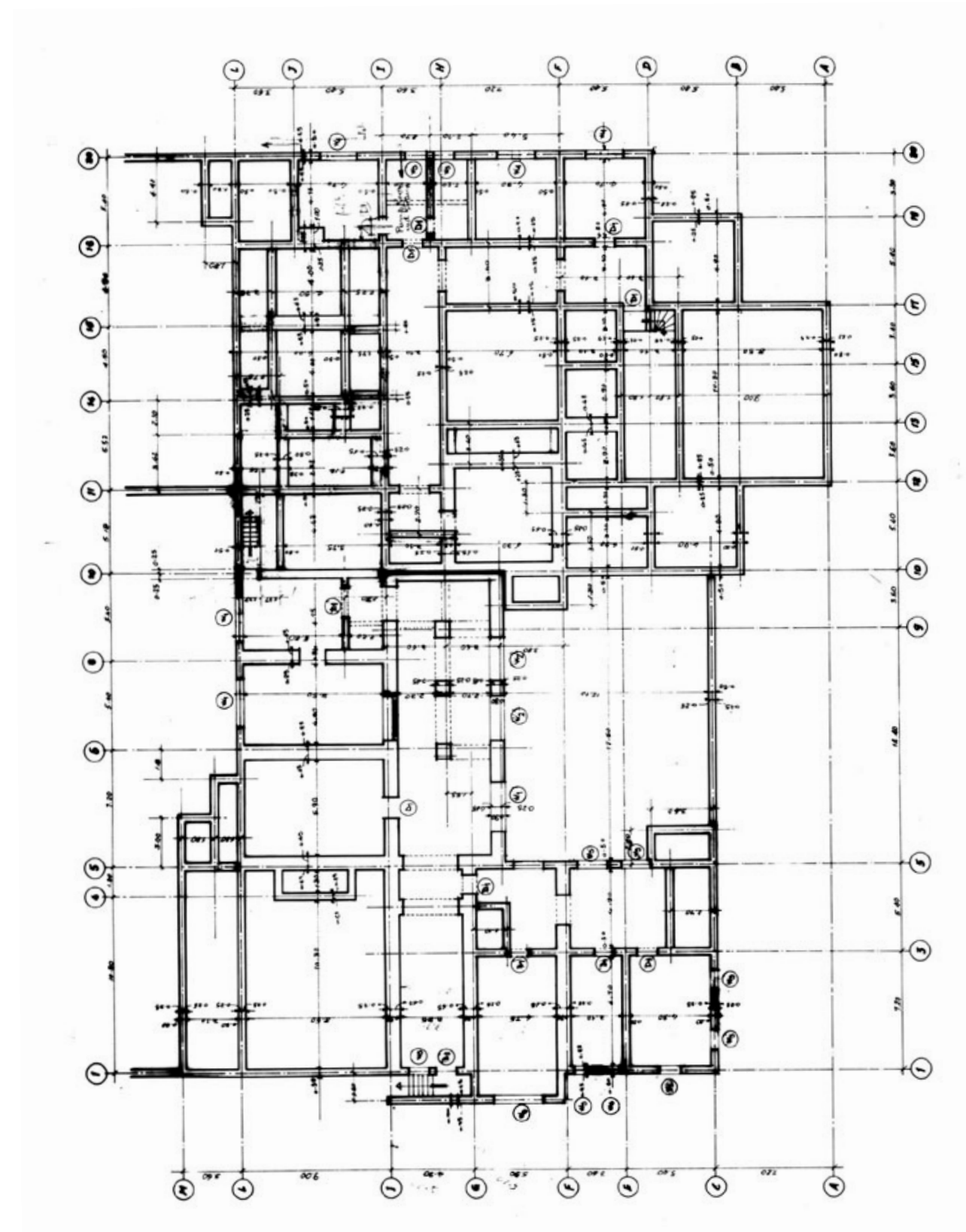
## DETAILED DESCRIPTION

- Introduction to Technical Drawing.

- Describe (discussion) the career opportunities available to a student who has mastered the skills presented in this class.
- Relate the need to design structures that are within a client's budget, based on cost estimates and the source of financing to the design process.
- Differentiate (discussion) between the types of working drawings, how they are typically sequenced, who is responsible for their execution, what each drawing typically shows, and explain the typical sequence in which drawings are created.

## DETAILED DESCRIPTION

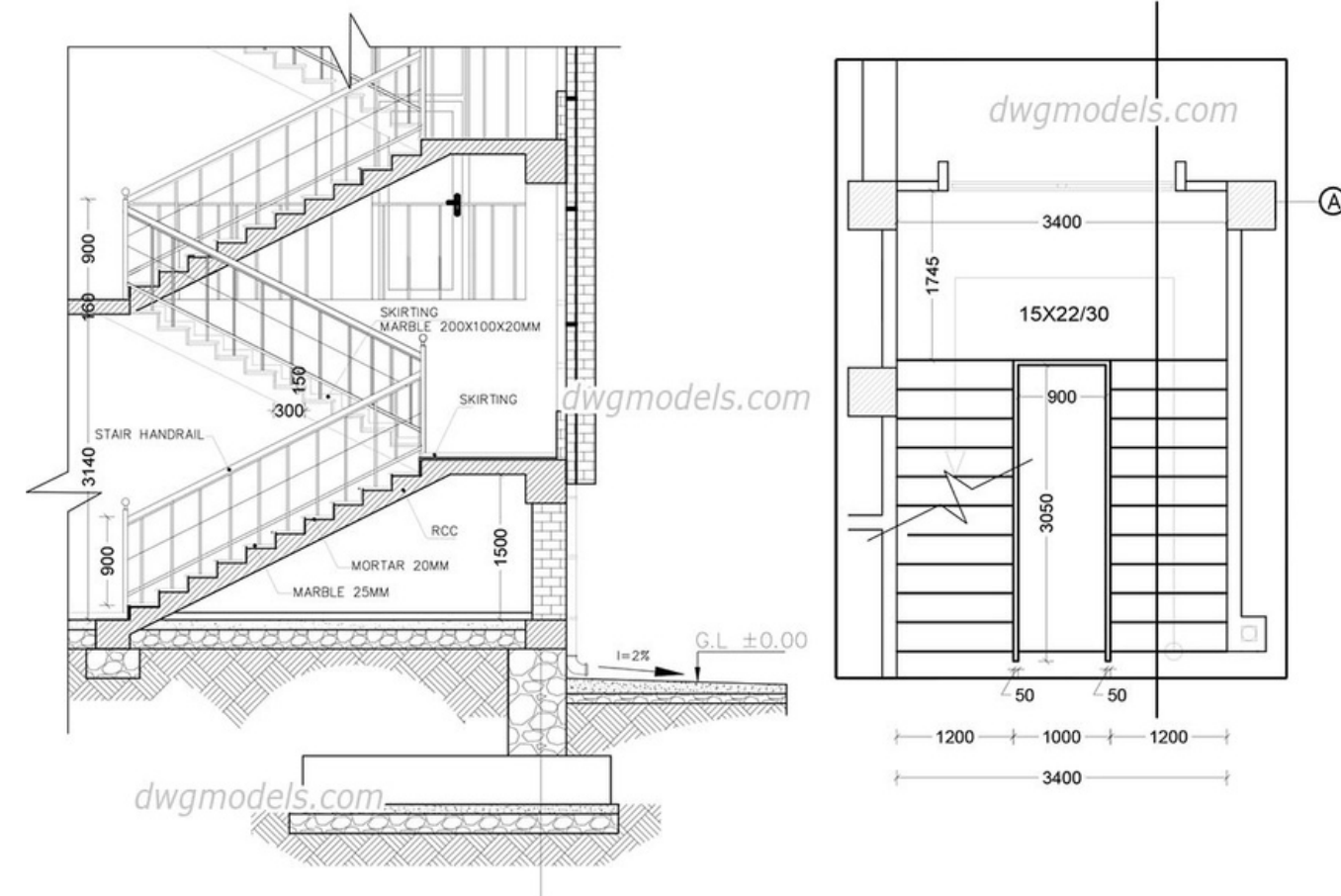
- Introduction to Technical Drawing.
- The acquisition of abilities, skills, and theoretical knowledge is developed through the constructive action of students.
- It is important that the progress of students is considered more in relation to their individual starting points, than in function of an initially established learning product. Technical drawing is covered in two courses, in a way that establishes a general and complete vision from the first one, expanding and applying the concepts in usual technical solutions in the second. The contents are developed in a parallel way through both courses, but in their summaries, the level of detail, applications and specific exercises, are determined.



## DETAILED DESCRIPTION

### • Lecture 2 (week 2) staircase

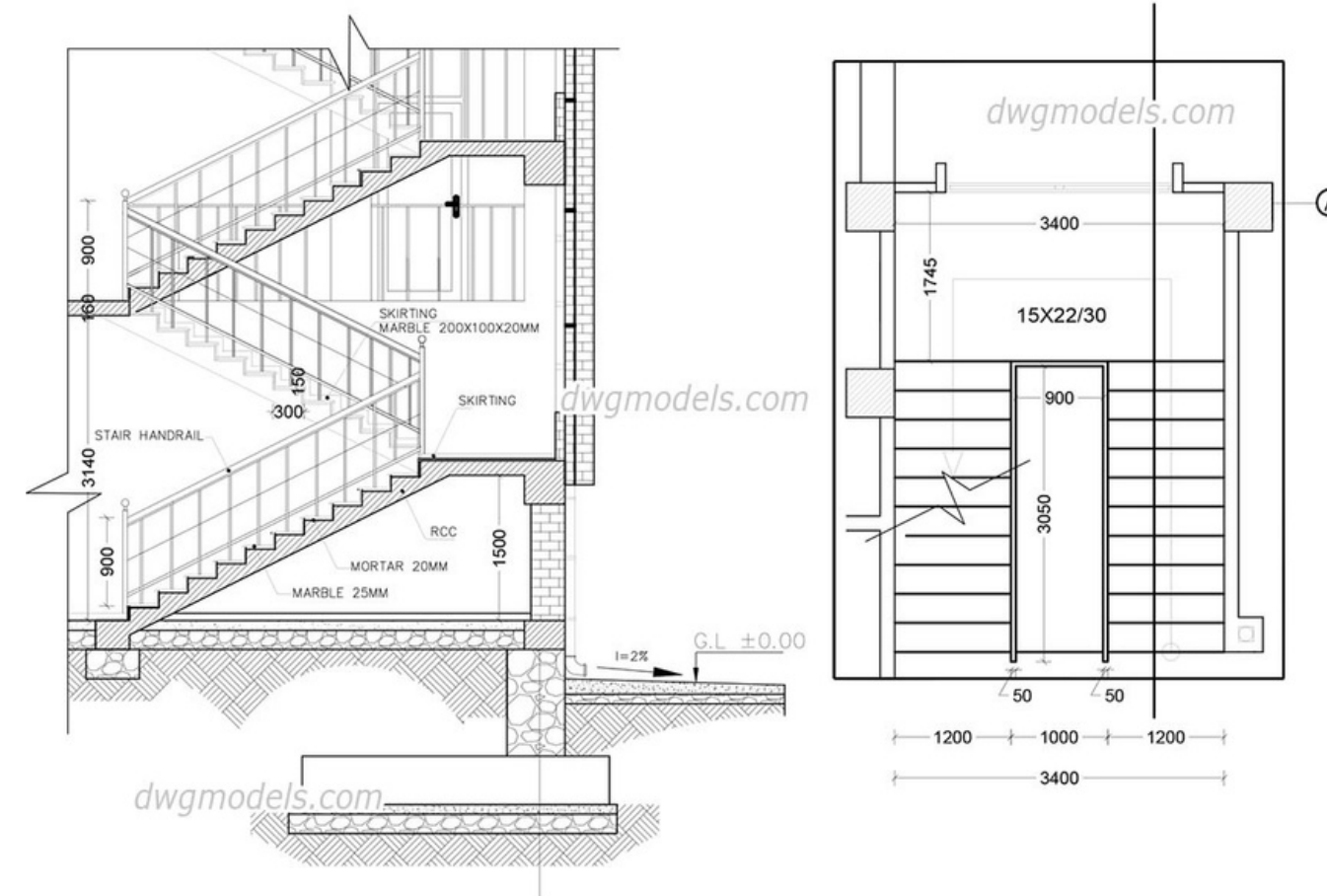
- Students must choose a design project of their previous design project and applied every lecture (lesson) on the project.
- Determine the heights of a structure's basic horizontal components, including finish grade, floor and ceiling lines, standard header heights, and project vertical edges from the plan.
- Determine the height and shape of roofs using construction lines representing side views of the structure.
- Dimension staircase (plan, section).
- Identify the four most common materials used in the construction of residential and commercial building
- Explain the function of reinforced concrete and steel columns/beams in roofs & foundations.
- Define cantilever.



## DETAILED DESCRIPTION

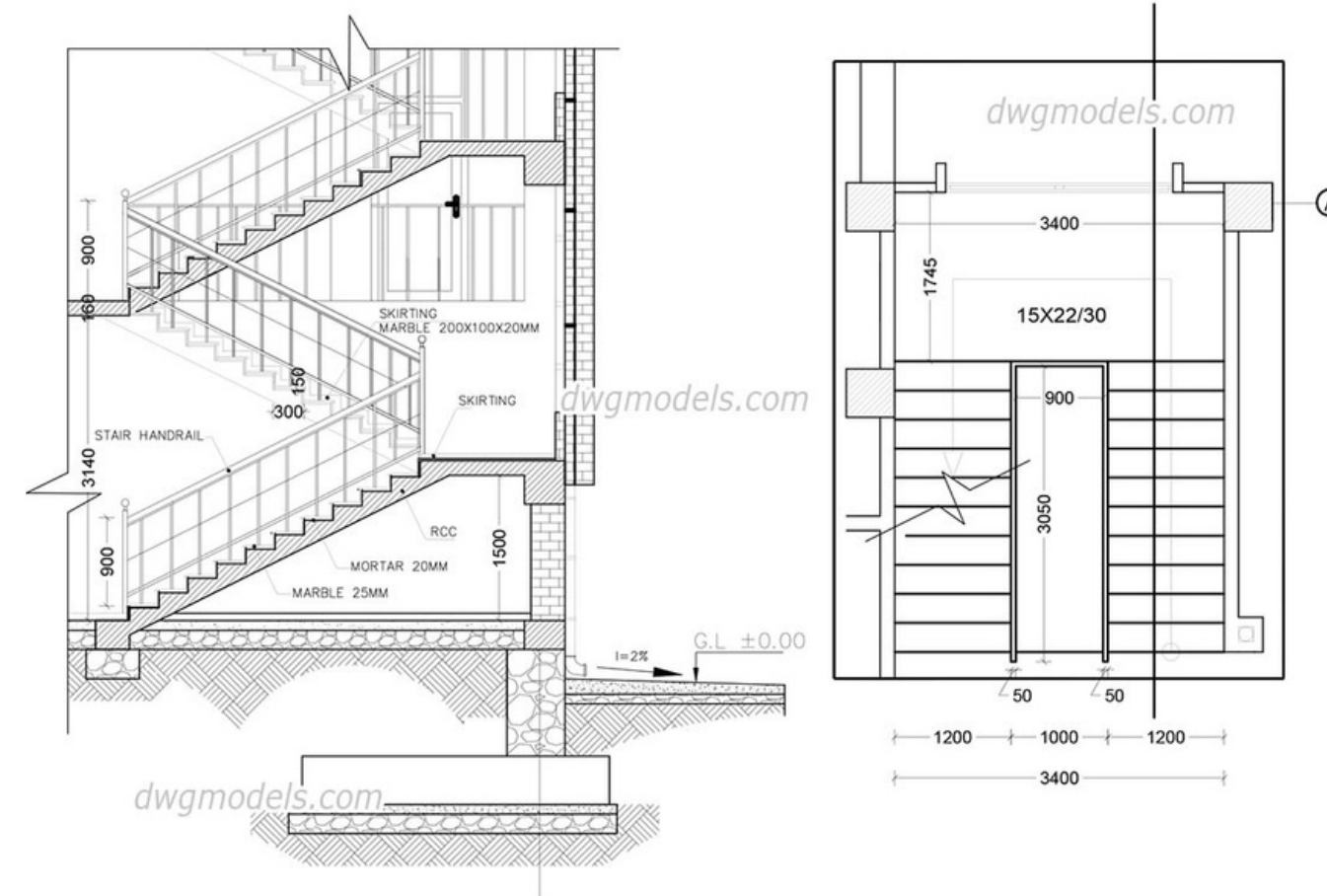
### • Lecture 2 (week 2) staircase

- Identify basic components of a post-and-beam floor system, as well as know their typical sizes and spacing.
- Distinguish (in Writing) between bearing and non-bearing walls.
- Differentiate between double-and single-wall constructions.
- Explain (in Writing) why building loads are calculated starting from the roof and working down to the foundation.
- Describe (in Writing) how loads are distributed through beams, floors, roofs, ceilings, walls, and foundations.
- Specify (in Writing) which architectural or structural drawing is used to place information on floor framing, upper floor framing, ceiling framing, and conventional and trussed roofs.



## DETAILED DESCRIPTION

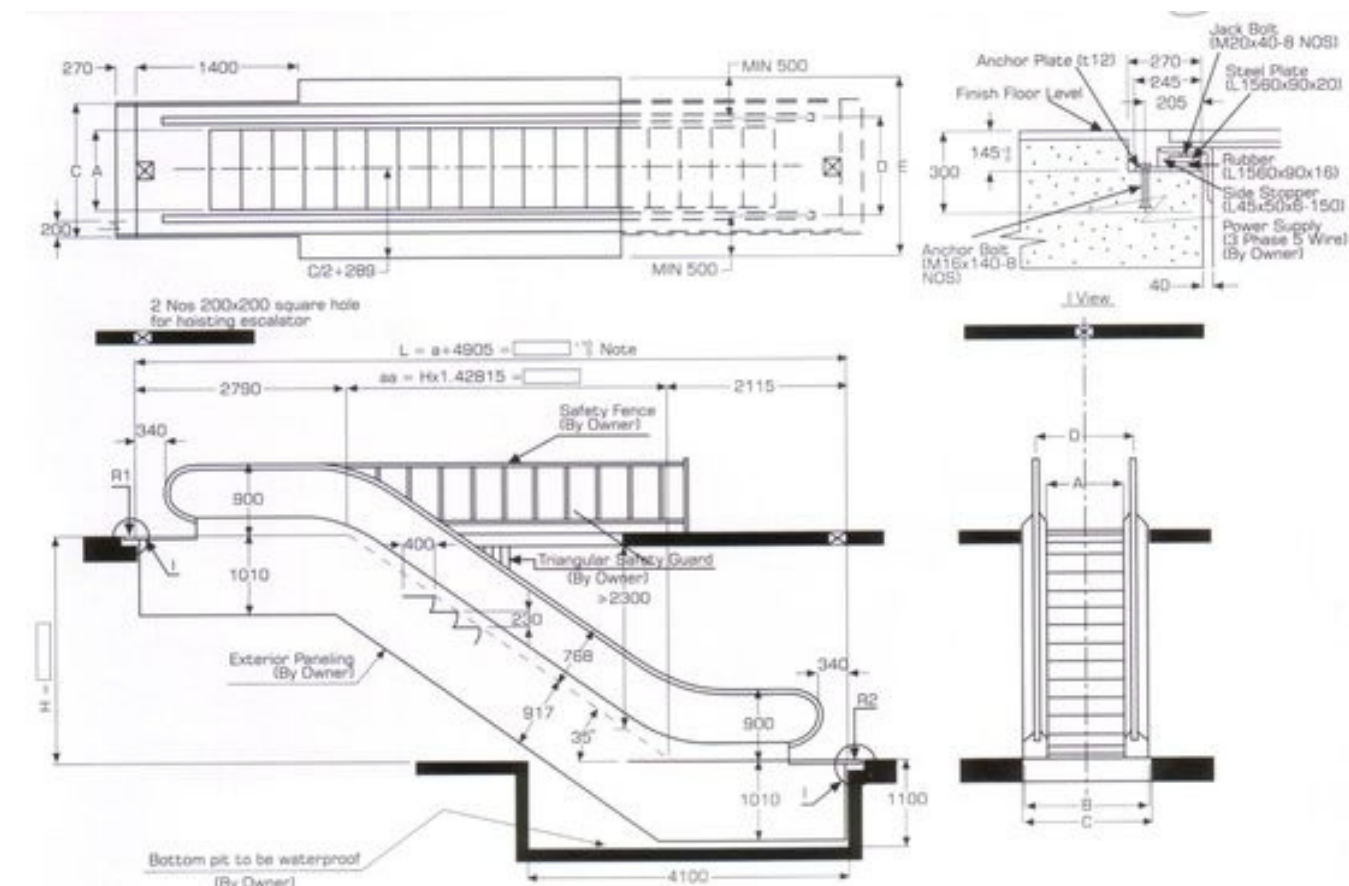
- Lecture 2 (week 2) staircase
- Explain (in Writing) stairs wall details including beam and supports, crawl space requirements, and insulation methodologies.
- Identify the scales typically used for the foundation layout.
- Concrete slab foundation.
- Use checklists to verify completeness of drawings.
- Stair Construction and Layout
- Define (in Writing) basic terms and requirements used in stair design and construction.
- Determine the rise and run of a stairway.
- Implement the procedures outlined to draft straight-run, open, u-shaped, and exterior stairs.
- Use appropriate finished-quality lines for drafting stairs.
- Properly dimension and apply notes to a stair drawing.





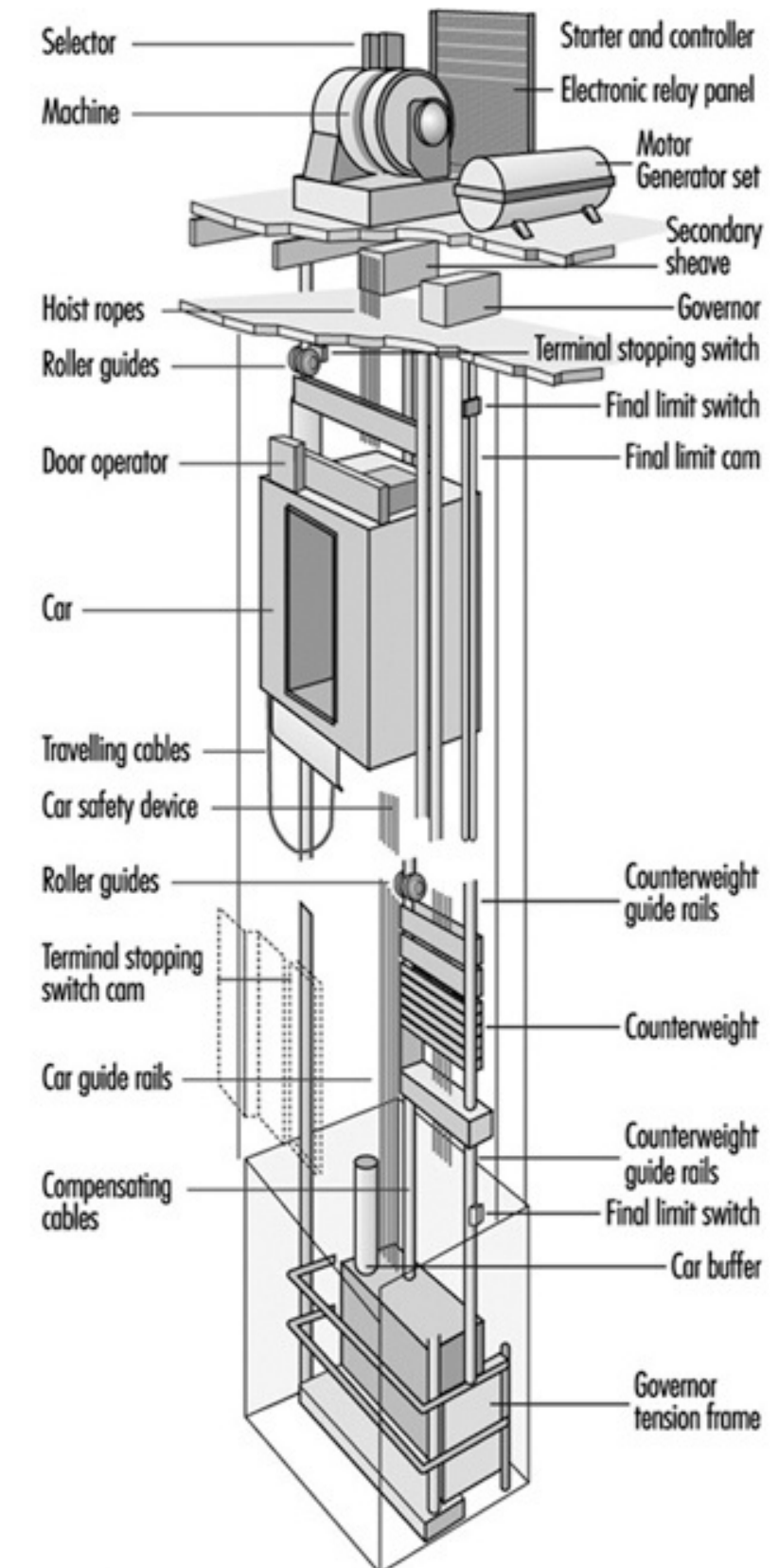
## DETAILED DESCRIPTION

- **Lecture 3 (week 3) elevator, escalator**
- Hand over the previous home work , explain by drawing :
- Elevator Hoist Systems
- Gearless Traction
- Machine-Room less:
- Hydraulic
- Elevator Dimensions
- The following dimensions are details that student should know, in order to properly inform manufacturers on the parameters of their building design.
- Maximum Travel Distance
- Minimum Floor Height
- Dimensions
- Entrance Dimensions



## DETAILED DESCRIPTION

- **Lecture 3 (week 3) elevator, escalator**
- **Hand over the previous home work , explain by drawing :**
  - Elevator Aesthetics throw:
  - Door Type
  - Jamb
  - Interior Cab Design
  - Elevator Performance:
  - Speed
  - Capacity
  - Energy Consumption
  - Fire
  - Escalator Aesthetics
  - Steps
  - Handrail
  - Balustrade
  - Inner and Outer Decking
  - Escalator Performance
  - Circulation
  - Speed



## DETAILED DESCRIPTION

- Lecture 4 (week 4) interior walls

Hand over the previous home work

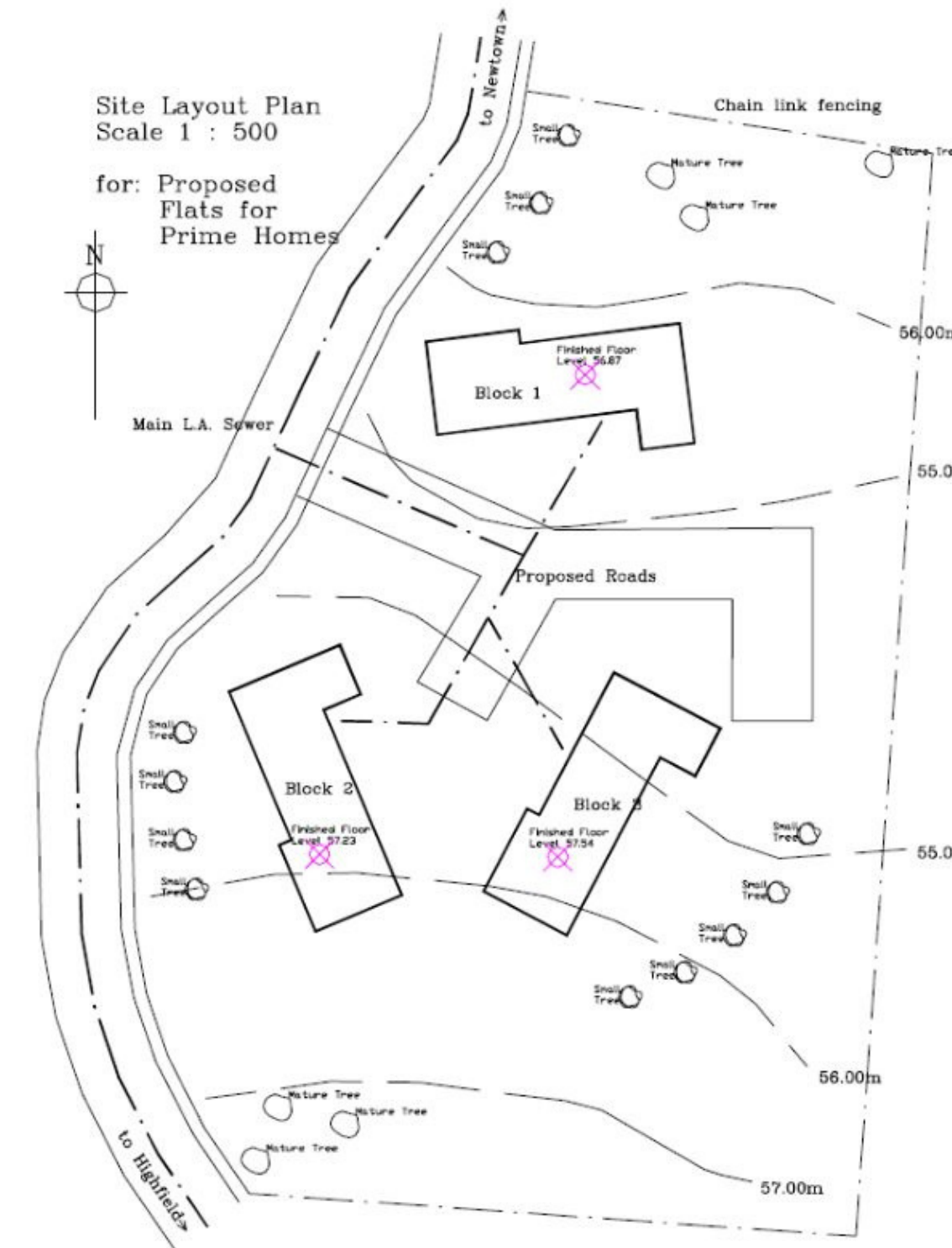
- Revision the home work in studio and give the home work sheet marks.
- Differentiate drafting strategies of partial and full walls.

## DETAILED DESCRIPTION

### • Lecture 5 (week 5) interior walls, site plan

#### Lesson Objectives

- Explain (in Writing) basic factors affecting the orientation of a house.
- Explain (in Writing) how terrain influences the configuration of a house.
- Identify (in Writing) an unobstructed southern exposure as the perfect solar site.
- Describe (in Writing) magnetic declination and its relationship to true north.
- Compare (in Writing) factors in selecting a solar site in both urban and suburban locations.
- Explain how landscaping can affect a solar site.
- Delineate architectural and landscaping strategies to offset the effect of wind.
- Identify (in Writing) methods to cool a structure with wind.



## DETAILED DESCRIPTION

- Lecture 6 (week 6) interior walls,  
Introduction to Elevations

Identify elevations as being a type of orthographic drawing, illustrating exterior building shapes, finishes, and vertical relationships.

- Explain that four elevations are typically required, but that more may be necessary if building walls are not at a 90-degree angle to each other.

- Specify the scale usually used to draft elevations.

Describe (in Writing) typical methods of elevation layout.

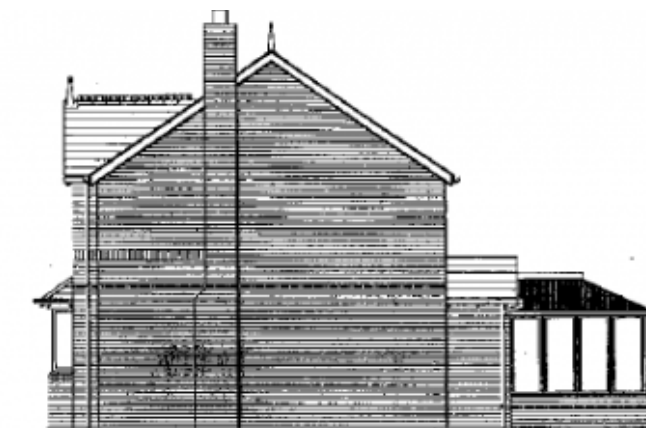
- Identify drafting conventions used for common roofing materials, including asphalt shingles, wood shakes and shingles, clay, concrete and metal tile, and built-up roofing.

- Identify delineation conventions used for common exterior wall coverings.

- Discriminate between drawing too much and too little detail on doors and windows.



FRONT ELEVATION



SIDE ELEVATION



REAR ELEVATION



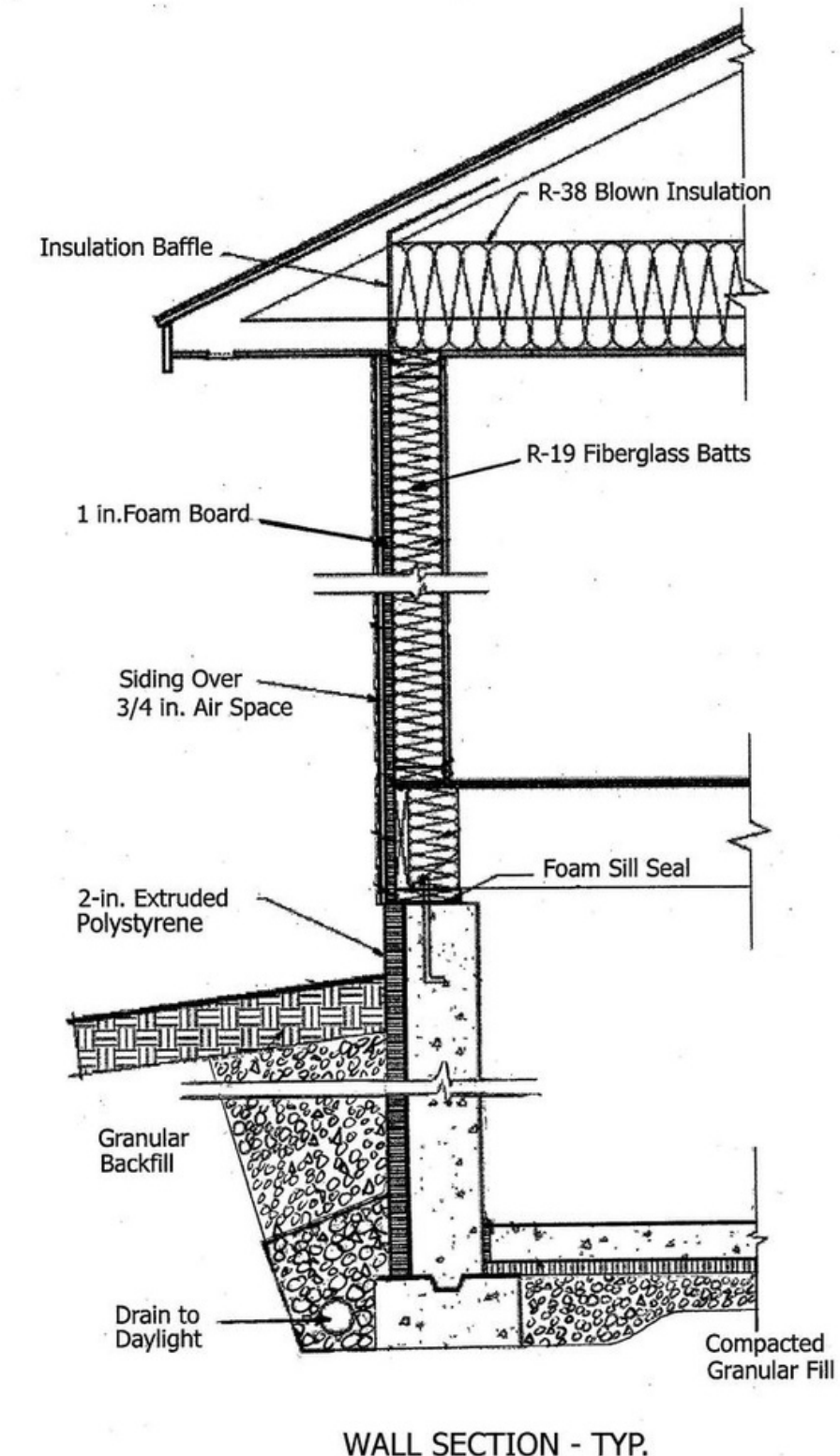
SIDE ELEVATION

## DETAILED DESCRIPTION

### • Lecture 7, (week 7) foundation & roof

Determine the heights of a structure's basic horizontal components, including finish grade, floor and ceiling lines, standard header heights, and project vertical edges from the plan.

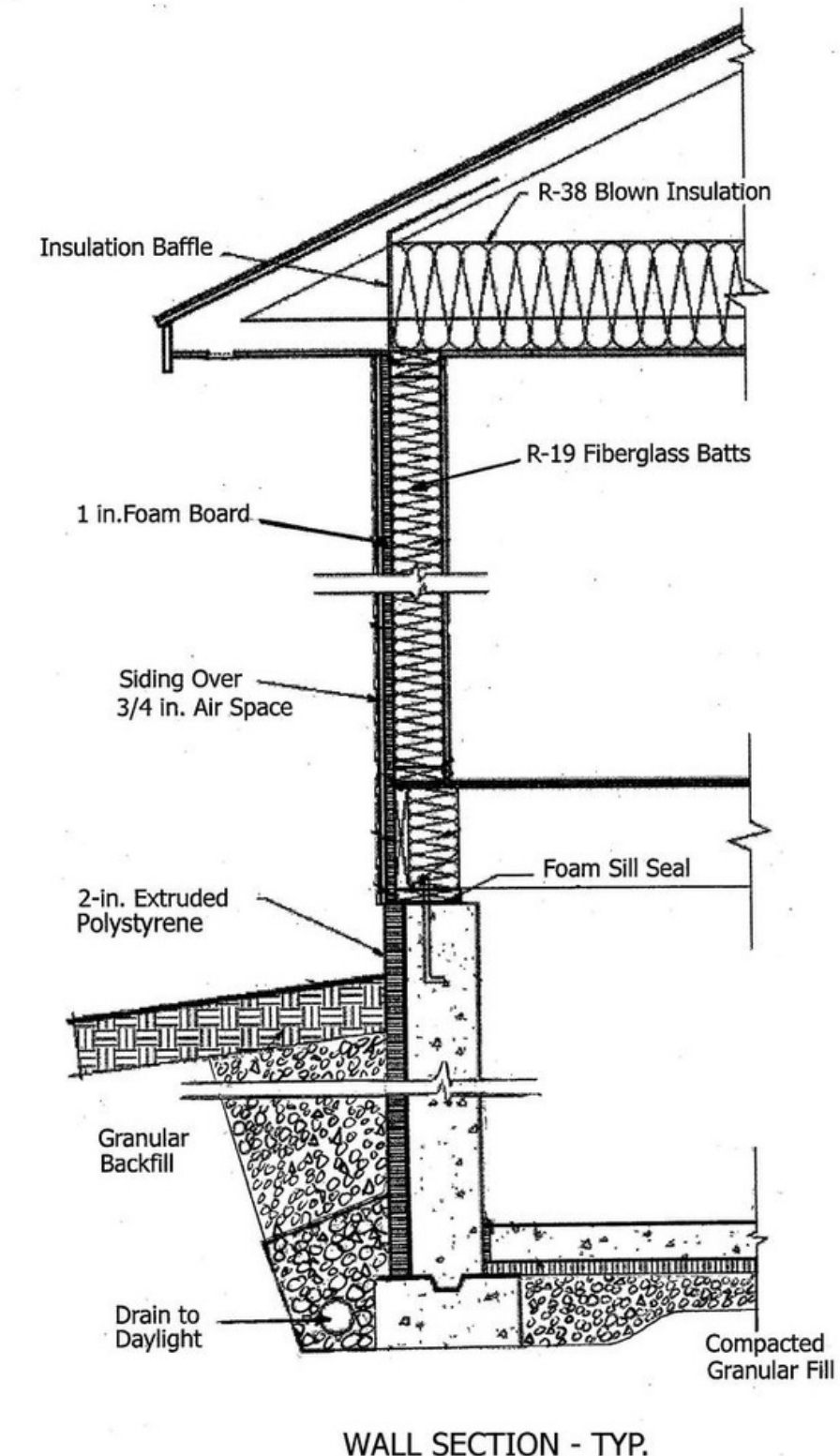
- Determine the height and shape of roofs using construction lines representing side views of the structure.
- Lay out all openings of an elevation including doors and windows.
- Demonstrate why it is common to highly detail the front elevation and only draw minimal information on the other elevations.
- Properly dimension an elevation, including roof pitch.
- Project grades from a plot or floor plan to an elevation.
- Identify (in Writing) the two basic elements of kitchen cabinets, on base and upper cabinet, as well as cite their standard amenities.
- Identity bathroom cabinet varieties.



## DETAILED DESCRIPTION

### • Lecture 7, (week 7) foundation & roof

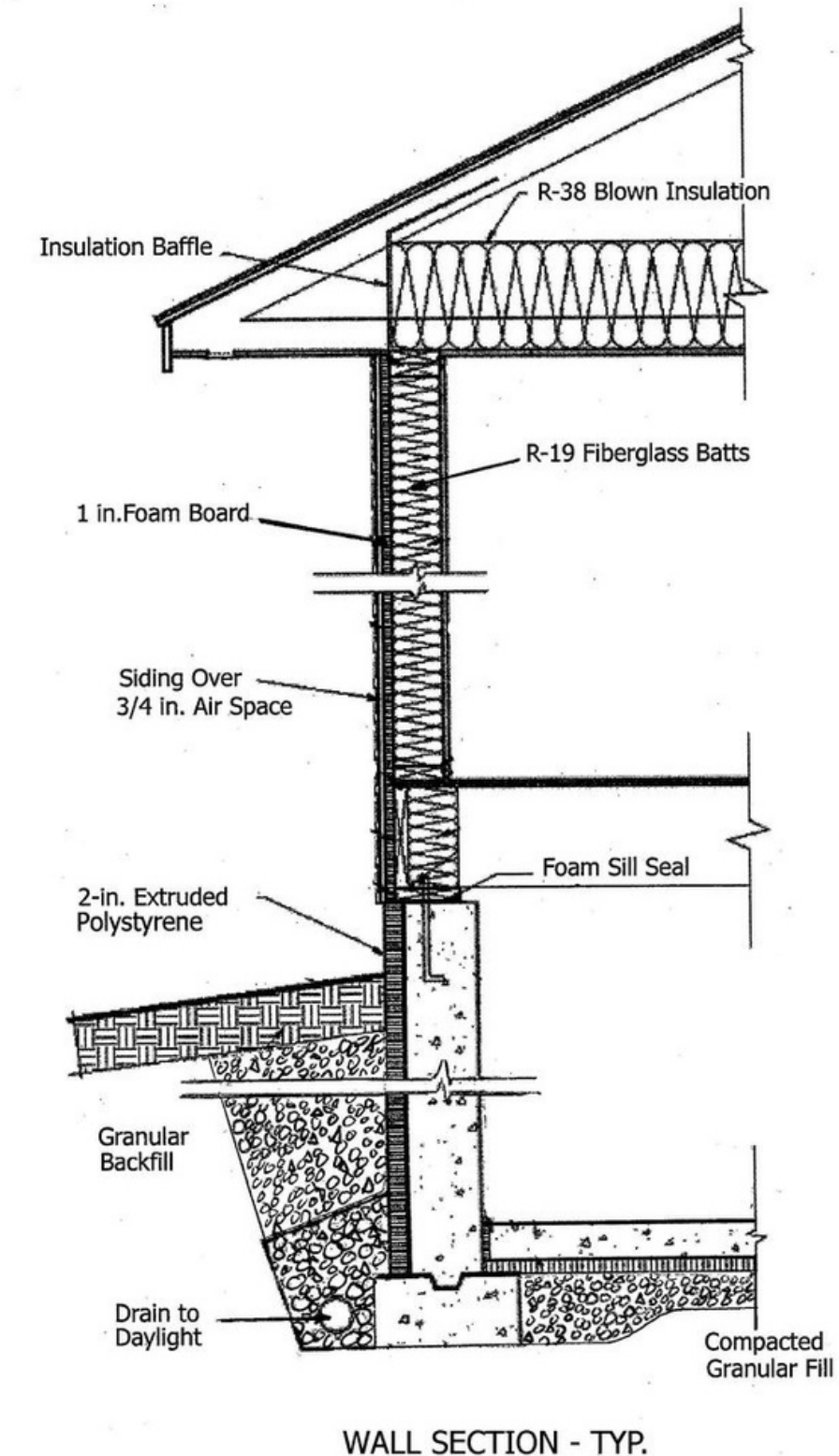
- Describe (in Writing) how kitchens, bathrooms, and laundry rooms are designed differently for an individual with a disability.
- Explain roof drainage systems and drafting methods.
- Dimension roof plans judiciously.
- Identify the four most common materials used in the construction of residential and commercial building
- Explain the function of reinforced concrete and steel columns/beams in roofs & foundations.
- Define cantilever.
- Identify basic components of a post-and-beam floor system, as well as know their typical sizes and spacing.
- Distinguish (in Writing) between bearing and non-bearing walls.
- Differentiate between double-and single-wall constructions.
- Explain (in Writing) why building loads are calculated starting from the roof and working down to the foundation.
- Describe (in Writing) how loads are distributed through beams, floors, roofs, ceilings, walls, and foundations.



## DETAILED DESCRIPTION

- **Lecture 7, (week 7) foundation & roof**

- Specify (in Writing) which architectural or structural drawing is used to place information on floor framing, upper floor framing, ceiling framing, and conventional and trussed roofs.
- Hand over the previous home work.
- Explain (in Writing) foundation wall details including venting, beam pockets and supports, crawl space requirements, and insulation methodologies.
- Identify the scales typically used for the foundation layout.
- Concrete slab foundation.
- Foundation plans with joist construction.
- Use checklists to verify completeness of drawings





## DETAILED DESCRIPTION

- **Lecture 8 (week 8) Door + Sections**

- Student will draw two sections (vertical & horizontal) full detailed also door details.
- Draw door types, sizes, requirements, and drawing conventions.
- Give the student there next sheet to draw
- execute the seven major stages of drawing sections:

**Stage 1:** Evaluate needs: evaluate floor and foundation plans for construction needed in a project and identify the appropriate number of sections.

**Stage 2:** Lay out the section: follow the procedures for floor, wall, and truss framing.

**Stage 3:** Finished-quality lines—structural members only: understand the line-weight conventions for structural members shown in section

**Stage 4:** Drawing finishing materials: use the outlined procedures for drawing finishing materials.

**Stage 5:** Dimensioning: implement procedures for dimensioning section.

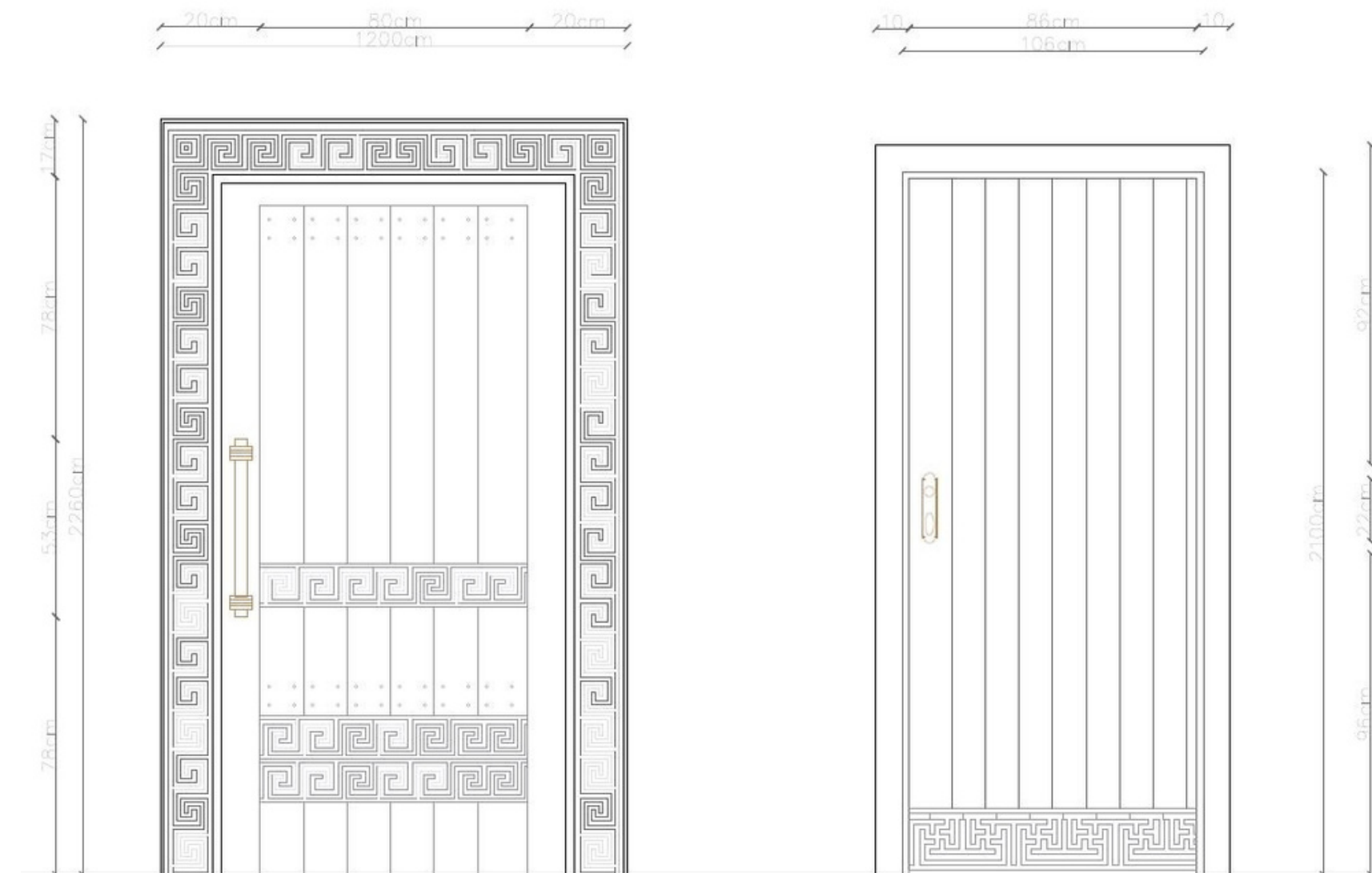
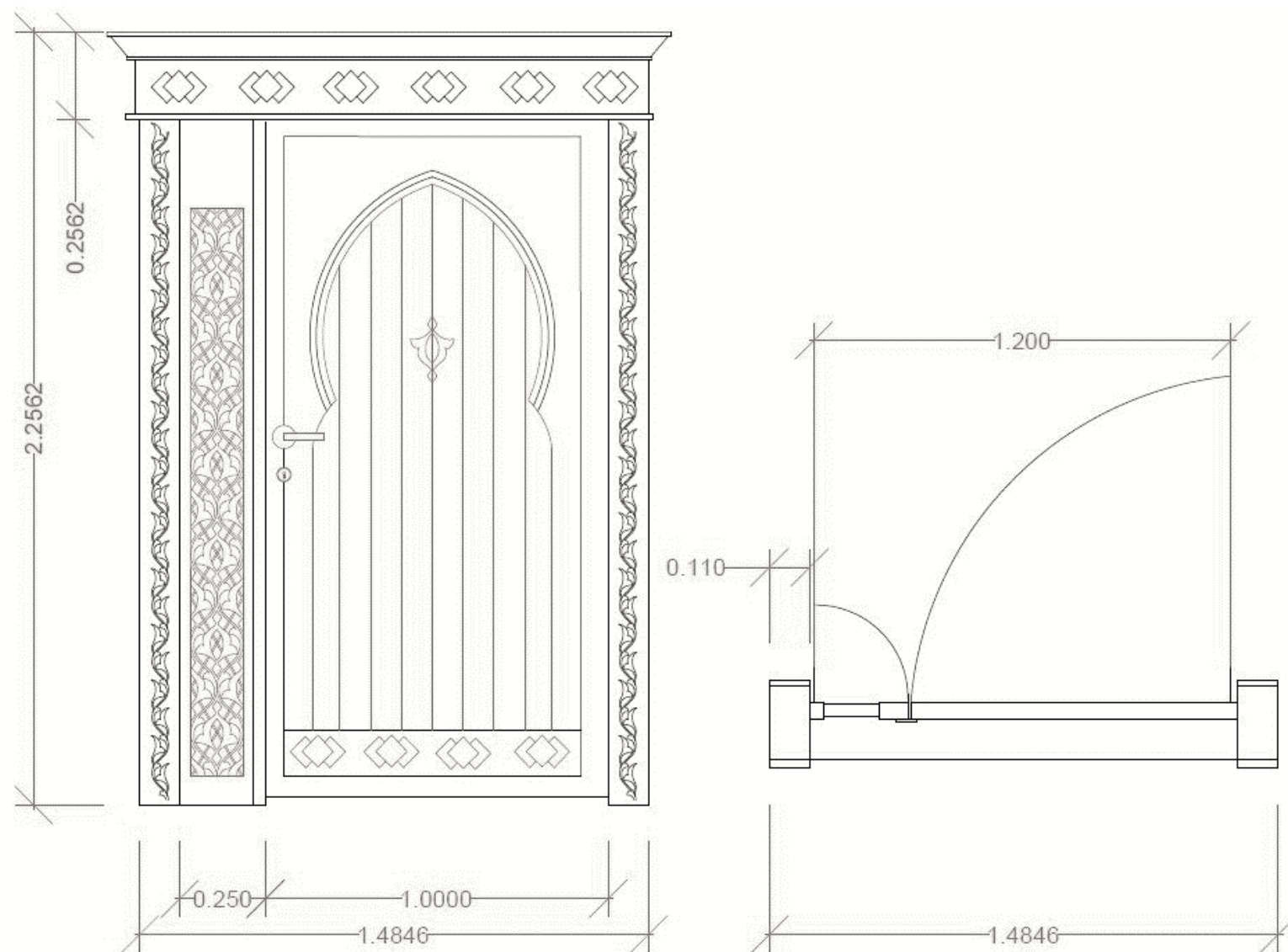
**Stage 6:** Lettering notes: plan and place appropriate notes for roofs, walls, and upper floors and foundations.

**Stage 7:** Evaluate your work: verify the quality and completeness of drawings.

# DETAILED DESCRIPTION

- Lecture 8 (week 8) Door + Sections**

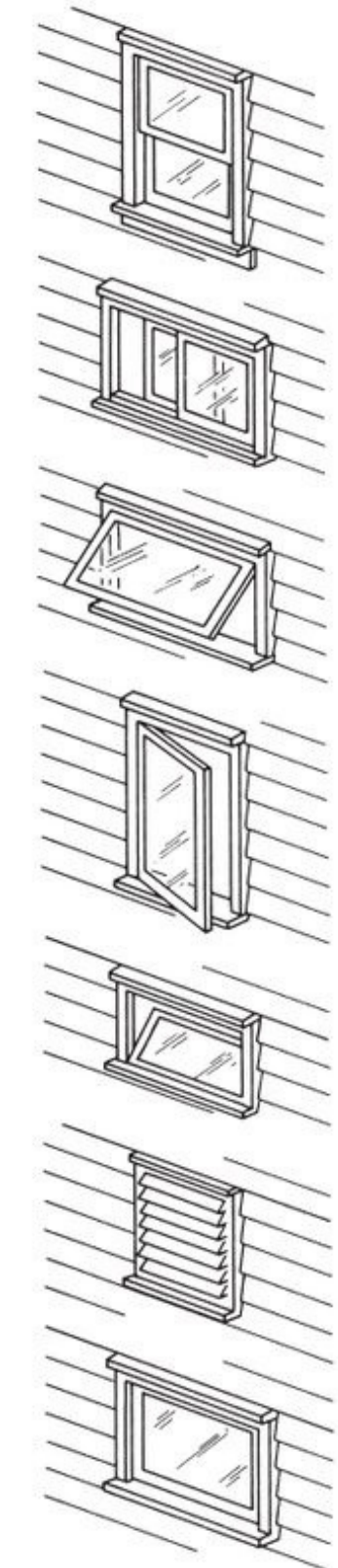
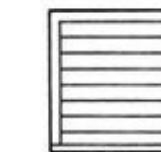
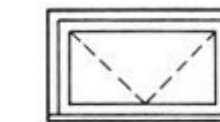
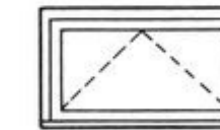
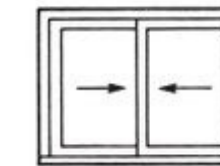
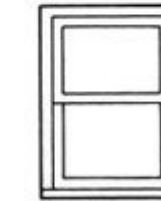
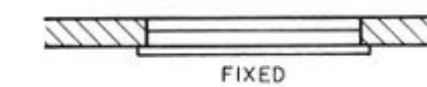
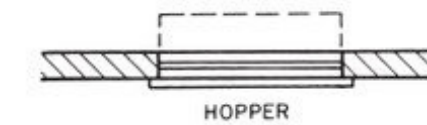
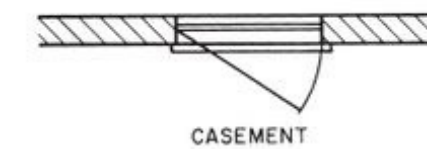
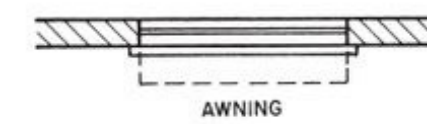
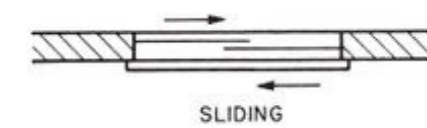
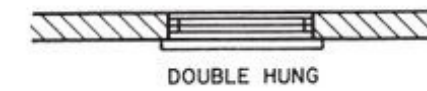
Student's work



## DETAILED DESCRIPTION

- Lecture 9 - (week 9) windows**

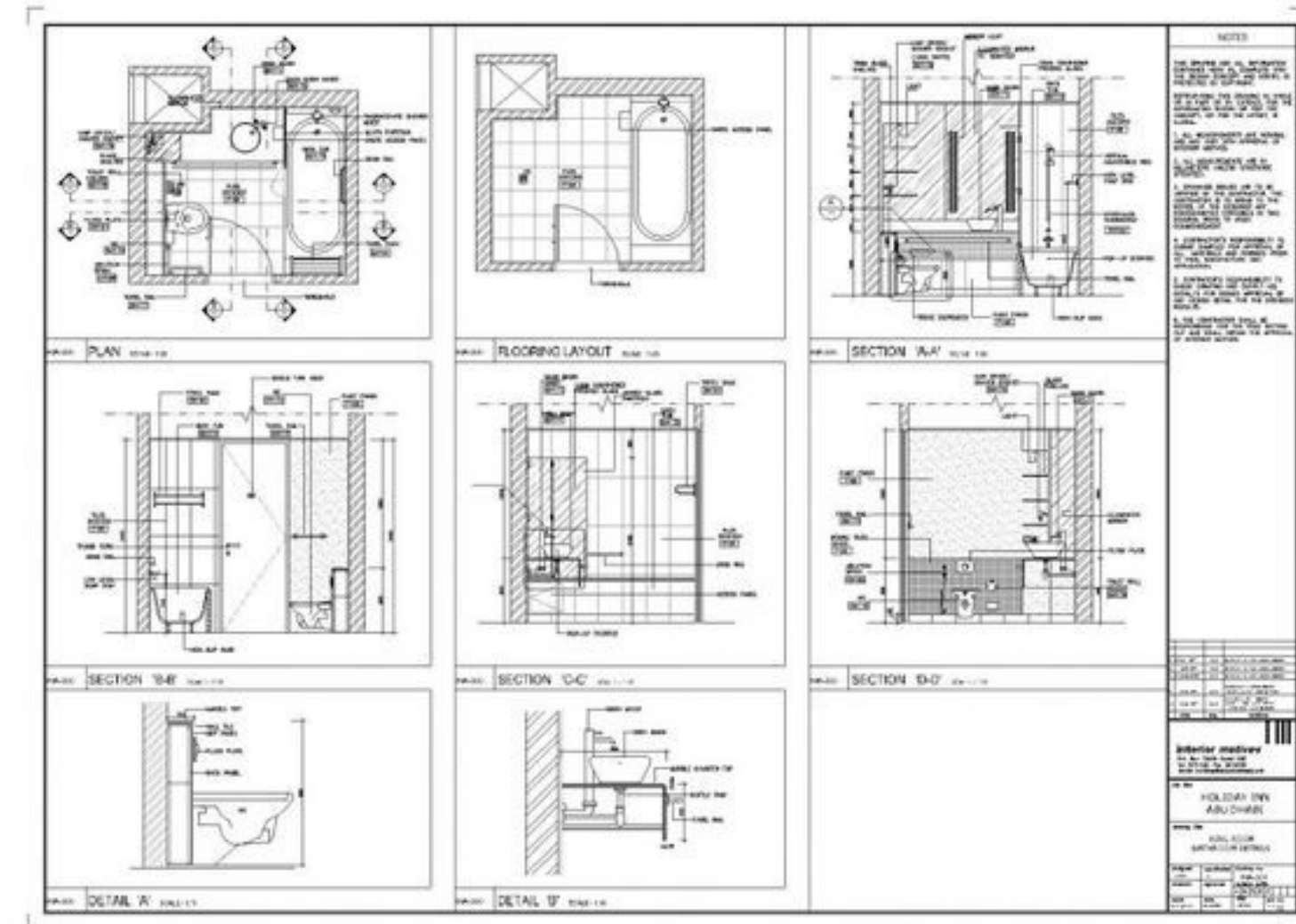
Draw window types, sizes, extent openable, and drawing conventions.



# DETAILED DESCRIPTION

- Week 10+11 – (week 10+11) kitchen + bathroom**

Identify (in Writing) the general sizes and drawing conventions of cabinets and appliances found in kitchens, bathrooms, and utility rooms.



## DETAILED DESCRIPTION

- Lecture 12 – (week 12) material

**Describe (in Writing) the Descriptions of Materials, who uses it, and understand its legal significance. Identify (in Writing) some of the minimum requirements of various construction specification classifications, including:**

- Room dimensions
- Foundations
- Stairways
- Roof
- Thermal insulation and heating
- Explain (in Writing) the usage of concrete block in commercial architecture, cite typical dimensions, know the importance of following a module, and describe how block is reinforced.
- Cite the constituent parts of concrete, as well as the various delivery methods available.
- Demonstrate the concept of vertical reinforcing and spiral ties and columns.
- Identify (in Writing) how steel members are specified on a drawing

# THE PRACTICAL PART

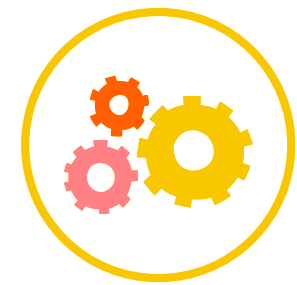
## Projects given to students during the academic years

- **FOLDING SCREEN**
- **HEXAGON END TABLE**
- **3D WOODEN GEOMETRIC ART**
- **WOOD WALL ART FROM PLYWOOD SCRAPS**
- **TECHNIQUES FOR MAKING A FEW SIMPLE BOXES**
- **PERGOLA OUTDOOR ROOM**
- **HEXAGON PICNIC TABLE**
- **WOODEN CRISS-CROSS RACK**
- **TABLE RUNNER USING SCRAP WOOD**



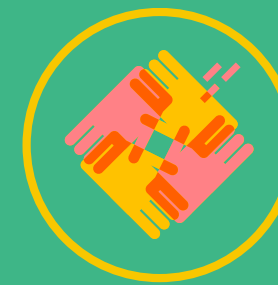
## FOLDING SCREEN

This elegant folding screen has a multitude of uses. It can be used to divide a room, or to screen off an area such as a home office or craft space. It's made from lightly stained white oak (although you could vary the wood depending on your taste), and is backed with plywood panels. These contrasting panels can be covered with wallpaper to match your décor or to pick out a feature color, as well as fabric, wood or window film on transparent acrylic.



## REQUIRED TOOLS FOR THIS PROJECT

- ·Bar clamps
- ·Belt sander
- ·Dust mask
- ·Framing square
- ·Jigsaw
- ·Miter saw
- ·One-handed bar clamps
- ·Sanding block
- ·Table saw
- ·Tape measure
- ·Utility knife



## REQUIRED MATERIALS FOR THIS PROJECT

- ·Butt hinges – 3 x 3-in.
- ·Lumber (see Cutting Lists)
- ·Primer
- ·Stain
- ·Wallpaper
- ·Wallpaper paste
- ·Wipe-on polyurethane
- ·Wood glue
-



# Instructions

## STEP 1:

### MAKE ALL THE PARTS AND PREFINISH THEM

- Close-up of dado blade
- An adjustable dado blade wobbles as it spins. Turn the center cam to adjust the amount of wobble and the width of the “dado,” that is, the groove. You have to remove your saw’s blade guard to use a dado blade, so be extra careful.



## Instructions

### STEP2:

### CUT GROOVES IN THE RAILS AND STYLES

Mark one side of each part and always cut with the mark facing away from the fence. That way, the grooves will match up perfectly, even if the cut is a hair off center. A feather board holds the board tight to the fence. Outfeed support is a must.



## Instructions

### STEP3:

### MORTISE THE RAILS

Build a carriage that rides along the fence to hold the rails upright. You'll need to reposition the fence for this step, but don't change the blade settings.



## Instructions

### STEP 4:

### MARK THE ARCH

Drill a pencil hole near one end of a stick and nail the other end to a wood scrap. Draw an arch across the lower rail, cut, and then sand the arch smooth.



## Instructions

### STEP5:

### MAKE THE PANELS

#### Wallpaper the panels

Cut the plywood panels to size and prime both sides. When you paste on the wallpaper, let it overhang the panel and trim off the excess.

Cut the plywood to size and glue the wallpaper to both sides using wallpaper paste or following the manufacturer's directions.



# Instructions

**STEP 6:**

**ASSEMBLE THE DIVIDERS**



Put it all together

Glue both rails to one stile, then insert the panel. Work the panel into the dadoes carefully to prevent wallpaper “roll back.” Finally, add the other stile, make sure the whole assembly is square and clamp it together.



Add the muntin's

Glue decorative muntin's to the panel. For longer muntins, you may need a weight to hold them down until the glue sets. Don't distort the panel with too much weight.

## PANEL POSSIBILITIES

Each section of the divider is simply a wood frame that encloses a panel. Dave covered his plywood panel with wallpaper, but there are lots of other options:

### Wood on Wood

The simplest panel option is 1/4-in. plywood, finished to match the frame. You could also choose a contrasting wood finish.



### Fabric

Cover the panel with fabric to match upholstery or curtains. Lightly coat 1/8-in. hardboard with spray adhesive (3M Super 77 is one brand) and then carefully lay the fabric over it.

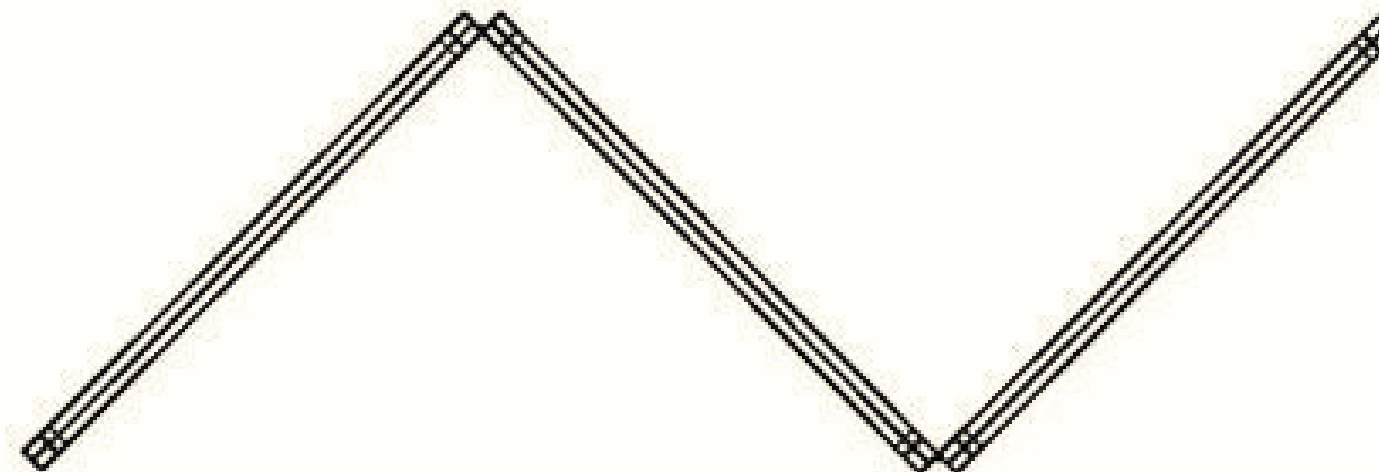
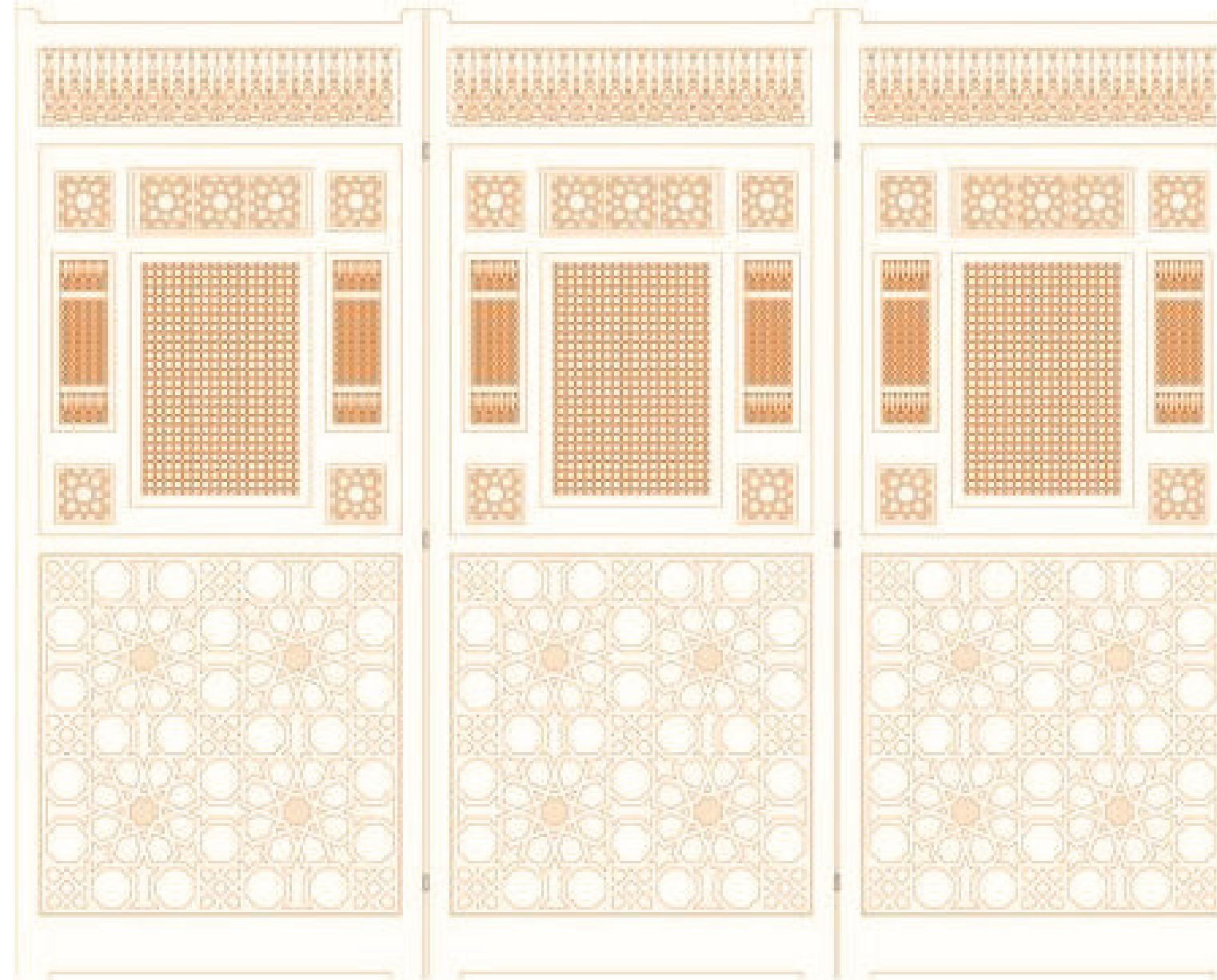


### Window film

Apply decorative window film to clear acrylic panels. You'll find both at home centers.

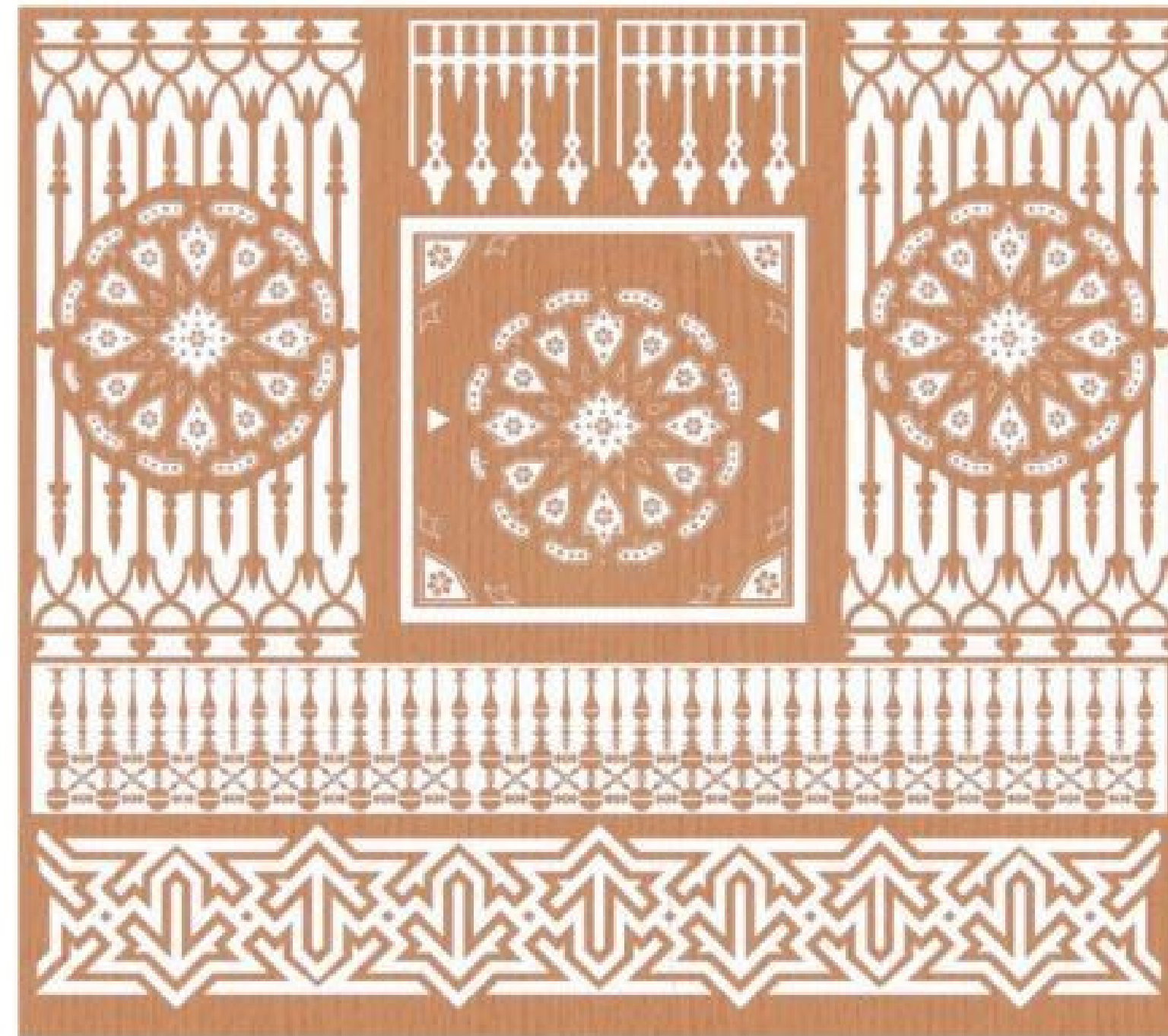


STUDENTS' WORK





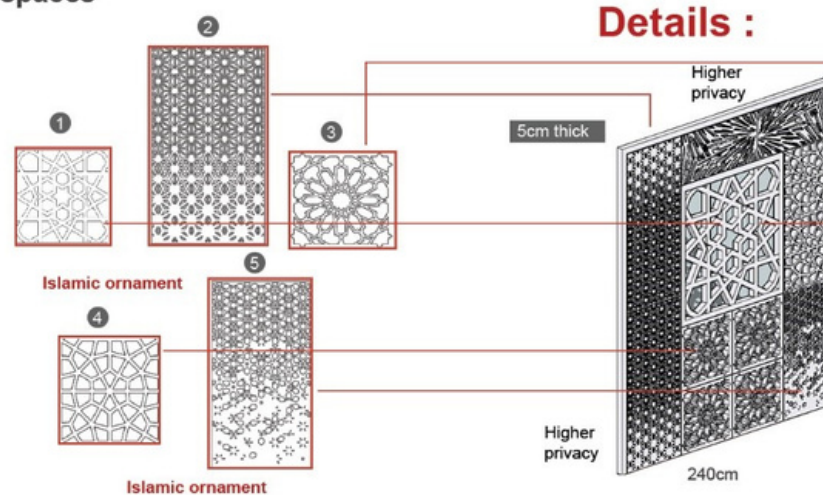
# STUDENTS' WORK



## STUDENTS' WORK

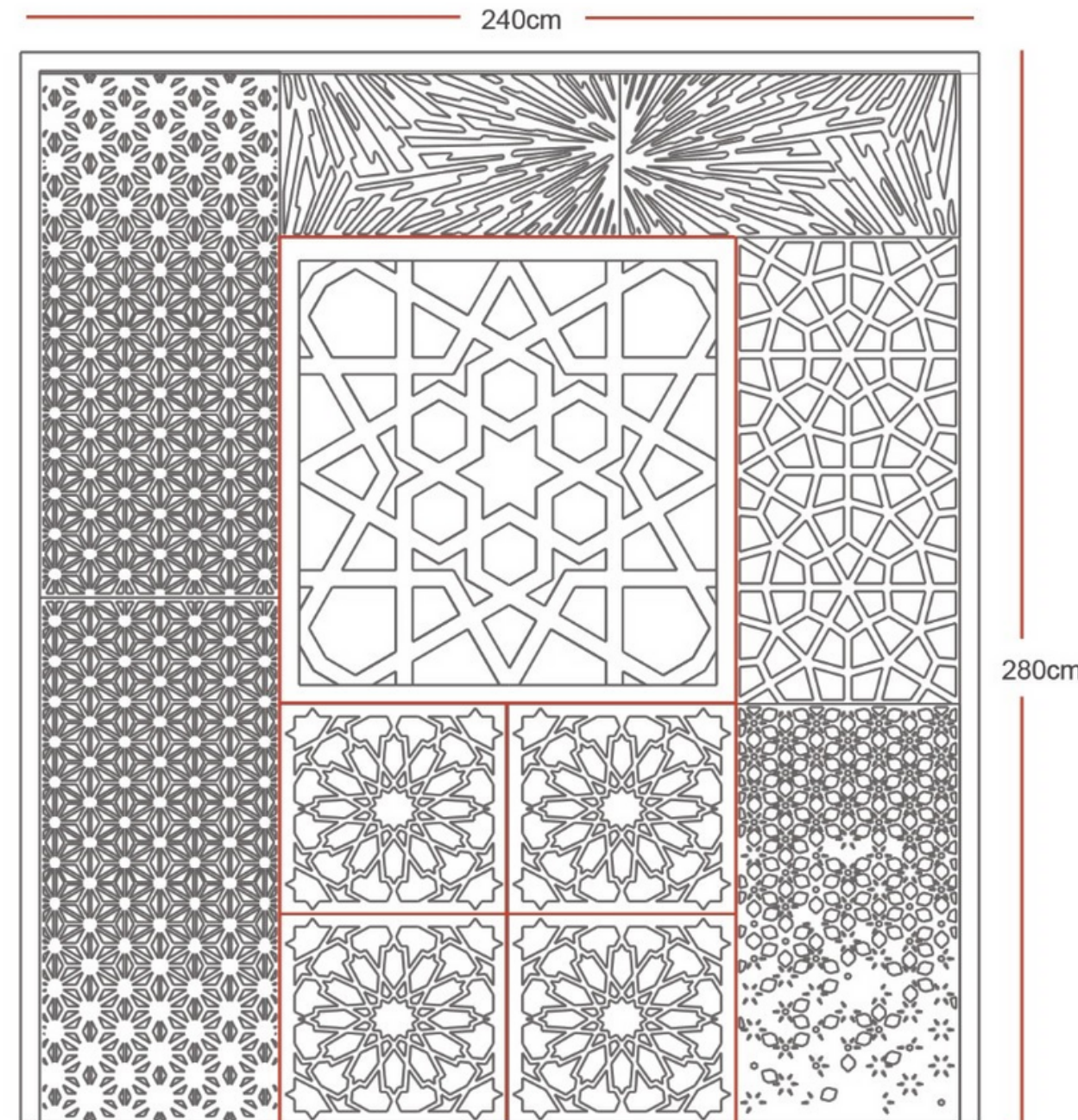
### Pattern Concept

The design one reflects the Islamic decorations in one pattern as room divider to create more privacy in spaces



### Design Specifications :

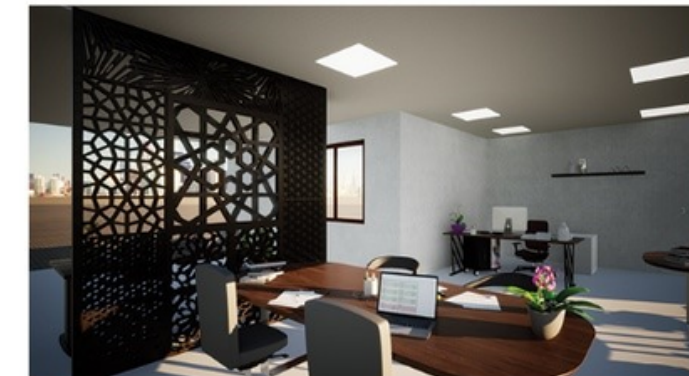
- Islamic Pattern Style
- Fixed Wood Partition
- Room divider function
- RAL Color - Brown 8002



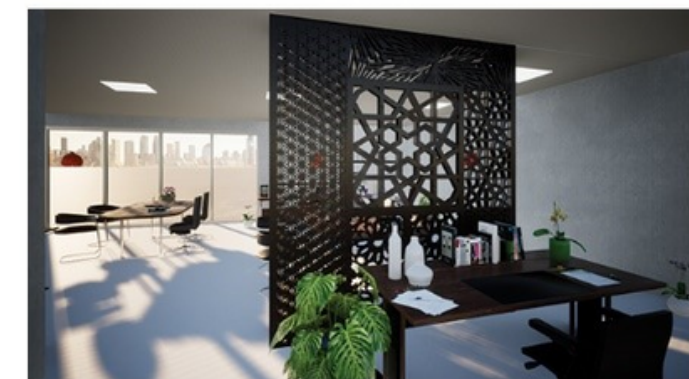
Elevation - Scale 1:10



3D Shot



3D Shot

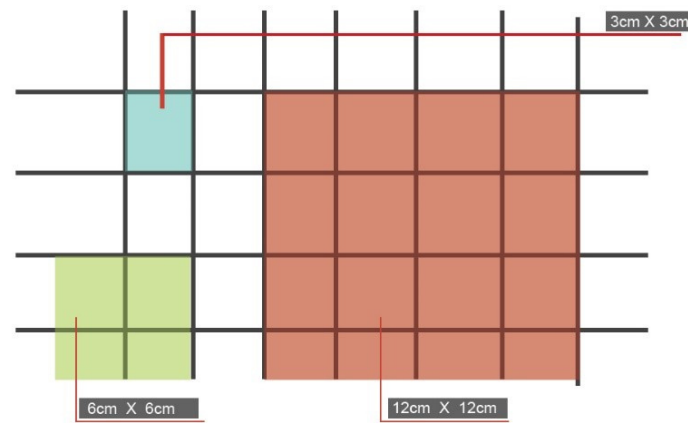


3D Shot

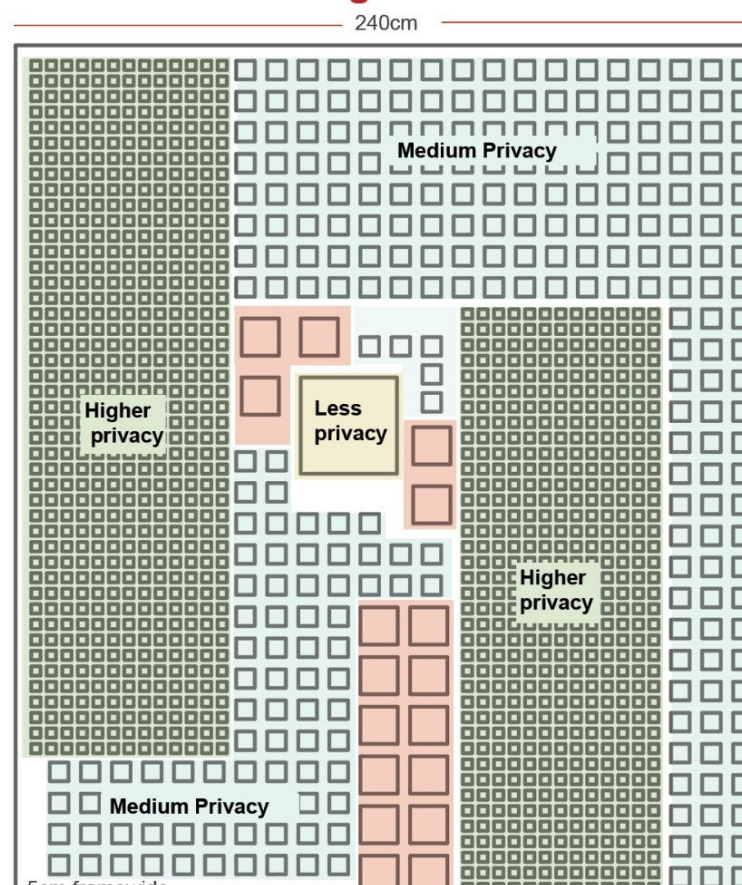
## STUDENTS' WORK

### Pattern Concept

The design two reflects the modular generations for grid 3cm\*3cm to 12cm\*12cm as modern wooden partition



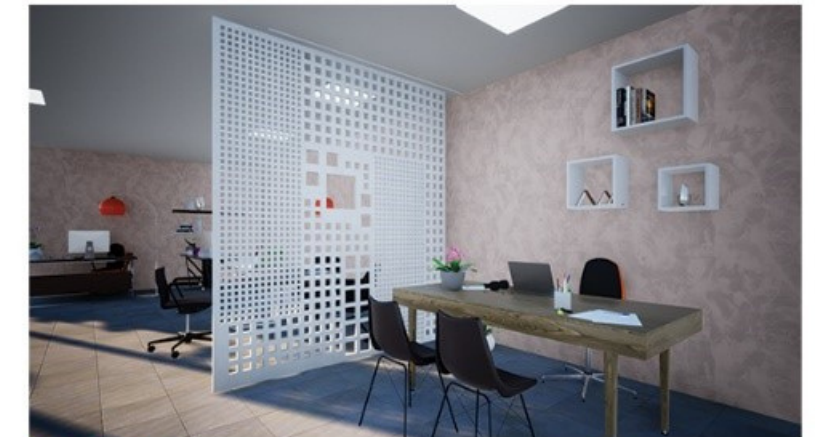
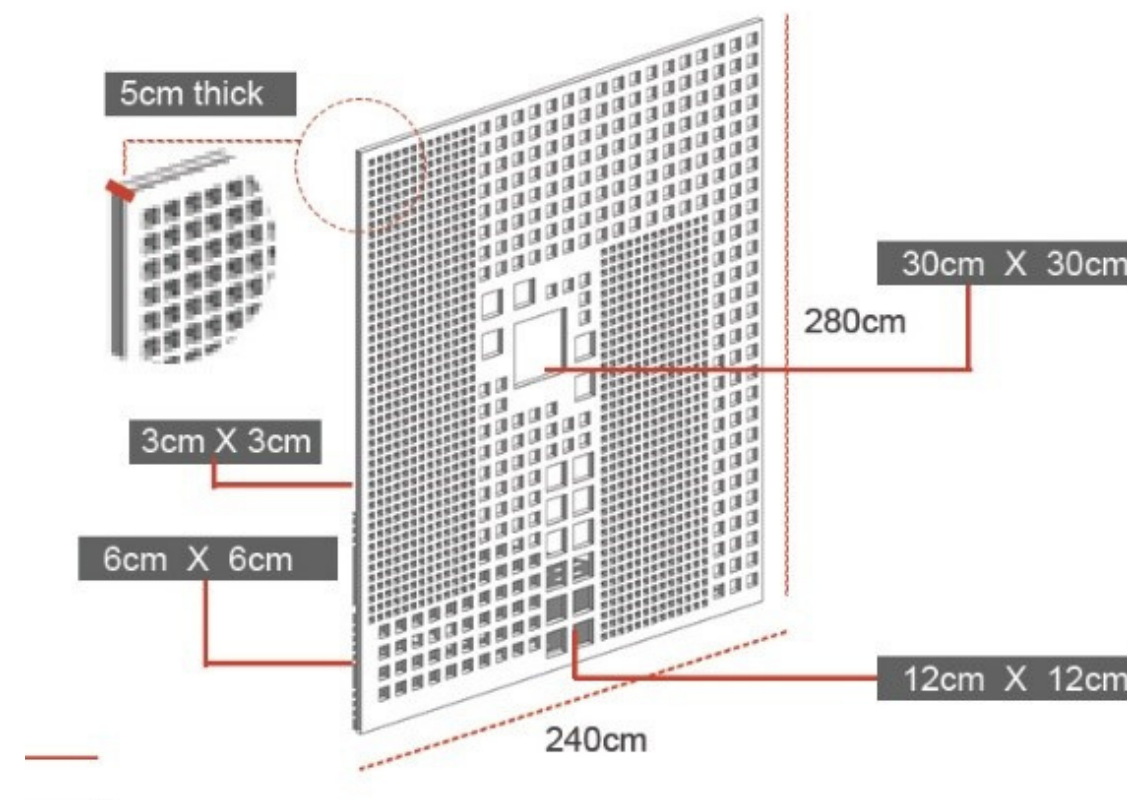
### The Pattern Design



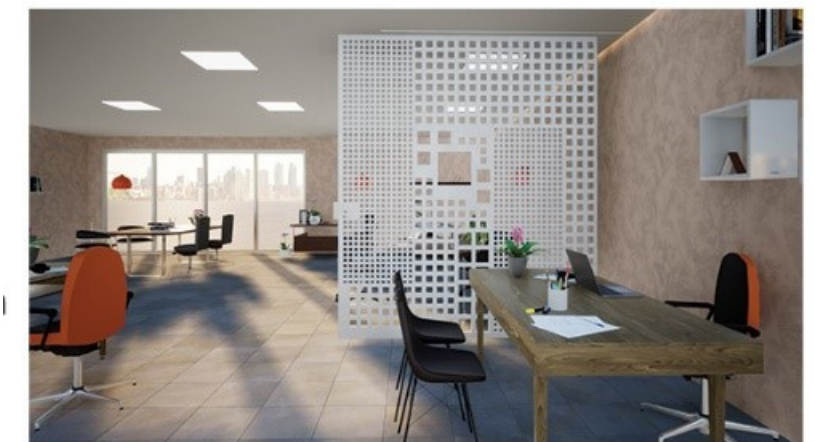
### Design Specifications :

- Modern Patteren Style
- Fixed Wood Partition
- Room divider function
- RAL Color - White 9010

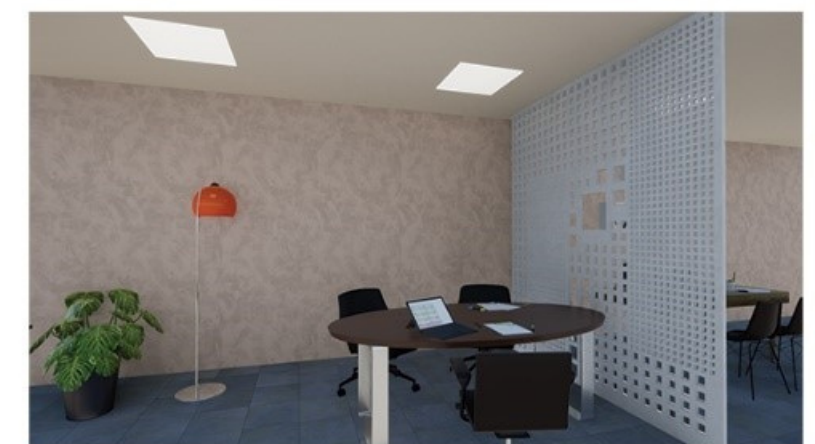
### Details :



3D Shot



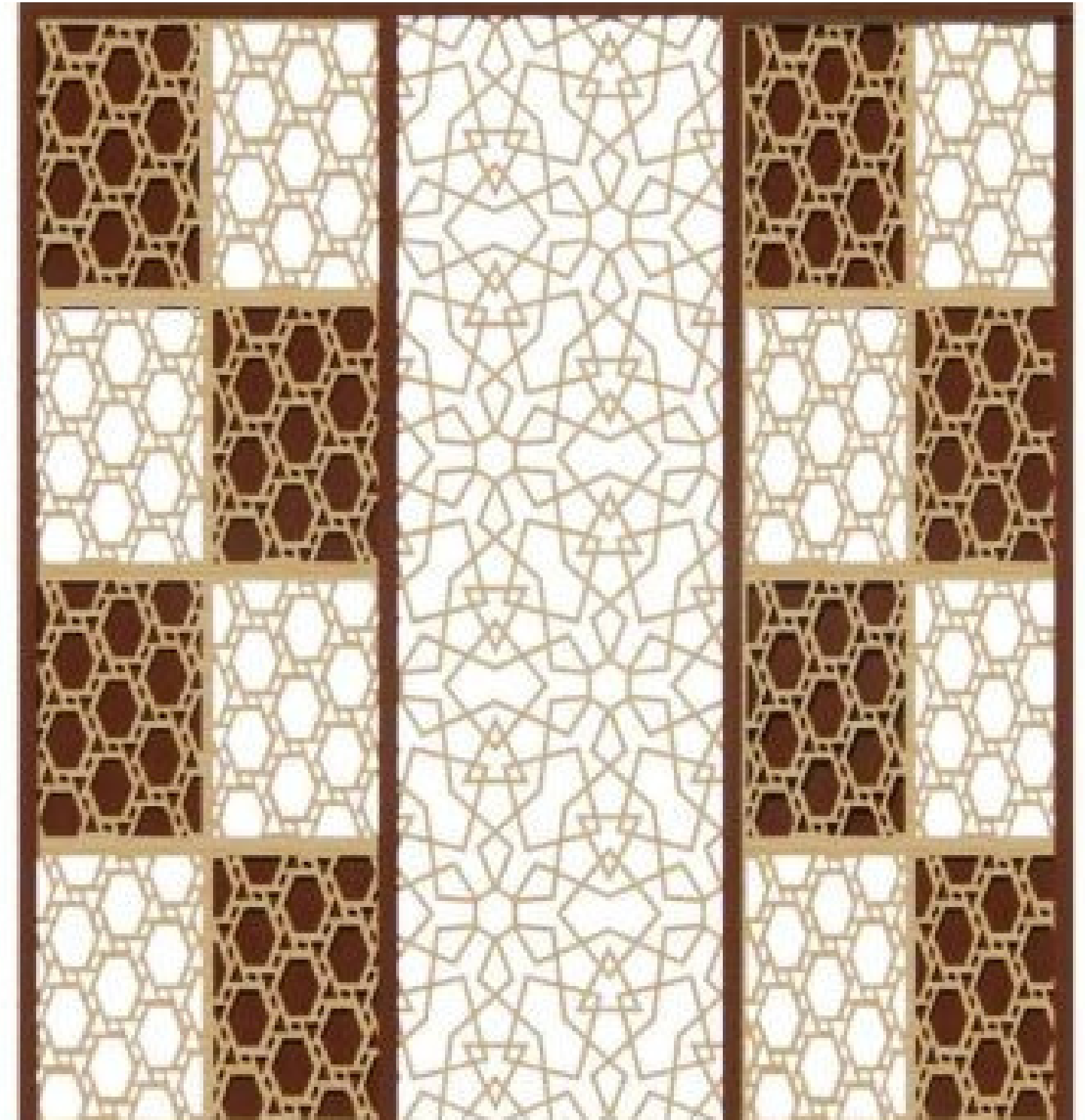
3D Shot



3D Shot

# STUDENTS' WORK

Craft Technology

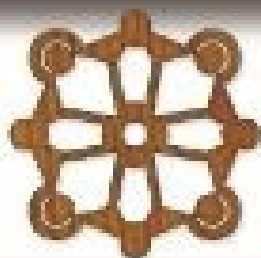


## STUDENTS' WORK

### Information

- \* Designer : Afnan Al-Moathen.
- \* Material : Wood.
- \* Design : Islamic.

### Repeated Shapes



### Solid and Void

- \* Solid : 45%
- \* Void : 55%

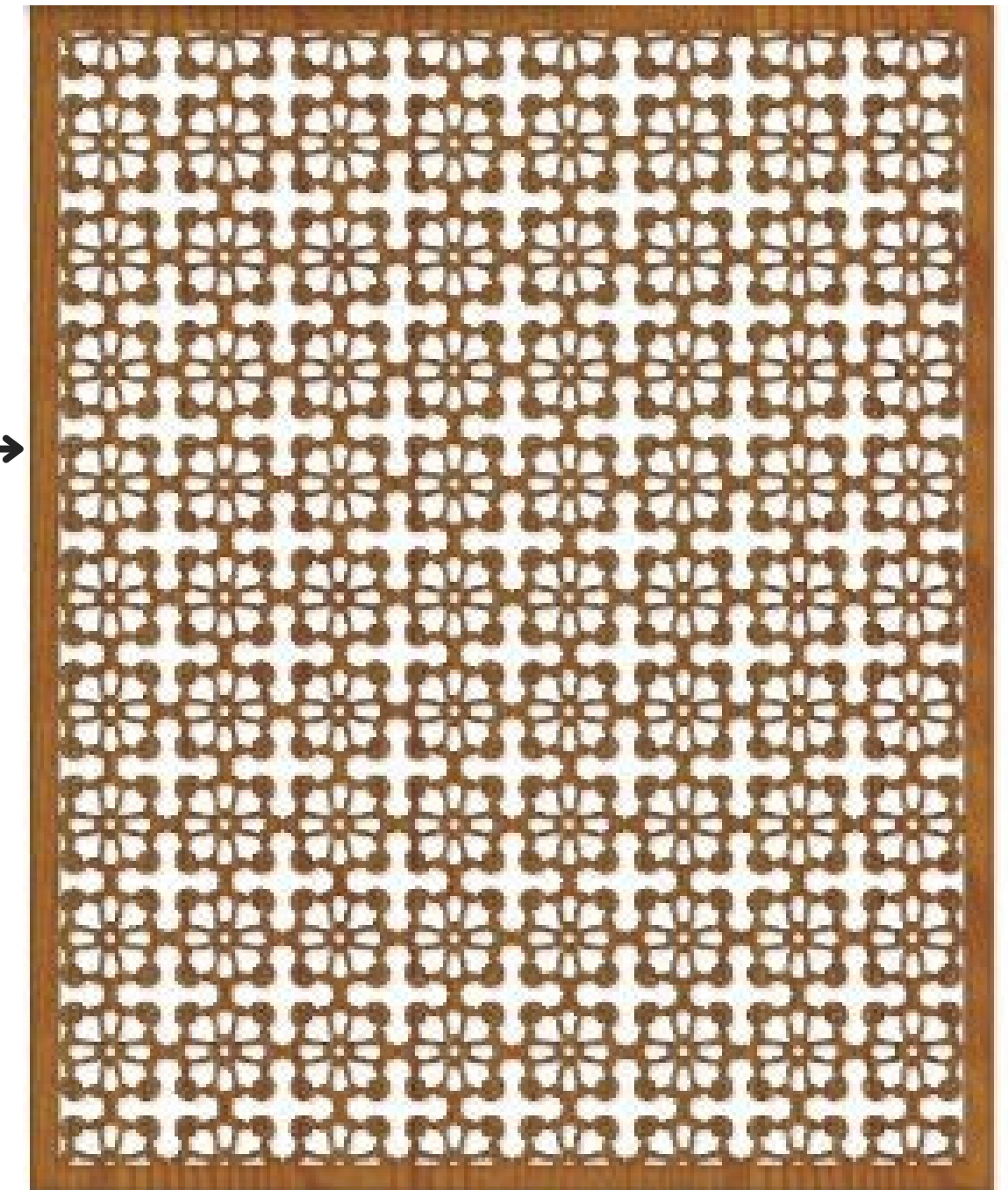
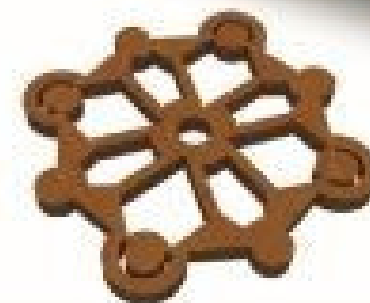
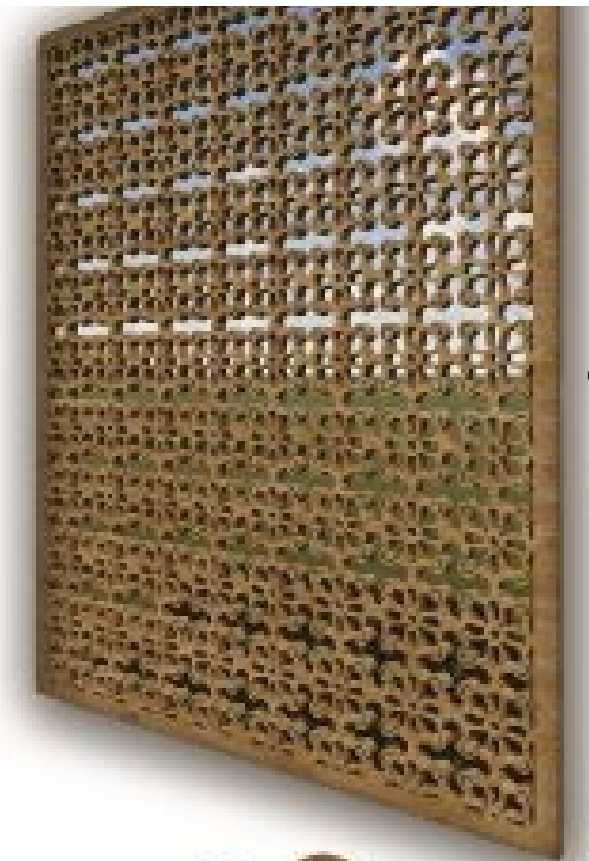
### Dimension

2.80m \* 2.40m

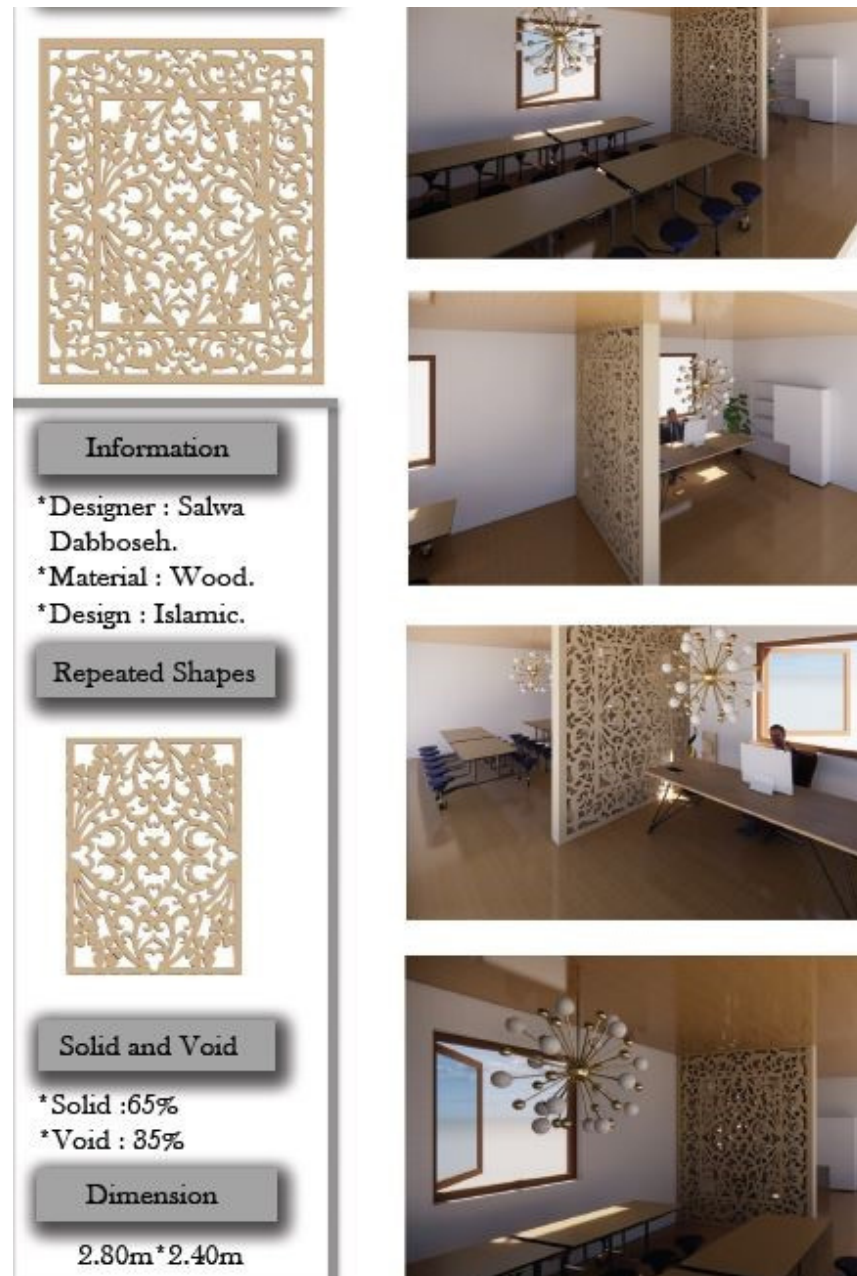
### Abstraction



*Passiflora caerulea*




## STUDENTS' WORK



**Information**

- \* Designer : Salwa Dabbseh.
- \* Material : Wood.
- \* Design : Islamic.

**Repeated Shapes**



**Solid and Void**

- \* Solid : 65%
- \* Void : 35%

**Dimension**

2.80m \* 2.40m





# HEXAGON END TABLE

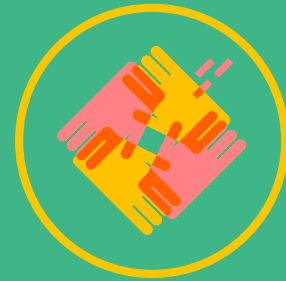
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## Objective of the project

Encourage critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems.

## Table of Contents

- All about the hexagon table
- Materials needed
- Dowel joinery for concealed joints
- Printable plans
- How to Build the hexagon table



## REQUIRED MATERIALS FOR THIS PROJECT

- Lumber per the plans
- Multi-mark tool
- Table Saw (if using a 1×10 board)
- GRR-RIPPER push block
- Miter Saw .
- Power Drill/Driver
- Brad Nailer and 1 ¼" finish nails
- 3/8" dowel jig kit
- 3/8" fluted dowel pins
- Wood glue
- Jig Saw
- Band Clamps
- Pipe Clamps or bar clamps
- Digital angle gauge (Optional but recommended for accuracy)
- Stain or paint of your choice.



# Instructions

## DOWEL JOINERY FOR CONCEALED JOINTS

- With so many joints in the picture, I specifically wanted concealed joints for this project.
- They had never used dowel joinery before this and after a lot of research, I decided this was the way to go.
- Using dowel joinery is really quite easy and if done accurately is quite foolproof.



## Instructions

### STEP 1:

#### MAKE THE CUTS

- • Start by cutting off the part of the board that will make the table top.
- • Rip the rest of the 1×10 into 1½" wide strips on the table saw
- • Cut the strips down to size per the cut list.



# Instructions

## STEP 2:

### BUILD FRAMES

- Build 6 frames using dowel joints.
- After drying overnight, the frames are ready for the next step



## Instructions

### STEP 3:

### CUT FRAMES

- Set the table saw blade at a 30° angle. (Or 60° depending on the direction)
- Bring the fence as close as possible to the blade so that the cut starts at exactly the edge of the frame. Be sure to make a few test cuts.
- Run each frame through the table saw so both ends of the frames are cut off at 30°. Be sure to check the direction of the cuts.



## Instructions

### STEP 4:

### GLUE UP THE FRAMES

- • Lay down masking tape and band clamp on the workbench and arrange the frames over them.
- • Add glue between each joint.
- • Slowly roll them up to build the hexagon.

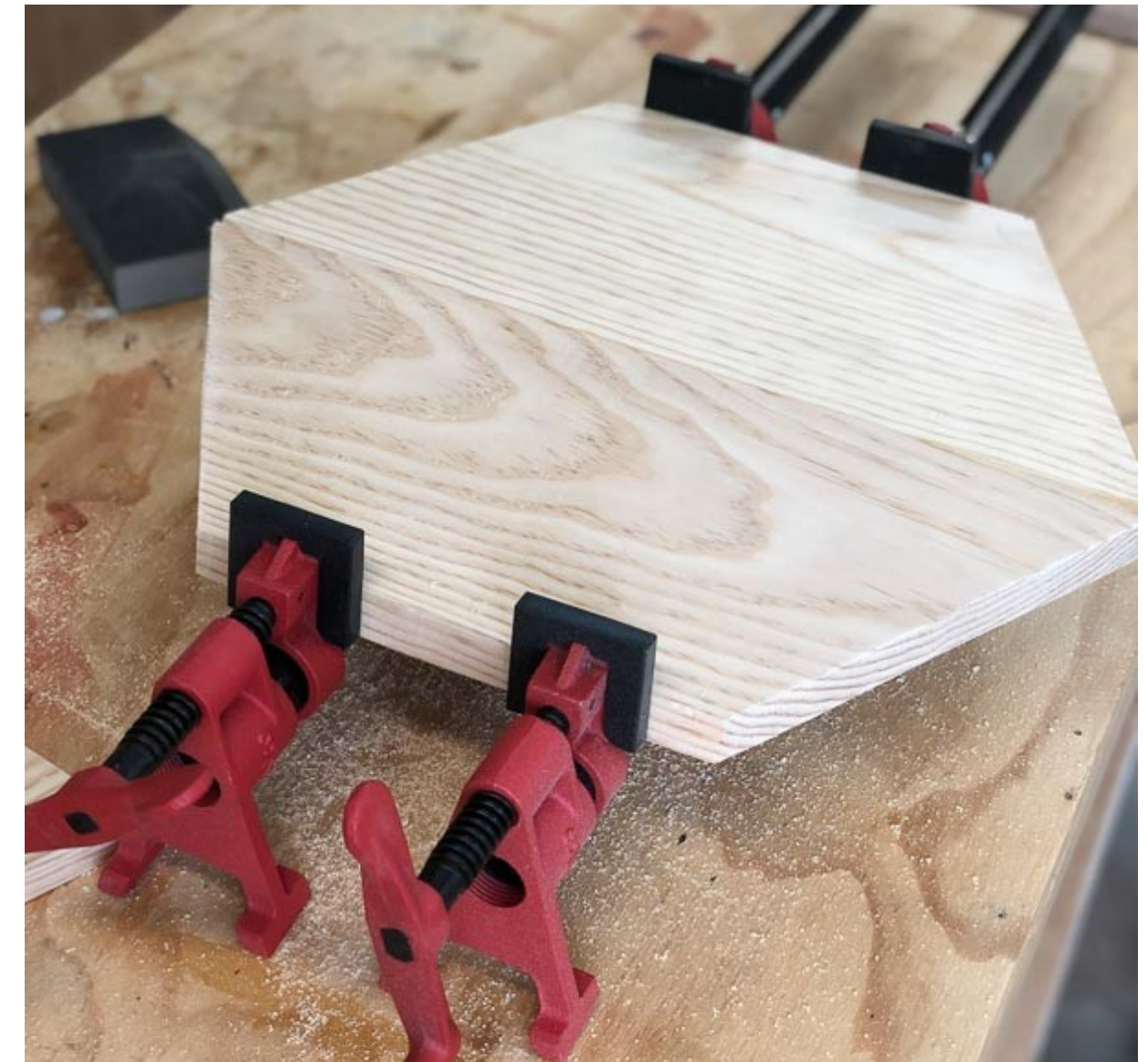


## Instructions

### STEP 5:

#### CUT THE TOP.

- The top is cut from the part of the board we cut off at the beginning.
- Use the bottom frame built in the above step as a guide to cutting out the shape of the top using a Jigsaw. There will be two halves.
- Glue up the two halves to form the full hexagon using wood glue and clamps and let dry overnight.



## Instructions

- **STEP 6 – Add finish**
- Fill any nail holes with wood putty and creases with caulking.
- Apply stain or color of your choice.
- **STEP 7 – Attach the top**
- The top can be attached to the frame using either a strong glue or L-brackets from the bottom.



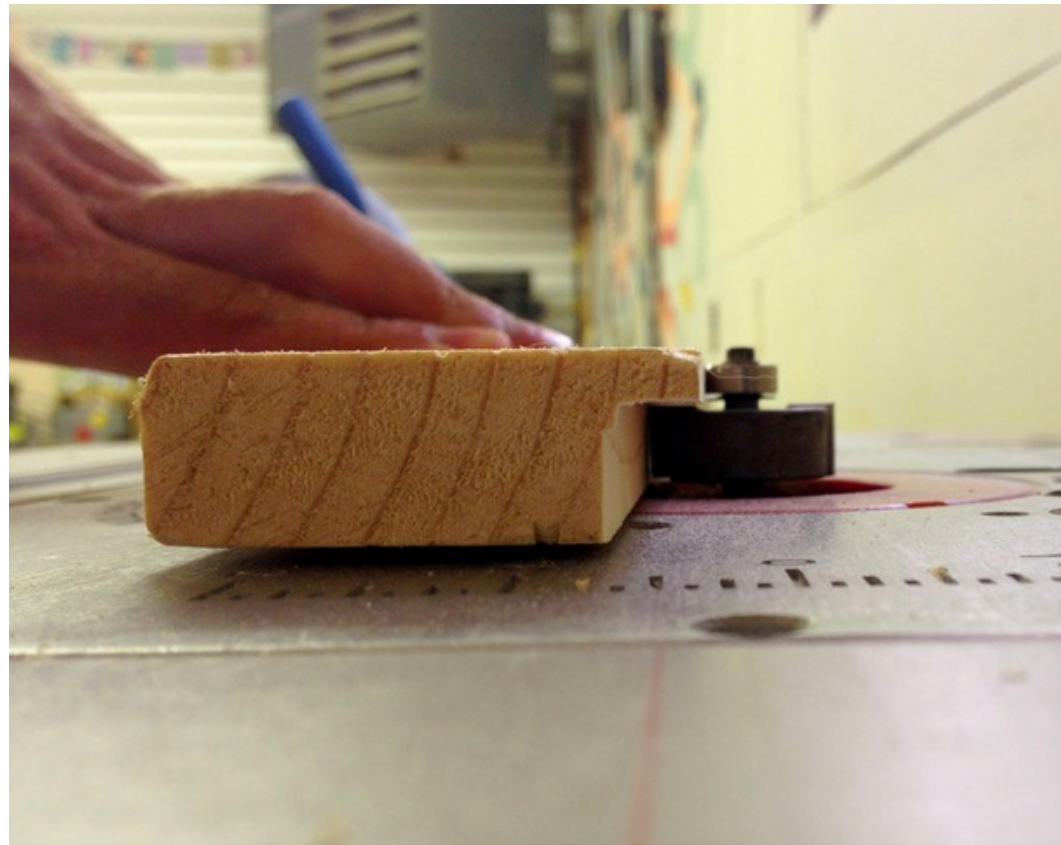
## 3D WOODEN GEOMETRIC ART

### Objective of the project

Support the student's creative thinking in the creation the details and application of acquired knowledge for future building practices.



# Instructions



## WOOD WALL ART FROM PLYWOOD SCRAPS

---

### Objective of the project

offer a comprehensive view of the buildings finishing work, interior as well as exterior, technological context, construction requirements and sequences, and construction details.

if you look at the pattern on the tile floor, you can see that the four "lobes" of the design create both a flower and a circle. I decided to create the flower, with all the points meeting in the middle and extending to the corners.

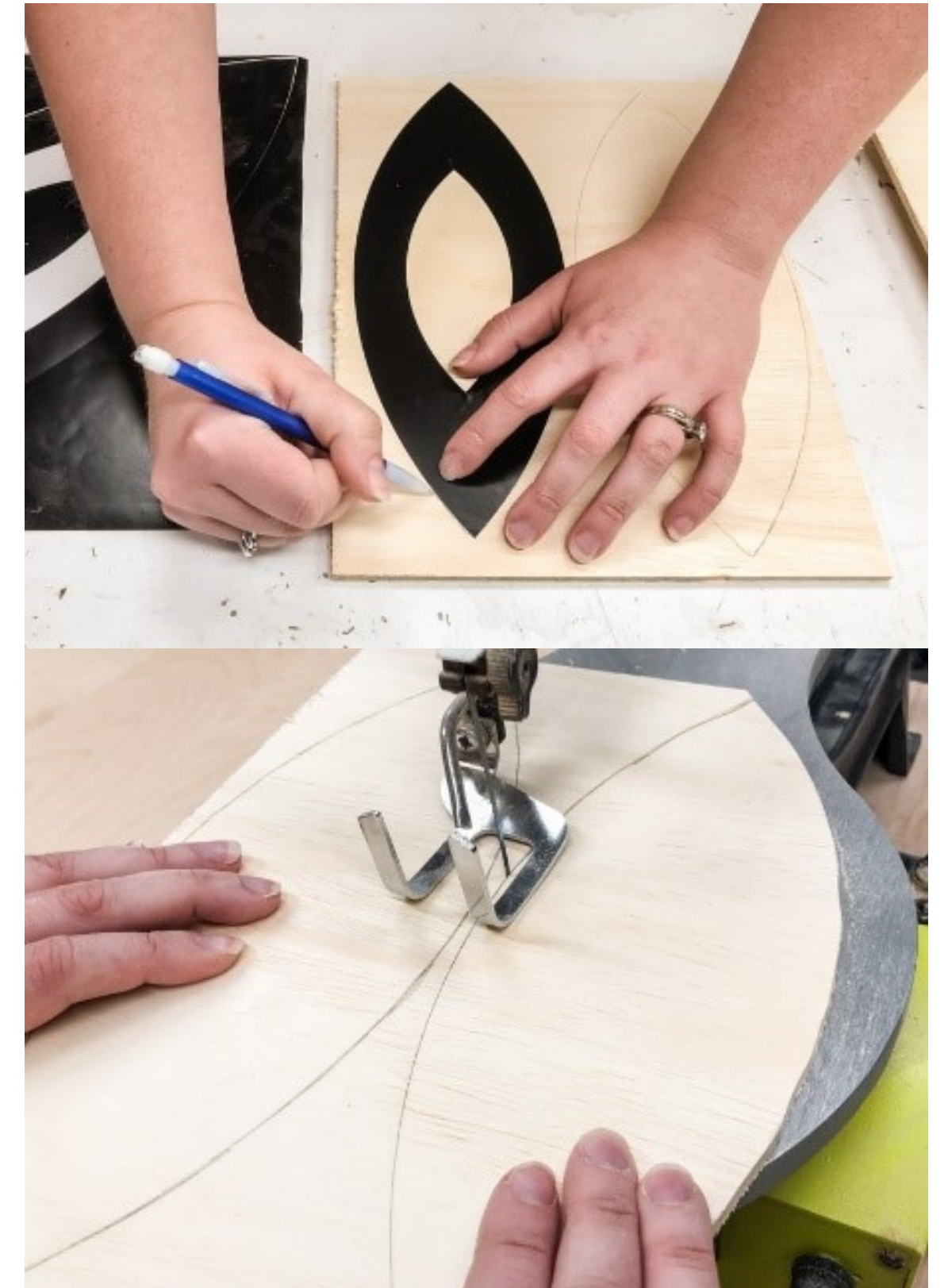
The largest shape is almost a foot long. Then I scaled it down to create two additional layers to go on top. The shapes were then cut out of vinyl with a Silhouette machine, but you can certainly do this freehand as well!



## Instructions

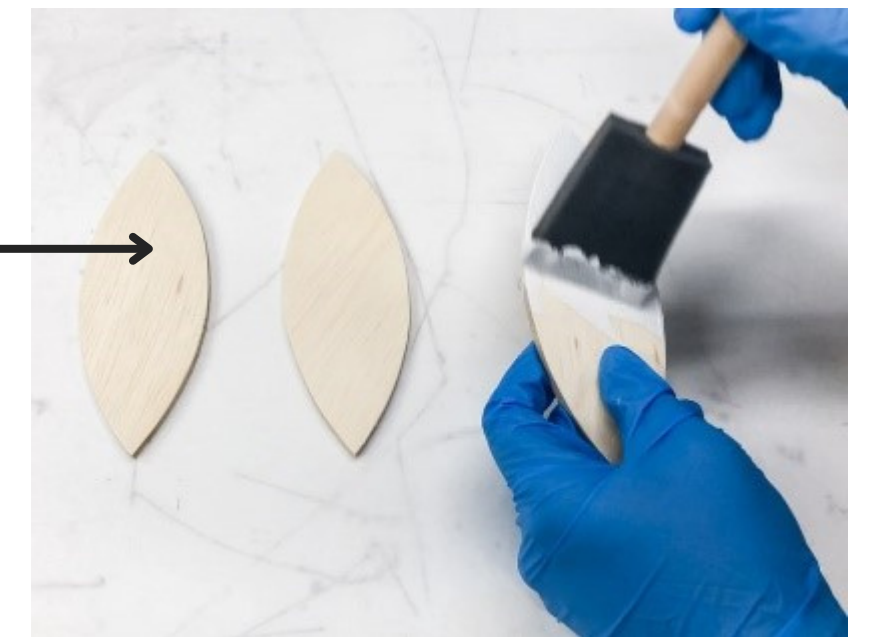
### CUT OUT SHAPES AND SAND

- cut out each shape with a jigsaw or scroll saw. I used the scroll saw because it makes cleaner cuts in thin wood and is easier to control.



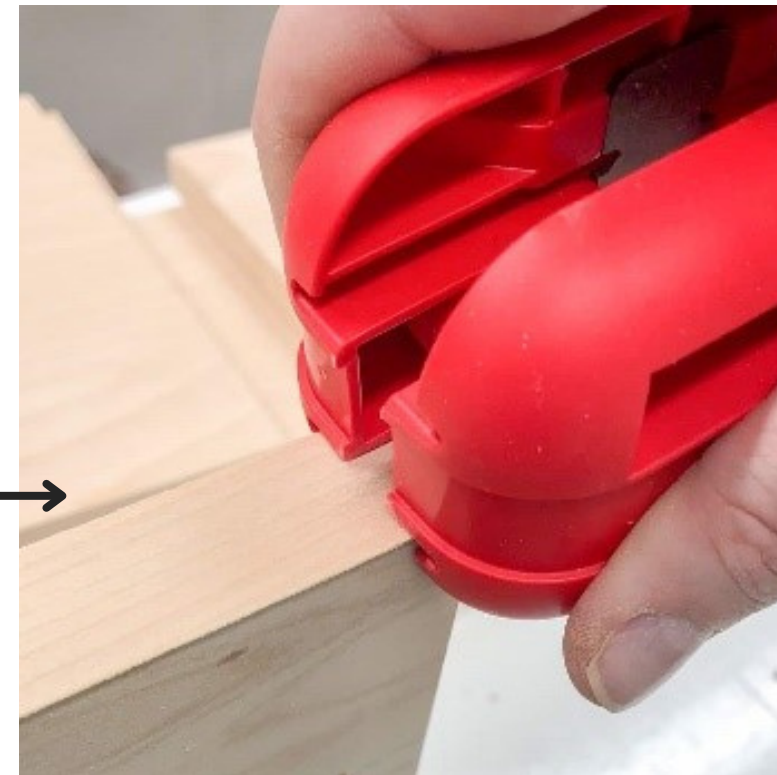
## Instructions

- Stack up the four pieces of each size and sand the edges at the same time. This will keep the shape consistent.



## Instructions

- Give the fronts a quick sanding with 220 grit sandpaper, then wipe off the dust with a tack cloth.



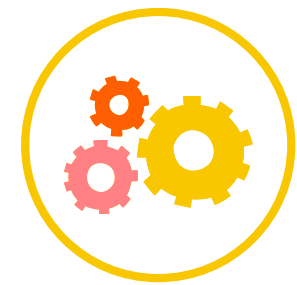
# TECHNIQUES FOR MAKING A FEW SIMPLE BOXES

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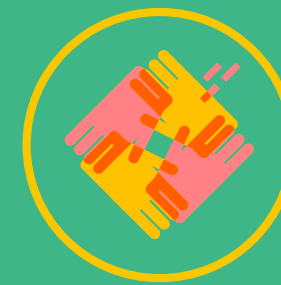
## Objective of the project

**Study Building Materials and Assemblies:**  
Understanding of the basic principles used in the appropriate selection of interior and exterior construction materials, finishes, products, components, and assemblies based on their inherent performance, including environmental impact and reuse.



## REQUIRED TOOLS FOR THIS PROJECT

- Hand drill and assorted bits
- Hand sander
- (this can either be straight sand paper and a block of wood or a power sander)
- speed square
- saw
- Clamps (few small and few large)
- Strap clamp (Or a piece of rope and a stick.. I'll explain later..)
- Tape Measure



## REQUIRED MATERIALS FOR THIS PROJECT

- Good Wood
- Most projects can be done with a single 4 foot 1x4. Project three needs a 4 foot 1x2.
- Scrap wood, or a piece or two you can sacrifice.
- a small 1/8th to 1/4 inch wood dowel
- Screws
- Wood Glue



# Box With Lid



# Basic Hinged Box



1



2



3



4



7



6

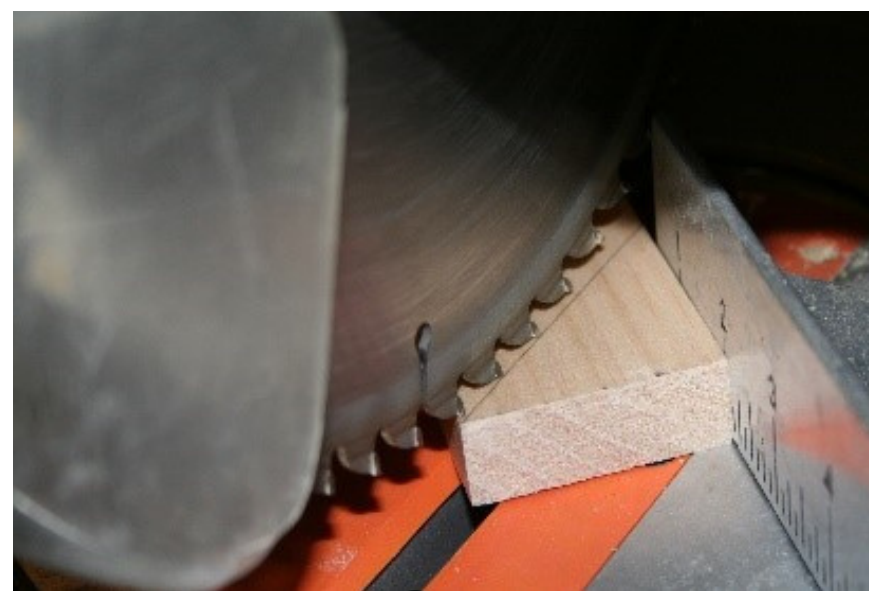


5

# Box With Mitered Corners and Pegged Top



1



2



3



4



8



7



6



5

## Final result

**Islamic decoration has been added to the box through CNC router**





# PERGOLA OUTDOOR ROOM

---

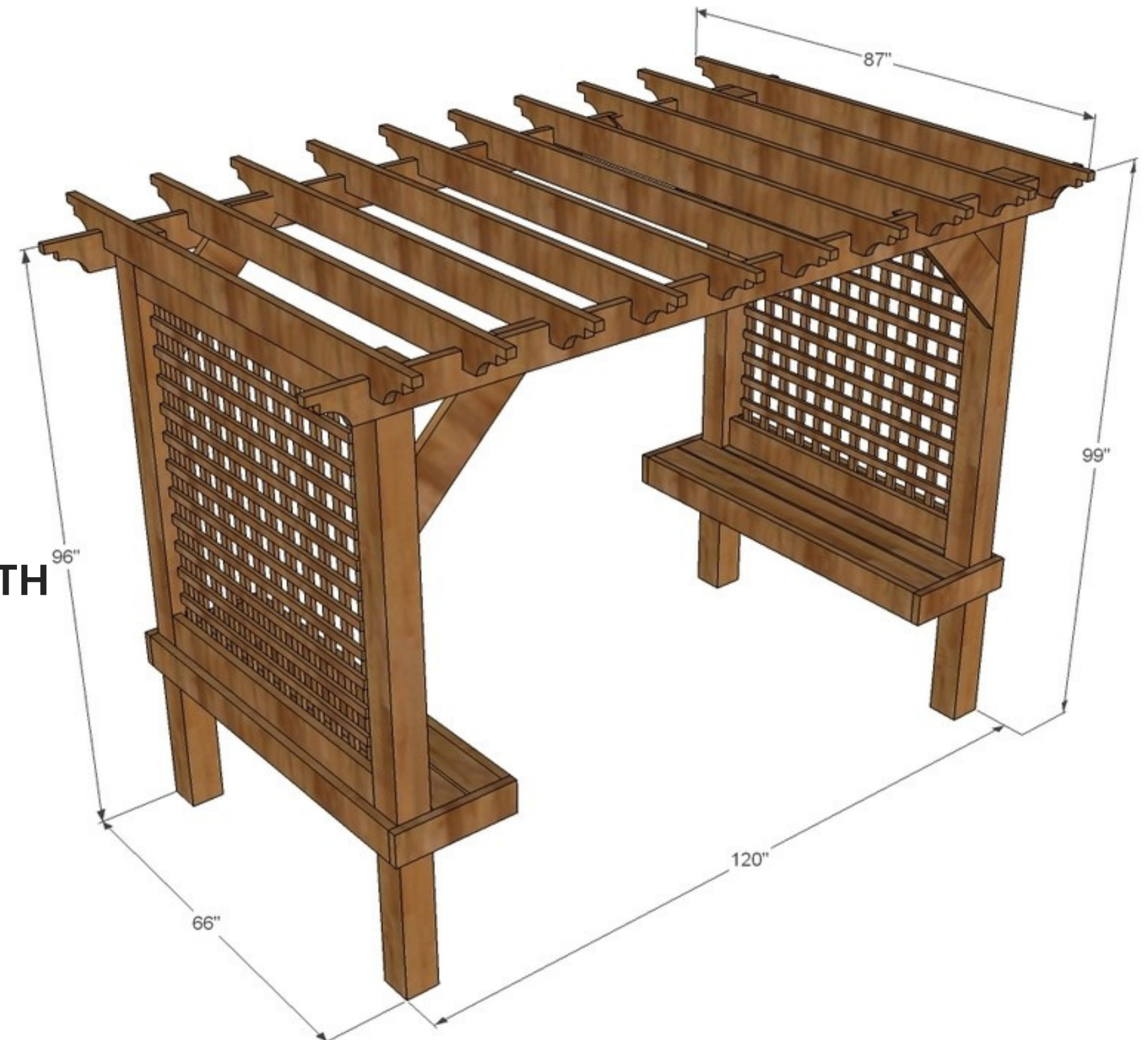
## Objective of the project

• **Building Materials and Assemblies:** Understanding of the basic principles used in the appropriate selection of interior and exterior construction materials, finishes, products, components, and assemblies based on their inherent performance, including environmental impact and reuse.

## Dimensions

### Preparation

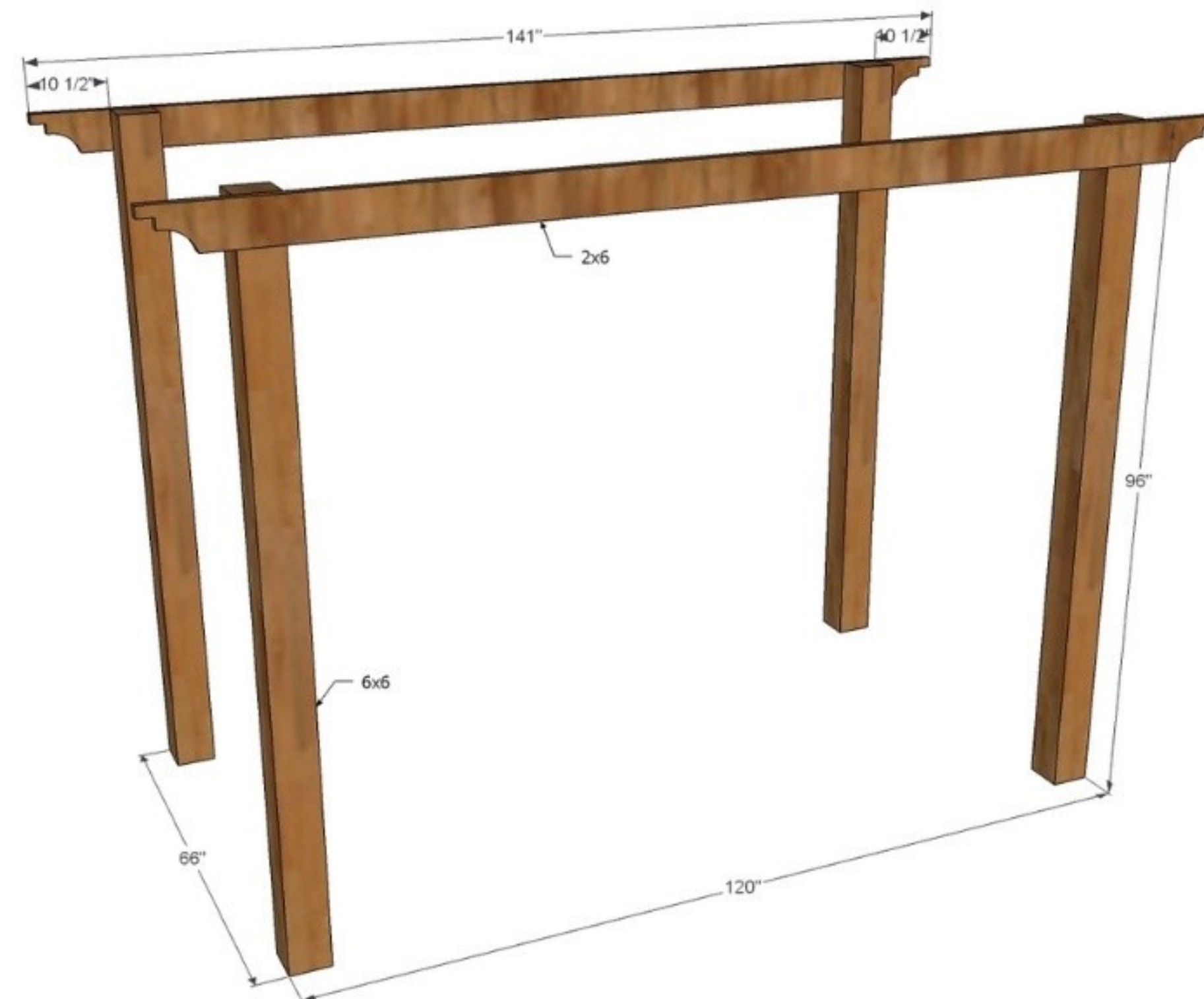
- 2-1/2", 3 -1/2" EXTERIOR DECKING SCREWS
- 1-1/4" AND 2" 18 GAUGE STAPLES
- 4 - 6X6 POSTS, 8 FEET LONG
- 2 - 2X6 BOARDS, 12 FEET LONG
- 10 - 2X6 BOARDS, 8 FEET OR STUD LENGTH  
(CUT UPPER RAFTERS FROM THESE BOARDS)
- 10 - 2X6 BOARDS, 12 FEET LONG
- 1 - 2X8 BOARD, 8 FEET LONG
- 1 - 2X4 BOARD, 10 FEET LONG
- 24 - 1X2 BOARDS, 10 FEET LONG



## Instructions

### STEP 1

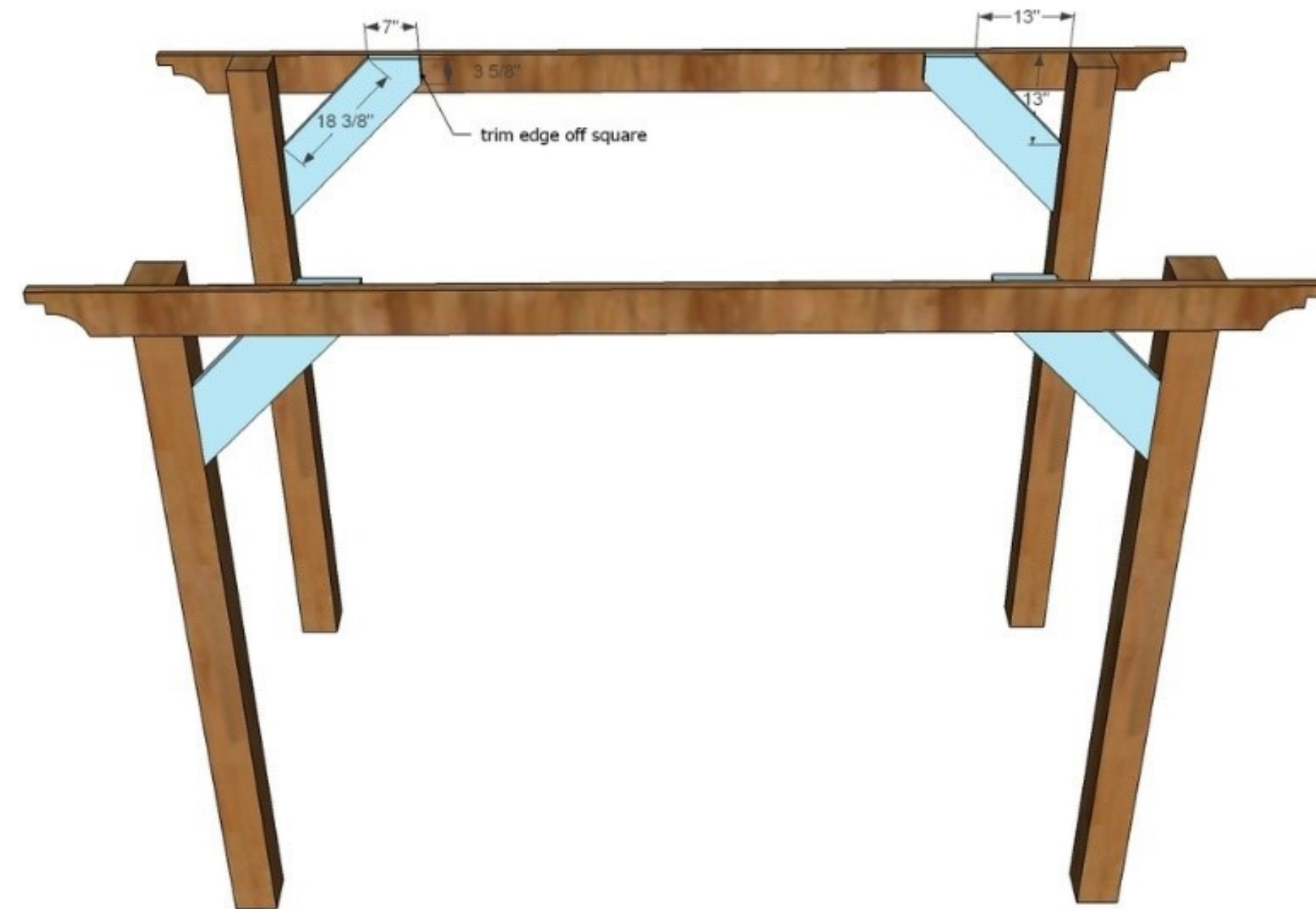
Carefully space 6x6 posts out on a level surface, 120" apart from outside to outside. Mark 141" long rafters, 10-1/2" in from ends on each end. Pre-drill four holes and attach two posts with 3-1/2" long exterior decking screws. Make sure the two posts are parallel at top and bottom when you attach rafters. NOTE: If cutting decorative tails on rafters (see step 3) do this on sawhorses on the ground before attaching to pergola.



## Instructions

### STEP 2

Check to make sure your posts are parallel to each other. Then attach cross supports to posts and rafters. To attach to rafters, use 2-1/2" exterior deck screws. To attach to posts, either drill 1-1/2" pocket holes and use 2-1/2" pocket hole screws, or attach using metal brackets.

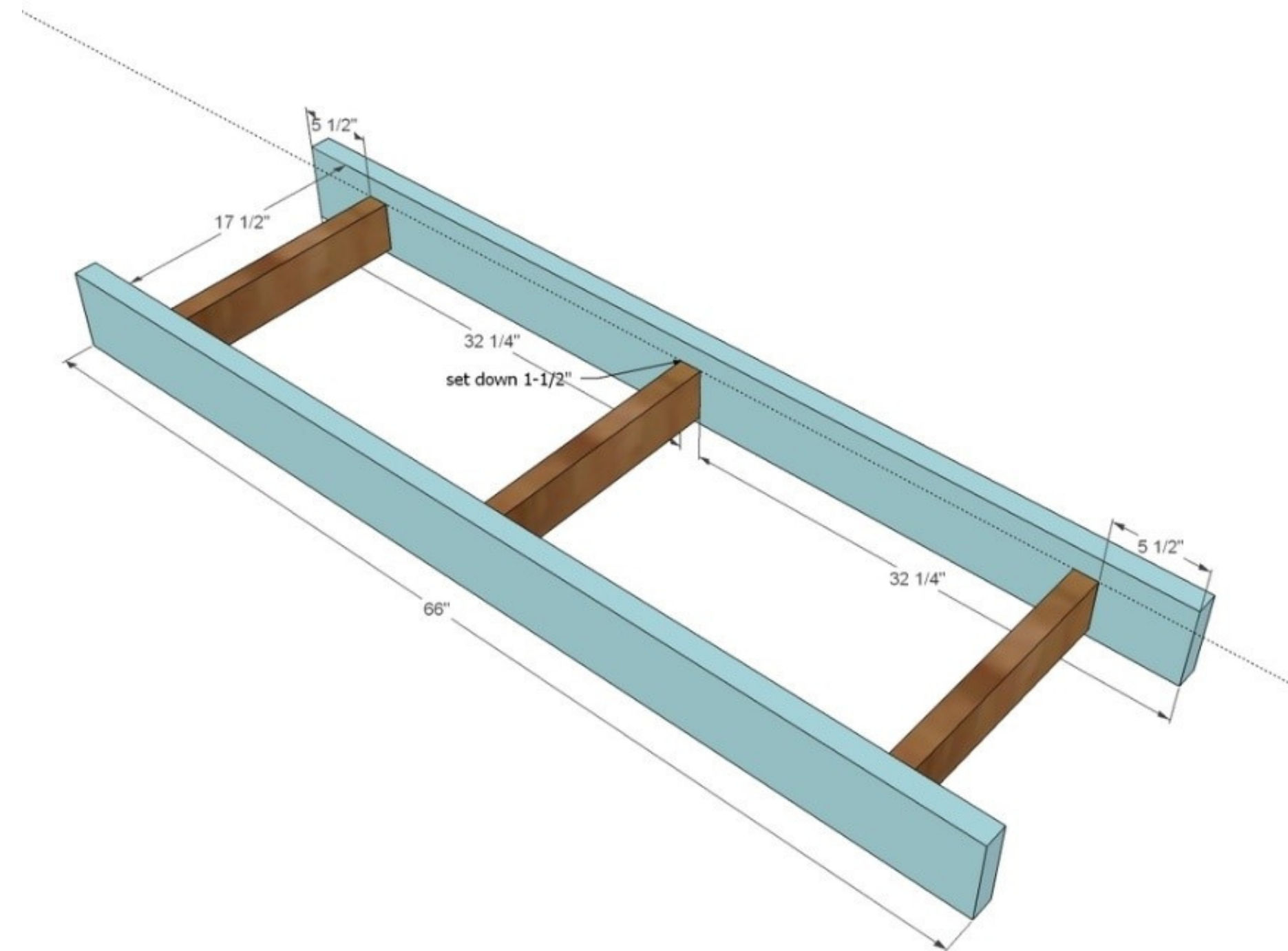




## Instructions

### STEP 3

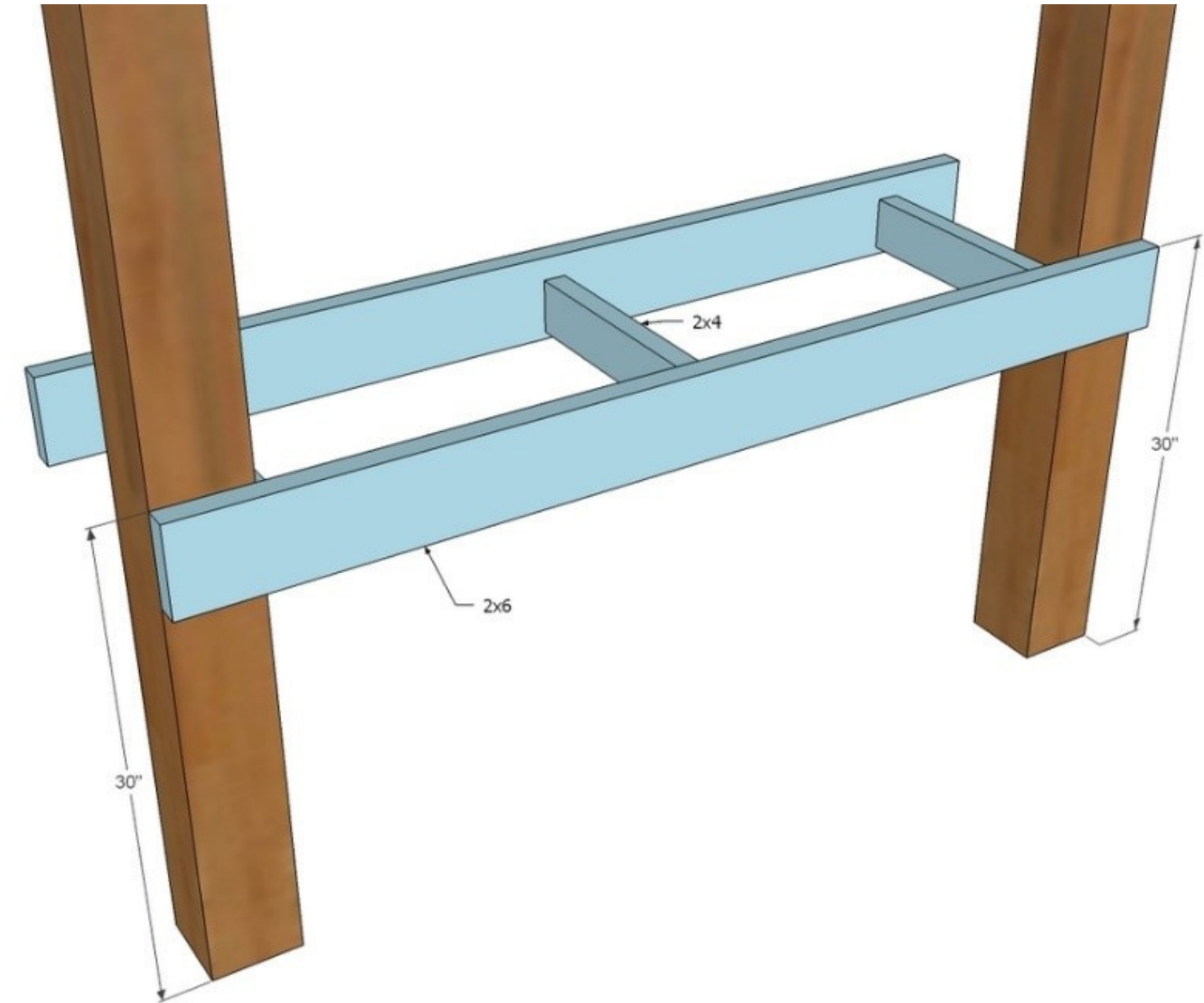
Use 3-1/2" exterior deck screws to attach shelves to posts. Pre-drill holes and attach through both 2x4s and 2x6s.



## Instructions

### STEP 4

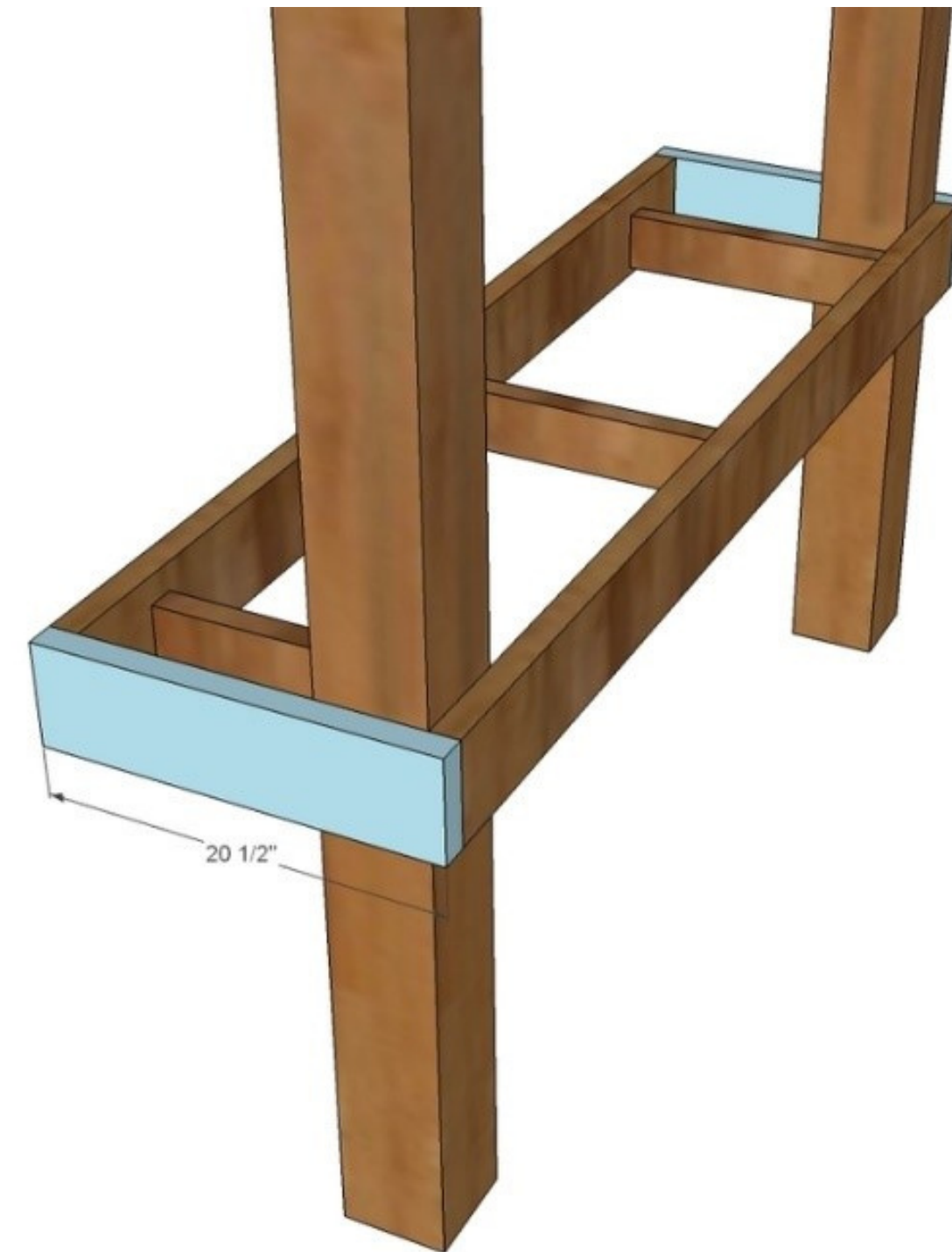
Use 3-1/2" exterior deck screws to attach shelves to posts. Pre-drill holes and attach through both 2x4s and 2x6s.



## Instructions

### STEP 5

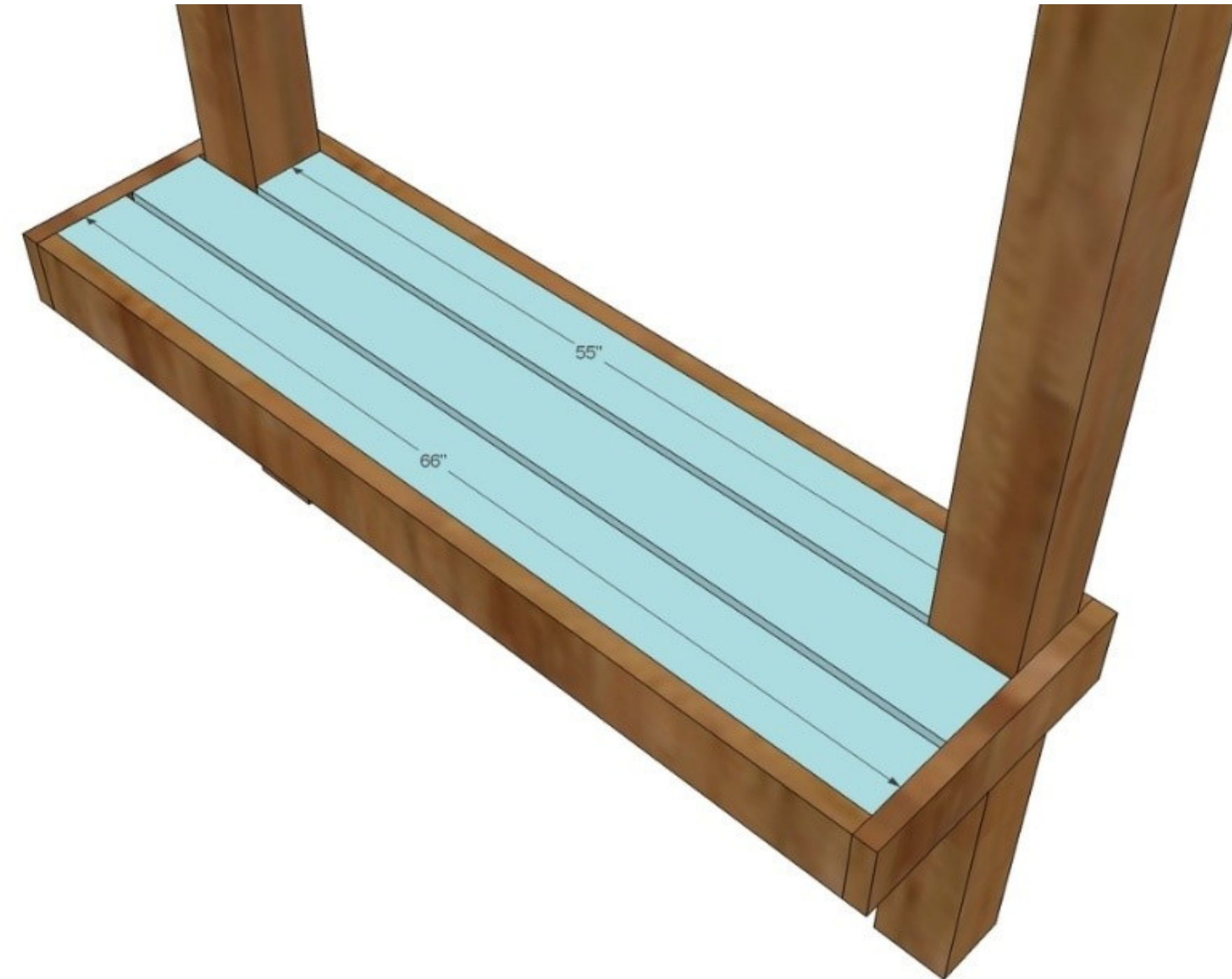
Predrill holes and attach 20-1/2" long 2x6 to ends of shelf 2x6 boards with 2-1/2" exterior wood screws.



## Instructions

### STEP 6

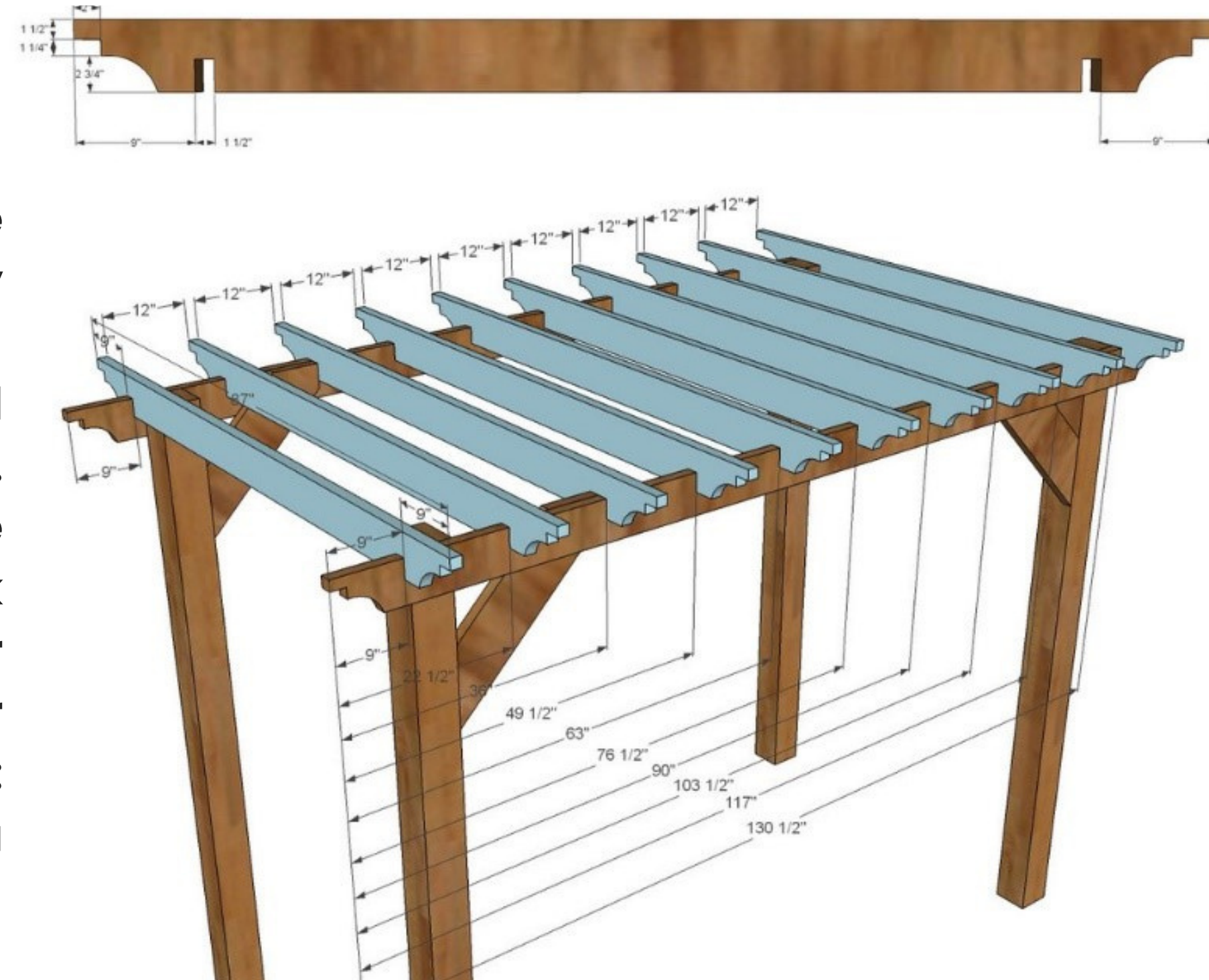
Lay seat boards in place. Attach to 2x4 framing with 2-1/2" exterior deck screws through predrilled holes.



## Instructions

### STEP 7

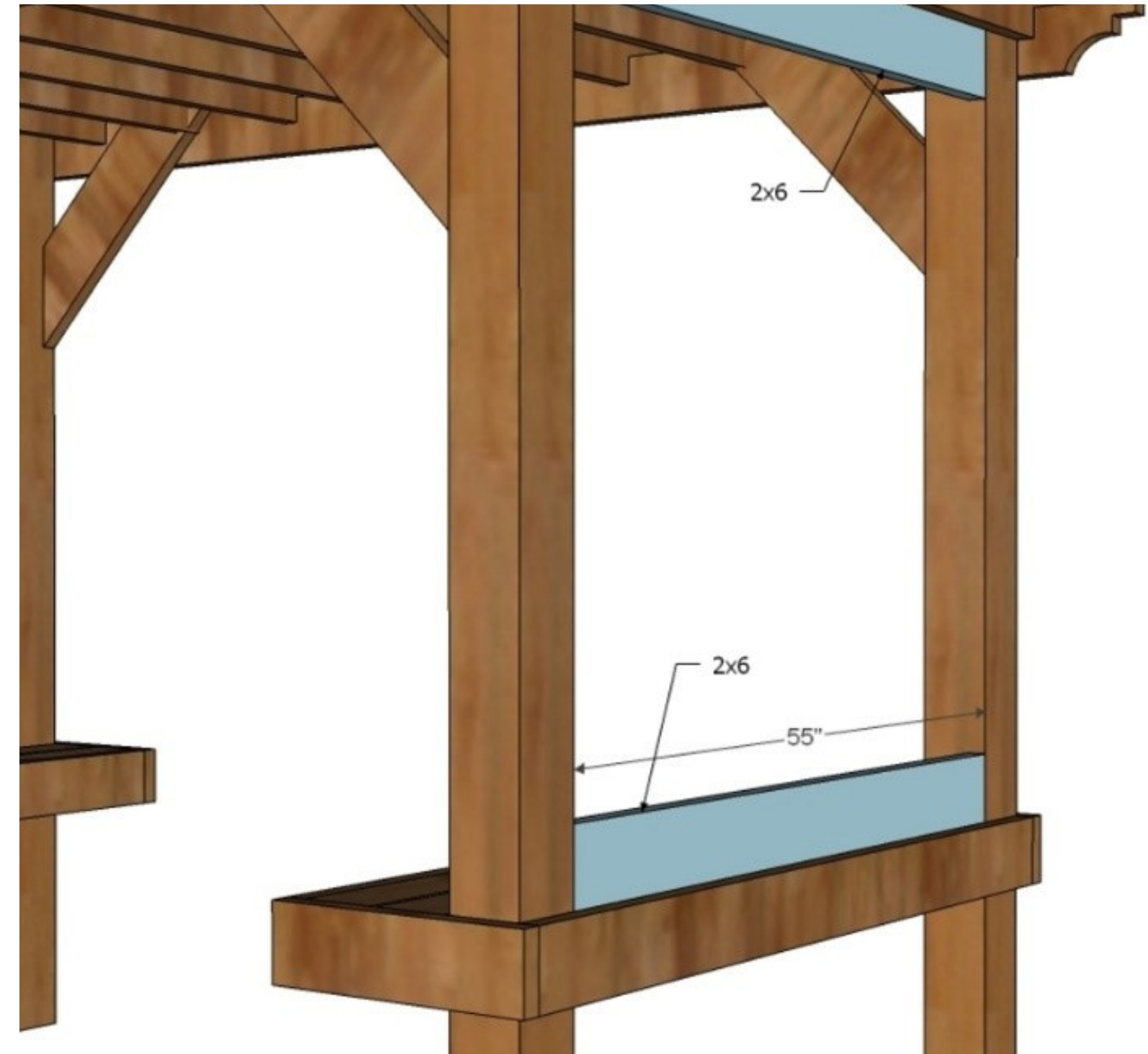
Cut tails of rafters if desired | decorative pattern with jigsaw. Notch out rafters by setting saw blade depth of circular saw to 2-3/4", and make cuts every 1/4" in the wood to be removed. Use a chisel to remove wood. TIP: Notch multiple rafters at the same time by clamping together and cutting. Mark rafters attached to top of posts for upper layer of rafters. Attach upper rafters to lower rafters with 3-1/2" screws through top. TIP: Cut a 12" scrap wood piece and use it as a spacer when attaching rafters.



## Instructions

### STEP 8

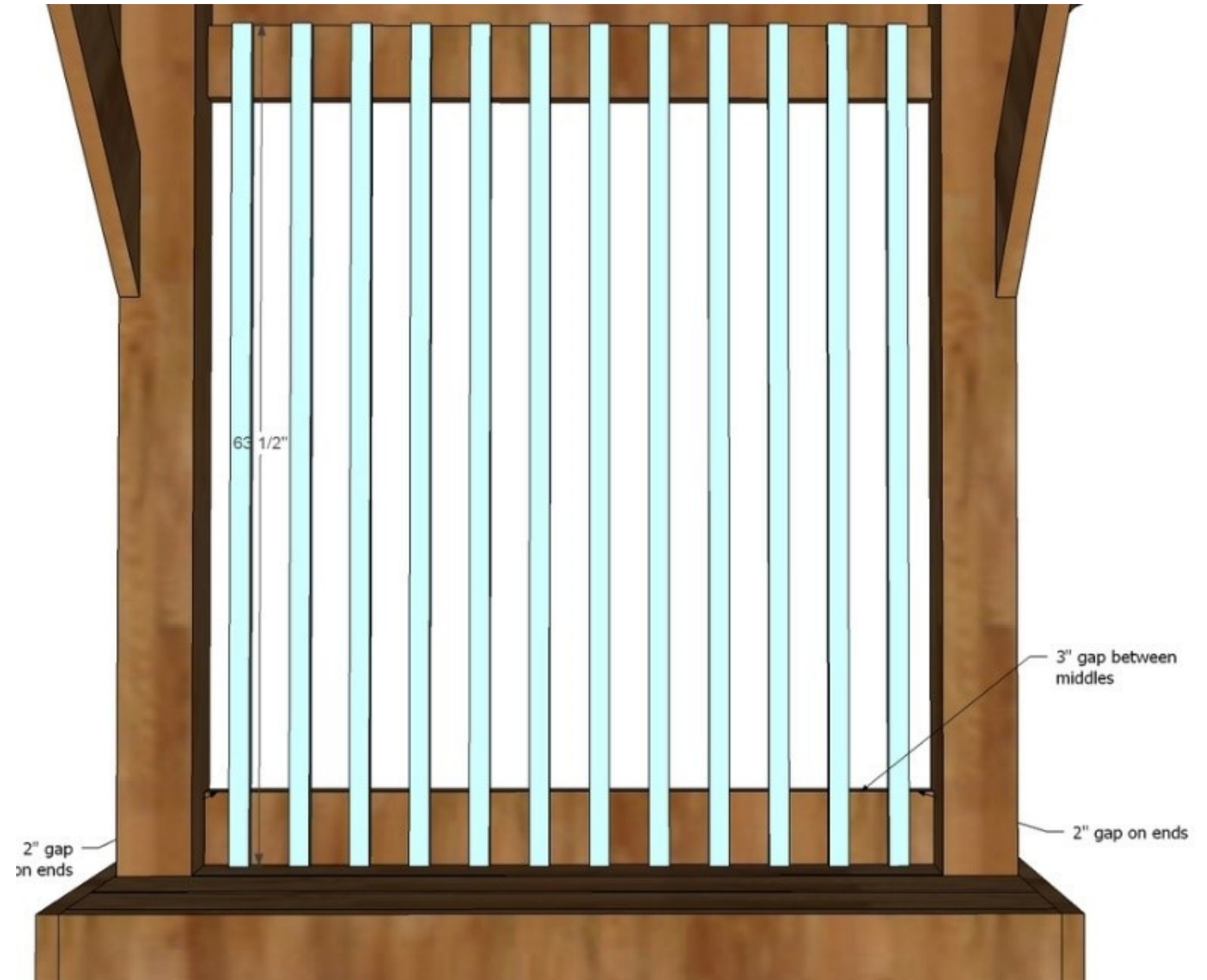
Drill (2) 1-1/2" pocket holes on each end of 2x6 boards that are 55" long. Attach to posts with 2-1/2" pocket hole screws.



## Instructions

### STEP 9

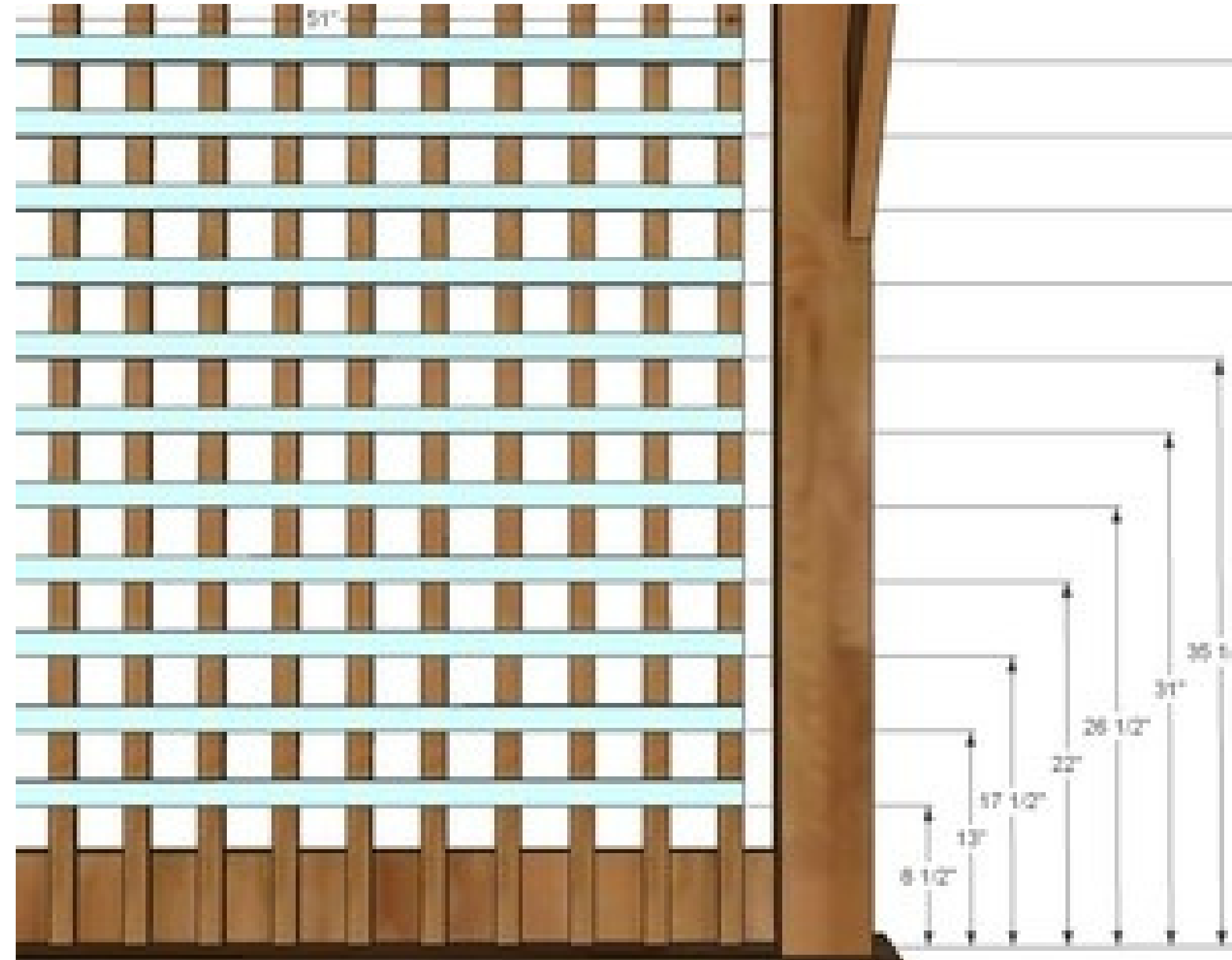
Use 2" staplers to attach vertical lattice boards to 2x6s from previous step. Start 1-1/2" offset from center and work outward. TIP: Use (2) 3" wood scrap blocks as spacers.



# Instructions

## STEP 10

Attach horizontal lattice boards to the vertical lattice boards with 1-1/4" staples. Spacing between boards is 3".





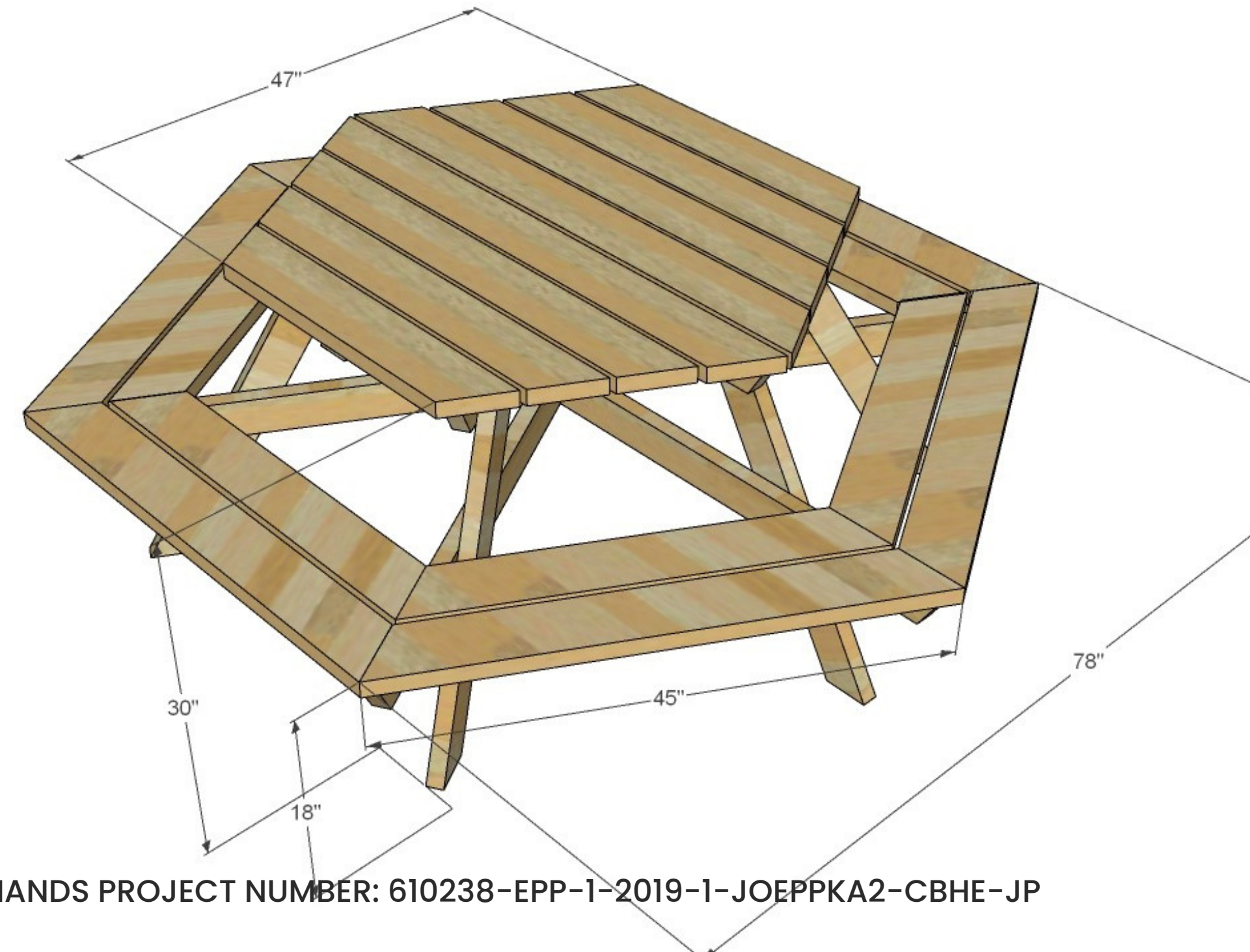
## Instructions

### STEP 11

Trim inside edges of lattice with 2x6 boards. Attach to posts with 1-1/2" pocket holes and 2-1/2" pocket hole screws.



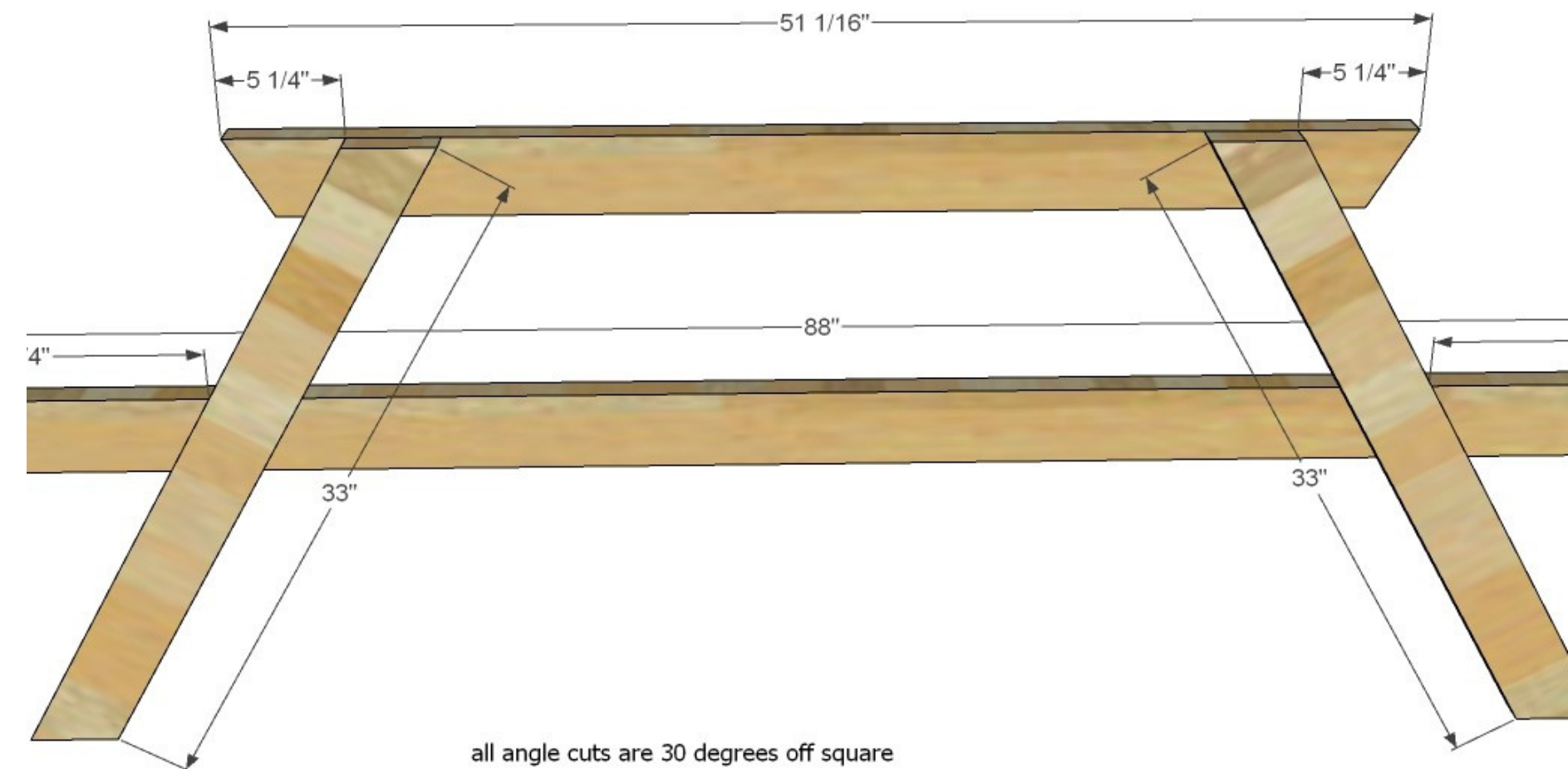
# HEXAGON PICNIC TABLE



# Instructions

## STEP 1

On a flat level surface, carefully layout the first section of the picnic table. It can help to have two people at this stage. Attach at all joints with three 2-1/2" self tapping wood screws.

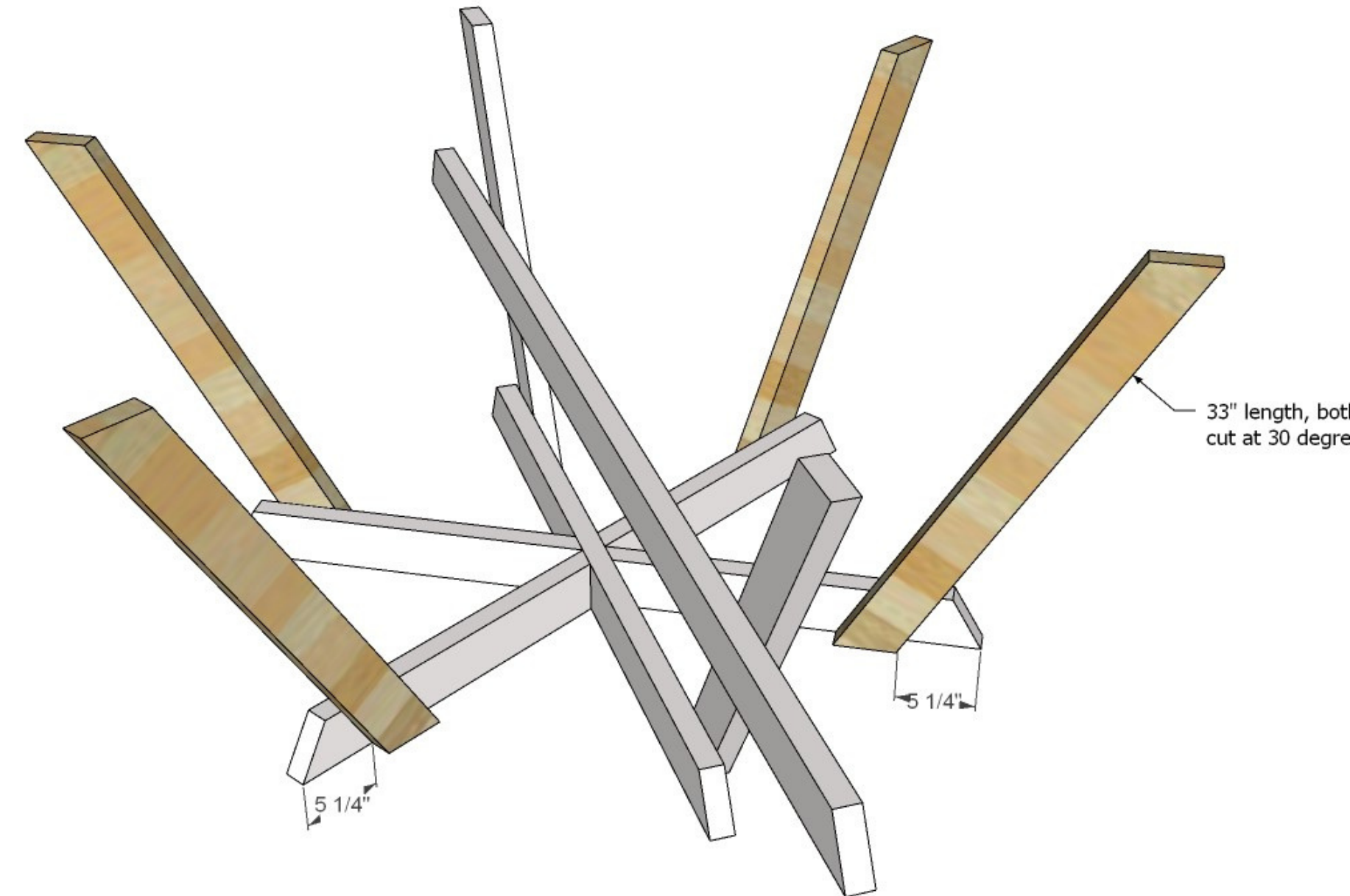


## Instructions

### STEP 2

First, cut the table supports according to the cut list. Then, keeping the same overall length, cut the outside end back at a 30 degree angle.

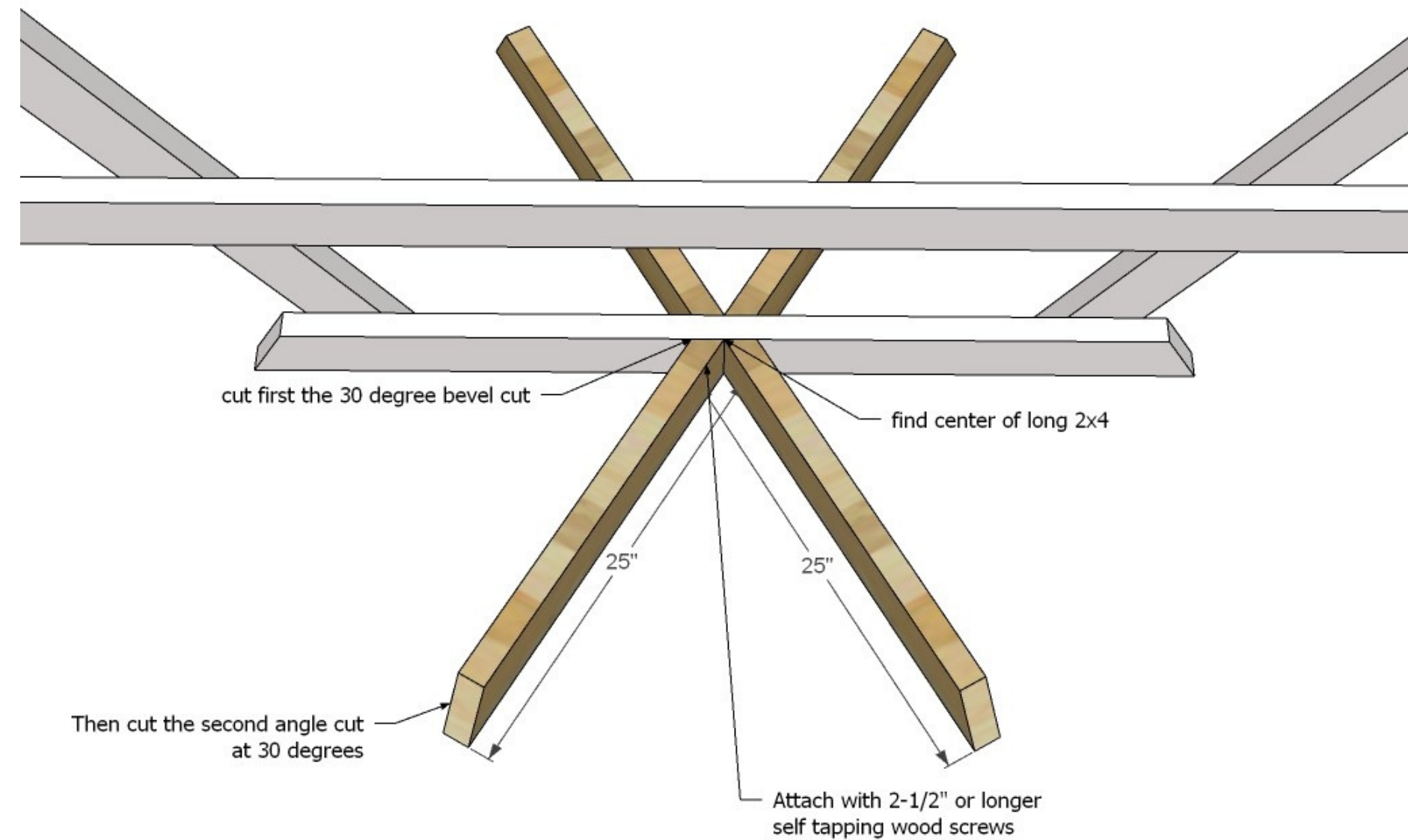
Attach centered on the main frame with the 2-1/2" screws, two screws per joint.



# Instructions

## STEP 3

Attach remaining legs with 2-1/2" self tapping wood screws, three screws per joint.



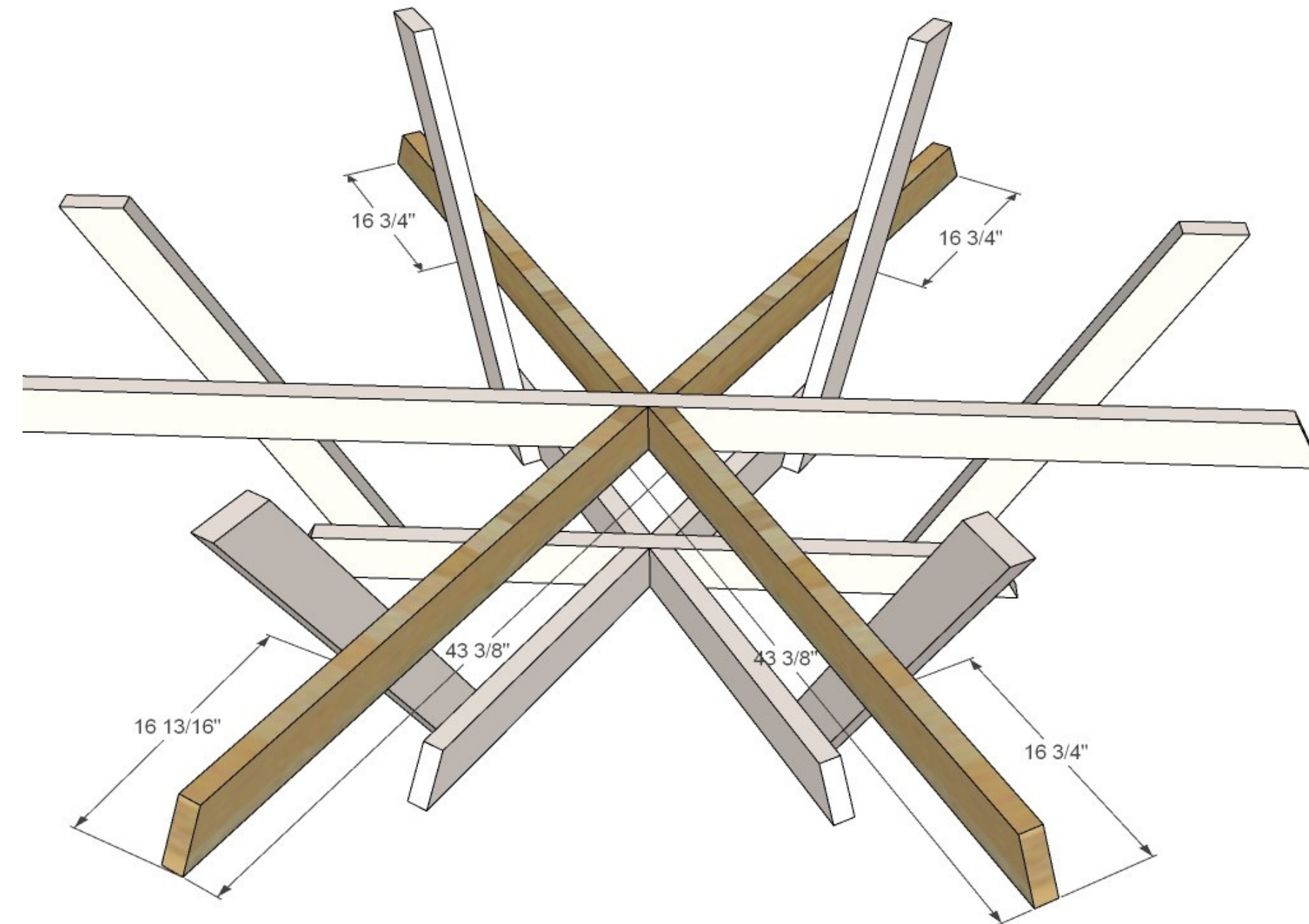
## Instructions

### STEP 4

Cut the seat frame board ends as directed in the cut list. Then, keeping the same overall length, cut the outside end back at a 30 degree off square angle.

Attach to the center of the main frame and to the legs.

TIP: Cut a 2x4 13" long and use it as a spacer to hold up your board while attaching to maintain the correct distance.



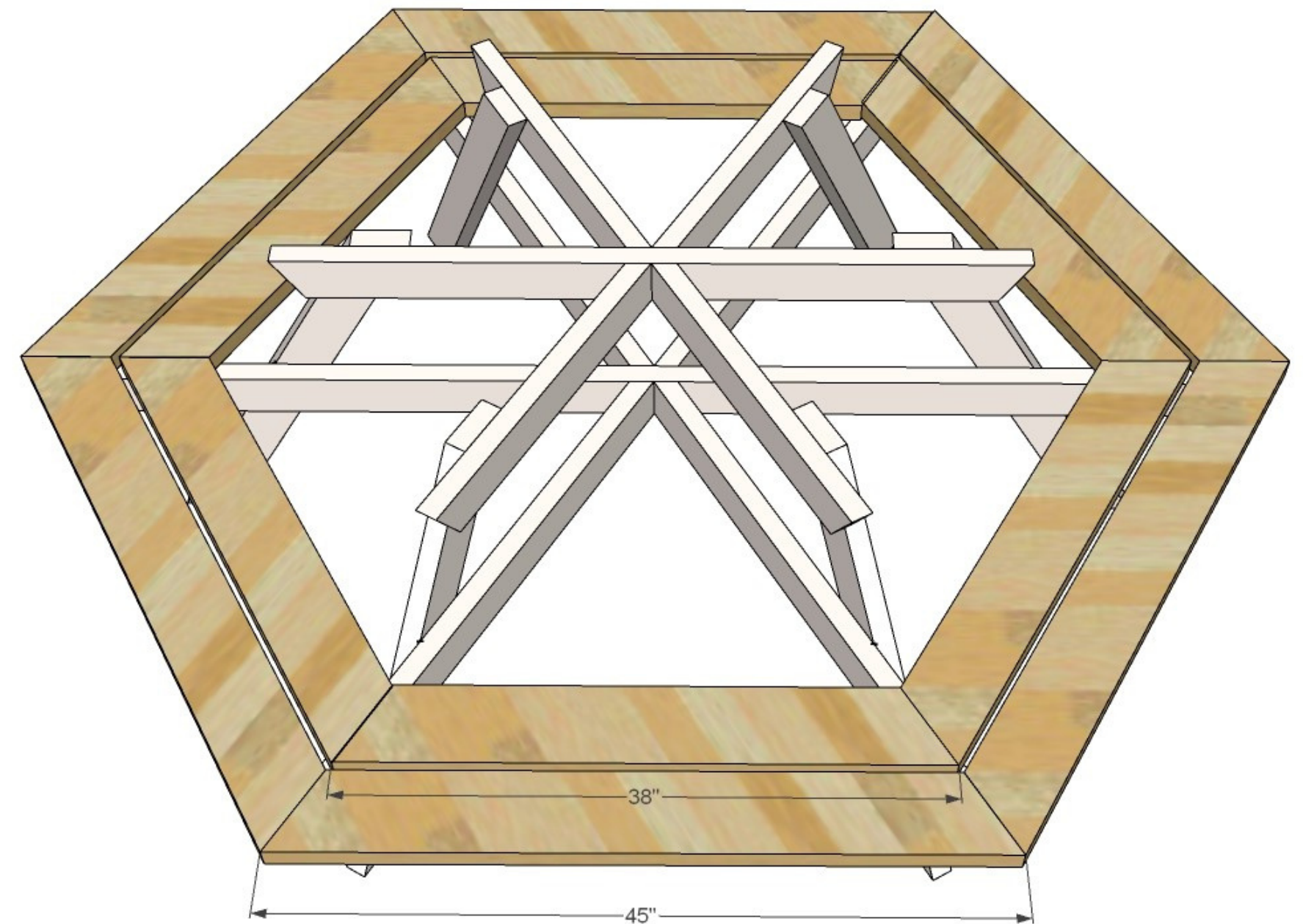
## Instructions

### STEP 5

Flip the project over.

Cut seat boards and lay outside seat boards in place. Make sure all the angles line up with the seat boards joining in the middle of the frame boards.

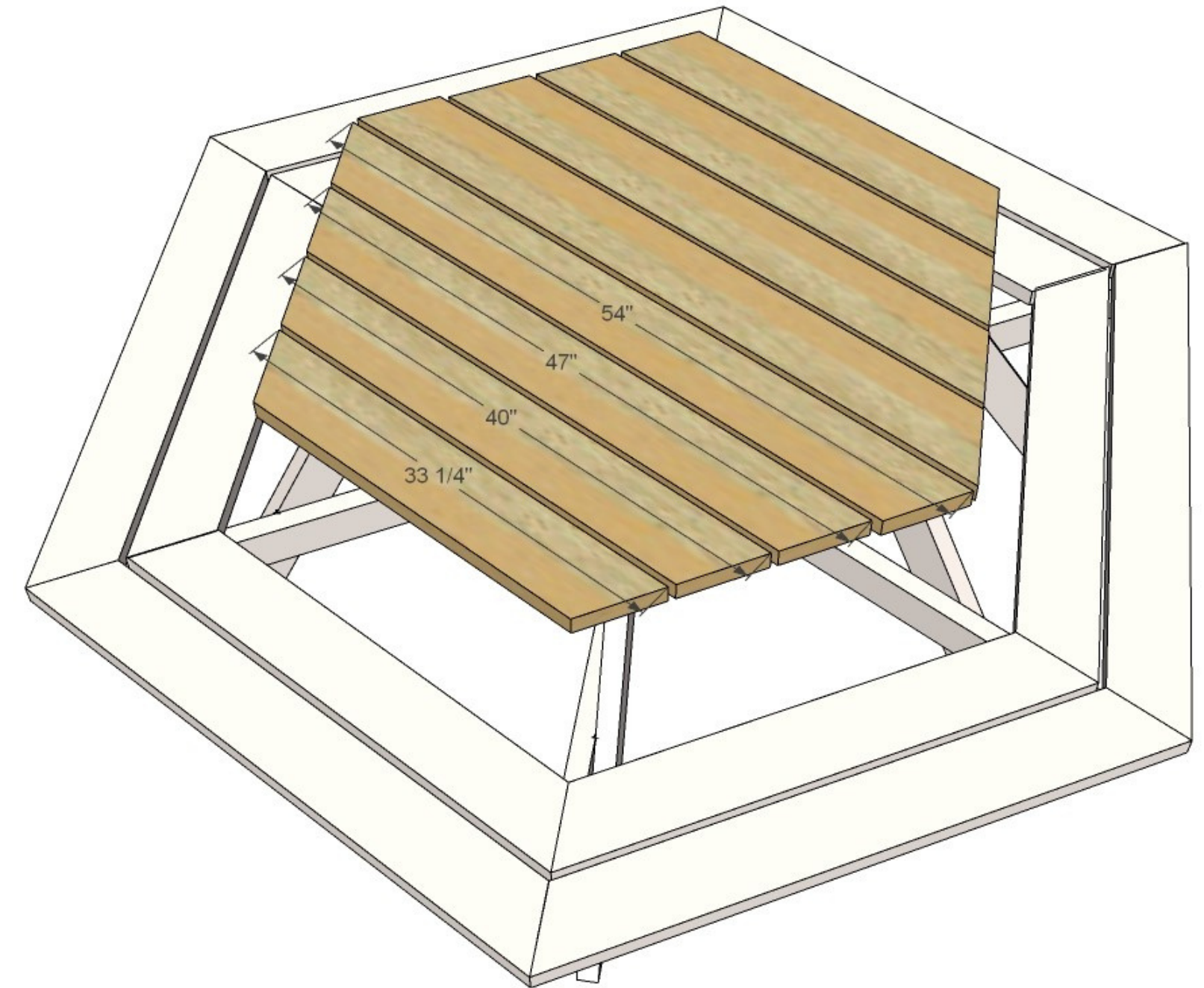
Attach with two screws per joint.



## Instructions

### STEP 6

Attach the tabletop boards on top, starting at the center and working outward, with a 1/2" gap in between.







## WOODEN CRISS-CROSS RACK

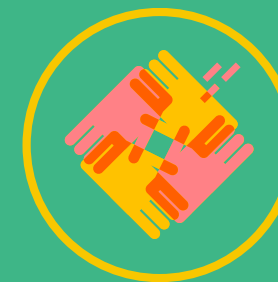
### Objective of the project

Develop basic knowledge and skills in construction estimating, selecting and insulating finishing materials, supervision, fixtures and fittings, mechanical and electrical services in architectural projects, project management and construction scheduling .

**The crisscross wooden rack is perfect for the countertop or mounting on the wall.**

**You can store small cylindrical things in it like:**

- **·craft paint**
- **·spice bottles**
- **·spools of thread, etc.**



## REQUIRED MATERIALS FOR THIS PROJECT

- • **1×4 boards per the plans**
- • **Jig Saw or table saw.**
- • **Wood glue**
- • **1¼" finish nails and brad nailery or hammer**
- • **Stain or paint of your choice.**

## Instructions

### Step 1 – Make the cuts

Make all the cuts per the plans.

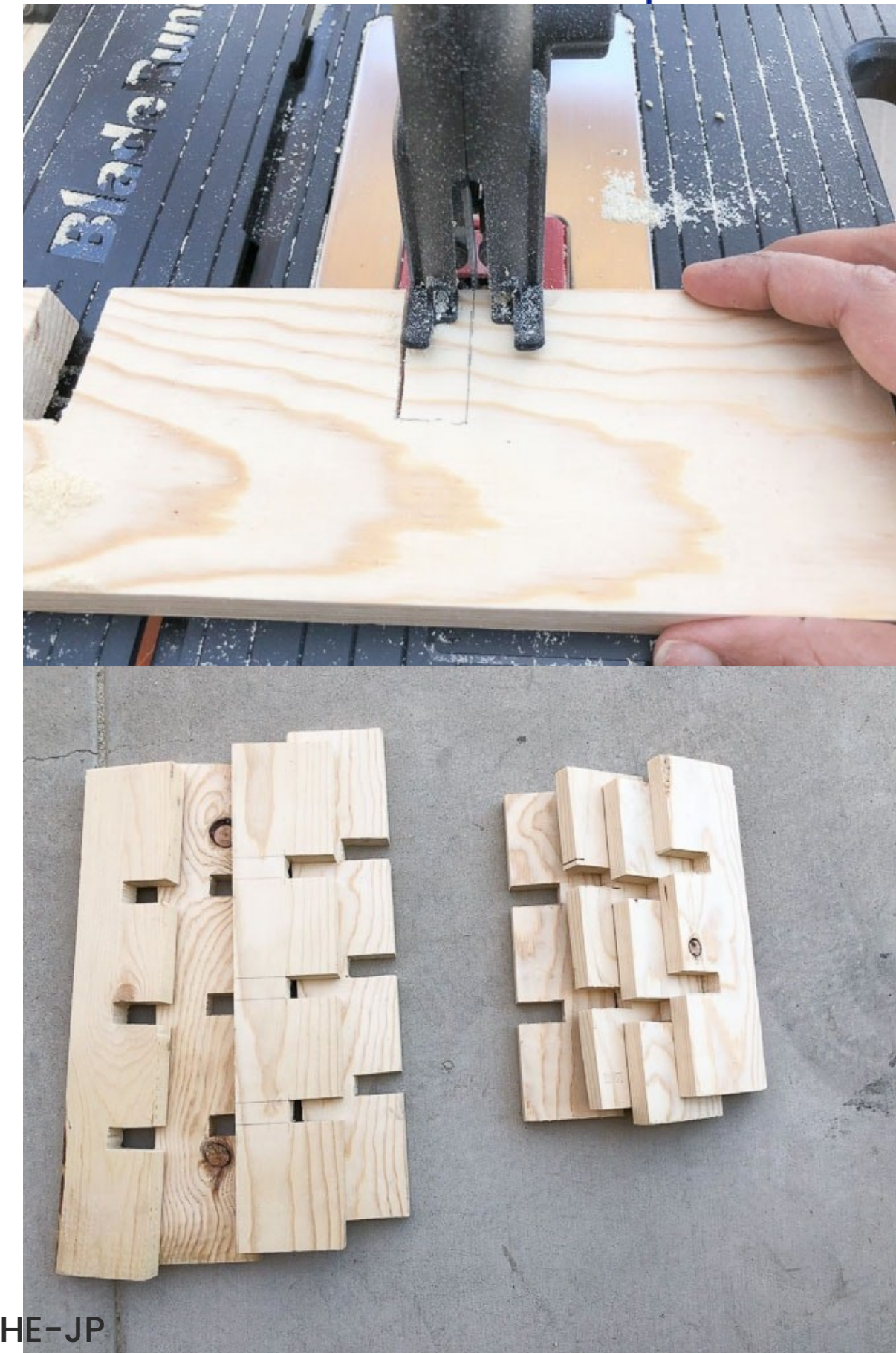
There are two types of cuts

- • cutting the boards to length
- \_ cutting the slots for the half-lap joints.

The crosscuts to cut the boards to length can be done using a miter saw or circular saw.

The students can use a table saw or a jig saw to make the cuts as well – anything that works well for them.

Making the half-lap cuts is the most critical step. All the slots need to be perfectly aligned and square for this to work.



# Instructions

## Step 2 – Put it together



## Instructions

### Step 3 – Attach

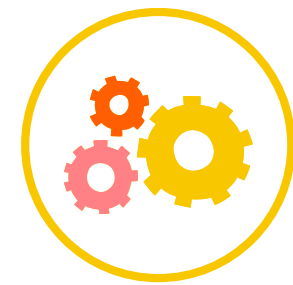
Once you have them all configured and ready, use wood glue and put it together. The end pieces are attached with wood glue and finish nails.





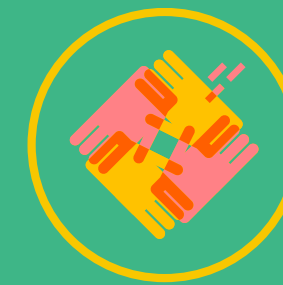
## TABLE RUNNER USING SCRAP WOOD

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## REQUIRED TOOLS FOR THIS PROJECT

- • Miter Saw
- • .Arrow GT300 Glue Gun



## REQUIRED MATERIALS FOR THIS PROJECT

- • Scrap boards. I used 1×2 and 2×2 boards
- • Thick canvas duck cloth
- • Arrow Glue Sticks
- • Stain and paint in the color of your choice. I used:
  - • Ebony black
  - • Gold paint
  - • American walnut
  - • Maple
- • Sanding block with 220 grit sandpaper
- • Tack cloth

## Instructions



Step 1: Identify the boards



Step 2: Make the cuts



Step 3: Clean up the blocks



# Instructions



Step 4: Stain

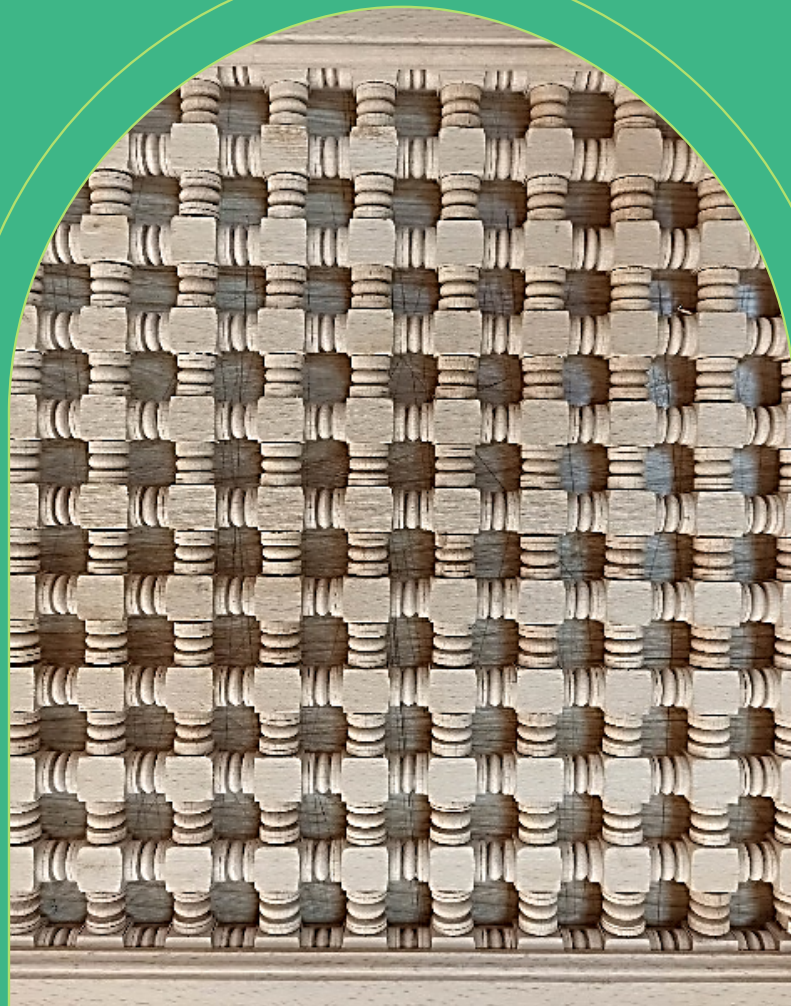


Step 5: Glue the blocks



Step 6: Top Coat

# STUDENTS' WORK



# STUDENTS' WORK





Co-funded by the  
Erasmus+ Programme  
of the European Union

# Building Constructions (2)

Thank you



Co-funded by the  
Erasmus+ Programme  
of the European Union

# Thank you

HANDS PROJECT NUMBER: 610238-EPP-1-2019-1-JOEPKA2-CBHE-JP