FAMILY FUN ACTIVITIES

WITH

FRACTILES-7
MAGNETIC TILING TOYS

MIRROR YOUR FRIEND GAME

Ages 5 and up, two or more players
Materials needed: one large or one travel set
Teaches reflection symmetry, cooperation

First set up the game by placing any two tiles, edges together, near the center of the board.

Player #1 places a third tile adjacent to one of the tiles on the board so that the three tiles together form a design with reflection (mirror image) symmetry.

Player #1 then selects a fourth tile and adds it to the design making sure that the next player will be able to place a tile that mirrors that move.

Player #2 places a tile that mirrors the last player's move, and then adds a tile of her own for the next player to mirror.

Continuing in this manner, it is fun to see the cooperative designs that emerge. This is an easy game to play with young children.

SYMMETRY GROUPS

Ages 7 and up
Materials needed: one large or one travel set
Teaches basic symmetry groups

Symmetry Groups, Activity # 1

Optional: Review the section "Fractiles and Symmetry" printed on the inside cover of the Fractiles-7 package for illustrations and definitions of symmetry groups.

Next, make some simple designs that are examples of each symmetry group.

Give each child at least seven tiles of each color. Have each child use their tiles to create one or more simple designs for one or more of the symmetry groups.

Have a discussion asking the children to think of some everyday objects belonging to each of the symmetry groups. Ask them to name some examples that are man-made and some that are natural forms. Examples might include the human face as reflection symmetry, a daisy as rotational symmetry, or a checkerboard as translation symmetry. Hint - some objects have more that one kind of symmetry.

Symmetry Groups, Activity # 2

Materials needed: Magazines with lots of colored pictures, scissors, paste, scrap book.

Look through the magazines, select and cut out pictures that are examples of the different symmetry groups you have learned about. Use the pictures to begin a symmetry scrapbook with separate pages or chapters for each symmetry group. Explain in your own words why each picture belongs to a particular symmetry group.

MAKING SMALL CIRCLES

Ages 7 and up
Teaches symmetry, areas, angle combinations
Materials needed: one large or one travel set
Allow at least 15 minutes

Divide the tiles into smaller sets of 21 tiles - 7 of each color. Give each person one of these smaller sets and a Fractiles board or other suitable steel based playing surface.

Each person works independently to form a circle using all their 21 tiles. It will be easier if you refer to packaging illustrations of 21 piece circles. It will be more challenging if an example is not shown.

Discover your own unique style of tiling the same circular area with your 21 tiles.

Compare the various circles you have made and describe the similarities and differences. If you can, describe what symmetries have emerged? Do any of the circles have translation symmetry? rotation? reflection? or more than one kind of symmetry? no symmetry?

STAR MAKING

Ages 8 and up
Work individually or as a team
Develops awareness of spatial relationships, and angle combinations.
Materials needed: one large or one travel set
Allow at least 15 minutes

If desired, you can refer to package instructions section "Why the Tiles Fit Together So Many Ways". This will be more challenging if you do not read the material first.

1. Give each person at least 14 red tiles, 7 yellow tiles, and 7 blue tiles.

2. Make a yellow star, using 7 yellow tiles. A full circle has 360 degrees, so what fraction of 360 degrees is one yellow tile (answer: 1/7th)

3. Next make a star with red tiles (14 red tiles). What fraction of 360 degrees is one red tile's angle (answer: 1/14th)

4. Use a calculator with as many decimal places as possible to see how many degrees are there in a single red tile. (answer: 360 divided by 14)

5. Again use the calculator to see how many degrees are there in a single red tile. (answer: 360 divided by 14)

6. Calculate all the angles of the tiles (six angles in all) - 1/14 of 360, 2/14 of 360, on up to 6/14. Did you notice anything weird about the numbers you got?

7. Next try to make a star using only blue tiles. Can you make a blue star in the same way as you made a yellow or red star? Why or why not?

8. Now make another star, but this time use more than one kind of tile. This star will look uneven or nonsymmetrical compared to the stars you made using only one color. After you have made this star, try trading some of the tiles in your star for different tiles. For instance, two red tiles can fit in place of one yellow tile. Try other combinations. What does this tell you about the relationships of the angles?

FOUR PLUS STARS GAME

Ages 7 and up, for 2 or more players
Develops awareness of spatial relationships and angle combinations.
Materials needed: one large or one travel set
Allow 15 minutes or more

Object of the game: Be the first player to complete a star composed of 4 or more tiles.

A star in this game is made of 4 or more tiles whose corners meet in the middle. Together these tiles close the circle. In other words, their adjacent corners have angles which add up to 360 degrees.

How to Play:

Set up the game by placing one tile near the center of the board.

Players take turns placing one tile at a time on the board.

The tile being placed must have at least one of its edges adjacent to the edge of a tile that is already on the board.

Tiles may not hang over the edge of the board or overlap other tiles.

You are not allowed to make a star with only 3 tiles as this is too easy and the game would end quickly.