

Lesson Plan

Course Title: Building Trades

Session Title: Wall Framing, Plates

Performance Objective:

Upon completion of this assignment, the student will be able to properly Identify, Lay-out, and size and assemble a corner post.

Specific Objectives:

Students will be able to:

- 1) Define and use terminology related to wall framing.
- 2) Identify and collect materials and tools needed to complete the assignment. 3) Evaluate and explain areas in this assignment where safety is needed.
- 4) List the steps and procedures to be successful
 - A) Use the blue prints to locate corner post, all by-pass walls will need a corner post. B) Gather materials and tools to be used. C) Work together as a group. D) Practice safety. E) Ability to Measure and Layout F) Ability to size and cut. G) Ability to assemble unit. H) Define terminology and understand what and where it is used. I) Pass a written test.
- 5) Demonstrate the ability to perform the task- assignment
- 6) Demonstrate proper safety practices though out the lesson / assignment. 7) Participate in quality control through each step of the assignment. 8) Clean up and organize the materials, tools, and lab areas.

Preparation

TEKS Correlations:

- (c) Knowledge and skills.
(2) Students will understand all aspects of contract documents, including architectural, engineering and shop drawings and interpret.
§130.51. Construction Technology
(c) Knowledge and skills.
(6) Students will know how to lay out and frame walls and ceilings, rough-in door and window openings, construct corners and partition tees, brace walls and ceilings, and apply sheathing and:
(b) describe the procedure for laying out a wood frame wall, including plates, corner posts, door and window openings, partition tees, bracing, and fire-stops;
(c) describe the correct procedure for assembling and erecting an exterior wall; and
(e) lay out, assemble, erect, and brace exterior walls for a frame building.

Interdisciplinary Correlations:

- **110.xx(6)(A)**
...expand vocabulary through wide reading, listening, and discussing.

Accommodations for Learning Differences:

[Lesson Plan/Curriculum Modifications Checklist](#)
[Guidelines and Procedures for Adapting Instructional Materials](#)
[Instructor Format for Curriculum Customization for Learning Differences](#)
[Sample Curriculum Customization for Learning Differences](#)

References:

Carpentry 3RD edition
Delmar / Thomos learning. Floyd Vogt / Kathy Sutphin

Carpentry
Delmar / Lewis. Timothy Lockley

Carpentry and Building construction
Glencoe / Mc Graw - Hill. Feirer / Hutchings / Feirer

Modern Carpentry
Good Heart / Willcox. Willis H. Wagner / Michael B. Kope

Curriculum, Building Trades
East Texas State University. Commerce, Tx.

Curriculum, Building Trades
Thomas Edison Vocational Technical H.S.. Elisabeth, New Jersey

Video:
#3 Wood Floor Systems. Wood Frame Walls
Thomas? Delmar Learning

Instructional Aids:

1. Wall Framing Plates PowerPoint Presentation
2. Wall Framing Plates PowerPoint Presentation Handouts

3. Wall Framing Plates PowerPoint Presentation Outline
4. Student Research Data Sheet Handout
5. Doors and Windows Header Handout
6. Trimmer Studs Handout
7. Student Blueprint Handout
8. Wall Framing Handout

Materials Needed:

- 1) Quantity 2 2" x 4" x 96" #2 yellow pine 2" x 4"
- 2) Quantity 3 x 12" #2 yellow pine
- 3) Quantity 20 #12 V.C. nails

Equipment Needed:

- 1) Skilsaw
- 2) Extension Cord Framing
- 3) Square
- 4) 25' Tape Measure
- 5) Utility Knife
- 6) Carpentry Pencil
- 7) Speed Square Safety
- 8) Glasses
- 9) 20 oz. Straight claw hammer.

Learner:

- Read; Carpentry and Building Construction. Unit 30, Wall Framing.
- Complete Worksheet Unit 28, Wall Framing.
- Watch Video.

Introduction

Introduction (LSI Quadrant I):

- Ask: How many students have looked at a set of blueprints and are able to take blueprints information and construct a wall?
(show of hands)
- Ask; What is some of the information we find in a set of blueprints needed to build a wall section?
Example:
 - 16" on center studs
 - Wall thickness
 - Rough openings •Intersecting walls
 - Studs line - up with floor joists

- Studs line - up with Rafters / Ceiling Joists
- Ask; Does any one have any experiences framing a wall section?
Shed, Garage, House
- Corner studs are used at the start and finish of a by- pass wall. They are made up of 2 precuts studs with 3 12" spacer nailed between them. The corner post provide 4 nailing surfaces for interior and exterior wall sheathing and can be placed in an interior wall as well as an exterior wall.

Outline

Outline (LSI Quadrant II):

1. Define the Terminology
 - Blueprints, Floor plans, Schedules
 - Lay outs
 - Sole (Bottom) plates
 - Top plates
 - Double top plates
 - On center
 - Rough opening, windows, doors, fireplaces
 - Intersecting walls
 - Corner post
 - Layout symbols, X, T, C, D, K, S,
 - Cripples
 - Trimmers Butt-
 - walls
 - By-walls

(Review with the students, students should have the following definitions)

- Blueprints are the plans that the Architect uses to communicates to a Builder, through lines, symbols, and dimensions, a project to be constructed.
- Layout is the process of marking the locations of framing members to be cut and assembled.
- Sole (Bottom) plate is a framing member, laid horizontally to connect and support the lower ends of the vertical-framing members. The sole plate is then secured to the floor.
- Top plate is a framing member, laid horizontally to connect and support the upper ends of the vertical-framing members.
- Double top plates lay horizontally on top of the top plate to help keep the wall straight; to tie connecting walls together, and as support strength for the rafters and/or floor joists to rest upon.
- On center is a layout that is in the middle of a framing, or sheathing, or other materials or layouts such as intersecting walls, rough opening for windows, doors, and fireplaces.
- Rough openings are areas in framing that are left open for doors, windows, and fireplaces.
- Intersecting walls, (partition walls), (king studs), are where two or more walls cross one

another to form a "T" or "X" shape intersection.

- Corner post, where two walls come together to form a "L" shape corner that can be located interiorly and exteriorly on a structure.
- Layout symbols, "D" double stud, "X" stud, "C" cripple stud, "T" trimmer, "S" spacer, "K" king stud, intersecting wall.
- Cripples are short studs that are placed 16" or 24" on center where a full length stud can not be used, found mostly above headers and below sills.
- Trimmers are studs, which support the headers over a rough opening.
- Studs are slender vertical members, usually 2"x4" or 2"x6" materials that are placed 16" or 24" on center. Studs support the top plates and provide a surface for sheathing to be nailed.
- Butt-walls, are walls that fit in between By-walls.
- By-walls, are walls that run from the outside of the sub-floor to the outside edge of the opposite end of the sub-floor.

2. The students will use the blueprints with the Instructor to locate and compile the locations and amount of corner post needed. Information. (Use Handouts page 1 and 2.)

3. With the information obtained from step 2, the students will gather the needed Materials for the layout, sizing, and assembling of the corner post.

- Two 2"x4"x8', #2 yellow pine with three pieces of 2"x4"x12 " plus, (scraps, longer than 12"), with be needed for each group.

- Students will select materials free of the following;

- a. Warp
- b. Checks - Cracks
- c. Bow
- d. Twist
- e. Cup
- f. Knots
- g. Other damages

4. Have the students square up and cut to length the two studs and three spacers.

- Gather together the selected materials and the tools needed to complete the task.
- Review with the students all areas and operations where safety practices may be required.
- Square-up one end of each board using a speed square and a skill-saw to remove about a forth of an inch.
- Measure from the squared ends of the studs, 92-5/8 inches and cut off the waste.
- Measure from the squared ends of the spacers, 12 inches and cut off the waste

5. Layout and assemble the corner post. (use a sharp pencil and a framing square)

- With all the parts now squared and sized, take the two studs and locate the center of each stud's length and mark the edge, (it should be 46-5/16 inches, have the students do the math).
- Take one spacer and locate the center of the length and mark the edge.
- Using hand-out one as a visual follow. The assembly procedure below.
- Nailing will be the placing of two #12 V. C. sinkers in opposite corners / sides, going from

the stud's face into the spacer's face.

- Assembling Procedures.
 - a. Align one end of the stud with a spacer block under it, make sure it is flat and flush, place two nails as directed above.
 - b. Do the same to the opposite end.
 - c. Align the middle of the stud with the middle of the spacer, Previously marked, and nail together.
 - d. Now place the nailed stud and spacer piece with the spacers facing up.
 - e. Place the other stud on the top of the spacers making sure that both ends and edges are aligned and smooth.
 - f. Using six nails, place two through the stud into each spacer. Note; At this stage (F), the corner post is considered "partial corner post", but is completed for our future application.

- 6. Have students check for quality control.
 - Check for ends and edges being aligned and smooth.
 - Check nails- Heads are flush with the woods surface, no bent nails, no nails persuding through the sides.
 - Check for materials that may have split / cracked. Replace if so.
 - Check for craftsmanship "hammer tracks", dents.

- 7. All students will participate in clean-up. Proper
 - cleaning and storage of tools.
 - Organize and store both assignment and extra materials.
 - Sweep up work areas and dispose of waste.

Application

Guided Practice (LSI Quadrant III):

The students will observe, ask questions, and analyze the demonstration to be presented by the Instructor. The students will use handout # 1 to take additional notes on, while following along with the instructor's demonstration.

Independent Practice (LSI Quadrant III):

At this phase the students will work collaboratively in small groups to start and complete the assignment.

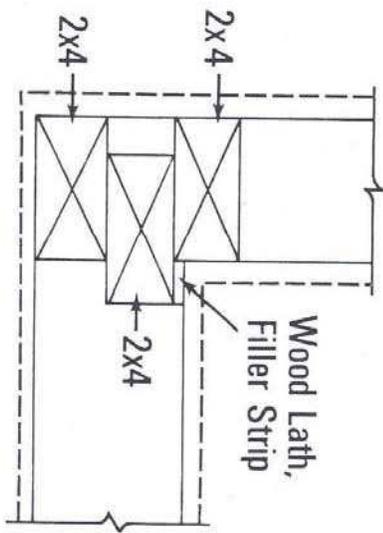
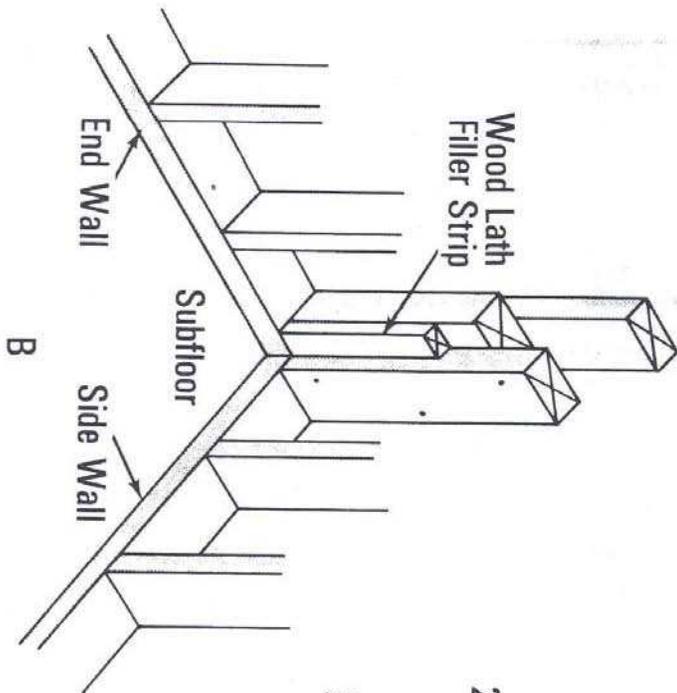
Summary

Review (LSI Quadrants I and IV):

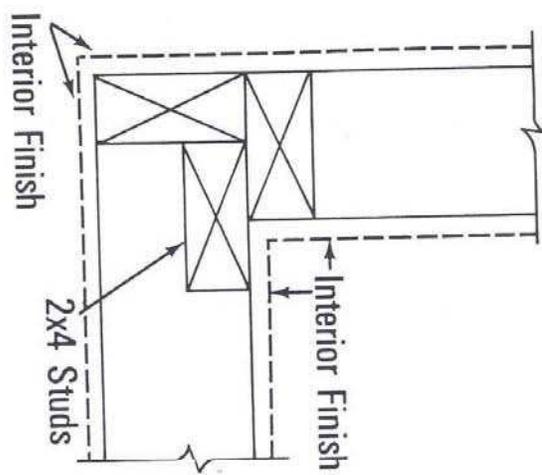
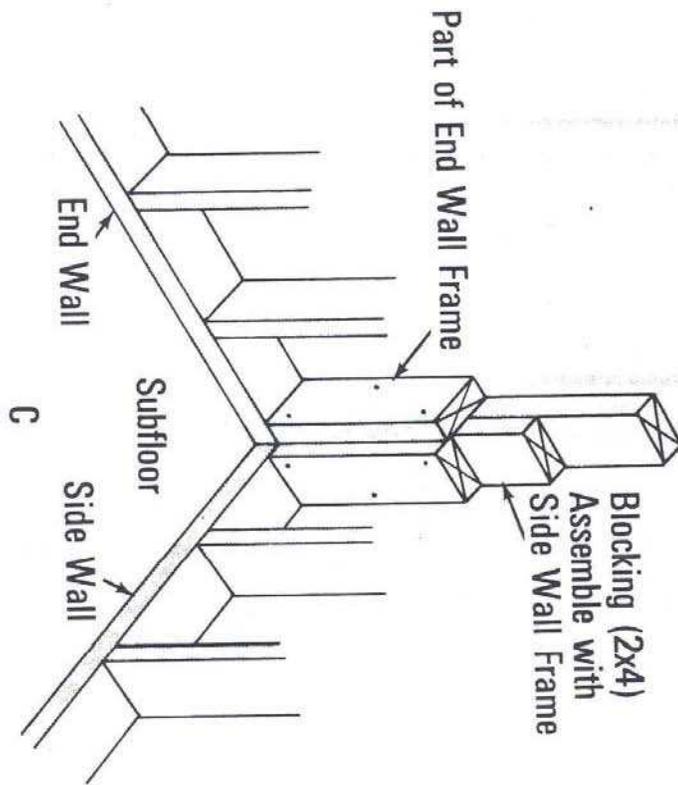
Review with each group independently to evaluate if they understand the assignment and have all the needed, materials, tools, steps of procedure.

Evaluation
<p>Informal Assessment (LSI Quadrant III):</p> <p>The Instructor will monitor each group as they independently work to complete the assignment. If a re-teach is needed on any information or procedure, all the groups will stop and participate in the re-teach.</p>
<p>Formal Assessment (LSI Quadrant III, IV):</p> <p>The students will be assessed by the accuracy of the completed assignment. The Instructor will be evaluating correct alignment of parts, proper lay-out, proper assembling (nailing), and craftsmanship. 100 points will be the high and a minus 5 points per error found.</p>
<p>Extension/Enrichment (LSI Quadrant IV):</p> <p>The students will use both correctly built corner post in a future lesson.</p>

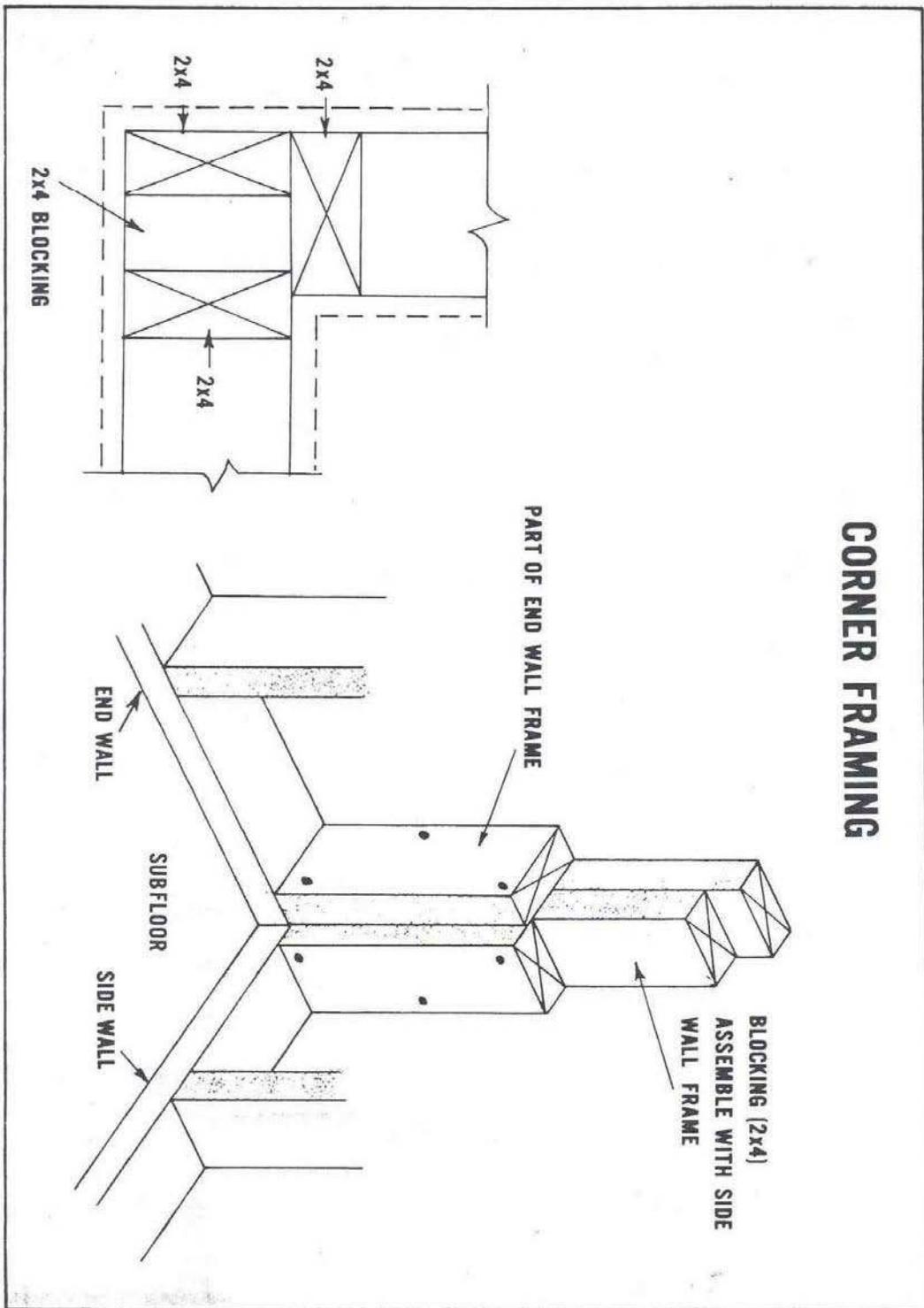
Corners



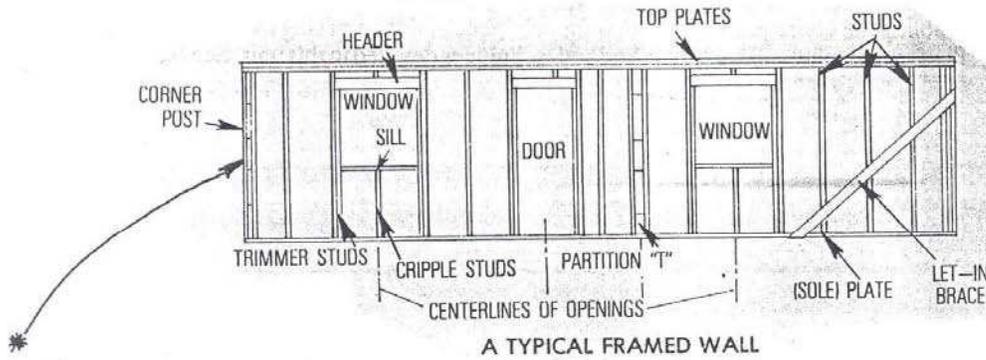
Corners



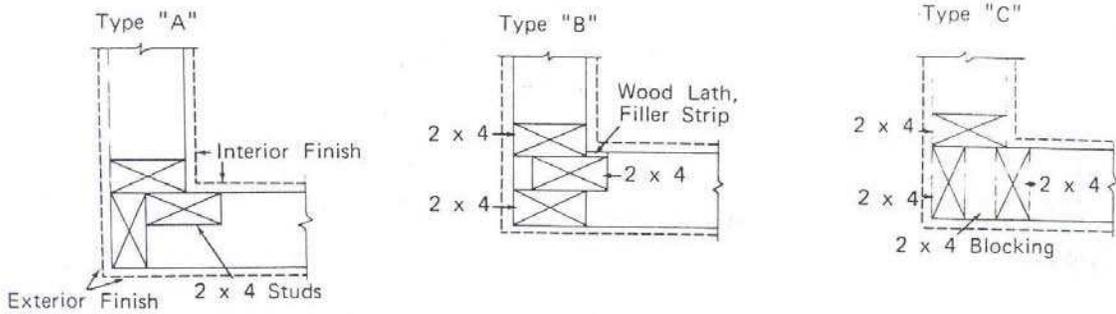
CORNER FRAMING



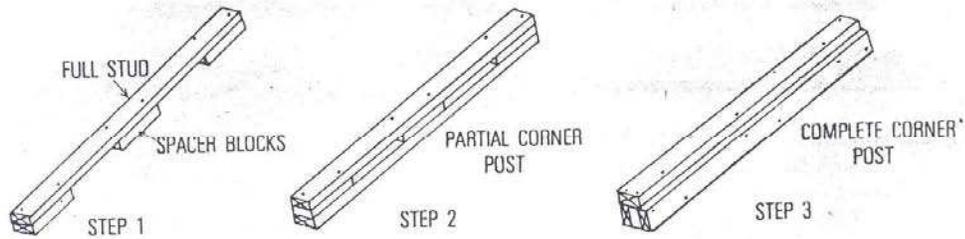
Corner Post



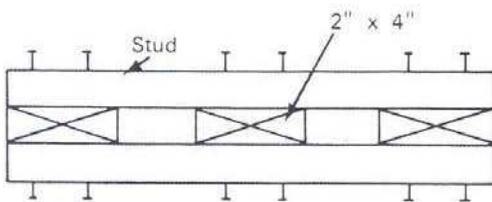
Where a corner post can be found.



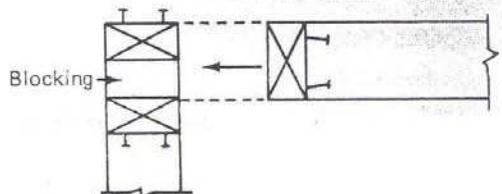
Determine which of the three types of corners, illustrated above, (note; type "C" is preferred by most builders)



Corner post assembly

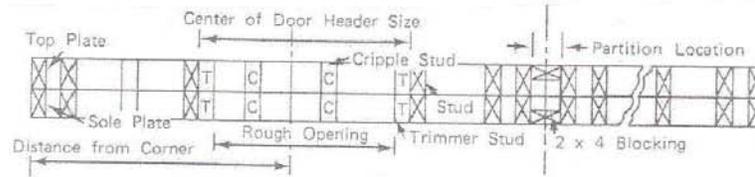


The third stud is attached to the end of the end wall and nailed to the corner as the walls are erected

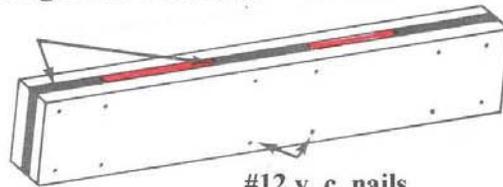


DOOR AND WINDOW HEADERS

*The headers can be found on the plate layouts between the two trimmers.

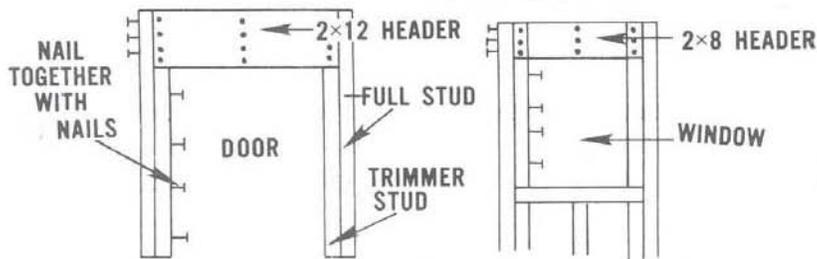


*The header is usually made out of a minimum of two 2"x6" framing materials using a 1/2" plywood/OSB material in the center for proper spacing of the thickness.

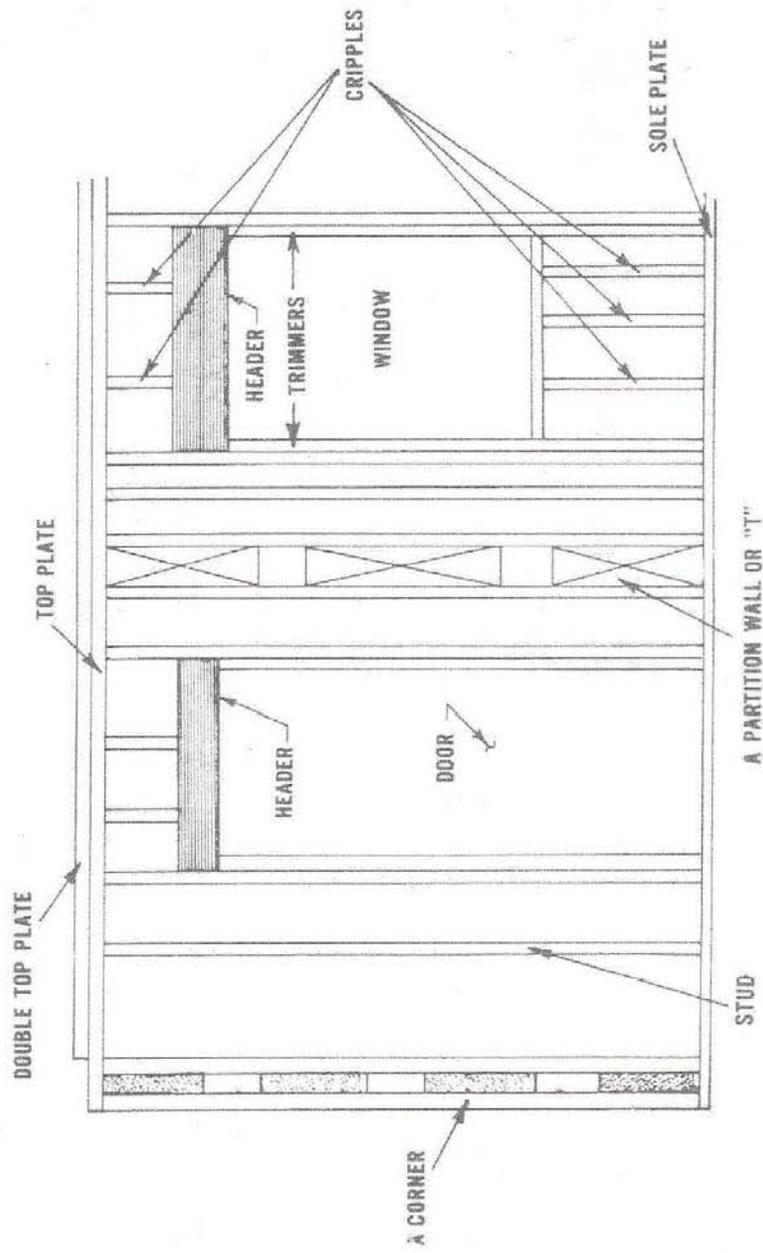


#12 v. c. nails

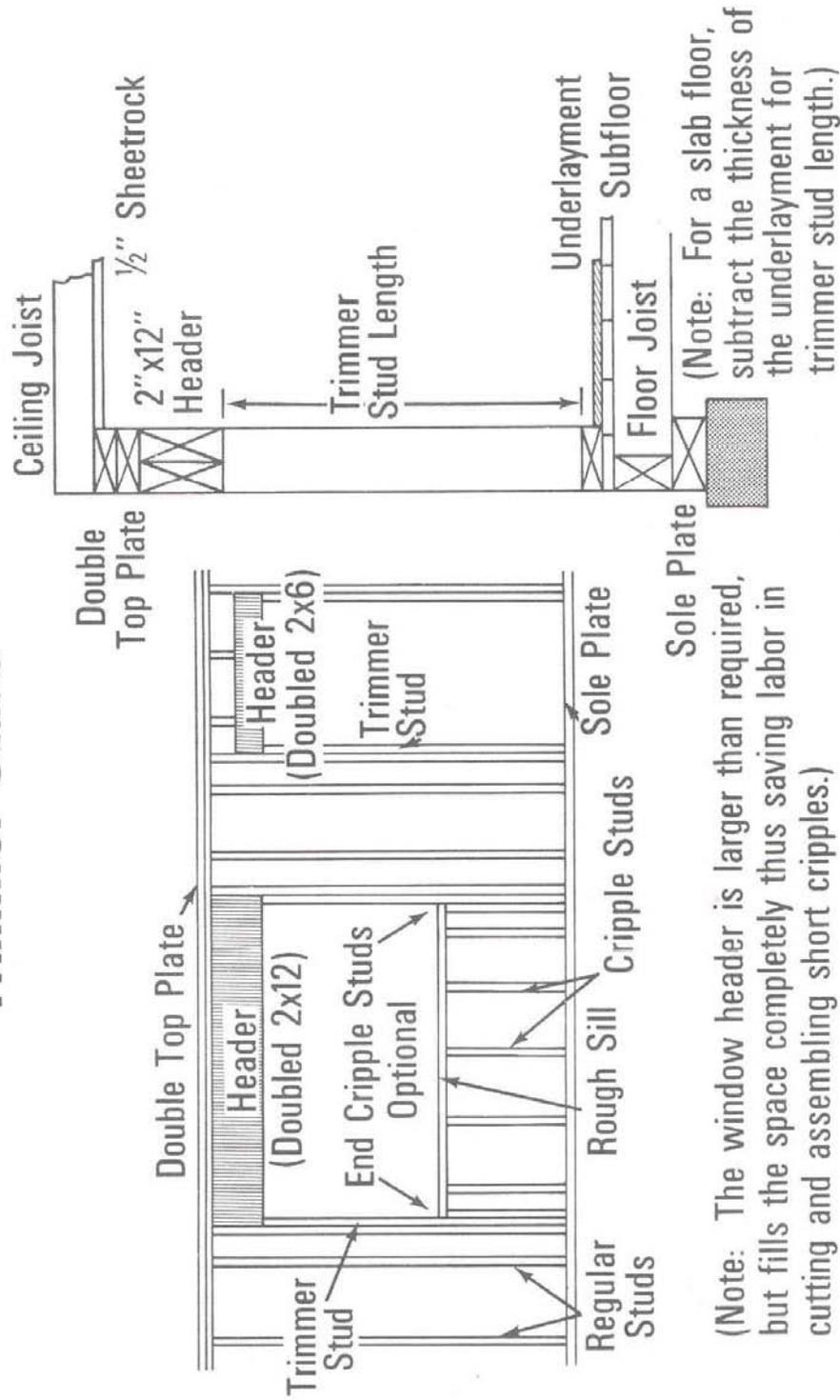
*Assembling patterns for the Door/Window Framing Units.



WALL FRAMING



Trimmer Studs



(Note: The window header is larger than required, but fills the space completely thus saving labor in cutting and assembling short cripples.)

Student Research Data Sheet, Window

*Directions research the student copy of the blueprints to help compile the needed data. Check window schedule for sizes.

*Most blue prints will have a detail section with a story pole to show the lengths, top of window, location through - out the project, today we will use the length of 84" from the floor to the top of the window. Check Handout 6 for a view of a typical storypole.

Window actual size $\underline{Th} \times \underline{W} \times \underline{H}$

Window rough opening $\underline{Th} \times \underline{W} \times \underline{H}$

*Figuring window parts, square and rectangle shape windows.

A) Header materials that will be used for this exercise will be 2" x 6" x _____".

- 1) The window schedule will give, in most cases the rough opening size along with the actual window size, Handout 1.
- 2) The header is supported by 2 trimmers, one on each side. So we add 3" for their thickness.

Example $3' 0" \times 4' 6"$

Step A. Window actual size in inches is 36" x 54".

Step B. Rough opening needs to have 1/2" added to the width and height, making it 36-1/2" x 54-1/2".

Step C. Add 3" for the trimmer thickness to the width. Header Length is now 39-1/2".

1) 2 quantity 2" x 6" x 39 1/2" #2 yellow pine

2) Cut 1 piece of plywood/osb spacer for between the (2) 2" x 6" x 39-1/2" header boards, the spacer should be under sized 1/4" off the width and off the length.

Step D. The sills are next parts to be sized, because the window is a rectangle/ square the (2) 2" x 4" sills should be cut to the same length as the 2" x 6" header pieces.

1) (2) 2' x 4" x 39-1/2" #2 yellow pine.

Step E The middle trimmer should be the same length as the rough opening of the height of the window unit. Example; 36 1/2 x 54 1/2"

1) (2) 2" x 4" x 54-1/2" #2 yellow pine.

Step F To find the (upper) trimmer/ cripple use the following formula.

1) Add the bottom plate thickness of 1 1/2" to the length of a precut, 92-5/8".

$$\begin{array}{r} \text{Precut length} \quad 92-5/8" \\ \text{Bottom plate thickness} \quad + 1-1/2" \\ \hline 94-1/8" \end{array}$$

2) Minus the predetermined height of the window, which is this case is 84", from the precut/bottom plate sum of 94-1/8".

$$\begin{array}{r} \text{Precut/bottom plate sum} \quad 94-1/8" \\ \text{Window height} \quad -84" \\ \hline 10-1/8" \end{array}$$

- 3) Next, minus the height of the header material, 5-1/2", from the sum of the precut-bottom plate/window height, 10-1/8". The remaining number will be the (upper) trimmer/cripple length.

Precut-bottom plate/window height 10-1/8"
 Header height of a 2"x6" +5-1/2"
 (upper) trimmer/cripple length 4-5/8"

- 4) (2) 2"x4"x4-5/8" #12 yellow pine.

Step F To figure out the length of the (lower) trimmer/cripple.

- 1) Subtract the following parts from the length of a precut stud, 92-5/8".

(upper) trimmer/cripple length 4-5/8"
 header height 5-1/2"
 (middle) trimmer length 54-1/2"
 (2) sill thickness + 3
 Total to minus from precut stud length 67-5/8"

Precut stud length 92-5/8"
 Minus total -67-5/8"
 (lower) trimmer/cripple length 25"

- 2) (2) 2"x6"x25" yellow pine.

Material types and sizes needed.

Quantity 2 2"x4"x92-5/8" Precut studs (#2 yellow pine)

Header

Quantity 2 2"x6"x__"

Quantity 1 1/2"x5-1/4"x__"

*Note, undersize the spacer of plywood/osb 1/4" to the width and to the length to make assembling easier.

Quantity 2 2"x4"x__" Sills (#2 yellow pine)

Quantity 2 2"x4"x__" (middle) trimmers (#2 yellow pine).

Quantity 2 2"x4"x__" (upper) trimmers/cripples
 (#2 yellow pine)

Quantity 2 2"x4"x__" (lower) trimmers/cripples
 (#2 yellow pine)

Student Research Data Sheet, Door

Directions, research the student blueprint sheet and record the following information.

Door actual size _____"TH x _____"W x _____"H
 Door rough opening, if provided _____"x _____"x _____"

#1 Determine the height of the R.O. for a Door.

- A) A standard door height is 6' 8".
 *Note change door height, if other than 6' 8".
- B) Add 3/4" for clearance at the bottom of the door.
- C) Add 3/4" for clearance between the header and the jamb header.
- D) Add 3/4" for the jamb header thickness.
- E) Subtract the thickness of the sole plate and the result is the trimmer stud length. Example;

Step A Door height	6' 8"
Step B Bottom clearance	3/4"
Step C Header/Jamb header space	3/4"
Step D Jamb header thickness	+ 3/4"
Step E Sub Total	6' 10-1/4"
Sole plate thickness	- 1-1/2"
Trimmer stud length	6' 8-3/4"

#2 Computing header length for a door.

- A) Check with the door schedule to find the actual width of the door,
Example 3' 0" width.
- B) Add 1/2" to the door width for clearance between door edges and jamb.
- C) Add 1-1/2" for side jambs.
- D) Add 1" for clearance to install jambs, shimming.
- E) Add 3" to the rough opening width for trimmer studs thickness to get the correct header length.

Example: For a 3' 0" x 6' 8" door.

Step A) Door width size	3' 0"
Step B) Door swing clearance	0-1/2"
Step C) Door side jamb	1-1/2"
Step D) Shimming Area needed	+ 1" .
Rough opening	3' 3"
Step E) Trimmer thickness needed	+ 3" .
Header Length	3' 6"

Material types & sizes

- Quantity 2 2" x 4" x 92 5/8" Precut studs (#2 yellow pine)
- Quantity 2 2" x 4" x _____" Trimmers (#2 yellow pine)
- Header
- Quantity 2 2" x 6" x _____" (#2 yellow pine)
- Quantity 1 1/2" x 5 1/4" x _____" Spacer, plywood/OSB.

*Note; undersize the spacer 1/4" for the width/length to help with the line-up of the 2"x6"s.

