WARNING!

NOT SUITABLE FOR CHILDREN UNDER 7 YEARS. FOR USE UNDER ADULT SUPERVISION.

CONTAINS SOME CHEMICALS WHICH PRESENT A HAZARD TO HEALTH.

READ THE INSTRUCTIONS BEFORE USE, FOLLOW THEM AND KEEP THEM FOR REFERENCE.

DO NOT ALLOW CHEMICALS TO COME INTO CONTACT WITH ANY PART OF THE BODY, PARTICULARLY THE MOUTH AND EYES.

KEEP SMALL CHILDREN AND ANIMALS AWAY FROM EXPERIMENTS.

KEEP THE EXPERIMENTAL SET OUT OF REACH OF CHILDREN UNDER 7 YEARS OLD.
ADVICE FOR SUPERVISING ADULTS:

- Read and follow these instructions, the safety rules and the first aid information, and keep them for reference.
- The incorrect use of chemicals can cause injury and damage to health. Only carry out those experiments which are listed in the instructions.
- This experimental set is for use only by children over 7 years.
- Because children’s abilities vary so much, even within age groups, supervising adults should exercise discretion as to which experiments are suitable and safe for them. The instructions should enable supervisors to assess any experiment to establish its suitability for a particular child.
- The supervising adult should discuss the warnings and safety information with the child or children before commencing the experiments. Particular attention should be paid to the safe handling of acids, alkalis and flammable liquids.
- The area surrounding the experiment should be kept clear of any obstructions and away from the storage of food. It should be well lit and ventilated and close to a water supply. A solid table with a heat resistant top should be provided.
- If any experiment starts to grow mould, dispose of the experiment immediately in household waste and wash your hands.

FIRST AID INFORMATION:

- In case of eye contact: Wash out eye with plenty of water, holding eye open if necessary. Seek immediate medical advice.
- If swallowed: Wash out mouth with water, drink some fresh water. Do not induce vomiting. Seek immediate medical advice.
- In case of inhalation: Remove person to fresh air.
- In case of skin contact and burns: Wash affected area with plenty of water for at least 10 minutes.
- In case of doubt, seek medical advice without delay. Take the chemical and its container with you.
- In case of injury always seek medical advice.
- Write in the box below the telephone number of your nearest hospital that can be reached in an emergency.

SAFETY RULES:

- Read these instructions before use, follow them and keep them for reference.
- Keep young children and animals away from the experimental area.
- Store this experimental set out of reach of children under 7 years of age.
- Clean all equipment after use.
- Make sure that all containers are fully closed and properly stored after use.
- Ensure that all empty containers are disposed of properly.
- Wash hands after carrying out experiments.
- Do not use any equipment which has not been supplied with the set or recommended in the instructions for use.
- Do not eat or drink in the experimental area.
- Do not allow chemicals to come into contact with the eyes or mouth.
- If foodstuffs are required by any experiment or in the instructions for use, do not replace foodstuffs in original container. Dispose of immediately.
- Dispose of all chemicals/experiments in household waste unless otherwise stated in the instructions.
**CONTENTS**

1. Skin Powder - Gelatin CAS 9000-70-8
2. Skin Liquid - Glycerol CAS 56-81-5
3. Red Powdered Colouring – not for food use, E124 Food Colouring – wash skin with soap and water to remove any incidental contamination.
4. Heart Chambers x 2
5. Balloons x 2 - made of natural rubber latex
6. Rubber Bands x 4 - made of natural rubber latex
7. Flexible Tubes x 2
8. Donor Organ Box - not shown

**USE OF THIS PRODUCT SHOULD BE SUPERVISED BY AN ADULT. ALL COMPONENTS ARE INTENDED FOR EXTERNAL USE ONLY AND SHOULD NOT BE INGESTED.**

**INTRODUCTION**

**Have you ever wondered what a beating heart might look like and what it might feel like to hold it in YOUR hand? Well now you can see for yourself...**

**In this totally gruesome kit, fill squidgy heart chambers with fake blood. Add tubes and pumps and mould a covering layer of gooey skin.**

**Place your creation in the donor organ box and surprise a friend when they open the box and see your heart beating away! GROSS!**

The Red Colouring (3) is supplied in powdered form. Before it is used, remove the cap, pull out the dropper and fill the bottle to the line indicated with cold water. Replace the dropper, screw the cap back on and shake. **Note: Colouring can stain so always wear old clothes and cover the work area with newspaper.**
Your heart is really a muscle. It's located a little to the left of the middle of your chest. There are lots of muscles all over your body, but the heart muscle is special because of what it does. The heart sends blood around your body. The blood provides your body with the oxygen and nutrients it needs. It also carries away waste.

Your heart is sort of like a pump, or two pumps in one. The right side of your heart receives blood from the body and pumps it to the lungs. The left side of the heart does the exact opposite; it receives blood from the lungs and pumps it out to the body.

How does the heart beat? Before each beat, your heart fills with blood. Then its muscle contracts to squirt the blood along. When the heart contracts, it squeezes — try squeezing your hand into a fist. That's sort of like what your heart does so it can squirt out the blood. Your heart does this all day and all night, all the time. The heart is one hard worker!

The heart is made up of four different blood-filled areas, and each of these areas is called a chamber. There are two chambers on each side of the heart. One chamber is on the top and one chamber is on the bottom. The two chambers on top are called the atria (say: ay-tree-uh). If you're talking only about one, call it an atrium. The atria are the chambers that fill with the blood returning to the heart from the body and lungs. The heart has a left atrium and a right atrium.

The two chambers on the bottom are called the ventricles (say: ven-trih-kulz). The heart has a left ventricle and a right ventricle. Their job is to squirt out the blood to the body and lungs. Running down the middle of the heart is a thick wall of muscle called the septum (say: sep-tum). The septum's job is to separate the left side and the right side of the heart.

The atria and ventricles work as a team — the atria fill with blood, then dump it into the ventricles. The ventricles then squeeze, pumping blood out of the heart. While the ventricles are squeezing, the atria refill and get ready for the next contraction.

So when the blood gets pumped, how does it know which way to go? Well, your blood relies on four special valves inside the heart. A valve lets something in and keeps it there by closing — think of walking through a door. The door shuts behind you and keeps you from going backward.

Two of the heart valves are the mitral (say: my-trul) valve and the tricuspid (say: try-kus-pid) valve. They let blood flow from the atria to the ventricles. The other two are called the aortic (say: ay-or-tik) valve and pulmonary (say: pul-muh-ner-ee) valve, and they're in charge of controlling the flow as the blood leaves the heart. These valves all work to keep the blood flowing forward. They open up to let the blood move ahead, then they close quickly to keep the blood from flowing backward.
An average human heart is about the size of your closed fist. As mentioned already it has 4 chambers, 2 right 2 left. Let’s make a model of a beating heart, but we will simplify things a little by having just 2 chambers with the right side receiving blood from the body and pumping it to the lungs and the left side of the heart doing the exact opposite; receiving blood from the lungs and pumping it out to the body.

**OK, let’s get started...**

**Donor Box Construction**

**IMPORTANT NOTE:** when making your box, do so with the printed side face up and always fold flaps away from you rather than towards you so that the unprinted side of the card piece folds towards other parts of the unprinted side of the sheet. Never fold so that the printed side folds towards other parts of the printed side.

To construct your first box corner, fold flap A on tab B down and slot it through the hole on tab C.

Repeat this action with all the other corners of the box base and lid.
To Form The Heart Skin Cover:

Add all the Skin Powder (1) into a cup or an old container like a margarine tub.

Run the hot tap in your kitchen and when it is as warm as possible, add 100ml of warm water to the Skin Powder. Also add the Skin Liquid (2) and 5 drops of the Red Colouring (3).

Mix quickly until all the Powder has dissolved. Be fast as this mixture will start to set quite quickly.

Now pour your mixture into a baking tray or a plastic food container measuring about 200 x 200mm.

Prick any large bubbles with a pencil and leave your mixture to set for around 20 minutes in the fridge to form your skin.

To Make The Heart

(You will need some Vaseline which isn’t included in the kit)

Wrap one of the Rubber Bands (6) a few times around one end of each of the two Flexible Tubes (7). Wrap until the bands are tight.

Get a jug of tap water. Add several drops of the Red Colouring (3) until you have a nice blood colour.

Rub Vaseline around the other end of the Flexible Tubes and place that end into the hole in each Heart Chamber (4). Push the Tube until it slots into place.

You will see that there are holes in the side of the Donor Organ Box. Thread the rubber banded ends of the Flexible Tubes through here.
You will need a little help for this part, so go find yourself a willing volunteer:

Place the Heart Chambers into the Donor Box.

Holding the tube upright, pour the red water down each tube until each Heart Chamber is full and the Flexible Tubes are each about ¾ full.

Rub Vaseline around the free end of each Flexible Tube and place a balloon (5) over that end of each tube. Now roll the Rubber Band (you previously placed there), back up and over the Balloon to hold it in place.

Wrap a piece of tape around where the Balloon and Tube meet for extra security.

Pack scrunched up white tissue around the Heart to look like it is being stored in ice.

When the skin is set, gently remove it from the tray and lay it over the heart, tucking the edges of the skin underneath the heart.

Close the Donor Box and place it on a table. Lay magazines or a newspaper over the tubes to hide them from view.

Now for the really fun bit…

When somebody opens the box, pump the two Balloons alternately and that will in turn pump “blood” into and out of the Heart, making it beat. You will also be able to feel the “pulse” as the liquid returns to the balloon.
Also available from Gross Science:

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