



Zelda Thunder Helm

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<https://learn.adafruit.com/zelda-thunder-helm>

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Overview



Zelda: Breath Of The Wild

In this project we'll build the Thunder Helm, a unique piece of armor in The Legend of Zelda: Breath Of The Wild. It's described as a precious heirloom passed down among the Gerudo. It deflects lightning strikes and is traditionally worn only by the Gerudo chief.



This helm measures 297 millimeters tall by 390 millimeters wide. The main body is printed in gold PLA while the details are painted with a metallic gold acrylic paint. We used translucent PLA to illuminate the gems on the front and sides. The gems snap fit into place, while the rest of the side parts are secured with machine screws.

The helm uses an adjustable elastic headband and we even managed to attach the circular lightning blot headdress to the headband!

This helm is the perfect accessory to the [Guardian sword](#) () and the [Guardian Shield](#) () projects!



Parts, Tools and Supplies

Here's a list of the parts needed to make this project.

- [Gold, blue and red PLA](#) ()
- Metallic acrylic paint
- [3D Printer](#) ()
- [Diagonal Flush cutters](#) ()
- Hobby knife
- M2x12mm screws (12)
- M2x6mm screws (3)
- [Elastic headband](#) ()





Proto-Pasta - Aromatic Coffee 1.75mm HTPLA Filament

Have you ever wished that your 3D printing filament smelled like freshly brewed coffee? If the answer is yes, then boy howdy are you in luck! Go ahead and scratch your...

<https://www.adafruit.com/product/3225>



Flush diagonal cutters

These are the best diagonal cutters, large super-comfortable grip to use and have strong nippers for perfect trimming of wires and leads. I've used my pair every day for years.

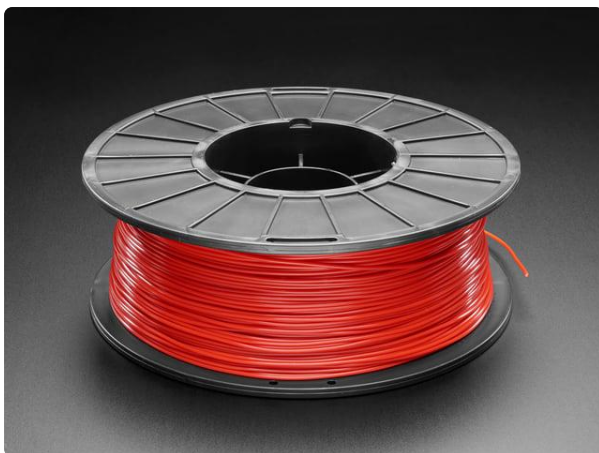
<https://www.adafruit.com/product/152>



Type A Machines Series 1 Pro 3D Printer

Built to last and better than ever. The Series 1 Pro 3D printers from Type A Machines offer durability, modularity and one of the largest...

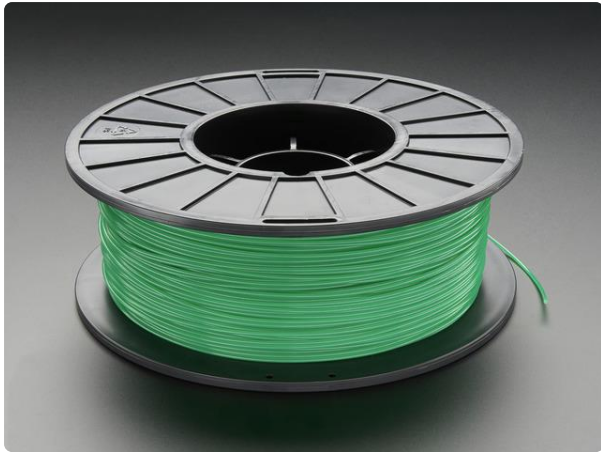
<https://www.adafruit.com/product/2412>



PLA Filament for 3D Printers - 1.75mm Diameter

Having a 3D printer without filament is sort of like having a regular printer without paper or ink. And while a lot of printers come with some filament there's a good chance...

<https://www.adafruit.com/product/2450>



PLA Filament for 3D Printers - 1.75mm Diameter - Green - 1KG

Having a 3D printer without filament is sort of like having a regular printer without paper or ink. And while a lot of printers come with some filament there's a good chance...

<https://www.adafruit.com/product/2150>



Costume Goggles

We've got some awesome LED goggle tutorials, and now you want to make your own, right? So pick up a pair of NeoPixel rings and...

<https://www.adafruit.com/product/1577>

3D Printing



3D Files and Modifications

The parts were designed in Autodesk Fusion 360. If you're interested in modifying the parts, you can download the source file. If you're using different 3D modeling

software, you can save it out as a STEP, IGS, OBJ and other file formats. The STLs can be downloaded "as is" from the repo sites listed below.

[Download the Fusion360 source](#)

[Download the from Thingiverse](#)

[Download from Youmagine](#)

[Download from Pinshape](#)

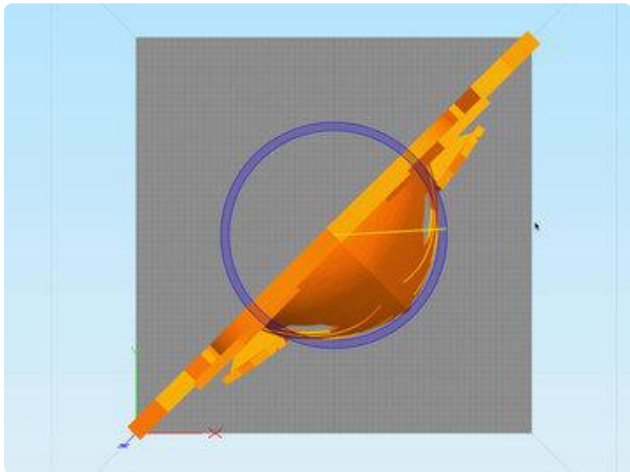
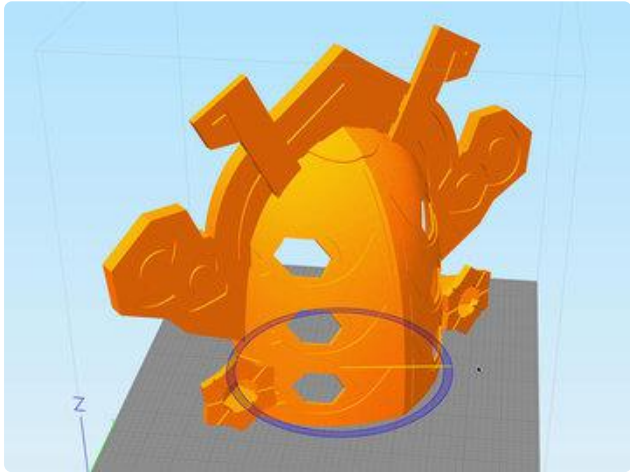
Slice Settings

Download the STL file and import it into your 3D printing slicing software. You'll need to adjust your settings accordingly if you're using material different than PLA.

- 230C Extruder Temp
- No heated bed (65C for heated)
- 90% Extrusion Multiplier
- .6mm Nozzle
- 0.72 Extrusion Width
- .4mm Layer Height
- 20% infill
- 4 to 6 skirt outlines (brim)
- Custom Supports

Check if you have enough Filament

We recommend using a brand new spool of filament as it will require over 400 grams of filament to complete. You can check if you have enough filament to complete the print by weighting the spool of filament before starting the print. A 1kg spool (2.2lbs) usually weights about 321g.

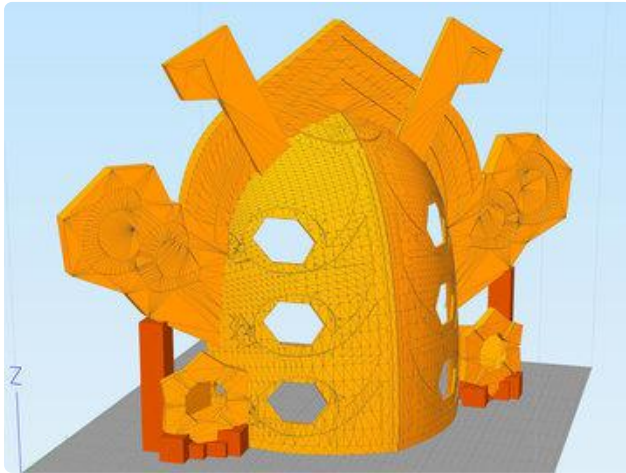


Fitting the helm

Although the source files are available to cut up into smaller pieces, we designed the parts to fit on larger printers with minimal supports.

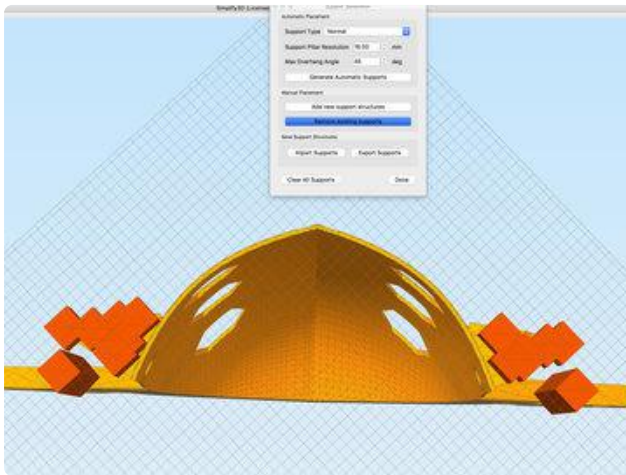
We recommend using a printer with at least a 300x300x300 size bed. To fit the helm on our bed, we rotated the model 45 degrees and then centered it in the middle of the bed.

Adding Supports



The star gems on the sides of the helm sit above the base of the helm, so we'll need to add a small amount of supports to hold up these parts.

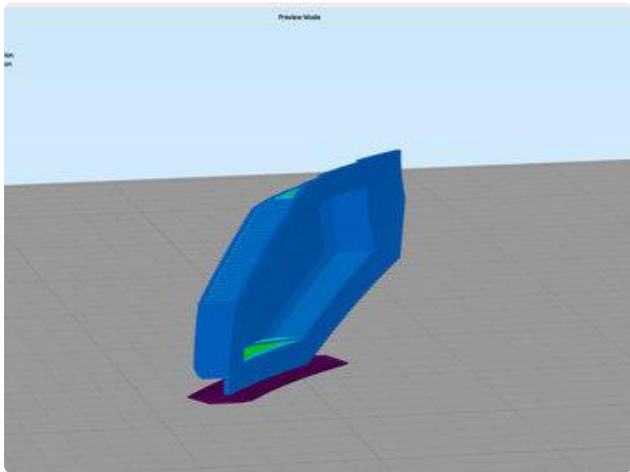
To optimize supports, we used Simplify3D custom supports with the pillar resolution set to 16mm and placed them around the star. We made sure to give a bit a spacing away from the sides of the helm.



Preventing Strikes

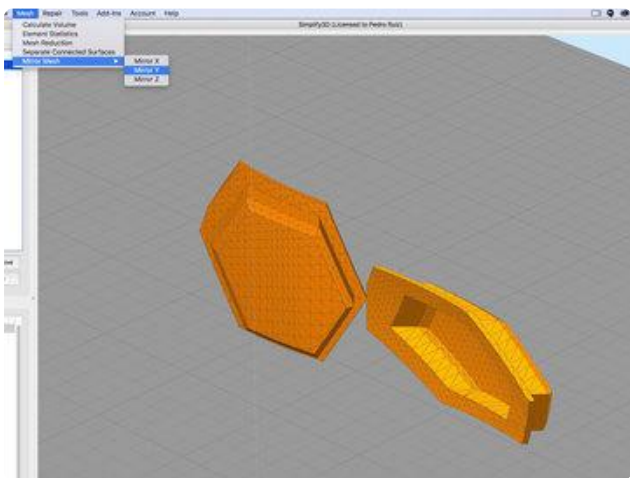
Strikes occur when the hot end becomes misaligned from hitting parts of the model that have warped. The lower "horns" on the side of the helm have a tendency to cause strikes, so we can add one support pillar on each horn to prevent them from wrapping.

Printing the Gems



The six gems on the front of the helm are printed in blue translucent PLA, while the two star gems on the sides are printed in a red translucent PLA.

The blue gems are able to print without any supports. They will however need a brim to hold the parts as it prints.



The red gems print as is with the top facing down on the bed.

Mirror Gem

The blue gems on the left side of the helm will need to be mirrored to fit the right side of the helm. We can use the mirror feature under: mesh > mirror mesh > mirror Y.

Assemble



Legend of Zelda: Breath of the Wild – Thunder Helm Reference Images

These screen shots showcase all of the details in the thunder helm. We used these to create the model and paint the details. Download our reference images by clicking on the button below!

[thunder-helm-reference.zip](#)



Metallic Gold

The script details are painted with a gold metallic acrylic paint. Use a medium sized brush and apply two to three coats. Allow each coat to dry before adding additional coats. You can leave the gems off until the paint dries to make it easier to paint.



Green, pink and blue

Next we can add the green, pink and blue details. The curves are indented to make it easier to paint but if to accidentally go outside of the lines, allow it to dry before scratching the paint off.



Gems

After the paint dries (about an hour) we can snap fit the blue and red gems onto the helm.

Thread screws



First we'll need to create the thread for all of the parts. We can start with the larger side connectors.

We designed counter sink holes so the M2x12mm screws can reach the mounting holes on the sides of the helm.



Create the threads by fastening the screws from the opposite side first, before inserting screws into the counter sink holes.

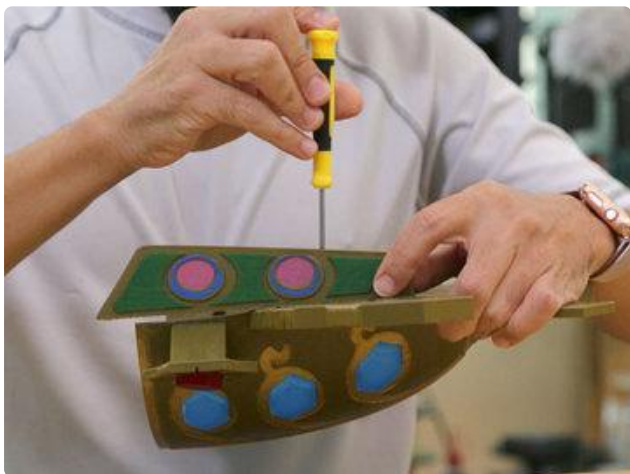
Fasten three screws inside the counter sink holes until the tips of the screws poke through. We can use the protruding screws to help align the side connectors to the helm.

Mount connectors to helm



Create the threads on the side of the helm with M2 screws. The tolerances should allow the parts to fit tight.

Align the side connector to the helm and fasten each of the three screws.



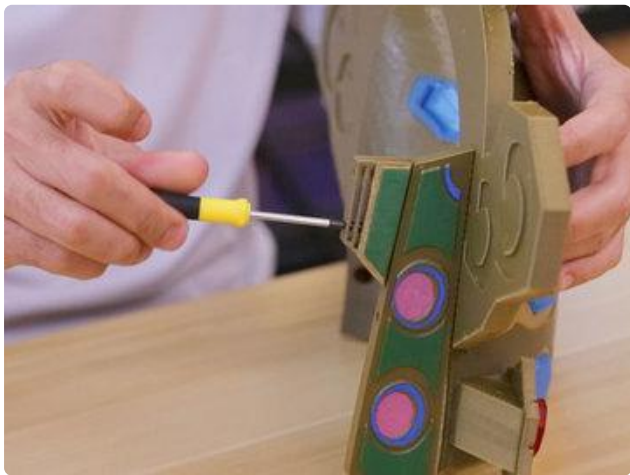
The shape of the helm might make it difficult to grip while fastening the screws, so we recommend holding it up against your chest as you fasten each screw into place.

If you have trouble aligning the screws to mounting holes, you could try to fasten the middle screw first and then the two screws on each side.

Strap connector



Next we'll need to create the threads on the side connector. The small strap connector is attached with two M2x12mm screws. Align the strap connector so the draft (slope) on the part is facing down.

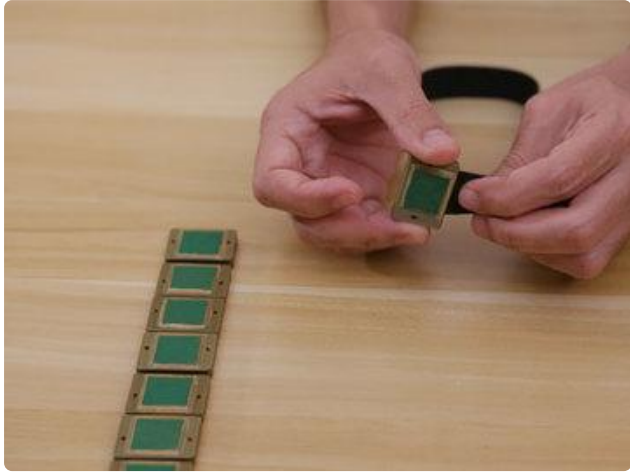


First create the threads on the opposite side of the counter sink holes. This will make it easier to create straight threads.

Next fasten the screws so both poke out just enough to help align them to the side connector.

Build the headband

Now we can move on to building the headband. We used a elastic headband from our [costume goggles \(\)](#) and then measure the length needed based on the size of our head. We'll need to remove the metal ends so we can fit the decorative blocks on the elastic band.



Decorative Blocks

The strap block parts have a slit through the inside to allow the headband to pass through. Make sure to remove any excess retraction string left over from printing. We want the inside of the blocks to be smooth, otherwise, excess material will make it difficult to pass the head band through. We used a hobby knife to carefully clean out the slit.

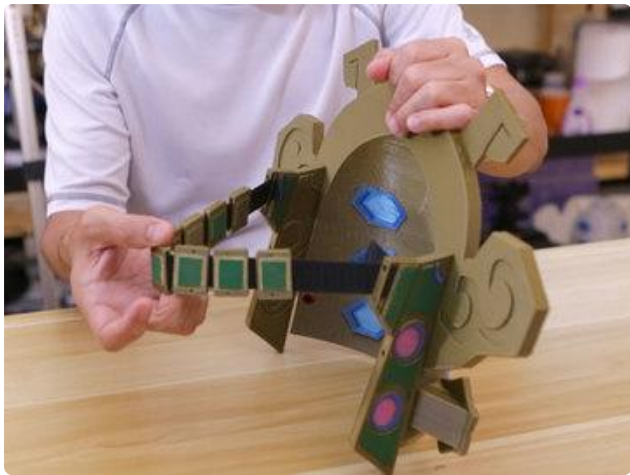


The sides are symmetrical so we'll only need to paint one of the sides. Allow the paint on the blocks to dry, and then add about 9 blocks onto the headband.



Attach headband

With the blocks added to the head band, pass and loop the ends through the two slits on the top connector part as shown in the pictures.



Adjust the length by verifying how much slack you'll need by test fitting it on your head.



Once the headband fits to your liking, we can go ahead and attach the metal ends. We used pliers to help bend the metal open and then pressed the ends together.



Bolt headdress



Now we can move on to assembling the bolt headdress. Layout the bolts so the mounting holes are aligned with the circular parts. Rotate the bolts so the shorter side of the bolts ends are pointing towards the center of the circular part.



We use M2x6mm screws for the three bolts on the top portion of the circle. The bottom two bolts will need M2x12mm long screws. These bottom two bolts will attach to the blocks on the headband.

Align the two bottom bolts to the decorative blocks and fasten the M2x12mm screws onto the top mounting holes on the blocks.



Complete!

Now you are ready to go into battle. While you can't see through the helmet, you can adjust the angle so the helm sits right above your nose. This way we'll at least be able to partially see!