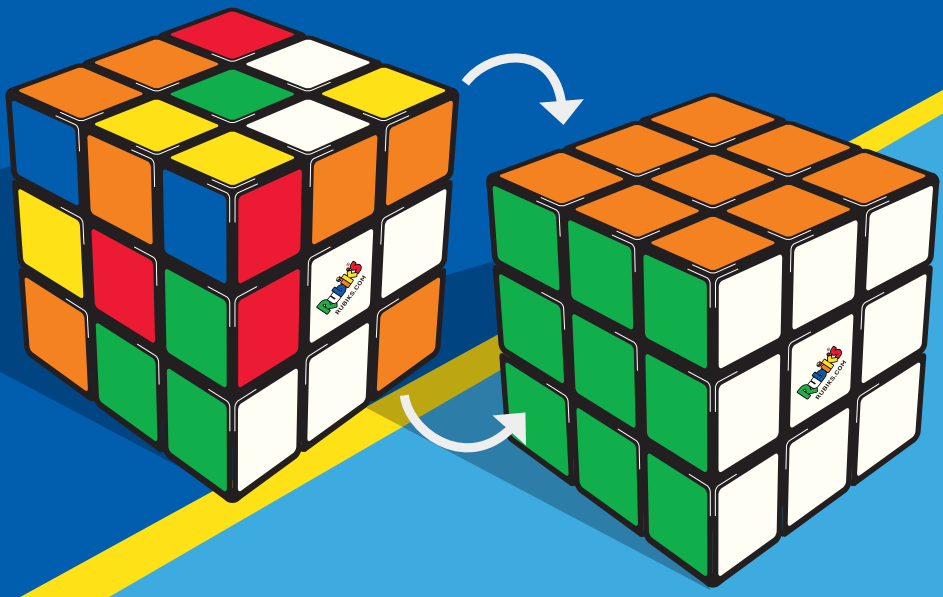
YOU CAN DO THE RUBIK'S CUBE

Solution Guide



HOW TO USE THIS GUIDE

- You will be learning the layered method to solve the Rubik's® Cube. After you learn this method, you can add speed cubing moves when you are ready.
- Throughout the guide you will see this symbol to indicate helpful tips. Take the time to read the tips closely.

- The gray areas on the Rubik's Cube mean that at the stage you are working on, the color of the gray pieces doesn't matter.

TIPS FOR SUCCESS

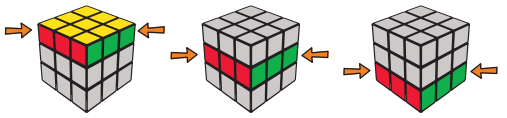
- Mindset is critical - learning to solve the Rubik's Cube is difficult but if you persevere, you CAN solve the Rubik's Cube.
- Keep the Rubik's Cube on a table or use a mat like the one on www.YouCanDoTheCube.com to maintain the same front face for an entire algorithm (sequence of moves).
- Think of the algorithms as moving a piece out of the way, setting up its correct position, and then moving the piece into that place.
- Master one layer by re-scrambling your Rubik's Cube and practicing multiple times before moving on to the next layer. (Note: When solving the last layer, you can scramble just the top by applying the algorithm on page 12).
- Learn songs and chants to help you memorize the algorithms.
- Place a small sticky note on the piece of the Rubik's Cube you are moving so you can follow its path. Consider taking a video while you do this and then watch the video.
- Use this guide along with You Can Do the Rubik's Cube's corresponding resources such as videos, solving checklist, and teacher guides.

GET TO KNOW YOUR RUBIK'S CUBE

LAYERS

There are three horizontal layers in a 3x3 Rubik's Cube.

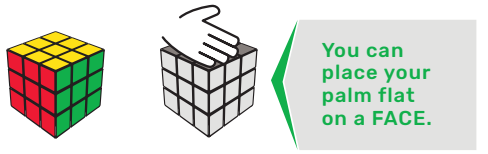
Using this guide, you will solve the Rubik's Cube layer by layer.



FACES

Each flat surface is a face.

There are 6 faces on a Rubik's Cube.



CENTERS

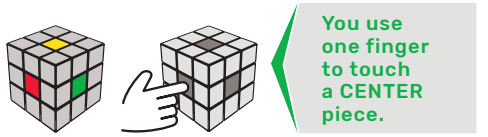
Center pieces have one colored tile.

There are 6 center pieces.

Center pieces are single tiles, fixed to the internal core.

When correctly solved, each face will be the color of its center piece.

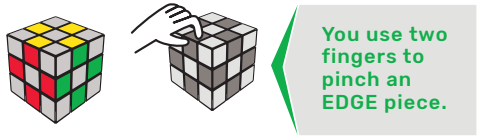
These center piece colors are always opposite each other:



EDGES

Edge pieces have two colored tiles.

There are 12 edge pieces.



CORNERS

Corner pieces have three colored tiles.

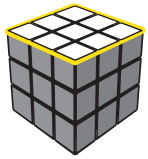
There are 8 corner pieces.

GET TO KNOW YOUR RUBIK'S CUBE

FACE KEY

Each face is represented by a letter.

U = UP FACE



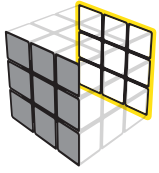
D = DOWN FACE

L = LEFT FACE

R = RIGHT FACE

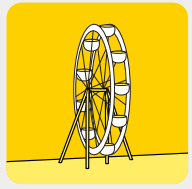
F = FRONT FACE

B = BACK FACE



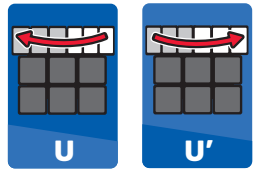
MOTIONS

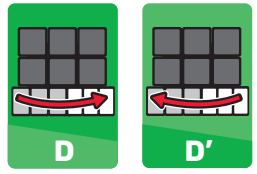
Think of the movements of these objects when you turn the faces.

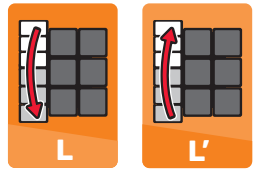


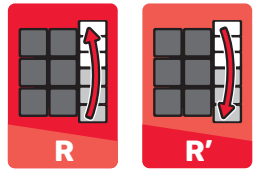
ALGORITHM KEY

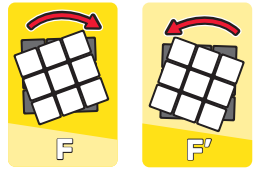
Moves used in this guide.

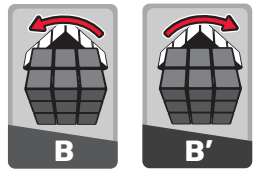






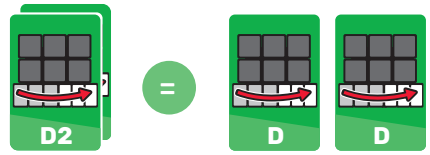




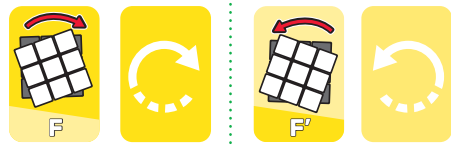


- Each move is a **¼ TURN**.

- An **ALGORITHM** is a sequence of moves that you need to do in a specific order.
- When following the algorithms in this guide, it is important to maintain the **FRONT** face of your Rubik's Cube so it stays the **FRONT** through all of the turns.
- If there is a **2** next to the algorithm letter, turn the face twice.



- A turn is clockwise when looking at that face directly. A letter with an apostrophe (') after it means to make an inverse or counterclockwise turn of the face.



RUBIK'S CUBE SOLUTION GUIDE

This 3x3 solution guide is divided into three stages as seen below.

SOLVE LAYER ONE

SOLVE THE MIDDLE LAYER

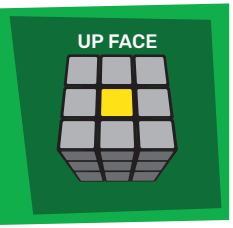
SOLVE THE FINAL LAYER

Now... let's get solving!

STEP 1: CREATE A DAISY

HOLDING YOUR RUBIK'S CUBE

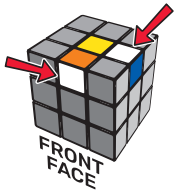
Begin by holding your Rubik's Cube with the **YELLOW CENTER** piece on the **UP (U)** face.



Action 1

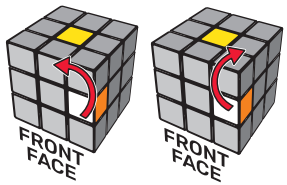
Look at the top layer to locate the EDGE pieces that have a WHITE tile. Leave them where they are.

See example to the right and notice that at this stage it is okay if the white tile is not touching the **YELLOW CENTER** piece.



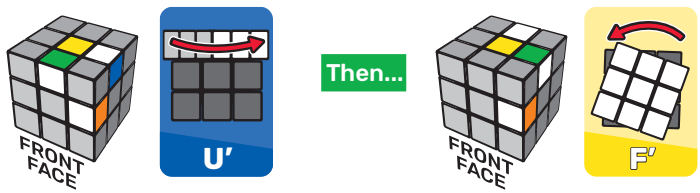
Action 2

Look at the middle layer. Move **EDGE** pieces that have a **WHITE** tile from the **MIDDLE** layer into the top layer.



BE CAREFUL NOT TO BUMP OUT THE WHITE EDGES ALREADY IN THE DAISY.

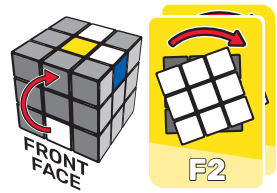
Rotate the **UP (U)** face to move a white edge out of the way before moving another white edge into the daisy.



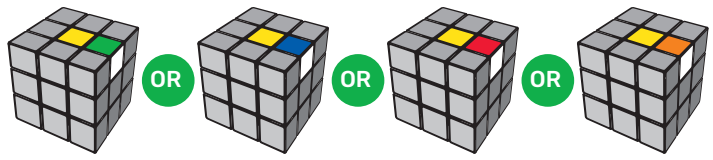
Action 3

Look at the bottom layer. Move **EDGE** pieces that have a **WHITE** tile from the **BOTTOM** layer into the top layer.

Don't forget the previous tip about bumping.

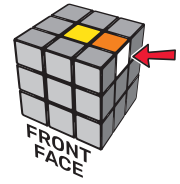


SOMETIMES, WHEN YOU PLACE THE EDGE IN THE TOP LAYER, THE WHITE TILE IS NOT ON THE UP FACE AND IT NEEDS TO BE "FLIPPED".

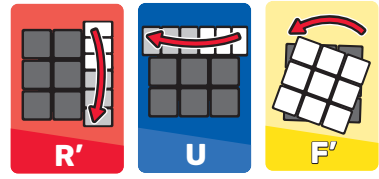


Holding your Rubik's Cube

To "flip the edge," so the **White** tile is on the **UP** face, hold your Rubik's Cube so the edge that needs to be flipped is on the **RIGHT** (R) face.



Follow this algorithm.

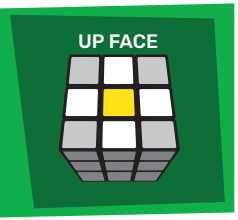


When your Rubik's Cube has a daisy that looks like this picture, you can move to **Step 2!**

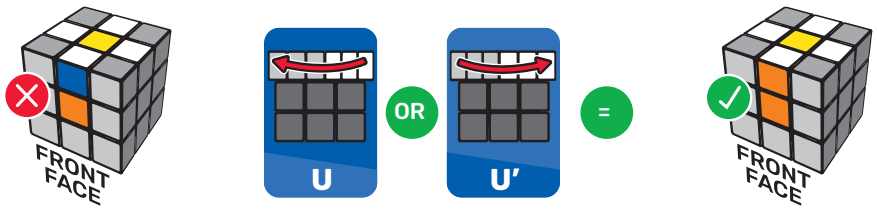
STEP 2: CREATE A WHITE CROSS WITH MATCHED EDGES AND CENTER PIECES

HOLDING YOUR RUBIK'S CUBE

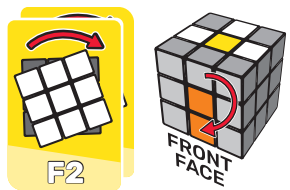
Begin by holding your Rubik's Cube with the daisy on the UP (U) face. Look at the FRONT face of the Rubik's Cube.



Action 1 If the **FRONT** tile of the UP edge piece matches the **CENTER** tile color, go to **Action 2**.
If not, turn the **Up (U)** face until it does.



Action 2 Turn the **FRONT** face two times **(F2)** so that the **WHITE** tile is now on the **DOWN (D)** face.



Action 3 Repeat **Action 1 & 2** for each **WHITE** edge.

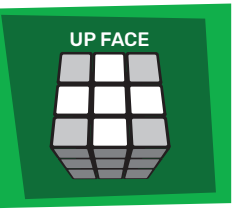
Action 4 Once all 4 edges have been correctly placed, flip your Rubik's Cube over to see the WHITE cross (with matching edge tiles on the **RED**, **BLUE**, **ORANGE** and **GREEN** faces).

When your Rubik's Cube has a white cross with the center and edge pieces matched, like this picture, you can move to Step 3!

STEP 3: SOLVE THE WHITE CORNERS

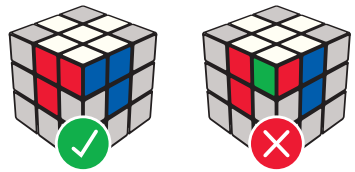
HOLDING YOUR RUBIK'S CUBE

Begin by holding your Rubik's Cube with the white cross on the UP (U) face.



CORRECT PLACEMENT

The correct placement of a corner piece is between center pieces with the same colors. Notice on the image how a red/blue/white corner goes between the red, blue, and white center pieces.

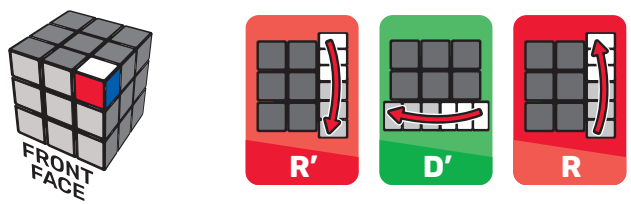


Action 1 Locate a corner piece with a **WHITE** tile in the bottom layer.

If your corner piece is in any of these positions then go to **Action 2** on the next page.

If your corner piece is in the top layer but not in the correct location then see the tip below.

TO GET A CORNER WITH A WHITE TILE FROM THE TOP LAYER TO THE BOTTOM LAYER:

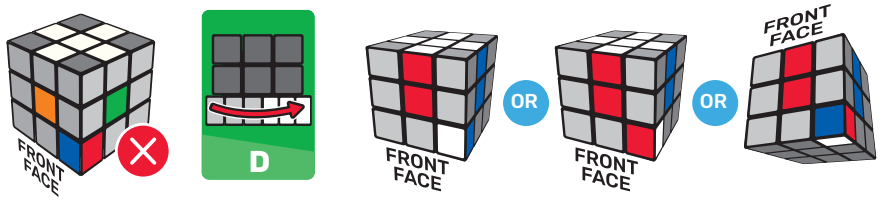


STEP 3: SOLVE THE WHITE CORNERS

Action 2

Rotate the **DOWN (D)** face until the corner is between the two matching colored center tiles.

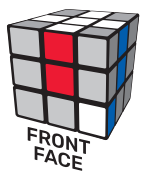
See 'Correct Placement' note on previous page and images below.



Action 3

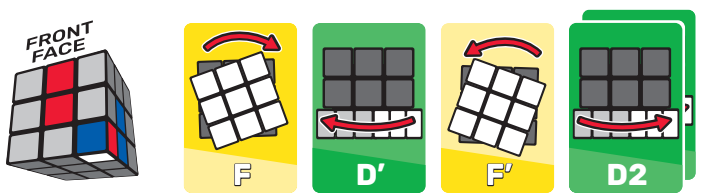
Keeping the white cross on the **UP (U)** face, hold your Rubik's Cube so the **WHITE** tile is on the **FRONT** face.

If the WHITE tile is on the bottom, see the tip below.

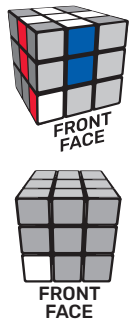


TO CHANGE A WHITE TILE FROM FACING DOWN TO FACING FRONT:

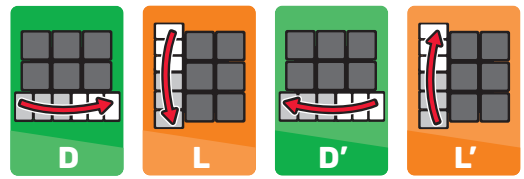
1. Hold your Rubik's Cube with the corner on the **RIGHT** face.
2. Follow this algorithm.



Action 4 If the WHITE tile is on the LEFT

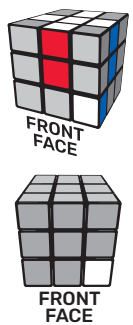


Follow the algorithm below.

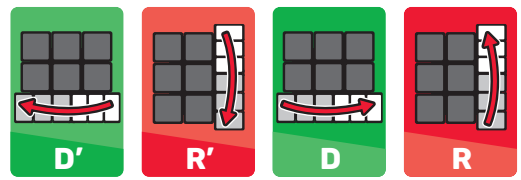


Notice: D moves the corner piece out of the way, L brings its corner position down, D' moves it into place and then L' brings it up to the top layer.

OR Action 4 If the WHITE tile is on the RIGHT



Follow the algorithm below.



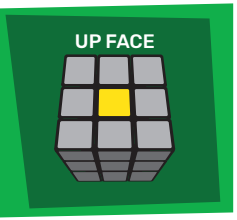
Notice: D' moves the corner piece out of the way, R' brings its corner position down, D moves it into place and then R brings it up to the top layer.

Action 5 Continue **Actions 1-4** until all white corner pieces are in the correct positions.

When your Rubik's Cube looks like the picture here, you have one-third solved and you can now learn to solve the middle layer!

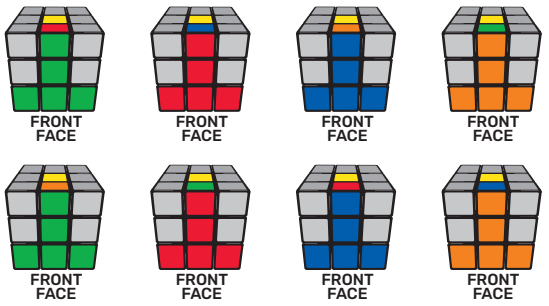
HOLDING YOUR RUBIK'S CUBE

Flip your Rubik's Cube over so the completed **WHITE** face is the **DOWN** face.



Action 1

Choose a **FRONT** face. Rotate the **UP (U)** face to create a vertical line matching one of the pictures below.



If you can't match one of these pictures, pick another **FRONT** face until you can match one of the pictures.

If you can't make any vertical lines, see tip below.

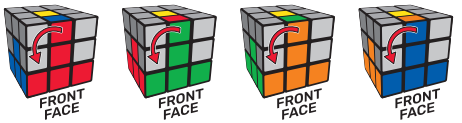
IF YOU CAN'T MAKE A VERTICAL LINE TO MATCH A PICTURE ABOVE:

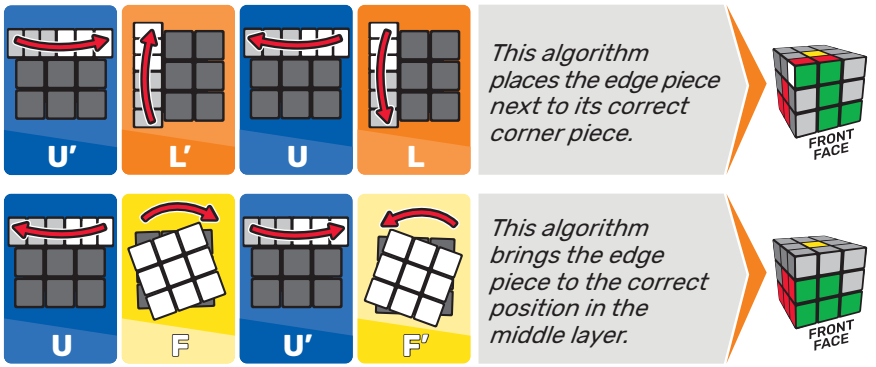
You will need to swap an edge from the UP (U) face with an edge already in the middle layer.

- Look in the **MIDDLE** layer to locate a mismatched edge that doesn't have a yellow tile.
- Hold your Rubik's Cube so the mismatched edge in the middle layer is on the RIGHT face.
- Follow the algorithm 'Moving Right' on page 11.
- Now proceed to **Action 1** above.

Action 2 Moving Left

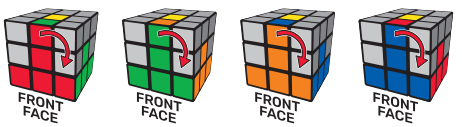
If you're moving the edge piece to the left, follow these moves:

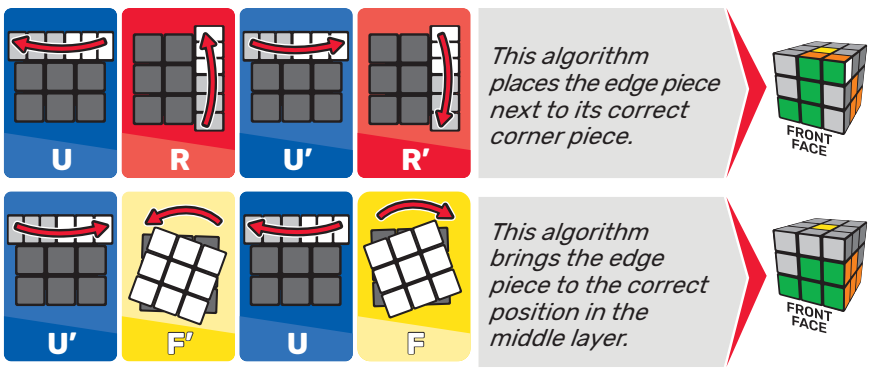




OR Action 2 Moving Right

If you're moving the edge piece to the right, follow these moves:





Action 3

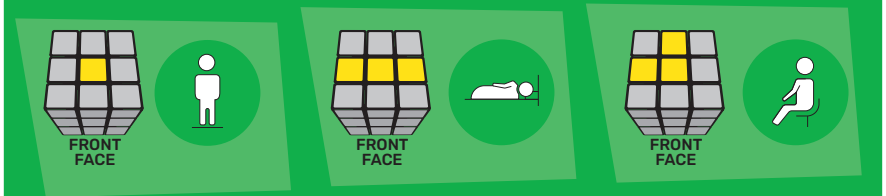
Continue **Actions 1-2** until all **MIDDLE** layer pieces are in the correct positions.

When the two bottom layers of your Rubik's Cube look like this picture, you can move to solving the third layer. You are two-thirds of the way done!

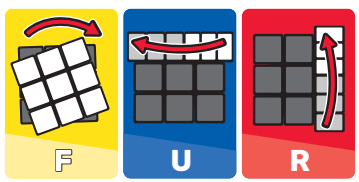
STEP 1: MAKE A YELLOW CROSS

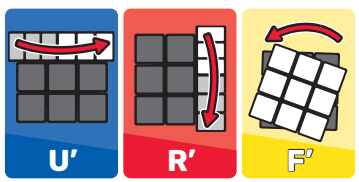
HOLDING YOUR RUBIK'S CUBE

Match your Rubik's Cube to one of the pictures below. Focus on the YELLOW edges on the UP (U) face only (not corners).



Action 1 Follow this algorithm.





Remember this algorithm as **FUR** says **U'R'F'**.

Notice the first three moves go clockwise and the next three moves go counter-clockwise.

Action 2 If the **YELLOW** Cross is not formed yet, REMATCH your Rubik's Cube to one of the pictures in the 'Holding your Rubik's Cube' section above and follow the algorithm again.

When your Rubik's Cube looks like this picture, move on to the next step!

STEP 2: ORIENT THE CORNERS

HOLDING YOUR RUBIK'S CUBE

Hold your Rubik's Cube so the UP (U) face matches one of the images in the table below.

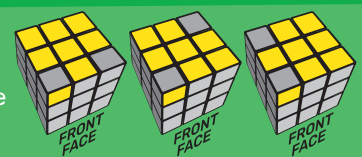
If **one** corner piece is **YELLOW**

This saying may help:
'Feed the fish'
Hold your Rubik's Cube so the fish can eat out of your **LEFT** hand.

If **no** corner pieces are **YELLOW**

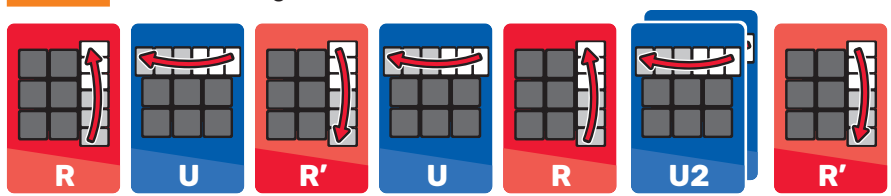
This saying may help:
'None - left'
Hold your Rubik's Cube with a **YELLOW** tile on the **LEFT (L)** face.

If **two** corner pieces are **YELLOW**



This saying may help:
'I see two, my left thumb's on you'
Hold your Rubik's cube so that you can put your left thumb on the tile on the **FRONT (F)** face.

Action 1 Follow this algorithm.



Notice the RIGHT (R) face turns in opposite directions every other time and the UP (U) face always turns clockwise.

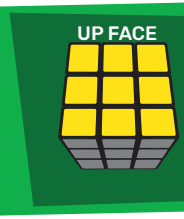
Action 2 If you do not have all yellow tiles on the **UP (U)** face you will need to **REMATCH** and follow the algorithm. (You may need to do this multiple times.)

When your Rubik's Cube has all the YELLOW on the UP (U) face, like this picture, move to Step 3!

STEP 3: POSITION THE YELLOW CORNERS

HOLDING YOUR RUBIK'S CUBE

Hold your Rubik's Cube with the **YELLOW** on the **UP (U)** face.



Action 1

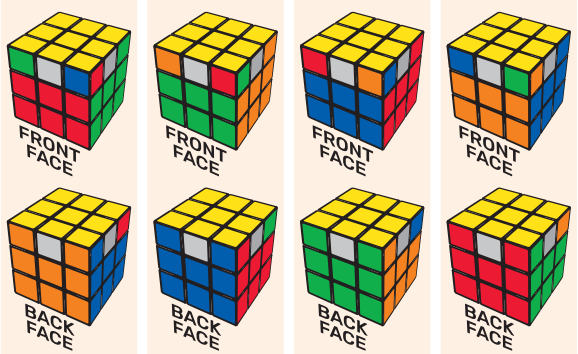
Twist the **UP (U)** face until two corners are in the correct location. You will know they are in the correct location if the colored tiles match the center colors.

CORRECT CORNER EXAMPLE

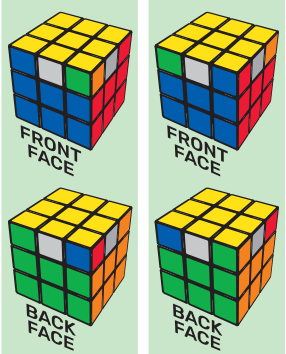
Action 2

Hold your Rubik's Cube so it matches one of the images here.

Adjacent Corners (on the same face)



Diagonal Corners

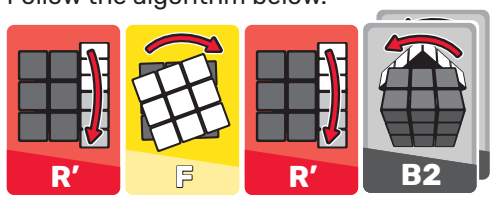


THINK OF CORRECTLY PLACED CORNERS AS TAIL LIGHTS.

Tail lights are in the back of a car. Hold your Rubik's Cube so the tail lights are on the **BACK** face before you start the algorithm.

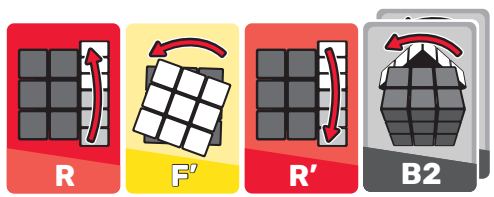
Action 3

Follow the algorithm below.



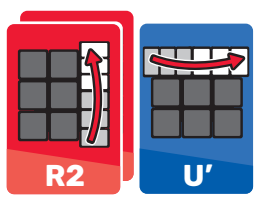
R'un to me **F**ast **R'**un to me **B**ack **B**ack

After this part of the algorithm, the top of your Rubik's Cube will look like this:



Run away **F'**ast **R'**un to me **B**ack **B**ack

After this part of the algorithm, the top of your Rubik's Cube will look like this:



Run **R**un away **U'**p

CHANT

The words underneath the turns are a chant to help you remember the algorithm.

Action 4

If your corners are not correct at this point, rematch your Rubik's Cube to one of the images in Action 2 and repeat the algorithm.

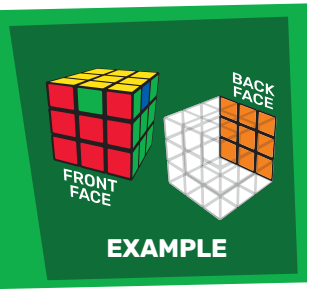
When your Rubik's Cube looks like this picture, move on to the final step!

STEP 4: POSITION THE YELLOW EDGES

HOLDING YOUR RUBIK'S CUBE

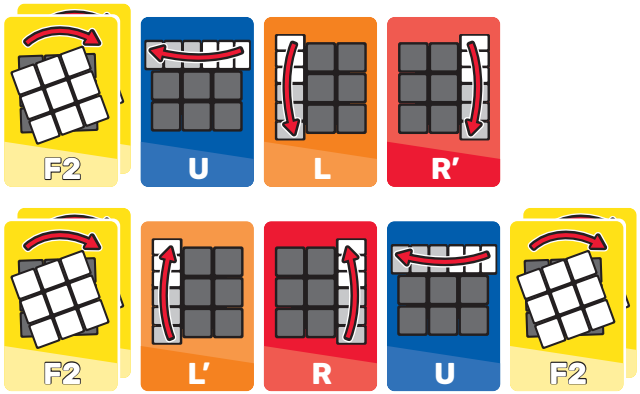
Hold your Rubik's Cube so the one face that is a solid color is the **BACK**, and the Yellow face is the **UP (U)** face.

If no face is a solid color, it doesn't matter which face is in the back.



Action 1

Follow this algorithm up to 3 times to move the unsolved edges **CLOCKWISE / TO THE LEFT**.



If you restart the algorithm, make sure a solved face starts as the **BACK** face of the Rubik's Cube.

BEFORE STARTING THE ALGORITHM, look at the unsolved edge on the FRONT face. Is it the same color as the center tile of the:

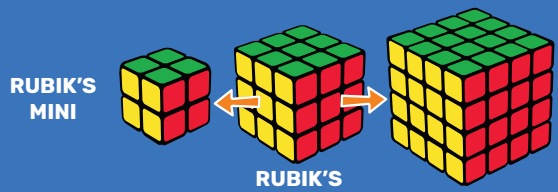
- **LEFT** face? Follow the algorithm above.
- **RIGHT** face? Change the two **U** turns to **U'**.

CONGRATULATIONS!

You have solved the Rubik's Cube!

You CAN do the Rubik's CUBE

TRY A DIFFERENT CHALLENGE



Available at: **RUBIKS.COM**

V1-2020

More resources available on YouCanDoTheCube.com

Videos for each stage / solution checklist / songs and chants / teacher guides

www.youcandothecube.com/educators/teach-to-solve/

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