Hot air balloons

What child doesn't like to build a flying object themselves! Building a hot air balloon in small groups can inspire younger and older children alike. Working together as a team, you learn to work towards a goal, implement instructions and understand physical relationships.

Material

- 12 sheets of tissue paper (colorful, proven quality)
- 4 light wood strips
- Steel wire
- Absorbent absorbent cotton
- Special cord
- 1 instruction manual with tips and advice (see below)

Description

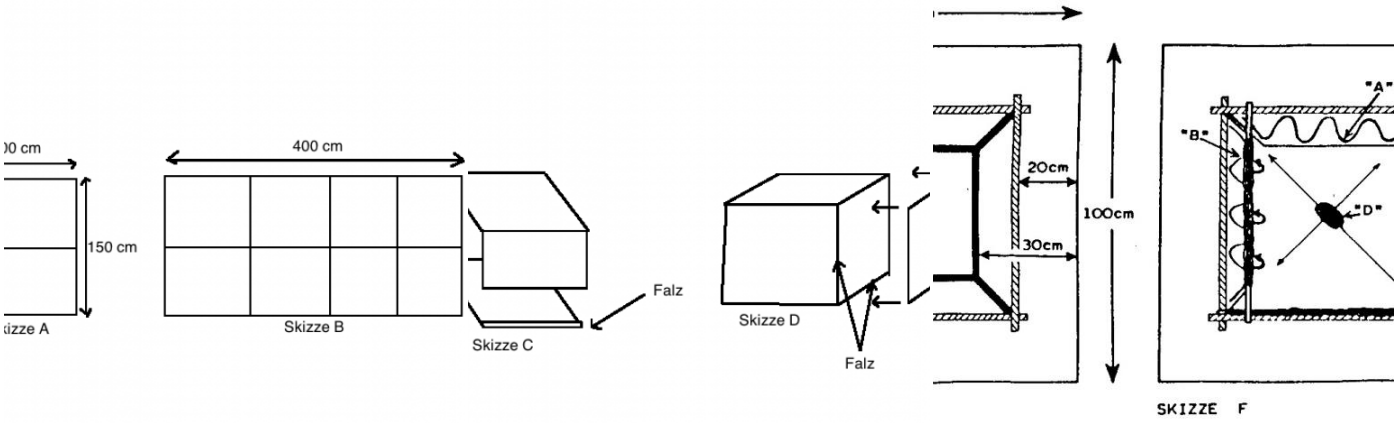
The volume of the hot air balloon is 1.5m^3, the weight approx. 260g (without absorbent cotton + fuel), the range two to twenty or more kilometers. The heat for the buoyancy is generated by a wad of absorbent cotton soaked in methylated spirits.

Building instructions

1. First we make the balloon's envelope. To do this, glue two sheets of paper together lengthwise (sketch A). We repeat this five times so that we end up with six double sheets. Four of these should be joined together according to sketch B. The result should be an area of 400 x 150 cm. - The two remaining sheets will be needed later.
2. Now fold one wide side of the large surface by 2 cm. Coat the fold with glue. To close the hot air balloon envelope, join the two wide sides together as shown in sketch C.
3. The envelope is now complete. The top and bottom remain. We make these from the remaining two double sheets. We cut them to the format of 100 x 100 cm.
4. One sheet is to be the ceiling. Fold one edge of the mantle over by 2 cm and glue a square onto it as shown in sketch D.
5. Now draw sketch E on the remaining square. Cut along the thick lines and glue (normal transparent) adhesive tape along the hatched lines, making sure that the adhesive strips overlap in the corners (this prevents the base from tearing during the subsequent work). This gives us the burn hole and the four tabs to which the strips are attached.

6. We now coat a paper flap with glue and wrap a wooden strip around it. We repeat this three times, making sure that the wooden strips protrude equally far on both sides. Tie the sticks tightly together in the corners with string.
7. Now glue the finished base to the bottom end of the hot air balloon casing, as described in point 4 of the assembly instructions.
8. Now the actual balloon is finished. The only thing missing is the heater. To do this, we take one of the wires, attach it to one corner and lead it to the opposite corner, where we also attach it. Repeat this with the other wire and connect the two free corners together. Now use the wire remnants to fix the absorbent cotton ball (made from one piece to prevent burning parts from being lost) in the middle of the wire cross (sketch F: "D").
9. The absorbent cotton should lie on the wires, not hang from the bottom. - Wire = weight, therefore save wire (in the corners); however, the absorbent cotton must hold well.

Sketches



Experience

- Unfortunately, two sheets of paper have to be glued together for each of the sides. This results in 5.4 m of glue seam with a weight that could easily be saved by using larger sheets.
- The special construction of the fire-hole frame requires a little dexterity and precise work according to the instructions
- We did not attach the fire hole bracing diagonally, as shown in the description, but parallel to the wooden sticks. This results in a wire saving of 50 cm!
- The day before, a leader should carefully consider the individual steps.
- The construction time is approx. 3-4.5 hours
- A sufficiently large space is important
- Flight time approx. 20 minutes
- Distance: 2-3 km
- Height: very high

How much can our balloon carry?

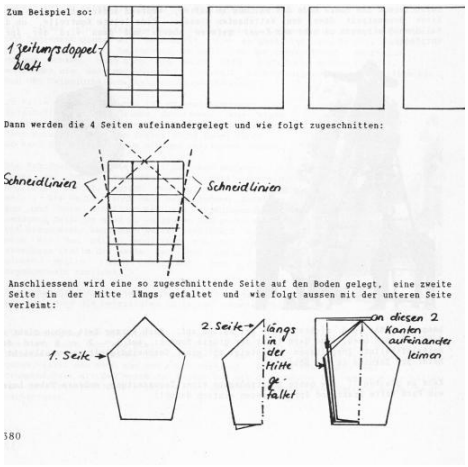
This depends on the difference between the inside and outside temperature. The greater the difference, the more weight the balloon can carry. In other words, the colder it is outside and the warmer it is inside the balloon, the more weight it can carry. The following applies: 44g of air is displaced from one m^3 for every 10 degrees of temperature difference. This means that our balloon (1.5m^3) is able to displace 66g of air for every 10 degrees of temperature difference and is therefore lighter by this weight.

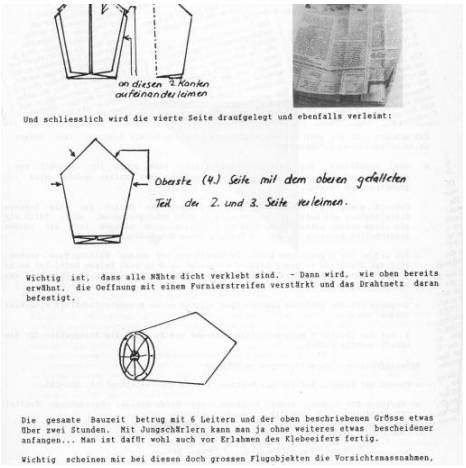
A small note with an address or a few words of greeting to the finder can be carried by the balloon without any problems. However, no more should be attached as this would shorten the range.

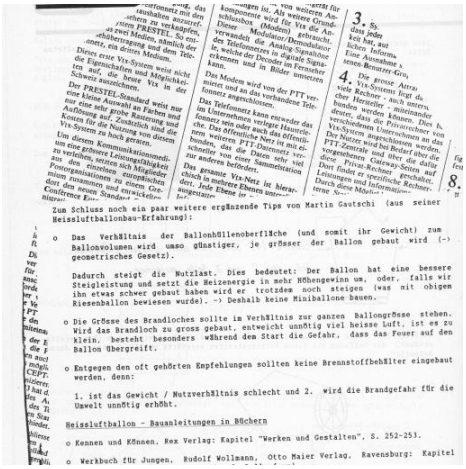
Precautionary measures at the start

- launch in an open area, e.g. a large meadow
- favorable wind conditions are important
- it is best to use methylated spirits.
- We take a collecting vessel (plate, etc.), hold it under the mudflat and douse it with methylated spirits until it is saturated. While we make sure that the walls do not bulge inwards (wind!), we light the absorbent cotton. Be careful with the fuel!
- The JS leaders involved are responsible for any damage
- During the chase, you should pay attention to the traffic and not keep looking up into the sky.

Alternative







List of sources

- **Cover picture:** Juropaarchiv, www.juropa.net
- **Contents and 4 pictures from the book:** Jungscharleiternachrichten, Die besten Tipps - der 80er Jahre, Edition 600.3.90 © BESJ-Verlag, Fällanden, page 373-382, Martin Gautschi, Louis Gardin, Walter Müller