

19. A Kaleidoscope

Materials

2 pieces of balsa $9 \text{ in.} \times 1\frac{3}{4} \text{ in.} \times \frac{3}{16} \text{ in.}$	sides
2 pieces of balsa $9 \text{ in.} \times 1\frac{1}{2} \text{ in.} \times \frac{3}{16} \text{ in.}$	sides
1 piece of balsa $1\frac{7}{8} \text{ in.} \times 1\frac{3}{4} \text{ in.} \times \frac{3}{16} \text{ in.}$	top
2 pieces of balsa $1\frac{7}{8} \text{ in.} \times \frac{3}{8} \text{ in.} \times \frac{3}{16} \text{ in.}$	} sides for small bead
2 pieces of balsa $1\frac{3}{8} \text{ in.} \times \frac{3}{8} \text{ in.} \times \frac{3}{16} \text{ in.}$	
2 pieces of Polyglaze or similar material $1\frac{3}{4} \text{ in.} \times 1\frac{7}{8} \text{ in.}$	} container

Transparent coloured beads
Mirrors, or other reflecting surface such as kitchen foil

Method

Glue one $1\frac{1}{2}$ -in. side to a $1\frac{3}{4}$ -in. side. Use pins for keeping the sides together while they are setting. On the inside of these glue two lengths of mirror, covering all the area. Mirrors of this size are difficult to obtain: you may get someone to cut you two from a large thin mirror. But failing this, you can use kitchen foil. Cut the foil in one piece, take care not to crinkle it, and glue it with the shiny side outside: if you make it larger than needed you can easily trim it down when it is stuck on the wood.

Join the other two sides and paint them inside, and one side of the top piece, white. Let the paint dry and then join the two lots of sides in the form of a box.

Find the centre of the top piece by drawing the diagonals, bore a small hole for looking through, and glue the piece, white side inside, to one end of the box.

Glue one piece of Polyglaze to the other end of the box. When the glue is dry, arrange and glue the four little container sides on this: keep them in place with pins until dry. Put a few transparent beads of different colours in the container and seal it off with the other piece of Polyglaze.

Put a dab of white paint on a cloth and smear the outside surface of

Kaleidoscope

You need:

2 pieces of mirror about

20 cm. \times 4 cm. (or

8½ in. \times 1½ in.)

thin cardboard

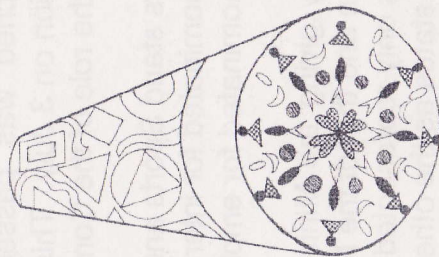
coloured gummed paper

adhesive tape

small plastic bag

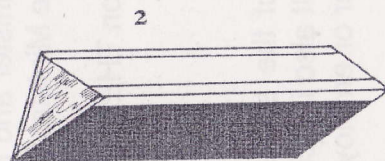
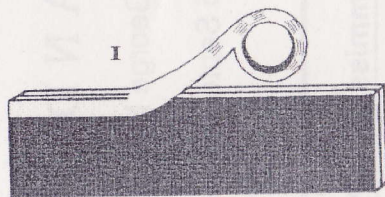
greaseproof paper

scissors



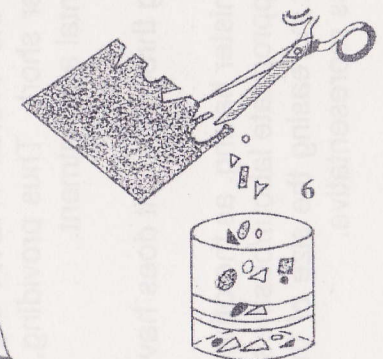
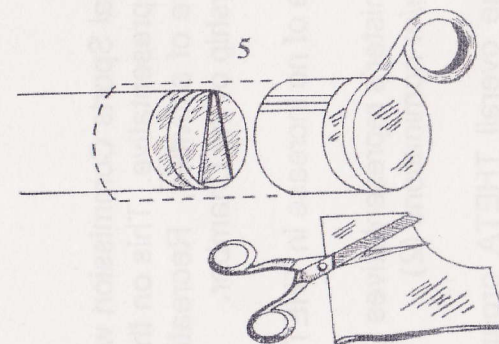
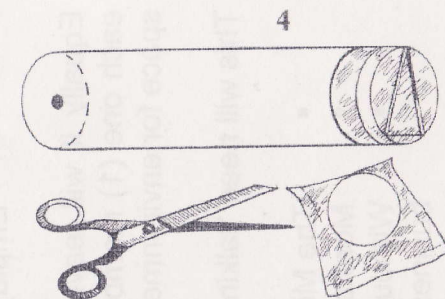
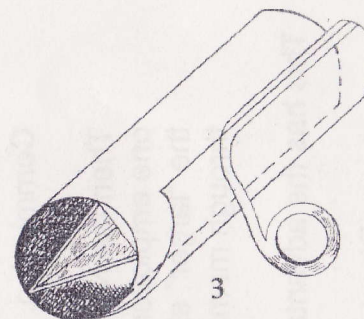
1 Place two mirrors side by side facing inwards. Join them together along the top with adhesive tape.

2 Cut a strip of cardboard 2.5 cm. (or 1 in.) wide and the same length as the mirrors. Use adhesive tape to join its long edges to the mirrors to form a triangular column.



3 Roll a piece of cardboard into a tube around the mirrors so that they are firmly held inside. Stick it down with adhesive tape.

4 Stick a piece of plastic over one end of the tube. On the other end stick a circle of card with a peephole cut in the middle.



5 Wrap a piece of cardboard about 5 cm. (or 2 in.) wide tightly round the tube. Tape the ends together to make a second, shorter tube and slide it off the longer one. Stick some greaseproof paper over one end.

6 Glue some pieces of gummed paper back to back so that both sides are coloured, and cut out several small shapes. Put them inside the shorter tube. Slide this shorter tube back onto the longer one. Decorate the whole kaleidoscope with gummed paper shapes.

You will see all kinds of patterns when you turn the end of the kaleidoscope. You could experiment with small beads or sequins or other small objects instead of paper shapes.

10-20

25-40

310 (5?)

Cap

Object

Object 40
clearance

310 (5?)

Clear

200

30

50

40

10

30°

5

10

X 5 feet

Oscillograph

You need:

an empty cocoa tin (or similar)

can opener

large balloon

small old mirror

elastic bands

glue

scissors

coloured paper

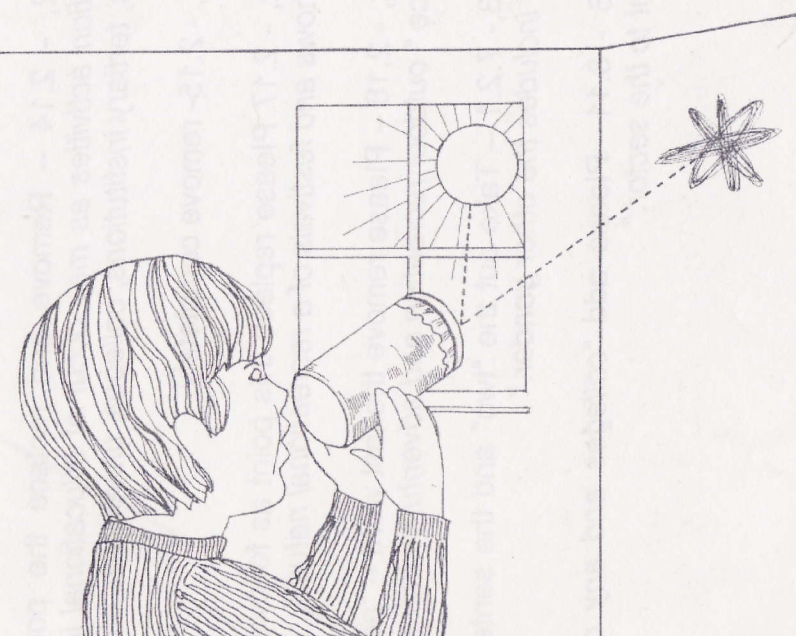
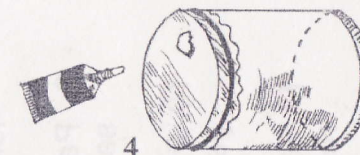
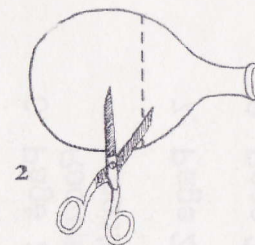
hammer

1 Remove the bottom of the cocoa tin with the opener.

2 Cut off the top half of the balloon and stretch the remainder over the bottom of the tin. Keep it in position with elastic bands.

3 Wrap the mirror in several layers of newspaper and tap it with a hammer so that it breaks into small pieces. Select one piece about 1.5 cm. (or $\frac{1}{2}$ in.) across and put the rest in a bag for safe keeping. (You may like to use them to decorate other kinetics.)

4 Glue the piece of mirror onto the stretched balloon, a little away from the centre.



5 Decorate the tin with coloured paper.

You must wait for some sunshine before you can use the 'oscillograph'. Hold it so that the mirror reflects a small patch of sunlight onto a wall. When you make noises into the open end of the tin the sound waves will make the mirror vibrate and a pattern of sound will be seen on the wall. Change the sounds, and different patterns will form. You can put it over the speaker of a record player or radio and watch music being 'drawn' on the wall.