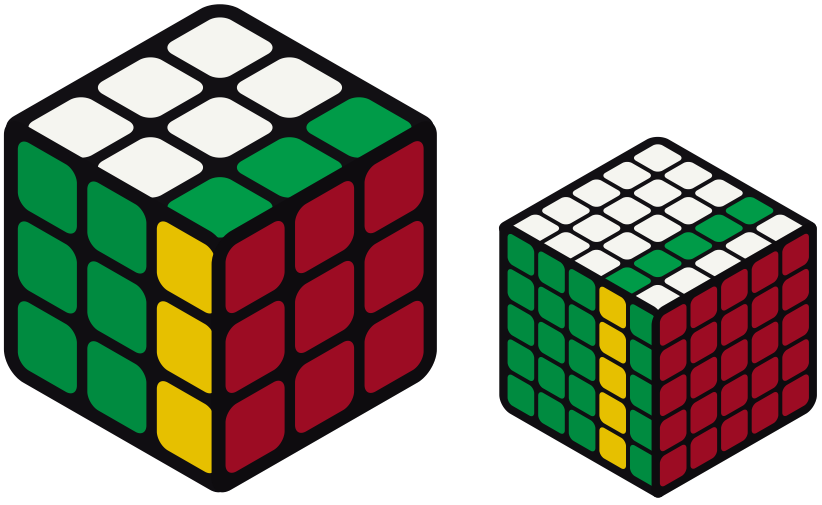
Cube Lab

PRINTABLE GUIDE

Notation cheat sheet

How to read cube moves — 3×3 and big cubes.



1. Six faces
2. Prime and 2
3. Wide moves, slices, rotations
4. Big-cube notation
5. Grouping

Made by Cube Lab — free, in your browser: rosestuffs.org/experiments/rubiks/ · Learn interactively at rosestuffs.org/experiments/rubiks/learn/

THE BASICS

Six faces

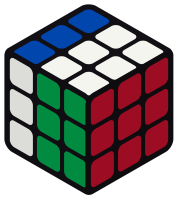
Each letter is a face. On its own it means a quarter turn **clockwise, as if you were looking straight at that face**. Pictures show a solved cube (white on top, green in front) after the move.

R



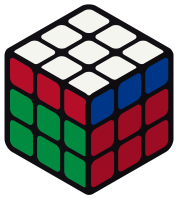
right face, clockwise

L



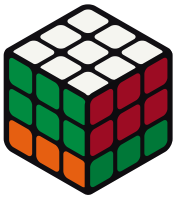
left face, clockwise

U



top face, clockwise

D



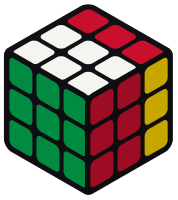
bottom face, clockwise

F



front face, clockwise

B

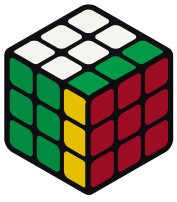


back face, clockwise

Prime and 2

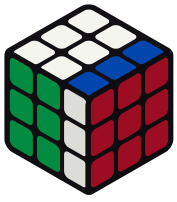
`R'` (“R prime”) is anticlockwise. `R2` is a half turn — direction doesn't matter.

R



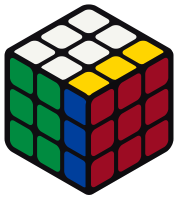
right face, clockwise

R'



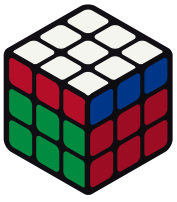
right face, anticlockwise

R2



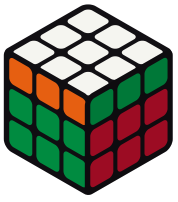
right face, half turn

U



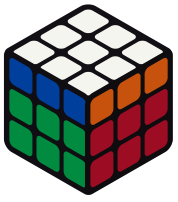
top face, clockwise

U'



top face, anticlockwise

U2



top face, half turn

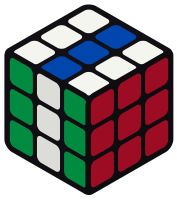
Wide moves, slices and rotations

r



right two layers, clockwise

M



middle layer, like L, clockwise

E



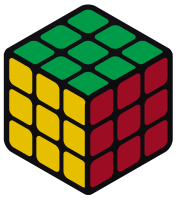
equator layer, like D, clockwise

S



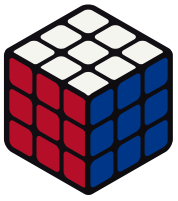
standing layer, like F, clockwise

x



whole cube, like R, clockwise

y



whole cube, like U, clockwise

r or **Rw**: the right face and the layer next to it, together.

M (middle) turns like `L`; **E** (equator) like `D`; **S** (standing) like `F`.

x, **y**, **z** turn the whole cube in your hands, like `R`, `U` and `F`.

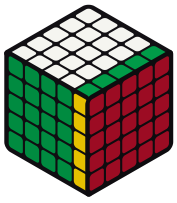
Moves are read left to right. Keep the cube still: the front stays the front.

BIG CUBES

Notation for 4×4 and up

On a big cube a number in front says which layers turn, counted from the face. Pictures: a solved 5×5 after the move.

R



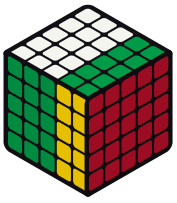
outer right layer

2R



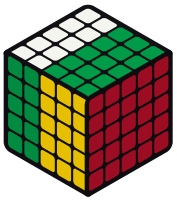
second layer only

Rw



outer two layers

3Rw



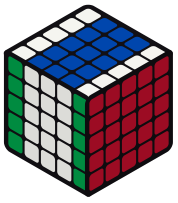
outer three layers

2-3Rw



layers 2 to 3

M



every inner layer (like L)

WRITE	MEANS	EXAMPLE ON A 5X5
`R`	the outer layer only	1 layer
`2R`	only the second layer from the right	layer 2
`Rw` `r`	the outer two layers (on a 3×3, `r` is the same)	layers 1–2
`3Rw` `3r`	the outer three layers	layers 1–3
`2-3Rw`	a block of inner layers, without the outer one	layers 2–3
`M` `E` `S`	every inner layer between two faces	layers 2–4

Grouping

`(R U R' U')3`	Do the moves in brackets three times. Also written `(R U R' U') ×3`.
`(R U)'`	The whole group backwards: `U' R'`.
`[R, U]`	A commutator: `R U R' U'`.
`[F: R U R' U']`	A conjugate: `F`, then the moves, then `F'`.

Practise reading moves with the notation trainer: rosestuffs.org/experiments/rubiks/notation/