



Theatre Virtual Learning

Theatre Design & Advanced Theatre Design
Stock Scenery: Building a flat

May 6



Lesson: May 6

Objective/Learning Target: The student will understand how to make a flat with the measurements involved

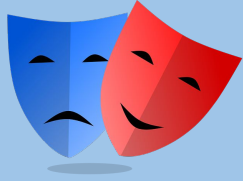


NAME OF LESSON

Let's Get Started / Warm Up Activities:

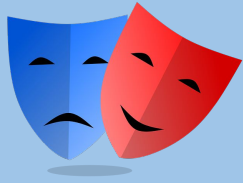
What is the real width of a 1X4" piece of lumber? Is it 4 inches, as the name implies?

Why is this important when doing construction?



Lumber dimensions

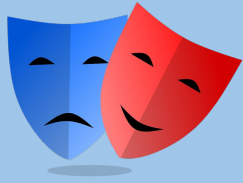
- When making flats, they must be made to an exact size.
- Flats are usually made of a 1x3 or a 1x4. 1x4's are more standard and usually readily available in a wood shop, so they are frequently used. However the lighter weight of a 1x3 is preferable, if you can get it.
- For this unit, we will assume you have 1x4's.
- Although a board may be called a 1x4, it is not actually 1 inch by 4 inches wide. That name comes from its rough cut, unfinished size. When it is finished, it actually has a smaller measurement of $\frac{3}{4}$ " \times $3\frac{1}{2}$ ".



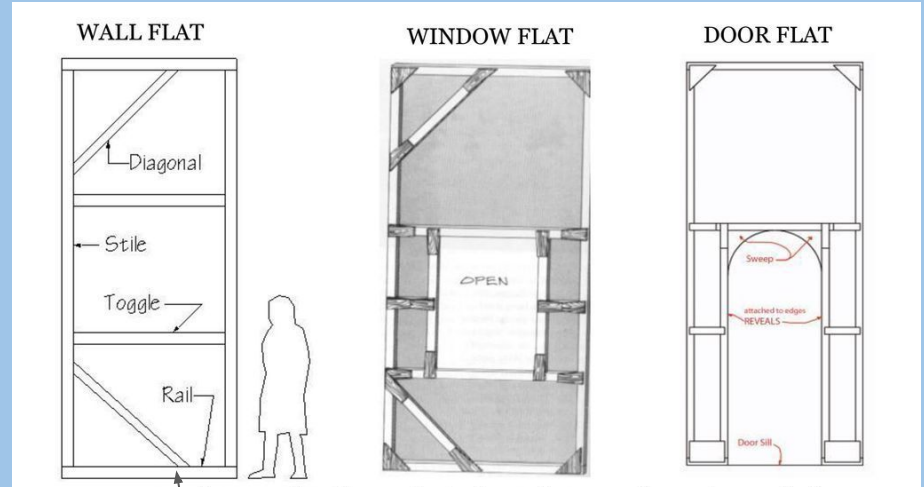
Lumber size

- The actual size of lumber is shown on this diagram.
- So, if a board is a 2X2, its actual size would be 1-1/2" x 1-1/2". A 1 x 3 would be 3/4" by 2-1/2" and so forth.

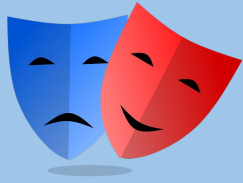
Thickness (inches)		Width (inches)	
Nominal	Actual	Nominal	Actual
1	3/4	2	1-1/2
1-1/4	1	3	2-1/2
1-1/2	1-1/4	4	3-1/2
2	1-1/2	5	4-1/2
2-1/2	2	6	5-1/2
3	2-1/2	7	6-1/2
3-1/2	3	8	7-1/4
4	3-1/2	9	8-1/4
4-1/2	4	10	9-1/4
5+	1/2" less	11-16	3/4" less



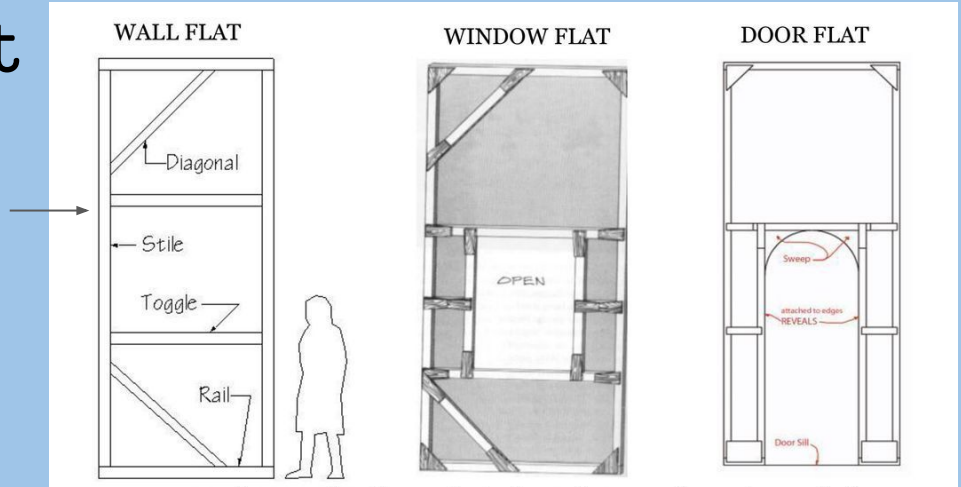
Making the flat



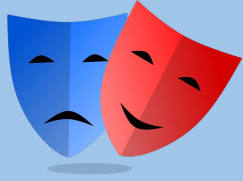
- Determine the exact size you need. For this exercise, we will assume it is a 4' by 8' flat.
- Cut the lumber for the rails (top and bottom of the flat)
- The rails run the entire width, so they will be 4 foot



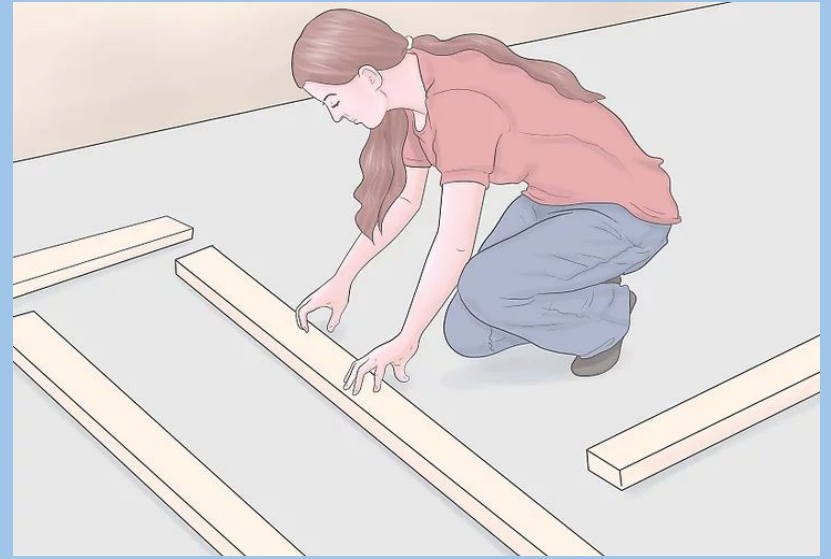
Making the flat



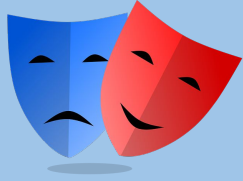
- Cut the lumber for the stiles. In order to determine the length of the stile, you must take the actual size of the 2 rails and subtract that from the ultimate height of the flat.
- In this case, the flat is 8' (96"). The 1x4 width is 3-1/2" wide. You have 2 of them, so together, you will need 7 inches less than the ultimate height of the flat. You would subtract 7 inches from 96" to get your length of cut for the stiles.



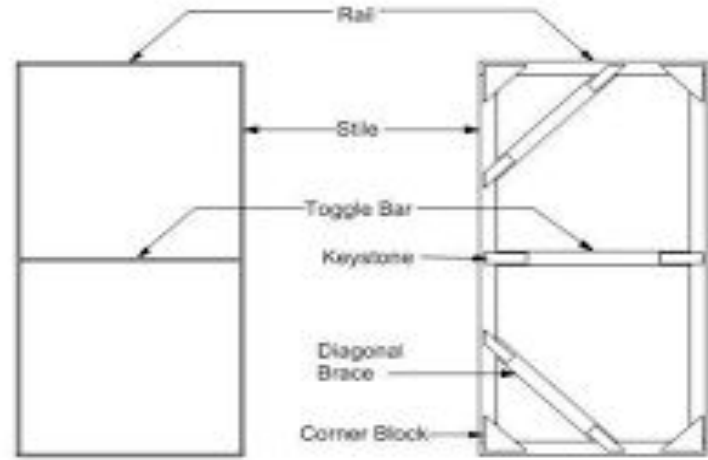
Making the flat



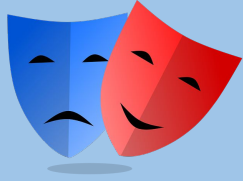
- Lay the boards out flat on the ground
- Make sure the rails are placed on top and bottom of the stiles.



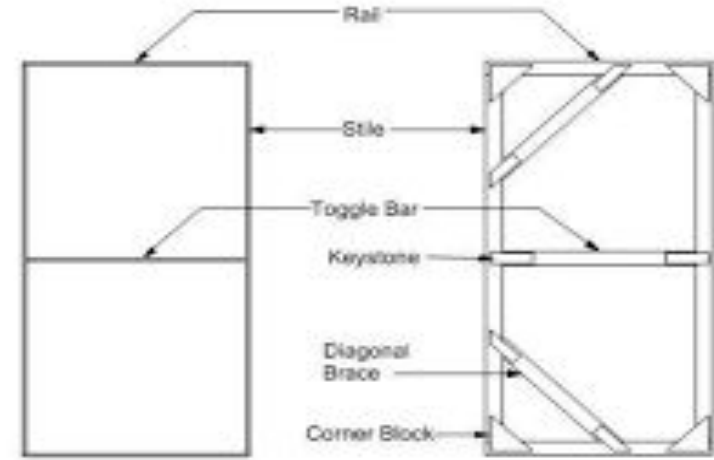
Making the flat



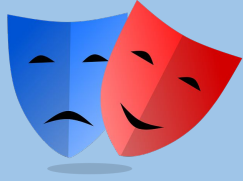
- Measure and cut the toggle(s) and diagonal braces for the flat.
- If you have an 8' flat, only one toggle will be necessary, however if your theatre needs a 12' flat, you will want to have 2 toggles to provide more structure.
- The corner braces will have to be mitre cut to fit in perfectly with the flat.
- All board should lay flat, butting up to each other with no overlap.



Making the flat



- Cut 4 pieces of $\frac{1}{4}$ " plywood in a triangle shape to use as corner blocks.
- Cut 6 rectangular or trapezoid shaped pieces of $\frac{1}{4}$ " plywood to be the keystones (or straps) to attach the stiles and diagonal braces.

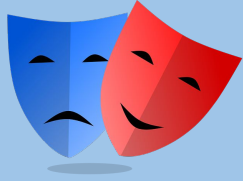


Making the flat



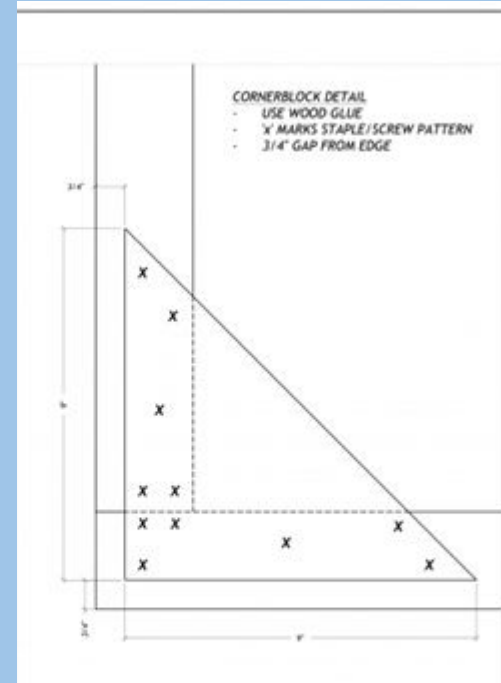
- Use a speed square or a framing square to make sure you are making the flat perfectly square for the next steps.
- It must stand and butt up flush to other flats.
- If it is out of square, there will be large gaps.

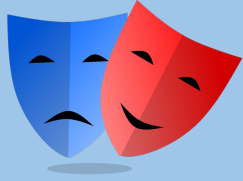




Making the flat

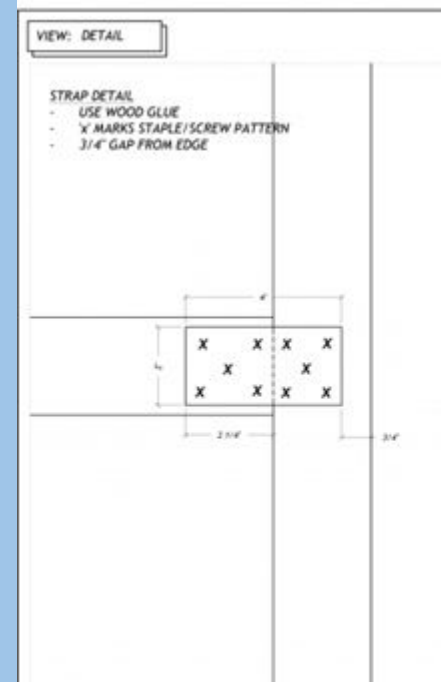
- Place wood glue on the stiles and rails where the corner block will go.
- Triangles are strong, so attach the corner blocks by screwing them on in a triangular pattern, as shown in the picture.
- Attach the corner blocks $\frac{3}{4}$ " away from the edge of the flat on all edges. (The reason for this is to allow flats to be able to butt up to each other at a 90 degree angle. The width of a flat is $\frac{3}{4}$ ", so any flat will smoothly sit against another without any bracing getting in the way.)

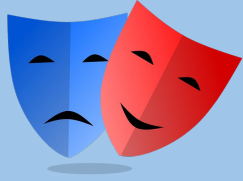




Making the flat

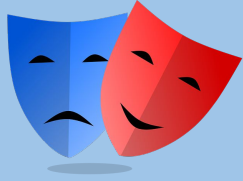
- Using the same wood glue and screw method attach the keystones or straps.
- Also attach them $\frac{3}{4}$ " away from the edge of the flat.
- Notice the pattern for attachment makes triangles, again.





Covering the Flat with Luaun

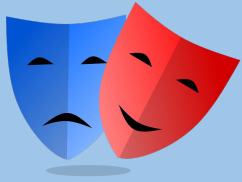
- For a sturdier flat, cover it with ¼” luaun--a thin plywood with a smooth surface which makes it easier to paint.
- If covering with plywood, the sheets come in 4’X8’, so one sheet fits perfectly on this flat.
- Flip the frame over and attach it to the front.
- Make sure to line up all corners before nailing or screwing the luaun to the front.



Covering the Flat with Muslin

- For a lighter flat, cover it with muslin
- Lay the muslin on the floor or work table.
- Cut the muslin to allow about 3-4 inches on each edge to fold back.
- Center the flat on the cut muslin.

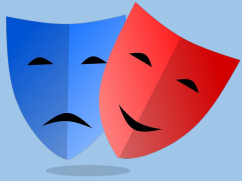




Covering the Flat with Muslin

- To attach the muslin, you can use several different methods.
 - Nails and hammer
 - Upholstery hammer and nails
 - Staple gun
 - Wood glue with any of the above
- As you attach the muslin, you must pull it tightly to get out as many wrinkles as possible.
- If you use glue, you will put it down on the wood before using the staple or nail.

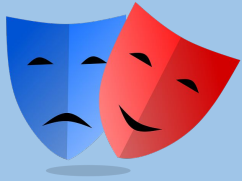




Covering the Flat with Muslin

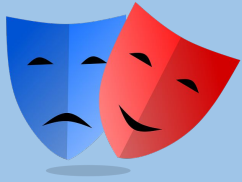
- Start stapling on one end in the center. Then do the edges closer to the corner of the same side.
- Move to the opposite end in the center and then the edges.
- Go to the center of one side and then the edges.
- Go to the other side and do the center and edges.
- The corners are done by pulling the center of the corner and stapling it. Then fold the sides of the corner over it. Sort of like the picture in the diagram to the right.





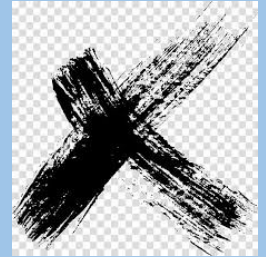
Covering the Flat with Muslin

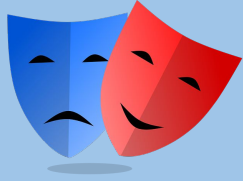
- Helpful hints
 - It is easier to cover a flat with muslin when you have other people helping to hold the muslin in place and pull out the wrinkles as you move around stapling or nailing it.
 - Even with help always use the method of doing one end, the other end, one side, and then the other side, followed by the corners.
 - Use plenty of staples or nails, because when you paint the muslin, it will draw tighter.
- Use a fireproof muslin canvas purchased for a theatrical supply store.
- If using nails, an upholstery hammer is magnetized and easier to use than a regular hammer and roofing nails



Preparing a Muslin to paint

- The muslin should be primed for paint. It tightens the fabric and provides a smooth painting surface. There are many products you can use.
 - Watered down scenic paint (NOT house paint)
 - Rosco has a “priming white” you can get
 - Gelatin glue
 - Laundry starch
 - White glue watered down
- Paint the sizing on in an “x” pattern (cross hatching), so the fibers of the muslin get coated nicely and draw up evenly.
- This is when the flameproofing will need to be painted on, as well. It can be mixed in with the primer.





Practice

Use the sketch you made yesterday.

Create a cut list of the different pieces you will need to cut to make the flat with their specific sizes.