

GUIDE TO PURCHASING MATERIALS TO MAKE THE ADAPTIVE CASUAL SHOE

Item	Potential Source	Cost
<p>To make the Adaptive Casual Shoe for Ankle Foot Orthotic Users you will need a sewing machine, a tube sock (old or inexpensive, this will be cut) as well as:</p> <p>Shoe sole Brooklyn Supply</p>	<p>https://brooklynshoesupply.com/collections/soles/products/margom-outsoles</p>	<p>\$39 each</p>
<p>Duck cloth, turquoise $\frac{3}{4}$ yard:</p>	<p>https://www.joann.com/jo-ann-stores-duck-canvas-fabric/prd23683.html</p>	<p>\$9.99/yd</p>
<p>Colorful outdoor canvas, $\frac{3}{4}$ yard</p>	<p>Examples:</p> <p>https://www.joann.com/outdoor-canvas-fabric-watercolor-cactus/16482747.html#q=outdoor%2Bcanvas&start=1</p> <p>https://www.joann.com/outdoor-canvas-fabric-tonal-green-palm-leaves/16482739.html#q=outdoor%2Bcanvas&start=1</p> <p>https://www.joann.com/outdoor-canvas-fabric-medallion-grey/16482663.html#q=outdoor%2Bcanvas&start=1</p>	<p>\$8.79/yd</p>

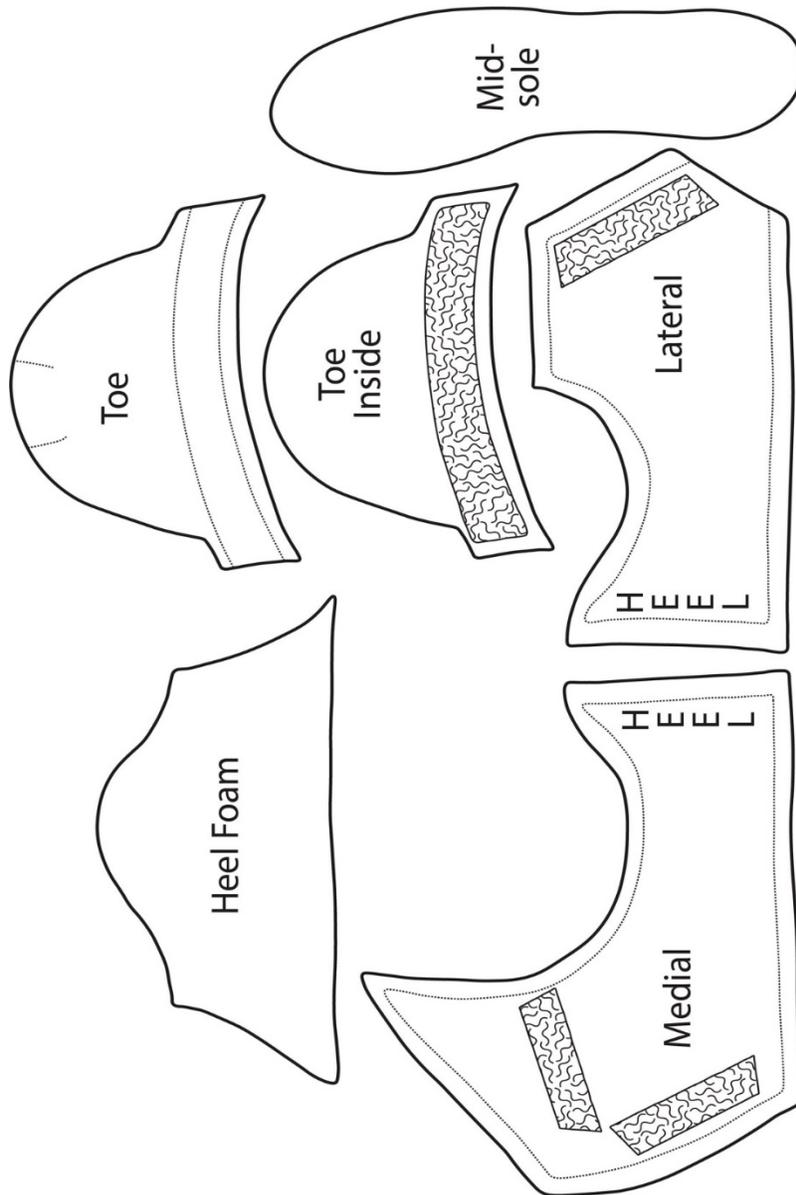
Velcro, 1/2-3/4 inch width	https://www.amazon.com/dp/B00114506l/ref=emc_b_5_t	\$2.73
Felt, 2 layers per shoe	https://www.joann.com/12x18in-felt/zprd_02404655a.html#q=felt&start=1	\$2.49
Thread- Match colorful outdoor canvas color and white	https://www.joann.com/coats-andamp-clark-dual-duty-xp-general-purpose-thread-250yds/xprd840925.html#icn=search&ici=thread&start=1	\$3.49
"Soft and Stable foam" By Annie	https://www.joann.com/pellon-flex-foam--2-sided-fusible-interfacing-fabric-20/14896799.html#q=.%2B%2BPellon%2BFlex%2BFoam%2B1-Sided%2BStabilizer%2B&start=1	\$10.99/5yd
Plastic Corset boning or plastic cable zip-ties	https://www.amazon.com/Hmrope-Premium-Plastic-Strength-Self-Locking/dp/B07TG9VMWY/ref=sr_1_6?dchild=1&keywords=zip+ties&qid=1590369269&sr=8-6 https://www.amazon.com/Polyester-Wedding-Dresses-Banquet-Clothes/dp/B087CVGRCM/ref=sr_1_25?dchild=1&keywords=plastic%2Bcorset%2Bboning&qid=1590369325&sr=8-25&th=1	\$5.29 \$12.99 (1/2 inch(12mm))

Interfacing	https://www.joann.com/pellon-931td-fusible-midweight-20in-interfacing-white/16698110.html#q=interfacing&start=1	\$4.99/yd
Fabric glue and spray adhesive	https://www.amazon.com/E6000-231020-Adhesive-Precision-Tips/dp/B00JP3X9WE/ref=sr_1_6?crid=18EK5DV0S1WD6&dchild=1&keywords=e600+glue&qid=1590369507&srefix=e600+%2Caps%2C137&sr=8-6 https://www.amazon.com/Scotch-Multipurpose-Adhesive-cardboard-plastic/dp/B00114RCP0/ref=sr_1_22?crid=2CPOEX5FNS0P5&dchild=1&keywords=spray+adhesive+for+fabric&qid=1590369563&srefix=spray+adhesive%2Caps%2C138&sr=8-22	\$7.15 \$16.83
Denim sewing needle	https://www.amazon.com/Singer-75467-Sewing-Machine-Needles/dp/B004IHNSW/ref=sr_1_2?dchild=1&keywords=denim+sewing+needle&qid=1590369611&sr=8-2	\$3.87
Sewing Scissors	https://www.target.com/p/fiskars-8-premier-bent-sewing-scissors-orange/-/A-75662026?ref=tgt_adv_XS000000&AFID=google_pla_df&fndsrc=tgtao&CPNG=PLA_Storage%2BOrganization%2BShopping_Local&adgroup=SC_Storage%2BOrganization&LID=700000001170770pgs&network=g&device=c&location=9007216&ds_rl=1246978&ds_rl=1247068&ds_rl=1248099&gclid=EAlaIqobChMI7rStrO7N6QIVFk2GCh2k6gW7EAQYBSABEgKcLvD_BwE&gclsrc=aw.ds	\$8.59

Safety Scissors	https://www.redcross.org/store/physicianscare-first-aid-titanium-bonded-bandage-shears-7in/90292.html?gclid=EAlaIqobChMlv9CN4vDN6QIVIOeGCh3E9Q4QEAQYBiABEgKRE_D_BwE&gclid=aw.ds	\$8.39
Duct tape	https://www.amazon.com/Duck-Colored-Inches-Single-285226/dp/B06WD8D2TR/ref=sr_1_4?dchild=1&keywords=duct+tape&qid=1590369696&s=arts-crafts&sr=1-4	\$3.88
Masking tape	https://www.amazon.com/Scotch-Masking-Painting-1-88-Inch-60-1-Yard/dp/B000BPILS2/ref=sr_1_8?dchild=1&keywords=masking+tape&qid=1590369902&sr=8-8	\$4.27
Construction Paper	https://www.amazon.com/Tru-Ray-Heavyweight-Construction-Electric-Orange/dp/B014CD2B70/ref=redir_mobile_desktop?ie=UTF8&aaxitk=eLEEU9Mgy4EiQ5tcDeWWgA&hscrid=9457168050501&ref=ss_sparkle	\$3.74
Permanent Marker	https://www.staples.com/Sharpie-Fine-Point-Permanent-Markers-Black-30001/product_498238?cid=PS:GooglePLAs:498238&ci_src=17588969&ci_sku=498238&KPID=498238&gclid=EAlaIqobChMlv5u7u-3N6QIVAEiGCh33UQ5NEAQYAyABEgL_-D_BwE	\$1.69



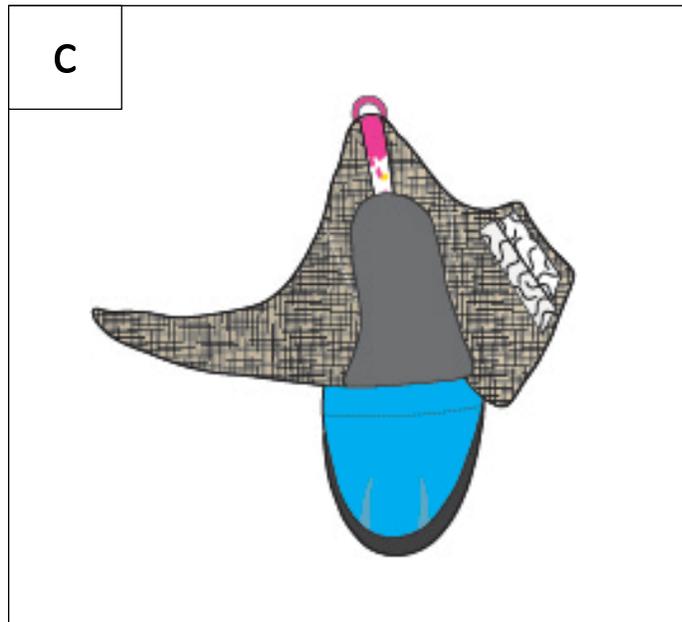
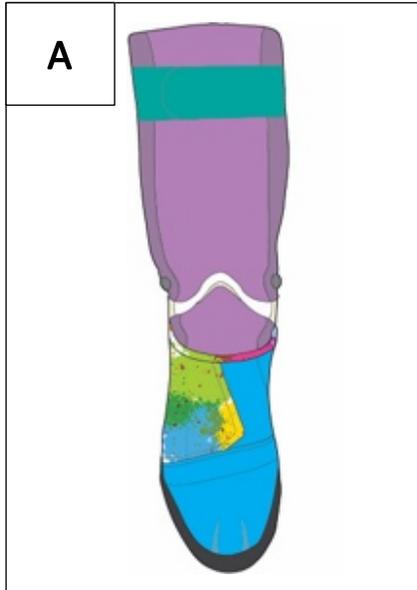
Pattern:



How to Make the Adaptive Casual Shoe

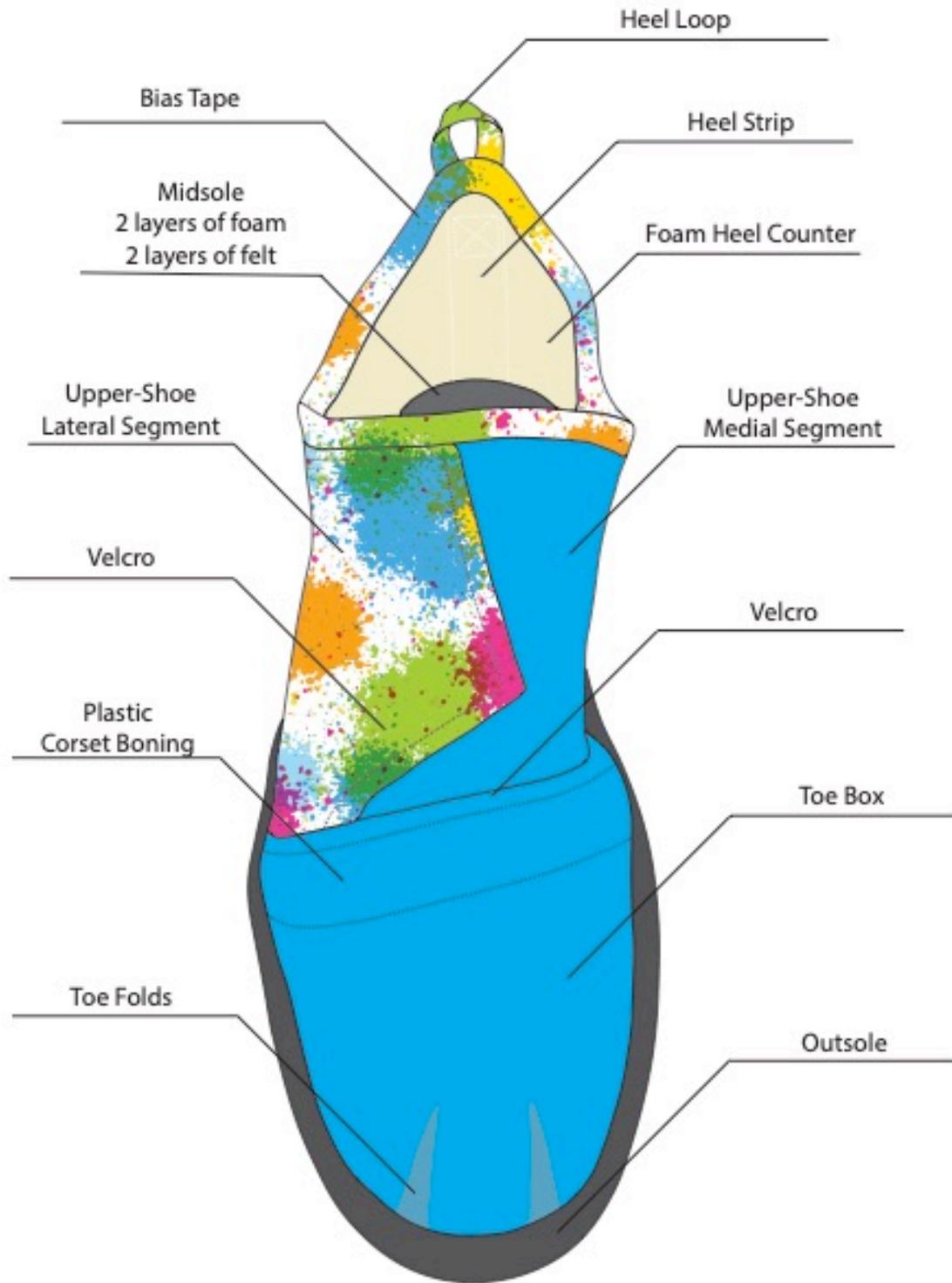
3- View Design Sketches:

- A. Top View AFO within shoe
- B. Side-View without AFO
- C. Top View with shoe open, without AFO



How to Make the Adaptive Casual Shoe

Design Map:





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Written By: Move To Learn Innovation Lab

TOOLS:

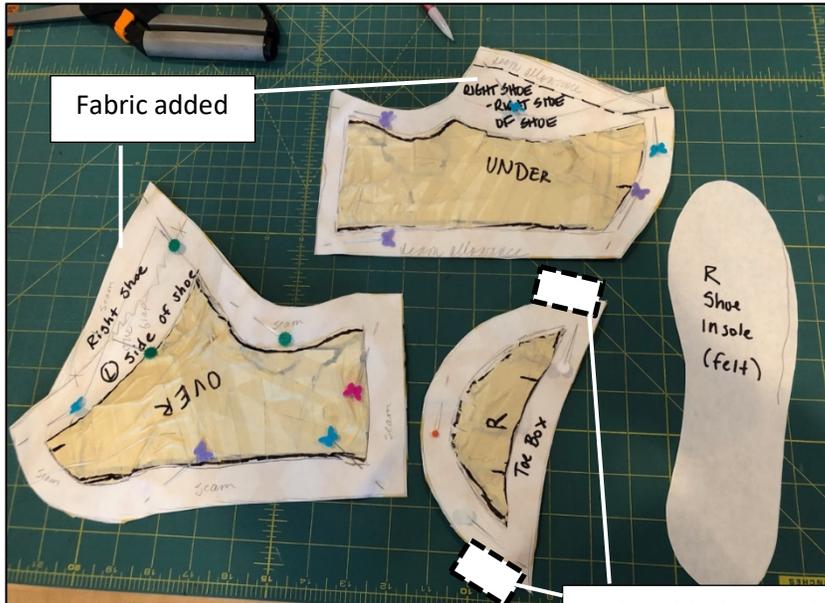
- **Sewing Machine** (1)
- **Denim Sewing Needle** (1)
- **Sewing Scissors** (1)
- **Safety Scissors** (1)
- **Duct Tape** (1)
- **Masking Tape** (1)
- **Sharpie** (1)

PARTS:

- **Shoe Sole** (1)
- **Fabric Supplies** (1)
- **Hook and Loop Fastener Strips (Velcro)**(1)
- **Thread** (1)
- **Plastic Zip Ties or Corset boning** (1)
- **Construction Paper** (1)

The following directions are for one shoe (either the right or left), you will need to make a second shoe following the same directions. If the user wears an ankle foot orthotic (AFO) on both feet that are similar in size, you can create one pattern and then turn it over to use for the other shoe (so your pattern will be a mirror image). If the user wears the AFO on one side, you can make two patterns, one with the AFO on, and one without. If the user wears two different sized AFO's, you can follow the directions to make the two patterns, one for each foot

Step 1 — Pattern Development



- The pattern for the shoe is created using a sock, duct tape, masking tape, and a permanent marker. While the pattern shapes should be similar, the length and width of the pattern will be based on your foot and AFO size.
- Put on an inexpensive sock over the foot with AFO donned, wrap a layer of duct tape around the sock. The duct tape should overlap to create a stiff layer of tape, from toes to above the ankle.
- Next, wrap a layer of masking tape over the duct tape layer, covering completely.
- Draw lines with the permanent marker on the masking tape. Mark the ankle, toe box, and a diagonal line from the ankle to the toe box, as shown below in the images. Mark left and right foot on the appropriate pieces. These will be the basic pieces of your pattern.
- The sock covered in tape makes a “mold” that is then cut off your foot. Cut through the sock layer, be sure to use scissors made for cutting along the skin. Tape the mold back together along the cut you just made.

How to Make the Adaptive Casual Shoe

- Cut the masking tape along the sections that you drew on the masking tape. These are your pattern pieces. Tape these pattern pieces to a large piece of construction paper.
- On the construction paper, trace along the outer edge of each pattern piece. Add at least ½ inch to the outer edge of each pattern piece. Adjust the pattern shapes based on the pattern drawings (See Pattern Figure). Add the “tabs” to the toe box, and add additional fabric for the medial flap which will go “under” the lateral flap in the final product.
- Create the heel foam pattern based on the pattern above. The heel foam should follow the shape of the heel and the medial and lateral segment patterns.

Step 2 — Prepare Supplies



- Colorful outdoor and solid outdoor canvas, foam, and felt. Cut out the fabric based on the pattern pieces that you created.
- Cut:
 - 2 layers of the toe-box from solid outdoor canvas
 - 2 layers of the medial (solid colored canvas) and lateral (patterned canvas) segments for each shoe, you should cut these with the “wrong sides” together, so the inner layer will act as a lining
 - 2 heel foam pieces
 - Interfacing to match the medial and lateral segment patterns
 - 2 layers of the felt midsole
 - 1 layer of foam midsole for each shoe
 - 2 pieces 1 ½ x 5 inch print outdoor canvas for
 - Center strip for the heel

Step 3 — Glue



- One layer of the felt midsole into the rubber outer sole using the fabric glue (E6000 glue) for each corresponding left and right shoe

Step 4 — Bias Tape



- Select the material that you want to use to make the bias tape to finish the edges of the shoe. This can be either the colorful or solid canvas. If you are unsure of how to make bias tape, there are great directions available on YouTube, or at the following link:
<https://www.mygoldenthimble.com/how-to-make-bias-tape-easy-without-maker/>

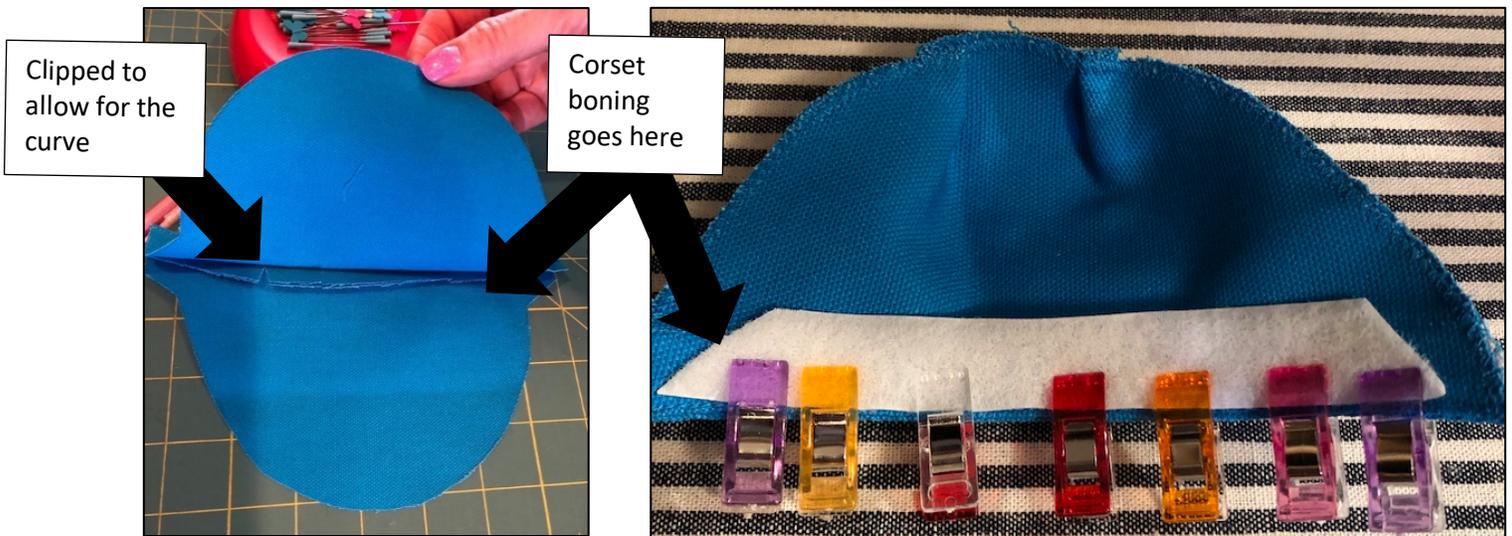
Step 5 — Medial/Lateral Segment



Zig-zag stitching
along the edge

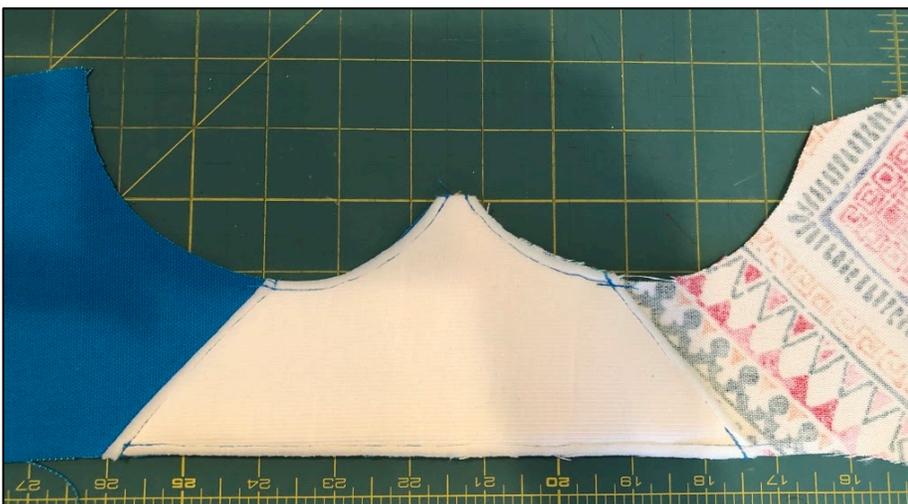
- The canvas material is prone to fraying, you can zig-zag stitch along all of the edges of the canvas to prevent fraying while you are constructing the shoe.
- Iron on the interfacing to the wrong side of each of the medial and lateral segments.
- Pin or clip two layers of the medial and lateral segments, wrong sides together, to create a medial and a lateral upper segment with 2 layers with interfacing in between. You will be matching the printed canvas pieces with each other and the solid canvas pieces with each other.
- Sew the layers together with a straight stitch to cover the interfacing and reinforce the material.

Step 6 — Create the Toe Box



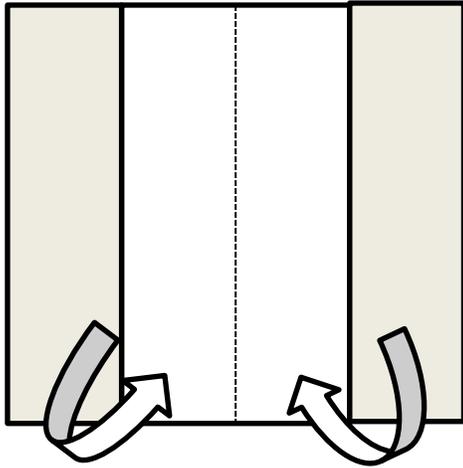
- Match up the 2 pieces of toe box, right sides together, and sew along the front edge of the toe box pieces, with a $\frac{1}{2}$ inch seam allowance. Clip into the seam along the curve, up to but not through the stitching, as needed to release the curve. Turn right side out, press seam flat.
- Insert boning in Front Edge of Toe Box: Create a channel by top stitching very close to the edge on the right side of the front edge of toe box you just created. Stitch again $\frac{1}{2}$ inch away from the line of top stitching to create the channel. Insert boning by sliding into channel. With all edges of toe box matching, zig-zag stitch around all raw edges of the toe box pieces to enclose the ends of the channel, connect the two toe box pieces, and prevent fraying. Attach soft side of the hook and loop fastener along the front edge of toe box that will now be considered the inside of the shoe. The corset boning helps the toe box keep its shape when the shoe is worn.
- Create the pleat in the toe box by making two small folds and stitch the fold along the outer edge. The pleats help the toe box keep a round shape.

Step 7 — Add Heel Foam



- Machine stitch the foam to the inside of the shoe upper with a straight stitch.

Step 8 — Create Vertical Heel Strip



- Cut 2 pieces of outdoor canvas 1 ½ x 5 inches. Note: this will be a little longer than you actually need, but that will be adjusted before the bias tape is added. (In the example, I used the print outdoor canvas fabric and fussy cut matching pieces, centering the area of the print that I thought would complement the overall appearance on the heel of the shoe. Depending on your fabric selection you might wish to consider your selection for this piece as that which will work best with your fabric choice.) Fold both sides of the 1 ½ x 5 inch heel piece, along the long sides, wrong sides together so that they meet in the center. Press well.

- Machine sew with a straight stitch the center vertical heel strip to the outside of the heel. Trim the heel center strip straight across to align with the bottom edge of the shoe piece and also along the curve of the top of the heel piece matching the curve of the shoe piece.

Step 9 — Finishing Edges



Bias Tape

Heel center strip



- Clip or pin the bias tape to finish the top of the shoe upper, being sure to encase all raw edge, including the heel strip.

Step 10 — Heel Loop



- Attach the bias tape loop to the heel with a straight stitch. You can sew an X pattern for additional design

Step 11 — Hook and Loop Fastener



- Attach the hook and loop fastener strips to the shoe upper with a straight stitch. You can also add Velcro to the multi-colored lateral flap for extra security.

Step 12 — Put the Shoe Together





- Next, you will build the shoe. The toe box will be hand sewn to a layer of foam, and the shoe upper will be sewn to a second layer of foam. Pin and then baste stitch the toe box to one layer of foam and baste the shoe upper to a second layer of foam. If you can, machine stitch the shoe upper to the foam after hand basting.
- Test the fit of the foam midsole in the rubber sole then glue the two layers of foam together so you will have a shoe with 2 layers of foam with both the toe box and shoe upper. You can use wax paper and clips to keep the foam together while the glue dries and avoid sticking the glue to the clips.
- Glue the double layer of foam to the felt within the rubber outer sole and glue the edges of the rubber sole to the canvas
- Use spray adhesive to attach the final layer of felt to the midsole to finish the shoes!



You can then follow these directions again to make the other shoe!



If you have any questions, please contact me at jorlando@udel.edu. I hope you enjoy your new shoes!

**Shoe design created by: Julie M. Orlando, PT, DPT, and Katharine A. Orlando, with recommendations and contributions from Adriana Gorea PhD and Michele A. Lobo PhD.
Thanks to Vedant Patel for assistance with the manual.**

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