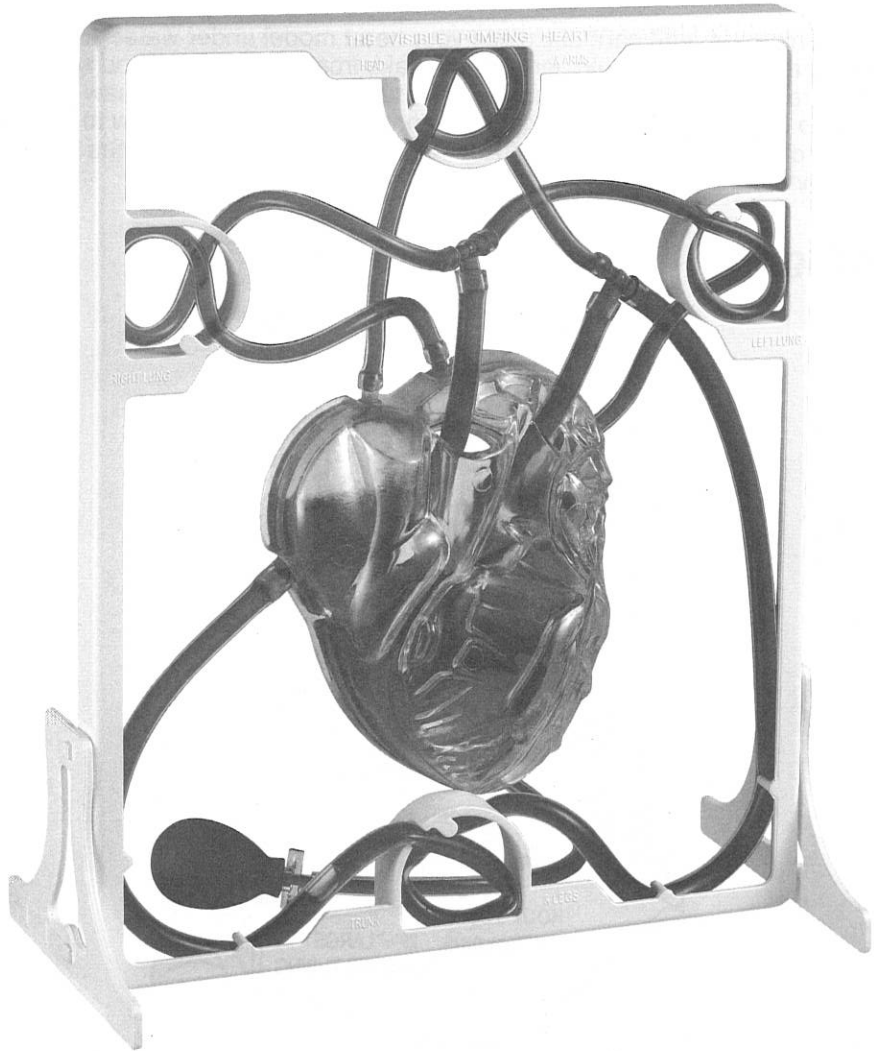


A 3-D Working Plastic Heart Model with Clear Chambers

Pumping Heart



Before You Begin:

Please be sure to read all of the enclosed instructions very carefully. Make sure you understand all the parts of your model and where they go before you begin to assemble. It is also best, when and where you can, to test fit parts together before cementing.

Your kit should include the following parts:

Quantity	Description	
(1)	Chambers Assembly	
(1)	Transparent Heart Cover	
(1)	Frame Assembly with Stands	
(1)	Squeeze Bulb	
(1)	Squeeze Bulb Connector	
(2)	T-Couplings	
(1)	Small Diameter Plastic Tubing	
(1)	Large Diameter Plastic Tubing	
(1)	Package Red Food Colouring Dye	
(1)	Acrylic Paints and Brush	

Also required is a small piece of sandpaper, scissors, a tube or bottle of cement, a ruler or other measuring device, and a sharp knife.

Warning: When using the sharp knife, it is best to have adult supervision to prevent damage to the model and injury to persons.

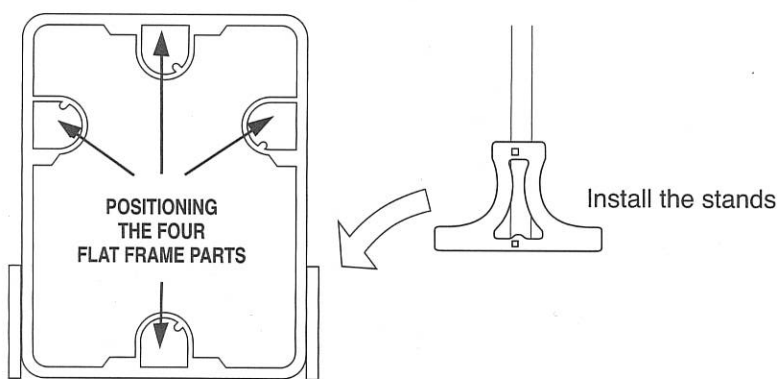
Special Note

Your pumping Heart model operates on a flow of liquid and air. This makes it very important you make sure there are no leaks and all valves are sealed properly. Check each valve carefully and if you see any excess plastic, trim and sand down the edges very carefully. Your model will not work properly if there is excess plastic on the valves. Always cover your work surface to prevent damaging it with cement.

— 1 —

Frame Assembly

Using the illustration as a guide, have the backside of the frame facing you; cement the four (4) flat pieces across the tops of the four (4) frame openings. To get the lettering on the front of the frame to stand out, take a wax crayon and rub it over the lettering. Wipe any excess wax off with a cloth.

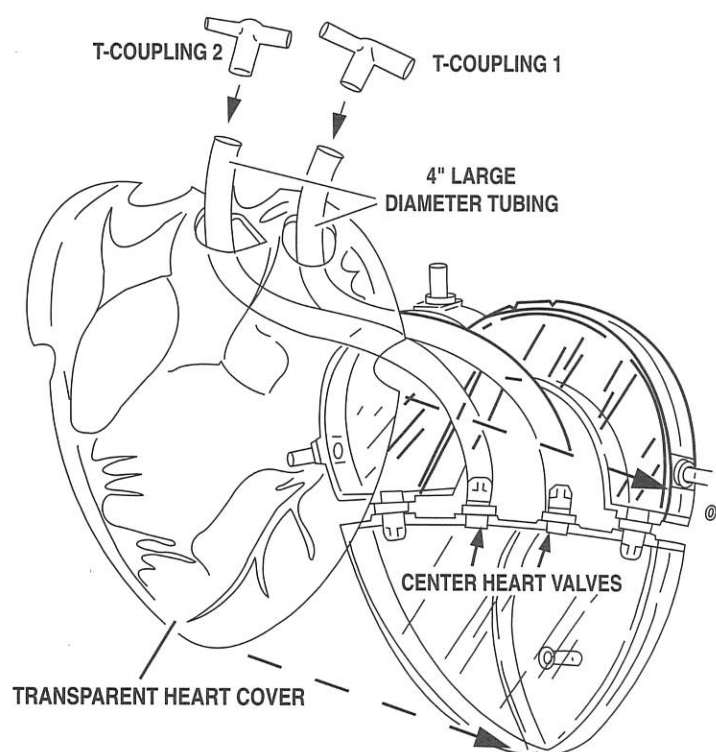
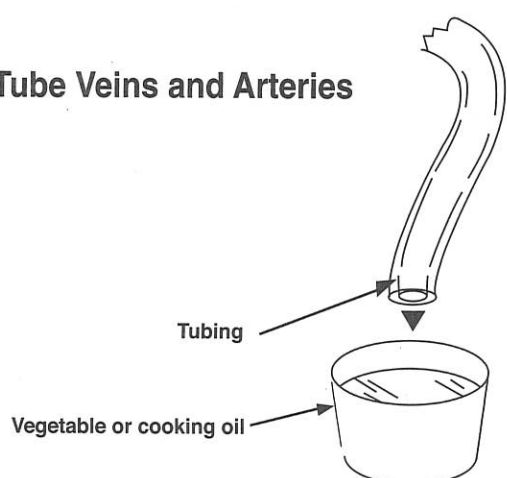


Cutting Tubing to Length

Using your ruler or other measuring device, measure off and cut two (2) 4" pieces and one (1) 25 1/2" piece of the large tubing and set these aside. Now cut three (3) 12" pieces of the small tubing and set these aside.

NOTE: Tubing will slide onto the connectors easier if it is lubricated first. To do this, dip one end of the tubing into vegetable or cooking oil.

Assembly of Tube Veins and Arteries



NOTE: While you are connecting the tubing to the model, you must remember that the flat part of the heart must always face the front. The rear of the model has the connector that the squeeze bulb connects to and this connection sticks out from the model.

1

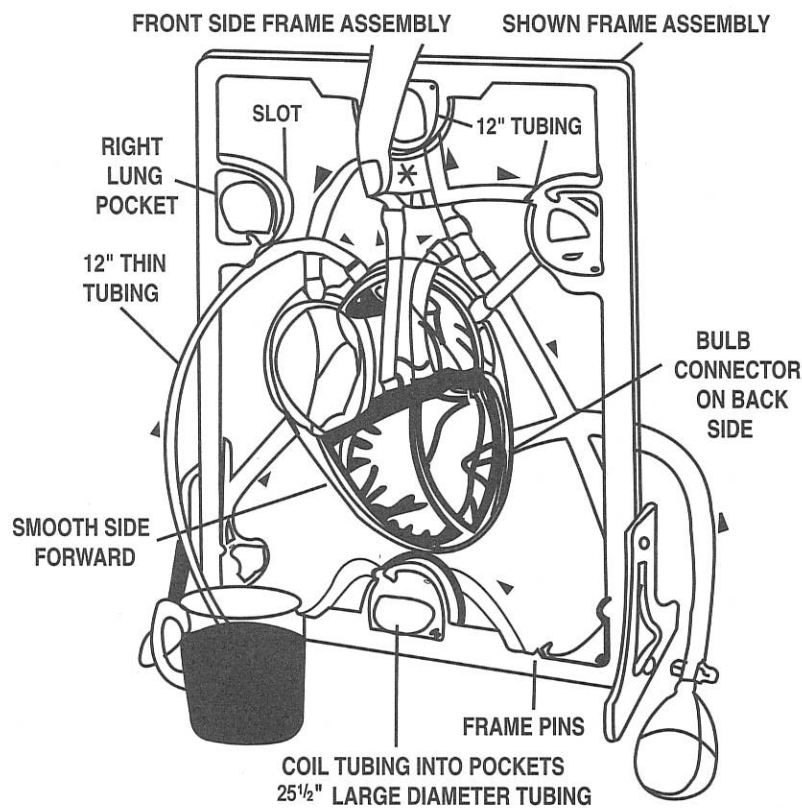
Carefully place the frame for the model flat on your work surface facing up. Now place the heart (smooth side up) into the frame so it is centred and tilting slightly to the left. Your heart model should remain in this position during the entire process of connecting all the tubes.

2

Studying the illustration of the assembled heart, you will connect the rest of the tubing. Press the two (2) 4" lengths of the large tubing into the center heart valves. Pull this tubing through the top of the heart cover as shown. Now press T-Couplings 1 & 2, one into each tube. The 25 1/2" piece of tubing is at the bottom of the heart. The top and sides of the heart will use the three (3) thin 12" lengths of tubing.

— 2 —

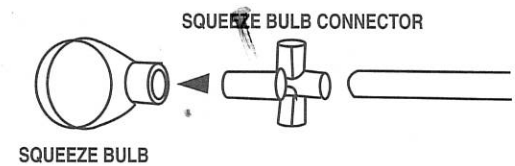
3 The frame pockets of your model get a full coil turn of the tubing. The tubing must be pressed into the slot going into the pocket and into the slot coming out of the pocket - **be sure to study the illustration carefully.** You may provide and use some clear tape to use in holding the tubing in the frame.



4 Using your illustrations as a guideline, twist the two (2) 4" lengths of heavy tubing so that T-Couplings 1 & 2 are in the correct position to connect with the rest of the tubing.

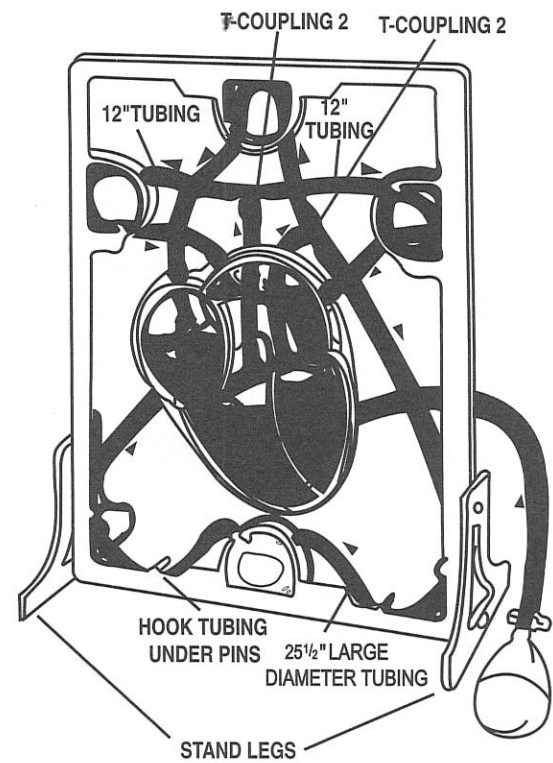
NOTE: Be sure to check all of your tubing connections to make sure that the tubing is pressed as far down as it will go onto the Connectors, Valves and T-couplings.

5 You may test for leaks of your heart model by connecting the extra length of thin tubing to the connector at the back of the heart and then assemble the squeeze bulb connector as shown in the illustration.



6 Fill a sink or tub and carefully place your heart model under water. As you squeeze the squeeze bulb, look for air leaks from the model. If you see any leaks, remove the model, disconnect the tubing from where you saw the leak, allow to dry fully, and then cement the connection again and allow to fully dry before checking for leaks again. Repeat this process as many times as required to eliminate the possibility of leaks.

Filling the Heart Model



Be very careful in handling the red dye that comes with this model so you do not spill it on any furniture or clothing. This dye is harmless but you should not eat or drink it.

1 You will need to dissolve the red dye powder in four (4) ounces of water. Be sure to cover your entire work surface with newspaper to aid in the prevention of damaging anything as you fill the model. Using the illustration as a guide, disconnect the tubing from T-Couplings 1 & 2, which is marked with an "X".

2 You will need to carefully uncoil the tubing in the right lung pocket and place the disconnected end into the dye solution, using the illustration as a guide. Placing a finger over the open end of the T-Coupling, squeeze the squeeze bulb in order to cause the solution to be drawn into the heart chambers. Keep doing this until about half of the solution has been drawn into your heart model. Your two (2) Ventricle Chambers should be full and the 2 Atrial chambers should have about 1/2" of solution in each of them. Now recoil the tubing back into the right lung pocket and reconnect the tubing to the T-Coupling.

3 You will squeeze the squeeze bulb to make the solution flow through your heart model. The arrows in the illustration indicate flow direction. The solution will flow to the various body parts that are marked on the frame and back to the heart, pretty much the same way your own heart really works.

NOTE: If your squeeze bulb should become flat during use, carefully remove the squeeze bulb from the tubing, as some dye may be present inside the bulb. Once removed, the squeeze bulb should take on its normal shape and you can now replace it back from where you disconnected it.

4 Hook your large tubing under the bottom and side pins of the frame. The blood flowing from these points on your model represents the Head, Arm, Trunk and Legs of your body, which flows into the Right Atrium, then into the Right Ventricle and to the Lungs, this would normally have a bluish colour. The blood flowing from the Lungs to the Left Ventricle and then to the rest of the body would be reddish in colour.

NOTE: The frame should tilt back at a slight angle when the stand legs are on the frame. You may cement the legs to the frame if you desire, but this is not required.

