

Student Lab Sheet for the Blow Molding Activity

Purpose: To simulate the industrial process of blow molding and produce an actual blow-molded object using polyethylene tubing and a heat gun.

Safety Notes:

A heat gun gets hot enough to blister paint off walls. It should never be aimed directly at a person or any flammable material. Students must be closely supervised. It is recommended that the activity supervisor be the only person to hold or move the heat gun. You can hold the plastic tubing in the hot air stream as long as you are closely watched. The long length of the tubing prevents heat from reaching the hands as the tubing is rotated in the hot air stream.

Materials:

- ½ in diameter polyethylene tubing cut into 15 to 20 centimeter pieces
- Heat gun (Note: a hair dryer will not get hot enough to work.)
- Pliers
- Sesame Street® character molds from a Fingles® Play-Doh® set by Playskool®
- Spray vegetable oil
- Colored water – optional
- Safety goggles

Procedure:

1. Choose one of the four Sesame Street® figure molds from a Play-Doh® Fingles® set. Spray the inside of the mold with a clear vegetable spray. Put on safety goggles.
2. Place a heat gun on its high setting and heat the bottom of a piece of polyethylene tubing until it becomes clear. Do this by holding the tubing 3 to 5 centimeters in front of the hot air stream and slowly turn the tubing back and forth to warm it on all sides. The heat gun can be held by the activity supervisor or set on a stand on the table.
3. Once the bottom 1 to 2 centimeters of the tubing is clear, remove the tubing from the heat and, using a pair of pliers, gently pinch together the last ½ cm. of the tubing. (The room temperature tubing is milky-white in appearance.)
4. Return the tubing to the stream of hot air and heat the bottom 5 centimeters of the tube (including the pinched portion) until it is clear, using the same method as before.
5. Remove the tubing from the heat and gently place the pinched portion just above the top “head” edge inside the mold. Allow the rest of the clear section of the tubing rest downward through the head and neck areas of the mold character.
6. Close the mold so that the upper “head” edge of the mold squeezes across the pinched portion of the tubing.
7. Holding the two halves of the mold closed, gently and steadily blow into the exposed portion of the tubing.
8. As you blow, you may see the plastic begin to fill the mold. Do not blow too hard or you will pop a hole in the tubing. When the mold appears to be filled, hold your finger or tongue over the open end of the tubing for another 15 to 20 seconds. This allows time for the plastic to cool.

9. Open the mold and pop the Sesame Street® character out of the mold.
10. If you choose, the character can be filled with colored water and the tubing on the neck heat-sealed shut using the pliers and heating technique described before. Since only the end of the tubing needs to be heated for sealing, the water contained inside will not get hot enough to boil.
11. It may take a few practice tries to produce a good final product. This whole process can be repeated several times until a good blow molding technique is developed.

Variations:

Numerous other molds can be used during the blow molding process. The heated tubing can be inflated inside a small glass bottle with a wide neck or even “free blown” without any mold at all, once the end has been pinched shut. You may find other molds to try, especially among your numerous toys. Another kind of child’s toy may also be purchased to simulate the blow molding process. The toy, sold under numerous names, has a tube of plastic resin from which a small portion is placed on the end of a straw. A child blows through the end of the straw to inflate a plastic bubble on the other end. (Do not inhale the acetone fumes!) The bubble can be pinched from the straw and will remain inflated for at least a short period. Blow molding can also be simulated by the blowing of bubbles in bubble gum or the inflation of a balloon inside a 2-liter soda bottle. In this case, the bottle must have a hole in the side before you inflate the balloon or the pressure of the air inside the bottle will not allow the balloon to inflate.