

# “FERN” PROTECTIVE FACE MASK

Developed by Nic Mominee and family. Patterns and instructions finalized April 23, 2020.

FERN is a contoured, multi-layered fabric mask with an adjustable (and removable) wire in the nose section. It has an internal pocket that can accommodate insertion of a soft filtration disk. FERN can also serve as a protective outer covering for standard PPE N95 masks, that will hold the N95 in place without its elastic straps or ties). FERN’s integral straps adjust and fasten with hook-and-loop tape, and have a single pull loop for quick release. With the nose wire removed, the mask can be autoclaved and dried for reuse many times.

[The designation “FERN” is in honor of our late aunt, Fern Theriac, a military nurse who served during WWII. Her uniform is on display at the Indiana War Museum in Vincennes, Indiana, along with that of her husband, Regis Theriac, a survivor of the Bataan Death March. Fern was imminently practical, and we like to think she would have appreciated this mask.]

## Materials needed:

- 100% cotton fabric (tightly woven; white or solid colors work best; 1 yd. gives 2-3 masks, depending on size of mask)
- Hook-and-loop tape (sewable), at least 1” wide
- Vinyl-covered wire (flexible garden tie wire works well, cuts easily)
- Thread (100% cotton; matching or contrasting color; medium weights work best)
- Narrow, lightweight cotton cording (soft enough to sew through easily; or make a simple fabric strip rolled to ¼” wide and stitched securely down its length and across its ends)
- Pattern pieces: “Part A” and “Part B/C”
- Wire cutters, basic fabric-cutting and sewing equipment

## Assembly instructions

*Two things to remember:*

1. DO NOT CLIP ANY CURVES. There is sufficient bias in the pattern to overcome this, and clipping will only weaken the functionality of the mask.
2. SECURE ALL SEAMS AT THEIR BEGINNINGS AND ENDS. Masks need to be durable.

### **PART A:**

1. Place pattern on fold of fabric. Cut 1 piece and open to lay flat.
2. On TOP LONG EDGE Mark from center fold line approximately 1-1/2” away from fold on each side, and just over 1/2” up from the cut edge. (See dot on pattern.)
3. Fold the TOP LONG EDGE over ¼” twice to make a double-folded edge. Stitching about 1/8” from the edge of the fabric, sew just up to the marks from both ends of the piece. Smooth the unstitched gap to follow the adjacent sewn edges and sew down to match the adjacent lines of stitching.
4. On the BOTTOM LONG EDGE: mark 1-1/2” out from both sides of the fold line.

5. Fold the edge over ¼" twice to make a double-folded edge, and stitch this down just up to the marks from both ends of the piece. This leaves an unstitched gap.
6. On the FRONT CURVED EDGE: fold Part A back in half and align curved edges. Sew a 1/2" seam from folded edge to the opposite end.
7. Starting back at the beginning edge, and approximately 1/8" out from the seam just finished, sew a second seam, keeping it approximately 1/8" away from the first seam.
8. Trim away 1/8" outward of the second seam. DO NOT CLIP CURVES.
9. Make a matching PULL LOOP from a 1" x 5" piece of fabric cut (on straight grain) from leftover scraps. Finger-press (or iron) each short end about 1/4" under to wrong side of fabric. Press the loop fabric in half lengthwise, wrong sides together, then open. Fold and press each long side to meet the center fold, and then refold to make a narrow, folded strip. Stitch down the entire length, along the center of the strip.
10. PART A - STRAP ENDS: Fold edges over 1/4" twice (to the inside of the mask, or to the "wrong side" of the fabric) to make a double-folded edge. Starting about 1/8" on the longer pre-sewn edge, securely stitch up to and to the middle of the double-folded edge. Leave the needle down and rotate 90° to stitch across the width of the strap to the middle of the opposite edge. Again, leave the needle down and rotate to complete securing the strap end. Do this to both ends.
11. STRAP END WITH PULL LOOP: Turn PART A so that all folded edges and the stiff curved edge are now "inside" the mask. The righthand strap, by default, will receive the PULL LOOP. Lay the righthand strap end so that the interior side faces up. Place one end of PULL LOOP across the end of the strap so that it extends into the strap about 1/8" past the pre-sewn strap end. Stitch across the LOOP securely. Curve the LOOP strip – without twisting it – to place the other end on the strap end. It should be in relatively the same position as the other loop end, just mirror-image. Sew this end down securely as you did the first end. Pulling on this loop is how the mask will be released and removed by the wearer, one-handed, or by an assistant.
12. Keeping the STRAP END WITH PULL LOOP facing up, cut a length of hook-and-loop tape to cover the width of the STRAP END, from seam to seam. Turn the soft side ("loop") of the tape face-up and position across the end of the strap, just covering the excess ends of the PULL LOOP. Starting in one corner of the tape, carefully stitch the tape down, just inside its perimeter edges. When you return to the first corner, leave the needle down and rotate 45° to sew a line diagonally across the tape. Secure stitching. The soft "loop" tape on the underside of the strap will fasten over the top of the other strap.
13. Place the left-hand STRAP END (the one without the PULL LOOP) with the exterior side facing up. Cut a 4" length of the hook-and-loop tape. Turn the coarse side ("hook") up and center lengthwise down the strap, butting one short end up against the pre-sewn STRAP END. Starting in one corner of the tape, carefully stitch the tape down, just inside its perimeter edges. When you return to the first corner, leave the needle down and rotate the strap about 45°. Sew a line diagonally about one-third

of the way across the tape. Keeping the needle down, rotate the strap again, and repeat this process to create a zig-zag line of stitching across the length of the tape.

## **PART B/C:**

1. Place pattern on fold of fabric. Cut 1 ("B"). Flip pattern over, positioning with fold of fabric as before. Cut 1 ("C").
2. Place B over C *with wrong sides together*. Carefully fold in half along fold line and align outer edges with each other. Pin to secure pieces in place.
3. On FRONT CURVED EDGE: sew a 1/2" seam from edge to edge. Starting back at the beginning edge, and approximately 1/8" out from the seam just finished, sew a second seam, keeping it approximately 1/8" away from the first seam.
4. Trim away 1/8" outward of the second seam. DO NOT CLIP CURVES.
5. On the LONG STRAIGHT EDGE: open the joined sides so that each half has a double thickness. Fold each double-thickness edge back on itself 1/2" and stitch down to close each edge.
6. Insert the conjoined B/C unit into PART A so that the seams of both FRONT CURVED EDGES are back-to-back inside.
7. Fold the CHIN EDGE of B/C under 1/4" to the inside and align with the bottom edge of PART A. Pin to secure. Smooth the fabric out to the sides and loosely pin to help keep it in place.
8. Stitch B/C to PART A, matching up to the seams on PART A.

## **Making the Wire Pocket:**

1. Align B/C and PART A, with PART A to the outside and B/C curving into PART A. Match up the FRONT CURVED EDGES seams (the ones that go from nose to chin).
2. Fold the SHORT TOP EDGE of B/C down between B/C and PART A until it lines up with the TOP LONG EDGE of PART A.
3. Pin the folded-over part of B/C to itself. Whatever the fold-over is, fold and pin that same width across the rest of B/C.
4. Stitch down the folded-over section approximately 1/8" from the raw edge of the fold, leaving the opposing ends open for inserting the wire.
5. Re-position and align B/C and PART A to fit together at the top edge. Match up the curved seam as you did for the CHIN EDGE.
6. Match up and pin the remainder of the top edges. NOTE: The outermost folded-down edges of B/C will fall below PART A's rolled edge. This is okay. DO NOT PIN PAST THIS POINT.
7. Carefully stitch across the top pinned edge no more than 1/8" from the edge, or at least matching up to the rolled edge stitching on PART A.
8. **Prepare the wire:** Cut a 4"-long piece of wire. Trim the internal wire slightly (maybe 1/8" to 1/4"): push the vinyl back along the wire just enough to expose a bit of the wire. Clip the wire, then ease the vinyl covering back in place. Do this to both ends. This will help prevent the wire from working out past the vinyl and poking into skin.

9. Carefully insert the prepared wire into the pocket. (A stiletto or long yarn needle may help keep the pocket open to let the wire pass more easily. Long skinny tweezers can help pull it through, if needed.) Center the wire in the pocket lengthwise. Make a slight bend at the center to keep the wire in place. (The wearer will adjust it further.)
10. Make a simple pleat of about 1/2" along the bottom edge of the mask, on each side of the attached B/C section. Stitch down securely, matching the existing lines of stitching. This will help the mask fit better below the jawline and chin.

### **Fitting/Comfort/Care**

- When wearing this mask without additional filtration, or without an underlying N95 mask, the front bulk of the curved seam can be neatly adjusted by grasping the “point” of the nose between thumb and forefinger, and tucking that up under the wire pocket area. You may need to hold the wire pocket area steady with the other hand while doing this. The mask will allow for adequate breathing in either configuration.
- When using this mask as a protective cover over a standard N95 mask, the straps of the fabric mask alone are sufficient to keep the N95 securely in place. The elastic straps attached to the N95 mask will not need to be used to provide a secure fit and seal.
- When fastening the mask strap ends, the fit should be snug to the face, but not tight.
- The wire in the nose pocket should be bent to conform comfortably over the nose and below the eyes, with no discernible gaps. Eyeglasses should be removed prior to fitting the mask. Further adjustment may be needed once eyeglasses are put back in place.
- This mask, when made with 100% cotton fabric and thread, and with flexible hook-and-loop tape, will withstand a considerable number of launderings with standard detergents and/or diluted sanitizing solutions. Strong solutions of bleach or hydrogen peroxide may cause colored fabrics to fade, and over time could weaken the fibers of the fabric. Use the weakest permissible concentrations of bleach or hydrogen peroxide necessary to properly sanitize/disinfect the mask.
- Fasten the strap ends of the mask together prior to laundering to minimize the hook-and-loop tape catching on other items.
- The wire in the nose pocket should be removed prior to laundering the mask, and disinfected separately before it is reinserted into the cleaned mask.
- Allow the laundered mask to air-dry fully, or tumble-dry on low heat. Excessive heat in wash water or in machine-drying could potentially cause fabric shrinkage, or weaken the hook-and-loop tape.
- Interim disinfection can be done by thoroughly spritzing the mask with a diluted solution of alcohol or hydrogen peroxide (obviously, not while being worn), and allowing it to air-dry sufficiently to permit re-donning the mask.























