Anyjackie’s Duckbill Face Mask V01.0  
(4/8/2020)

You will need to print out pages 2-6 and optionally 9-11 to use as patterns. The rest is useful to print out for reference, but you can also view it on your screen.

This Instructable will show you all the steps to sew a pretty good duckbill face mask. If you are an experienced sewer, you can sew this mask in 20 minutes (excluding time to cut out the pieces, swear, and rip out seams).

This pattern builds off the great work of Dr. Chris Holmes and DeborahHopetree

I have made a few adjustments to the mask. First, I have added a pocket to make it easy to remove and replace the metal nose bridge. In designs where the metal is sewn or glued in, once the metal breaks, the mask loses effectiveness. Also, being able to remove the metal piece for cleaning allows for a more thorough cleaning of both components. Another change is I attached the elastic before combining the two cups to minimize the stitching (and additional punctures) in the actual mask area. And finally, I have added a little indicator tag on the inside of the mask to that the end user can see what fabric is used in between the visible layers. This also has the added benefit of allowing one to monitor the breakdown of the filter fabric over repeated washings.

Please note that this mask is not difficult to sew from a technical perspective, but it does have a lot of details. I don't have any research to back this up, but with the right filter fabrics, it could be more effective than a disposable surgical mask. However, do your own research and make your own conclusions.

I also plan on sizing this down and sewing it for my children. I think having more of the mask away from the face (an issue for those with sensory issues), as well as the fun duckbill design will make it more tolerable to wear. Just keep in mind that the best mask is one that is worn, so when sewing for children and the general public, using cotton for the filter layers is fine. It is probably preferable, because it increases the chances the masks stay on.

First, why this style of mask? I made a few different prototypes. The first one I made was surgical-style, with pleats, and it used straps that tied at the back of your head. I didn't like it, because it required the additional steps of ironing and sewing the pleats, plus additional sewing to bind the edges. Also, I found that the straps tended to slip down off the back of my head. The next mask I made was duckbill style with elastics that went around the back of the head. The fit was much better, but the elastics still slipped down. The version I finally settled on uses behind the ear elastics in conjunction with a headband with sewn-on buttons. The headband is optional, but for those who have to wear masks all day, it's an ear-saver. There are several hacks floating around to save ears. The simplest one I have seen just uses a paper clip to hook both loops of elastic at the back of the head.

Why do I like the duckbill? I think it fits the face better, and the extra internal volume created by the shape made it easier to breathe and lessened overheating. I also like that it sits away from the mouth and nose.

What about a pocket for a removable filter layer? I considered it, but the problem with those is that the removable layer won't have edge-to-edge coverage, and you have to worry about shifting inside the pocket. For now, I think having the layers sewn in works better.
Mark the dotted lines to show where to attach the flap and the pocket.

Cut 1 piece (as a folded layer, folding fabric where marked)
LINING - Easy Version

In the Easy Version, the placement of the elastic is same on the top and bottom. Sew this version first, and see if you want to graduate to the Pro Version.

Cut 1 piece (as folded layer, folding fabric where marked)

Mark these lines to show where to attach the flap and the pocket. Snip through both layers

LINING - Easy

1 inch
LINING - Pro Version

I have found the mask fits better when the elastic placement isn’t symmetrical from top to bottom, but it adds another level of complexity. I’m including it here for experienced sewers.

Cut 1 piece (as a folded layer, folding fabric where marked)

Mark these lines to show where to attach the flap and the pocket. Unfold the fabric piece. Snip at the Nose End for the top of the duckbill, snip at the Chin End for the bottom. On the cover piece, make the corresponding snips so you can line up the cups later.
FILTERS

Cut 2 pieces (as folded layers, folding fabric where marked)
Supplies:

Before you start, make sure you have a clean working area, tools, and clean hands. If you want to eat a bag of Doritos and lick the cheesy goodness off your fingers, do that first, then wash your hands.

1. Cover Fabric (9 x 12”) Ideally, this should be a tightly-woven cotton in a print or color to make it easy to tell which side is out.

2. Filter Fabric (2 pieces 9 x 12”) You can use filter fabric cut out of air filters, surgical draping fabric, non-woven polypropylene (the fabric used in a lot of reusable shopping bags), or even two more layers of cotton. I don’t recommend vacuum cleaner bags. Even though they are great at filtering, it’s very hard to breathe through them. Whatever fabric you choose, do a couple of test washes to make sure it’s washable. You don’t want the fabric to break down, fray, or pill excessively. There is evidence that blue shop towels are great for use in masks, but I don’t know how they hold up with repeated washings. In addition to the pattern pieces you will cut out for the filter fabric, I recommend sewing in a little tag that is visible on the inside of the duckbill. I find it good practice to sew in a tag to indicate the number of layers and the filter material. It’s also a good way to let the end user know the mask construction and to gauge how the filter fabric is faring over repeated washings.

3. Lining Fabric (9 x 12”)- this should be a tightly-woven cotton in a light color to make it easy to tell which side is in.

4. 15 inches of elastic, cut into two 7.5” pieces. Here, I will be using 3/8” wide elastic. You may have to adjust the length depending on how stretchy your elastic is and how big your heads are. If you don’t have elastic, you can also try cutting out strips of spandex, old pantyhose, or anything stretchy that you can find. If you don’t have anything stretchy, you can also use ribbon, bias tape, or cloth straps that tie in the back of the head. You will need to cut 4 strips of fabric 18” x 2”.

5. Metal for the nose bridge. You have lots of options: twist tie, pipe cleaner, floral wire, jewelry wire, millinery wire, aluminum or copper wire (14 gauge works well). In my example, I will be using anodized aluminum 4mm x 1.2mm flat tape (16 gauge) usually used in jewelry-making. After cutting the lengths, I used a metal file to round out the sharp edges. If you use plain wire, be sure to loop the ends so they aren’t sharp.

6. Printed Pattern
7. Scissors
8. Sewing Machine
9. Thread
10. Marking tool - permanent marker, ballpoint pen, pencil, chalk, whatever you have on hand works, as all the lines will be hidden by final sewing.

Pro Tip: if making these masks in bulk, you can lay out the pattern so the duckbills nest into each other, allowing you to make more masks with your fabric. You will, however, have to sew a seam (and increase the cut piece to allow for the seam allowance) on the folded section to join pieces that don’t have that fold there.
Step 1: Prepare the materials
You are going to want to prewash and dry your fabric. The cotton will shrink a little, and you want it to be stabilized at its post-dryer size before you start sewing.

Cut out the pattern, lay out your fabric, and trace the outlines. You will need to cut the following pieces

- Cover Fabric: 1 duckbill + the pieces for the nose bridge pocket
- Filter Fabric: 2 duckbills + 1 piece for the inner tag
- Lining Fabric: 1 duckbill - on this piece, cut a small snip (1/4" deep) in the fabric where marked. The snips mark the spots where you will attach the elastic later. Note that I have included two options for the lining pattern, an Easy Version and a Pro Version. You only need one.

Cut out the elastic (two pieces that are 7.5" long) & metal nose bridge (4" long) and set aside.

Step 2: Sew the pocket
The pocket will be created with a series of folding, sewing near the fold, and then trimming away the seam allowance. This is to eliminate extra bulk. I have included these instructions with diagrams to scale, so you can check your piece as you proceed.
1. Fold 1/2" hem.

2. Sew near folded edge.


4. Fold 1/2" hem.

5. Sew near folded edge.


7. Fold 1/2" hem.

8. Sew near folded edge.


10. Fold in 1/2" hems on both ends.
11. Sew near folded edges.


13. Place the flap on the **cover fabric** duckbill and sew where indicated. Trim the excess fabric.

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Cover fabric is right side face up

1/4”
14. Place the pocket where indicated, sew along the line, and trim excess fabric.

15. Fold the bottom half of the pocket up once.

16. Fold the small flap to the right and fold the pocket flap up again.

17. Sew along the dotted line. Your pocket is now finished.
Step 3: Sew the duckbills

A. Start with the lining fabric, face up to create the inner cup. Place the filter fabric tag on the side as shown so that about ½” will be left visible inside the cup when you are done. Fold the fabric up, then sew along the sides using a ½” seam allowance. Then trim the seam allowance to ¼”. Looks like a pair of underwear!

B. Attach the elastic to the lining cups where marked by the snips you cut on the edge of the fabric earlier. (Location depends on if you chose the Easy or the Pro Version for elastic placement) Refer to the picture to get the pieces oriented correctly. You want to sew the elastic to the right side of the lining cup, raw edge of the elastic to raw edge of the fabric. Sew the elastic about ¼ inch away from the edge (but no further than ½” inch). Go forward and backwards a few times with your stitching to get a secure attachment. Now trim the seam allowance on the sides to about ¼” (indicated by the solid yellow line).
C. Now, make a stack that goes from the bottom to the top: filter fabric, filter fabric, cover fabric (right side facing up). Fold it in half. Sew up those sides with a ½” seam allowance.

D. Trim the seam allowances to ¼” as well. If you are feeling fancy, when you get close to the open side of the mask, grade the seam allowances. That will help the whole thing lay flat when you go to sew it.
E. After you sew the sides, turn that thing right-side out. You now have two duckbill cups. Put the cover cup inside the lining cup. If you are using the Pro Version of the lining, make sure the snips on the cover line up with the ones on the liner. Note that the lining cup is still right-side-in.

F. Start sewing on the bottom (chin-side) of the mask. This is the side that has no pocket for the nose bridge. Using a ½” seam allowance and starting from about 3 inches from the side, start sewing. Sew all the way around to the nose piece side, and then continue back on the chin side for another 3 inches. Be careful to only sew through the elastic at the point where it is attached to the liner. Stop there.
G. Turn the entire mask right-side out via the opening that is left. Fold the exposed edges in and topstitch along the open area.
H. Insert the metal nose piece and your mask is finished!

Step 4: Cleaning the mask

Remove the metal piece before washing. Wash the mask with according to manufacturer recommendations for the fabrics you used. Soap and water are extremely effective at deactivating COVID19 because it breaks down the protective fatty layer on the outside of the virus. But there are a lot of other pathogens that can survive cold water laundering. Use the hottest water and dry at the hottest temperature that the fabric can tolerate. This will clean but not sanitize your mask. If you use fabrics that are chlorine bleach safe, you can also add that to your laundry routine (though the aesthetics may suffer, and elastics may break down prematurely).

Some people have put masks in a pressure cooker to steam (30 minutes has been a number tossed around) or used those microwave sterilization bags designed for baby bottles.

Others keep a rotating collection of masks under the theory that COVID19 will not survive on surfaces for longer than X number of hours. So they will wash a mask and wait 3 days to put it in use again. But that doesn’t work on long-lived pathogens like MRSA.

Keep in mind that a lot of the fabrics that have high filtration rates are not designed for sterilization temperatures or for bleach, so read the manufacturer’s guidelines and use your best judgement.

Interesting links on decontaminating and reusing respirators:

https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-

https://www.elsevier.com/__data/assets/pdf_file/00...