



## Plans and Instructions to build a folding reflector oven



[Kayak2go.com](http://www.kayak2go.com) also has folding kayak plans available for purchase. The low cost and ease of construction make the folding kayaks a great youth group project. See page 7 of these plans and visit [www.kayak2go.com](http://www.kayak2go.com) for more information.

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#### ***READ THE FOLLOWING BEFORE PROCEEDING FURTHER***

#### **WARNING AND RELEASE OF LIABILITY**

These plans emphasize safety and care in both the building and the use of this reflector oven. However, like any activity, there is the risk of injury. Building a reflector oven requires the use of tools that may cause injury or death to the user or other participants. In addition, the use of the reflector oven near a campfire requires care and involves risk. Kayak2go.com is unable to ensure that all reflector oven construction and use activities are carried out in a safe manner. Kayak2go.com or any of the persons related to Kayak2go.com can not assume any responsibility or liability for any injury or damages that may result from the construction, use of these plans or use of these reflector ovens in any way. By using these plans to build a reflector oven you do hereby indicate that you have read this caution and liability release statement and do release Kayak2go.com and all related persons of any and all responsibility and liability. If you do not agree to this liability release statement, please return these plans to Kayak2go.com or delete them. Going forward with the building of a reflector oven indicates that you have accepted the above stated risks and do release Kayak2go.com and all related persons of any and all responsibility and liability.

## **Introduction**

This reflector oven is great for backpacking and camping. Just imagine a hot biscuit with butter melting on it or a hot chocolate chip cookie fresh out of your own reflector oven. Sounds good, doesn't it? I designed this folding reflector oven a few years ago while serving as a Scoutmaster of a Boy Scout unit. I wanted a simple reflector oven that was light and compact for use on backpacking outings. I also wanted the construction to be simple so that the boys would be able to do most of the work. This reflector oven sets up easily in a few seconds and folds down to a lightweight and compact 8" x 9" x 1/2" (approximate) package. The reflector oven is shown in set-up position in figure 1 and in the folded position in figure 2.



Figure 1 Setup and ready to bake position

Figure 2 Folded-down and ready to backpack position

The following pages contain the plans and instructions to build the folding reflector oven pictured above. Some of the construction techniques may be new to you. Read over the plans a few times until you understand the process thoroughly.

**+ Safety First:** Please keep **SAFETY FIRST** in both the building and use of your reflector oven. To minimize the risk of injury, please follow the following guidelines as you build and use your reflector oven:

### Building your reflector oven :

- Always wear eye protection when using hand and power tools. Safety glasses are available at most hardware stores.
- Wear hearing protection when using or working near power tools. Ear plugs and other types of ear protection are available at most hardware stores.
- Know your tools – make sure that you understand the safe operating procedures for each of the tools you use. Refer to the tool manufacturers' materials for safety instructions and guidelines.

### Using the reflector oven:

- Always use care when handling the oven to avoid getting burned by the oven metal or by the fire. Use pliers, a hot pad or heavy leather gloves to handle the oven when hot.

**👏 Group Tips:** These reflector ovens can be a great project for Boy Scouts and other youth groups. When building more than one reflector oven at a time there are a number of things that can be done differently to make the experience more efficient, enjoyable and rewarding. These tips include ways to set up the project, the use of templates, efficient ways of cutting out the materials, and ideas to reduce the average cost of the reflector ovens. These group tips are noted by the “👏 Group Tips” logo and appear throughout these plans.

## **Construction Overview**


The following outlines the steps required to build the reflector oven:

1. Cut the top, bottom, sides, legs and rack supports from aluminum sheet
2. Drill the holes in the top, bottom, sides, legs and rack supports
3. Cut the wire mesh to size
4. Stitch the oven together with wire (stitched together like a “spiral bound” notebook)
5. Attach the legs and rack supports using pop rivets


## **Materials Required**

The following materials are required to make one folding reflector oven.

<b>Item #</b>	<b>Item Description</b>	<b>Quantity / size</b>
1	0.020 inch aluminum sheet	Approximately 17” x 20” piece required – see page 8 and 9 for part dimensions
2	20 gauge galvanized or stainless steel wire	Approximately 60 inches
3	1/8 inch pop rivets (short length)	(4)
4	1/2 inch wire mesh (commonly used for rabbit cages)	8” x 10”

 **Group Tips:** Aluminum sheet can be purchased from various sources including hardware stores and metal shops. One possible source of the aluminum sheets could be the aluminum sheets used for replacing the kick-panel of aluminum screen doors. You also might check in your area for aerospace companies or other companies that use aluminum sheet – you may be able to get the companies to donate surplus aluminum.

## **Tools Required**

The following tools are required to make the reflector oven. Alternate tools are also listed in the  **Group Tips** in the detailed instructions.

- tin snips or metal shears
- wire cutters
- measuring tape or ruler
- square
- protractor (optional)
- electric drill (hand power drill or drill press)
- 3/32 inch drill bit
- 1/8 inch drill bit
- needle nose pliers
- a vise (optional)
- pop rivet gun
- Pencil
- Sandpaper (100 grit)

## **Building the Reflector Oven**

The following paragraphs provide detailed instructions outlining the construction of the reflector oven.

**+ Safety First:** The edges of the aluminum sheet can be sharp – use care in handling the aluminum to avoid cuts. Use care in using all hand and power tools. If the reflector oven is being done with youth, assign an adult to work with the youth to make sure the youth understand the proper way to use the tools. Emphasize safety before starting and monitor closely.

**👉 Group Tips:** Divide up the work to be done into an assembly line type process. Assign various teams to perform each of the cutting and drilling steps. To allow each person to have a sense of ownership of their own oven, you might cut and drill all the parts in an assembly line fashion and then let each person stitch and pop rivet their own individual oven.

### **1. Cut the aluminum sheet to the specified dimensions**

Using metal shears or tin snips cut the top (1), bottom (1), sides (2), legs (2), rack supports (2) from the aluminum sheet to the dimensions shown on pages 8 and 9. After cutting the pieces out sand the edges with 100 grit sandpaper to remove all sharp edges. Using pliers and/or a vise to bend the rack supports as shown on page 9.

**👉 Group Tips:** Check with the local sheet metal shops, heating & air conditioning shops, Junior High School shop, or High School shops to see if you could use their large floor mounted metal shear to cut the parts out. These metal shears make the cutting easy, make nice straight cuts and leave a cleaner edge. To minimize the time required to layout and mark the parts, make one set of parts first and use them as a pattern or template to trace, mark, and drill the additional parts.

### **2. Drill the holes for the wire binding and pop rivets as noted in the plans**

Note: Some aluminum sheet has one side that is more shiny and polished than the other. If this is the case, as you go through the following drilling and assembly steps, face the shiny sides inward so that the shiny surface will become the inside reflecting surfaces of the oven.

- a. Using a ruler or tape measure, mark the hole locations on the reflector oven bottom per the dimensions given on page 8.
- b. Use a hammer and drill start punch or an 8-penny nail to center-punch a small dimple for the hole locations.
- c. Place the top and bottom together aligning the back hinge and side edges. Use a C-clamp and clamp the top and bottom to keep them from moving while you drill the 3/32" back hinge holes.
- d. Drill the holes along the top-bottom hinge side (the 10 inch long side). Unclamp the top and bottom and drill the additional side hinge holes in the **bottom only**.
- e. Using the bottom as a template, drill the side hinge holes in the sides.
- f. Drill the 1/8" leg holes in the legs and the sides. Drill the 1/8" holes in the rack supports. **DO NOT** drill the rack support holes in the sides. The hole in the sides for the rack support must be positioned to align with the wire mesh support rack. It will be located and drilled as the last step.

### **3. Cut the wire mesh to size**

Using wire cutters cut the ½ inch wire mesh to 9 by 7 inches. The finished dimensions will likely not be exactly 9 x 7 inches since the wire mesh is not exactly in perfect ½ inch grid spacing. This is okay. Try and cut the wires off flush with the edges. Sand any sharp edges smooth using 100 grit sandpaper.

#### **4. Stitch the oven together with wire**

You will now stitch your oven parts together with wire. The wire stitching needs to be tight enough to hold the oven together and yet loose enough to allow the oven parts to hinge back and forth. The goal is to make the wire stitching somewhat look like the wire on a spiral wire bound paper folder. The top, bottom, and wire mesh rack will all hinge together at the rear of the reflector oven. Place the top and bottom together matching them up in the same way they were when you drilled the hinge holes (shiny side facing inside). Place the wire mesh rack in between the top and the bottom and align its back edge with the back edge (this will become the hinge edge). Take 36 inches of wire and start at one end stitch the wire loosely one hole at a time (similar to a spiral bound notebook stitch). Do a double stitch on both ends and cut off the excess wire. The stitching should look something like the stitching shown in figure 3 and figure 4. Use about 8 inches of wire to stitch each of the sides to the bottom. The sides will need to be able to hinge freely – keep the wire loops a little loose.

#### **5. Pop rivet the legs and the rack supports to the oven sides**

Pop rivet the legs to the outside of the sides as shown in figure 5. The legs should be able rotate with some effort.

You will now install the rack supports.

Open up the reflector oven as if you were going to set it up (see figure 1). Place the rack support through the wire mesh in the approximate position shown in figure 6 and mark the hole location on the right side. If you find that the rack support does not pass through the wire mesh hole easily, round the corners of the rack support or taper the top end. Pop rivet it in position with the head of the pop rivet on the outside as shown in figure 6. Repeat this for the other side.

Your reflector oven is now complete. Practice opening and closing it. You may find that you need to bend the sides in slightly so that the top can rest on the sides. This allows you to check on whatever you are cooking by lifting the top back as shown in figure 7. Remember to use care in opening and closing the reflector oven to avoid damaging the wire hinges. If you find that you wrapped the wire hinges too tightly, remove them and redo the wire hinges.

**Using your oven:** You can make a simple cover out of fabric to protect your oven when it is not in use. A simple cover is shown in figure 8. Cook directly on the wire mesh or use some foil or make a simple baking pan can be made from the aluminum sheet. Cut a piece 7 x 5 inches to allow room for the heat to reflect around the pan. To use, simply set up next to the fire as shown on the cover page of these plans. A nice



Figure 3 Completed stitching – view looking at the back of the top/bottom hinge. Note the double stitch on the end.



Figure 4 Completed stitching – view looking inside at the hinge showing the wire stitching along top-bottom hinge. See how the back edge of the wire mesh rack is encircled by the wire stitching.



bed of hot coals cooks more evenly than a blazing fire. For other reflector oven cooking tips see books on outdoor cooking in your local library.

If you have any comments or suggestions as to how we might improve these plans, please e-mail your comments to [kayak2go@mail.com](mailto:kayak2go@mail.com). Also check out [www.kayak2go.com](http://www.kayak2go.com) and see the plans to build a folding kayak. See the following pages for more information.



Figure 5 Legs are pop riveted onto the sides as shown. Leg should be able to rotate. Note that pop rivet head is on the leg side not the inside of the oven.



Figure 6 Rack support is located as shown. You may want to round the corners of the rack support or even taper the top portion of the rack support to make it easier for it to go between the wire mesh.



Figure 7 Top hinges back allowing you to check on your "baking" without removing the entire reflector oven away from the fire.



Figure 8 A simple "envelope" type pouch can be made from some nylon material. Use velcro to close envelope flap.

**Did you like these plans? Check our plans to build the folding kayak pictured below!**

A kayak2go.com folding kayak is:

- **Low cost** – the cost of building this kayak usually runs around \$80-120 depending upon the model (8 or 10-foot), number of kayaks built, and the cost of materials in your area.
- **Easy to build** – compared to other kayaks, this kayak uses simple construction methods and can be completed over three to five weekends.
- **Compact and easy to store** – the kayak folds down into 6 inch by 14 inch by 8 or 10 foot space (depending upon kayak model). The kayak can be stored easily in or on many powerboats, sailboats, and motorhomes, inside most apartments or hung on a garage wall.
- **Easy to transport** – the finished kayak with paddle weighs about 40 pounds for the 8-foot model and 50 pounds for the 10-foot model.
- **Great project for youth groups** – due to the ease of construction and low cost, this kayak makes a great project for Boy Scouts and other youth groups. This is a great parent-youth project that will provide treasured memories from both the building and use of the kayak.

The 28-page kayak plans provided by Kayak2go.com include dimensioned plans and instructions to build both the 8-foot and 10-foot kayak models (shown in figure A). The kayak folds down as shown in figure B making it easy to store and transport. We love to use our kayaks when we go crabbing.

Check out [www.kayak2go.com](http://www.kayak2go.com) for more information on how to purchase these kayak plans.



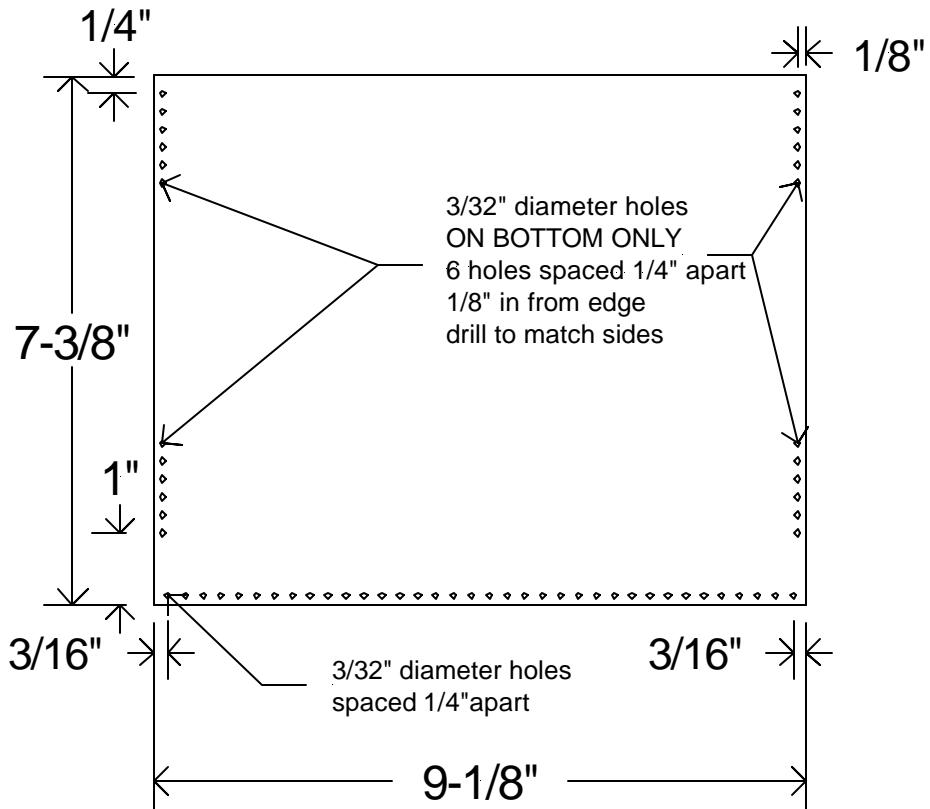
Figure A The plans have dimensions and instructions to build both the 8 foot and 10 foot models shown.



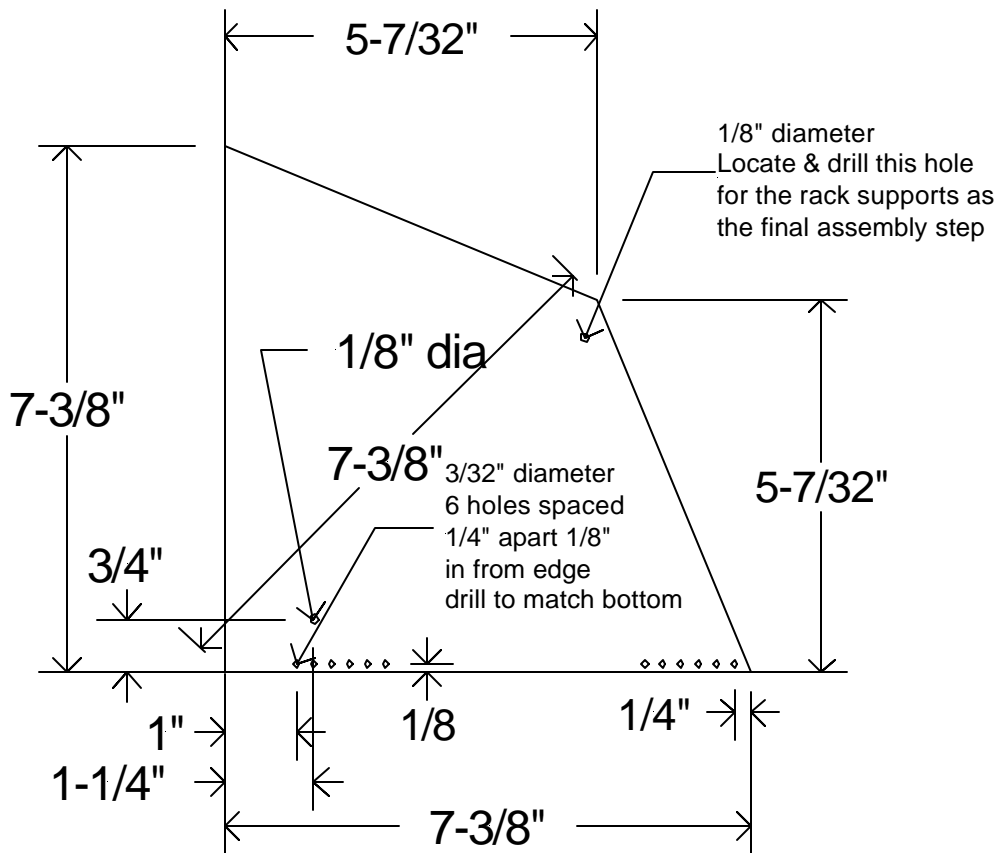
Figure B Folds down making it easy to store and transport.



Figure C This kayak is great for many uses. We love to take ours when we go crabbing.

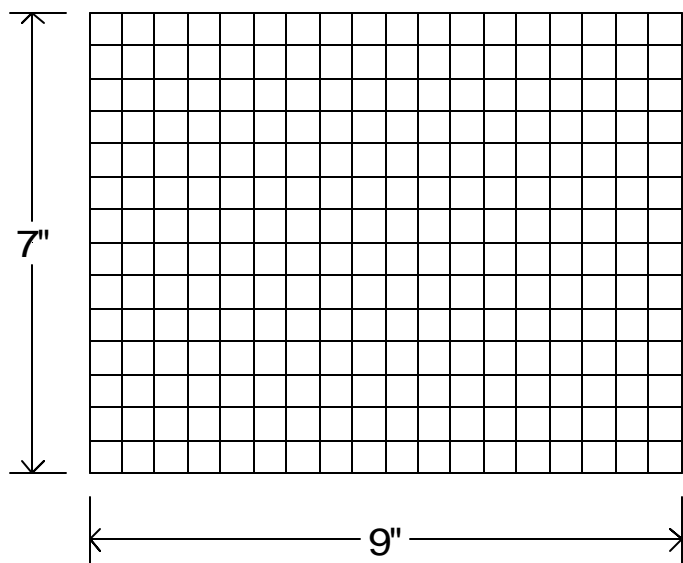
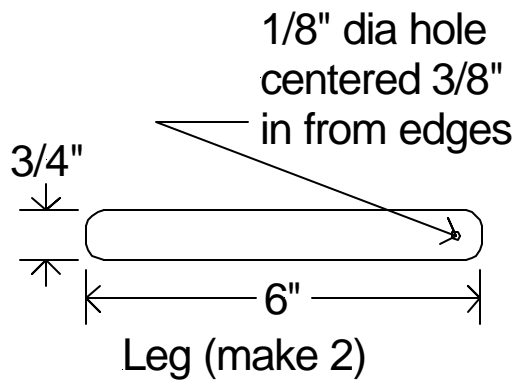
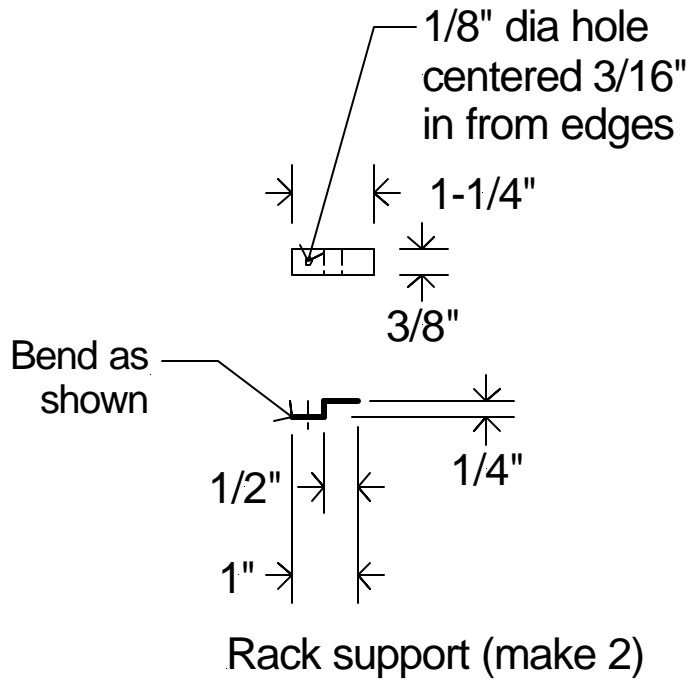


Top/Bottom (make 2)



Side (make 2)





Rack (make 1 from 1/2" wire mesh)