

Place Logic

by Michelle Pauls
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Logic puzzles are common in this column, as well as in the *Maximizing Math* column. In fact, readers may recognize similarities between this month's puzzle and the October 2003 *Maximizing Math* activity—*Square Grid Logic*. The challenge in both puzzles is to arrange numbers in square grids so that the same number does not appear in the same row or column. This puzzle differs from *Square Grid Logic* in that each square grid is divided into smaller shapes, and the same number may not appear in the same small shape.

Given these limitations, there are still many possible solutions for each grid. For this activity, two or three numbers in each grid have been filled in for students. The numbers have been carefully selected so that there is only one possible solution for each square. To solve these puzzles, students will have to exercise their logic skills and be able to consider several possibilities simultaneously.

There are three student pages provided for this activity. The first sheet is fairly simple, and should be used as a warm-up activity to get students comfortable with the rules and the process. Once they have completed the three by three grids, they will be ready to move on to the more challenging four by four grids on the second and third student pages.

To get the maximum benefit from this activity, be sure to discuss with students the thought processes they went through as they solved the puzzles. At first, they may simply have solved them using trial and error, but after solving a few, some strategies and techniques should have become apparent.

For example, in the grid shown above, four numbers can be filled in immediately. In the second row, the 2 and 3 are already in place. That means that the remaining two numbers in that row must be 1 and 4. Because there is a 4 in the bottom row, second

2		3	
	4		1

column, you know that the 4 cannot go between the 2 and the 3. Likewise, because the 1 is in the bottom row, fourth column, you know that the 1 cannot go to the right of the 3. That means the order of the second row must be 2, 1, 3, 4. The same logic applies to fill in the bottom row—3, 4, 2, 1.

2	1	3	4
3	4	2	1

Now that two rows are filled in completely, the columns can be filled in with ease. The first column contains the numbers 2 and 3. You know the 1 cannot go in the top left corner because there is already a 1 in that small square. Likewise, a 4 cannot go in the third space down because there is already a 4 in that small square. Thus, the only possible order for the first column is 4, 2, 1, 3.

4			
2	1	3	4
1			
3	4	2	1

With the first column completely filled in, the two small squares on the left half of the square are each missing only one number. As soon as those are filled in, the last four spaces can be quickly filled in with the only possible arrangement of numbers.

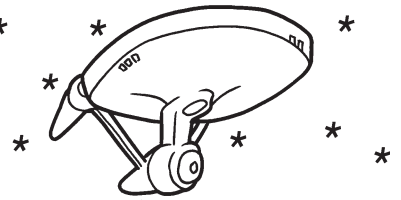
4	3	1	2
2	1	3	4
1	2	4	3
3	4	2	1

Once students are proficient at solving the *Place Logic* problems, they may want to create their own. There is a page of blank grids provided for this purpose. This extension is a great challenge; placing three or four numbers in a grid so that only one solution is possible can take several tries. Students can also make up their own shapes that are different than those used on the student pages.

I hope you and your students enjoy this activity. If your students create some problems of their own, we'd love to share them with our readers. Send their work to Michelle Pauls, PO Box 8120, Fresno, CA 93727, or e-mail mpauls@aimsedu.org.



PLACE LOGIC



The squares below are divided into three smaller shapes. The object of this puzzle is to place the numbers 1, 2, and 3 in the empty spaces so that each number appears exactly once in each row, column, and shape. A sample problem and its solution are shown here. ○ ○ ○ ○ ○ ○

○	○	○
		3
1		

○	○	○
3	2	1
2	1	3
1	3	2

	1	
	3	

1		
2		

IT'S LOGICAL

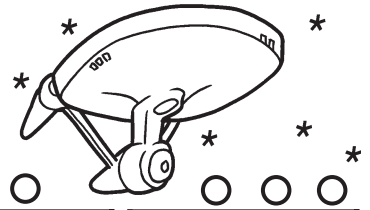
2		
		1

2		
	3	





PLACE LOGIC



The squares below are each divided into four smaller squares. The object of this puzzle is to place the numbers 1, 2, 3, and 4 in the empty spaces so that each number appears exactly once in each row, column, and small square. A sample problem and its solution are shown here. ○ ○ ○ ○

				4	3	1	2
2		3		2	1	3	4
				1	2	4	3
	4		1	3	4	2	1

2		3	
	4		1

4			
		1	
			2
	2		

		3	
1			
2			
			4

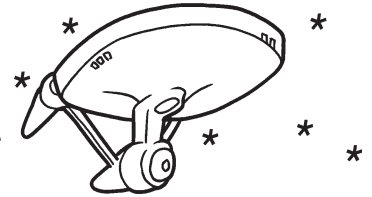


FASCINATING.





PLACE LOGIC



The squares below are each divided into four smaller shapes. The object of this puzzle is to place the numbers 1, 2, 3, and 4 in the empty spaces so that each number appears exactly once in each row, column, and small shape. ○ ○ ○ ○

3			
		4	
	2	3	

I'M A DOCTOR, NOT A MATHEMATICIAN!

I SEE NO SOLUTION.

YOU MUST THINK LOGICALLY, DOCTOR.



	2	1	
	4		

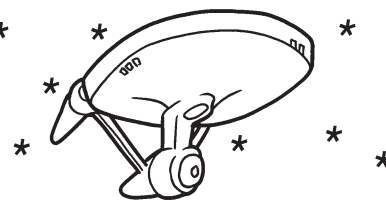


	2	3	
			4

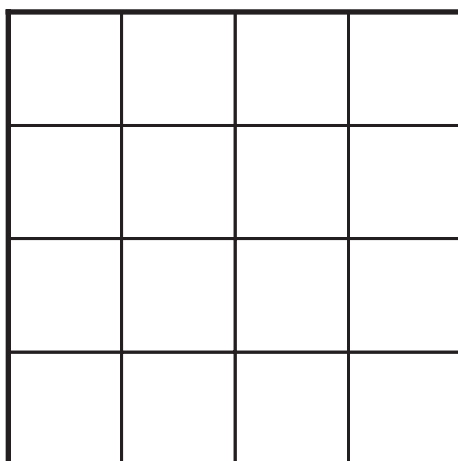
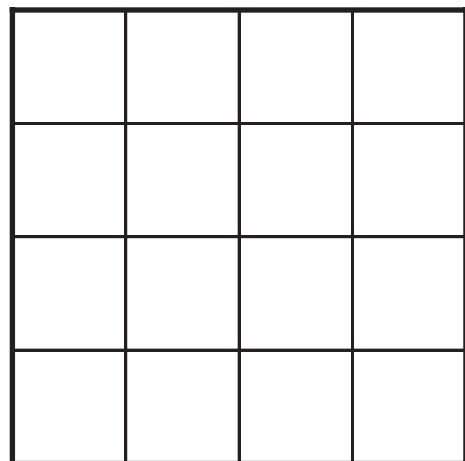
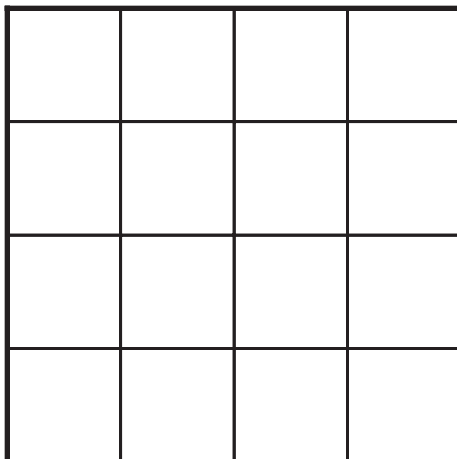
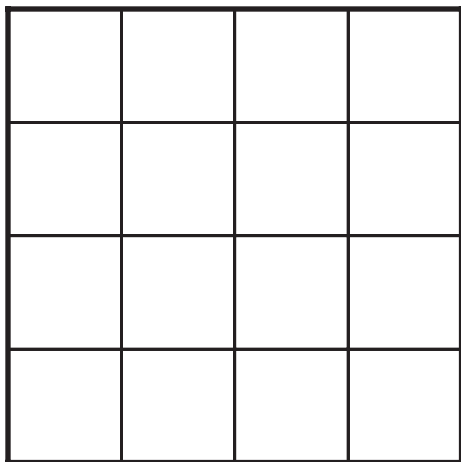


PLACE LOGIC

EXTENSION



Use the blank squares below to create your own problems. Divide the squares into four smaller shapes, each containing four squares. Place three or four numbers in the grid in such a way that only one correct solution is possible. Once you have created a problem that works, trade it with a classmate to solve. If he or she is not able to find a solution, change some of the numbers until it works. ○ ○ ○○ ○ ○○



BLANK??
WHAT...WILL
...WE DO!!?

WHAT WILL...
WE DO!!!?

