



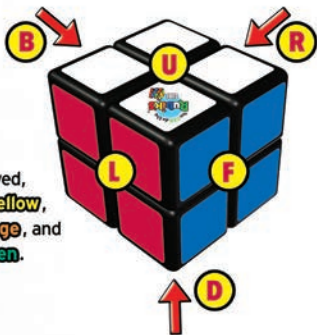
**Solution Guide**  
**2x2 Rubik's Cube**  
**Unlock the Secret!**

[www.YouCanDoTheCube.com](http://www.YouCanDoTheCube.com)

# STAGE 1:

## Get to know your 2x2 Rubik's Cube

Unlike the 3x3 Rubik's Cube (which has centers, edges, and corners), the 2x2 Rubik's Cube has only corner pieces. There are 8 corner pieces, each containing 3 of the 6 colors: **white**, **red**, **blue**, **yellow**, **orange** and **green**.



When the cube is solved, **white** is opposite **yellow**, **red** is opposite **orange**, and **blue** is opposite **green**.



**R = RIGHT FACE** - Right side of the cube



**L = LEFT FACE** - Left side of the cube



**U = UP FACE** - Top side of the cube



**D = DOWN FACE** - Bottom side of the cube



**F = FRONT FACE** - Front side of the cube



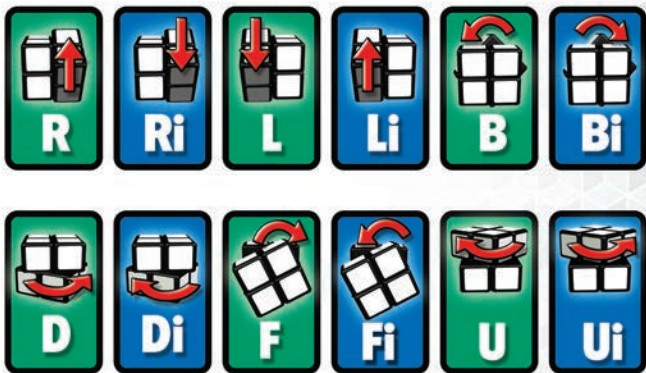
**B = BACK FACE** - Back side of the cube

Cube sides are represented by a letter.



**VERY IMPORTANT**

When making the moves below, hold your cube full-face front with logo on top as shown. Dark grey on the pictures means the color does not matter. Each move is a  $1/4$  turn rotation.



A letter with an "i" after it means an inverse or counter-clockwise move when looking at that face directly.

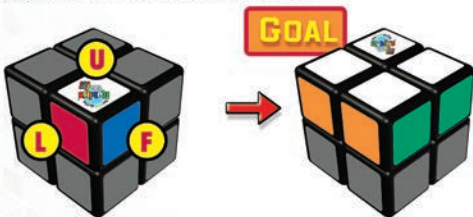
## STAGE 2: Solve the first layer

### Step 1 - Getting started

When solving a 3x3 Rubik's Cube, the center pieces indicate what colors go on each side. On the 2x2 Rubik's Cube, we don't have center pieces to guide us, so we are going to pick a corner piece to start with and build off of that. Any corner piece could be used as a starting piece, but let's use the corner that is white, blue, and red. It's easy to spot because it has the Rubik's® logo on the white tile!

#### Holding Your Cube:

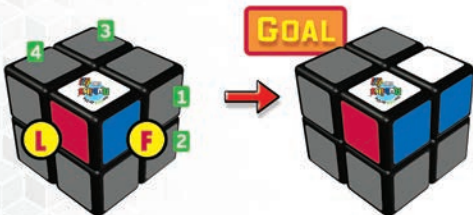
Hold the cube so the **white / blue / red** corner is in the top layer, in the front-left position, with the white tile on the top.



\* F stands for the front face- Hold this part of the cube facing you

### Step 2 - Solving the 2nd Corner

Of the 7 other corners, only 1 will have both white and blue tiles (the 3rd color on this corner piece will be orange). This piece belongs in position **1** (next to the **white / blue / red** corner) with the white tile on the top (**U**) face and the blue tile on the front (**F**) face.



\* Find the **white / blue / orange** piece, identify the state your puzzle is in, and follow the solving sequence.

### State 1:

If the **white/blue/orange** corner is in position **1**, follow the sequence **0, 2, or 4** times until the white and blue tiles are lined up.



**1**

**TIP!**  
The colored tiles of the **white/blue/orange** corner may not be in same order as these pictures- you are just looking for the location of the corner piece.

### State 2:

If the **white/blue/orange** corner is in position **2**, follow the sequence **1, 3, or 5** times until the white and blue tiles are lined up.



**2**

\*\* If the corner is located **anywhere** else in the **bottom layer**, rotate the down face (**D**) until the piece is in State 2. Then use the solving sequence **1, 3, or 5** times until the white and blue tiles are lined up.



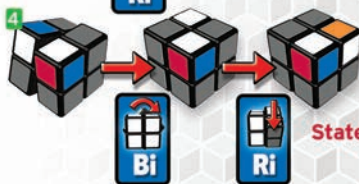
**State 2**

\*\* If the corner is in position **3**, rotate the right face counter-clockwise (**Ri**) to move the piece into State 1. Then use the solving sequence **0, 2, or 4** times until the white and blue tiles are lined up.



**State 1**

\*\* If the corner is located in position **4**, rotate the back face counter-clockwise (**Bi**) to move the piece to position 3, then rotate the right face counter-clockwise (**Ri**) to move the piece into State 1. Then use the solving sequence **0, 2, or 4** times until the colors are aligned.



**State 1**

### Step 3 - Solving the Third Corner

Now that you have two corners aligned, hold the cube so that the two solved corners are on the left (L) face.



#### TIP!

Turn your cube and hold it like this now. The two solved corners are on the left (L) face.

#### GOAL



Find the **white/orange/green** piece, identify the state your puzzle is in, and follow the solving sequence.

#### State 1:

If the **white/orange/green** corner is in position **1**, follow the sequence below 0, 2, or 4 times until the white and orange tiles line up.



#### TIP!

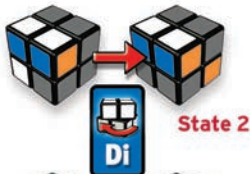
The colored tiles of the **white/orange/green** corner may not be in same order as these pictures- you are just looking for the location of the corner piece.

#### State 2:

If the **white/orange/green** corner is in position **2**, follow the sequence 1, 3, or 5 times until the white and orange tiles line up.



\*\* If the corner is located in the **anywhere** else in the **bottom layer**, rotate the down face (**D**) until the piece is in State 2. Then use the solving sequence 1, 3, or 5 times until the white and orange tiles line up.



\*\*If the corner is in the top layer (**U face**), rotate the right face counter-clockwise (**Ri**) to move the piece into State 1. Then use the solving sequence 0, 2, or 4 times until the white and orange tiles line up.



## Step 4 - Solving the 4th Corner

To solve the final corner in the top layer, hold the cube with the two orange tiles on the left (L) face.



### TIP!

Turn your cube and hold it like this now. The corner you still need to solve is in the upper-right position.

GOAL



Find the **white/green/red** piece, identify the state your puzzle is in, and follow the solving sequence.

### State 1:

If the **white/green/red** corner is in position **1**, follow the sequence below 0, 2, or 4 times until the white, green, and red tiles line up.



### TIP!

The colored tiles of the **white/green/red** corner may not be in same order as these pictures- you are just looking for the location of the corner piece.

### State 2:

If the **white/green/red** corner is in position **2**, follow the sequence 1, 3, or 5 times until the white, green, and red tiles line up.



\*\* If the piece is located anywhere else in the bottom layer, rotate the down face (D) until the piece is in state 2. Then use the solving sequence 1, 3, or 5 times until the white, green, and red tiles line up.



State 2

**Congratulations!** You have solved layer 1.



## STAGE 3:

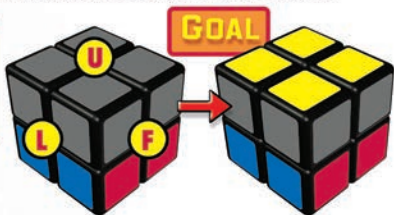
# Orient the final layer- Get all of the yellow tiles on top.

Orienting the 4 final pieces means that we want all of the yellow tiles on the upper face of the Rubik's Cube. At the end of this step, the 4 corners with yellow tiles may not be in the right locations, but they will all be rotated so that the yellow tiles are on top.

Hold the cube so that the solved layer is on the bottom.

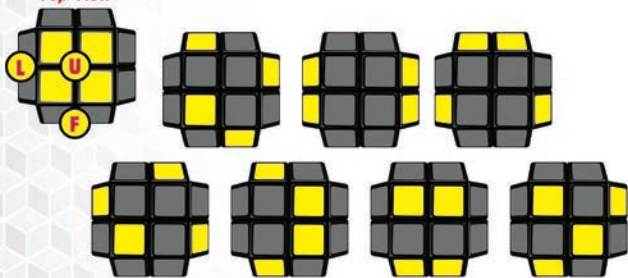
### TIP!

Turn your cube over so the white face is on the bottom.



Identify where the yellow tiles are on your cube. Hold your cube to **match** the picture. Follow the sequential moves.

### Top View



If the yellow tiles are not all on top after 1 sequence, **REMATCH** and hold your cube like another picture and follow the sequence again. You may need to do this 2 or 3 times.



# Solving the final layer- Position the yellow corners correctly

## STAGE 4:

Finally, you are going to put the 4 remaining pieces into the correct locations.

### Step 1

Turn the upper face (U) until you can match 2 of the corners on the upper layer to the bottom layer. Now, if all 4 line up, you have solved the 2x2 Rubik's Cube! If not, complete step 2.

### Step 2

Identify the state your cube is in. Hold your cube to match the picture. Then, follow the correct sequence.



View 1  
Front

View 2  
Back



#### ADJACENT CORNERS:

If the 2 corners that need to be aligned are adjacent (side by side), hold your cube to match the picture, and then follow the following sequence.



#### TIP!

The solved face on the side (lateral face) could be red, orange, blue or green. Hold your cube so the solved face is the back (B) face, and the two corners that need to be swapped are on the front (F) face.

#### DIAGONAL CORNERS:

If the 2 corners that need to be aligned are diagonally across from each other, hold your cube to match the picture, and follow the following sequence.



#### TIP!

After you follow the sequence, the corners that needed to be aligned will be adjacent. Now, follow the instructions for adjacent corners.

**Congratulations!** You just solved the 2x2 Rubik's® Cube!

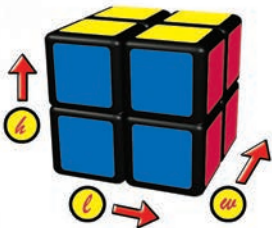


 = Height

 = Length

 = Width

 = 1 Cubie



### The Mathematics of a 2x2 Rubik's Cube

Each face of the Rubik's Cube can be measured to find its area. You can use a ruler, or just count the cubies. Measure the length and width, then multiply them to calculate area. What is the area of one face?

If you add together the areas of all 6 faces, you can calculate the surface area of the cube.

What is the surface area of the 2x2 Rubik's Cube?

If you find the measurement for width, you can multiply the height x length x width to calculate the volume of the cube.

What is the volume of the 2x2 Rubik's Cube?

If you took apart the 2x2 cube and counted the pieces, how many pieces would there be?

### Making Patterns

Can you make this pattern on your 2x2 Rubik's Cube?

What other fun patterns can you make?



Rubik's Cube 2x2  
Checkerboard Pattern

## Fractions

Each face of the Rubik's Cube can be used to model fractions.

- Find or make a face that shows  $\frac{1}{4}$  blue.
- Find or make a face that shows  $\frac{2}{4}$  red. How could you write this fraction in another way that means the same as  $\frac{2}{4}$ ?
- Find or make a face that shows  $\frac{3}{4}$  green.
- Find or make a face that shows  $\frac{4}{4}$  yellow. How much of the entire Rubik's Cube is yellow?



## Critical Thinking Puzzle

If you can only see 3 faces of a 2x2 Rubik's Cube, and it looks like this:



What do the other faces look like?

Here is a net of the Rubik's Cube to help you:



Check us out online at

[www.YouCanDoTheCube.com](http://www.YouCanDoTheCube.com)



For your next challenge, try the 3x3 Rubik's Cube!

- Start a Club
- Print Certificates
- Host a Competition
- Become a Cube Coach
- Make a Rubik's Cube Mosaic

Thank you to Bryan Kinkel for his contributions to this guide.

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V1 -12/16