DOLLHOUSE FIRE BEHAVIOR PROP

Construction Plans and Basic Assembly Instructions







Research Institutes

Fire Safety Research Institute

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It is with great pride that we dedicate these Dollhouse Fire Behavior Prop Construction Plans and Basic Assembly Instructions. What began as a simple concept has evolved into an essential resource for fire service professionals, instructors, and students worldwide, thanks to the collaborative efforts of many individuals dedicated to improving the fire service.

The prop's story began when Fire Chief Ed Hartin discovered it being used in Sweden. Recognizing its potential, he introduced it to us as a practical, cost-effective tool for demonstrating fire behavior principles. Motivated by its value, we modified the original design to make it even more effective and accessible, creating a scalable, low-cost alternative to full-scale burn rooms and live fire training.

Our goal was to ensure high-quality fire dynamics education would be available to all firefighters, regardless of department size, budget, or resources. To achieve this, we made the design, methodology, and training resources available for free, empowering instructors around the world to incorporate fire behavior education into their programs and improve decision-making, ultimately reducing line-of-duty injuries and deaths. This also created a community of continuous improvement that has helped shape where the Dollhouse Prop is today.

Since its introduction, the Dollhouse Prop has become a cornerstone in training curricula, demonstrating key fire behavior concepts such as flow paths, ventilation-limited fires, and the impact of tactical decisions. It has been widely adapted to explore various fire scenarios, including different materials, fuels, and ventilation configurations. Beyond formal training, the prop has also played a key role in educating civilians and recruits on fire spread, ventilation, and critical tactics like closing doors to limit fire growth.

Looking ahead, we hope to see the Dollhouse Prop integrated into every fire academy and department's curriculum. We envision it being used in virtual and hybrid learning environments to enhance understanding and empower firefighters at all levels to make safer, more informed decisions on the fireground. We also want to acknowledge the contributions of Matt Palmer and Randy Hinton, whose work has been vital to the prop's success. Matt redesigned the prop with a peaked roof and attic space, significantly enhancing its functionality. Randy's CAD drawings have made it easier for fire departments worldwide to replicate the prop, ensuring its widespread use as a vital training tool.

Through the combined efforts of Fire Chief Ed Hartin, Matt Palmer, Randy Hinton, and everyone involved, the Dollhouse Fire Behavior Prop has become more than just a tool, it represents our collective commitment to improving firefighter safety and education. By sharing this resource freely, we believe it will continue to make a lasting impact on fire service education for generations to come.

With deep gratitude and respect, we dedicate this work to them, and to the countless firefighters and instructors who have and will continue to benefit from the Dollhouse Fire Behavior Prop as they work to make our communities safer.



Paul J Norwood







Construction Plan and Basic Assembly Notes

Allow 3-4 hours to complete this project, ideally with two people. Although the prop will ultimately be burned, careful assembly ensures better room seals and improved results for your training exercise. For detailed guidance, follow the link or scan the QR code to watch a step-by-step video of the basic assembly instructions.

WATCH THE BUILD VIDEO

Materials

- 2 sheets of 4’ x 8’ 7/16” oriented strand board (OSB) cut to specifications outlined in these plans
- 1” staples for use with a pneumatic staple gun
- 2-3 10oz containers of caulk

Tools

- Table saw (to cut and rip OSB)
- Circular saw (depending on skill level, all cuts can be accomplished with this tool)
- Jig saw or oscillating multi-tool style saw
- Pneumatic stapler with compressor
- Cordless drill with spade-style wood drill bit
- Caulk gun
- Marker or writing utensil

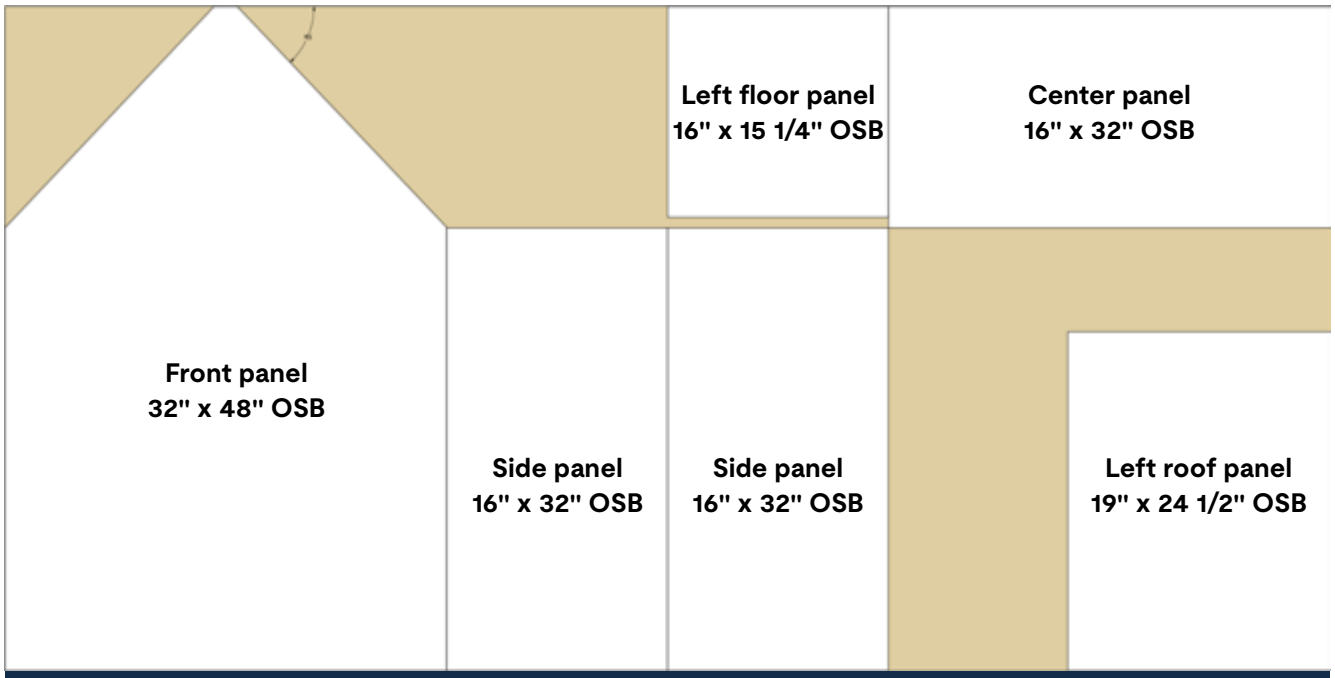
Safety

- Wear eye, ear, and respiratory protection when cutting materials to protect from wood dust, which is classified as IARC group 1: carcinogenic to humans.
- Wear latex gloves when spreading caulk.
- Be mindful of finger placement when using the pneumatic stapler.

1

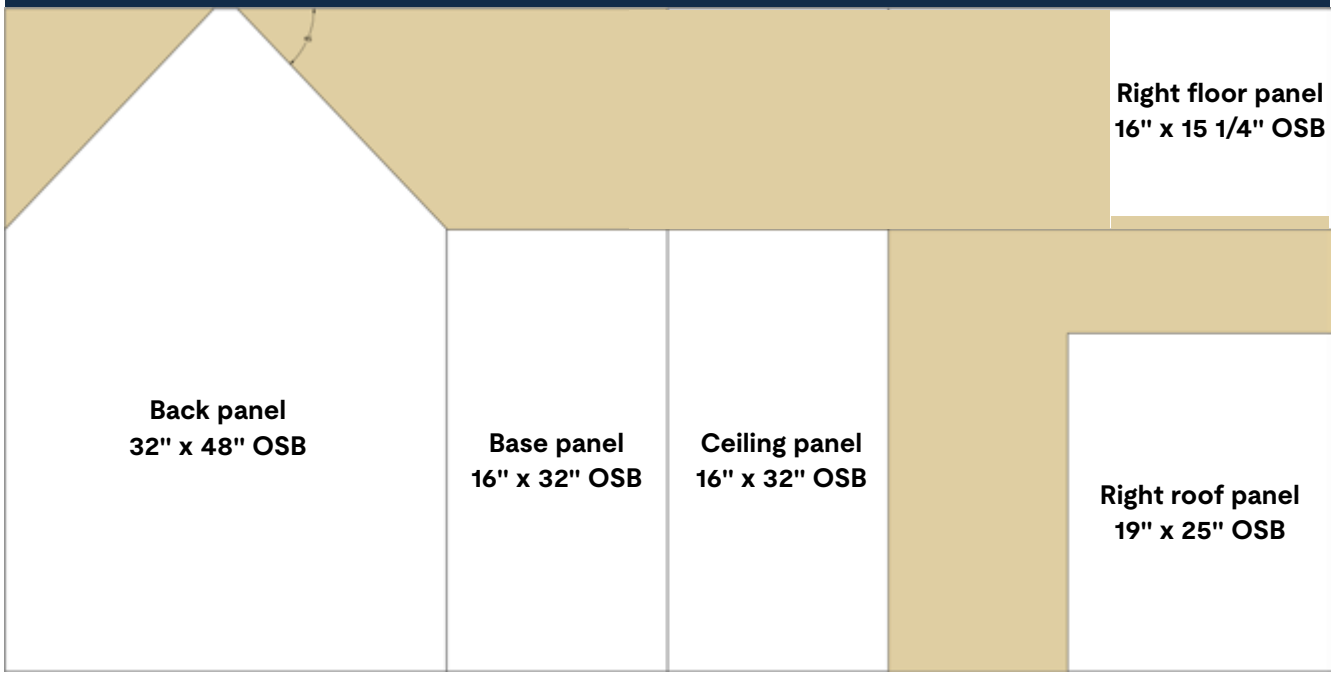
Prepare the Materials

Gather all your materials and cut panels to the appropriate size. The slides, punch out panel, and slider guide pieces should be cut from the scrap material. Label the panels clearly for assembly.



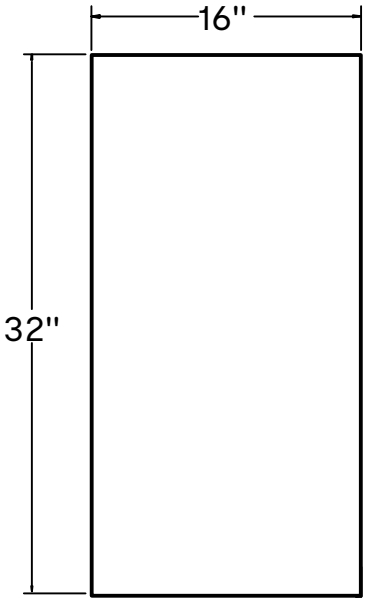
Builders Tip

For the front and back panels of the dollhouse, stack the sheets of OSB and cut them together. This ensures that they are the same size, which makes it easier to assemble and more successful when performing the demonstration.

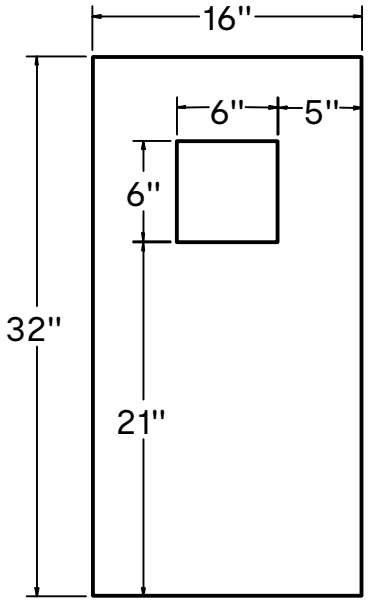


Note: Not to scale

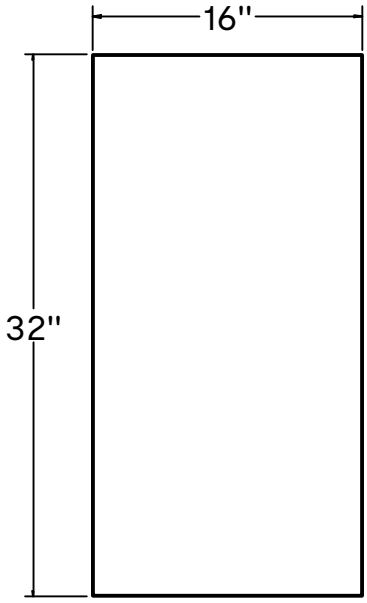
SIDE PANEL (NEED 2)



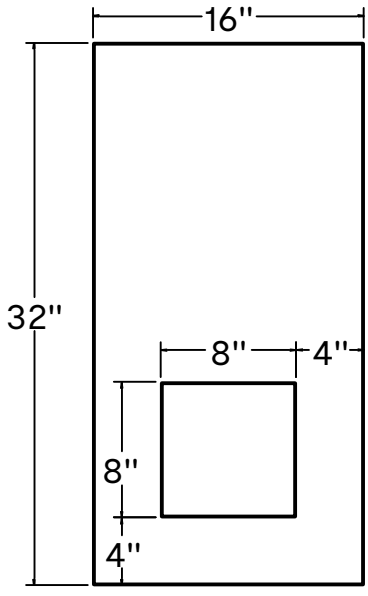
CEILING PANEL



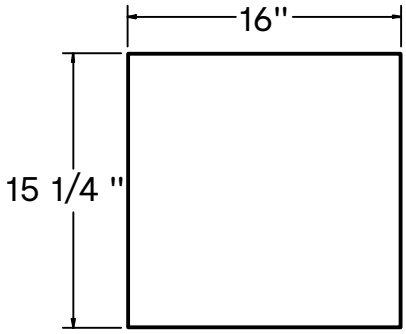
BASE PANEL



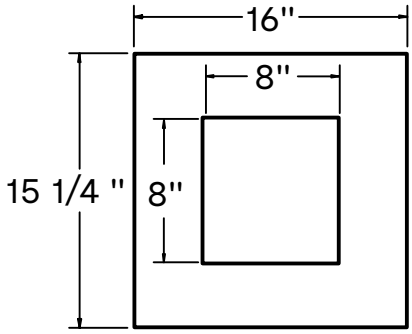
CENTER PANEL



LEFT FLOOR PANEL

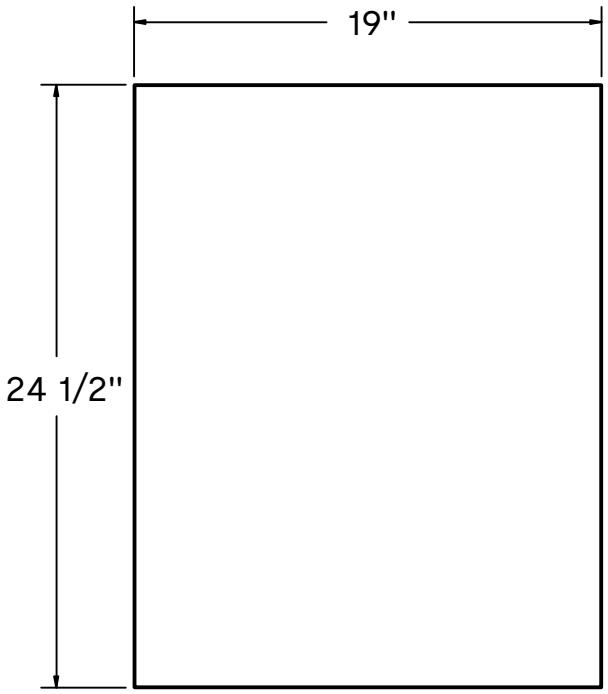


RIGHT FLOOR PANEL

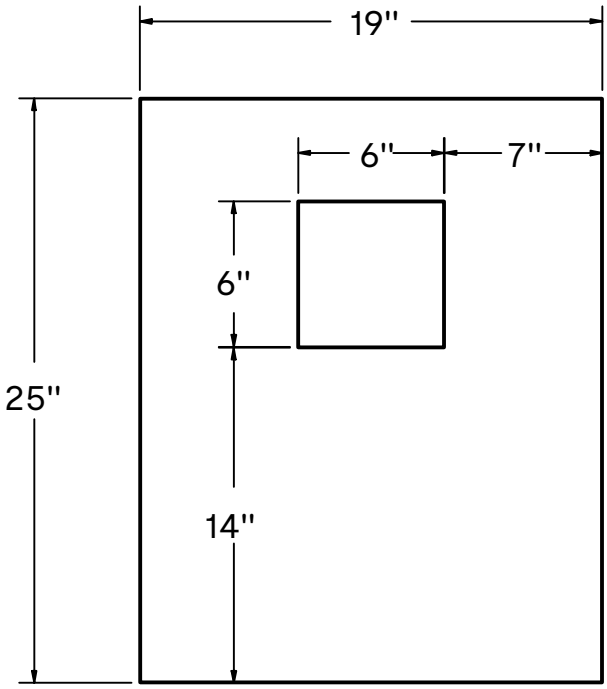


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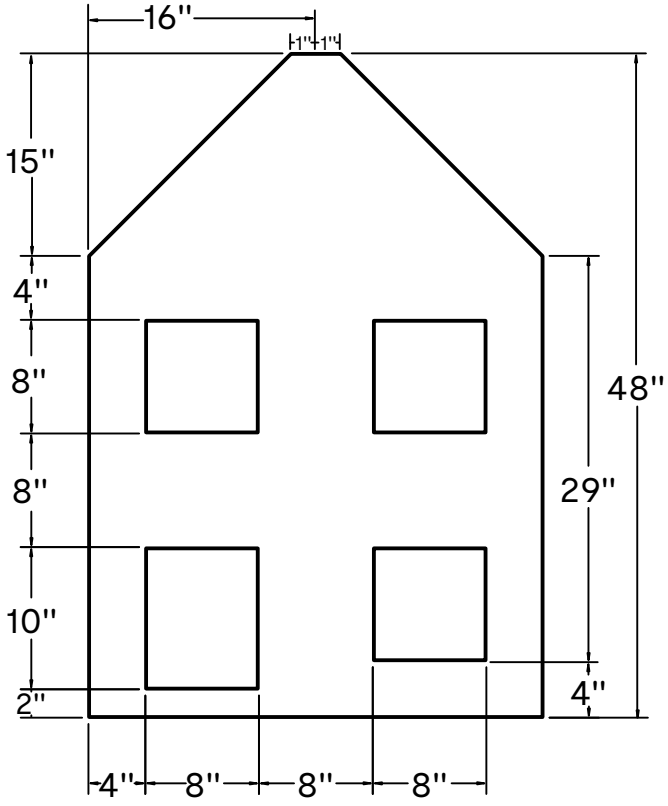
LEFT ROOF PANEL



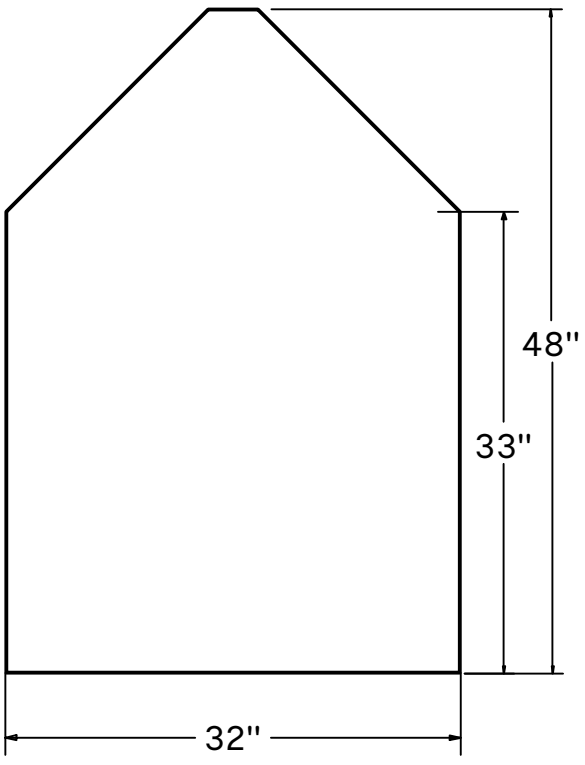
RIGHT ROOF PANEL



FRONT



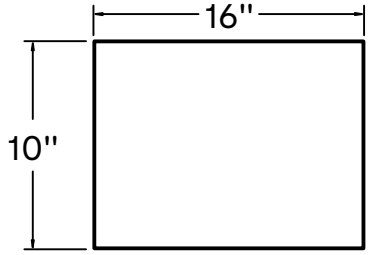
BACK



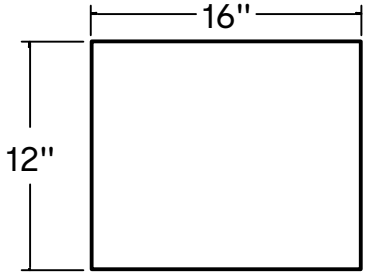
Note: Not to scale

Remember, these pieces are cut from the scraps of OSB.

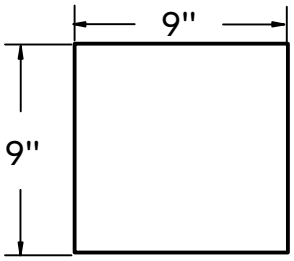
SLIDER (NEED 6)



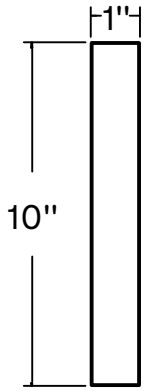
LARGE SLIDER (NEED 1)



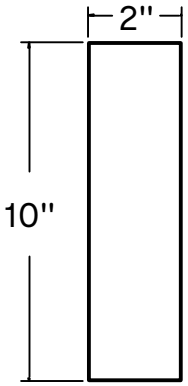
PUNCH OUT PANEL



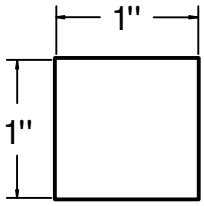
SLIDER GUIDE (NEED 14)



SLIDER GUIDE (NEED 14)



SLIDER STOP (NEED 4)



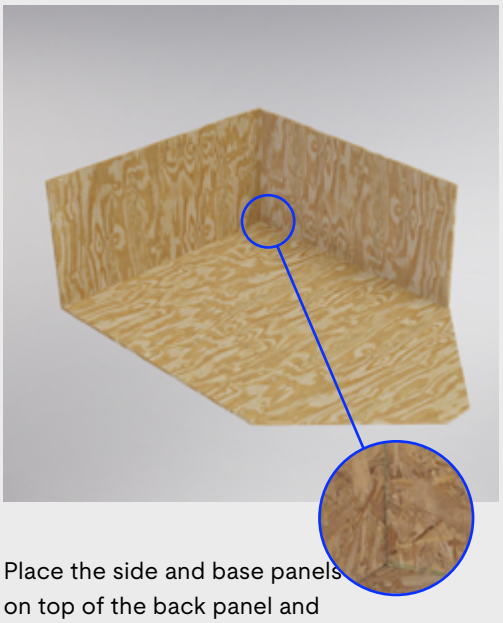
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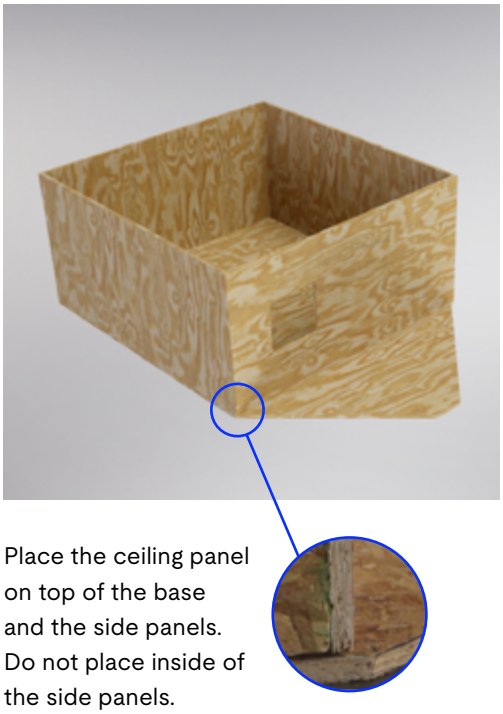
Assemble the Sides

Now that we have all of our materials prepared, we can begin assembling the dollhouse. To ensure we have the correct placement, we will build the sides on top of the back panel.

1. Lay the dollhouse's back panel on the table.
2. Take the base panel and one side panel and place them appropriately. Both panels should sit on top of the back panel (not on the side) and the side panel should sit on top of the base panel.
3. Attach the two panels together using the staple gun. They do not get attached to the back panel at this time.
4. Place the other side panel in the same manner, on top of the base panel and bottom panel. Attach the other side panel and bottom panel using the staple gun.



Place the side and base panels on top of the back panel and the side panel on top of the base panel.



Place the ceiling panel on top of the base and the side panels. Do not place inside of the side panels.

Builders Tip

Cuts may not be perfectly precise, which can result in a gap. Instead of leaving the entire gap on one side, center the piece and split the difference, leaving smaller gaps on both sides. This approach makes caulking easier in future steps, which allows for a better seal.

5. Repeat for the ceiling panel, which should sit on top of the side panels. The hole in the ceiling panel should be on the right side, which will be the top of compartment 3.

Note: Not to scale

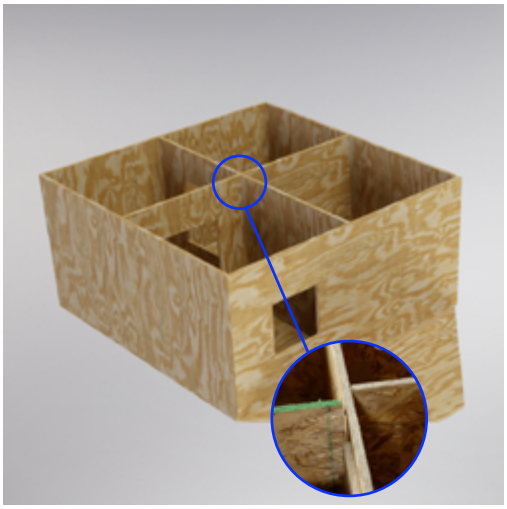
3

Assemble the Interior

Now that we have the sides together, let's assemble the interior of the box.

1. Insert the center panel vertically, hole side down, into the middle of the box.
2. Before attaching, ensure the center panel is in the correct place by inserting the floor panels horizontally, on either side of the center panel. The floor panel with the hole should be on the right side of the box, under the ceiling hole.
3. Attach the center panel the bottom and ceiling panel using the staple gun.





4. Slightly offset the horizontal floor panels, then use the staple gun to attach them to the side and center panel.

Now is a good time to reorient yourself with the box.

» Compartment 1 is on the bottom left.
» Compartment 2 is on the bottom right.
» Compartment 3 is on the top right.
» Compartment 4 is on the top left.

During the demonstration, the fire will begin in compartment 1 and transition to compartment 2, 3, and then the attic space, hence the openings connecting these compartments. Compartment 4 will remain isolated throughout the demonstration.



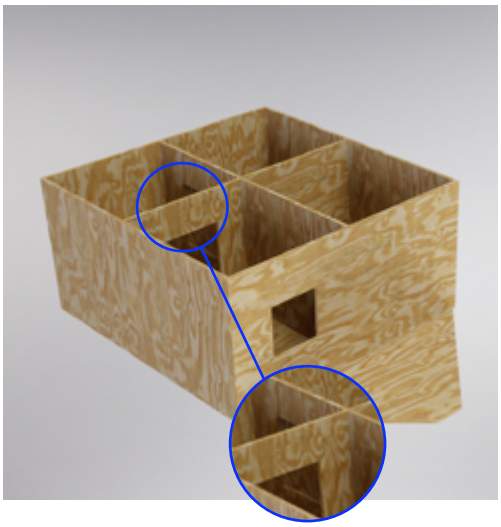
Note: Not to scale

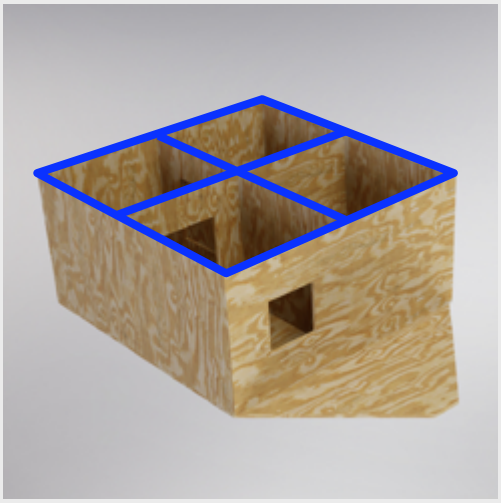
4

Attach the Punch Out Panel

Now that the interior panels are attached, let's add our punch out panel.

1. Locate the punch out panel and position it in the bottom left compartment, over the opening on the vertical panel between compartment 1 and 2.
2. Attach the panel using the staple gun. Don't use too many staples here, only one or two. This makes it easier to punch out during the demonstration.





5

Attach the Front Panel and Caulk the Interior

Now, let's add our front panel and caulk the interior.

1. To create a strong seal, spread caulk along the top edges of the box, as indicated by the blue lines in the image to the left.
2. Lay the front panel on top of the box. Make sure the orientation is correct with the larger opening in the bottom left.
3. Attach the front panel with the staple gun.
4. Flip the box over,. Remember the back isn't attached yet.
5. Caulk the inside of the box everywhere that two pieces of wood come together. This will create a strong seal for the demonstration.



Note: Not to scale

6

Attach the Back Panel

Now that the interior is caulked, let's attach our back panel.

1. Just as we did previously, spread caulk along the top edges of the box, as indicated by the blue lines in the image to the right.
2. Place the back panel on top of the box and attach it using the staple gun.

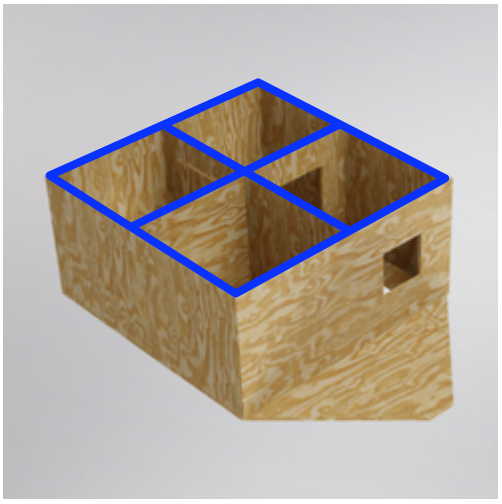




IMAGE IS STRICTLY FOR VISUALIZING THE CUTS.

7

Cut the Openings for the Sliders

If not done previously, now we need to cut the openings for the compartment 3 and attic sliders.

1. Orient the box so you are able access the back panel and compartment 3 through the opening in the front panel.
2. Take your pre-cut 10-inch slider and lay it on the bottom of compartment 3. Using the marker, draw a line the length of the slider where it hits the back panel.
3. Pull the slider out and use the drill to mark the corners of the line so you can identify what needs cut.
4. Orient the box so you can use a jig saw to connect the holes in the back panel, creating an opening right above the floor for your slider.
5. Test the slider to ensure the hole is the correct slides.
6. Repeat these steps to create an opening for the attic slider that will go above compartment 3.

Note: Not to scale

8

Assemble the Attic Slider Guides

Now that the slider openings are cut, let's assemble the attic slider guides.

1. Orient the box so you can easily access the attic space.
2. Pull the attic slider out slightly and place a 1" x 1" block between the edge of the slider and the front panel, leaving enough slider exposed at the back to grip.
3. On both sides of the slider, attach a 1" strip of OSB to the top panel. Then attach a 2" strip of OSB on top of the 1" strip. This creates a guide for the slider so that it can easily slide in the correct place.



DO NOT ATTACH THE STRIPS OF OSB TO THE SLIDER.



9

Attach the Roof Panels

Now that the attic slider guides are in place, let's attach the roof panels.

1. Place the two roof panels above the attic space, ensuring that the roof panel with the hole is above the attic slider.
2. Attach the roof panels to each other and then to the front and back panels. You do not need to caulk the roof panels so that you can simulate eaves in your demonstration.

Note: Not to scale

10

Assemble the Slider Guides

Now that the roof panels are attached, let's assemble the slider guides.

1. All sliders are the same with the exception of slide 1, which is the largest. Set this aside.
2. Starting with the roof, lay the slider over the hole, ensuring enough is hanging off the back to grip. Following the same pattern as the attic slider, on both sides of the roof slider, attach a 1" strip of OSB to the roof panel. Then attach a 2" strip of OSB on top of the 1" strip.
3. Repeat for the slider in between compartment 2 and 3.





DO NOT ATTACH THE STRIPS OF OSB TO THE SLIDERS.

4. Lay the box on its back and lay out all of the door sliders on the front panel, ensuring enough is hanging off the side to grip. Slider 1 is the largest and should be over compartment 1 in the bottom left.
5. Lay out the remaining eight 1" strips of OSB around the doors, attach to the front panel.
6. Lay out the remaining eight 2" strips of OSB on top of the 1" strips, attach to the 1" strips.
7. Place a 1" x 1" block horizontally in between door 1 and door 2 to keep the doors from sliding too far in. Attach using the staple gun.
8. Repeat step 6 but in between door 3 and door 4.
9. Place all sliders their appropriate guides.

Note: Not to scale

11

Finishing Touches

Now that the slider guides are in place, let's apply our finishing touches.

1. Using a marker or spray paint, label your compartment doors 1, 2, 3, 4.
2. Go through your box one more time and fix any holes with caulk. Remember to avoid the attic space.
3. Admire your handiwork, your box is now ready to burn!



Instructors Note

The Dollhouse Fire Behavior Prop is a powerful, versatile tool for teaching fire dynamics. Consider using the prop to educate your recruit class, reinforce topics with seasoned firefighters, or even drive home Close Before You Doze messaging with the public. For more instructor information, follow the link or scan the QR code.

DOWNLOAD INSTRUCTOR RESOURCES

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