

# Air Control Funnel

*User Guide*



## Cautionary and Warning Statements

- This kit is designed and intended for educational purposes only.
- Use only under the direct supervision of an adult who has read and understood the instructions provided in this user guide.
- Read warnings on packaging and in manual carefully.
- Always exercise caution when using sharp tools.

## Materials Included

- 24 cardboard grid pieces
- 1 black elastic cord
- 1 cord lock
- 2 cardboard-funnel Side A pieces
- 2 cardboard-funnel Side B pieces
- 2 corner shields

## Items Required (not included)

- Cool-melt glue
- Cool-melt glue gun
- Large scissors
- Tape
- Ruler

## Cutting the Corners

1. Tear along the perforated lines of the cardboard sheets to make the required 22 cardboard grid pieces. Each sheet makes eight cardboard grid pieces. You will have two extra.
2. Line up the side corner shield with the edge of a horizontal cardboard grid piece and trace the slant with a pencil. Repeat this for the other side of the cardboard grid piece and cut along the traced line (Figure 1).
3. Repeat Step 2 for eight other pieces.
4. Repeat Steps 2 and 3 for the top/bottom corner shield (Figure 2). **Note:** Label each piece you cut with “top/bottom” or “side” so you can easily identify pieces when building. You should end up with nine top/bottom pieces and nine side pieces.



Figure 1



Figure 2

## Creating the Grid for the Large Opening

1. Using four cardboard grid pieces, make a box by interlocking the far-left and far-right slots of each piece (Figure 3). Make sure that top/bottom pieces are used for the top and bottom and side pieces are used for the sides.
2. With the open slots on the side pieces facing up, insert seven of the top/bottom pieces into the slots so the pieces interlock (Figure 4).
3. Flip the cardboard and repeat Step 2 by filling the top/bottom open slots with side pieces (Figure 5). When finished, you should have a box grid made with 18 pieces of cardboard (Figure 6).

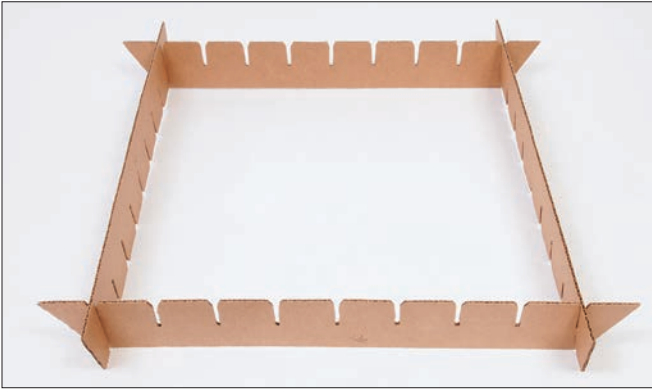


Figure 3

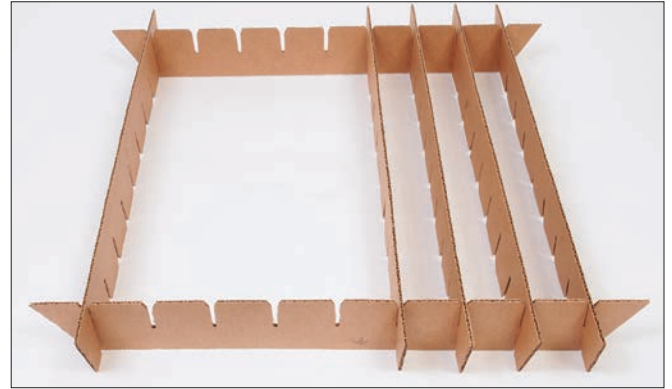


Figure 4



Figure 5

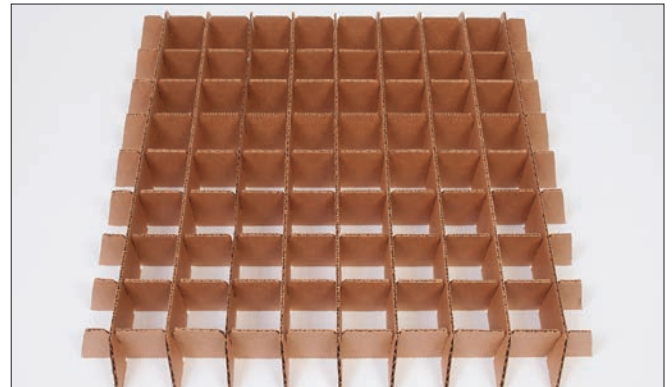


Figure 6

## Creating the Funnel

1. Split the cardboard funnel pieces in the middle along the perforated line and, with the white side facing up, bend the end flap up.
2. Put the cardboard funnel pieces together with the white sides facing out. Sides of similar shape fit opposite of each other (Figure 7).
3. Glue the outside where the pieces create an overhang. A small line of glue will help make the funnel sturdier (Figure 8).
4. Tape together the outside corners of the smaller box that forms at the end of the funnel pieces (Figure 9).
5. Place the grid made previously into the large opening of the funnel. When correctly oriented, it will fit firmly within the opening (Figure 10).

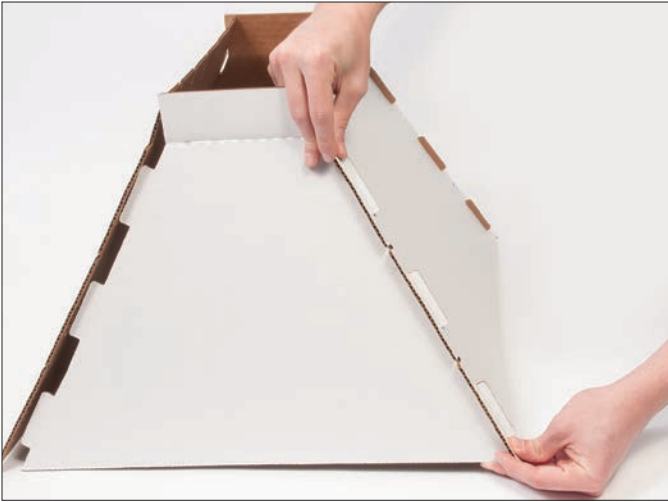


Figure 7



Figure 8

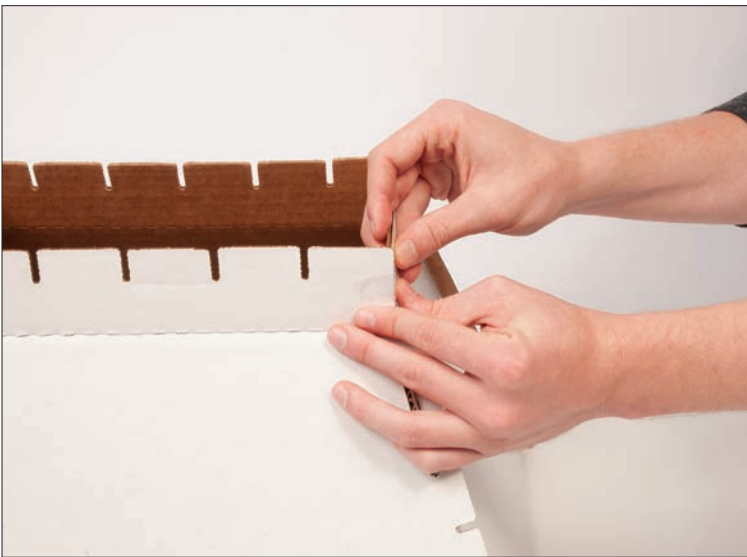


Figure 9

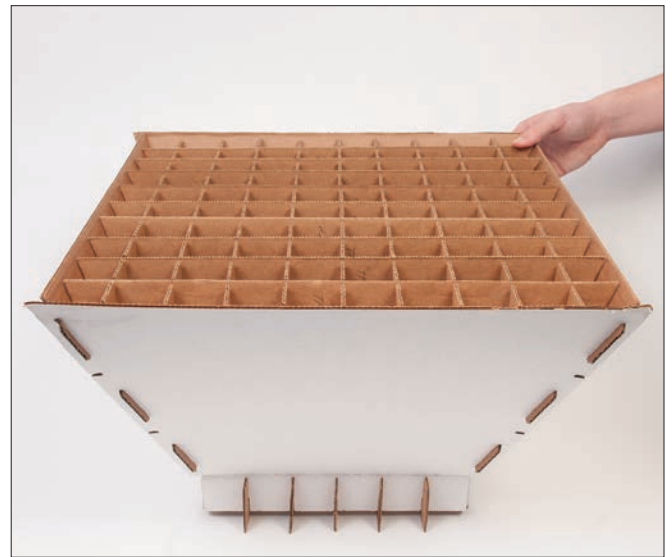


Figure 10

## Creating the Grid for the Small Opening

1. Measure eight inches from the edge of a cardboard grid piece and draw a line (Figure 11). Cut along the line.
2. Use the eight-inch cardboard grid piece to trace and cut out four more pieces (Figure 12).
3. Draw a line on a new cardboard grid piece at the first slot and the seventh slot from the left (Figure 13). Cut along the lines. This new piece measures roughly 11-3/4 inches. Use the 11-3/4-inch piece to trace and cut out one more piece (Figure 14). These two pieces fit horizontally in the small opening.
4. With the slots facing down, insert the eight-inch pieces into the slots on the 11-3/4-inch pieces (Figure 15) and insert them into the slots on the small opening side of the funnel (Figure 16).



Figure 11



Figure 12



Figure 13



Figure 14

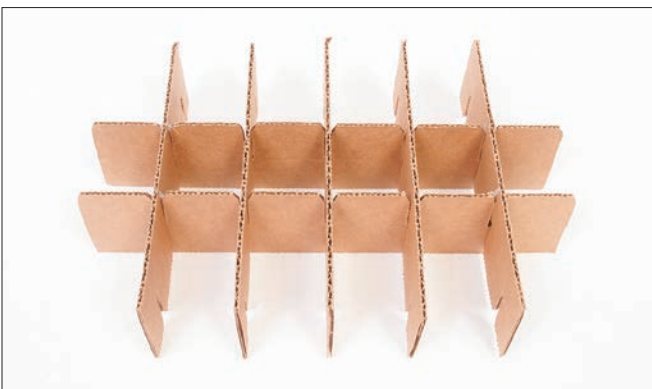


Figure 15

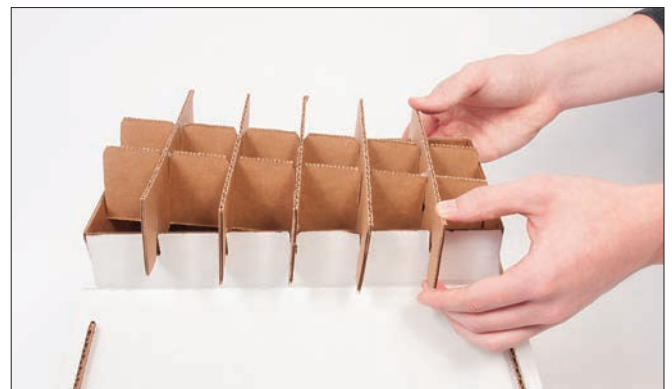


Figure 16

## Secure the Air Control Funnel to a Fan

1. Squeeze the cord lock and slide the black elastic cord through both holes (Figure 17).
2. Place the Air Control Funnel in front of the fan with the large opening against the fan and secure it onto the fan with the black elastic cord. Tighten the cord lock appropriately until the grid is snug against the fan. There are slots on the Air Control Funnel for the black elastic cord (Figure 18).

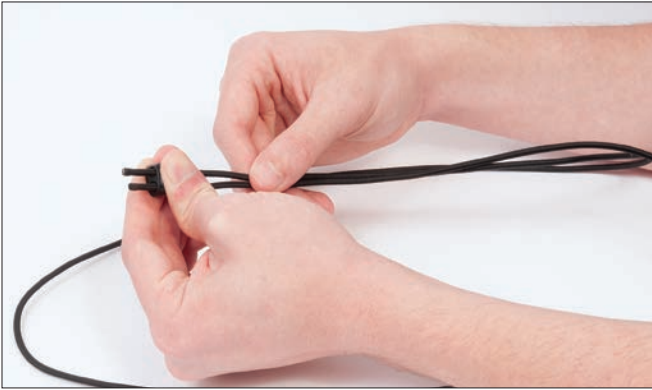


Figure 17

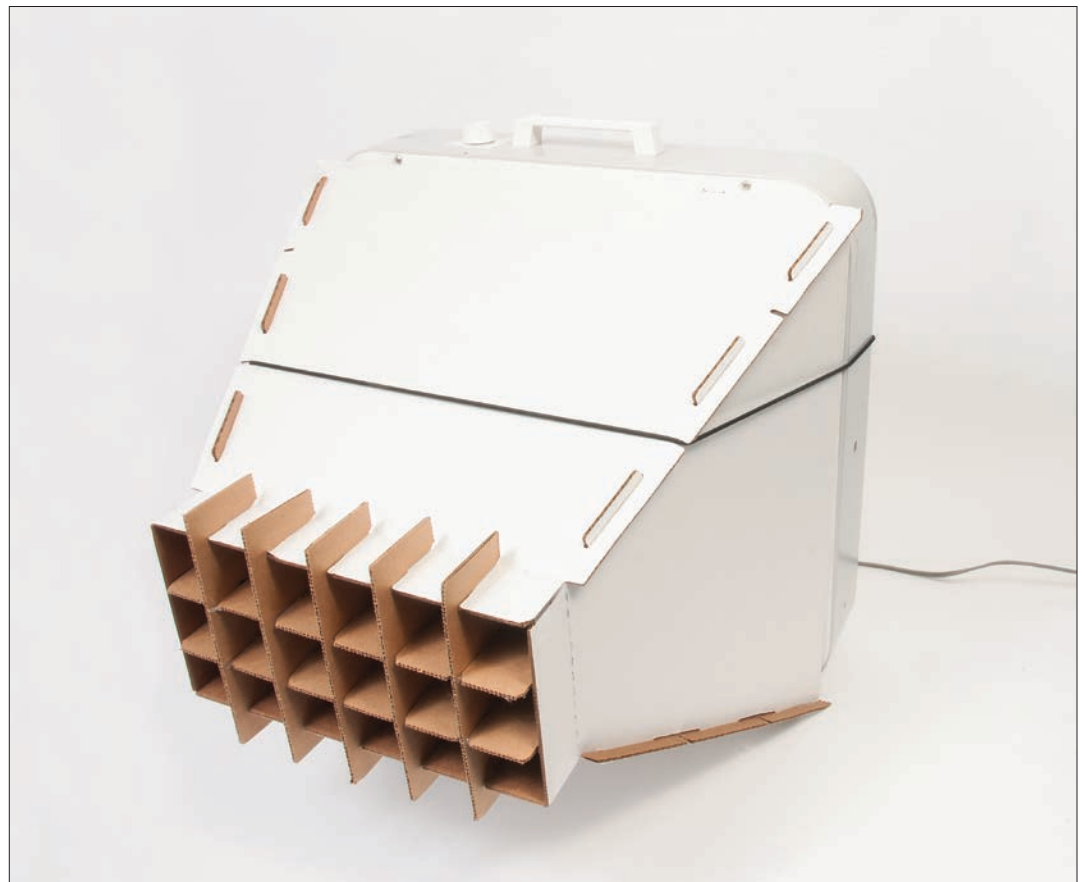


Figure 18

## Activity Ideas

- Use an anemometer (wind speed indicator) to measure the wind speed difference with and without the Air Control Funnel. Discuss the difference.
- Calculate the compression ratio of the Air Control Funnel by measuring the size of the fan and the size of the funnel. Express that as a ratio. Discuss what this means.
- Use the Wing Test Stand, Wing Build Kit, and Air Control Funnel to test the lift of the wing built during the Wing Build Kit activity.

# PITSCO

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