

Design A Sock

originally posted on October 16, 2006

Minor changes in [] have been made for the pdf version.

Underlined words are links. Access the links from the pdf document or from the original post.

In honor of [Lolly's](#) fabulous [Socktoberfest](#), I offer this tutorial on designing a sock. This is part 1 in a three part series. [Click on any picture in the original post to see it larger.]

For me, designing a sock starts by listening to the yarn. Dare I call it yarn whispering? I rarely pick a yarn after I pick the pattern stitch; I don't get good results that way. Different yarns are suited to different patterns. So, I try to couple the desired look of the sock with what the yarn can do well. A good design will show off both the yarn and the pattern.

I won't debate various [sock heels and toes](#). [Many](#) have done that already and have explored more methods than I have. I want to give you a big picture of how I put together the parts to make a whole. I try to make all the parts harmonious. I want the ribbing to flow into the body of the sock and not be a separate bit stuck onto the top. I also like the heel and toe to be integrated into the body of the sock.

I start with the pattern stitch. When picking a pattern stitch, some of the questions I consider include: *How many stitches per inch should I expect from this yarn?* A fingering weight yarn allows for a finer, more intricate design, whereas the limited number of stitches in a sport weight yarn lean towards something simpler. *How will the color and texture of the yarn affect pattern stitches?* Generally, a complicated pattern stitch requires a plain yarn, something in a solid or almost solid color. A simple pattern stitch can often accommodate a complicated pattern.

What style of sock do I want? Do I want cables, lace, stripes, texture?

What kind of sock do I want? Should it be top-down, toe-up, gusseted heel, afterthought heel? The options are dazzling. To be honest, I have favorites in this area. I try new techniques, but usually stick with what I know I like and what works for me.



Once I have some ideas of what I want, I turn to my pattern stitch books, especially my knitting bibles, volumes 1 & 2 of [Barbara Walker's Treasuries](#). I have had them for over 20 years and use them constantly. Each one has dozens of post-it notes from past projects. I start by trolling for pattern stitches, marking everything I *might* be interested in. A second pass culls out the duds and I settle on the best 3-6. I have been known to try dozens of pattern stitches before finding the right one or giving up for another time.

Swatching*

I believe in swatching the pattern stitches I am interested in. What I visualize is often different from what really happens when needles and yarn are put together. I always start with stockinette stitch on the recommended needle. If that isn't firm enough, I try the next size down. Socks wear best when knit tightly; it should resist getting too stretched out when pulled on. The easiest way to differentiate between the two needle sizes is to make a garter ridge (knit on the wrong side) when you switch needle size or pattern stitch. Once I know the right needle size, I start the first pattern stitch. Feel free to cast on or off to get the right number of stitches for each pattern stitch. It doesn't matter that the swatch be pretty; it is to inform you. If you are like me, it will be frogged and knit into the sock.

*My definition of a swatch is a pattern stitch sampler. I don't usually wash the swatch. You may do so if you wish.

Let's start with an example. The swatch is knit from the bottom up, so I will discuss them in that order. Slightly counter intuitive for the picture, but bear with me.



The yarn is [Sock!](#) from [Lisa Souza](#) in the Pacific colorway.

Stockinette Stitch was a nice tension on the first needle I tried (US#1)

Woven Diagonal Herringbone: pattern is lost in the color texture.

Halved Diamond: better, but the pattern is still lost.

Waving Rib: snore city, it is a nice little pattern, but it needs a plainer yarn to be anything more than a vertical rib.

Diagonal Ribbing: wasn't working.

At this point I relented. I had been trying to make this a texture pattern sock and it didn't agree. I wasn't listening to the yarn. So I tried a basic yarnover pattern. I wanted it a little more solid so I added another stitch to the repeat. This clicked.

Now I have the pattern stitch, what will the ribbing be? I tried adding purl stitches and keeping the yarnovers, but it was too confused. Fortunately, my favorite ribbing had the same number of stitches and the transition from would be graceful.

The pattern stitch design is done.

The next decision is what type of sock to make. I prefer toe-up. I like to try on my socks as I work them and I never have to worry that I'll run out of yarn for the second sock. I also like avoiding having to graft the toe. I can also cast-off stretchier than I can cast on. Your preferences may be completely different. That is the beauty of designing your own sock.

Fit

I prefer a snug sock. I achieve this by reducing the circumference of the sock OR the length of the foot by 10%. I usually opt for circumference, unless the number of stitches required dictates otherwise. Either way works well and I don't see obvious differences. Socks are very forgiving garments.

Design

For wearing comfort I like the sole to be stockinette with the pattern stitch only on the top of the foot. My gauge for stockinette is 7.25 sts/in and 6.5 sts/in in the pattern stitch. Let's assume a foot that measures 10 inches around at the instep. Reduce by 10% to 9 inches. Half of 9 inches is 4.5 inches. Here comes the math: 4.5 inches at 6.5 sts/in = 29.25 sts, 4.5 inches at 7.25 sts/in = 32.63 sts, 29.25 + 32.63 = 61.88 sts. Ideally, I want to cast on a multiple of 4, so either 60 or 64 stitches will work. Before I decide, I want to check how the pattern stitch will fit. My pattern stitch is a multiple of 5. Half of 60 is 30 (the number of stitches I'll be working in the pattern stitch); again this is good. However, I like to have one buffer stitch on each side of the pattern stitch, so I'll opt for 32 sts top and bottom for a total of 64 stitches.

You may be thinking that the different gauges will make the sock top (patterned) and bottom (stockinette) uneven. In theory this is true. What will really happen is that the top will expand and come down the sides of the foot a little; any gauge mismatch at the toe will not be noticed. The toe area gets a lot of stretching anyway.



Toe:

I have long toes so I like a squarish toe. I like to cast on 50% of the total stitches (many people use about 40%). So, $64 \times 0.5 = 32$ stitches. Divide that between two needles and you get 16 stitches per needle. I used [Judy's Magic Cast-On](#), my favorite method for a toe-up sock. I knit the first round and then start the increases. My preferred increase is a yarnover that is knit through the back of the loop on the subsequent row. It looks the same as lifting the horizontal bar and making a stitch (often called M1), but it doesn't distort the tension of the surrounding stitches.

Note the yarn sticking out of the toe on the left. I place the cast on tail between the 4th and 1st double pointed needles to indicate the beginning of the round. It would work for 2 circular needles too.



Foot:

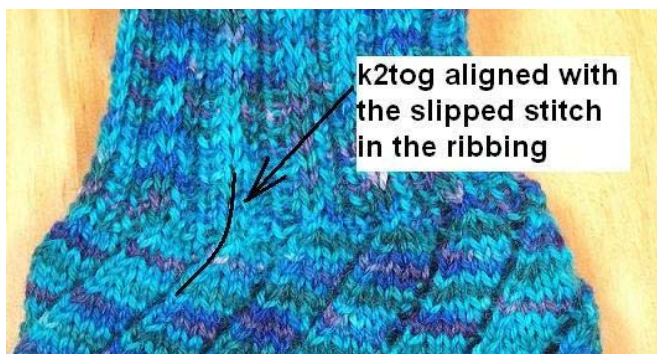
When the toe increases plus two rounds are complete, I switch to the pattern stitch for the top of the sock. Work until the desired length given the type of heel you plan to use. After watching this yarn and how pretty the striping was, I decided not to mess up the stripes by making a gusseted heel. That leaves two options: I could do a short-row heel or an afterthought heel. I chose the afterthought heel. To figure out the heel length I measured the length of the toe. An afterthought heel is basically a toe knit in the location of the heel (and very easy to replace by the way). This toe measured a little more than 1.5 inches. I subtracted that from the total foot length (less 10% if you didn't take it out of the circumference). For me: 10 inches minus 1.5 inches is 8.5 inches.

When the foot measures 8.5 inches I knit all the sole stitches on contrast scrap of yarn. Then knit those stitches again in the sock yarn and continue working the sock. This waste yarn will be removed later and the stitches will be picked up for working the heel.

Note that by deciding on an afterthought heel I gave up on being able to try on the sock as I work and an afterthought heel requires grafting. Part of designing, for me at least, is being flexible enough to change or modify an idea mid-stream if it feels like the right thing to do.

Leg:

Continue for two rounds working the "sole" stitches in stockinette and the rest in pattern. When switching to the pattern stitch all around we need to check our math. The pattern stitch is a multiple of 5 and we have 64 stitches. I increased one stitch at the start of the round. Work the leg for as long as you like and the yarn allows.



Ribbing:

I think one of the most important transitions is from the leg to the ribbing. I always select the ribbing and pattern stitch with each other in mind. The ribbing I chose consists of two rounds:

R1: *k1, slip 1 purlwise, k1, p2*

R2: *k3, p2*

The ribbing is a multiple of 5 stitches like the pattern stitch. The center knit stitch is slipped every other row creating an additional depth to the ribbing. I aligned the

ribbing so that the slipped stitch matches up with the k2tog ridge. The slipped stitch in the ribbing forms a ridge too so they mesh quite well. Continue the ribbing for as long as you want. I recommend at least 2-3 inches. This sock has about 3 inches of ribbing.



Heel:

Work a basic afterthought heel (the toe in reverse). You can decrease to less than 32 stitches (the heel here is reduced to 28 stitches before grafting) if you have pointy heels. Just remember that you will be adding a bit to the overall length of the foot.

I am working on a tutorial for afterthought heels; look for it soon.



TA DA! A sock designed.

I wrote up the pattern. It is available as a pdf [here](#) or in the side bar [of my blog].

Next in [Part 2](#): a new yarn and a cable sock design.

Pattern Errata:

10/16/2006 - the chart in the pattern was wrong (missing some k2togs). It should be fixed now. Thank you to Ann for catching it.

10/17/2006 - that smart Ann caught another mistake, this time in the pattern stitch directions. I also fixed the hyperlink to this page as it wasn't working.

Be sure to check the [original post](#) for any errata that may have been found after this pdf version was made or downloaded.