Rubik's Revenge
Solution Hints Booklet

Revenge - The Ultimate Challenge

RUBIK'S Revenge is the big brother of the best selling, original RUBIK'S Cube. Some of the moves that you might know that work on the original Cube also work on Rubik's Revenge - but be warned: the similarity stops there.

Rubik's Revenge presents a completely new challenge. You must mix up the puzzle with a few twists and turns and then try to match up the pieces until each face is a single colour. However, you are advised to read the first few sections of this booklet first.

Try to solve the puzzle logically, but be careful. Be very, very careful. Your success will depend on how well you grapple with the totally unexpected problems you will meet.

With millions more combinations than the original, Cube plus its own special devilry, you should be wary of Rubik's Revenge - the Ultimate Challenge.

Meet Your Revenge

RUBIK'S Revenge has 6 faces. Each face will be a single solid colour when the puzzle is solved.

The puzzle has 12 different layers and each can be turned independently of the others.
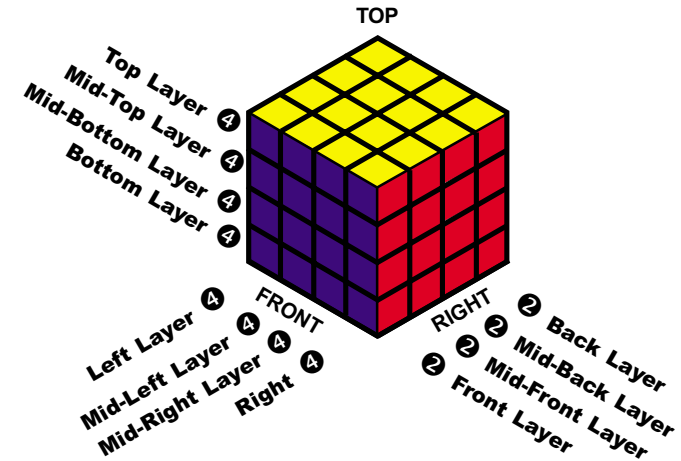
Meet Your Revenge

Revenge is made of 56 smaller cube pieces. 24 have a single colour - these are Face Pieces, 24 have two colours - these are Edge Pieces; and 8 have three colours - these are Corner Pieces.
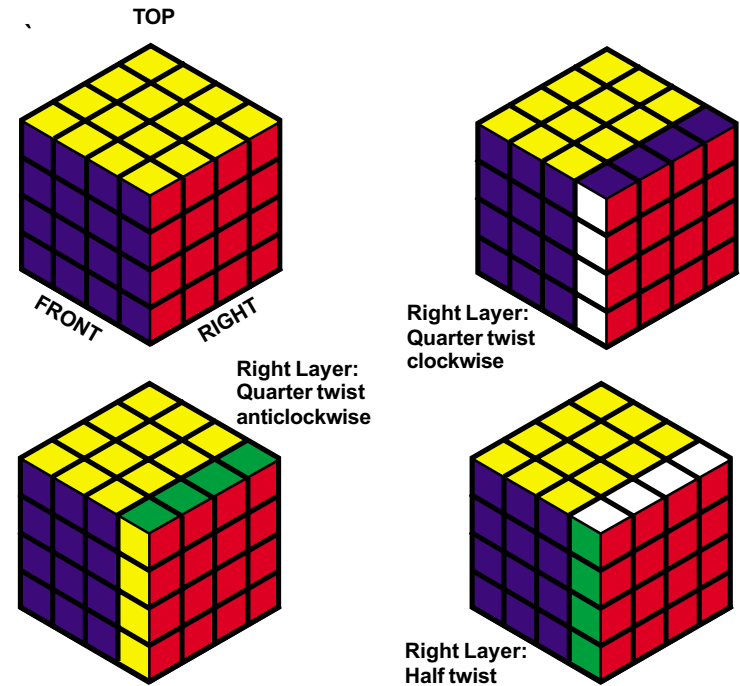
Corner Piece
Face Piece
Edge Piece
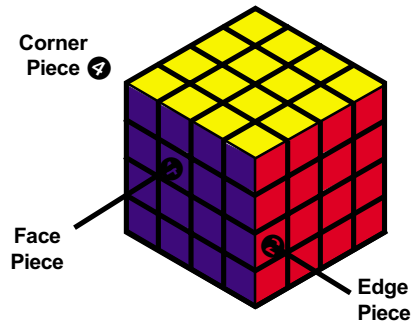
When the puzzle is solved, the Yellow face is always opposite the White face; Blue is opposite Green, and Red is opposite Orange.

Also, when the Yellow face is on top, Blue is at the front when Red is on the right, as in the diagram above.
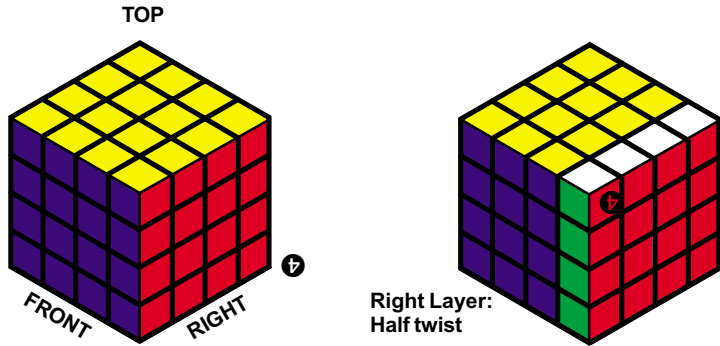
Twisting Hints

There are two kinds of twist that can be given to any layer: a quarter twist and a half twist.

A quarter twist rotates one layer of the puzzle 90º clockwise or anticlockwise. A half twist rotates one layer 180º. (Twisting a layer through three quarters is the same as twisting it one in the opposite direction.)

TOP

FRONT   RIGHT

Right Layer: Quarter twist anticlockwise

Right Layer: Quarter twist clockwise

Right Layer: Half twist

Twisting Hints

Think of the orientation. For example, moving the back right corner piece with a half twist will put it diagonally opposite and upside down.

TOP


FRONT   RIGHT

Right Layer: Half twist

If the same piece were instead moved by two quarter twists of two different layers, it would end in the same position but in a different orientation.

Bottom Layer: Quarter twist anticlockwise

Front Layer: Quarter twist anticlockwise
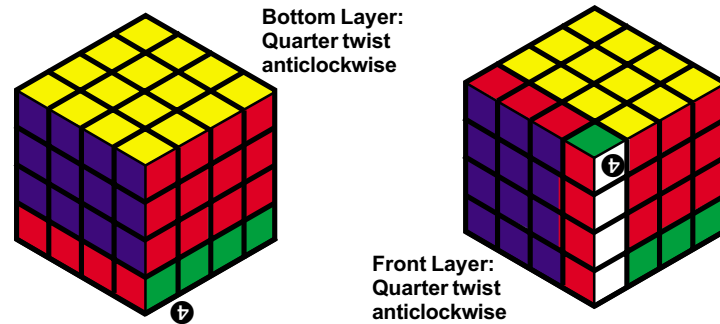
Twisting Hints

Whenever you move a piece, performing the moves you made backwards will return the puzzle to its original position.

As an exercise in twisting, try this: from the solved position, twist two adjacent layers at a time (as though the cube were 2x2), and try to get each face with four 2x2 blocks of four different colours as shown here.
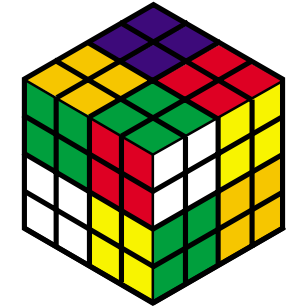
Now try to put the puzzle back into the solved position. This is the same as trying to solve the Mini-Cube or just the corners of the Revenge.

Don't worry if your Revenge gets muddled up, there are some General Hints in the next section.

General Hints

If you haven't jumbled your Revenge up, now is the time to start.

Then, try to solve the puzzle logically.

Unlike Rubik's Cube, the face pieces do not determine which face is which colour. In fact, there are four face pieces of each colour. It is best to start from a corner piece.

Turn the puzzle so that your chosen corner is on the top layer. In the example here, the Red/Yellow/Blue piece has been used. This piece shows what colour the faces must be. Remember, Blue is opposite Green; Red is opposite Orange; and Yellow is opposite White.

TOP

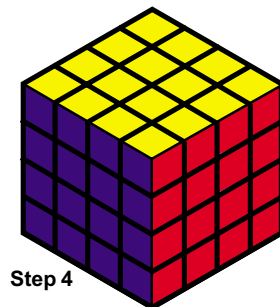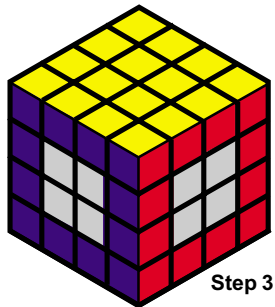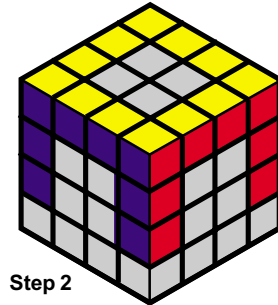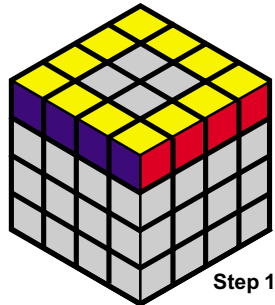**FRONT**   **RIGHT**
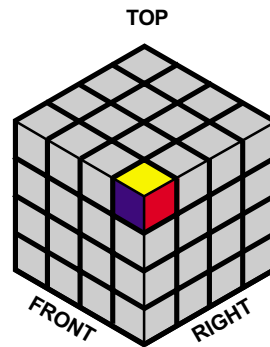
General Hints

Now that you can see which pieces must go where, try to build up on your chosen corner piece. You can do this in several ways. For example:

Layer by Layer:

Step 1

Step 2

Step 3

Step 4
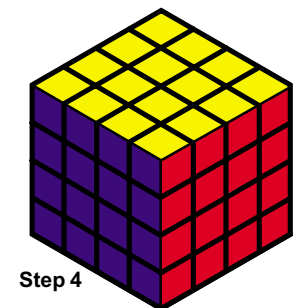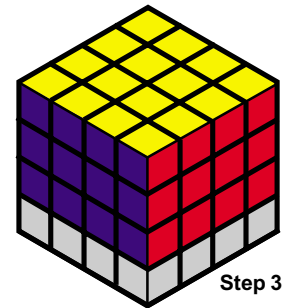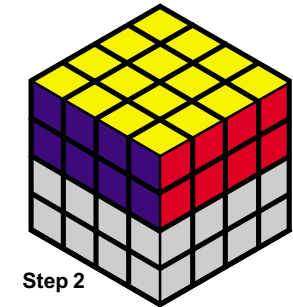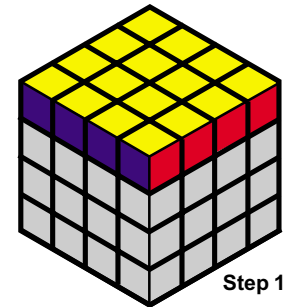
General Hints

Edges; Corners, and Faces:

Step 1

Step 2

Step 3

Step 4

Some methods will prove more difficult than others, so try different ways. (There is one that avoids the problems the others may encounter.) Whichever approach you use, you will need different sequences: some which just affect face pieces; some that just affect edge pieces; and some that just affect corner pieces.
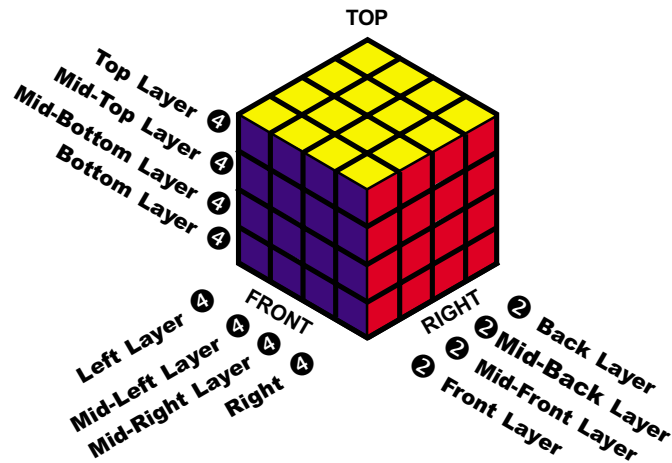
General Hints

Experiment with different sequences of twists to find out what they do. Try to find some that move pieces you have already positioned to one side and then put them back in place. You will often find that other pieces yet to be placed have either moved about or been reorientated. You should make a note of any effects that look useful so that you can repeat them to achieve a desired result.

However, to do this you must use a system to record your moves and the effects. Also, you will need to put numbered or lettered stickers onto your puzzle to differentiate between identical pieces. (For example, Blue face pieces could be numbered 1 to 4 and Blue/Red edge pieces tagged A and B. This makes it easier to see what has moved where.

A system for recording your sequences is given in the next section.

Notation System

The layers of Rubik's Revenge are as labelled here.

TOP

Top Layer ❹
Mid-Top Layer ❹
Mid-Bottom Layer ❹
Bottom Layer ❹

FRONT

Left Layer ❹
Mid-Left Layer ❹
Mid-Right Layer ❹
Right ❹

RIGHT

❷ Back Layer
❷ Mid-Back Layer
❷ Mid-Front Layer
❷ Front Layer

The front face is the one that is facing you when you start the sequence. Keep that face towards you throughout the sequence.

Notation System

Remember to look for sequences that do not disturb pieces already positioned: those pieces should end up where they started. Only record sequences that do this.

Movement of a layer is recorded by the layer's name and an arrow. The arrow gives the direction that the *front* or *top* edge of that layer is moved one quarter turn. Thus, for example:

Notation	Indicates:
Front❷	Front layer one quarter twist to left.
Back❹	Back layer one quarter twist to right.
Top❷	Top layer one quarter twist to left.
Bottom❷	Bottom layer one quarter twist to left.
Left❺	Left layer one quarter twist down.
Right❸	Right layer one quarter twist up.
Mid-Left❺	Mid-Left layer one quarter twist down.
Mid-Back❷	Mid-Back layer a quarter twist to left.

Notation System

Remember, the direction relates to the visible edge of that layer at the *top* or *front*.

With a half-twist, direction is irrelevant, so this is shown by replacing the arrow with a 2. So, **Front2** means that the front layer is rotated a half-twist.

You may want to twist two layers together. This should be recorded as, say:

Bottom+Mid-Bottom❷

You may find it tricky to twist a middle layer. In practice, it's easier to twist it with the adjacent face layer and then turn the face layer back.

There is a reason for the way the puzzle is viewed. This enables you to see how the pieces already positioned are moved out of the way and where they go to. If you can see this clearly, you will find it much easier to remember the sequence.
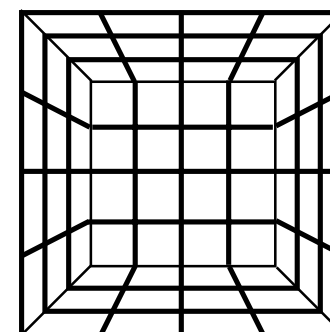
Notation System

To note the start and finish positions, so that you can see what has happened after a sequence of moves, copy and use the diagrams below.

This is the one used in this booklet. It represents the view of the bottom layer (and a false perspective of the sides) you would have if you tilt the puzzle away from you.
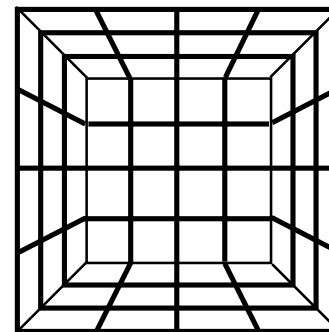
Start Position　　　　　　　　　　　**End Position**

SEQUENCE:

Notation System

Just record the effect that is relevant. For example, suppose you find a sequence that moves one edge piece from the bottom layer to the mid-top layer while leaving the pieces in the top layer and the other edge pieces in the mid-top layer unchanged. This is the only important effect. You do not need to note what happens to the other pieces on the bottom and mid-bottom layers. All you need to know is the start position of the piece that ended in the mid-top layer.

For example, your start and end position should simply be noted as here (along with your sequence of moves).

Start Position   **End Position**
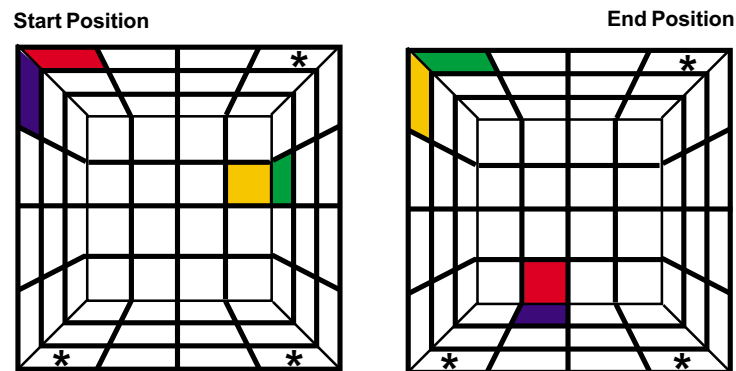
(Asterisked pieces remain unmoved.)

Notation System

For each sequence that you find, there will also be a Reverse, a Mirror, and a Reverse Mirror.

Suppose you have found a sequence that reads:

Mid-Left❺; Bottom❷; Mid-Left❸; Bottom2; Mid-Left❺; Bottom❷; Mid-Left❸.

The Reverse is the sequence in reverse order with the direction of arrows also reversed, as here:

Mid-Left❺; Bottom❹; MId-Left❸; Bottom2; Mid-Left❺; Bottom❹; Mid-Left❸.

The start position of the Reverse is the end position of the original sequence, and the Reverse ends with the start position of the original. So, if you perform a sequence and then wish to put the puzzle back as it was, simply do the Reverse of the one you did to restore the original position.

Notation System

A MIrror sequence is a left-right reflection of the original. This swaps left and right without changing the arrows and reverses all other arrows The Mirror of the previous sequence would be:

Mid-Right❺; Bottom❹; Mid-Right❸; Bottom2;
Mid-Right❺; Bottom❹; Mid-Right❸.

Start and end positions are reflections of those for the original sequence. For example, the diagrams here are the reflections of those on page 16.

Start Position   **End Position**
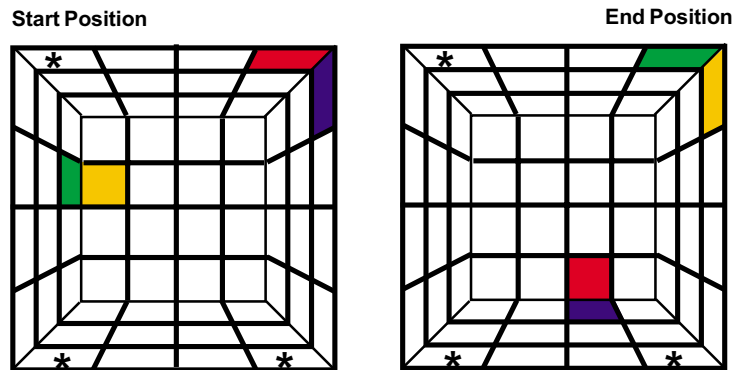
Whenever you find a useful sequence, make sure you also record these other versions. If you have trouble finding your own sequences, some useful ones are given in the next section.

Revenge Sequences

This section contains some general sequences to cover many situations. (There are other more specific sequences for you to find.) The system of notation is as described in the previous section.

The start and end positions show the **bottom** face. (That is, the view you would have if you tilt the puzzle away from you.) Start and end positions for the Reverse and Mirror versions have been omitted for reasons of space.

Always hold the puzzle so that the piece you wish to move is in the appropriate start position.

Asterisked pieces remain unmoved as do all the other pieces of the puzzle.

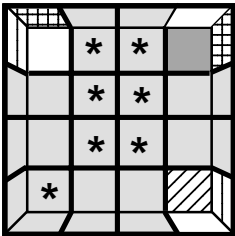The relevant pieces to be moved are hatched to avoid confusion with the colours you might be placing.

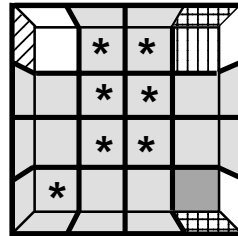## Revenge Sequences

Three-Corner Shuttle
This shuttles a triangle of corner pieces one place clockwise around the bottom layer.

Left❺; Bottom❹; Left❸; Front❷; Bottom❹;
Front❹; Left❺; Bottom❷; Left❸; Bottom❷.

Start Position　　　　　　**End Position**

Reverse
Bottom❹; Left❺; Bottom❹; Left❸; Front❷;
Bottom❷; Front❹; Left❺; Bottom❷; Left❸.

Mirror
Right❺; Bottom❷; Right❸; Front❹; Bottom❷;
Front❷; Right❺; Bottom❹; Right❸; Bottom❹.

Reverse Mirror
Bottom❷; Right❺; Bottom❷; Right❸; Front❹;
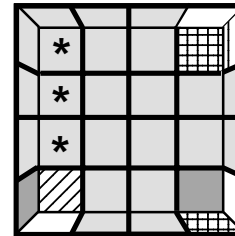Bottom❹; Front❷; Right❺; Bottom❹; Right❸.
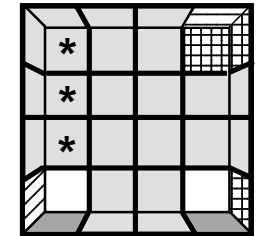
Revenge Sequences

Three-Corner Flipper
This flips three corner pieces on the bottom layer without changing their position.

Right❺; Bottom❷; Right❸; Bottom❷; Right❺;
Bottom2; Right❸; Bottom2.

Start Position　　　　　　**End Position**

Reverse
Bottom2; Right❺; Bottom2; Right❸; Bottom❹;
Right❺; Bottom❹; Right❸.

Mirror
Left❺; Bottom❹; Left❸; Bottom❹; Left❺;
Bottom2; Left❸; Bottom2.
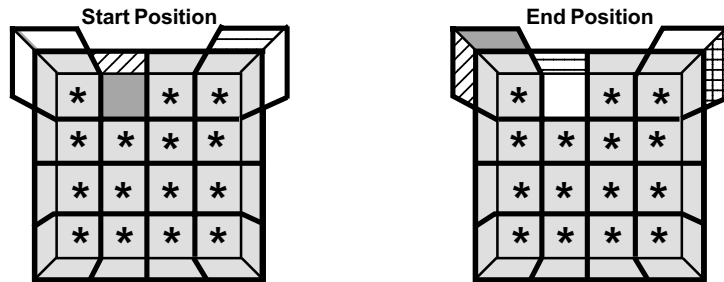
Reverse MIrror
Bottom2; Left❺; Bottom2; Left❸; Bottom❷;
Left❺; Bottom❷; Left❸.

Revenge Sequences

Low-Edge Shuttle
By shuttling a triangle of edge pieces clockwise around the front layer, this moves an edge piece from the mid-bottom layer into the bottom layer.

> Left❺; Bottom❷; Left❸; Mid-Bottom❷;
> Left❺; Bottom❹; Left❸; Mid-Bottom❹.

Start Position — **End Position**

Reverse
> Mid-Bottom❷; Left❺; Bottom❷; Left❸;
> Mid-Bottom❹; Left❺; Bottom❹; Left❸.

Mirror
> Right❺; Bottom❹; Right❸; Mid-Bottom❹;
> Right❺; Bottom❷; Right❸; Mid-Bottom❷.
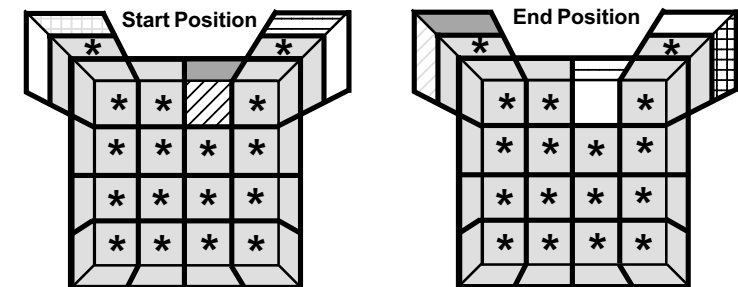
Reverse Mirror
> Mid-Bottom❹; Right❺; Bottom❹; Right❸;
> Mid-Bottom❷; Right❺; Bottom❷; Right❸.

Revenge Sequences

High-Edge Shuttle
By shuttling a triangle of edge pieces clockwise around the front layer, this moves an edge piece from the mid-top layer into the bottom layer,

> Left❺; Bottom❷; Left❸; Mid-Top❷;
> Left❺; Bottom❹; Left❸; Mid-Top❹.

Start Position — **End Position**

Reverse
> Mid-Top❷; Left❺; Bottom❷; Left❸;
> Mid-Top❹; Left❺; Bottom❹; Left❸.

Mirror
> Right❺; Bottom❹; Right❸; Mid-Top❹;
> Right❺; Bottom❷; Right❸; Mid-Top❷.
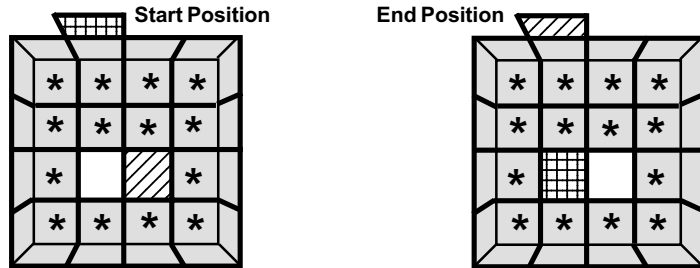
Reverse Mirror
> Mid-Top❹; Right❺; Bottom❹; Right❸;
> Mid-Top❷; Right❺; Bottom❷; Right❸.

Revenge Sequences

Face-Lifter
This shuttles three face pieces.

Mid-Left+Mid-Right❺; Bottom❷; Mid-Right❸;
Bottom❹; Mid-Left❸; Bottom❷; Mid-Right❺;
Bottom❹; MId-Right❸.

Start Position   **End Position**

Reverse
Mid-Right❺; Bottom❷; Mid-Right❸; Bottom❹;
Mid-Left❺; Bottom❷; Mid-Right❺; Bottom❹;
Mid-Left+MId-Right❸.

Mirror
Mid-Left+Mid-Right❺; Bottom❹; Mid-Left❸;
Bottom❷; Mid-Right❸; Bottom❹; Mid-Left❺;
Bottom❷; MId-Left❸.
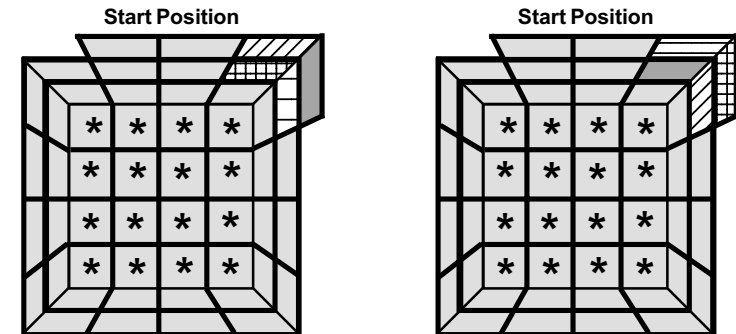
Reverse Mirror
Mid-Left❺; Bottom❹; Mid-Left❸; Bottom❷;
Mid-Right❺; Bottom❹; Mid-Left❺; Bottom❷;
Mid-Left+MId-Right❸.

Revenge Sequences

Mid-Swapper
This swaps two adjacent edge pieces in the front middle layers.

Front2; Mid-Bottom❷; Front2; Mid-Bottom2;
Front2; Mid-Bottom❹; Front2.

Start Position   **Start Position**

Mirror
Front2; Mid-Bottom❹; Front2; Mid-Bottom2;
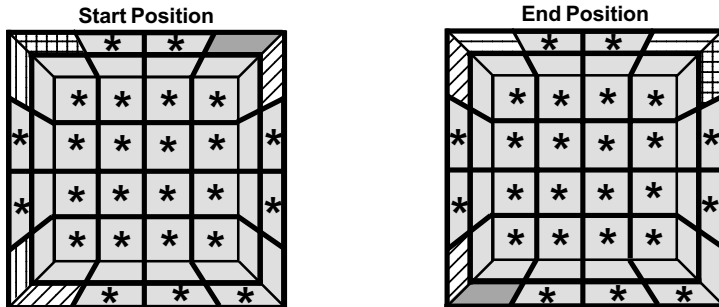Front2; Mid-Bottom❷; Front2.

In both cases the reverse is the same as the sequence.

Revenge Sequences

Mid-Shuttle
This shuttles a triangle of edge pieces clockwise around the mid-bottom layer.

Back❷; Bottom2;
Left❺; Bottom❷; Left❸; Mid-Bottom❷;
Left❺; Bottom❹; Left❸; Mid-Bottom❹;
Bottom2; Back❹.

Start Position   **End Position**

Reverse
Back❷; Bottom2;
Mid-Bottom❷; Left❺; Bottom❷; Left❸;
Mid-Bottom❹; Left❺; Bottom❹; Left❸;
Bottom2; Back❹.

Revenge Sequences

Mirror
Back❹; Bottom2;
Right❺; Bottom❹; Right❸; Mid-Bottom❹;
Right❺; Bottom❷; Right❸; Mid-Bottom❷;
Bottom2; Back❷.

Reverse Mirror
Back❹; Bottom2;
Mid-Bottom❹; Right❺; Bottom❹; Right❸;
Mid-Bottom❷; Right❺; Bottom❷; Right❸;
Bottom2; Back❷.

With this sequence (as with any that shuttles three pieces), performing it twice has the same effect as doing the Reverse once.

You should try and solve the puzzle for yourself using the sequences provided. They are all you need - plus a little imagination. If you are still having trouble, a full solution guide is given in the next section.

Solving RUBIK'S Revenge

Once you start twisting, it's easy to get Rubik's Revenge completely muddled. Don't worry - it can always be put right from any state. The following steps will help you solve the puzzle.

1. Select any corner piece as your starting corner. Turn the puzzle so that this piece is in the top face. It is automatically in the correct position. (In our example, Yellow is the top face and Blue is the front.)

TOP

FRONT **RIGHT**

2. Find a second piece that's a side-by-side match and twist it into place.
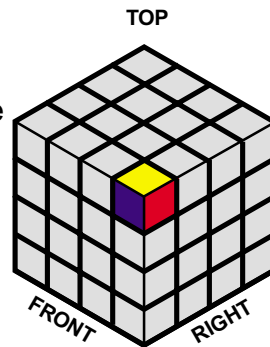
> **NB** - Of two identically coloured edge pieces, only one can be placed in a particular position with the colours correctly orientated.

Solving Rubik's Revenge

3. Position all edge and corner pieces of the top face. If you have trouble, use the sequences. (The Three-Corner, High-Edge, and Low-Edge Shuttles can all be used if you turn the puzzle so that your top face becomes the relevant face in the sequence diagrams.)

TOP

FRONT **RIGHT**

4. Position the face pieces of the top layer by using the Face-Lifter.
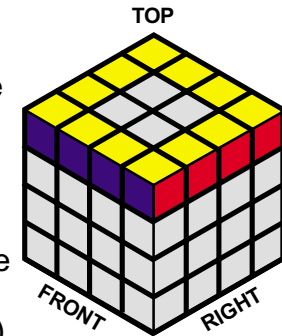
> **NB** - When using the Face-Lifter, you may first need to twist faces to align the pieces to be moved. Note these so you can reverse them afterwards.

TOP

FRONT **RIGHT**
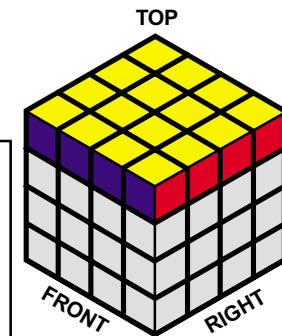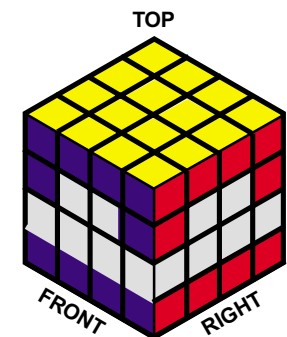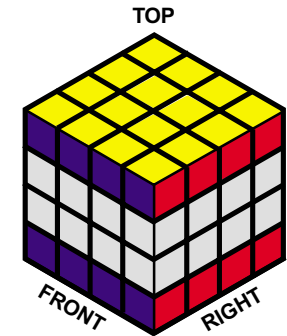
Solving Rubik's Revenge

5. Next, and most importantly, complete the bottom face.

6. Start by using the Three-Corner Shuttle to correctly position the corner pieces. If two seem to be correctly placed, turn the layer so one of the other two is correctly placed. The Three-Corner Shuttle will then position the other three. If the two that need to be swapped are diagonally opposite, you will need to use the Three-Corner Shuttle twice.
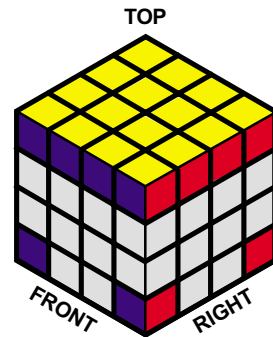
7. Once the corner pieces are in the right positions, use the Three-Corner Flipper to orientate them correctly.

Solving Rubik's Revenge

8. Use the Low-Edge and/or High-Edge Shuttles to drop the edge pieces into their correct positions on the bottom face. If a piece you want is already in the bottom face, use one of the shuttles to remove it.

9. Complete the bottom face by using the Face-Lifter.

10. Use the Mid-Swapper to correctly position the edge pieces of the mid-top layer. If a piece you want is already in that layer, use the swapper to remove it.)
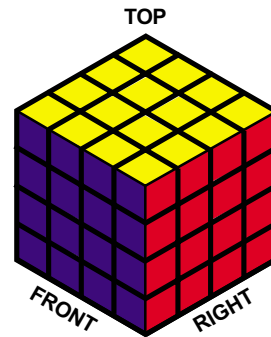
Solving Rubik's Revenge

11. Turn the mid-bottom layer so that only one edge piece is correctly positioned. Then use the Mid-Shuttle to correclty position the other three. If two diagonally opposite edge pieces need to be swapped, you will need to use the shuttle twice.
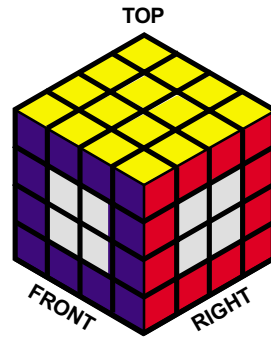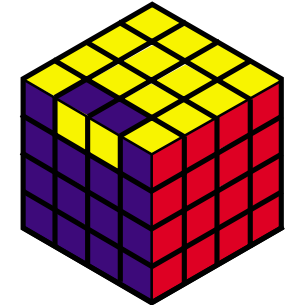
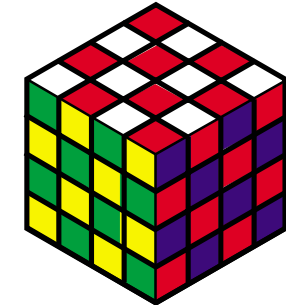12. Finally, complete the centre faces by using the Face Lifter.

More Revenge

Once you've mastered the puzzle, there is more fun to be had.

Try solving the puzzle layer by layer from the top down. There's a fifty-fifty chance you'll either solve it or reach the position shown here. From this position, see if you can find the shortest sequence that will solve the puzzle.

Other patterns can be made. For example, is it possible to make all the faces a checkerboard pattern?

Rubik's Revenge isn't over yet.