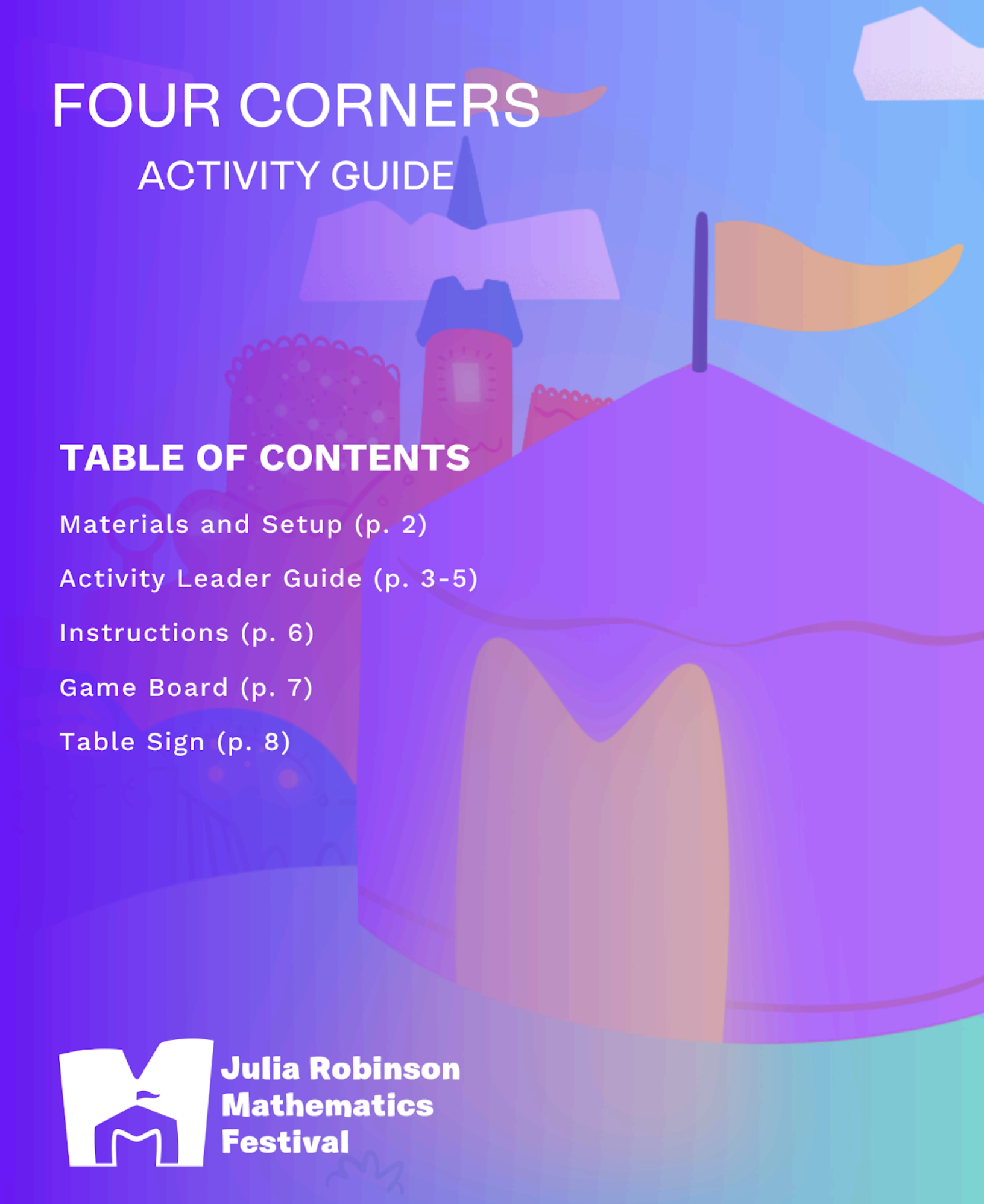
FOUR CORNERS

ACTIVITY GUIDE



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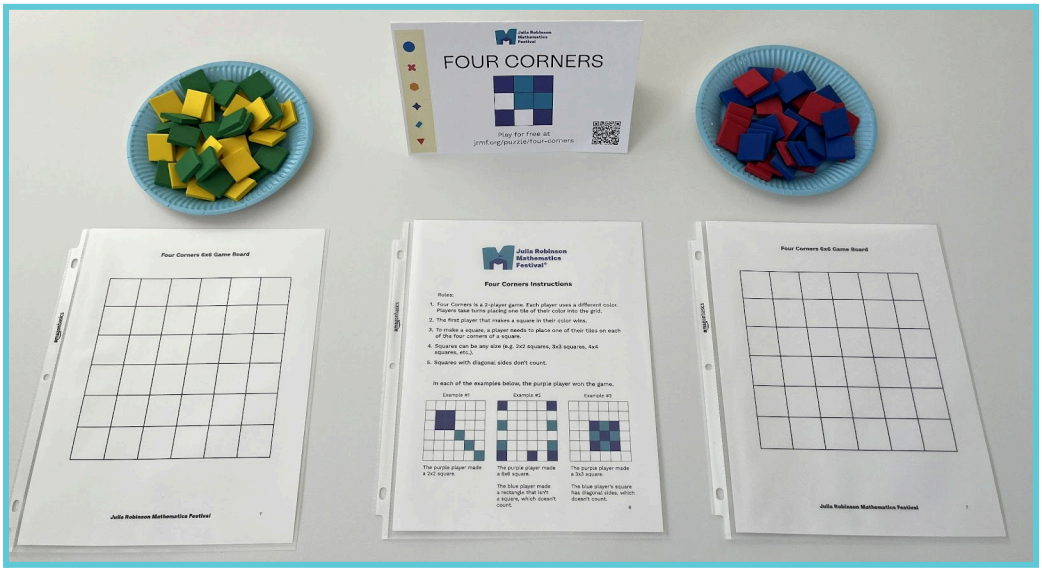
Materials and Setup

Per table (assuming 5 pairs of students per table), you will need:

Per Table	Material Preparation	
200 colored tiles	Each pair of students needs 40 tiles in two different colors, e.g., 20 blue and 20 red.	
5 copies of Instructions	1 page each	p. 6
5 copies of Game Board	1 page each	p. 7
1 copy of Table Sign	1 page *print on cardstock for sturdiness*	p. 8

Per Table	Purchasing Materials		
Color square tiles	pack of 400 for $22.95		
10 plastic sheet protectors	pack of 100 for $7.67	pack of 500 for $26.99	These are recommended in order to protect the documents that students will be handling.



Objective

Be the first player to place tiles in their color on the four corners of a square.

Rules:
1. Players take turns placing one tile anywhere on the game board. Players use different colors.
2. The first player to place tiles in their color on the four corners of a square of any size (e.g. 2x2, 3x3, 4x4, etc.) wins.

Materials

Each Four Corners table should be prepped for 5 stations of two students.
Each station needs:
1. 40 tiles in two different colors, e.g., 20 blue and 20 red.
2. Four Corners instructions.
3. Four Corners game boards.

How to Play

We encourage you to explore the activity yourself ahead of time.
You can try our online version here.

Introduce the activity without overexplaining it and without telling what strategies students might want to use. As much as possible, avoid giving away answers. Students should be encouraged to explore, experiment, and learn from their mistakes.

1. Model the rules using the tiles to explain.
2. Play a game with the student or start a game playing against a pair of students. Then have them switch to playing against each other once they understand the game.

Standards

1. Make sense of problems and persevere in solving them. CCSS.MP1
2. Model with mathematics. CCSS.MP4
3. Attend to precision. CCSS.MP6

Asking Good Questions

1. Ask questions about confidence.
    a. When a student asks you “Is this right?”, instead of saying “yes” or “no” right away, ask them how confident they are in their answer. Here are some examples:
        i. “Maybe. What do you think? How confident are you?”
        ii. “On a scale of 1-5, how confident are you in your answer?”
    b. If a student is not confident in their answer, follow up by asking “What would help you feel more confident in your answer?” or “Why do you not feel confident?” This helps you determine how best to help the student through their explorations.

2. Ask students about choices.
    a. When a student is stuck or shows you a wrong answer, instead of jumping in and showing the student the correct answer, start by asking about the choices that the student made along the way. Here are some suggested steps to follow:
        i. Start from the beginning.
        ii. Ask students to show you what they’ve tried so far.
        iii. When the student gets to a point where they have different choices, ask the student “What other choices can you make here?”
        iv. Have the student make a different choice and try to solve the puzzle. This helps the student see that they have the power to make different choices during an activity, and they’ll start to do this on their own in the future.
        v. If you’re familiar with the puzzle or a particular solution, stop the student only when a different choice will help them get to the solution. This will help them feel successful faster without you giving away too much of the answer.

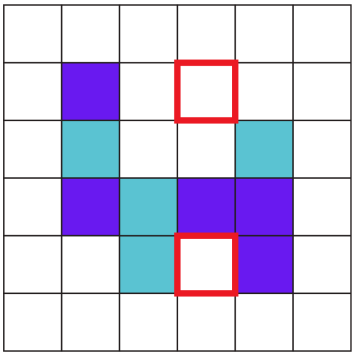
3. Ask students about strategies.
    a. If a student is getting into the activity and has been doing it for a while, ask the student if there are any strategies they’ve come up with to help them solve the puzzle or win the game.
    b. Follow up by asking if they think their strategies will work for all puzzles and/or larger puzzles, more complex puzzles, etc. Have the student explore more complex puzzles to test out their strategies.
    c. This is a great way to encourage a student to dive deeper into an activity and to start looking for patterns, structure, and proofs.

Answers

Many students will discover that they can guarantee a win if they can create a situation where they have at least two winning moves on their next turn.

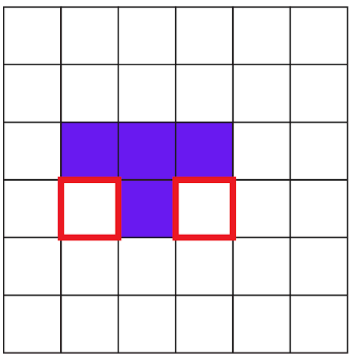
In the example game below, it's the Blue Player's turn. However, the Purple Player has two ways that they can win on their next turn (outlined in red). No matter what the Blue Player does, the Purple Player will win on their next move.

Example Game

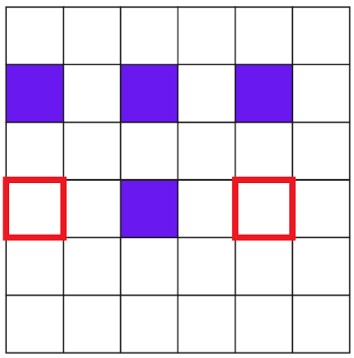


A common way to create such a situation is to make a T-shape, like in the examples below (winning moves are outlined in red). A T-shape can be any size and in any orientation to be effective in winning Four Corners.

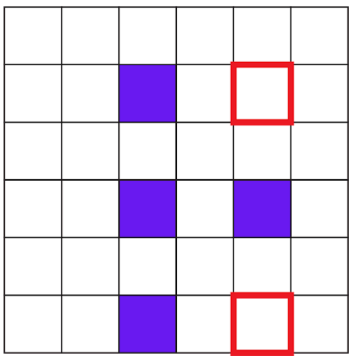
Example #1



Example #2



Example #3



Over time, students will learn that when they see a shape in their opponents' color like the ones above, they have already lost the game, even without finishing it. In the mathematical field of Game Theory, this is called a *losing position*, because when you start your turn in such a position, you know that you've lost.

As students play Four Corners, they'll start to notice and keep track of different kinds of losing positions. By finding new and creative ways to create these losing positions for their opponents, students will develop better, more effective strategies.

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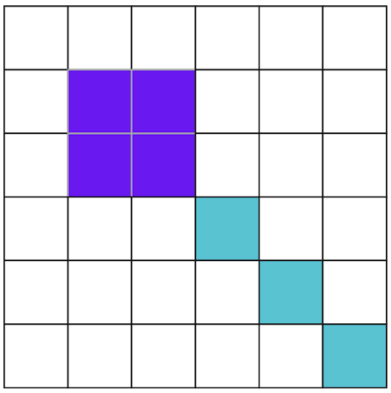
Four Corners Instructions

Rules:

1. Four Corners is a 2-player game. Each player uses a different color. Players take turns placing one tile of their color into the grid.
2. The first player that makes a square in their color wins.
3. To make a square, a player needs to place one of their tiles on each of the four corners of a square.
4. Squares can be any size (e.g. 2x2 squares, 3x3 squares, 4x4 squares, etc.).
5. Squares with diagonal sides don't count.

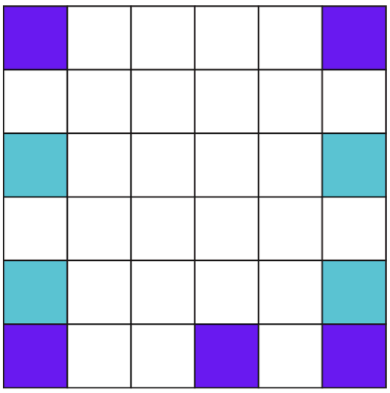
In each of the examples below, the purple player won the game.

Example #1



The purple player made a 2x2 square.

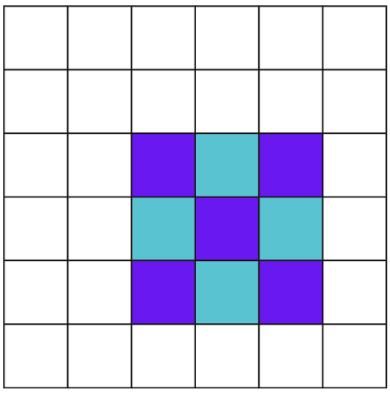
Example #2



The purple player made a 6x6 square.

The blue player made a rectangle that isn't a square, which doesn't count.

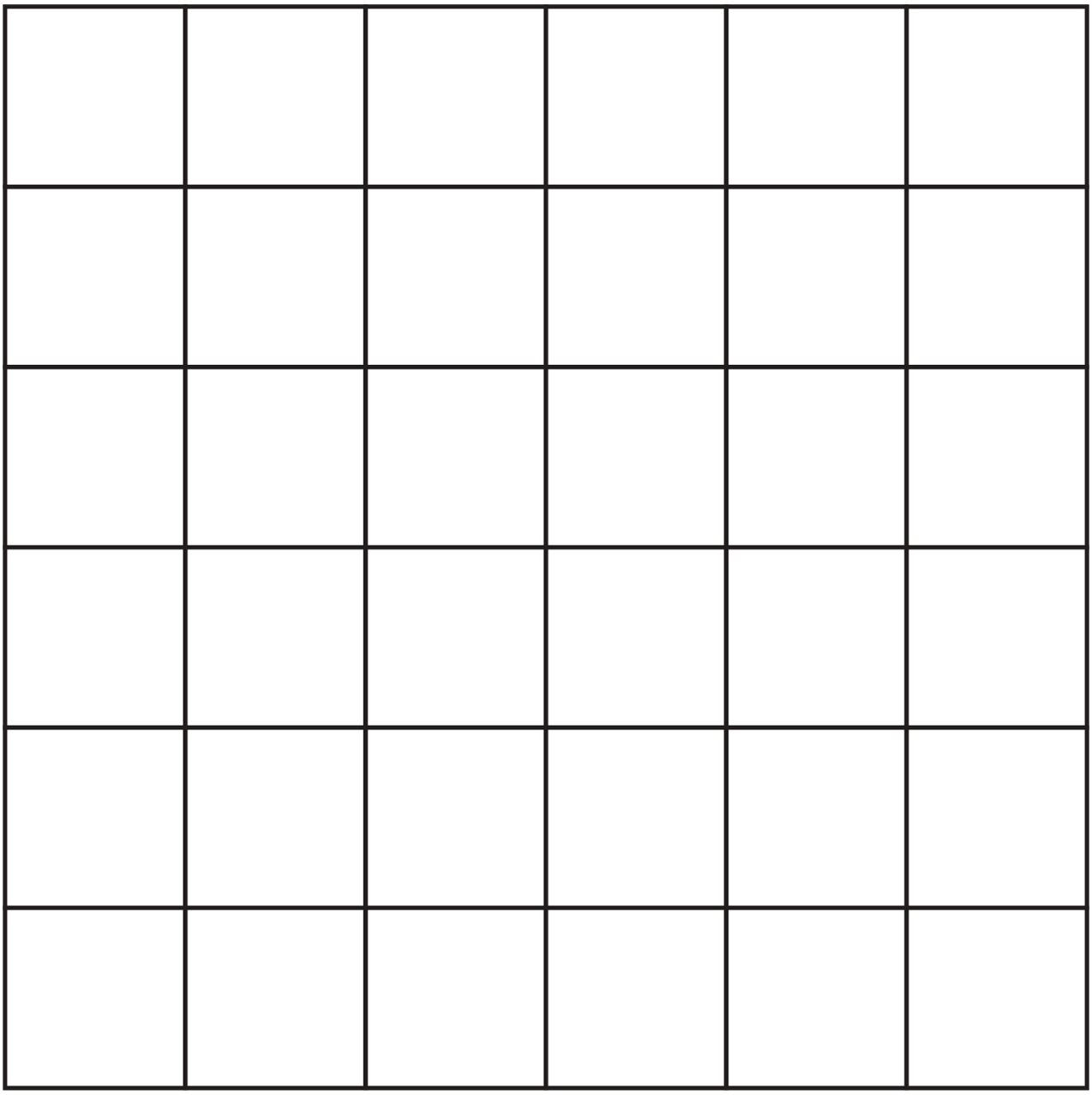
Example #3



The purple player made a 3x3 square.

The blue player's square has diagonal sides, which doesn't count.

Four Corners 6x6 Game Board



Play for free at
jrmf.org/puzzle/four-corners

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