

How-To



Elven Cosplay Foam Armor Tutorial

**Mikaela Renshaw
with Mark Renshaw**



Elven costumes entered in the San Diego Comic-Con masquerade were made of EVA and craft foam. Two of the costume creators demonstrate their construction techniques.

Like many people, my family and I enjoy going to [San Diego Comic-Con](#) and admiring all of the amazing costumes that people make. Inspired by those costumes, as well as the TV show [The Heroes of Cosplay](#), we decided to try our hand at making costume armor, hoping to create something special for *Comic-Con*, and to try out the Masquerade.

This was our first time making cosplay armor, and our first time working with foam, although my father, Mark Renshaw, and I have some experience making elaborate Halloween props and costumes. So while this was our first time competing in, or even attending, the Masquerade, we were determined to produce something good.

My brother wanted to be an armored [Drow Elf](#) warrior/sorcerer. I, on the other hand, wanted to be an armored Woodland Elf warrior. Initially, my brother and I didn't know where to start, so, we turned to the Web, and with the help of our parents, Google images, and several YouTube how-to videos, we came up with a game plan.

If this is your first time making foam armor, as it was for us, then you need to come up with a basic concept, keeping several things in mind. The first is mobility. You want to be able to move and be comfortable while wearing your costume. You also want to be able to walk, and sit down and rest.

Second, remember that foam acts as insulation. We had a wonderful discussion about foam armor with a group we met at San Diego Comic-Con in full "master-chief" armor, from the game *Halo*. They built small laptop computer fans into their helmets to help keep cool, and told us they avoided going out in the full sun whenever possible.

Finally, think about visibility, especially if you plan to have a fully enclosed helmet. Remember, to be flexible with your designs. Our costumes evolved as we went along, due to both the materials we found, and those we decided to use, as well as the experiments we did along the way.



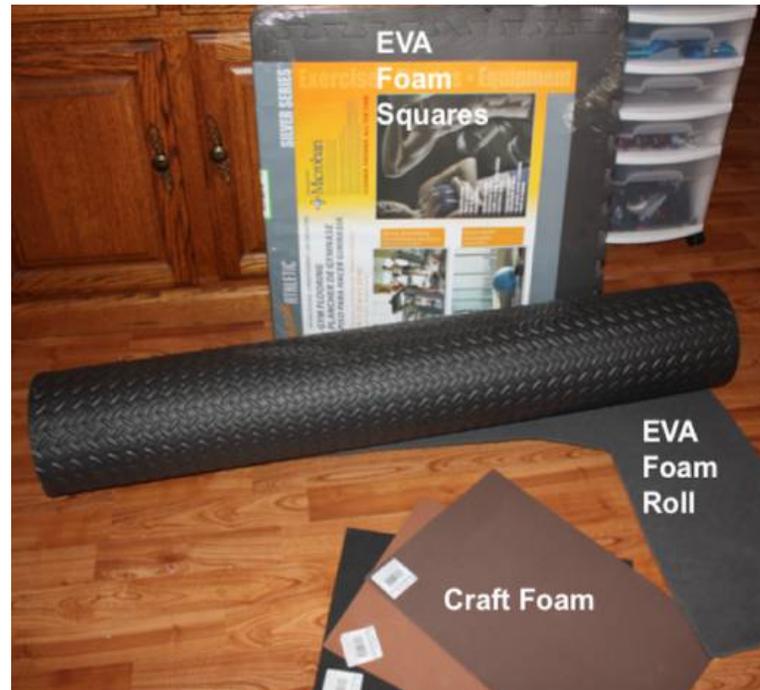
Drow Elf and Woodland Elf costumes as worn in the Masquerade contest at San Diego Comic-Con 2014

To begin, I recommend looking online at what other people have done, and watching a few foam armor tutorials on YouTube. While none of those videos related specifically to our armor design, they did help us to learn the basics of shaping foam, and they'll do the same for you. I would also recommend looking into how plate armor is constructed and put together. A good resource for this is the [SCA \(Society of Creative Anachronism\)](#), an organization whose members make historically accurate armor, and hold battles and tournaments. They have groups all across the country, and appear at Renaissance fairs. You can look up a local chapter online.

Another thing to remember about armor construction is to give yourself plenty of time. We worked on our armor at night and on weekends, with the Drow Elf armor taking two and a half months, and the Woodland Elf armor taking three months. It's a time-consuming process, and you may want or need to redo some parts to achieve a better fit or greater comfort. We did this on more than one occasion. So, be sure to plan well and start far in advance of whatever event you hope to attend. Most importantly, have fun, be creative, and come up with something unique that you can enjoy and be proud of.

I recommend working with someone else. Having someone else to talk to, share ideas with, and even complain to, makes the process go faster and makes it more enjoyable. For us this was a family project.

My brother and I were the creative team who came up with the original ideas and the concept designs. Our father was our technical designer for the armor, He had a good supply and knowledge of tools, and he made sure that our designs were functional. Our mother was our chief seamstress, helping us out with the parts of the costume that required sewing. Don't be afraid to ask for help!



EVA foam, and craft foam in black, and two shades of brown.

Here are some of the basics for crafting foam armor. Luckily, foam is lightweight, flexible, fairly inexpensive, and easy to find. To make our costumes have the look of leather and hold their shape, we used two types of foam: EVA foam and craft foam.

We used EVA (Ethylene-vinyl acetate) foam for the base and foundation of the armor. You can purchase it from sporting goods stores such as [Big Five Sporting Goods](#). It comes in both rolls and thicker squares that can be fit together as a floor cover for a gym or work out station. We used the type that comes in a large roll. EVA foam can be heated and shaped, and it will retain and hold its shape as it cools. This allows you to build the basic armor form.

However, EVA foam is grey and clearly looks like foam, and we wanted our armor to look like leather. To achieve this we used craft foam from [Michaels Art Supply](#). Craft foam is lightweight, inexpensive and comes in black, several shades of brown or tan, as well as additional colors. Furthermore it can be treated to look like leather.

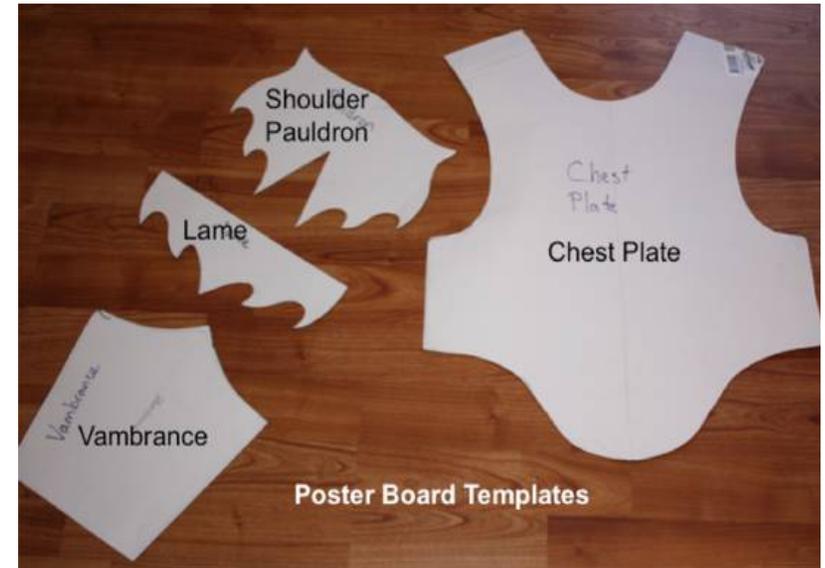
To accomplish this, simply iron the surface. Be sure, though, to place a piece of paper over the surface and set the iron on medium heat. When you iron craft foam you will see that it melts the surface just slightly and it picks up a shiny, leather like sheen. We covered the surface of the shaped EVA foam with glued on layers of the treated craft foam using hot glue. When the hot glue cools and hardens it adds an extra layer of rigidity to the armor. However, to hold the pieces together, we used real leather straps and leather rivets because foam can tear. Genuine leather is better for holding it all together.

You will need some basic tools to make your armor. To shape the EVA foam, you will need a heat gun. This is sort of the tool version of a hair dryer, which blows hot air and allows you to heat the EVA foam to shape it. You will also need a sharp pair of scissors and [X-Acto](#) or other utility knives to cut the foam, a hot glue gun and plenty of glue sticks for attaching the craft foam, a leather punch and hammer to punch holes and attach the leather rivets with, and an iron and ironing board to treat the craft foam. Additional tools that can be helpful include a [Dremel rotary tool](#) and a wood burning tool like [Versa-Tool](#) that is normally used to burn lettering into wood.

The supplies that you will need are: EVA foam, craft foam, poster board paper, leather pieces and strapping, Velcro, leather rivets, and some small buckles, fabric paints and rubber stamps. Much of this can be purchased at craft and fabric stores, such as Michaels Art Supply or [Jo-Ann Fabrics](#). For

a better selection of rivets and small metal buckles, however, I recommend ordering online from [Tandy Leather](#). Small finishing touches can really make a costume, such as small metal studs, adornments, belt buckles, etc. Hitting the thrift stores, swap meets, and eBay will help you find accessories that fit your theme and bring added detail to enrich your creation.

To make the armor's under-layer, we created patterns out of poster board for all the different pieces, such as the chest plate, back plate, shoulder pauldrons, lames, bracers, thigh plates and shin guards. For the chest and back plates we laid down a sleeveless T-shirt on the poster board and traced it out. We made sure to trace the patterns a bit larger to start with.



Poster board cut out templates, used to first test for sizes, were then used to trace and cut out EVA foam pieces for the Drow Elf armor.

We tested the size by lightly taping the poster board template pieces together over our bodies to see how they fit before using our foam. The pieces overlapped in places.

Keep in mind that when you bend something over a curved surface, such as your torso, it needs to be a bit larger. You can always trim the EVA foam pieces down a bit after you heat shape them.

Once we had our poster board templates, we traced the patterns on the EVA foam and cut out the pieces. We used the heat gun to start molding these pieces because the heat makes the foam malleable. We made sure to keep the corrugated pattern of the EVA foam facing inward against our bodies and the flat smoother surface as the outside of the armor.



Leaves were first traced on to heat treated (ironed) craft foam, cut out, then veined using a [Versa-Tool](#) heat tool.

Most pieces required multiple re-heating and re-shaping steps to achieve the proper shape and fit well. Even though you will use leather straps to attach and hold pieces together, you don't want to put too much stress on the straps: otherwise, the rivets that hold the straps to the softer foam can tear out. Foam is not overly strong, so don't try to compensate for badly shaped pieces by tightening the straps to pull and bend the foam. It is better to shape the EVA foam correctly from the start to fit well, so that the amount of pull and stress on the straps and foam is minimized.

For shaping the smaller pieces such as the wrist guards, lames, etc., the process can be sped up by placing the heated pieces in the freezer, to cool them faster.

We started with the larger breast and back plate pieces, shaping the heated EVA foam to fit our bodies. To accommodate a feminine figure, we used a soft ball to stretch and bend the foam over for the chest plate. It took several cycles of heating, bending and shaping to achieve a good fit. Sometimes rolling a section of the heated foam (such as where it curves over the top of the shoulder) tightly while warm, then releasing it, was more useful to achieve a tighter curl or bend, than just bending the foam over our bodies.

We initially made the pieces overly large, and they overlapped where the back and chest plates met. Once the pieces were shaped, we began trimming back the overlap so that the chest and back pieces fit together and met properly. We left a little extra room once they fit together to allow for freedom of movement and some airflow.

Once the chest and back EVA foam pieces were fully shaped, we prepared to layer the treated craft foam onto them. We ironed the

craft foam in full sheets. Once cooled, we cut them into various shapes and hot glued the layers onto the EVA foam.

For the Drow Elf armor we used black craft foam exclusively, and cut out dragon scale like patterns. For my Woodland Elf armor, we used different shaped leaves. Each was traced on to the craft foam using a poster board template, then cut out. To give a more realistic leaf pattern we melted leaf veins into the iron-treated side of the craft foam leaves using the heat tool. This took a considerable amount of time because the veins had to be individually carved into each leaf that would be glued onto the armor. However, it proved to be well worth the effort, as it gave the leaves a slightly three dimensional appearance, which greatly enhanced the overall look of the costume. We used two colors of brown craft foam and alternated the different colored leaves to give a camouflage appearance to the armor.

We attached the craft foam leaves and scales to the EVA foam using hot glue. For best results, coat almost all of the backside of the craft foam pieces with a thin layer of hot glue, using the nozzle or tip of the hot glue gun to spread the hot glue around. Avoid excessive amounts of glue, or going all the way to the edge of the craft foam, to prevent excess glue from squeezing out from under the craft foam and being visible when you press the piece to the armor. Also be sure to glue the non-ironed side of the craft foam, so that the ironed and more leather like side faces outward. If the hot glue starts



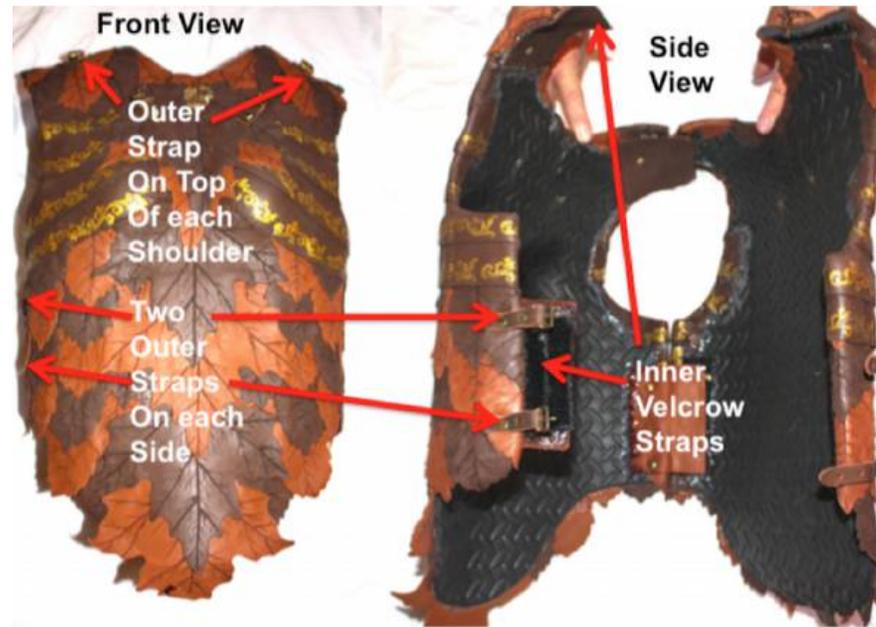
EVA foam was traced and cut out using poster board templates for the Drow Elf armor and heated using the heat gun. Foam was shaped by hand, by rolling the lame, and/or stretching and shaping the shoulder pauldron over a bent knee. The V-cut was then glued together with hot glue to help shape and hold it in the dished shape. Shaped pieces were covered in the layers of craft foam, which hides the glued seam of the pauldron. After being covered with craft foam the lames were riveted to leather straps and attached to the pauldron.

to cool and harden before you can spread the glue across all of the back surface of the craft foam piece, just use the heat gun to reheat the glue ensuring that all the glue on the piece is hot and sticky.

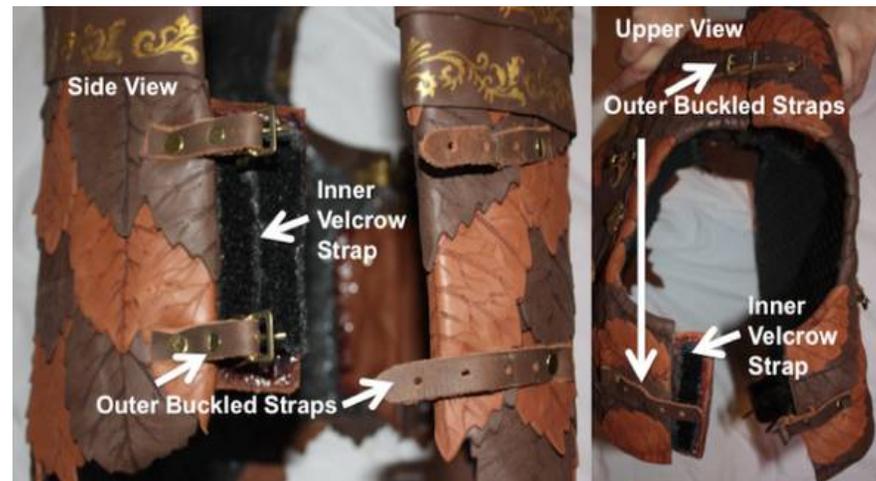
Next, we carefully placed the piece of craft foam on the EVA foam under-layer and used a folded wet paper towel over the top to press the craft foam to the EVA foam. The wet paper towel kept the hot glue from burning our hands, and cooled it so that it stuck quicker.

We started hot gluing the craft foam at the bottom of the armor, making sure the first pieces slightly overlapped the EVA foam, so that the EVA foam edge could not be seen. We then started layering the craft foam upwards, with each new layer slightly overlapping the layer below. This enhanced the dragon scale look of the Drow Elf armor and the leaf scale mail look of the Woodland Elf armor. Once the armor was covered from top to bottom, small pieces of craft foam were curled over and glued to the top and side edges to make sure none of the EVA foam was visible.

To attach the breast and back plates, we hot glued and riveted leather pieces with attached Velcro to the inside of the armor, and riveted additional straps of leather with small buckles to the outside of the armor on



Chest and back plate fitted together. Inner leather straps have Velcro attached with a corresponding Velcro piece glued and riveted on the inside of the opposite piece of the upper body armor. The outer straps use brass buckles to attach. The rivets go through both the inner and outer leather straps. (Additional straps will be added later for attaching the shoulder pauldrons to the chest and back plates.) Notice that the craft foam bends around the side edges of the EVA foam, and extends over the lower edge of the EVA foam hiding the EVA foam from view.



Side view of body armor, and upper view looking down on top of shoulders.

both sides and the tops of the shoulders, where the back and breast plates met.

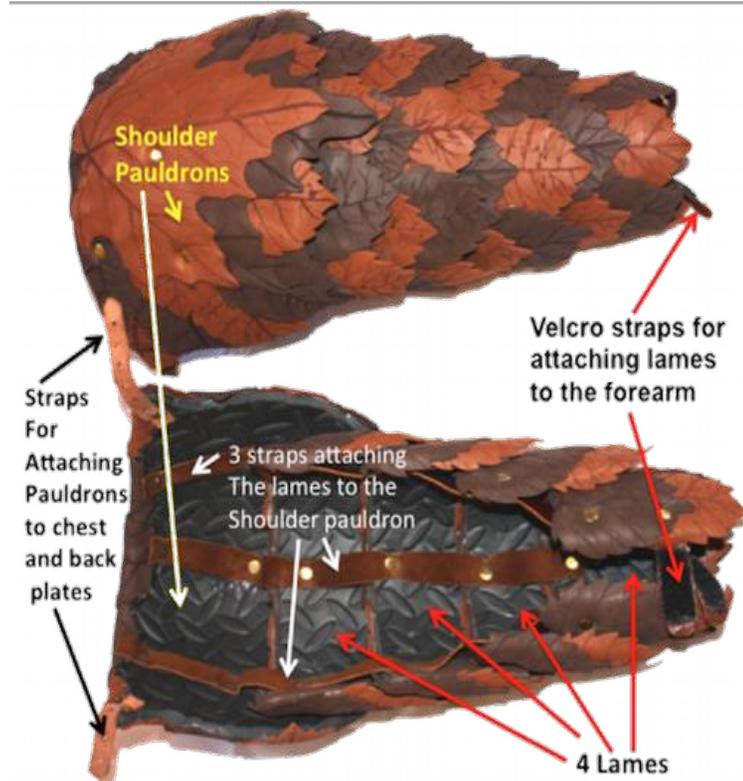
We painted a Drow symbol on the front chest plate of the Drow Elf armor. My brother downloaded a Drow house symbol he liked from the Web, and created several overlapping stencils from poster board. We used them to paint the symbols on the breastplate with fabric paint. For my Woodland Elf armor, we used a rubber stamp to add a design across the rib section lightly in ink. We then went back over the design with fabric paint and a fine paint brush. In both cases we painted the designs on the craft foam piece with the fabric paint before gluing them to the EVA foam.

We added other decorations in the form of a gold leaf pin that was hot glued to the front of the Woodland Elf armor, and added silver skulls (used to make paracord bracelets, and sold at Michaels Art Supply) to the neck line of the Drow Elf armor. The skulls were sewn on with heavy black waxed thread (used for sewing leather) after hot gluing them in place. The thread went through the hole that passes through the side of the skulls.

Two outer straps are on each side of the body armor, and one outer strap is on top of each shoulder. A Velcro strap is on each shoulder

(inner side of the armor) and on each side of the body (inner side).

We made pauldrons (the curved piece that fits over the shoulder) and lames (the curved overlapping plates that extend down the forearm) individually, and attached them to each other and the chest armor with leather straps. For the pauldrons, we cut a V-shaped notch into the EVA foam, so that when the edges of the V were glued together it would help create the shape of the



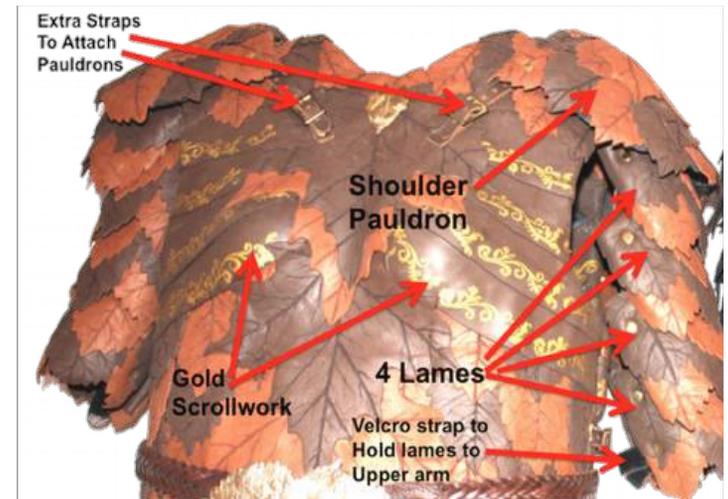
Each shoulder pauldron was riveted to four lames with three straps. Two additional straps were attached to each shoulder pauldron: one to buckle the pauldron to the chest plate and one to buckle the pauldron to the back plate. Leather straps with Velcro hot glued to them were attached to the last lame to strap the lame around the upper arm.

pauldron. Additional shaping came from heating and stretching the piece before hot gluing the edges of the V together. While this left a visible glue seam in the EVA foam, the seam became invisible, once it was covered in craft foam.

As with the body armor, we started hot gluing the craft foam leaves or dragon scales to the pauldrons and lames at the bottom or edge that points out from the shoulder. The craft foam extended out past the EVA foam pauldron or lame to hide the edge. Subsequent layers extend up the pauldrons and/or lames, each slightly overlapping the one below.

For the lames, we cut the EVA foam, and heat shaped it to curve around the arm by rolling it while warm into a tight roll (illustration on page 56). Once the heated foam started to take on the proper curvature we placed it in the freezer to quickly cool it and allow it become more rigid. The EVA foam lame was then covered with craft foam leaves or dragon scales using hot glue, as described for the previous armor pieces.

We riveted two leather straps to each shoulder pauldron, and attached it with buckles to the chest and back plate. Three additional straps were riveted to the shoulder



Shoulder pauldrons and attached lames buckled to the chest plate. Scroll work on chest plate was re-painted using gold fabric paint after the pattern was initially faintly placed on the foam using a rubber stamp and gold ink.

pauldron to attach the lames that cover the upper arm. The lames were riveted to these straps with leather rivets. Drow symbols were painted free hand on the shoulder pauldrons, and silver skulls and studs were added to the pauldrons and lames. For the Woodland Elf armor we used alternating colored leaves with leaf veining patterns, so no further adornment was required. We added leather straps to the lowest lame to strap around and hold them to the upper arm. The straps attached to the lames using leather rivets, but we also used Velcro to allow the straps to attach to each other.

Covering the lower abdomen and hips was one of the more difficult sections to figure out. Since you bend at the waist and will often be sitting, this section of the armor needs to be highly flexible and soft enough for you to sit comfortable. Initially,

we used EVA foam plates covered in craft foam as with the rest of the armor but found these to be too stiff and uncomfortable to sit down in.

We finally decided to make a simple under-tunic of leather-like vinyl that would be worn under the upper body armor and extend down underneath to the upper thigh. The vinyl was soft and supple enough, and slits were cut into the front and back of the lower section of the tunic to allow for better movement. Dragon scales or leaves were hot glued to the lower part of the vinyl tunic to cover the areas visible when wearing the armor. The upper section of the vinyl tunic was covered by the upper chest and back plate armor and thus did not need added scales or leaves.



The vinyl under tunic had leaves attached with hot glue for the Woodland Elf costume. The second panel shows how the upper body armor covers the blank (non-leaf covered) portions of the tunic.

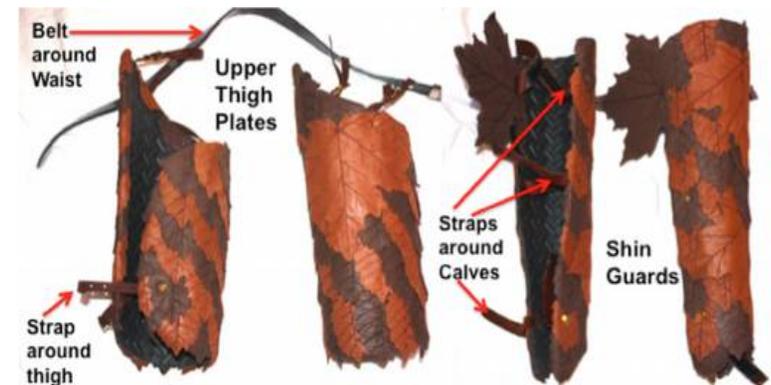
While hot gluing the craft foam leaves and scales added some rigidity to the vinyl tunic, the thinness of the craft foam ensured it was still flexible enough to sit and move in. Alternatives might be chain mail, or a war skirt as seen in Greek and Roman armor.

Bracers or vambrances, were made for the forearms using the EVA foam, heating and curling the foam to fit. Like the other pieces, the vambrances were then covered in the treated craft foam. Black leather gloves were added to the Drow Elf costume, decorated with Drow symbols, silver studs, and skulls. For the Woodland Elf armor, a back hand plate was added with bronze colored studs (obtained at Jo-Ann Fabrics) at the knuckles.

Thigh plates and shin guards (greaves) were made in similar fashion. We attached leather straps with rivets that went around the back of the thigh and leg to hold the armor in place. Additional straps were attached to a belt,



Finished vambrances covered forearms for Drow Elf and Woodland Elf costumes. Drow symbols were painted with silver fabric paint using stencils. Silver studs and skulls were added to accent the Drow Elf armor, while bronze studs were used to accent the knuckles of the Woodland Elf armor. A leather strap was riveted to the back hand plate to fit around the palm of the hand and hold the plate to the back of the hand.



Upper thigh and lower shin armor used for the Wood Elf costume. The belt fits around the waist while two straps attach each thigh plate to the belt to keep the armor from slipping down. An additional strap buckles around the thigh to hold the armor on to the leg. Three leather straps hold the shin plate to the lower leg using Velcro.



Mask for Woodland Elf was made by hot gluing silk fabric leaves to a simple face mask. Serrated teeth for Drow Elf costume were created by sharpening acrylic finger nails and super gluing them to a piece of Warbla thermo plastic, which had been heat fitted to my brother's upper teeth and mouth.

which went around the waist, to prevent the thigh plates from slipping down while walking.

We did not make helmets, preferring to have better visibility for walking around Comic-Con. Also, helmets tend to be a bit stifling and hot. Instead, for the Woodland Elf costume, we made a mask by hot gluing silk fabric leaves to a simple face mask. A crown of leaves was made in the same way. We made serrated teeth for the Drow Elf costume by sharpening acrylic finger nails and using [Super Glue](#) to attach them to a piece of [Worbla](#) thermoplastic, which had been heat-fitted to my brother's upper teeth and mouth.

We purchased belts at a local thrift store, and appropriately themed belt buckles from eBay. A black Halloween robe with an added trim was worn underneath the Drow

Elf armor, while a faux brown leather cloak was added to the Woodland Elf costume. Both of us wore leather boots. My brother's were black with black fur trim, while mine were simple brown leather boots.

We had swords while at the Masquerade contest, but for walking around Comic-Con we only had a sorcerer's staff for the Drow Elf and an elven bow for the Woodland Elf. The simple hickory wood bow came from eBay. We stained and

polished it using brown shoe polish, painted it with gold elven symbols, and wrapped the handle with a leather thong. Fake arrows were made of wooden dowels stained with shoe polish with craft foam feathers or fletching added with hot glue. The staff was stained and polished wood, wrapped in leather, with a polished stone skull adorning the top.

We both wore commercially available pointed Elf ears that attached using spirit gum. We colored the Drow Elf ears by painting them with liquid latex mixed with black latex paint.

Seeing the finished costumes and getting a chance to compete in the Comic-Con Masquerade was amazing, and made all those hours of carving leaf veins worth it. I felt an enormous sense of pride, and I loved

that I was able to show off the costumes to both the audience and the other competitors. I sincerely hope to repeat the experience, and am looking forward to making other costumes with my dad.

So, what's next, you ask? Well, we're currently working on iridescent fairy wings for my younger sister and I to dress as Fairies in the style of our favorite fantasy artist Nene Thomas. We are also looking into making dragon rider costumes where we will be actually riding dragons as part of the costume. Never let the fear of failure limit your imagination, and your willingness to try to create something wonderful and new that you can enjoy!

***Mikaela Renshaw** is a college freshman majoring in English. She has been cosplaying for as long as she can remember at Renaissance fairs, theme parks, Halloween, and later events like Comic-Con. She hope that her costume-making skills will continue to grow, so that she can go on to create more complex costumes.*

***Mark Renshaw** is a molecular biologist and father of three. As an avid enthusiast of Halloween, he has been making props and decorations for many years (for an example, search 'dangling crank spider Aragog' on the web). More recently he started helping his children make unique Halloween costumes. This has now transitioned into helping with Comic-Con costumes as well. He is also a fan and regular attendee of Renaissance Faires, and has some familiarity with medieval armor.*