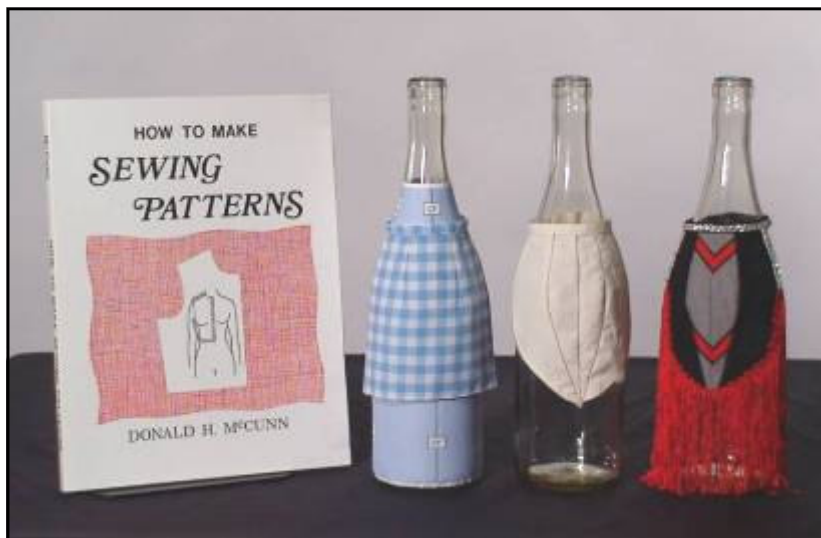


Pattern Design Guides by Don McCunn

An Introduction to Pattern Design



These instructions show how to use a bottle and an apron sloper pattern to practice the following pattern design techniques:

- Drafting a Sloper Pattern
- Draping a Sloper Pattern
- Pivoting Darts to New Locations
- Changing Darts to Seams
- Changing Seam Locations
- Adding Fullness

The instructions take you step-by-step through each procedure.

Note: These instructions have been created for the online class “An Introduction to Pattern Design” taught by Don McCunn.

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An Introduction to Pattern Design

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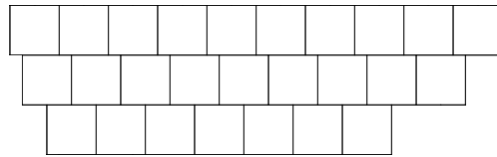
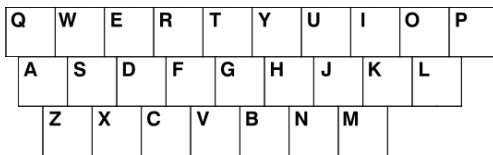
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Introduction

The process of converting fitted slopers to original designs can be accomplished using a handful of techniques. Following are instructions for each of these techniques.

By practicing the techniques, the procedures for pattern design can become intuitive. Then you can focus what you want to achieve with a design rather than how you are going to do it.

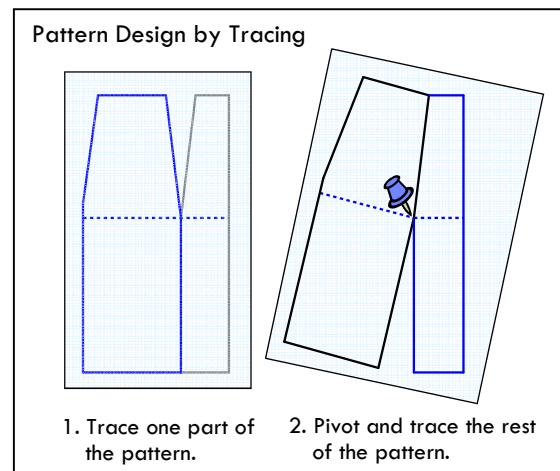
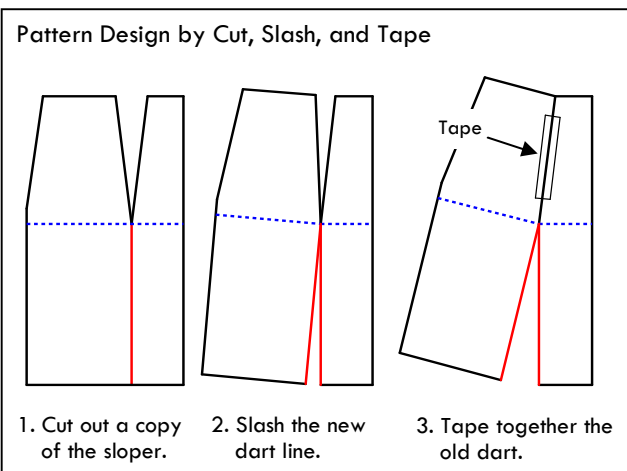
This is similar to learning to type. If you are unfamiliar with a keyboard, you have to look for each letter before you can type it. But if you learn to touch type, you can use the keyboard on the right just as easily as the one on the left. Your typing has become intuitive rather than a mental process requiring constant thought.



Approaches to Pattern Design

There are two approaches for changing a fitted sloper to a new design.

In these examples, the dart is being changed to the red line. The instructions on the following pages use the tracing technique.



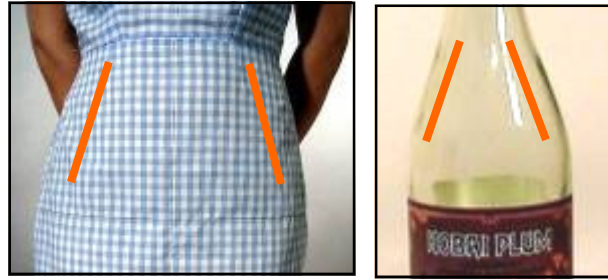
The Model Bottle

The Bottle Shape

To illustrate these pattern design techniques, we will use the simple shape of a bottle. A bottle can be used to approximate the shape of this woman's side seam from the waist to hip in quarter scale.

For these instructions, it is important to select a bottle that has a flat cone-like shape. If the neck of the bottle, has too much of a curve, the darts will be difficult to deal with.

To simulate patterns in quarter scale, the cone of the neck should be at least 2" (5cm) long.



Prepare the Bottle

To prepare the bottle, follow these steps:

1. Cover the bottle with tape, such as masking tape, that can be written on.
2. Draw the Hip line where the body of the bottle meets the cone shape of the neck.
3. Measure up 2" (5cm) from the Hip line and draw the Waist line.
4. Measure from the Hip line to the bottom of the bottle and divide this measurement in half. Draw a line around the bottle at this level. This will be the Knee line.
5. Find the raised seam on the side of the bottle that goes from the neck to the bottom of the bottle. Draw a line here for the Side Seam.
6. There should be a second raised seam on the opposite side of the bottle that can be used for the other Side Seam.
7. Measure from Side Seam to Side Seam at the Hip line and use half of this measurement to mark the Center Front location.
8. Make Center Front marks on the Waist and Knee line, then draw in a Center Front line.
9. Label all the lines you have drawn.



Creating the Apron Sloper

These instructions will show you two ways to create an apron sloper for your bottle: drafting and draping. You only need to create the sloper once. But I have included instructions for both so you can try both or choose the method you prefer. You will need the PDF file with the 1/3 Scale Ruler which is available from my school website.

I have included draping to show you techniques that can also be used for fitting. I have developed this particular approach to draping/fitting for the person with little or no sewing experience.

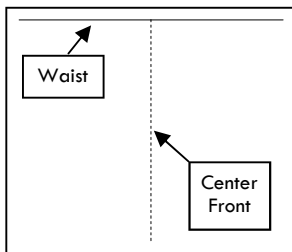
If you need a helping hand when it comes to fitting clothes on yourself, you can practice fitting the sloper on the bottle with a non-sewing helper. This helper should then be able to do the fitting of the slopers for your body with a skill and confidence he or she may not otherwise have.

I have also included simplified sewing instructions in this section for the easiest and quickest way to try out the apron examples, see page 6.

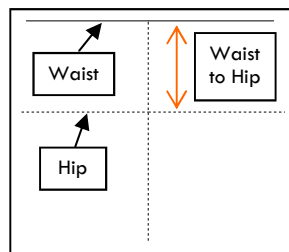
<http://Patternmaking-Classes.com>

Drafting the Apron Sloper

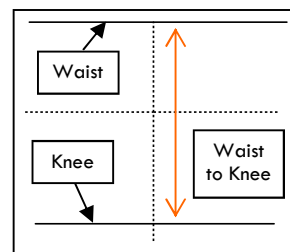
To draft an Apron Sloper for your bottle, you will need a sheet of 8-1/2" x 11" or A4 typing paper, your bottle, a tape measure, and a ruler.



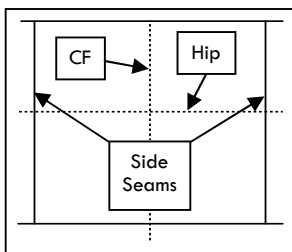
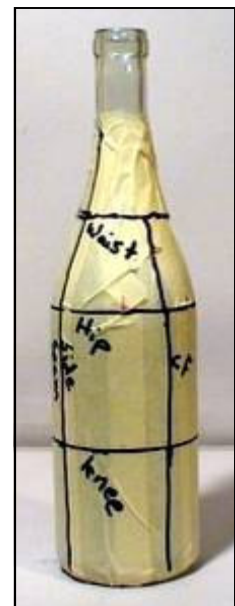
1. On a sheet of paper draw a vertical line. This will be the Center Front line.
2. At the top of the Center Front line, draw a horizontal line. This will be the Waist line.



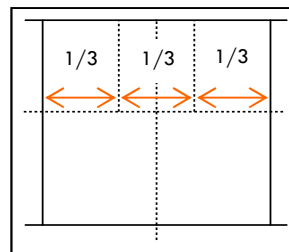
3. On the bottle, measure down from the Waist line to the Hip line. This is the Waist to Hip measurement.
4. On the pattern, measure the Waist to Hip length and draw the Hip line.



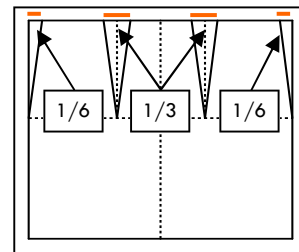
5. On the bottle, measure down from the Waist line to the Knee line. This is the Waist to Knee length.
6. On the pattern, measure the Waist to Knee length and draw the Knee line.



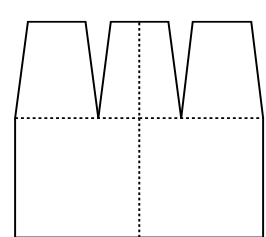
7. On the bottle, measure from Center Front to each Side Seam at the Hip.
8. On the Hip line, mark the Center Front to Side Seam lengths.
9. Draw vertical lines for the Side Seams.



10. Use the 1/3 Scale Ruler to divide the distance at the Hip from Side Seam to Side Seam in thirds.
11. Draw vertical lines from the Hip to the Waist for the center lines of the darts.



12. Subtract the Waist from the Hip measurement.
13. Divide the difference between the Waist and the Hip between the two Side Seams and the two darts at the Waist line.
14. Draw in the Side Seams and darts.

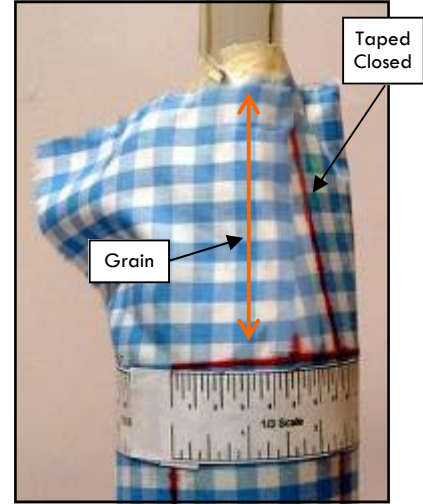
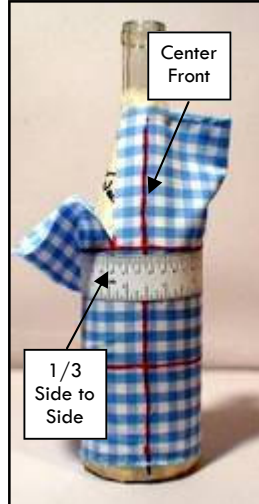


15. Cut out a copy of the Apron Sloper.
16. Tape the darts closed and verify that the Apron Sloper fits the bottle correctly.

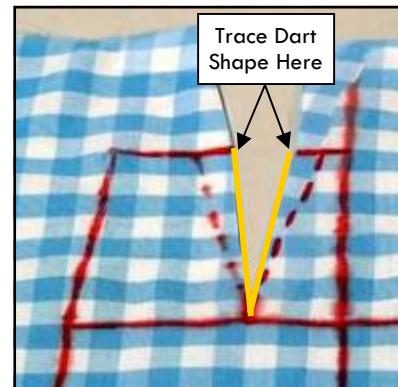
Creating the Apron Sloper (cont'd)

Draping the Apron Sloper

To drape an Apron Sloper, you will need a small piece of fabric about 6" x 6" (15cm x 15cm). I recommend gingham as it is easy to see the grain of the fabric. You will also need fabric scissors and scotch tape.



1. Tape the gingham to the bottle so the vertical grain is following the Side Seam of the bottle and the horizontal grain is following the Hip line.
2. On the gingham draw in the Side Seam, Hip, and Knee lines.
3. On the gingham draw in the Center Front line following the grain of the fabric.
4. Use the 1/3 scale ruler to divide the distance between the Side Seams in thirds. This will be the position for the center of the darts.
5. Cut the gingham along the center of the dart from the top of the fabric to the hip. Follow the vertical grain of the fabric as you make these cuts.
6. Tape the Center Front line of the gingham to the center front line of the bottle.
7. Tape the fabric between the dart and the Side Seam so the middle of this fabric goes straight up the neck of the bottle.
8. Tape the dart closed.



9. Draw in the Waist line from Center Front to the Side Seam.
10. Draw in the Side Seam between the Waist and Hip lines.
11. Remove the gingham from the bottle.
12. Draw dotted lines on both sides where the fabric of the dart overlaps.
13. Cut half way between the darted lines.
14. Lay the fabric flat, then trace the lines from the gingham onto a sheet of paper.
15. For the dart shape, trace the edges that were cut, the yellow lines, not the red dotted lines.

Creating the Apron Sloper (cont'd)

Sewing the Sample Aprons

The primary function of these instructions is to show you how to create designs from sloper patterns. Quarter scale apron patterns have been selected for this project so that in addition to creating the patterns on paper, you can see the results in fabric. The amount of sewing required is minimal and finishing techniques for garments that will be laundered are not necessary.

About Slopers

Sloper patterns should just be the dart and seam lines without seam allowances. However, to test the patterns in fabric, you do need to add seam allowances. Although the outside edges of the test garments can be left unfinished, these instructions show a quick, clean edge finish.

The Waistband

The body of the apron must be held up by a waistband. However, because we are testing the aprons on bottles, these waistbands do not require a closing device such as a hook and eye. They can simply be sewn closed at the Center Back seam.

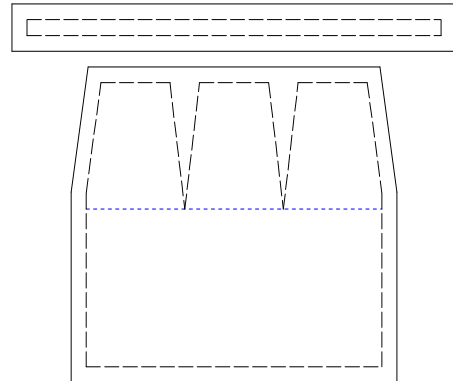
Height: 1/4" (6mm)

Length: Waist measurement

Seam Allowances: 1/4" (6mm) around all edges

Sewing Sequence

1. Pin the pattern to the paper, then cut the fabric.
2. Pin and sew the darts, then press flat.
3. Stay stitch around the outside edges of the body of the apron.
4. Press under the outside seam allowances, then topstitch in place.
5. Center the apron body on the waistband, right sides together, then pin in place.
6. Sew the apron body to the waistband with a line of stitches from Center Back to Center Back. This creates top stitching where the waistband does not coincide with the body of the apron.
7. Stay stitch along the seam line for the top of the apron waistband.
8. Press under the seam allowance on the waistband along the seam line from Step 6, then topstitch in place.
9. Sew the waistband's Center Back seam closed, then press open.
10. Press under the top seam allowance of the waistband, then topstitch in place.
11. The apron is now complete and ready for your model.



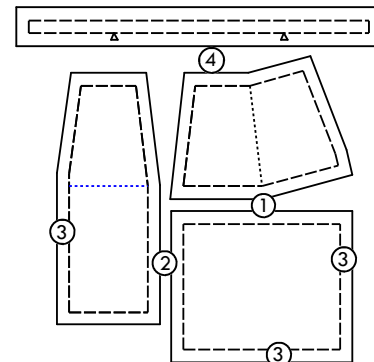
The pattern to test slopers requires a 1/4" (6mm) seam allowance.

Sewing Tips

Sewing Sequence

Sew seams that dead end into another seam first. In this example the sequence is as follows:

1. Horizontal Seam
2. Vertical Seam
3. Outside Edges of the Body
4. Waistband Seam



Gathering a Seam

1. Make evenly spaced marks on the edges to be gathered.
2. Sew two lines of long gathering stitches.



3. Pull the top threads to gather the fabric, then pin using the marks as a guide.



Changing Dart and Seam Locations

Fabric is changed from a flat two-dimensional shape to the three-dimensional shape of a body by darts and seams. A sloper records the shape of the body using these darts and seams.

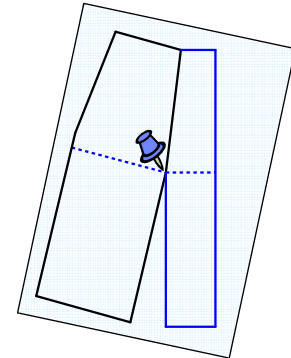
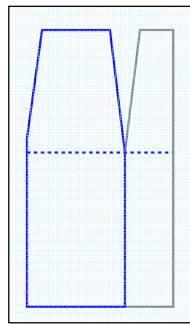
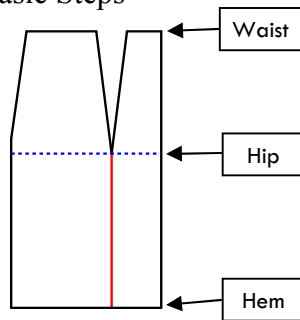
For people, the sloper needs to be created with enough room to allow for movement including breathing, walking, sitting, and raising the arms. The Apron Sloper we are working with only needs to record the three-dimensional shape of the bottle.

To create an apron that is different from the basic sloper, you can change the location of the darts and seams without changing the fit. The three techniques used to change these locations are as follows:

- Changing the location of the darts
- Changing the darts to seams
- Changing the location of seams

The other way to change the sloper is to add fullness. The description for how to add fullness starts on page 13.

The Basic Steps



This example shows how to change the dart to the hem.

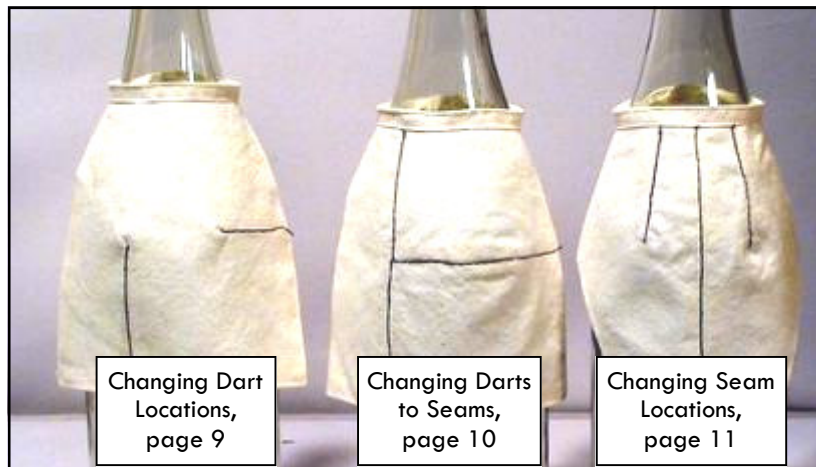
1. Draw the new design lines on a copy of the sloper. The new design line is the red line.

2. Place pattern paper on top of the sloper.
3. Trace around one portion of the pattern shape.

4. Pivot out the old dart.
5. Trace around the rest of the pattern.

The Examples

The examples on the following pages show how to create the pattern variations shown below.

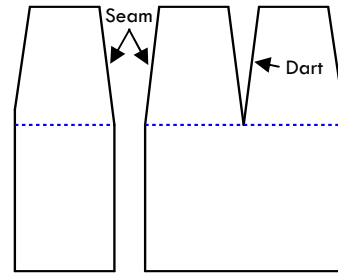


Darts and Seams

Seams vs. Darts

Seams divide a single pattern piece into two or more pieces. A seam may change the shape of the pattern or the seam may simply be included as a decorative detail.

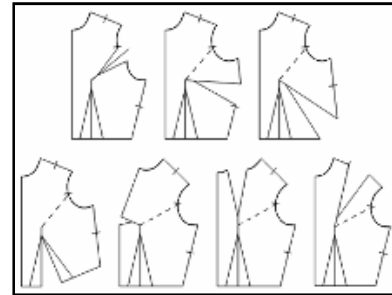
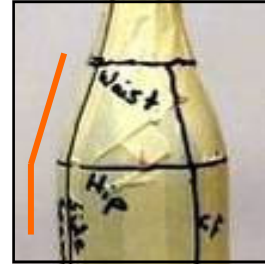
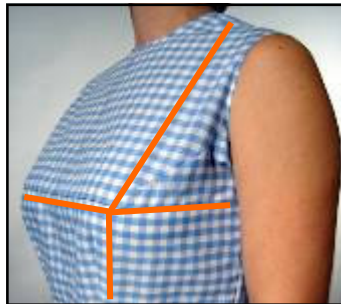
Darts are formed by removing a wedge from a pattern. This means darts always change the shape of a pattern from a two-dimensional form to a three-dimensional one, leaving the pattern as a single piece.



Dart Position

Darts need to be positioned where the shape of a body changes. For bottles, the vertical shape changes where the slope of the neck meets the body of the bottle. We are calling this location the hip line. Since the bottle is cylindrical, the horizontal shape from center front to side seam is continuous. The position of the dart can therefore be moved around the bottle without affecting the fit.

The bust darts for women, the change in the contour occurs in at least two directions. The slope from the shoulder to the bust is one contour change and the shape from center front to side seam is a second contour change. In this case, the dart must always point to the apex of the bust, but the wedge of the dart may come from any seam.

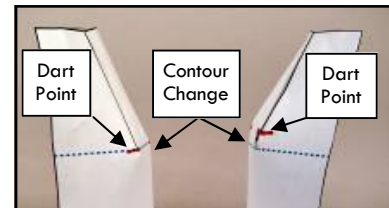


Dart Points and Shaping

When changing the position of a dart, you should always pivot the dart where the shape of the body changes, such as the hip line or the apex of the bust. After the position of a dart is changed, the point of the dart should be set back from the pivot point for optimum shaping.

When a curve is continuous, such as the hip line of the bottle, the point of the dart does not need to be set back from the pivot point.

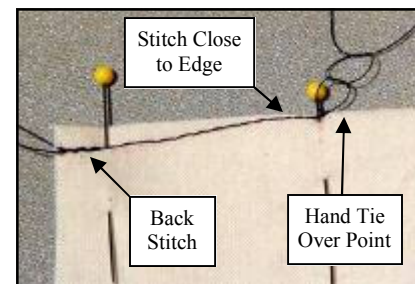
Darts can change the shape of a pattern dramatically. To soften the shape, use multiple darts. Notice the difference in the shape of the apron when four darts are used instead of two.



Sewing Darts

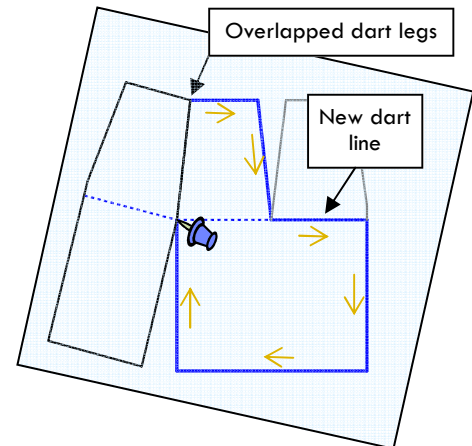
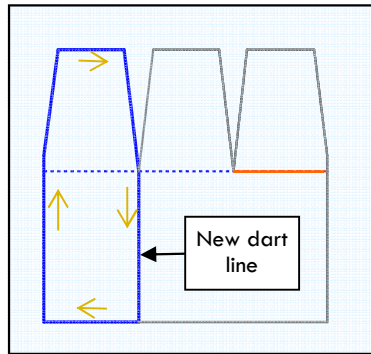
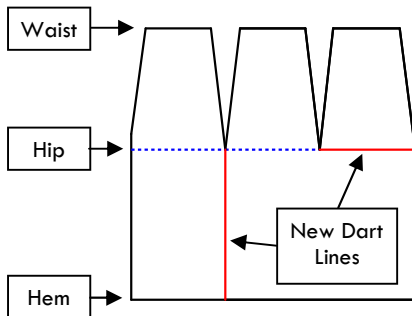
When sewing darts follow these steps:

1. Mark the darts using tracing paper.
2. Use pins to align the two legs of the dart.
3. Start from wide end of the dart with a back stitch.
4. Sew toward the point keeping the last few stitches close and parallel to the fold of the dart.
5. Tie off the threads over the point of the dart using three overhand knots.



Changing Dart and Seam Locations (cont'd)

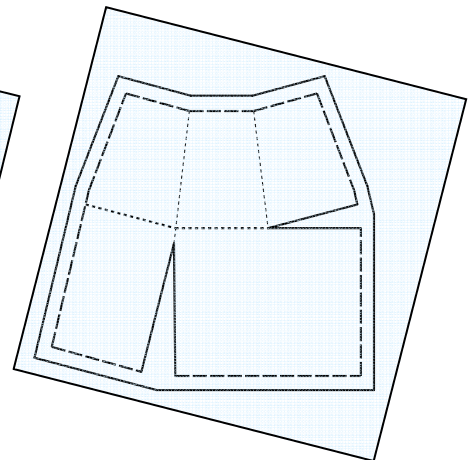
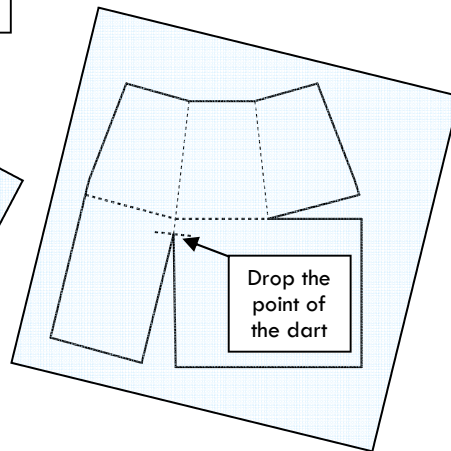
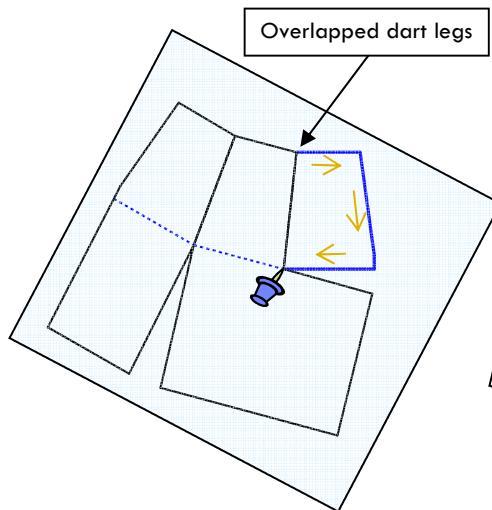
Altering Dart Locations



1. On a copy of the sloper, draw the locations for the new darts. In the illustration above, the new dart locations are indicated by the red lines.

2. Place a fresh sheet of paper on top of the sloper.
3. Trace from the side seam to the location of the new dart line, as shown by the blue lines above.

4. Put a pin in the point of the first dart and pivot the pattern until the traced leg of the first dart overlaps the opposite leg of the dart.
5. Trace around the pattern to the location of the second dart at the hip line, as shown by the blue lines above.



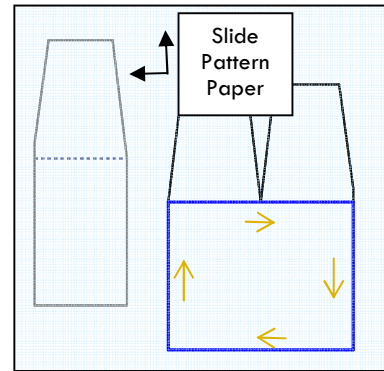
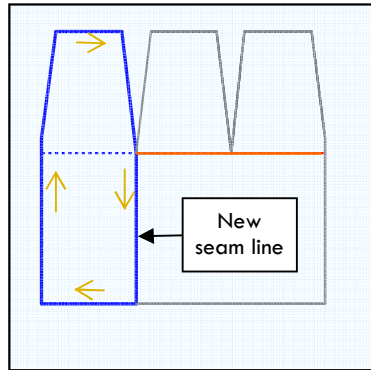
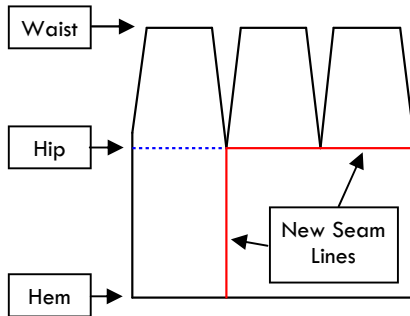
6. Put a pin in the point of the second dart and pivot the pattern until the traced leg of the second dart overlaps the opposite leg of the dart.
7. Trace around the pattern from the waist to the hip, including the side seam, as shown by the blue lines above.

8. The point of the dart should not be exactly at the hip line. Extend the length of the original dart's waist to hip line by 1/4" (6mm).
9. Redraw the new dart so the point of the dart is now 1/4" (6mm) down from the hip. The dart that follows the hip line does not need to be changed.

10. Add 1/4" (6mm) seam allowances around all outside seams.
11. Cut the pattern paper along the seam allowance lines.
12. Pin the pattern paper to your sample fabric and cut out the fabric.
13. To complete this trial apron design, sew the darts and add a waistband.

Changing Dart and Seam Locations (cont'd)

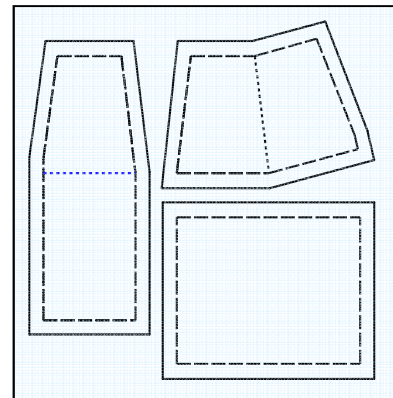
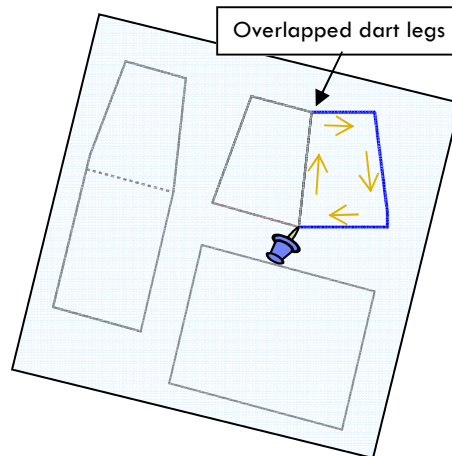
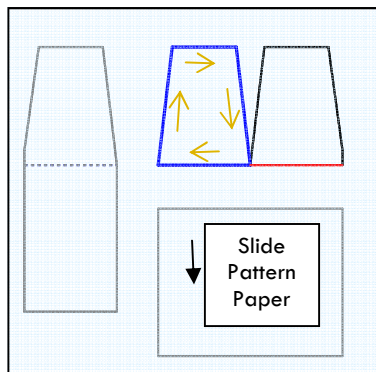
Changing Darts to Seams



1. On a copy of the sloper, draw the location of the new seam lines. In the illustration above, the new seam lines are indicated by the red lines.

2. Place a fresh sheet of paper on top of the sloper.
3. Trace from the side seam to the location of the new vertical seam line, as shown by the blue lines above.

4. Slide the pattern paper up and to the left to leave room for seam allowances.
5. Trace around the pattern for the bottom of the apron, as shown by the blue lines above.



6. Slide the pattern paper down to leave room for seam allowances for the horizontal seam.
7. For the center portion of the apron, trace around the pattern from the waist to the hip, as shown by the blue lines above.

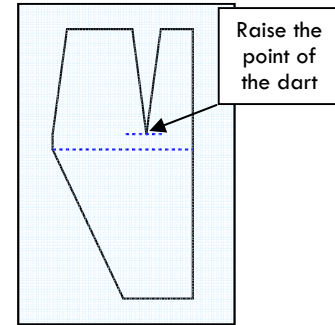
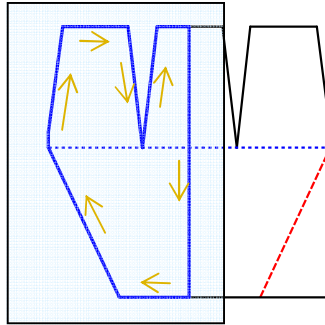
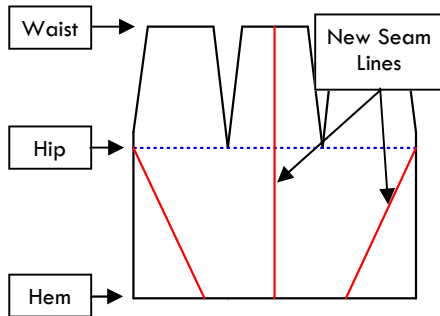
8. Put a pin in the point of the second dart and pivot the pattern until the traced leg of the second dart overlaps the opposite leg of the dart.

9. Add 1/4" (6mm) seam allowances around all outside seams.
10. Cut the pattern paper along the seam allowance lines.
11. Pin the pattern paper to your sample fabric and cut out the fabric.
12. To complete this trial apron design, sew the seams and add a waistband, see page 6.

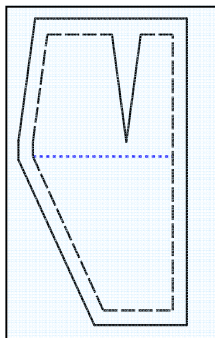
Changing Dart and Seam Locations (cont'd)

Changing Seam Locations

The steps below show how to change seams. Seams can be either internal seams that hold the apron together or external seams that define the outline of the apron. This design is symmetrical with a seam at center front. It is therefore only necessary to create a half a pattern.



1. On a copy of the sloper, draw the location of the new seam lines. In the illustration above the new seam lines are indicated by the red lines.
2. Place a fresh sheet of paper on top of the sloper.
3. Trace from the side seam to the location of the new vertical seam line at center front, as shown by the blue lines above.
4. The point of the dart should not be right at the hip line. Redraw the new dart so the point of the dart is now 1/4" (6mm) up from the hip.



5. Add 1/4" (6mm) seam allowances around all outside seams.
6. Cut the pattern paper along the seam allowance lines.
7. Pin the pattern paper to your sample fabric and cut out the fabric.
8. To complete this trial apron design, sew the darts and center front seam. Add a waistband.

Changing Dart and Seam Locations (cont'd)

Original Designs

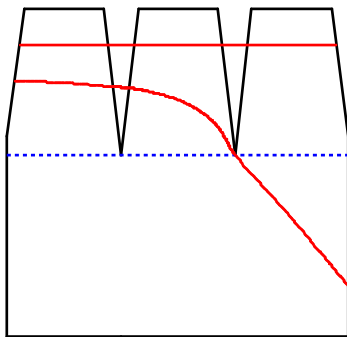
You can create any design you want by drawing your new design lines on a copy of the sloper then lifting the new pattern.

When you start working on the patterns, you may find that you don't like the look of the lines. If your pattern shapes look wrong, chances are the design will not come out correctly.

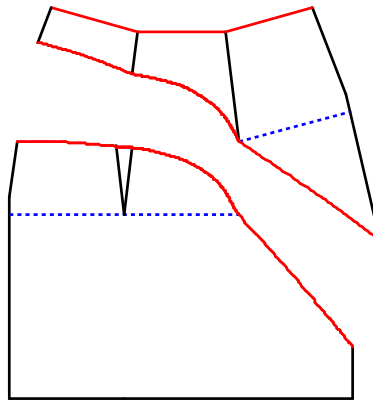
Indicated below are the steps you can take to correct problems you may encounter when creating original designs.



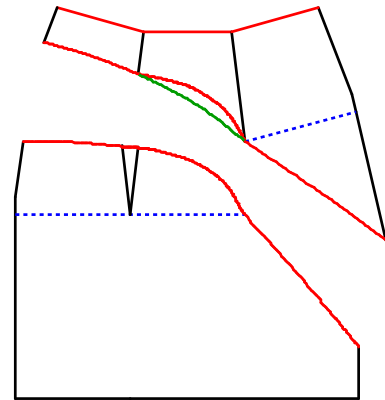
The Finished Apron



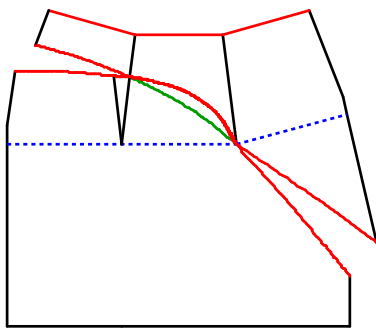
1. Draw the design lines you want on a copy of the sloper.



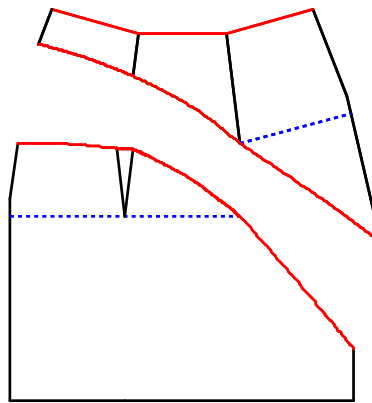
2. When you close out the darts on the top of this pattern, the curve of the new bottom seam does not look right.



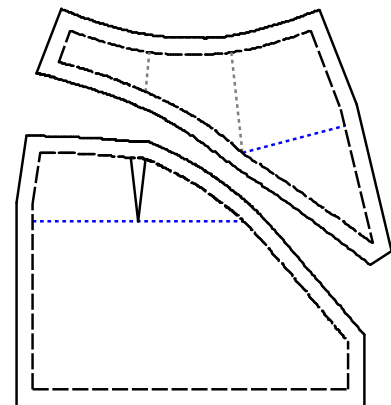
3. Correct the appearance of the seam line on one of the pattern pieces, as shown by the green line.



4. Move the corrected pattern piece back on top of the original pattern piece.
5. Adjust the second pattern piece to match the first.



6. Separate the two pattern pieces.



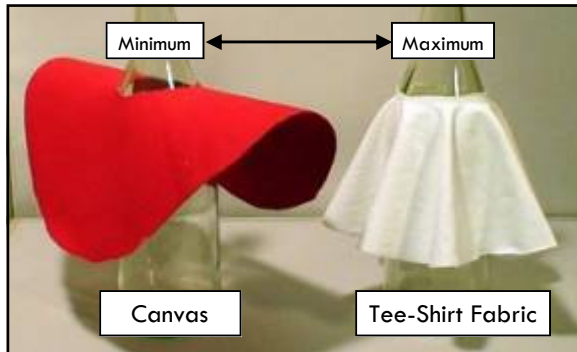
7. Add seam allowances and test the design in fabric.

Adding Fullness

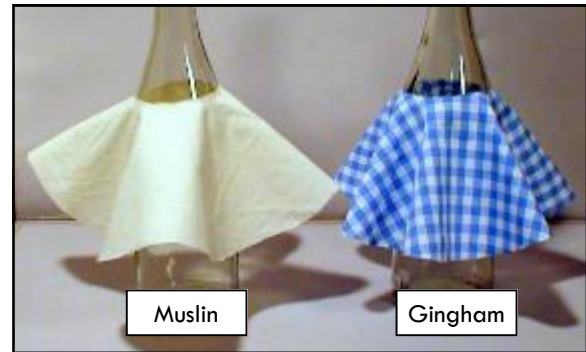
Fullness changes a garment from the fitted shape of the sloper to one where the fabric does not follow the contours of the body closely.

Fabric and Fullness

The amount of fullness you can put into a given garment depends on the drape of the fabric you are using. A quarter scale circular skirt, see page 23, is one way to evaluate and keep track of how different fabrics respond to fullness.



Extremes show minimum and maximum drape.



Similar fabrics may drape differently.

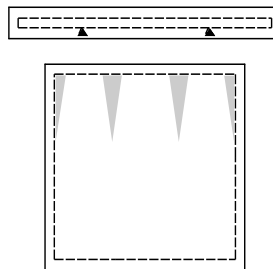
Basic Types of Fullness

With Gathers

To create gathers, one pattern is made longer than the other. The fabric is then gathered or pleated. The two patterns can be the same shape.

In the photo, the first apron uses just the fullness from the sloper's darts and side seam for the fullness. The apron remains fitted from hip to hem.

The second apron is expanded further to create fullness from waist to hem, see page 14.

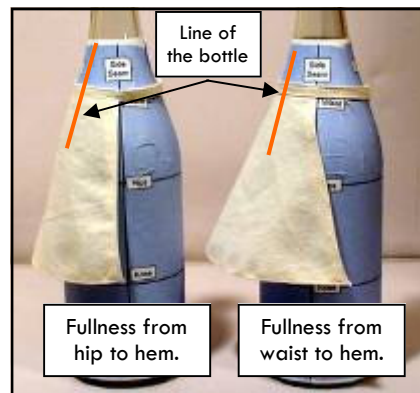
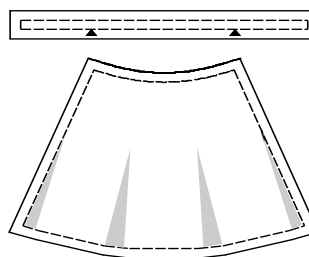


Without Gathers

To create fullness without gathers, one pattern piece is made more curved than the other. When the two contrasting shapes are sewn together, the fabric moves out from the body.

In the photo, the first apron shifts the shaping from the sloper's darts and side seam to the hem. The apron remains fitted from the waist to the hip.

The second apron is expanded further to create fullness from the waist to the hem, see page 15.



Combined Shaping

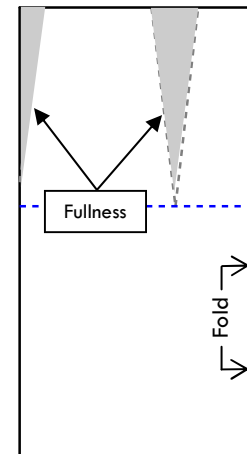
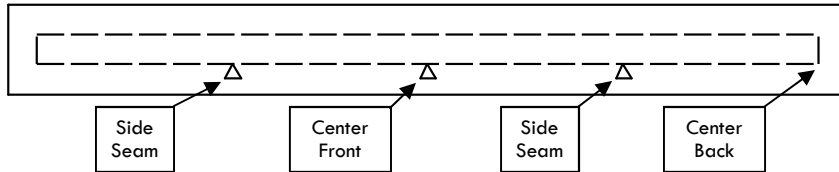
Both techniques can be combined, see the description of Ruffles on pages 16 thru 18.

Adding Fullness (cont'd)

Gathers from Darts and Side Seam

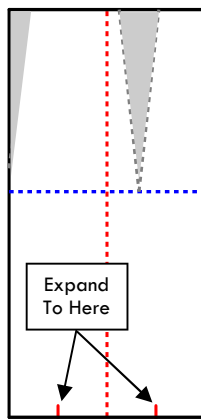
The Apron Sloper can be converted into an apron with gathers from waist to hip while remaining fitted from hip to hem using the steps below. For this example, half the Apron Sloper is shown.

1. Draw a line straight up the side seam from hip to waist.
2. Create a waistband with sewing notches at Center Front and Side Seam locations.

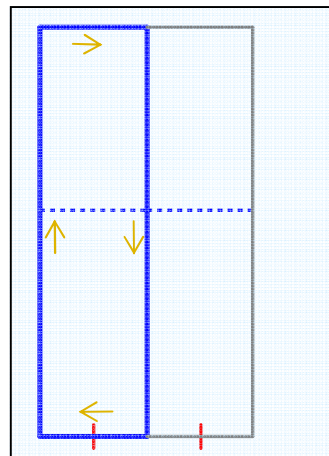


Increasing Fullness for Gathers

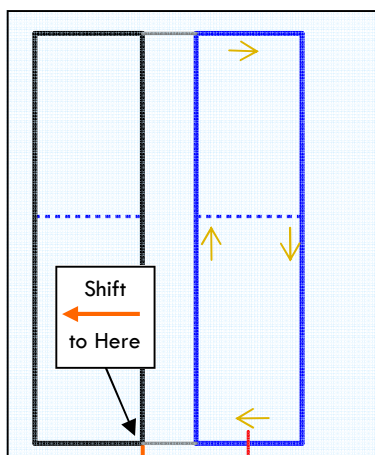
To add fullness from the hip to hem area, the apron pattern can be expanded to add the desired amount of fullness. In the example below, the fullness is increased by half.



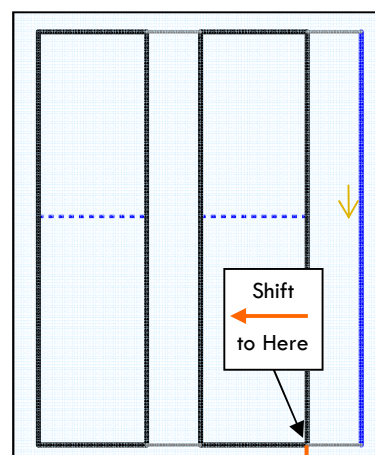
1. On half a copy of half an Apron Sloper, draw a vertical line, dividing the pattern in half.
2. On the Hem line, make two marks that divide the pattern into fourths. These are the marks that allow the pattern to be expanded by half its width.



3. Trace around the first portion of the Apron Sloper.



4. To expand the apron, shift the pattern paper to the first red expansion mark.
5. Trace around the second section of the pattern.



6. Shift the pattern paper to the second red expansion mark.
7. Draw in the last line of the pattern which is the Center Front line.

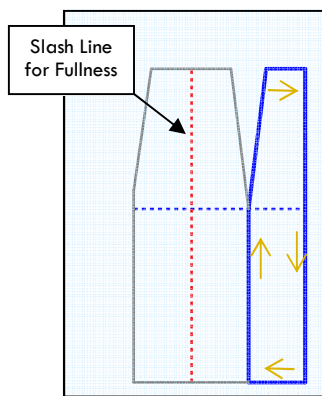
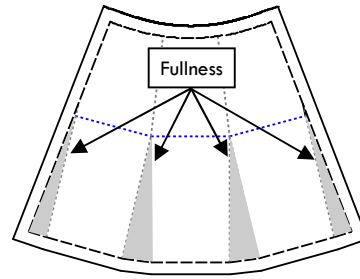
Adding Fullness (cont'd)

Fullness from Darts

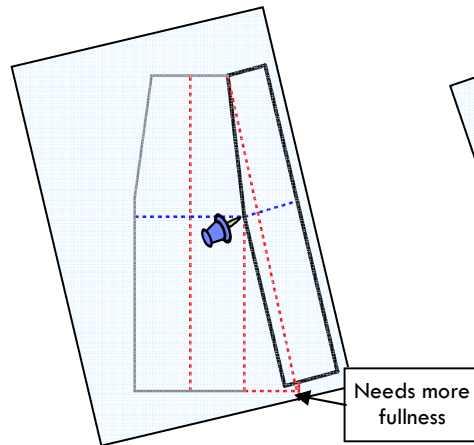
One way to add fullness to a garment, is to pivot the darts to the hem, see page 9. Then instead of sewing the darts leave the wedge of fabric as fullness.

This variation leaves the apron fitted from waist to hip but adds fullness from the hip to the hem.

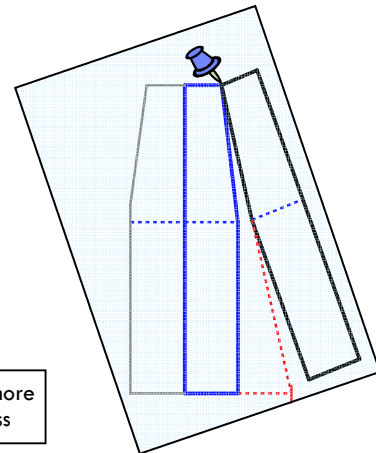
To add fullness in the waist to hip region, the pattern needs to be pivoted from the waist. The illustration below shows this process, doubling the fullness at the hem. Only half the Apron Sloper is shown.



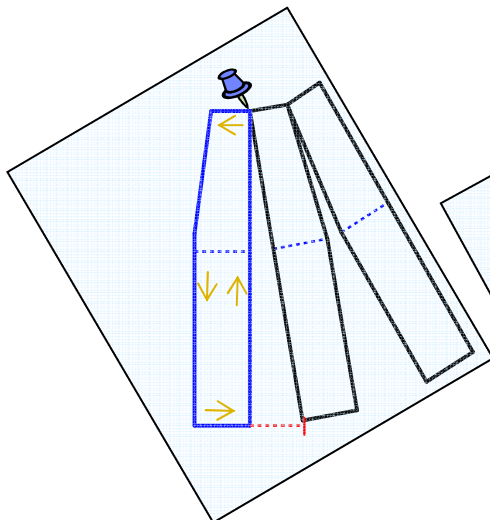
1. Trace the first portion of the pattern.



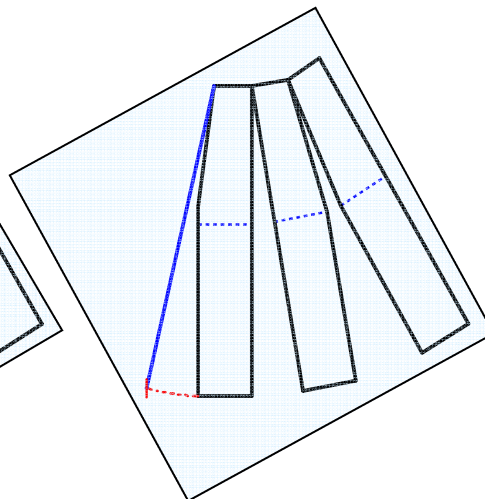
2. Pivot the pattern paper at the point of the dart. This does add fullness between the waist and the hip.



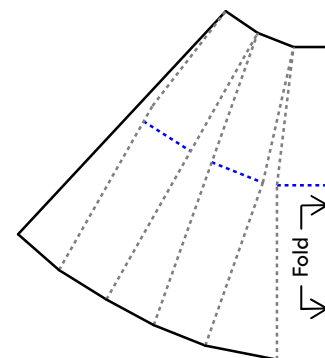
3. Pivot from the waist to add fullness between the waist and the hip.
4. Trace the middle portion of the pattern.



5. Pivot the pattern from the waist to add double fullness at the hem.
6. Trace around the last portion of the sloper.



7. Extend the Side Seam to add double fullness at this location.



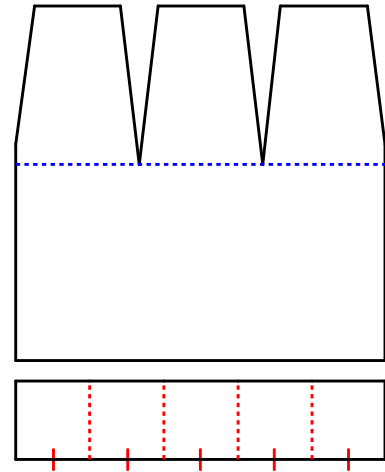
8. Draw in lines to complete the hem.
This apron now has some fullness between the waist and the hip.

Adding Fullness (cont'd)

Ruffles Showing Variations of Gathers

You can use ruffles to experiment with different pattern manipulation techniques for adding fullness. In the examples on these three pages, variations are used to add fullness by using the sliding technique, the pivoting technique, then combining both sliding and pivoting.

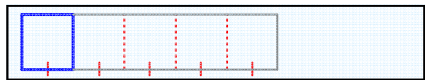
1. To create a "ruffle sloper," draw a rectangle that is the width of the Apron Sloper and 1" (2.5cm) high.
2. Divide this into even units or boxes. The example shows the red expansion lines at 1" (2.5cm) intervals.
3. Divide each box in half with a mark for determining how much fullness is to be added.



Fullness for Ruffles by Sliding

The sliding technique adds the same amount of fullness to the seam line and the bottom of the ruffle. Because the top seam of the ruffle is expanded, the ruffle will be gathered before it is sewn. In this example, half again as much fullness is added.

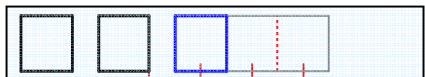
Notice that the resulting pattern shape is straight.



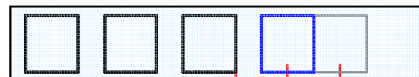
1. Trace the first box.



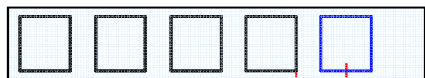
2. Slide by half, then trace the second box.



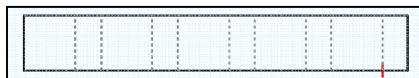
3. Slide by half, then trace the third box.



4. Slide by half, then trace the fourth box.



5. Slide by half, then trace the fifth box.



6. Slide by half, then complete the straight ruffle pattern.



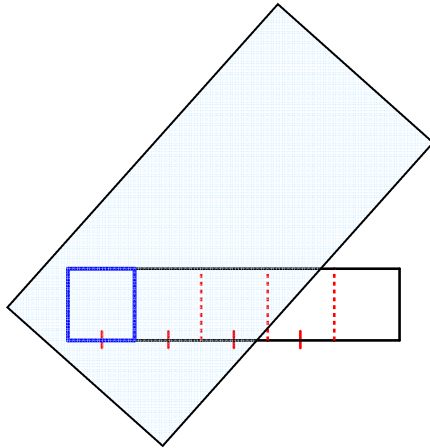
Adding Fullness (cont'd)

Fullness for Ruffles by Pivoting

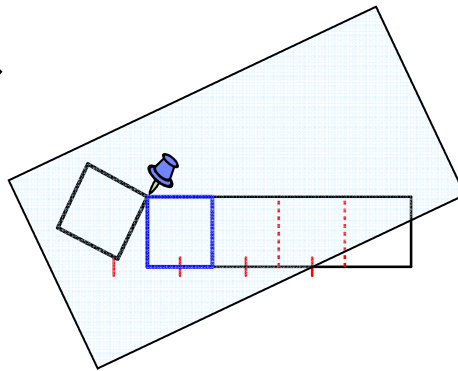
When you add fullness by pivoting on a seam line, the seam will have no gathers.

When you are adding fullness by pivoting, you need to guess as best you can where to place the paper. If possible, use a large sheet of paper and start in the middle. Some experimentation will help before you start drawing in the actual lines.

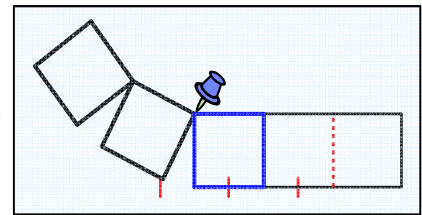
Notice that the resulting pattern shape is curved.



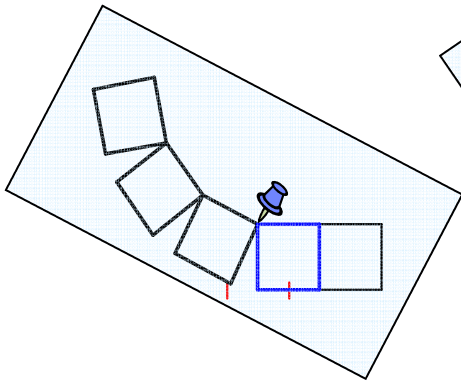
1. Trace the first box of the pattern.



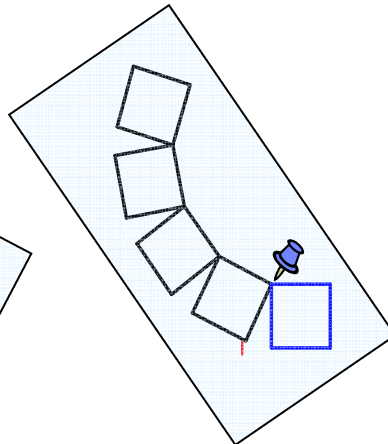
2. Pivot then trace the second box.



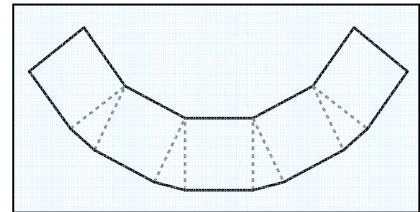
3. Pivot, then trace the third box.



4. Pivot, then trace the fourth box.



5. Pivot, then trace the fifth box.

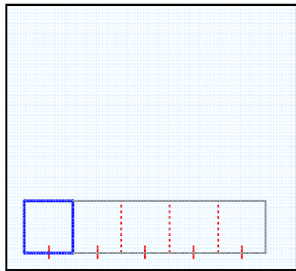
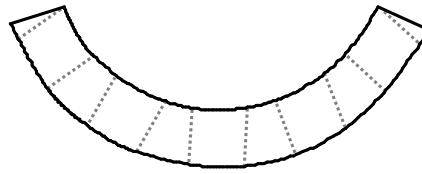


6. Finish the pattern by connecting the bottom seam lines where the pivots added fullness.

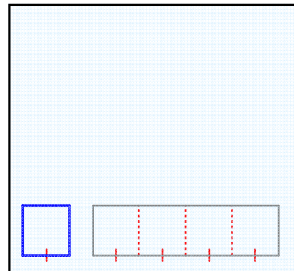
Adding Fullness (cont'd)

Fullness for Ruffles using Slide and Pivot

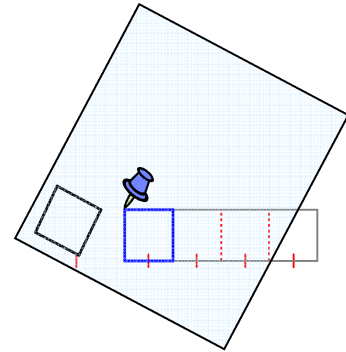
The amount of Ruffles in a garment can be controlled by combining the slide and pivot techniques.



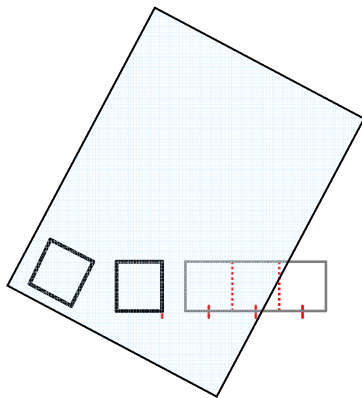
1. Trace the first box.



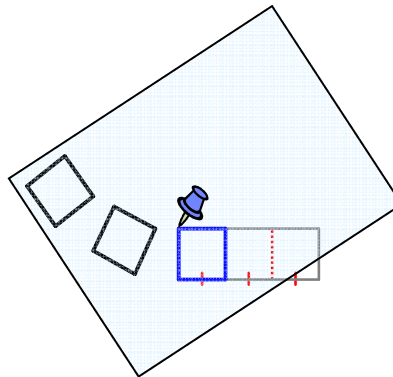
2. Slide the first box.



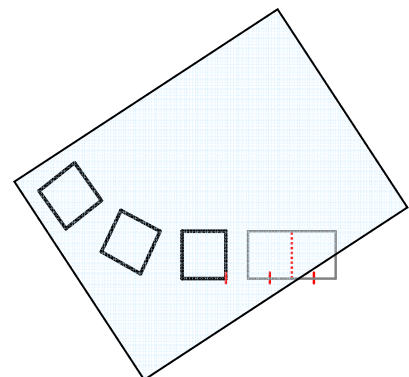
3. Pivot at the second box.
4. Trace the second box.



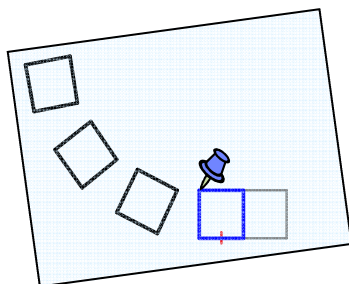
5. Slide the second box.



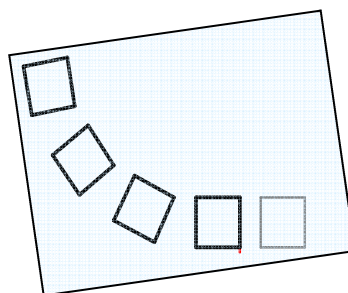
6. Pivot at the third box.
7. Trace the third box.



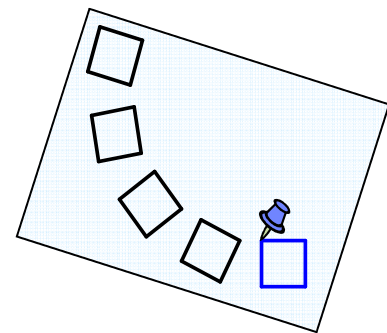
8. Slide the third box.



9. Trace the fourth box.



10. Slide the fourth box.



11. Trace the fifth box, then finish the pattern.

Adding Fullness (cont'd)

Tapering Fullness in Seams

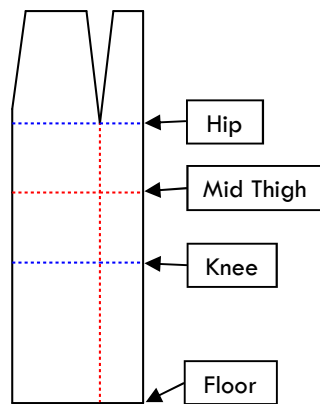
Tapering fullness in a garment from fitted to full requires using appropriate seam locations. An example of this style is the trumpet or morning glory skirt that is fitted from waist to mid-thigh then flares in fullness down to the hem at the floor.

To achieve this look, you cannot simply add fullness to the side seams. You need to add fullness to the vertical seams, or a horizontal seams, or by inserting gores. Notice in the photo that the apron on the left does not flare out in front like the others. That is because only the side seam has been changed.



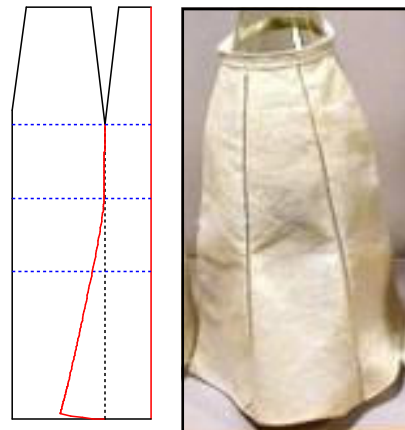
Floor Length Sloper

To create these styles, you need a full length sloper that is waist-to-floor length. Add a mid-thigh line half way between the hip and knee.



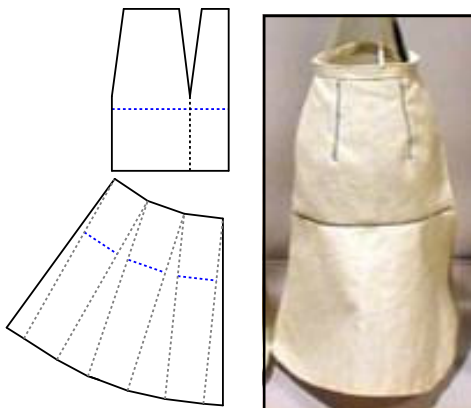
Vertical Seams

The modification to the sloper shown below adds a vertical seam starting from the point of the dart. This creates a 3 gore apron (or 6 gore skirt).



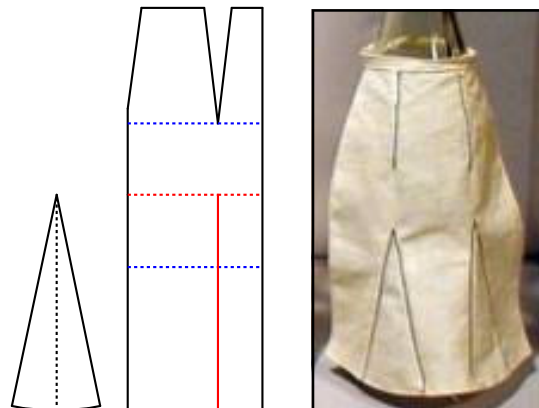
Horizontal Seam

The modification to the sloper shown below adds a horizontal seam at mid thigh. The fullness is created by pivoting the bottom of the apron.



Gore Insert

The gore insert can use the same shaping as drawn for the vertical seam variation. This type of insert is tricky to sew. It would be easier to simply sew the gore into a vertical seam that runs parallel to the center front line.



Adding Fullness (cont'd)

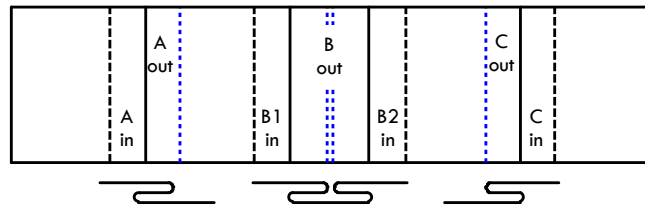
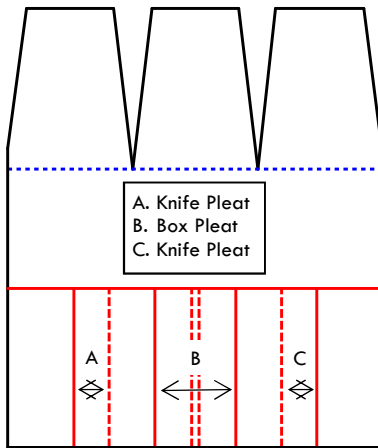
Pleating Patterns

Pleats are a method of adding fullness that give a lot of control over the shaping of a garment. While the combinations of fold variations is infinite, you can use the following steps to create virtually any combination of pleating:

1. Draw the design seam lines on a copy of the sloper.
2. Draw in where you want the folds to occur. Use solid lines to indicate outside folds and dotted lines for inside folds.
3. Mark the pleats A, B, C, D, etc. If you are using a combination of pleats indicate the type of pleat: knife, box, inverted box, etc.
4. Fold a blank sheet of pattern paper using the fold lines you have indicated on the sloper.
5. Trace the seam lines from the sloper to the folded pattern paper.
6. Cut out the pattern paper and mark the pleats on the pattern including which are the outside portions of the pleat and which are the inside.

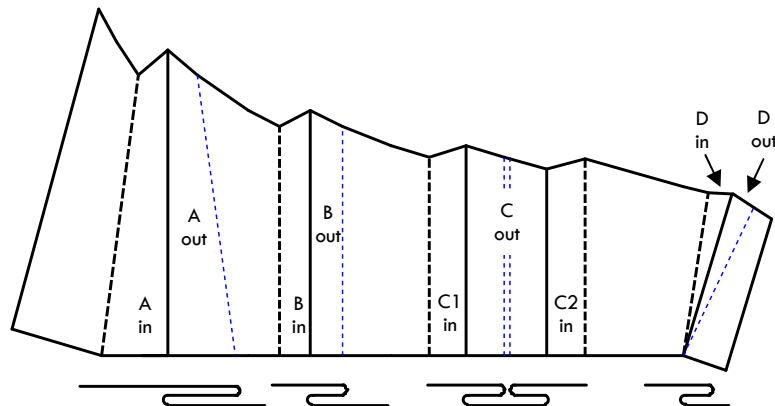
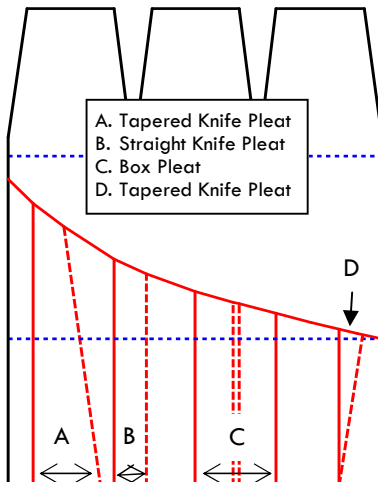


Two examples are shown below.



1. Draw the design lines.
2. Draw the pleat lines.
3. Fold blank pattern paper following the pleat lines.
4. Trace the design lines.

5. Unfold the pattern paper and mark where the pleats are folded. The blue lines indicate where the inside folds will appear.
6. Label the pleats.
7. Keep the folded paper copy as a record.



A Utility Apron

You can use a Utility Apron to hold small objects and tools that might otherwise clutter your desk, kitchen counter, drafting/cutting table, or other workspace.

The Utility Apron described here shows how to make an apron with pockets designed for specific tools and/or supplies. A cork board and push pins are used to create the patterns for the apron's pockets.

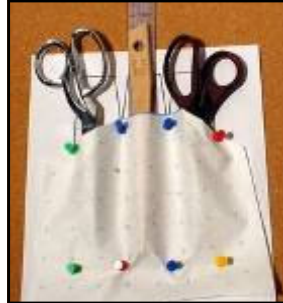
When sewing this type of apron, match the seam location for all the layers of the pockets and sew the tallest pockets to the apron first.



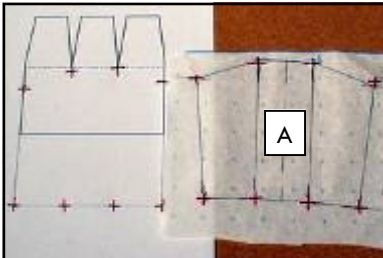
This is two apron patterns combined. Depending on the tools, you may need to add as much as 1" (2.5cm) ease from hip to hem at the side seams to join the aprons. The instructions describe the first side.



1. Lay out the tools for the apron on top of copies of the bottle sloper. Place the tallest tools in the back and the shorter tools in front.



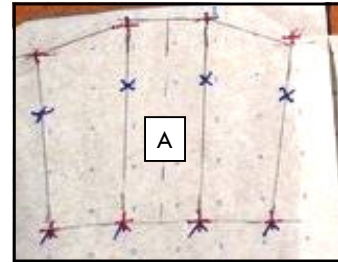
2. Start with the tallest tools. Place a fresh sheet of pattern paper over the tools.
3. Use push pins to secure the pattern paper to the sloper.



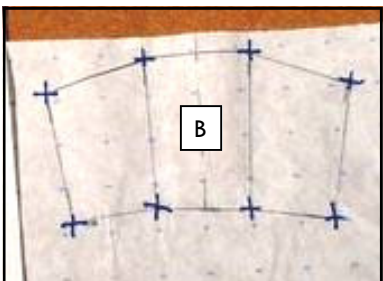
4. Remove the pins.
5. Mark the locations of the pin holes on the sloper.
6. On the pattern paper for the first pockets, use the pin holes to draw in the sewing lines. This is pattern A.



7. Place the second row of tools on top of pattern A.
8. Place a new sheet of pattern paper on top of the tools and secure with push pins.



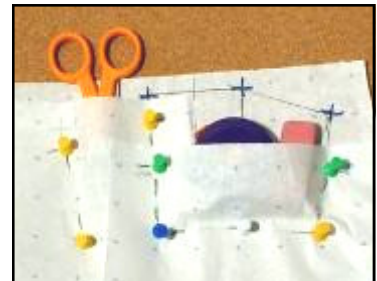
9. Remove the pins.
10. Mark the locations of the pin holes on pattern A, the blue marks in this example.



11. Mark the pin holes on the pattern paper for the second layer and draw in the sewing lines. This is pattern B.



12. Place the tools for the final level on pattern B.
13. Place a piece of paper over the taller of the tools and secure with push pins.



14. Place a piece of paper over the shorter tools and secure with push pins.
15. Remove the pins and draw in the sewing lines.

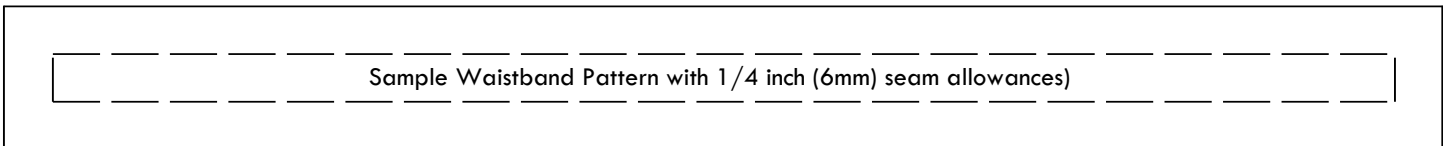
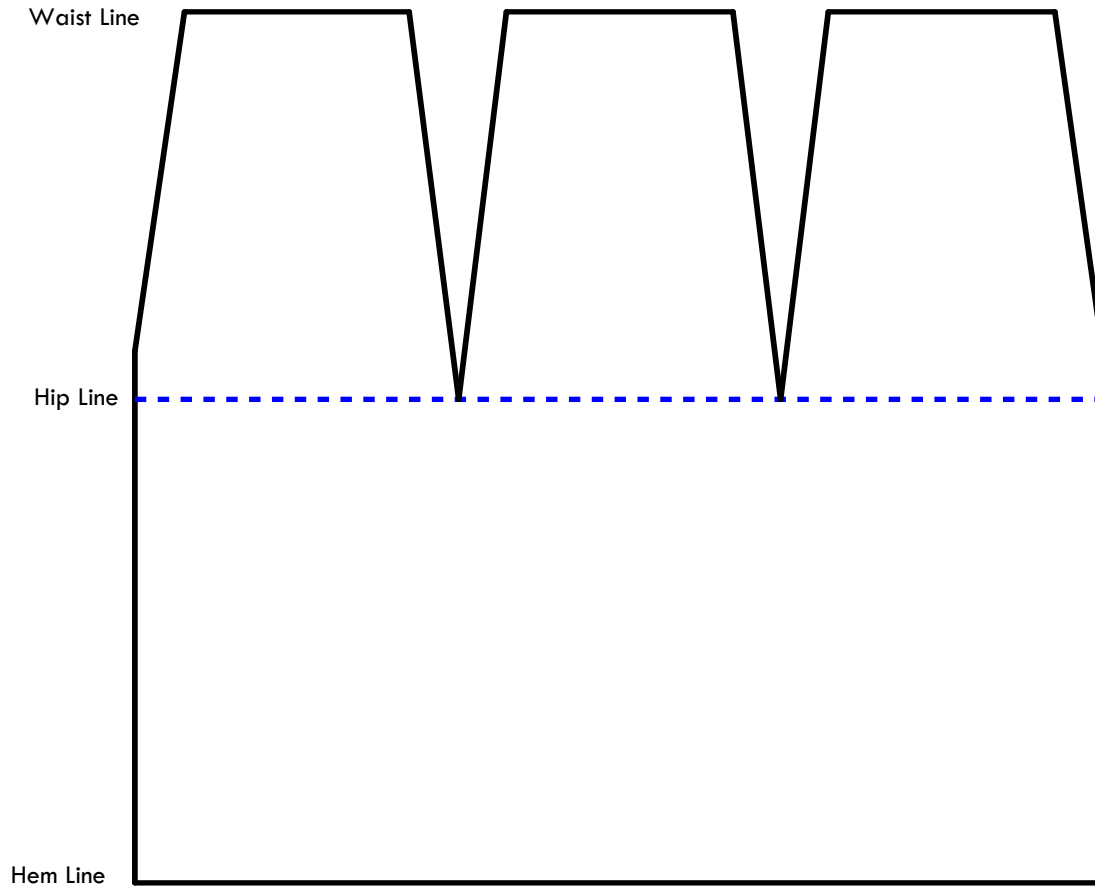
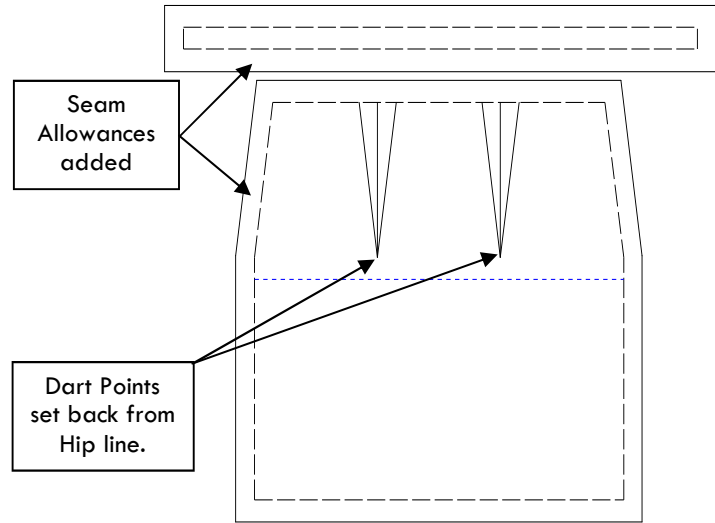
Sample Patterns

Sample Sloper Pattern

If you have not created an Apron Sloper pattern as described on pages 4 or 5, you can use a copy of the pattern below to try the pattern design techniques described in these instructions.

The Apron Sloper below takes the point of the dart to the hip line. After you have created a pattern that uses darts, adjust the point of the dart until it is approximately 1/4" (6mm) back from the hip line as shown in the illustration to the right.

You will also need to add seam allowances to any design you intend to sew. See the sewing instructions on page 6 for further details.



Sample Patterns (cont'd)

Circular Skirt Pattern

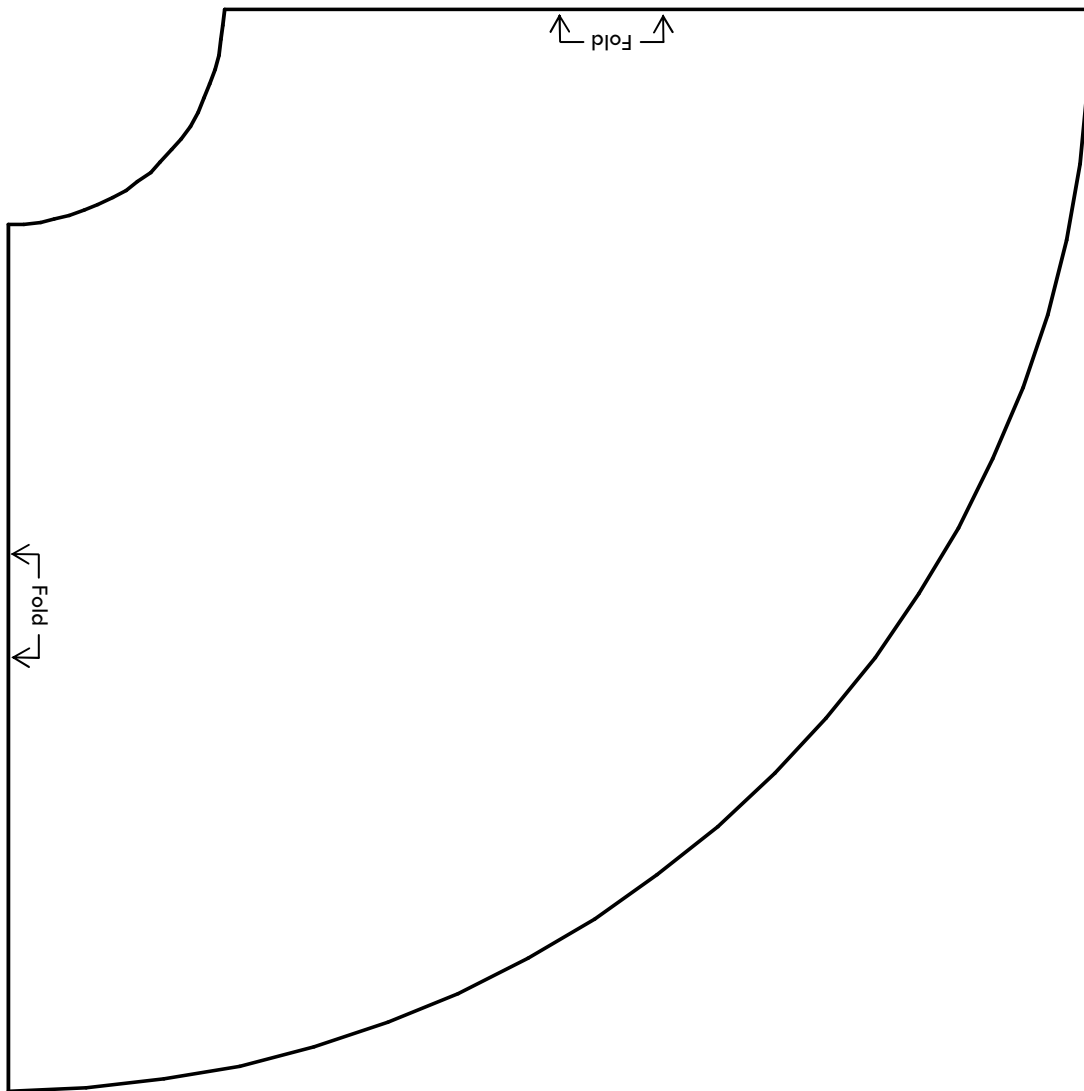
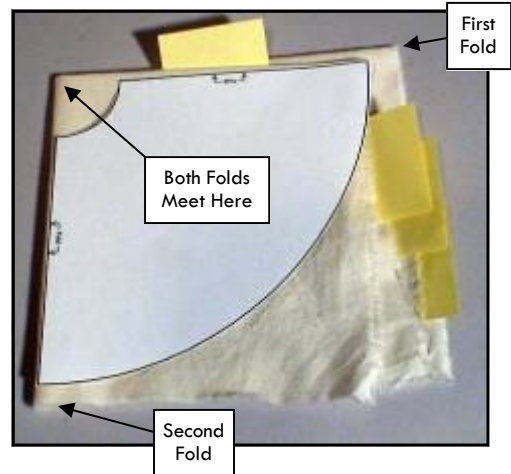
Use this circular skirt pattern to cut samples for evaluation of fabric for fullness as described on page 13.

To use this pattern, you will need a square of fabric 12" by 12" (30cm x 30cm). Fold it first lengthwise, then width wise. Then place the pattern on the fabric as shown.

No seam allowances are required unless you want to test how the fabric falls with a hem.

If you are cutting it out of stretch fabric, stay stitch around the waist to preserve the circumference of the fabric at this point.

If you are cutting it out of a loose weave, zigzag the waist opening.



Sewing-Free Pattern Designs

Pattern designs should always be done on paper. Paper patterns are much more stable than patterns recorded on fabric. The reason for cutting the patterns out of fabric is to make the resulting garment comfortable and one you can move in. This is not required for the bottle model used in these instructions.

You can try the patterns for the apron by simply cutting out the paper patterns you have made and taping the darts and seams closed. If you are doing an apron that has gathers, I suggest you transfer the pattern shapes to paper towels, otherwise typing or pattern paper can be used to test the results of your pattern manipulation experiments.

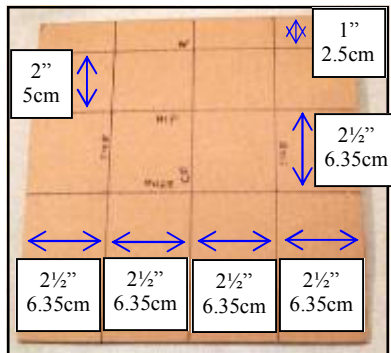
When you do this, I suggest you don't add seam allowances. Just butt the seams together and tape. Paper will be stiffer than fabric, but that will give you an indication of what the pattern is doing that may help you understand pattern design better.

Using the Sloper from page 22

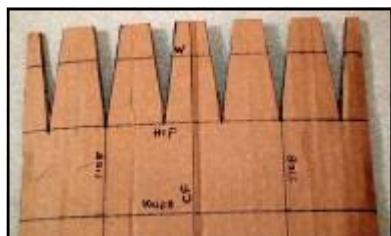
There is an apron sloper pattern that is ready to be used on page 22. To test the patterns, you will need a bottle with the following specifications:

- 10" (2.5cm) circumference around the main body.
- A flat cone-like neck like the one on page 3.
- 2" (5cm) up from the body, the neck should be 7" (17.8cm)

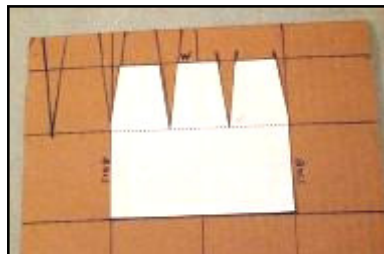
If you don't have a bottle that meets these specifications, you can make a bottle out of cardboard using this sloper pattern and the instructions below.



1. On a sheet of cardboard 10" by 10" (25.4 by 25.4cm), draw the waist, hip, knee, side and center front lines as shown above. The corrugation of the cardboard should follow the center front, CF, line.



5. Cut out the darts.



2. Cut out a copy of the sloper from page 22.
3. Draw in the side seams and darts as shown above.



6. Tape the darts and center back seam closed.



Tapered Fullness in paper.
(Pattern from page 19.)



Ruffles using a paper towel.
(Pattern from page 18.)



4. Roll the cardboard into a cylinder.



The Finished Bottle