



Balloon Explorium

Instructions for a 6-foot model tissue paper hot air balloon

(Courtesy of PAPER AIR, P.O. Box 602, Drexel Hill, PA 19026)

Safety First: Since your balloon is made of paper, it is important to avoid contact with sparks or flame. It is recommended that the inflating and launching of the balloon be under adult supervision and that a fire extinguisher be at hand. Under no circumstances should fire be carried aloft with the balloon.

Glue Note: Although almost any paste, glue, glue stick, or mucilage can be used, best results have been obtained using a quick setting, white glue, such as "Elmer's" or "Ross' School Glue", etc. and applied best through a narrow, tapered tip to control the flow. Do not use model airplane type glue, as it tends to soak through the tissue paper and cause the folds to stick together.

Materials:

- 21 sheets Tissue Paper 20" by 30"
- Glue
- Scissors
- 22-24 gauge flexible wire – preferably aluminum or steel
- Kite string – approximately 12" in length

Assembly Instructions:

Joining panels to form gores.

The 6-foot aerostat is made of 7 tapered gores each containing three panels of #1 grade tissue paper 20" by 30" in size. Each gore is assembled as follows:

1. Select three panels and place them end to end lengthwise with a ½" to 1" overlap. Carefully glue the panels together along the overlaps to form a single long sheet 20" by 90". By alternating colors you can form checkerboard and other patterns. Place this gore aside.
2. Repeat until you have a stack of 7 of these gores.

Shaping the gores.

Once your stack of gores is complete, place them on top of one another, being careful to make them as aligned and straight as possible. You are now ready to cut the gores into the shape that will form the envelope. There are two methods for shaping the gores.

Using a pre-cut gore pattern.

1. If mass-producing the tissue balloons it is advisable to build a gore pattern out of pressboard or hardboard, available at any hardware store in 4' by 8' sheets. A single sheet should allow you to create 4 gore patterns. The pattern should be no more than 88" in length, and 20" wide at the widest point, see figure 1.
2. Place the gore pattern on the stack of tissue "gores". Have one person hold down the pattern while another cuts the stack of tissue "gores" with a pair of scissors.



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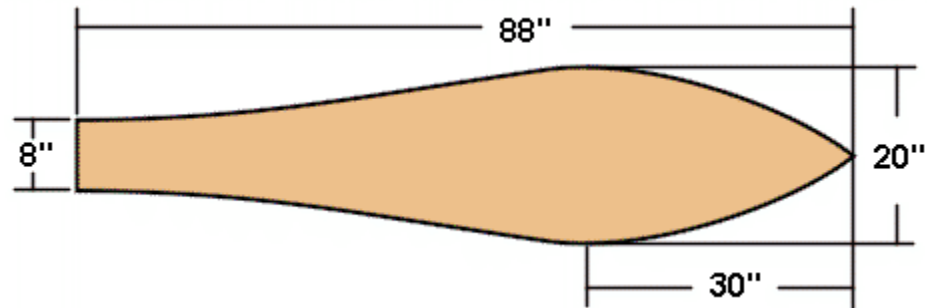


Figure 1.

Cutting the pattern free hand.

1. With all the tissue "gores" stacked on one another, carefully fold them in half lengthwise, making it 10" by 90" in size.
2. Carefully apply several spring clips along the folded edge of the tissue "gores" to keep the sheets from moving.
3. Draw a half of a leaf shape on the top sheet (figure 2) and cut it out through all the sheets.

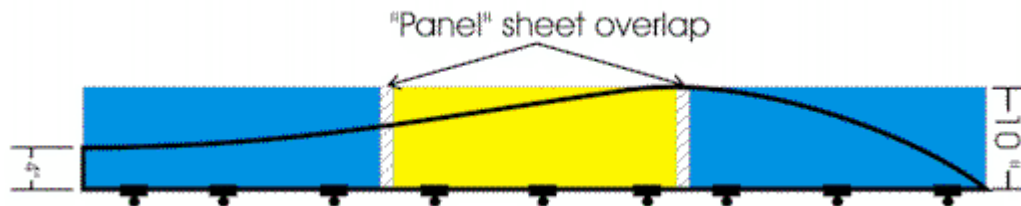
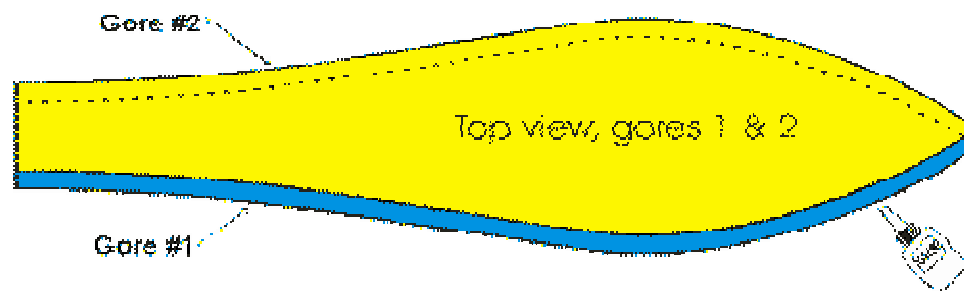


Figure 2.

Joining the gores to form the envelope.

1. Select two gores and lay one directly on top of the other, allowing a ½" to 1" margin to show on the bottom gore (gore #1) as shown in figure 3.





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Figure 3.

2. Apply a very thin line of glue to the margin of the bottom gore. Fold the glued margin over the edge of the gore on top (gore #2) as shown in figure 4.

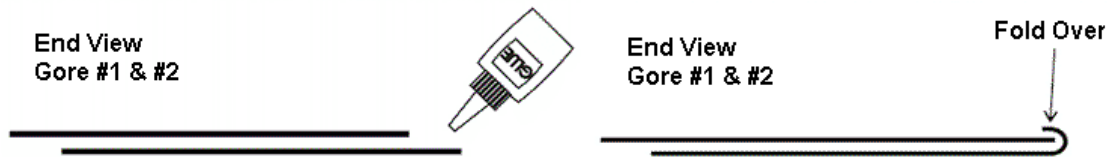


Figure 4.

3. Place a third gore on top of gore #2, again allowing a ½" to 1" margin to show on unglued side of gore #2. Repeat the gluing as per step 2 above.
4. During and after gluing, carefully separate all folds to keep them from sticking together. It is important to the final shape of the balloon that these folds do not stick together.
5. Glue up the remaining 4 gores using the above procedure. Take your time, be careful. Don't rush.
6. You should now have a stack of 7 gores (folded accordion style) with two edges that have not been glued – one on the top and one on the bottom. After making sure that there are no folds stuck together, glue the two edges of the remaining gores, top and bottom – thus joining all sections together. (figure 5)

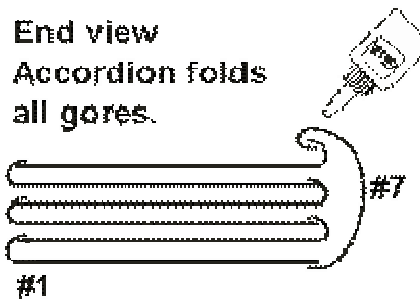


Figure 5.

Forming the throat.

Make a wire ring big enough (approximately 18 inches in diameter) to fit inside the throat (bottom) of the balloon. Fold the tissue over the ring about 1 inch and glue or tape into place. Use 18-gauge aluminum or steel wire.

Closing the top.

1. Where all the points meet at the top, tie a 12 inch piece of string about 2 inches back to close the hole. Leave a loop in the string for holding the balloon up while inflating.
2. You can now inflate the balloon with a fan or vacuum cleaner to check for holes and loose seams or edges. Small holes do not matter.



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The Burner

The burner is a trash barrel burner or an 8-inch diameter stove pipe with an elbow (figure 6) or fire door at the bottom for proper draft. A screen is placed over the top to prevent sparks. Crumpled newspaper is an ideal fuel, as it produces a large flame, sufficient to rapidly heat the large volume of air inside the balloon.

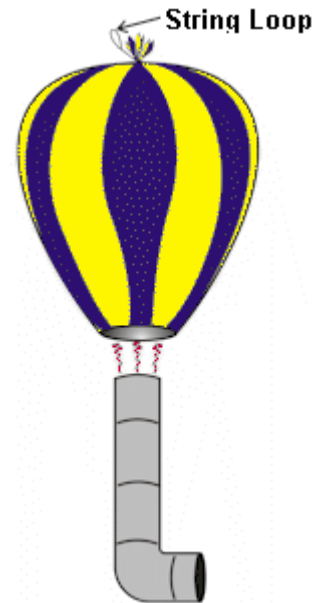


Figure 6.

Launching the Balloon

Do not attempt to inflate the balloon without the throat ring installed. The ring acts to hold open the bottom of the balloon during inflation, to give shape to the balloon and to stabilize the balloon during flight.

To inflate the balloon, hold the wire ring over the stovepipe while another person holds the balloon up with an 8 or 9 foot pole through the loop in the string at the top. Feed crumpled newspaper into the fire door (one sheet at a time) to maintain a constant fire. Start with a slow fire at first. The balloon will fill with hot air and the pole can be removed after about 1 minute. After the balloon is sufficiently full of hot air and well rounded out, it may be released. The fire should be increased just before release. Should your balloon catch fire, **DO NOT RELEASE IT**. Under no circumstances should fire be carried aloft with the balloon. Put fire out with the fire extinguisher.

Best launching conditions are usually during periods of calm or with a very slight breeze of less than 3 m.p.h., usually in the morning or evening. Dead calm conditions are ideal. Breezy conditions rob the balloon of its heat and increase chances of fire. When the tissue walls feel warm and the balloon starts tugging let it go. The height the aerostat rises depends on the heat of the air inside the balloon. An ascent of several hundred feet is not uncommon. The balloon will stay aloft and drift until the hot air cools. The larger the balloon, the higher the rise and longer the flight.