Ten Card Arrangement
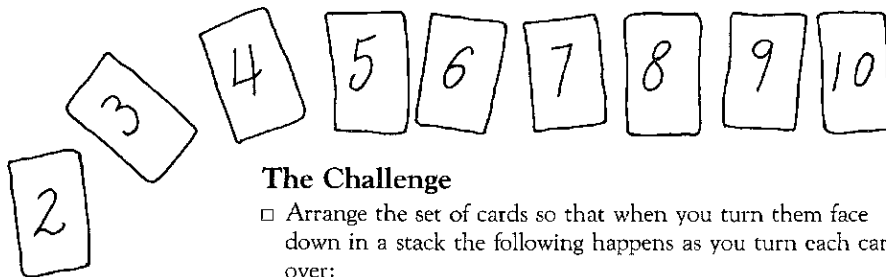
TOOLS

3×5 cards
Pens

Grade Level

Why

To use a complex but logical number series to solve a problem

How

□ Give each pair of people (usually parent and child) a set of ten 3×5 cards.

□ Have the numerals 1 through 10 written on the cards:

The Challenge

□ Arrange the set of cards so that when you turn them face down in a stack the following happens as you turn each card over:

- □ The first (top) card is turned face up (to begin a new stack) and is a 1.
- ⊓ The second card is moved to the bottom of the old stack, still face down.
- □ The third card is turned face up to the new stack and is a 2.
- □ The fourth card is moved to the bottom of the old stack, face down.
- □ The fifth card is turned face up and is a 3.
- □ The sixth card is moved to the bottom, face down.
- □ The seventh card is turned face up and is a 4.
- □ The eighth card . . .

. . . And so on until all of the cards have been turned face up, and the resulting new stack is in reverse order, with the 10 on top and the 1 on the bottom.

► *Some possible solution strategies are shown at the end of this chapter, on page 71. Please don't look until you have worked on the problem for at least 30 minutes. Try several strategies before looking.* ◄
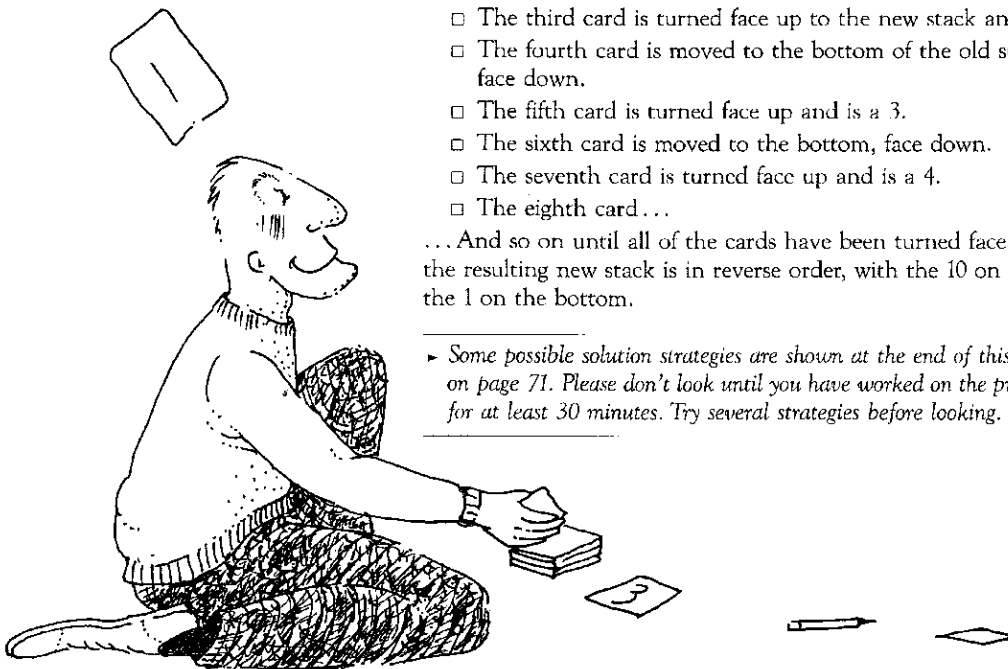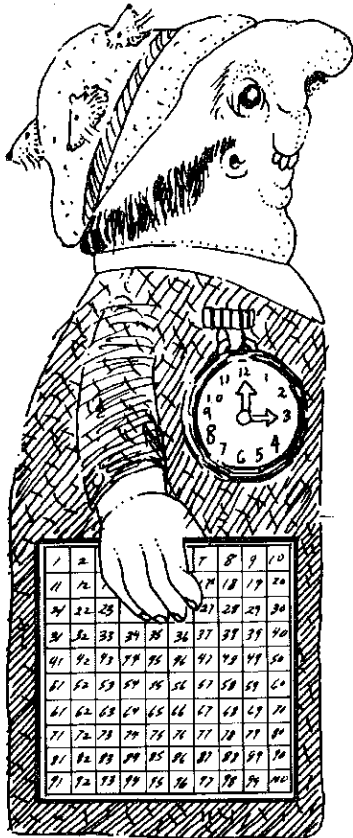
Before or After
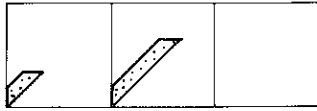
Grade Level

TOOLS

Hundred charts

Markers or beans of different colors

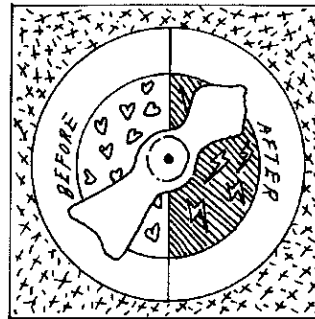**BEFORE/AFTER spinner (see page 154 for directions)**
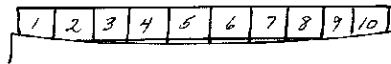
A game for

2 players

Why

To practice moving on a number line

How

☐ Make a spinner like the one shown.

☐ Cover a hundred chart so just the first row shows, making a number line from 1 to 10.

1	2	3	4	5	6	7	8	9	10

☐ Players take turns.

☐ On your turn, choose a number from 0 through 9, say 7.

☐ Then spin the BEFORE/AFTER Spinner.

☐ If you get a BEFORE, place one of your markers one number **before** the number you chose. If you had chosen a 7, you would put your marker on the 6.

☐ If you get an AFTER, place one of your markers one number **after** the number you chose. If you had chosen a 7, you would put your marker on the 8.

☐ If a marker is already on a number, you may not put another marker on it. You may, however, choose a covered number before you spin the spinner.

☐ Continue until all of the numbers are covered.

☐ The player with the most markers on the board wins.

More Ideas

☐ Play with a larger board, such as the numbers 0 through 19.

☐ Play with the rule that you must cover the number that is **two** spaces before or after the chosen number.
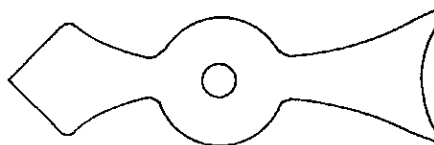
Making Spinners
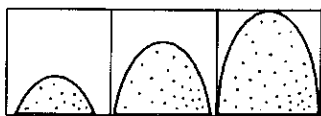
Grade Level

TOOLS

Cardboard
Scissors
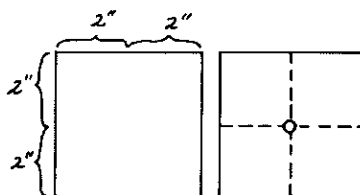**Ruler**
Pencil
Paper clip
Tape

How

☐ Cut out a cardboard arrow shaped like this:

☐ Punch, with punch, hole in center.

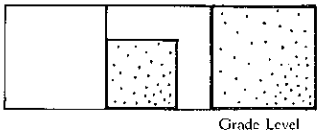☐ Cut a scrap for a paper washer into a square and punch a hole in center with punch.

☐ Cut out a four-inch square of cardboard.

☐ On the four-inch card, measure two inches along on all sides and mark lightly:

☐ Connect these marks with faint pencil lines.

☐ Mark center with a dot.

☐ Make hole in the center of the spinner card with thumbtack or end of paper clip.

☐ Draw a design for the activity you want to do:

Rainbow Logic

TOOLS

**Colored paper squares
for each player
(4 each of 4 colors)**

3×3 and 4×4 grids

A game for
2 or more players

Patterns like

and

are not allowed.
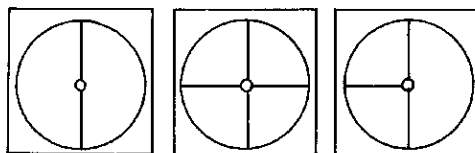
Why

To practice deductive thinking and spatial reasoning

How

☐ For the first game, a parent should be leader.

☐ After the first game, any player may become leader.

☐ The leader prepares a secret 3×3 color grid, using three squares of each color.

☐ All of the squares of the same color must be connected by at least one full side.

For example, a secret grid might be

Column A	Column B	Column C	
Green	Yellow	Yellow	Row 3
Green	Green	Yellow	Row 2
Blue	Blue	Blue	Row 1
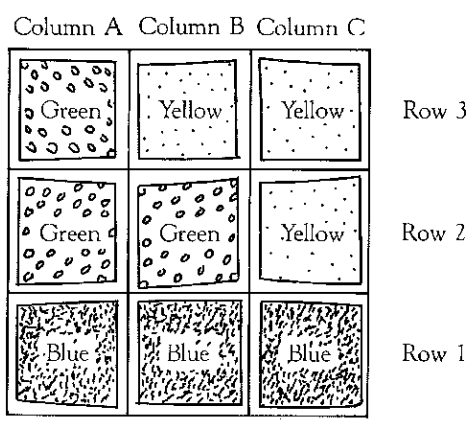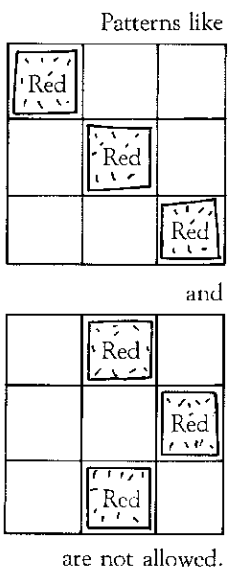
☐ Clues are given in the following manner:

  ☐ Players ask for the colors in a row or a column (rows are horizontal, columns are vertical.)

  ☐ The leader gives the colors, but not necessarily in order.

☐ Allow time for the players to discuss what they have learned after each guess before giving a new clue.

☐ The goal is for the players to be able to give the location of all colors on the grid after as few questions as possible. Each player should use a grid and colored paper squares to keep track of the clues. Squares may be put **beside** the row or column until exact places are determined.

☐ Let each person be the leader for two games, then let a new person lead, until all have had a chance to lead.

☐ When everybody is familiar with the game, or for older students, play using a 4×4 grid, with the same rules.
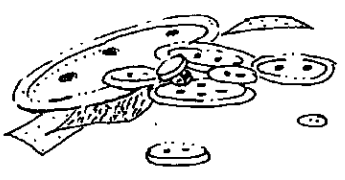
More Ideas

☐ Either before beginning the game, or after you have played, talk about how many different possible arrangements there are for the three colors. See Pentasquares (page 188) for more discussion.

☐ For younger children, try a 2×2 grid, or give them the color information in order, so that they can put the colors onto the grid immediately.

Column A	Column B	Column C	Column D	
				Row 4
				Row 3
				Row 2
				Row 1
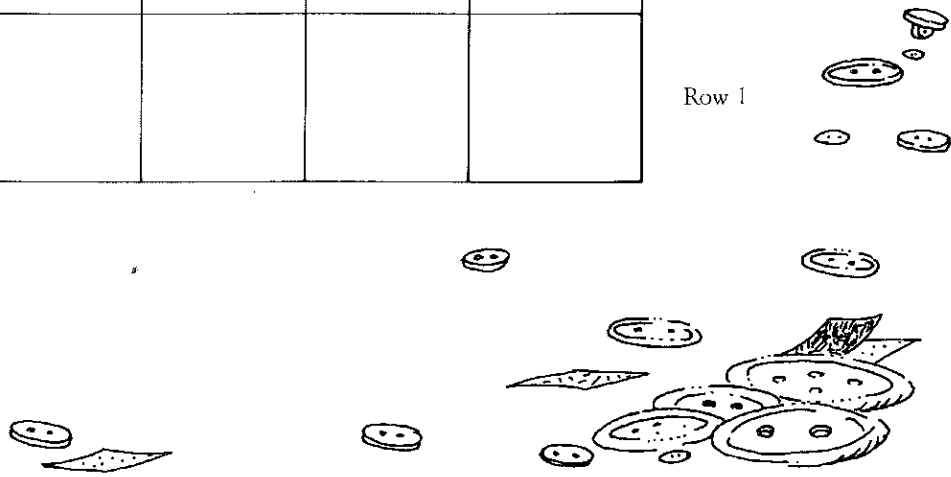
Cover Patterns

Grade Level

TOOLS

Hundred charts
Markers or beans

Why

To see visual patterns among the first hundred numbers

How

☐ Choose one of these rules, and cover all of the numbers on the chart that fit the rule. Usually it is better to take off the markers for one rule before starting another rule, but sometimes you may want to see how the rules overlap. Try these rules:

☐ numbers with a 2 in them

☐ numbers with a 4 in them

☐ numbers with a 7 in them

☐ numbers with a 0 in them

☐ numbers with a 5 in the tens' place

☐ numbers with both digits the same

☐ numbers whose digits add to 9

For example, in the number 45, the digits 4 and 5 add to 9; or in the number 81, the digits 8 and 1 add to 9.

☐ numbers whose digits have a difference of 1

For example, in the number 45, there is a difference of 1 between the 4 and the 5; and in a 54, there is also a difference of 1 between the 5 and the 4.

☐ numbers that are multiples of 3

☐ numbers that are multiples of 5

☐ numbers that are evenly divisible by 6

☐ numbers that have a circle

☐ numbers that have a factor of 4

☐ Study the patterns that the different rules make. Mathematics **does** make sense when we see how it fits together.

☐ Make some new cover pattern rules for your family to try.
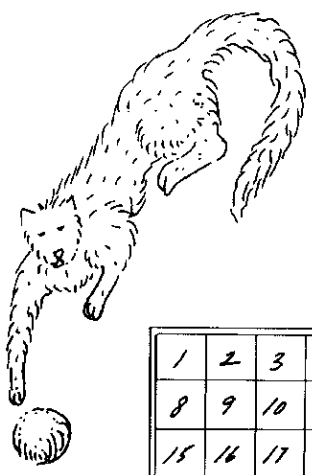
1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	32	33	34	35
36	37	38	39	40	41	42
43	44	45	46	47	48	49

1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27
28	29	30	31	32	33	34	35	36
37	38	39	40	41	42	43	44	45
46	47	48	49	50	51	52	53	54
55	56	57	58	59	60	61	62	63
64	65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80	81