

## THE GREATEST PERIMETER PROBLEM

**Objectives:** Use the sides of colored tiles to compute the perimeter of polygons and study the relationship between the shape of a polygon and its perimeter.

**Materials:** The Greatest Perimeter Problem Activity Sheet and Transparency  
Four sheets of "The Greatest Perimeter Problem Grid Sheet" per group  
20 colored tiles per participant  
20 transparent tiles for the leader  
One pair of scissors per group

**Procedures:**

1. Pass out 20 colored tiles and "The Greatest Perimeter Problem Grid Paper" to each participant.
2. Orally go over the rules from the transparency "The Greatest Perimeter Problem" and be sure to demonstrate on the overhead the correct and incorrect way to make a polygon. As a group, work through problems A, B, and C.
3. Introduce the contest by asking groups to make a polygon with the greatest perimeter using only 20 colored tiles. The polygon must follow the rules on the transparency "The Greatest Perimeter Problem".
4. Allow participants to work in groups to solve this problem for 5 minutes to make their polygon and then another two-three minutes to determine its perimeter. Have participants record the polygon and its perimeter on the grid paper, and cut it out. Have each group then hold up their polygon and tell its perimeter.
5. Conclude the activity by determining the winning group or groups and the perimeter of their polygon.

Notes:

1. The answers to "The Greatest Perimeter Problem" will vary. All groups should be able to make polygons with the requested perimeters. The greatest perimeter that has been made with 20 colored tiles is 42 inches; because of the restrictions imposed by the rules, it is thought that this is the maximum perimeter possible.
2. As you conclude "The Greatest Perimeter Problem" assist participants to understand the relationship between the shape of polygon and its perimeter. Generally stated, this relationship is that elongated shapes will have the greater perimeters and square-like shapes will have the smaller perimeters when area (the number of colored tiles) is constant.

## THE GREATEST PERIMETER PROBLEM

Using 20 colored tiles and "The Greatest Perimeter Problem Grid Paper," work in teams to make polygons that have the perimeters listed below. Each colored tile has a perimeter of 4 inches. With the colored tiles make a polygon that has:

- A. A perimeter of 20 or less inches.
- B. A perimeter between 21 and 30 inches.
- C. A perimeter between 31 and 40 inches.

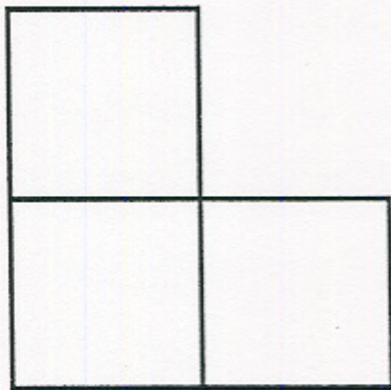
The polygons you make must follow these rules:

1. The polygons must have an area of 20 square inches.
2. All colored tiles must be placed so that they touch other tiles on at least one side.
3. A colored tile may not be placed so that it touches another tile along only part of a side or at a point.
4. Each colored tile must fit completely within the squares on the grid paper.

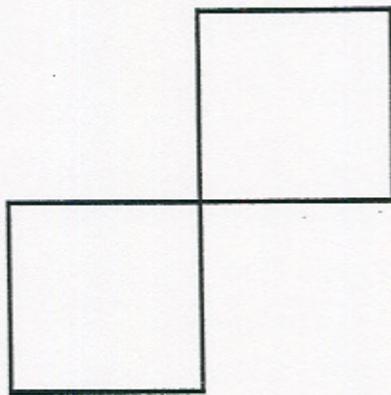
Examples:



Yes



Yes



No

After finding polygons with these perimeters, trace them on the grid paper and then record the perimeter on each polygon. Study these polygons to determine the characteristics that affect their perimeters. Save your polygons for future activities.

# THE GREATEST PERIMETER PROBLEM GRID PAPER

