

Inflatable Sculpture: the basics

Materials

1) .6 MIL plastic sheeting, available at most hardware stores in various sizes:

- 10' x 20'
- 20' x 25' Available in clear and black
- 10' x 50'
- 20' x 100'
- 40' x 100'

2) Duct tape, available in silver, gray, black, clear

- Used to build forms by attaching plastic sheets to each other.
- Additionally can be used to create surface details.
For example, white tape used to make drawings on black plastic.

3) Permanent Ink Markers

- Ideally, I suggest using pens by TEXAS MARKER. These refillable markers typically used for sign making are perfectly scaled for making larger drawings or color block areas on clear plastic sheeting.

www.texasmarker.com

- Always use ink on the **OUTSIDE** of the inflatables **not** on the inside.
- Must be used in a well ventilated area.

Equipment

- Measuring tape(s)
- Scissors
- String/rope
- Box fan
- Extension cords
- Music player(s) with speakers

Design Process

Have students sketch their ideas of spaces and places that are engaging to them. Show them some images of inflatable sculptures so they get the idea of what is possible.

Always have students create a scale model. I like to use a 1" = 2' ratio. The same plastic can be used for both the models and the actual sculpture. To create volume in the model simply stuff it with remnant plastic. Remind students of the standard sizes of the plastic sheeting; particularly the 20' width that will be very useful.

Encourage students to use their imaginations. Designs can always be modified to become more feasible, but that initial dream stage is important in accessing interesting ideas that may be integrated into the final design.

I charge the students with a mission:

TO MAKE A MEANINGFUL WORK OF ART FOR THEIR COMMUNITY

Points to consider:

- Who is your audience? Is the structure appropriate for this group?
- What are you communicating through your art to your community?
- What do you hope they will experience when they see your sculpture?
- Do students want to spend most of their time building or colorizing?*

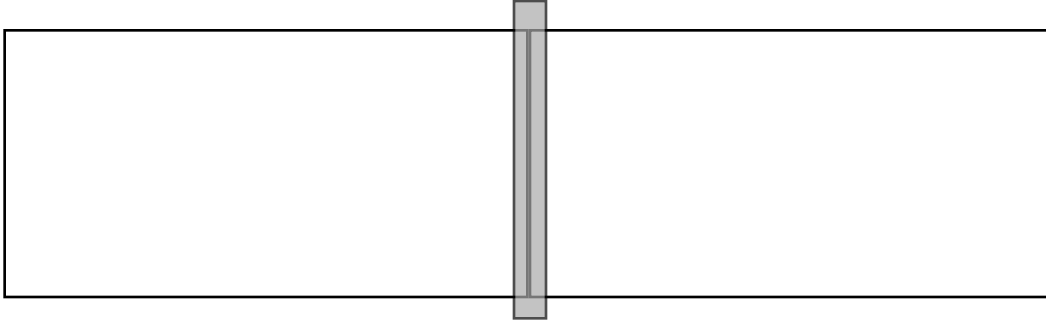
I find small design teams of 4 or 5 work well.

After each team presents their model to the whole group, vote on the design that will be scaled up into the full sized sculpture. Generally, I allow students on the first elimination round to vote for two of their favorite designs. The second round they are given a single vote.

* If time constraints are an issue, one can assume that one will have enough time to create either a complex sculptural form or a highly detailed inked surface design but probably not both.

**Remember, if you can build it small, then you can build it big!
And of course, the other way around.**

Construction Process

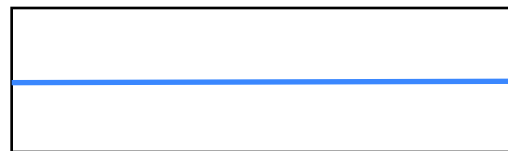


- When joining two plastic sheets, **never** overlap plastic rather have the edges **abutting** one another. Place the tape evenly down the middle of the seam to create a strong hold.
- Ideally, seams should be taped both on the inside *and* the outside of the inflatable.
- Entrance and exit are always the same. This allows for air pressure to “close” the opening behind people who are entering and exiting.
- The fan should be placed adjacent to the entrance rather than directly across from it if possible.
- Always tape from one end to other: do not start a seam in the middle of its length.

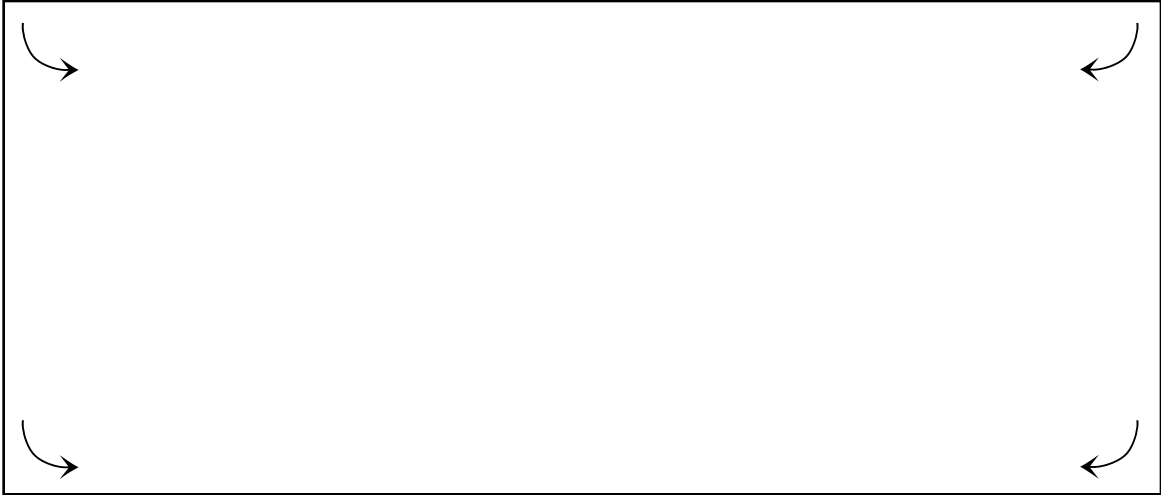
The simplest form is a tunnel or pillow created by simply attaching two long seams:

Tunnel

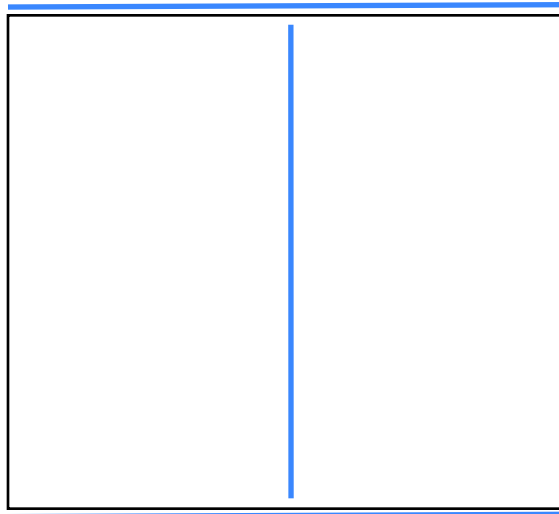
Fold both long edges to the middle. **Tape** the center seam.



Pillow



1) Open plastic sheet. Fold short ends to the middle. [Tape](#) center seam.



For the top and bottom seam: Pull back the edge of the top sheet of plastic to reveal the bottom sheet. Fold the bottom sheet over to join the top sheet so they abut one another before taping. Always work from one end to other.

Small gaps at the corners are fine. It is important however to keep the center seam aligned in the center.

It is most efficient to have students break into taping teams.

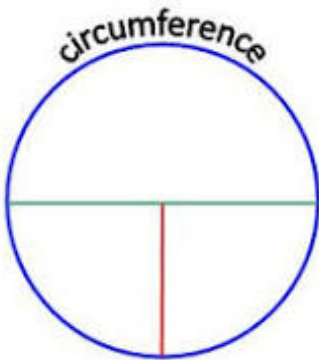
For straight seams:

- One or two students are responsible for lining up the two sheets just ahead of the taper
- Taper follows by pulling and then placing the tape along the seam
- One or two students follow the taper use their feet to press the tape on the seam

For circular seams or joining two forms (for example, tunnel to pillow):

- Use the above, with the addition of two or three students who will cut pieces of tape to have at the ready when needed and hand them to the taper.
- Other students can be useful inside the inflatable by placing their backs along the seams so the tapers have a surface to press against -- makes it much easier to place the tape.

The proper way to tape bottom and top circles together is to first secure the two together with pieces of tape across the seam from top to bottom at 6" increments; and then, fill in the spaces between the tape by running tape along the seam.



Determining circumference of a tunnel (so you will know how wide the plastic needs to be) can be done simply with this equation:

Or to figure this out in reverse:
How tall will my tunnel be if I use 20' wide plastic?

The equation $C = \pi d$ is displayed in red. A blue bracket on the right side of the equation connects the variable 'd' to the label "diameter" above it. Another blue bracket on the left side connects the variable 'C' to the label "circumference" below it. The entire equation is enclosed in a green rectangular border.

$$20' = 3.14 \times d \text{ or } 20' \text{ divided by } 3.14 = 6.3'$$

Now of course in the real world, we are talking pneumatic structures so this will be approximate. But this at least it gives you and your students a starting point.

Cutting Tips

- Determine the number of similar shapes you will need to complete your sculpture and cut those once by layering the plastic sheets on top of one another before cutting.

For example, let's say you need four 20' circles; two black and two clear. Lay out two black 20' x 20' and two 20' x 20' clear sheets on top of one another. Cut all sheets together.

- An easy way to cut circles is to find the center point by using two tape measures or ropes positioned diagonally on each corner so that they cross each other in the middle. Where they cross is the center point.

Have one person hold a string at the middle point. Explain that they must keep the end of the string exactly at that center point and they must be able to rotate along with the person on the other end of the string. The person on the outer end can tie a marker to the string. S/he should be directed to keep the string pulled tightly and move a full circle around the plastic sheet. Another person can be directly behind cutting the circle a few feet behind the person who is drawing it. One must carefully watch the center person to make sure they aren't moving from the center point.

So true – measure twice; cut once!

Inflation Tips

- **Always** have one person stationed at the fan to make sure it is positioned correctly.
- Always make sure that fan is completely free from plastic getting pulled into its intake of air. As the sculpture moves a bit with air currents and wind this can happen. Make sure the fan attendant aware of this duty:

[Keep the plastic away from the box fan face.](#)

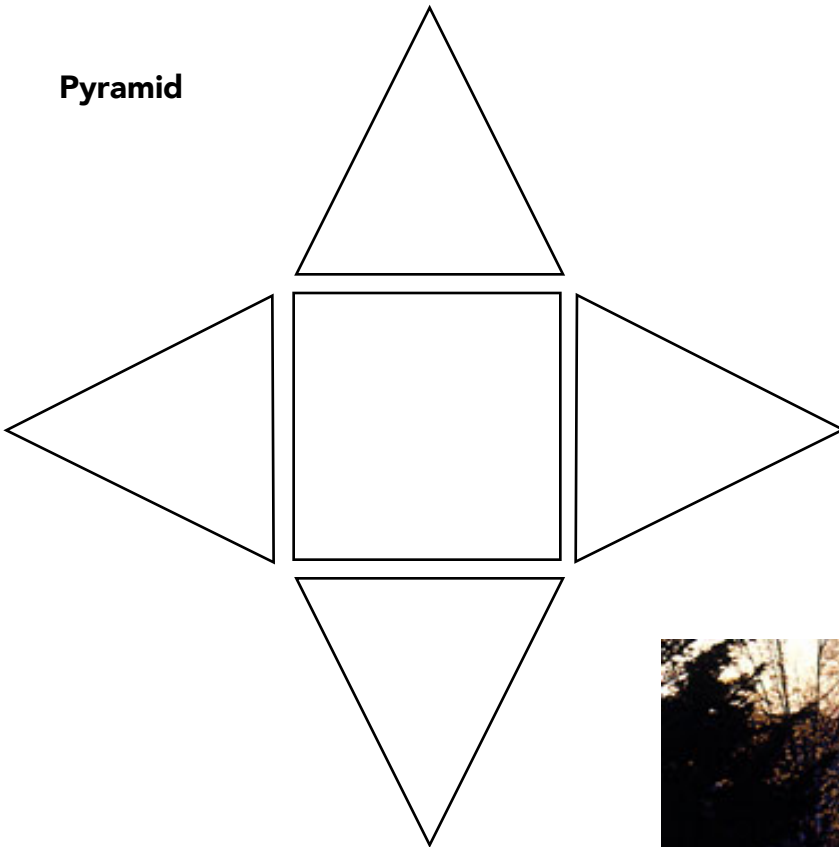
- The fan is placed in the sculpture wall. Usually it's best to tape the box fan into place to create an airtight an opening as possible. This doesn't have to be perfectly airtight but there should not be a big gaping hole around the fan either.
- Keep extension cords safely away from water and places where people could trip on them. If inflating inside, note where the electrical supply is place the inflatable so that the shortest cord is needed.

Culminating Event Tips

- Determine the number of people who will be allowed in the inflatable at any given time. Ask students to take responsibility for monitoring traffic in and out of the sculpture.
- Remind those who enter that this isn't a bouncy space -- [the floor or ground is hard!](#)
- Students love to tell people about their work. Encourage opportunities for them to speak about their sculpture before people enter the work.
- If using sound in the inflatable, keep in mind that additional power sources and players may be necessary. Decide in advance who will take responsibility of keeping these devices safe during the exhibition.

More Complex Shapes

Pyramid



Curvilinear Forms

This isn't as challenging as you might image and can provide for an amazing array of shapes. The outside edge can be contoured to any shape. These shapes do take more time to tape, but often result in dramatic sculptures. For example:



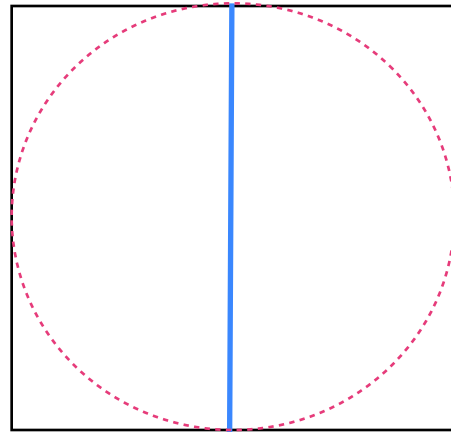
In the case of Kennett High School's inflatable sculpture shown above, the front and back panels were cut together. Students stood shoulder to shoulder on the plastic to create the contoured top. Once they were pleased with the contour, a student cut the shape by following the students' feet. This work also was designed to contrast the "compression" of city life in the center with the expansiveness of the natural beauty of the mountains in both daylight and at night. To achieve this, the top and bottom panels were cut wider at the ends (15') tapering to a narrow passage (5') in the center city section. The top and bottom sections (clear and black) were layered and cut together since they mirror one another.

**There are no right angles in inflatable sculptures.
Think puffy!**

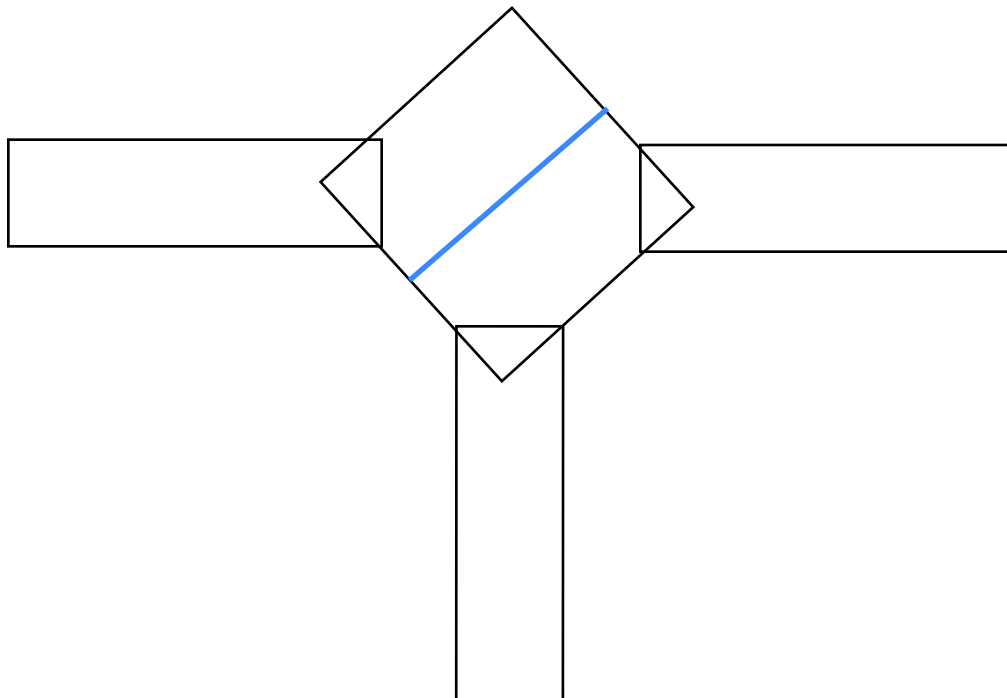
Modifying and Connecting Shapes

Simple modifications can change shapes. For example, you can create a round form by modifying the pillow shape:

Simply **cut** the corners off and tape them using the circular seam method.



Perhaps your design indicates a round center with tunnels radiating from the center: it is not necessary to make the pillow round rather you can attach the tunnels to the corners which will give the appearance of a round center area.



Attaching tunnels with the Alternating Flap Method

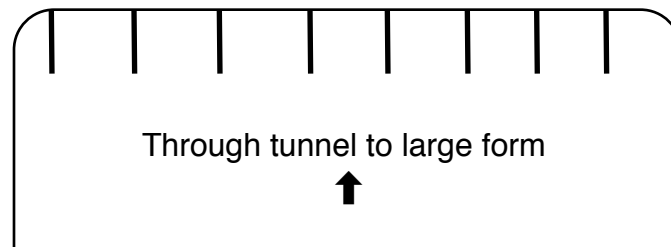
This method allows one to attach a tunnel to a form or perpendicularly to another tunnel. It allows people to move from crawling in a tunnel into a larger sculptural form, usually one where it is high enough for them to stand inside.

Step One: Creating the opening in the large form

Determine where you want the tunnel to attach to the large form. This is usually done after inflating the sculpture. While inflated, cut a slit in the side of the form to accommodate the height of the tunnel. Then carve out two semi-circles on each side to create the tunnel opening. Try to be aware of the relative size of the tunnel circumference in relation to the semi-circles that are being cut.

Step Two: Preparing the tunnel

Cut slits along the edge of the tunnel where it will connect to the large form. These slits can be cut by flattening the tunnel so the top and bottom are pressed together. The cuts should go through both. Place the cuts 6" to 8" apart along the edge and make the cuts 5" or 6" deep. They do not have to be precise.



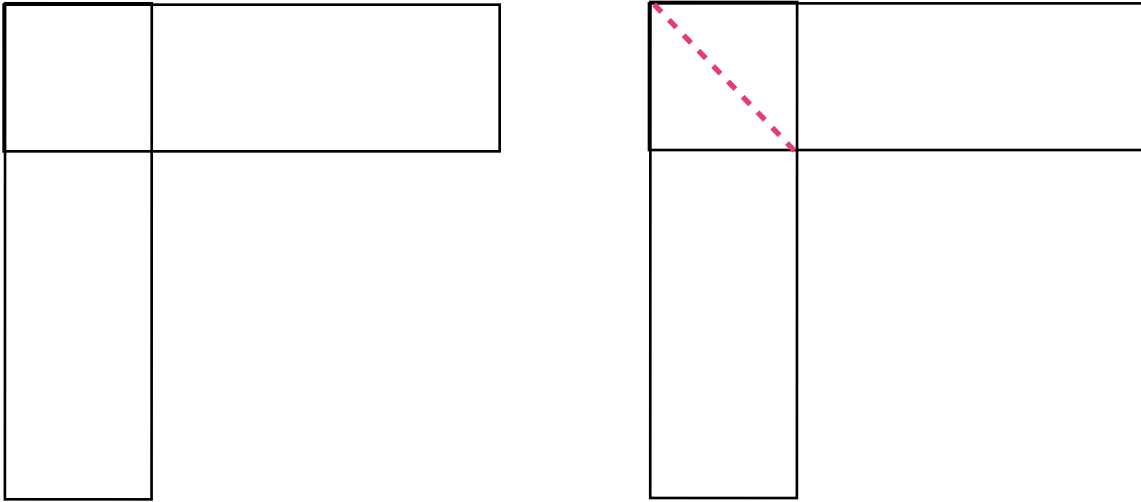
Step Three: Attaching the tunnel to the large form

Match up the top center of the tunnel with the top center of the incision in the large form. Take the center flap from the tunnel and position it on the outside of the large form making sure that it overlaps completely the full depth of the flap cut. Tape this in place. The next flaps going in each direction from the center flap alternate between being attached on the outside and the inside to form a complete seal. Each flap should be taped on each flap edge as well as along the circumference edge of large form where the front and back meet. Both the exterior and interior flap edges need to be taped.

Attaching Tunnels with the Corner Method

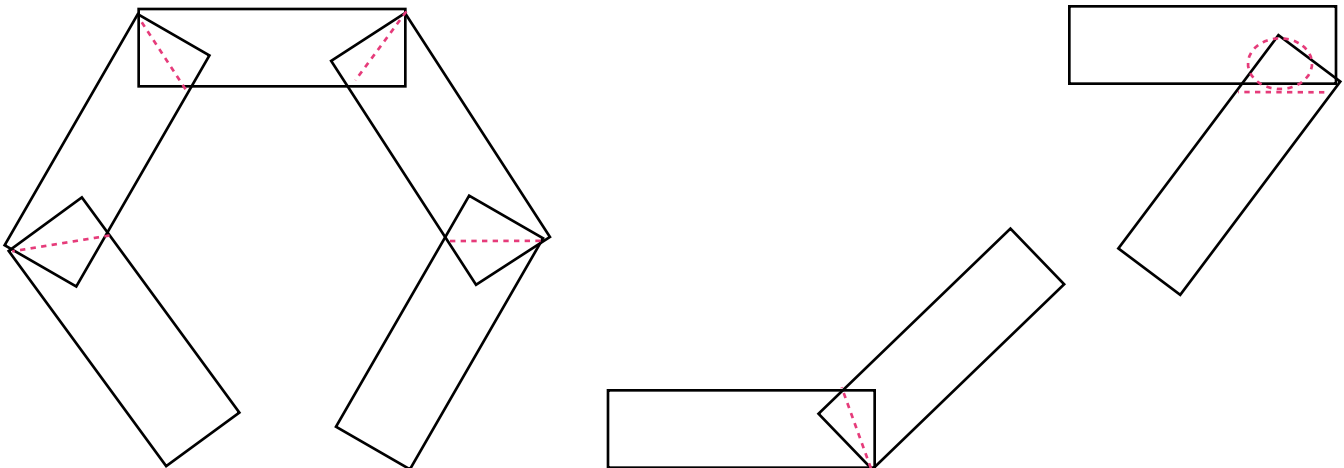
Tunnels can be attached to one another at a variety of angles. The simplest is creating a 90 degree angle.

- Place two tunnels flat on top of each other with the two ends overlapping perpendicular to each other:



- **Cut** the both tunnels diagonally from the interior corner to the exterior corner.
- Remove excess plastic and tape the diagonal seams outside. After inflating, tape the interior from inside.

Other Angles

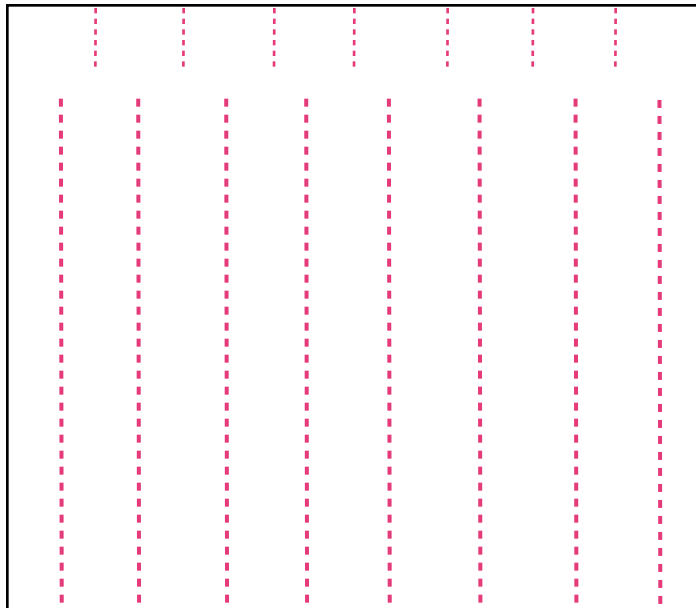


Controlling Light

Because there is a choice of using both clear and black plastic, students often enjoy designing their inflatables with this contrast in mind. The black plastic is extremely opaque even outdoors on a sunny day. This means that a pillow form made with black plastic is extremely dark inside. Sometimes students choose to add light to the interior of black forms: black light, LEDs, etc. Along with sound this can be dramatic and effective in creating an “alternative” or contrasting experience for viewers.

To control light in transition areas like a clear tunnel into a black pillow, one can use streamers cut from black plastic as a partial light barrier. It allows for people to crawl between the forms while blocking enough light to maintain darkness in the black form.

The simplest way to attach streamers is to use the Alternating Flap Method on a black plastic streamer panel that looks like this:



The top smaller slits are attached to the top of the tunnel using the the Alternating Flap Method. The streamers can be cut any width, straight or curvy. The edges and bottom of the streamer panel can be trimmed after it is attached to the roof of the tunnel for a precise fit.



Inflatable sculpture video documenting work created by 7th and 8th graders including teacher comments:

<http://www.youtube.com/watch?v=3rkVk4QO9vM>



