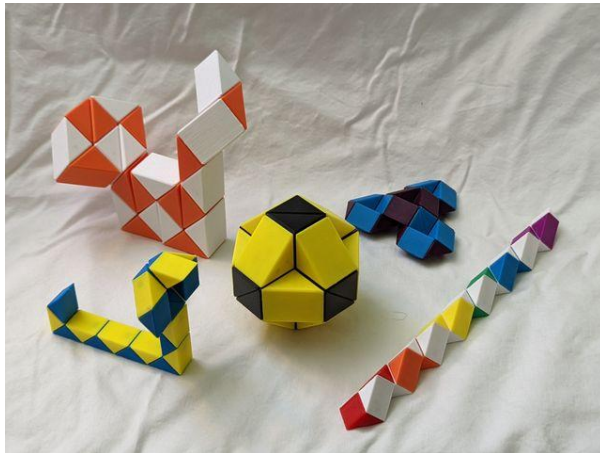




Snake puzzle toy (100% 3D printed)



animatorgeek

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Summary

A snake toy as invented by Erno Rubik, 3d printable in two sizes. Easy minimal assembly and no extra hardware needed.



16.81 hrs



12 pcs



0.20 mm



0.40 mm



PLA
PET
ASA



96 g



Prusa
MK3/S/S+

[Toys & Games](#) > [Puzzles & Brain-teasers](#)

Tags: [toy](#) [snake](#) [fidget](#) [fidgettoy](#) [articulated](#) [rubiks](#)
[satisfying](#) [rubikssnake](#)

Edit July 2nd 2022: uploaded new version without unneeded hole supports

I found several other snake toy models online but none of them lived up to my hopes and dreams. I wanted one that didn't require extra hardware and had a satisfying snap when the joints were turned. So I designed this one to be better than all the others. It took a lot of prototyping and iteration, but I developed a really good mechanism that has a very

satisfying feel when turning the pieces and holds together with just the right springiness.

A fun toy for both kids and adults. The traditional length is 24 segments, but in shorter lengths it makes a great distraction/fidget toy.

I've designed two sizes: 15mm (0.6 inch) and 25mm (1 inch) so you can print the size that most appeals to you or to the toy lover in your life.

Printing

If this is too much info and you just want to get to the printing:

Download the two gcode files that correspond to the size (large or small) and material you want to make your snake out of. You should get one file for color 1 and another for color 2.

If you want to get into the details:

There are three versions:

- 25mm firm: larger segments designed to be printed in PETG
- 25mm soft: larger segments designed to be printed in ASA, ABS (untested), and PLA
- 15mm: smaller segments printable in any of the above materials.

Here's a rundown of the pros and cons of the different materials I tested in the development process:

- **ASA (and probably ABS):** I recommend ASA as the best material for this toy, and I suspect ABS will have similar properties if that's what you've got. I don't have any ABS to test myself, but I know it's supposed to have similar physical properties to ASA. ASA has a good amount of spring for the joint tabs, and it's not too brittle. It slides against itself very nicely, meaning no lubrication is needed.
- **PETG:** A close second in terms of functionality, and number one in ease of printing and assembly. It's not as strong as the other two, hence why I've made a stronger version of the large snake. Its real advantage is in its flexibility. There's little chance of the joint tabs snapping if you print with PETG.
PETG will probably creak like crazy when you turn the joints. The material just doesn't slide smoothly against itself. Unless you really don't care about the noise, some lubrication is needed. (Wax works well – see below.)
- **PLA:** While you can printing PLA, I recommend one of the other materials if you have it available. PLA is the stiffest of the three, but also the most brittle. The small version of the snake can be printed in

PLA if you're careful but you should probably expect to print a few replacement pieces for when the joint tabs break on assembly. The 25mm-soft version is the best one of the three to print in PLA since the tabs are longer and more able to flex without breaking.

PLA deflects under long-term stress, so you should expect snake segments made with it to lose some tightness over the first few days. I've made the tabs strong enough to compensate, so PLA segments might seem a little too stiff when first assembled. They should be better after a day or two. They will be unable to maintain tension, though, so there will unavoidably be a tiny bit of wiggle in their indexed state. If a piece is left out of index (that is, rotated to a diagonal position relative to the adjacent piece) it could deflect even more and result in a permanently loose joint. For this reason, I recommend one of the other materials over PLA.

Similar to PETG, PLA makes a lot of noise when turning the joints unless you lubricate the tabs before assembly.

- **Other materials:** I tested all the filament types I had available, listed above. I would be interested to hear your results if you try printing it in other materials. I recommend just printing two segments at first and printing the full toy only when you've verified that the joint works well in the new plastic.

The three slicer (3mf) projects all have the same structure. There are two groups of twelve snake segments – one group for each color in a two-color snake. Most of the segments are identical, with both a male (tabs) and female (hole) face. One group has a piece that has only a male joint and the other group has a piece with only a female joint. Those are the end pieces of the snake. I've also included two more groups, each with one end piece and one middle piece. These can be useful if you want to perform a test before printing the whole thing, or if you want to make a rainbow snake like the one in my pictures.

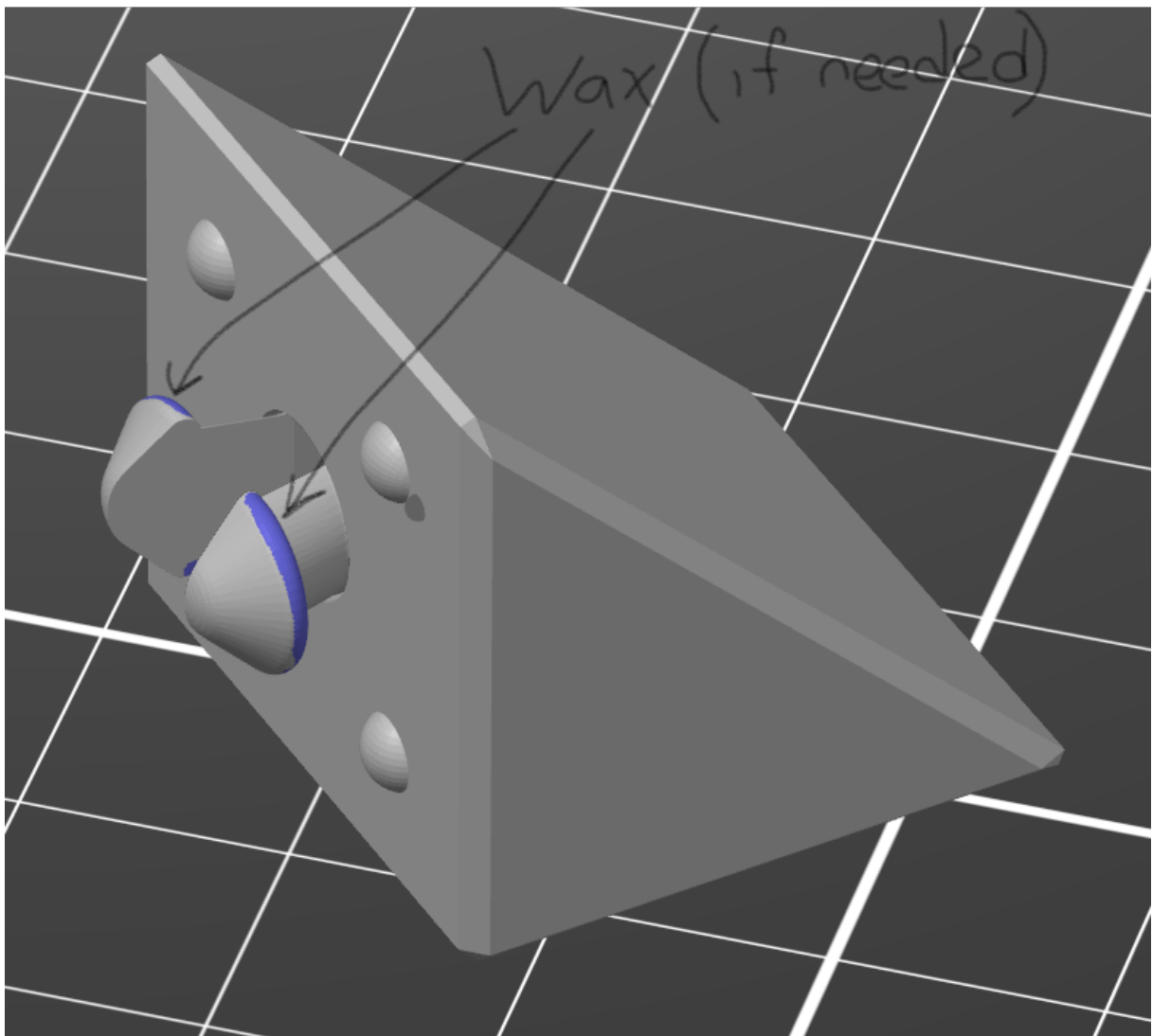
Each segment with tabs also includes a support piece. You don't need to turn on supports when printing this model because the included support piece provides all the support needed. Make sure as you move the pieces around the virtual build plate that you keep each segment together with its support.

For a standard two-color snake, slice each large group separately so you can print them in their own color. If you want to make a single-color snake you can arrange both groups of twelve on your build plate and print them all at once.

Assembly

Remove all the support pieces. With a properly tuned print profile they should come away without much effort. Check the tabs to make sure there aren't any extra bits of support stuck to them. Flex the tabs toward each other with your fingers to make sure they have good spring action.

If you're printing in PLA or PETG, I strongly recommend using wax to lubricate the tabs. Without it or some other lubricant, your joints are likely to make a creaking sound when you turn them. I simply rub the rim of each tab on the wax of an unlit candle – it doesn't need much – before inserting it into the next piece. The wax seems to last a long time – I haven't had to reapply it in any of the snakes I've made in the last few months.

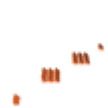


Disassembly

It's possible to pull the segments apart after they're assembled, but there's some chance of bending or breaking the tabs when you do so.

That's much less likely to happen with PETG than with ABS (moderately likely) or PLA (quite likely). So if you're not printing in PETG it's best not to disassemble the snake once it's together unless you really need to.

Model files



rubiks-snake-25mm-firm-petg.3mf



rubiks-snake-15mm.3mf



rubiks-snake-25mm-soft-asa-abs-pla.3mf

Print files



rubiks-snake-25mm-color-1_02mm_asa_mk3s_8h22m.gcode

🌀 ASA 🌀 0.40 mm ≡ 0.20 mm ⌚ 8.36 hrs ⚖️ 48 g 🖨️ Prusa MK3/S/S+



rubiks-snake-25mm-color-2_02mm_asa_mk3s_8h27m.gcode

🌀 ASA 🌀 0.40 mm ≡ 0.20 mm ⌚ 8.45 hrs ⚖️ 48 g 🖨️ Prusa MK3/S/S+



rubiks-snake-25mm-color-1_02mm_petg_mk3s_8h31m.gcode

🌀 PET 🌀 0.40 mm ≡ 0.20 mm ⌚ 8.52 hrs ⚖️ 65 g 🖨️ Prusa MK3/S/S+



rubiks-snake-25mm-color-2_02mm_petg_mk3s_8h37m.gcode

PET 0.40 mm 0.20 mm 8.62 hrs 66 g Prusa MK3/S/S+



rubiks-snake-25mm-color-1_02mm_pla_mk3s_8h22m.gcode

PLA 0.40 mm 0.20 mm 8.36 hrs 65 g Prusa MK3/S/S+



rubiks-snake-25mm-color-2_02mm_pla_mk3s_8h27m.gcode

PLA 0.40 mm 0.20 mm 8.45 hrs 66 g Prusa MK3/S/S+



rubiks-snake-15mm-color-1_02mm_asa_mk3s_3h17m.gcode

ASA 0.40 mm 0.20 mm 3.29 hrs 14 g Prusa MK3/S/S+



rubiks-snake-15mm-color-2_02mm_asa_mk3s_3h19m.gcode

ASA 0.40 mm 0.20 mm 3.32 hrs 14 g Prusa MK3/S/S+



rubiks-snake-15mm-color-1_02mm_petg_mk3s_3h22m.gcode

PET 0.40 mm 0.20 mm 3.37 hrs 19 g Prusa MK3/S/S+



rubiks-snake-15mm-color-2_02mm_petg_mk3s_3h24m.gcode

PET 0.40 mm 0.20 mm 3.39 hrs 19 g Prusa MK3/S/S+



rubiks-snake-15mm-color-1_02mm_pla_mk3s_3h18m.gcode

PLA 0.40 mm 0.20 mm 3.30 hrs 19 g Prusa MK3/S/S+



rubiks-snake-15mm-color-2_02mm_pla_mk3s_3h19m.gcode

PLA 0.40 mm 0.20 mm 3.31 hrs 19 g Prusa MK3/S/S+

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