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## **Draft and Sew a Lower Body Sloper and Muslin** with Sanae Ishida

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### **Chapter 1 - Draft and Sew a Lower Body Sloper and Muslin**

#### Overview

- Hi, my name is Sanae Ishida and I am an author, illustrator, and maker of many things. In this class, I'm going to show you how to make what I call a lower body sloper. A sloper, also commonly known as a pattern block, is the foundation piece from which you can make and draft many garments. I'll cover taking measurements, drafting a sloper, then sewing a muslin to check the fit of the sloper, and I'll also briefly go over common fit issues and adjustment techniques. (upbeat music) It'll seem like a lot of numbers, but don't worry, we'll go through it together and at the end, you'll have a sloper and muslin that fits your unique and beautiful body. I tell everyone, "Good enough for now." You're not trying to get things perfectly perfect and you'll be amazed at all the wonderful clothes you'll be able to make. (upbeat music)

#### Materials

- Let's start with the materials and supplies you'll need to draft your lower body sloper. A gridded cutting mat, the larger the better. I have several rulers here, not all of them are necessary, but are helpful to have and I'll go through each one. These are clear gridded rulers. This one is more flexible. This one is rigid. They are interchangeable, but I like having both on hand. If you only have one, I would go with probably the flexible one. A styling design ruler or a French curve. The Swedish tracing paper. Elastic that we'll tie around our waist. There's some tape for marking our body and some clear tape, just in case you need to tape some paper together. We have a measuring tape. Pencil. I like to have an alternate color when I draft the seam allowance. A pen. Eraser. The rubber band is optional, it's going to come in handy when we're measuring certain body parts. Scissors for cutting paper. These smaller rulers are nice to have, this is a seam gauge and just a small clear ruler for when you add seam allowances. You have the lower body sloper measurement form, which is available for download, where you can fill out all of your measurements and makes the math a little bit easier. Here are the supplies and materials for creating the muslin. A gridded ruler. A small ruler. A pencil. A pen. Muslin fabric, about four to five yards to start with is great. The more the better. An old sheet or any kind of cotton with a tighter weave is ideal. You'll need fabric shears. Snips for clipping thread. Weights, pins. Marking tools, these are called Chaco pen. These are my favorite. An iron and a pressing surface. Sewing machine and coordinating thread. You'll also want a chair or a stool, something without armrests and a mirror and you'll want to wear tight fitting clothes or snug fitting clothes to take measurements. Or if you want to do without any pants or clothes, that's fine too, to take your measurements.

#### Take measurements

- To begin, let's take a few measurements. Grab your measurement form and something to write with. And I like to have my tape precut pieces already ready to go. And then we will start by wrapping elastic around our natural waist. Let's take our elastic and go ahead and wrap it around your waist. You want to tie it snugly but not too tight. Like so, this is kind of a long piece. And then I do the teapot test where I just kind of, you know, the little song about going side to side. And the elastic should settle into your natural waist. But for some people, the preferred waist might be lower or higher, depending on where you like your skirt, or pants, or shorts to sit. So determine where that

is, and you can place your first tape where your preferred waist is on the side. My leggings have side seams, so I like to place the tape along the side seams. I'm going to keep my preferred waist at my natural waist where the elastic is. Now that we have the preferred waist, let's put a piece of tape at the high hip, which is usually where your pelvic bone is. You might have to press around there to find that bone, and put it right there on the side seam, and then move onto your full hip, which should be the fullest part of your hip, including your buttocks. Your upper thigh is generally the fullest part of your upper leg, usually about one inch to two inches from the crotch area. And then the thigh is usually about halfway between your upper thigh and knee. I'm going to just put it right around here. For the knee, you'll place it right where the knee bone is jetting out. Find the fullest part of your calf and place the tape. And then finally, the ankle is where your ankle bone is. Once you've applied all the tapes, we're going to take the vertical measurements starting at your preferred waist. I'm going to use the top of the tape as my measuring point. So you take that number and fill out your measurement form. So high hip, and then we'll do the same thing for all of the tape pieces. So starting at the preferred waist, I'm going to the full hip, and fill out the form. Try to keep the measuring tape right along the side seam. We can skip the crotch depth for now. We'll get to that later. So now we're going to move on to the thigh. As you get lower down your leg, you want to make sure you don't bend your knee to get your measurements. I take a piece of tape, and actually tape it right where the the knee tape already is and then measure the opposite direction. For the calf and the ankle, we're going to do the same tape trick, and tape it near the existing tape, but try not to tape on top. I found that I just end up taking the tape off if you do that. For the out seam, you're going to start at the ankle all the way up to the preferred waist. For the inseam, you're going to start at your ankle on the other side, so the inside of your leg up to your crotch. For the crotch length, we're going to be getting the measurement from the front of your waist down and around back up to the preferred waist at the back. So in order to do that, I usually find a point on the measuring tape that's about 20 inches. And if you have seams in your leggings, or tight fitting clothes, or if you're, you know, just in your underwear in your home, or however you're doing this, you want to make this the center point. It'll be right down in the center here, and there's a front crotch length and back crotch length. Now if it makes it easier, you can use something like a rubber band to mark this point, or if that's too fussy, I just use my finger here. So let's start with 20, and then we're going to loop the measuring tape. Put that spot in the center, and then again, snug but not too tight. You're going to get the front, grab it with your fingers, and then keep pulling up backwards too. Get to that preferred waist. My elastic got under my leggings there, but right there. Now you have your front measurement and your back measurement, and record it on your form. Let's skip the crotch depth for now. Next, we're going to take horizontal full measurements. Let's start with the waist, the preferred waist. You want to keep it snug, but not too tight. High hip. This might be a good time to use a mirror to make sure your measuring tape is parallel to the floor. Full hip. Next, the upper thigh. Thigh. Let's get our knee. And calf. Ankle. We're almost there. Just a few more measurements. Using the side seams, measure just the front half of your preferred waist. And then your high hip side to side, try to keep it level. Full hip. The temptation is to get super exact, but I've tried to keep it to, you know, the quarters. So let's say 10 and a quarter, 10 and a half, 10 and three quarters instead of  $\frac{7}{8}$  and  $\frac{15}{16}$ . Next, we will take the crotch depth measurement in the chair and that's our final measurement for now. I know it seems like a lot of numbers, but they will all come together in the end, I promise. Now, sitting down on a chair, and you can take off all your tape except keep your either elastic waist marking or the tape for your preferred waist. And the reason we sit is because the body spreads out, and that actually adds to the measurement. So if you

were standing and took your measurements, the final sloper would be too tight in that area. So let's sit in the chair, make sure you're sitting straight. Take your ruler, your gridded ruler that's clear so that you can see where the waist is, your preferred waist. And keeping the ruler straight, you're going to use your mirror, and then get your measurement that way. You want the zero to be on the bottom here on the chair, and then you're measuring up. And then mark your measurement. Now we'll fill out the rest of the form and do a little bit of math. So there's going to be a lot of transferring the same numbers in different parts. So for example, the crotch depth, we're copying from the chart eight here. So 10 and a quarter. Got my little inch marks. And then that is complete for those charts. This one is already done. And then this is where the gold is with some math. Okay, for the crotch depth line, we're going to just use that same number from the full hip. And then we are going to get the chart nine and corresponding number, we want the upper thigh. Upper thigh is 21 here. Let's do the math part, shall we? So we want to divide the horizontal front measurement by two. That's eight, nine and a half. And then these are all the same. Nine and a half, nine and a half. 21 is 10 and a half. This one's a little tricky, 18 and three quarters. So a little hack that I use, you can use a calculator, of course, but since we're dealing with a lot of fractions, I like to just go and, let's see, I have 18 and three quarters, so that's 18 and three quarters. And I take the end here, and then I get, when you fold it in half like that, I see that it is roughly between nine and three eighths and nine and a half. So I'm just going to say about nine and a half. So same thing, 14 and three quarters. And as you can see, I'm not being fully, fully exact, because what we end up doing is adding what's called ease, which is that extra little bit of space that allows you to move in your clothing, so it's not skin tight. So, okay, so 14 and three quarters, half of that is about seven and three eighths. 15, seven and a half, eight and three quarters, four and three eighths. I guess this could be three eighths too. Again, we don't have to be too exact. Now we're adding the ease to each of the numbers here. So I have the ease already marked. Okay, so that would be two fourths, three fourths, nine and three quarter inch. Now this part takes a little bit explaining. This is a line that we're going to use to create the curve of the rise or the crotch area. So I'll explain this more later, but for now, we're good. You can just skip over to the next one. So this is one of those things where you get seven and seven eighths, right? I often just round up, so I'll probably say it's about eight. This one we have one and a half inches, because we need to add more at the ankle. So your foot can fit through the opening. Five plus seven eighth, which would be about six, right? And then this last part, when we're drafting our sloper, we're going to have a center line, and we want the line to intersect at the center. So this is just something that's easier to already have done, so you know where the midpoint is. But again, you can use the same trick with the measuring tape, and figure out where the center point is and just kind of measure that out too. About four, it's going to be a little less than four, and then three. One more sheet. For this one, remember we are now calculating the back part of your body, the lower body. So we have the front measurements here, and we also have our full measurements here. So chart 10 and chart nine. The full preferred waist circumference was 31 minus the front part, which was 16. So 15 is the back waist, and then high hip, 37 minus 19 is 18. And then the crotch depth line is very easy. You're just using the same number as above. And then the upper thigh circumference. Now we're just doing a bunch of copying, so we use the same numbers in charts nine and 10. So let's go upper thigh circumference is 21, thigh is 18 and three quarters, and knee circumference 14 and three quarters, 15, eight and three quarters. The reason we don't copy this other parts is we have different amounts of ease for the back. The back sloper is always bigger than the front sloper. We're doing the same thing as we did with chart 10. We're going to do a little bit of math. 15 is seven and a half when divided by two, nine. Now we're adding some fractions. That's going to be seven and a

half and half is eight, nine and a quarter. Midpoint four. Four, three, voila. We've now filled out the form.

#### Front lower body sloper

- Let's start drafting the front lower body sloper. We are going to start with a vertical line. And so take your Swedish tracing paper or any large piece of paper you might have to tape a few together. If you have really large rolls, that's great. For the vertical line, I'm basing it on the outseam measurement in chart seven. So minus 36 inches, so I made sure I had enough length for 36 inches plus a few extra inches for adjustments and just drafting purposes. The top of the vertical line is going to be your preferred waist. And then based on chart seven, we're going to plot each vertical point on the vertical line. In my chart seven, my high hip is three and three quarters inch from the preferred waist. As you can see, I've already plotted the points, but I like to use a measuring tape just because it's longer. So it's easier for me to measure or you can use a ruler, of course. So I would go start from the preferred waist, measure out three and three quarters mark and then continue on all the way down to the ankle. Now we're going to plot the horizontal lines. And for the horizontal lines, we are going to use our handy dandy chart 10 because we're on our front lower body sloper. And remember, you have this column with the full length of the horizontal line. But then the midpoint will help you plot them onto the vertical line. I take my ruler, and then my preferred waist is eight and a half inches long. And the midpoint is four and a quarter. So I find four and a quarter on my ruler. And I like to use this cutting mat with the grid because it helps me align the vertical line straight and then draft the perpendicular horizontal lines. You can see it through the Swedish tracing paper. So I do four and a quarter, four and a quarter. And then the full length is eight and a half. So I start here and then I draw a line to eight and a half. And then I just keep going down the chart, it's nine and a three quarters, roughly about five, a little bit less than five. I'm gonna put there. Nine in three quarters. The full hip is the same. So nine and three quarters. Okay, and this crotch step line is a little bit different. So again, it's the same as the full hip length, it's nine in three quarters. Okay, what's the same as the full hip line, that's about there. And then we're actually going to add two inches to the left, there's going to be a curve here for that raise and we're going to accommodate that, I had just enough room here. So we're going to add two inches, like that. And then we'll just keep going down for each vertical point. Here are all the horizontal lines drafted. And now we're going to draft the front crotch length rise right here, it's going to be a curve. That number is going to be on chart eight. We've got the front crotch length that 10 and three quarters. And then I do have to add some ease here. So 10 a quarter, 11 inches, 13 and a quarter, so it'll be 11 inches from this point to this point in a curve. So you can create this curve a couple of ways. We have a styling design ruler or a French curve. And we know that it's 11 inches, or an alternative method is with the measuring tape. And let's see, sometimes you kind of have to play with this. So 21 from 10, that's perfect, 11. So it makes that curve. There will be times when the line might crossover a little bit, and that's okay. We're going to just adjust more as we go. Sometimes if your front crotch length is too long for just this area, you may need to add more, just go up a bit. Or if you don't have enough space to create the curve, you might have to lower your waist a little bit as well to get that number as close as possible. This worked out well with 11 inches of the curve. Next, we're going to start connecting all the endpoints of the horizontal lines. And you'll notice that sometimes maybe the lines will seem too short or too long, and that's completely okay. We're just recreating the shape of your lower body. And there will be more adjustments to be made in the muslin stage, I am really just free handing it and see how this was short. But you want to make sure

you're accommodating the upper thigh area there. So I'm just gonna go a little like that. And then, we're just gonna keep connecting the endpoints. It's already starting to look like a lower body sloper. And keep in mind that every sloper can look completely different. Each body is unique, and each sloper is unique. So if your sloper doesn't look exactly like this, it's okay. After I've connected the lines, I look at the overall shape and start smoothing the shape out so it looks angled. The seams to go in sharply there. So curving it out a bit. I have quite full calves. So this is my natural body shape. I'm going to just connect it like that. You want to make sure that your inseam line that you drew matches as closely as possible to the inseam number in chart seven. So mine says 26 and a quarter, let's measure the inseam. It's almost actually, here, I'm gonna do it this way. We go, doo, doo. Yeah, 26 and three eighths. So it's only off by an eighth of an inch. And you have a little bit of wiggle room with an inseam. Because of the way it's at this angle, the fabric stretches a bit and you can go even up to about an inch of difference from your number here. And you're still okay, but you want to keep it as close as possible. So if you are off more than an inch, you want to shorten it by going closer to the line. And then you may have to redraw this line to bring it up. Conversely, if you need to lengthen it, you'll go a little farther, in my case, I would have to tape more paper, go farther out and then probably shorten this curve so that it equals that from, in my case, 11 inches. And then the last step for our front lower body sloper is to what's called square the corner. And that means there are several corners here on this sloper. That when you sew the fabric pieces together, in the muslim stage or when you're creating a garment, unless they are at perfect right angles, you end up getting these strange V situations or a concave, upside down V. So they need to be at the right angle so they'll be flushed and straight. And the way I check that is I take a ruler and I just go and make sure it's a right angle. And so you need just about a half inch at the right angle. This is looking good. This is looking good. You want it here on these two corners. This one is a little bit angled that way, so I would just bring it down. It's very subtle. Same here, just bring it down a little bit. And this one isn't as critical, but I try to make it more of a right angle if possible, like so. This part is what you want the right angle to be. Right angle, right angle, right angle, right angle. And then I just label it front lower body sloper. Another thing I like to do is add these little arrowheads to indicate grain lines so you know how to place the sloper piece onto the fabric when you cut it out, so that is parallel to the grain line.

#### Back lower body sloper

- Drafting the back lower body sloper is very similar to the front, but there are a couple of key differences. We're going to start by raising the preferred waist an inch and 1/4 up from the side where the longer crotch depth is. So an inch and 1/4. And then, we're going to draw this line, diagonal line. And this is because when you sit down, the fabric lowers, so you want to maintain coverage by adding this extra inch and 1/4. You may need more, you might find out, but an inch and 1/4 is a good starting point. We know that the back crotch length is 13 inches, so let's bring out our handy-dandy Styling Design Ruler here. I'm going to flip it around. 13 inches, nine plus 13 would be 22. Oh, that looks good. Again, just like the front lower body sloper, you may need to adjust the height of the waist depending on what your back crotch length is, or you might have to extend this line or shorten that. So play around with that. Okay, now, we're going to connect those endpoints, the freehand drawing method. Again, you can see that the upper thigh didn't quite make it. It seems kind of extreme here, so I'm gonna go a little bit closer there. You could also use your ruler to get the points there and just smooth out the curves. At this stage, it's more about getting the general shape. I might wanna smooth that out a bit there. Like that. Like I said, the back lower body sloper

will always be wider, bigger than the front lower body sloper. This does not look quite like a right angle. But that's okay. This part, we want to make sure is squared. That's pretty good. This part, I might have to lift up a little bit. So you can see it's not an exact thing. And then, those are squared. Remember those perpendicular corners. And this one isn't as important for the squaring. So that looks pretty good to me. This might be not as smooth. Then again, the grain line arrows and then label the back lower body sloper. We also have to check the inseam. Lower body, 26 1/4. And again, the front lower body and the back lower body slopers may be slightly different in terms of the inseam. But up to an inch, again, is okay because of that stretching factor. This is a little under 27, so I actually would shorten this a little bit. So, go here and here and test that out. Make sure this is still about 13. Yep. Now we're going to compare the front lower body sloper to the back lower body sloper. The handy thing about Swedish tracing paper is that you can see through it. So, if I line them up like this, we can see that's the back, that's the front. This is the front rise to the crotch, and then this is the back rise up to the newly drafted preferred waist section. This is going to be the side seams. I want to point out that the crotch depth line is a little longer for the back lower body sloper. It's three inches versus the two inches that we extended, and you can notice that it's extended on the opposite ends. This was just me making sure that I differentiated and didn't get confused down the line. So I know that if it's facing this way, it's the back lower body sloper. If it's facing that way, it's the front lower body. This step is called aligning, or we can also call it truing up. There is slight differences here, but I'm just to call it aligning. And that means we just wanna make sure that the pattern pieces line up when we cut out the fabric and are sewing it together. Like I said, Swedish tracing paper is transparent enough so that you can see the lines. And so I just match it up. So this is slightly longer in the back. I'm just going to adjust the front a tiny bit. I'm going to bring up the front a little and bring down the back a little because we had made some adjustments here before. Looks good. And then, I'm going to just see how the inseams are lining up. Like I said, it could be, this part can be a little off because of the stretchiness of this section. So that's decent. And yeah, I'm happy with the way these two look. Now we can cut these out. If you're finding that the slopers are very different, the first thing I would do is double check your measurements. With the way the measurements are set up, typically, there shouldn't be more than an inch difference in terms of the side seams or the inseams. And if it's about an inch, it's pretty easy to either shorten or lengthen either the front or the back sloper piece or split the difference. All of that would work.

### Make a muslin

- Now we're moving into the muslin making stage. The paper slopers are basically the 2D version of your body and the muslin is made out of fabric and is the 3D version. I have my slopers on the muslin fabric and I'm using washers as pattern weights here. Normally I would use chalk to trace the slopers but I've already done it with a Sharpie to make it easier for you to see. Now we're going to add seam allowances to the traced slopers. I usually use 3/8 inch seam allowances but for muslins I like to use 5/8 inch, which will give us a little bit more wiggle room to make adjustments. To add seam allowances, you can use a gridded ruler or even a small ruler. I like the gridded rulers. And, remember, it's 5/8 inch. So the way I start is I measure out 5/8 inch out from the preferred waistline. We don't need to add seam allowance to the waist. I'll only be adding seam allowances where the corresponding muslin pieces will be sewn together. So 5/8 inch here, and then I keep going along and marking maybe every inch to an inch and a half. Sometimes I just like to draw these longer lines extending out from the hem there. And we also don't need to add seam allowances at the hem. And then connect the dots. So we only need to have seam allowances to the rise, the inseam and the

side, the muslin fabric is folded so there are two layers. We'll do the same thing for the back piece. Add seam allowance to the rise, the inseam, and the side seam, and then we'll cut out the pieces. You should have two fronts and two backs. We're going to pin and sew along the front rise and the back rise. Now we have these pinned and we will go to the sewing machine. I like to start with the longest stitch to make taking out the seam easier if need be. Let's put the fabric in right at the 5/8 inch line. I'll do a back stitch. (machine whirring) Let's move on to the other piece. (machine whirring) Okay, now we'll pin in sew the inseams together. Let's open up each side and with right side facing, so that means the side without the seam allowance facing. I start by aligning at the bottom center here. And to reduce bulk, I like to point the seam allowance of one side one way and the seam allowance on the other side the other way. And then I'll pin these. And then I align the hem corners. Just keep double checking to make sure the fabrics aren't bunching up. Okay, let's do the other side. Start by aligning the hem corners. That looks good. Okay, we're ready for sewing. Align it with the 5/8 inch mark. (machine whirring) Make sure it's not bunching up. Just smooth out the fabric here. And then I'm paying attention to the seam allowances pointing opposite directions. (machine whirring) We're in the home stretch. Now we're going to sew the side seams and I like to leave about three or four inches open on one side so you can slip the muslin on easily. Let's start pinning. Again, I go down and make sure the hem corners are matched up. Gonna work from both directions to keep the fabric nice and smooth. And also gotta pin this other side too. It doesn't really matter which side you leave open, you just want a little bit of opening so that you can actually pull the muslin over your hips. Let's line this up as always. And this side is the opening side so I'm starting lower, lining up the 5/8 inch. Back stitch. (machine whirring) Final seam. We're starting at the top for this side. All right, clip. Let's turn the muslin right side out and see how it fits.

### Troubleshooting

- I have my muslin on now. I think this fits pretty good and I'll show you, but remember, we're not trying to strive for perfection. We just want to represent our bodies with our slopers and muslins and there is a little bit of guesswork with the adjustment phase. But for now, let me show you my muslin. I safety pinned it here on the side to keep it in place, and you can see the opening here. I'm liking this fit. It's snug, but not super tight. I can still slightly bend my knees, but you may not be able to bend all the way down. There will be wrinkles near the knees. There's always going to be wrinkles, especially in the crotch area, but if it's too baggy, that's an area you'll probably have to make an adjustment. You want to make sure that your side seam is going straight down your leg, that's looking good. And in the back, again, you will get some wrinkles down below your buttocks and behind your knees. But if you start seeing more folds, then you want to adjust as well. Often it gets loose along the sides and the areas that require the most adjustments tend to hover around the crotch area. You might have extra space here or it might be too tight. You could adjust the knee section if the wrinkles bother you, but this is looking good. You want the rise to be centered as you check your fit, and make sure the back seam is centered, as well. I have a very flat butt, so I don't require any darts. And yeah, this feels good. This is a good muslin. Let me show you a muslin that's too baggy. You can see that there's a little bit of extra going on in the front. It's also slightly looser on the sides. But the real bagginess is happening under the butt here. I want to start by adjusting the back first because often by adjusting the back, it will pull things on the front as well, and so you'll solve both problems at once. You can use any marking tool, but I have a Sharpie here. I pinch the folds and try to figure out how much extra room I need to remove. I'm marking along each side of the fold so I can get a gauge of how much I should remove. If I want to take in the sides, I would

just come here and mark along the side seam. So keep in mind that when I adjust the sloper, I'll be taking out from both sides. Here's the baggy muslin, and here are the markings that I made to indicate how much I want to take out of the sloper. This is a little counterintuitive. To get rid of the bagginess under the butt, we're actually adjusting the crotch area. And so, I would take a ruler, and it looks like it's about an inch that I need to remove. So I would come to my back sloper, because remember, the bagginess is mostly on the backside. And I am actually going to shorten the crotch curve by about one inch and then probably go maybe two and a half inches just so that it's not straight down like this, but we're sort of maintaining this curve. And then go down, remember, it's not precision here but experimenting, and you will want to double check that the inseam is still close in number to the original inseam that you had. And you can do that either by measuring or, I just sort of check to make sure that this still seems to be working. Yeah, that'll work. Okay. Then you just cut that piece. And remember, we also wanted to adjust the side seam here. We'll go ahead and start with the back. And that was about a quarter inch, I think. That's eyeballing it. Yep, it's about a quarter inch. And you're measuring from the side seam to where your marking was. And remember there are no seam allowances here so this is actually a replica at this sewn stage to the sloper. And I put it there to get where the positioning of where I want to trim the sloper, so it's around there. And I'll start with a quarter inch. Aligning it. So then we will just trim about a quarter inch there, like so. But we wanna kind of maintain the curve. That looks good enough. I'm on the conservative side when it comes to adjusting, just so that I don't overdo it. From this point, there are a couple ways that you can transfer these changes back onto the muslin. So in the case of a too baggy muslin, you can just use a seam ripper, undo all the seams, make the adjustment, trace the sloper back on, and then sew it again. As I mentioned before, my lower body slopers have no darts because I'm shaped like a cylinder and I have no butt. However, you may find that as you're trying on your muslins that there might be some bubbling going on between your waist and your hips. And a way to address that is by creating darts. Darts can be either in the front or the back, but let's focus on the back for now. Let's say you are having some bubbling here, when you're wearing your muslin, you're going to want to pinch on both sides where the bubbling is happening, like so. Well, you'll have to do it one at a time probably. But you're going to pinch, and then, using a Sharpie, you will mark where the bubbling is happening. And then, also, where it's pointing towards the fullest part of your buttocks. So I might do something like that. And then you go on the other side, just double checking, hold, and then, so you'll end up with something probably not as neat as that, but something along those lines. And then you take off your muslin, take a look at your markings, and you're going to create a triangle which forms the dart. And let's say this is the fullest part of your buttocks. And you can use a ruler or you can freehand it and just create a triangle. Typically about three to four inches in height for a dart. But again, you can completely play around and see what works for you. You do want the dart to be at least, you know, an inch or two above the fullest part. But again, you can play around with that. You'll notice I drew the dart on one side. We want the darts to be symmetrical on both sides. So let's start with this one and then we'll transfer it onto the sloper. And then you can transfer it to the other side so that you'll have it in symmetrical mirrored positions. Yeah. Ooh, that was a big splotch. Oops. To sew a dart, it's really easy. So these are the dart legs, this is the apex. With right sides facing or together, you're going to want to align the dart legs up to the apex, like so. So starting at the waistline, back stitch here, and then sew along the dart leg, but you do not back stitch at the apex. You just sew off and leave a thread tail of about, I would say, four or five inches, and then you tie it into a knot at the apex. When you back stitch it makes it too bulky here or creates a bubble. So that's the reason why you just so often create a

more subtle knot. And then you'll end up with your dart. This isn't meant to be a comprehensive lesson on all the fit issues, but a quick overview of the common situations I've encountered. Now try on your muslin and see how it fits. For muslins that feel too tight, it would be pretty obvious, you know, that's when the fabric feels like it's digging in, or around the crotch area, you'll see whisker-like wrinkles. And the way to address it is similar to the baggy muslin. You will mark the areas that feel too tight and then you'll bring the muslin over. I'm just going to demonstrate it with a sloper here. But because your sloper is smaller than the size that you actually want, you're going to have to tape some paper. So let's pretend that you are noticing those whiskery wrinkles, and that means we'll have to adjust this crotch curve area similar to the baggy muslin. And this is the front sloper. I'm going to tape some extra Swedish tracing paper, like so. And like I said, we start conservatively. So I'm going to add about a quarter inch and create a new curve. And this quarter inch won't dramatically affect the inseam, and it'll be okay with that curve, as well. And once you draw that new curve, you will cut. I like to tape the backside too so it doesn't get floppy. And then you will need to trace a whole new muslin in this case. There could be more adjustments that need to be made, and there may be some guesswork involved, but just keep experimenting. Next, we'll move on to another fairly common situation which is the twisted leg. For the twisted leg, you'll notice that the inseam is turning towards the front or the back. If the inseam is twisting towards the front, that means the front inseam is too short and needs to be lengthened. If it's twisting towards the back, that means that the back inseam is too short and needs to be lengthened. Let's say it needs to be shortened for the back. Take your ruler and we are going to draw a line, maybe just like a third of the way from the edge of the hem. And then I'm going to draw this line, like so. This is going to be a hinge here at this corner. And then you'll cut. Since we're shortening, you will overlap. Again, conservatively. I'm always starting with about a quarter inch. Let's measure that out. Quarter inch. And then you're going to close together. And if you want to get very particular, you could tape the paper and just smooth it out. But I would typically just visually smooth it out until all of my changes have been made and then I'll create a final version of the sloper. Now let's say you want to add length. We're going to do the exact same thing, but instead of overlapping, you're spreading. And then you're spreading. And what's different about lengthening the inseam is that you will want to adjust the hem again so that it's the same as it was before. And you can add paper behind. And you can see- Let's see, how much did we overlap there? An inch. So we'll add back the inch. So we're adding about an inch there. Another inch. Measure out the overlap onto that extra paper. But you could also double check your measurements from the charts, too. And then just cut out the pieces of paper. Now, I will say, having made a lot of slopers, adjusting at the crotch has actually resolved a lot of the twisting leg situations, too. But this is another method to add your toolkit in case that doesn't work. When it comes to adjustments, the permutations are infinite. You know, there's all sorts of different adjustments that you can make. But just be patient and experiment. Be very gentle with yourself. This isn't about making the perfect sloper but something that feels like you, your body, and getting to know what your body is like, and this tremendous, miraculous, this thing that we have. And once you have your slopers made, you'll be able to make clothes that fit your unique body in the way that you want. It's amazing. The possibilities are immense.