

LUCKY 13 Starter Set Manual

Manual rev 0.4, 10 Mar 2022

About

Lucky 13 is a fully 3D printable, highly poseable, snap-together, modular, customizable, jointed figure. This starter set features everything you need to start printing, playing, and making it your own. The included STL files give you access to:

- A core **armature** with lifelike articulation!
- A basic **skin** that easily snap-fits for customization!
- A set of **accessories** for extra inspiration!
- A **display base** to show off your figure in extra-dynamic poses!

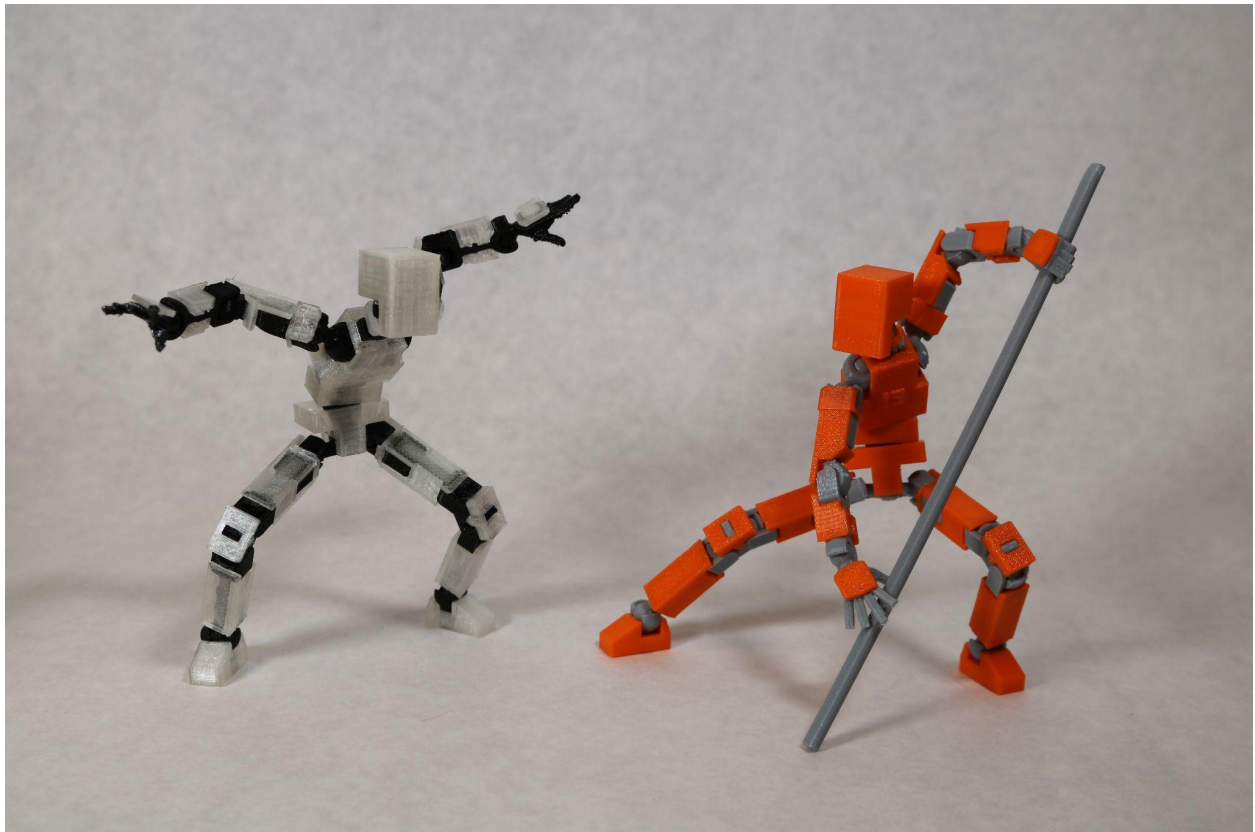
I hope you'll have as much fun with Lucky 13 as I have.



License

Lucky 13 is distributed under a [CC BY-NC-SA 2.0](https://creativecommons.org/licenses/by-nc-sa/2.0/) license.

- You **can** share and adapt this design. You are welcome to design your own skins and accessories for use with the Lucky 13 base. Please do!
- You **must** provide attribution when sharing this design or a remix. This can be in the form of a link to the original download page.
- You **may not** use this design for commercial purposes (e.g. selling prints on an online marketplace).
 - If you run a print-on-demand service, you may print this model for someone **on request** and charge a fair price for your services.
 - However, you may not **list** this design for sale on your own storefront.
- You **must** distribute any remixes under the same license.



Printing instructions

Files

Two sets of parts are included: **individual parts** and **plated parts**.

- **Individual parts** are, well, individual: one piece per file. You can put them on the plate however you want.
 - Be sure to print two of anything labeled [2X] in the file name.
- **Plated parts** are pre-arranged in groups. You lose some control over where things are placed, but you'll know you aren't missing any parts. Just print one of each file.

I strongly recommend that you print at least a couple of parts individually before jumping into printing a full plate. This will let you know early if you need to tweak any settings for better bed adhesion or part fitment.

Materials

The armature parts need to be printed in a strong material - I use PETG. This is essential for the joints to work as desired. You'll also want to use PETG for the arms of the display base.

For the skin, accessories, and base plate of the display base, you can use the material of your choosing. I generally prefer to use PETG everywhere, but PLA works too.

Slicing and settings

All parts should be printable **without supports**. (The hands of the armature are pre-supported). You may or may not want to use a **brim**, depending on how good your bed adhesion is. My Prusa Mini *can* print everything without brims - but it doesn't always *want* to.

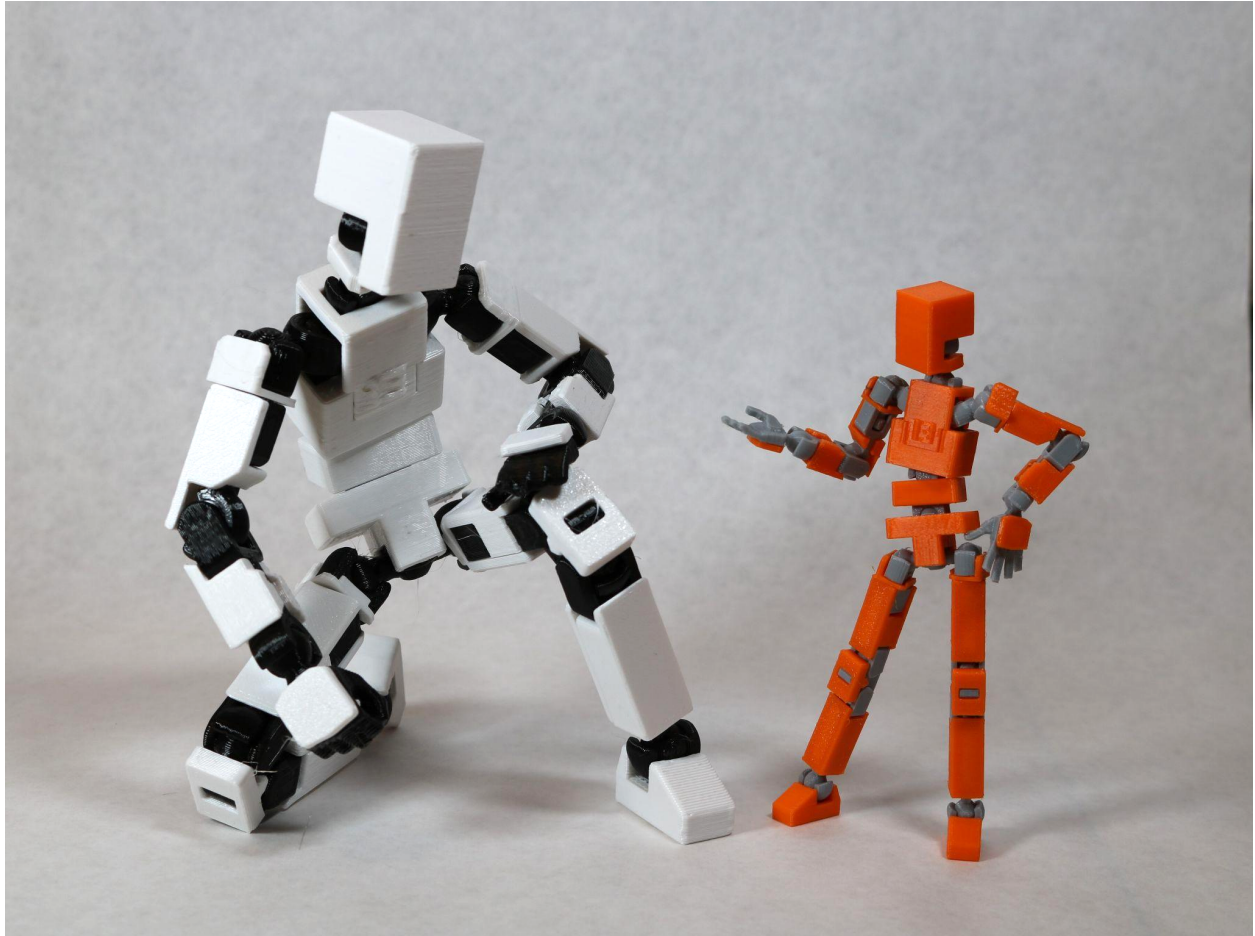
If you want to quickly stress-test your printer, here are the parts that tend to give me the most trouble with adhesion:

- 00A07 [2X] armature clavicle.stl
- 00A08 [2X] armature shoulder.stl
- 00A20L armature hand fist left.stl (or any of the hand parts)

I recommend printing with a **layer height of 0.15mm**. While other heights can work, 0.15 is what I used for test fitting, so I can't guarantee as good of a fit otherwise.

Infill percentage does not matter much at the default scale, as most of the part's volume is taken up by perimeters. Keep it at or above **15%** to make sure top layers are supported and thicker parts are rigid enough.

Note that these parts are optimized for printing with a **0.4mm nozzle**. I have also had good results printing at 200% scale with a 0.8mm nozzle.



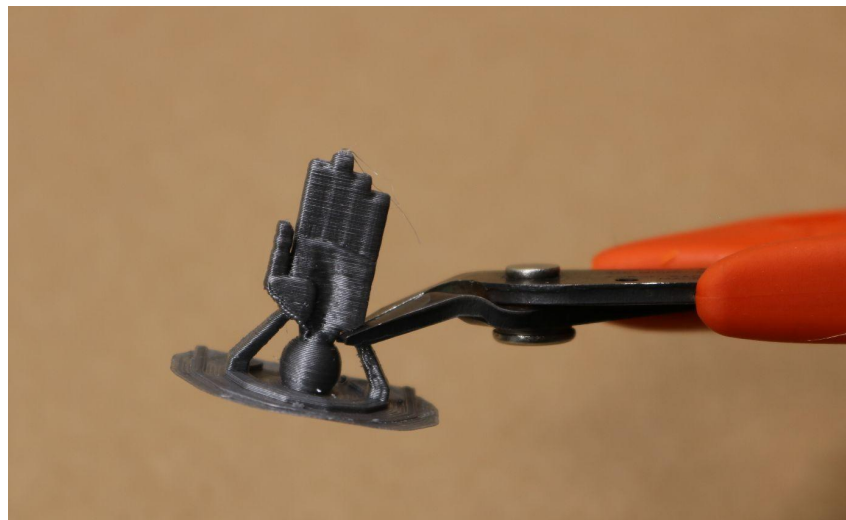
Assembly instructions

Parts check



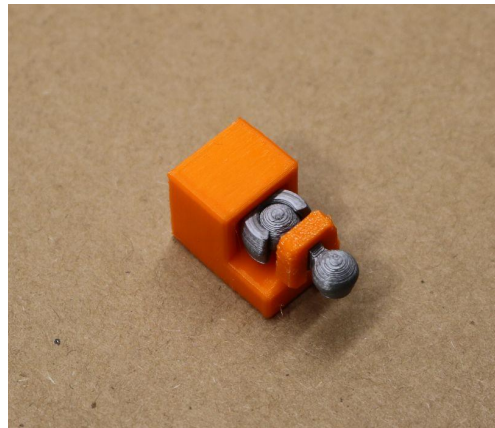
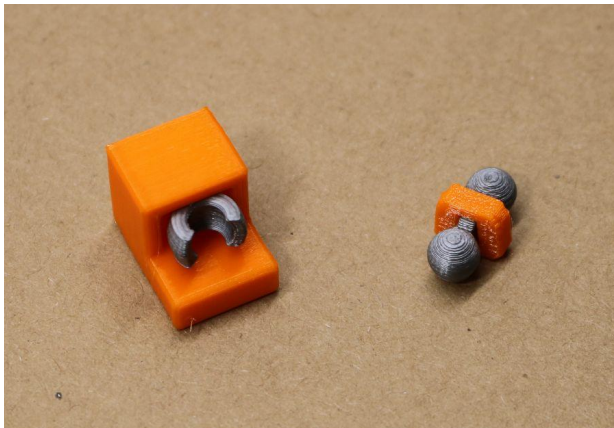
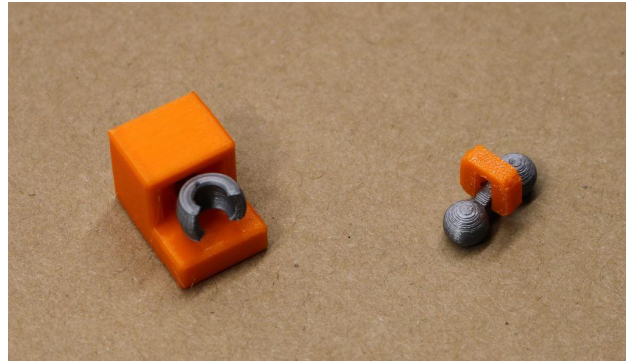
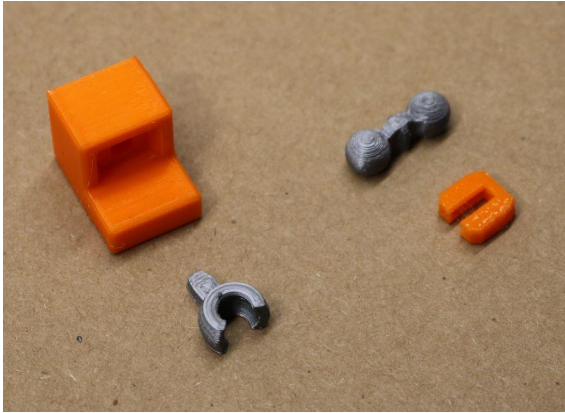
Make sure you have all the parts printed, as shown here. (My hand armature parts still have a brim attached).

Removing supports



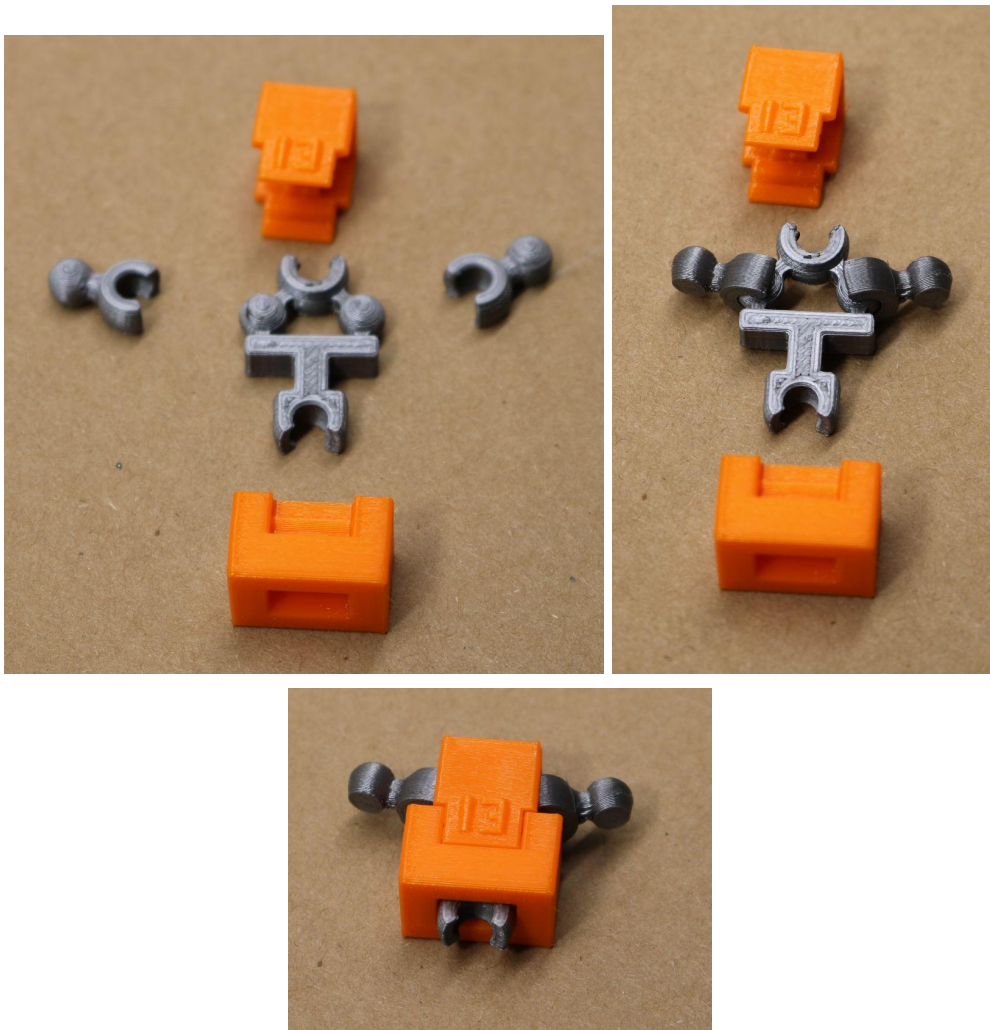
The hands of the armature come pre-supported. Simply snip away the supports with flush cutters. (If you don't have flush cutters, nail trimmers will do in a pinch. But you should go get some flush cutters, they're great.)

Head and neck



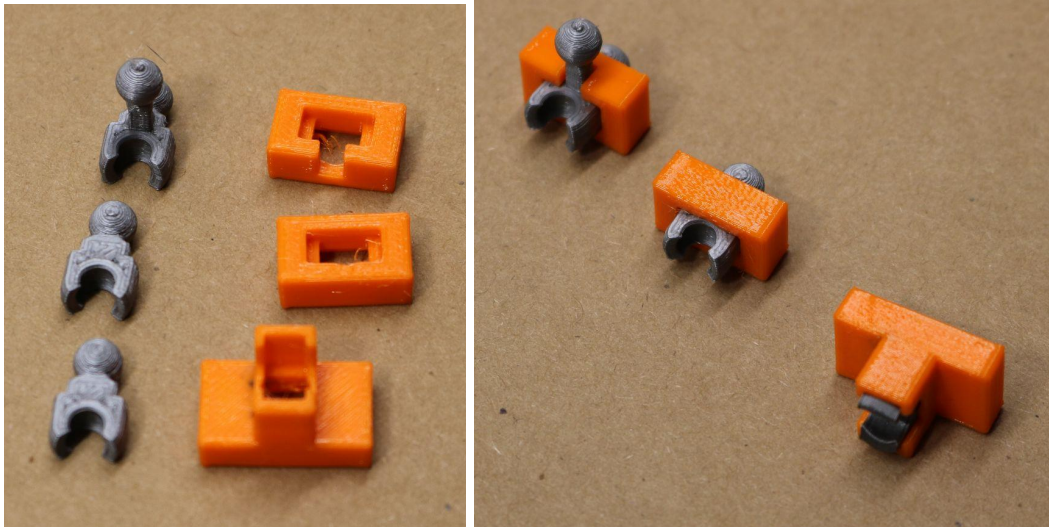
Assemble as shown. **You should be able to assemble everything by hand.** If the parts are too tight, do not force them. Simply file down parts as needed. The ball joints in the armature will be stiff at first, but become smoother as you move them more.

Chest

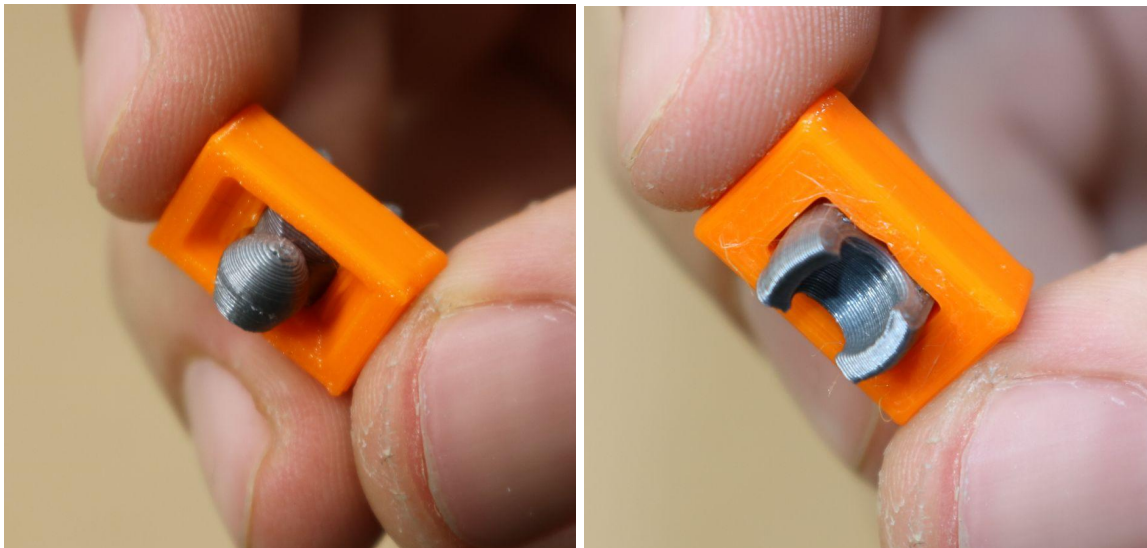


Attach the clavicle joints to the chest piece, then sandwich with the skin.

Abdomen and waist

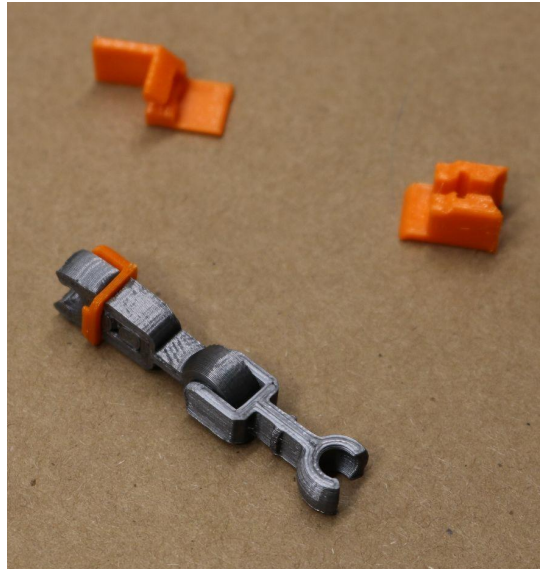
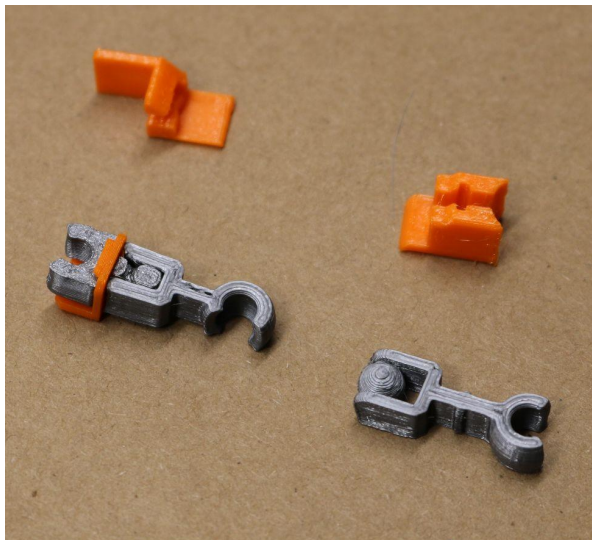
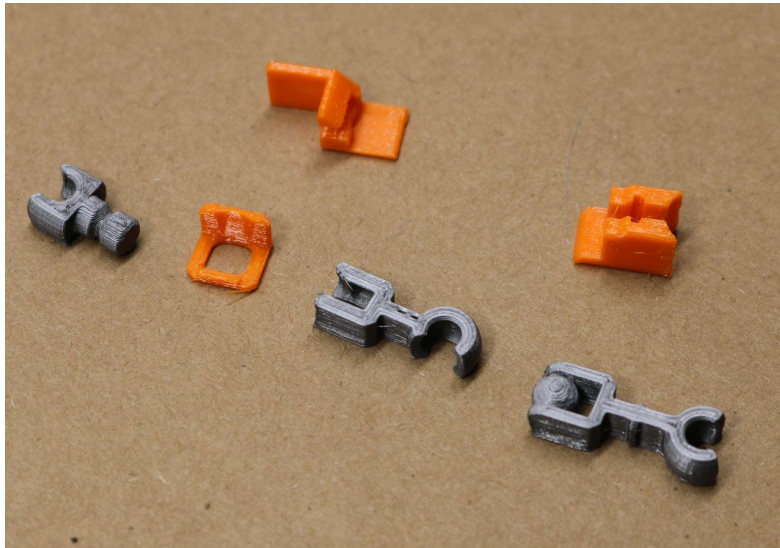


Insert each of the armature parts through the abdomen and waist skin parts.

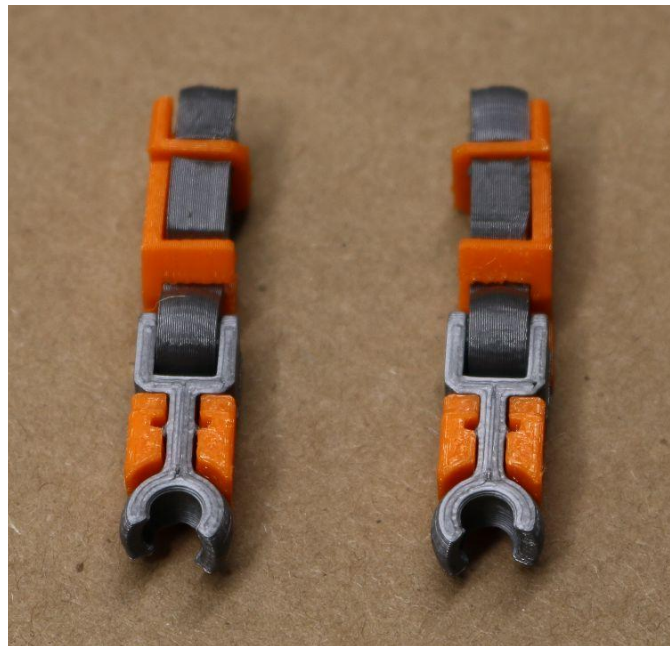


Notice that the wider opening of the skin part has the ball joint, and the narrower opening has the socket.

Arms



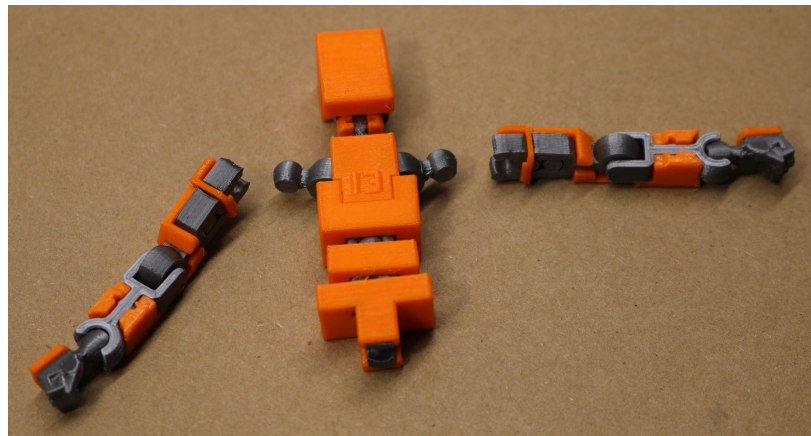
Insert the shoulder armature through the skin piece into the upper arm. This may take some force but again, should be doable by hand. Add the forearm armature.



Notice that the forearm piece is not quite symmetrical. The socket for the hand is rotated slightly away from the body. Slide on the skin parts. The second arm is a mirror of the first.

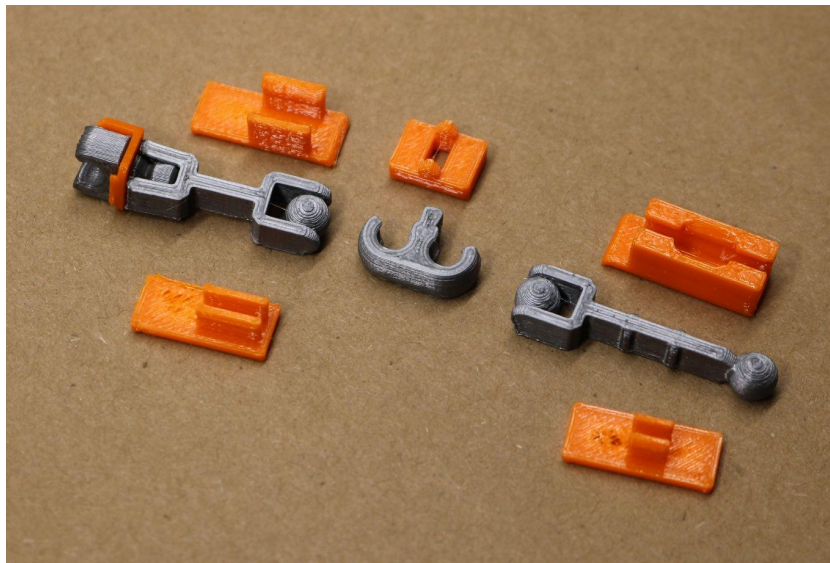
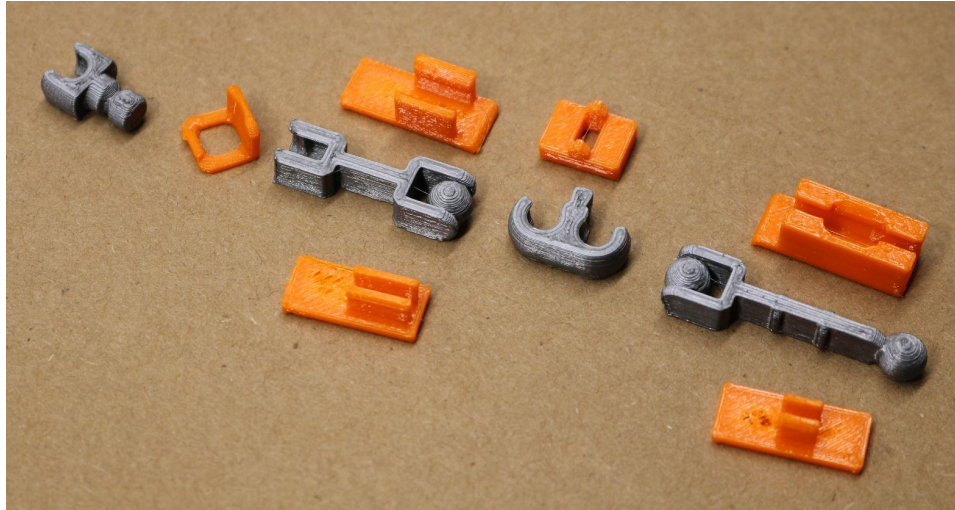


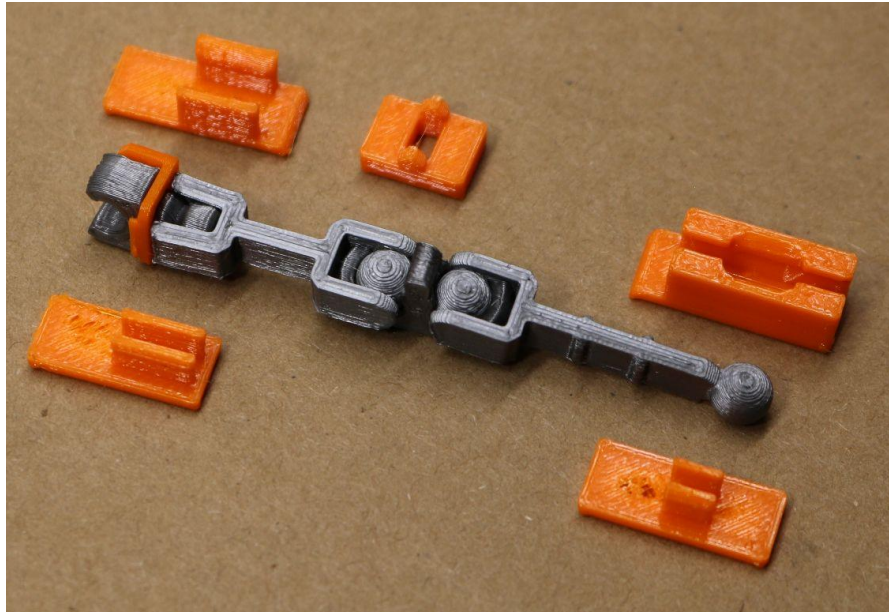
Add the skin part to each hand.



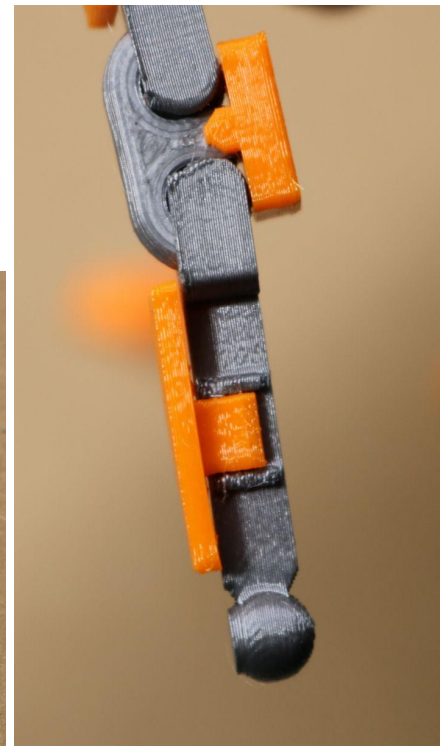
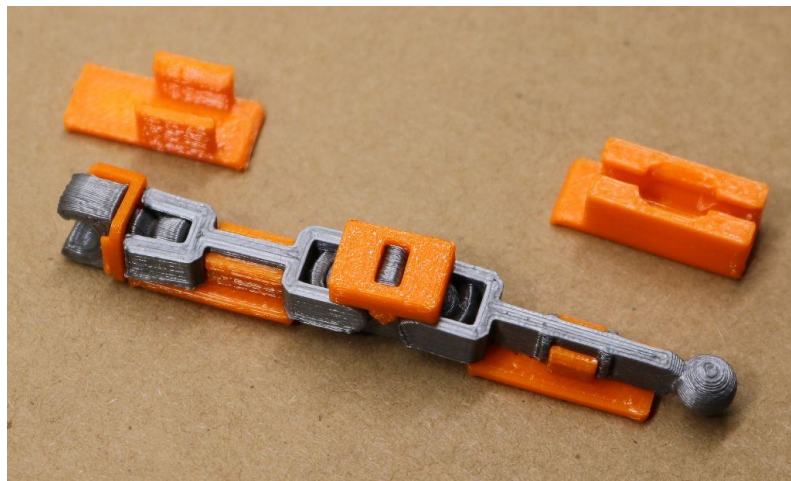
Add a hand of your choice to each arm, and attach the arms to the body.

Legs

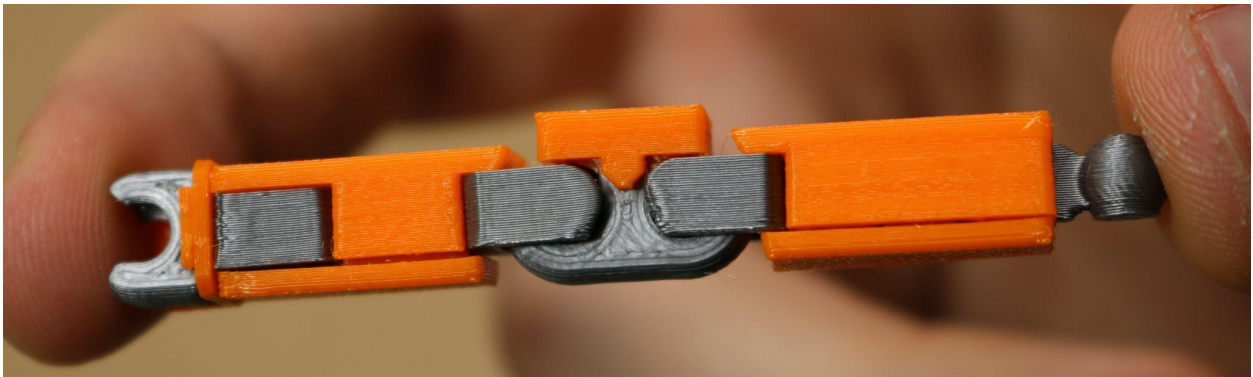




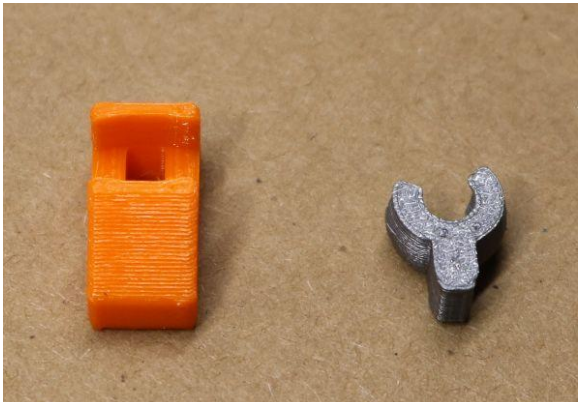
Attach the joint to the thigh just like in the arm. Then add the knee and shin parts.



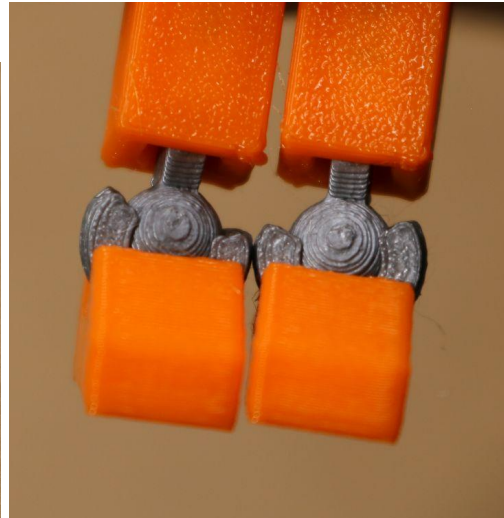
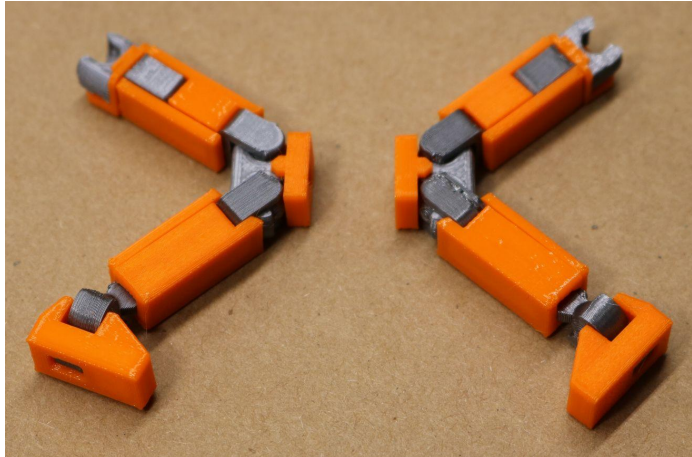
Add the rear skin pieces to the thigh and shin. Note that on the shin part, the end that points up towards the body is slightly longer.



Add the front pieces of the skin, oriented as shown.

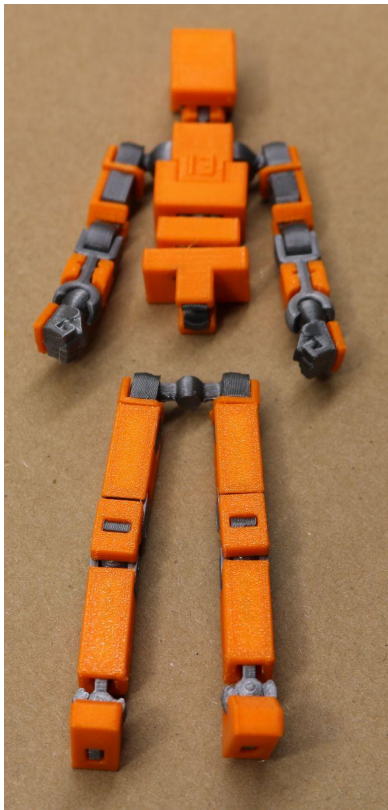
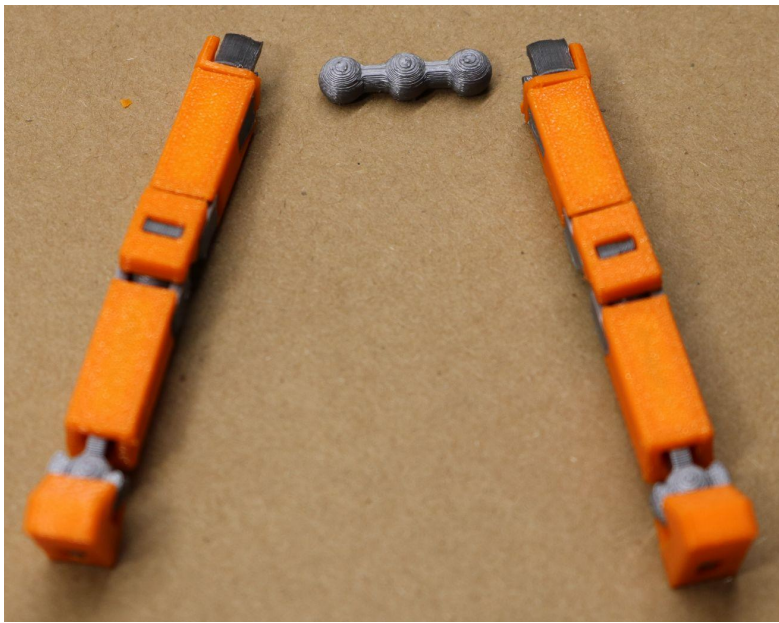


Complete the foot piece by inserting the armature piece into the skin piece. Notice that the opening of the joint is not symmetrical, and should point towards the center of the body.



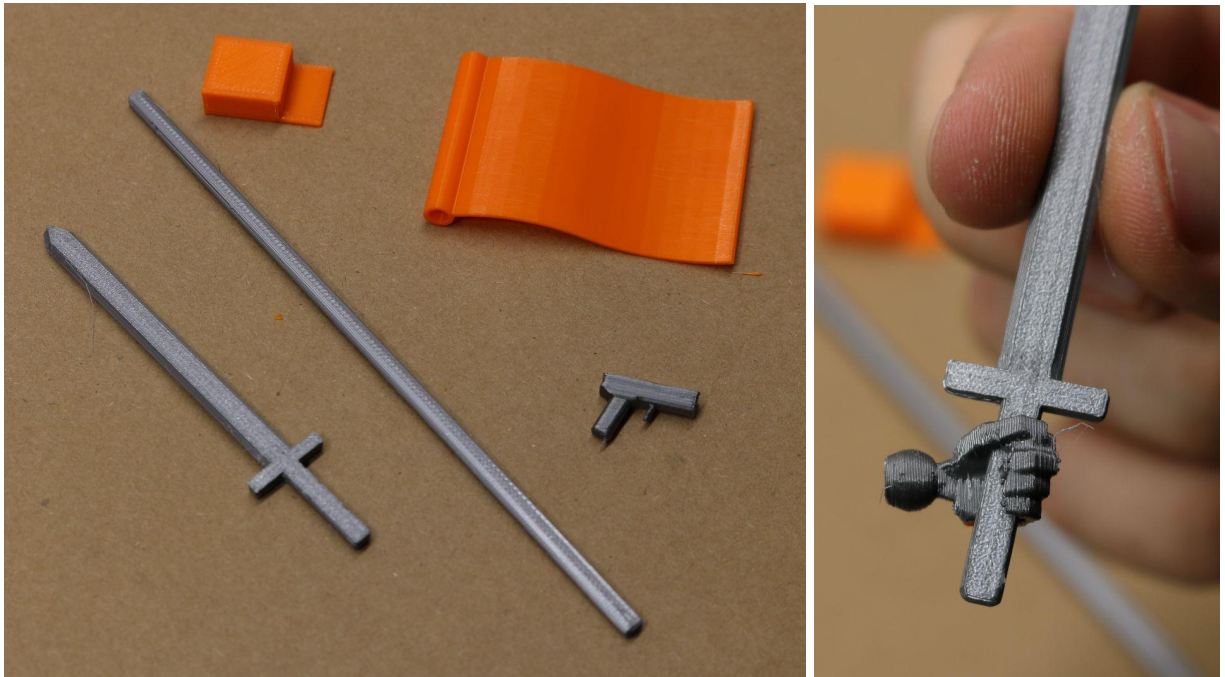
Complete the second leg just like the first. Make sure the feet are mirror images.

Final assembly



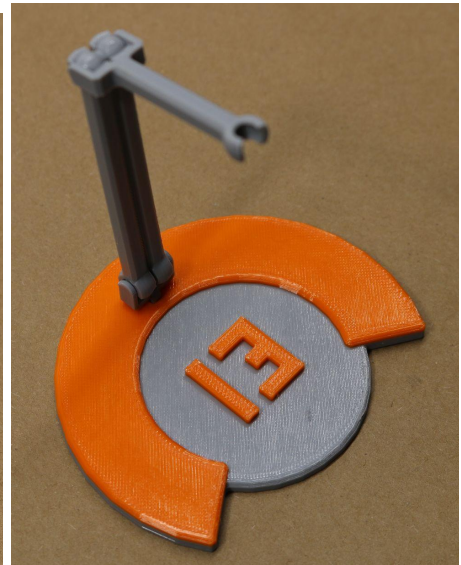
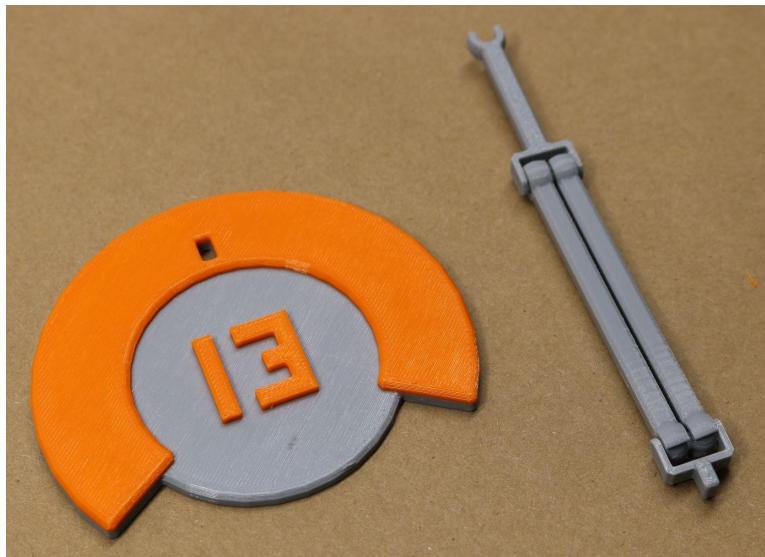
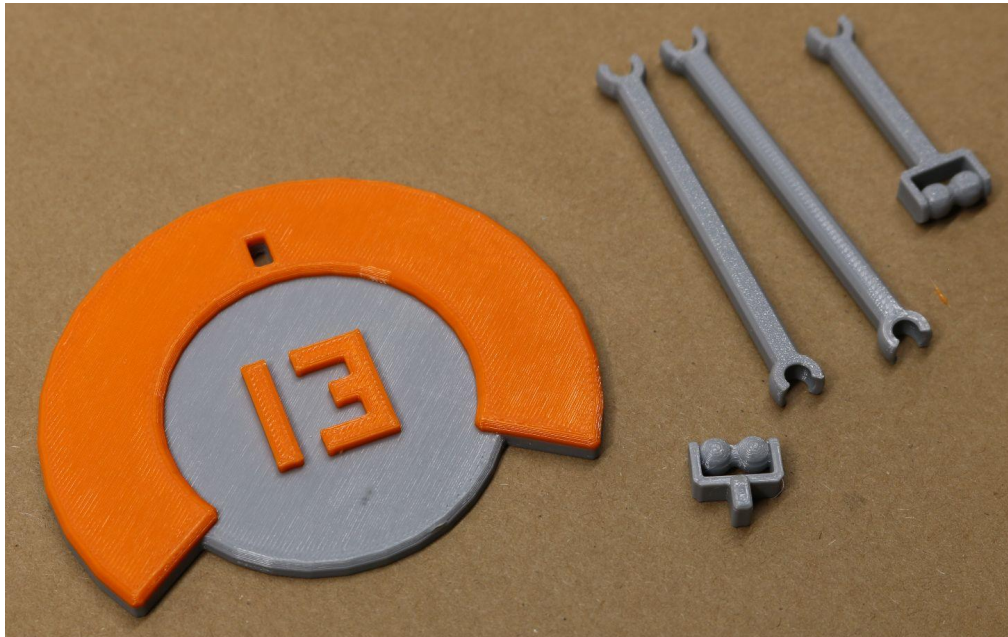
Attach the legs to the hip piece, then add the rest of the body. Lucky 13 is complete!

Accessories

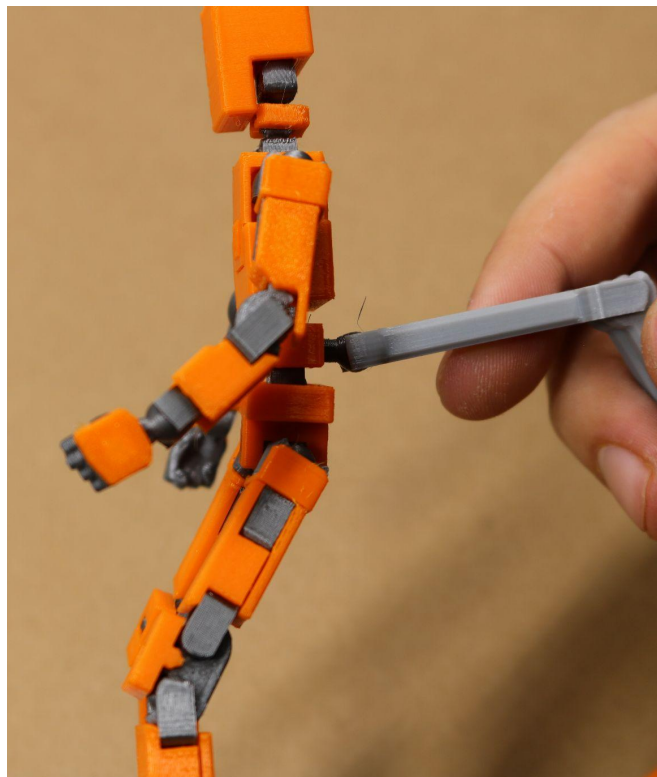
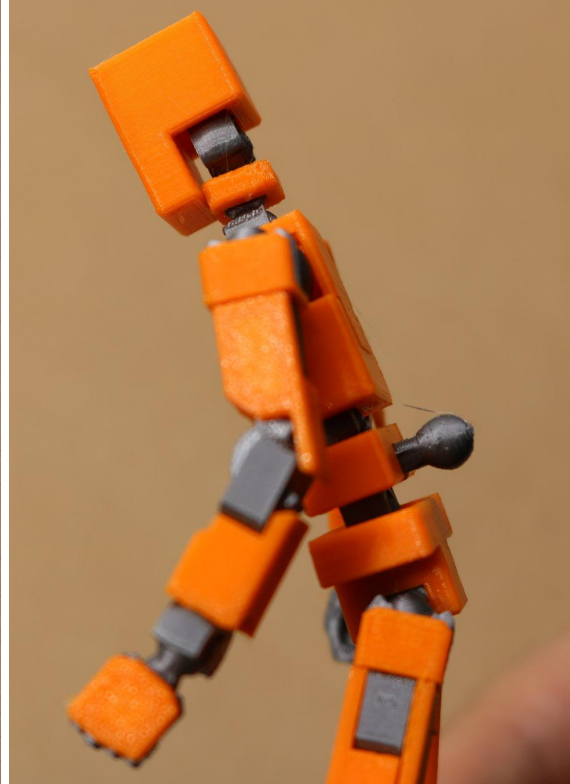


The accessories are fairly straightforward; simply insert the shaft into the hole in the grip hands. The staff fits into the flag to become a flagpole, and the hat is a hat.

Display stand



The display stand is assembled as shown. I added a filament change in the base plate for the two-color effect.



To use the display stand, replace the abdomen section in the figure with the version with an extra ball joint. Attach the joint to the socket in the arm of the base.



Tips

Printing and assembly

- **Every printer is different.** Mine isn't particularly customized, but it's still not going to behave exactly the same as yours. You may have to dial in a few settings, but stick with it!
 - Run test prints before committing to a full plate of parts. Check for build plate adhesion using the parts I mentioned earlier. Print an armature part and a skin part that go together and make sure the fit is right.
 - If the fit is too tight, look for "XY size compensation" in your slicer, and apply a small negative value (say -0.05mm) to the skin parts. This will open up holes, shrink pegs, and give you more clearance overall.
- You should be able to assemble all parts by hand. If you find yourself reaching for a hammer, maybe instead grab some sandpaper and sand down the part that's not fitting.
- I don't trust my printer to get through a full plate of small parts without at least one losing adhesion. I like to print the armature parts in small batches that each take 30 minutes or

less, so I don't lose hours if one part goes wandering. I gamble a little bit more with the skin parts, which have more contact area.

- The jointed connections will probably be pretty stiff and may be “jerky” when first assembled. Don't worry - they'll even out as you move them around more.
- On the other hand, it's natural for joints to get less tight over time as the material wears and relaxes. Here's one way to tighten them up again: disassemble the joint, then put a thin coat of liquid superglue on the ball. Let it dry completely before putting it back together.
- Try making multicolor parts by changing filament partway through the print. You can make a two-tone display base by changing filaments after 3mm, or make a flag with horizontal stripes of your choosing.



Customization

Are you interested in designing your own upgrades and accessories for Lucky 13? Awesome! These measurements may help:

- Want to add more accessories? The “grip” hands have a cylindrical hole that’s 4mm in diameter. Design accessories with a 4mm shaft, and he’ll be able to hold them!
 - The included accessories use a partially flattened cylinder. This both helps the print stick to the build plate and makes for a grip that’s firm, but not impossible to break.
- Want to design more joints to add to the armature? All the ball joints in the armature are 6mm in diameter. The sockets are 5.8mm in diameter, which gives them a friction fit. Pretty much all of Lucky 13’s armature parts are 5mm “tall” on the build plate.
- Want to make a new skin? Use this one as a starting point! I’ve purposely made it as slim as possible so you can build on top of it in the modeling software of your choice.



Frequently Asked Questions

- **Can I share skins and accessories that I make for Lucky 13?**
 - Yes, of course! I would love to see more people exploring the potential of this design.
 - Please credit me on your download page. You can simply say “Based on Lucky 13 by Soozafone” with a link to my original page.
 - Your post should be an actual remix or transformation of the design - do not just re-host the original files.
- **Can I SELL skins and accessories that I make for Lucky 13?**
 - If you’re putting the work into designing something, you should be able to get paid for that. (I’ll be designing skins to sell myself too!)
 - You can sell anything you design for Lucky 13, but PLEASE give credit and link back to the original page.
 - Don’t resell the original files, only your new parts.
 - In other words, be cool. I put a lot of work into this. :)
- **Can I print Lucky 13 and sell it to others?**
 - Please don’t put Lucky 13 up for sale on your online store without permission. If you are interested in selling Lucky 13, please get in touch with me and we can work something out.
 - If you want to sell in a physical shop, well, I really can’t stop you. But I’d like you to at least ask me first. :)
- **I want to collaborate with you on future releases!**
 - Neat! Send me a pitch.
- **When I put the figure together all the joints were nice and stiff, but a week later they’re much looser. What gives?**
 - The plastic is naturally going to wear and relax over time. If things get too floppy, you can tighten up the joints with superglue as mentioned in the tips section. Or just print more!
- **What size is the finished figure? Can I scale it up/down?**
 - Lucky 13 is about 5.5 inches or 14 cm tall at 100% scale.

- It should scale up to at least 200% without much issue. I have printed at 200% with a 0.8mm nozzle, but a standard 0.4mm nozzle should be fine too.
- Scaling down is likely to be tricky, as many armature parts are already only a few lines wide. You might be able to make it happen with a smaller nozzle - but I haven't tested this.
- **Can I print with resin?**
 - Probably! But I haven't tested it. You will need a tough resin for the armature.
- **What software did you use to design Lucky 13? What printer do you use?**
 - Lucky 13 is designed fully in Blender.
 - I have a Prusa MK3S and a Prusa Mini.
- **Where can I contact you?**
 - For general public comments, post on the product page and I'll get a notification.
 - For private messages, PM me on reddit (/u/soozafone) or send me an email at gaberosiak@gmail.com.
 - For tips (thanks!) you can send a [donation through PayPal](#).



Thanks for printing!

No, really, **thank you**. Developing this design has been a labor of love, and I'm excited to be sharing it with you. I hope you'll share pictures of your prints!

If you like Lucky 13, please leave a like and a comment on the download page. It's free and we all need that algorithm boost.

If you *really* like Lucky 13, consider showing your appreciation by [sending me a tip](#). You'll be supporting me as I improve on this design and develop future ones.

Lastly, this is a work in progress and I am always open to suggestions to make this the best project it can be. Let me know what you think!

Thanks,

Gabe (Soozafone)

