How to Build a DIY Cold Frame

Keep Plants Warm Without a Full-Sized Greenhouse

By
KAMRON SANDERS

Updated on 02/19/24

Reviewed by
DEANE BIERMEIER

PROJECT OVERVIEW

- **WORKING TIME:** 1 - 3 hrs
- **TOTAL TIME:** 1 - 2 days
- **YIELD:** One cold frame
- **SKILL LEVEL:** Advanced
- **ESTIMATED COST:** $60 to $100

A cold frame is a smaller but effective alternative to a greenhouse, which often isn't a practical purchase for many homeowners. A cold frame is a simple structure that sits over the top of your plants during the offseason and protects them from the elements while trapping warm air inside. This setup is ideal to care for tender perennials and give an early start to cold-tolerant plants and seedlings, regardless of the climate. Read on to learn the basics of how to build a cold frame.

What Is a Cold Frame?

A cold frame is a simple structure, most commonly constructed out of wood, that sits over the top of plants during colder seasons. A clear, sloped lid allows light to enter the frame and holds the thermal energy to allow plants to grow in the off-season continually.

Before You Begin

A cold frame can be built out of just about anything. This example is constructed out of pressure-treated lumber and features an acrylic top. Here are some other tips and ideas:

- **Use scrap wood:** Recycle appropriately pressure-treated lumber or untreated rot-resistant scrap lumber you already have, such as redwood or cedar. Use lumber treated with non-toxic preservatives (such as ACQ), but do not use wood treated with creosote or pentachlorophenol because these toxins can become trapped in the frame.[1]
- **Upcycle windows:** Build them out of reclaimed windows you may have stowed away in the shed.
- **Use scrap glass:** If you don't have windows, use pieces of regular glass or plexiglass, a thick acrylic plastic.
- **Adjust the size:** A cold frame can be a universal fit, or you can build it to fit perfectly over your specific planters or raised beds. Plan your cold frame accordingly and adjust the provided materials list and steps as needed.
- **Seal the cold frame:** To keep the wood in good shape while protecting plants, it's common to seal it with exterior white latex paint or a non-toxic exterior-grade penetrating oil sealant, such as linseed oil.

What You'll Need

Equipment / Tools

- Circular saw
- Miter saw
- Drill
- Drill bits
- Step bit
- Screwdriver
- Tape measure
- Sealing and staining supplies
- Trigger clamps
- Straight edge
- Pencil
- Marker

Materials

- 1 2x4 x 8-foot pressure-treated board
- 3 5/4-inch x 6-inch x 12-foot pressure-treated deck boards
- 2 2x2 x 8-foot furring strips
- 1 2-foot x 4-foot plexiglass sheet
- 2-inch self-tapping exterior wood screws
- 1-1/4-inch self-tapping exterior wood screws
- 3/16-inch washers
- Exterior-grade penetrating oil
- Wood stain (optional)
- 2 door hinges

Instructions

How to Build a Cold Frame

Follow the steps below to build your DIY cold frame. These steps yield a cold frame 2 feet by 4 feet, but you can easily adjust the dimensions to accommodate your specific garden.

1. Cut Outside Boards
    a. Cut three 12-foot and 5/4-inch deck boards into five pieces measuring 4 feet.
    b. Cut five pieces from the deck boards, each measuring 22 inches. o Set the remainder aside for later use.
2. Cut Inside Supports
    a. Cut a pressure-treated 2x4 into two pieces measuring 15 inches long. o Cut two pieces from the board measuring 11 inches long.
3. Assemble Front and Back
    a. To assemble the back, lay three 4-foot deck boards flat on a work surface with the sides pushed tightly together.
    b. Slide a 15-inch 2x4 beneath the boards at each end, spaced 1 inch from the ends, and flush at the bottom.
    c. Screw through the deck boards into the 2x4s with 2-inch self-tapping exterior wood screws, placing at least two screws per board. o To assemble the front, repeat the process with two 4-foot deck boards and the 11-inch 2x4s.
4. Attach Sides
    a. Attach the sides and assemble the frame by screwing two 22-inch boards into the sides of the 2x4 supports on each side.
    b. Position the boards in line with the front of the frame so that the top board on the back is exposed.

    c. Once assembled, the full frame should measure 2 feet by 4 feet.
5. Cut Angled Side Boards
    a. Mark the angle for the top side rails by placing a straight edge spanning from corner to corner on the remaining 2-foot board and trace the line.
    b. Clamp the board to a work surface.
    c. Carefully cut along the line with a circular saw.
6. Mount the Angled Side Boards
    a. Set the side rails in place with the high side against the exposed upper on the back of the frame.
    b. Screw the side rails into the back 2x4 supports.
    c. Secure the front by drilling a pilot hole through the top of the rail, 4 inches from the end.
    d. Screw through the rail into the board beneath.

WARNING The tapered end of the side rail can easily split. Avoid this by drilling proper pilot holes and refrain from overdriving your screws.

7. Cut Wood for Lid
    a. Build the lid by cutting a 2x2 furring strip into two 4-foot pieces.
    b. Cut two pieces from the strip measuring 21 inches.
8. Assemble Lid Frame The top will consist of a wooden frame with a piece of plexiglass screwed into the top.
    a. Start by assembling the frame into a 2-foot by 4-foot rectangle.
    b. Screw through the 4-foot 2x2s into the ends of the 21-inch pieces. To avoid splitting, pre-drill the screw holes.

WARNING If you make a cold frame larger than 2 feet by 4 feet, add 2x2 stringers in the middle to strengthen the lid frame.

9. Mount Plexiglass
    a. Place the plexiglass sheet on the frame and adjust until all sides are even.
    b. Use a marker to mark screw holes in each corner, then one more on each short side and two more on each long side.
    c. With the plexiglass sitting on the wood frame and the protective film intact, drill through the plexiglass and stop once you hit the wood.
    d. Use a step bit and make the holes slightly larger than the screw threads.
    e. Screw the plexiglass to the frame using 1-1/4-inch wood screws and washers. To prevent cracking, hand-tighten the screws.
    f. Remove the protective film once the cold frame is fully assembled.
10. Mount Lid
    a. Place the lid on the frame with the plexiglass side facing up.
    b. Adjust the lid until it's even on all sides.
    c. On the back of the cold frame, mount two door hinges connecting the lower frame and the lid frame using the provided screws.
11. Cut and Mount Lid Arms
    a. To aid in holding the lid open while working or venting the cold frame, two lid support arms are needed.
    b. Cut one 2x2 long enough to hold the door open at a height that allows you to tend to the plants comfortably.
    c. Cut another piece only a few inches long to hold the lid open just enough to let excess heat out when necessary.
    d. Mount each arm on opposing sides of the interior of the cold frame.
    e. Pre-drill the screw holes and refrain from over-tightening the screws to allow the supports to swing up when needed easily.
12. Seal the Cold Frame
    a. Seal the total wood surface using an exterior-grade penetrating oil, following the manufacturer's instructions for proper application.
    b. Remove the plexiglass top to ensure all wood gets coated or sealed before attaching the top.

c. If you desire a darker finish, you can stain the cold frame, but do this before sealing.

Tip Place the cold frame on bricks rather than directly in the dirt to further protect the wood from the elements. Holding the wood up and avoiding ground contact will help it last longer.

How to Keep Cold Frames Warm

Heating a cold frame differs from heating a greenhouse. Cold frames only keep plants 5 to 10 degrees warmer than the outside temperature. Monitor your cold frame to check if your plants are too cold. You can top the cold frame with blankets on very cold nights to add more essential degrees of warmth.

To increase heat inside, create a hotbed. Make a hotbed by digging 2 feet below the soil and adding a thick layer of compost with about 6 inches of soil on top. The compost breaks down and generates heat to warm the cold frame.

How to Use Your Cold Frame

Putting your newly built cold frame to work is as easy as placing it over your plants whenever the cold weather hits. While cold frame usage is primarily passive, there is one trick to using it effectively for overwintering plants. If there is ever an abundance of heat inside the frame, such as after an abnormally warm day, use the small lid support strut to vent the heat.

While the sloped lid should prevent debris from sitting on top of the cold frame and blocking the light, you may occasionally need to clean the top.

How to Maintain Your DIY Cold Frame

Keeping your cold frame in great condition for years of use is as simple as keeping the wood sealed. Because of the exposure to the elements, it's a good idea to reseal the wood annually.
If the plexiglass gets cloudy over time, you can easily replace it. However, the cloudiness shouldn't interfere with the cold frame's effectiveness, so only do so if you desire the look of crystal-clear plexiglass.

FAQ

- **When should you plant in a cold frame?**

Put a cold frame over summer and fall plants to extend the season. Use a cold frame for seedlings in the spring to give them a protected head start on the growing season. If you want to grow plants for cold weather, overwinter them in your cold frame.

- **What is the best base for a cold frame?**

Pavers are good as a hard surface if you fill the cold frame with pots. Other gardeners use weed control fabric topped with 6 inches of sand to plunge pots into. A soil base over weed control fabric is best for plants, not in pots.

- **What crops can grow in a cold frame?**

Growing crops in the winter is easy with a cold frame. Lots of salad greens and vegetables are perfectly fine in a cold frame into the winter. Crops include leafy greens such as arugula, lettuce, chard, kale, and spinach and other vegetables such as carrots, peas, and radishes. However, many plants do well in a cold frame.