Flexagons

Flexagons are folded devices with a surprising number of sides, invented by mathematician Arthur Stone.

Why Flex?

- Encourages manipulation
- Doesn't reveal everything right away
- Surprise factor

Uses

- On a Möbius strip, write "us" and "them" on opposite sides; they are united.
- Susan Fowler shared a flexagon-like book at NASAGA '02.
- This job aid is a flexagon.

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1-Sided Figure: Möbius Strip

A. Take a strip of paper, fold a half-twist, and attach the ends. You can trace a single line on the whole sheet. Slice it in half the long way – you get a very large ring.

B. Take a strip of paper, fold a full twist, and attach the ends. Slice in half the long way, and you get two linked rings.

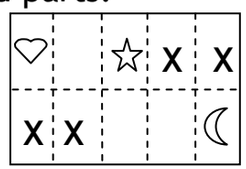
2-Sided Figure

C. They sell these by the box at office supply stores.

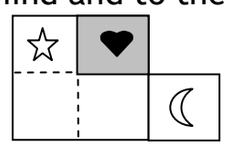
3-Sided Figure: Tritetraflexagon

D. Three-way flexagons.

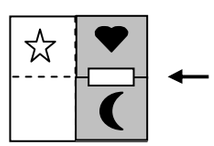
1. Fold the paper into tenths and cut out the X'd parts.



2. Fold the left flap behind and to the right.



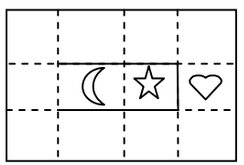
3. Fold the rightmost panel to the left (on top). Tape where shown.



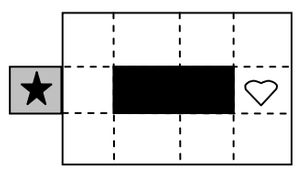
4-Sided Figure: Tetratetraflexagon

E. Four-way flexagon.

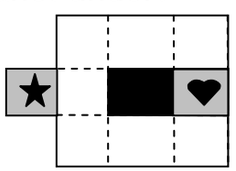
1. Fold the paper into twelfths and cut the solid lines as shown.



2. Fold the "tongue" behind & to the left.



3. Fold the rightmost panel under.



A couple variations

- The height of the tongue doesn't matter. (The paper must be divided into quarters, but the "thirds" needn't be equal.)
- You can have more than one tongue.
- You can cut out the tongue (leaving a slit), and use ribbon instead. (Make the slit a little wider than the ribbon.)

6-Sided Figure: Hexaflexagon

F. Hexaflexagon—
See Martin Gardner's book.

Relatives

Magic Wallet – magically moves dollar from side to side.

Jacob's Ladder – makes a waterfall as tiles cascade.

Resources

Google search for "flexagon"

Hexaflexagons and Other Mathematical Diversions, Martin Gardner. U. of Chicago Press, 1988.

"Tetraflexagons," in *The Second Scientific American Book of Mathematical Puzzles and Diversions,* Martin Gardner. U. of Chicago Press, 1987.

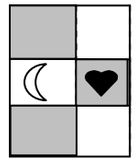
home.xnet.com/~aak/hexahexa.html

www.kathrynhuxtable.org/cgi-bin/home/flexagon/hexahexa.shtml

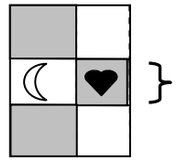
www.drking.worldonline.co.uk/hexagons/flexagons/

www.sherston.freeserve.co.uk/HTML/Mathematics/Flexagons.htm

4. Fold tongue and leftmost panel to the right. Slip tongue beneath the rightmost panel.

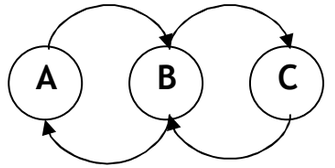


5. Tape along the edge as indicated (middle section only).

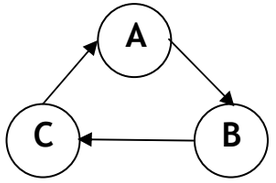


Mapping

- Work your way through the flexagon, labeling each face.
- Create a diagram showing moves from face to face.



Tritetraflexagon



Triangle
(Stoplight!)