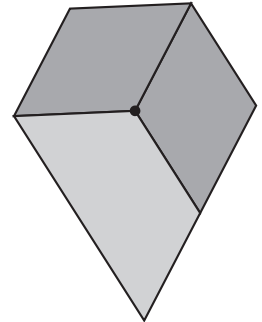# LAB 1.1
Angles Around a Point

Name(s) _____

■ **Equipment:** Pattern blocks

Place pattern blocks around a point so that a vertex (corner) of each block touches the point and no space is left between the blocks. The angles around the point should add up to exactly 360°.

For example, with two colors and three blocks you can make the figure at right.

Use the chart below to keep track of your findings.

• Every time you find a new combination, circle the appropriate number on the list below.

• Cross out any number you know is impossible.

• If you find a possible number that is not on the list, add it.

Since the two-colors, three-blocks solution is shown above, it is circled for you.

Colors:	How many blocks you used:									
all blue	3	4	5	6						
all green	3	4	5	6						
all orange	3	4	5	6						
all red	3	4	5	6						
all tan	3	4	5	6						
all yellow	3	4	5	6						
two colors	③	4	5	6	7	8	9	10	11	12
three colors	3	4	5	6	7	8	9	10	11	12
four colors	3	4	5	6	7	8	9	10	11	12
five colors	3	4	5	6	7	8	9	10	11	12
six colors	3	4	5	6	7	8	9	10	11	12

How many solutions are there altogether? _____

Discussion

A. Which blocks offer only a unique solution? Why?

B. Why are the tan block solutions only multiples of 4?

C. Explain why the blue and red blocks are interchangeable for the purposes of this activity.

D. Describe any systematic ways you came up with to fill in the bottom half of the chart.

E. How do you know that you have found every possible solution?

F. Which two- and three-color puzzles are impossible, and why?

G. Which four-color puzzles are impossible, and why?

H. Why is the five-color, eight-block puzzle impossible?

I. Which six-color puzzles are impossible, and why?