

Appendix 515

BORDERS

There are several things we need to keep in mind as we make flat projects with borders.

Since stitch gauge and row gauge are usually different in almost all knitted fabrics, we have to take that difference into account when we design borders.

Seed-Stitch Borders

Seed stitch usually has the same row and stitch gauges as our stockinette, and a common stockinette ratio of stitch and row gauges in worsted-weight yarn is five to seven. If we get five stitches per inch, we usually get about seven rows per inch. Some knitters may get five to six; other knitters may get five to eight, six to eight, six to nine, or some other ratio.

If we want a one-inch-wide border on all four sides of a flat item, then we must have left and right borders that have the number of stitches we get per inch. But the top and bottom borders can't use the number of *stitches* per inch; they must use the number of *rows* per inch.

If we get five stitches and seven rows to the inch in seed stitch and we want all four borders to be one inch wide, then we have to make the left and right seed-stitch borders *five stitches* wide, but we must make the top and bottom borders *seven rows* tall.

If we prefer the borders to be five rows tall at the top and bottom and five stitches wide at the left and right, that's fine. But now we know how to alter a project to make the top and bottom borders the same measurement as the right and left.

Garter-Stitch Borders

We learned in chapter 110 that garter stitch is usually perfectly square when it has the same number of stitches and *ridges*. That means the top and bottom borders must be the same number of ridges tall as the side borders are stitches wide.

If we get five stitches per inch, then for one-inch borders on all four sides, we have to have five border stitches on the left and right edges, but we have to have *five ridges* (which are *ten rows*) at the top and bottom.

Garter-Stitch Side Borders

Because garter stitch has more rows per inch than most other knitted fabrics, left and right borders of garter stitch will be shorter than the main body of most projects if both the central fabric and the borders have the same number of rows. That means we need to add extra rows in the side borders. How? With short rows.

Get the Row Gauges

We have to make swatches of both the pattern stitch and garter stitch. If you can be patient enough to make four-inch long swatches of each, that would be better than having just one inch of both fabrics.

Once you have several inches of both fabrics, count the number of rows in each swatch.¹

In my first basket-weave hot pad, I got thirty rows in four inches of the basket-weave pattern, and I had fourteen ridges (twenty-eight rows) in three inches of garter stitch.

Figure Out the Difference in the Row Gauges

Each basket-weave row is 0.133 inches (four divided by thirty) tall, but each garter-stitch row is only 0.107 (three divided by twenty-eight) inches tall. Yes, the difference seems small, but suppose we want a blanket whose central basket-weave portion is sixty inches long. Sixty inches of basket-weave will be 450 rows (sixty inches divided by 0.133 inches per row). But if the garter stitch in the left and right borders is also 450 rows long, the side borders will measure only a bit more than forty-eight inches tall (450 rows multiplied by 0.107 inches per row). That's going to be a big problem.

We can look at the problem in the other direction as well. Each inch of basket-weave has 7.50 (thirty divided by four) rows. Each inch of garter stitch has 9.33 (twenty-eight divided by three) rows. The difference between those two numbers shows that in each inch of basket-weave, we have to have almost almost two additional rows of garter stitch in the right and left borders to make them be the same length as the basket-weave fabric.

What Short Rows Are

Short rows are made by stopping before the end of the row, turning the work, and working back toward the beginning of the row, leaving the rest of the stitches on the current row unworked for the time being (some books call them *stitches in waiting*). After working back a certain distance, the piece is turned back in the original direction.

Sometimes after the first turning we work all the way back to the beginning of the row, but in other situations, we might work only part of the way back. When we turn back to the original direction, we again might work only partway across before turning a third time, or we might work all the way to the end of the row.

Here's a chart showing *one pair* of short rows (we count the turns made, not the number of partial rows that we wind up with).

¹ It's better to have several inches' worth of fabric, both across stitches and up rows, so that you can get fractions of a stitch or row per inch. If you have only an inch of fabric to measure, it's too easy to stretch or squish the fabric, which will give you a false gauge.

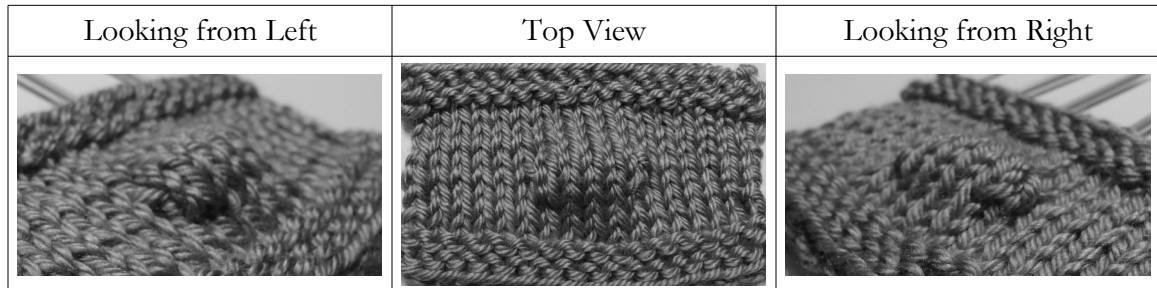
| | | |
|----------|---------------------------|----------|
| 6 | □□□□□□□□□□□□□□□□ | |
| | □□□□□□□□□□□□□□ | 5 |
| 4 | □□□□□□□□□□□□□□ | |
| | □□□□□□□□□□□□□□ | 3 |
| 2 | □□□□□□□□□□□□□□□□ | |
| | □□□□□□□□□□□□□□ | 1 |
| | RQPONMLKJIHGFEDCBA | |

How do we interpret the chart?

On rows one and two we work all the way across and all the way back in the normal way. On row three, however, we stop short of the end, working only as far as stitch L, leaving stitches M through R unworked. Then we turn the work.

On row 4, we work stitches L through G. Then we turn the work again, leaving stitches F through A unworked. On row five we work all the way to stitch R at the end of the row, and on row six, we work all eighteen stitches.

The key thing to notice here is how the center of the swatch has more rows than the left and right edges. These extra rows make a sort of bump or blister in the fabric.



As we look at stitches A through F moving vertically up the chart from row one to row six, those stitches have only been worked four times: they are only four rows tall. The same thing is true of stitches M through R. Those stitches are also only four rows tall.

But the central area, stitches G through L, is six rows tall, because there are two extra rows, the short rows, on rows three and four.²

In this explanatory chart, the two short rows have been numbered. Normally, short rows remain unnumbered, as we'll see in the rest of the discussion.

² Short rows can be worked in the round also. In both the flat and the round, there are usually holes at the turning points, which can be hidden with various techniques. For the purposes of putting short rows in left and right garter-stitch borders on fabrics with fewer rows per inch than garter stitch, we're ignoring the issue of holes. (If we make the basket-weave hot pad with short rows in the left and right borders, we'll see that, without any special treatment, it's almost impossible to find the holes formed at the turning points.)

For short rows in left and right borders of garter stitch, we'll almost always work just the garter stitches at the beginning of the row, turn and work back to the edge, then turn and work all the way across the piece, where we will turn and work just the border stitches, then turn and work back to the edge of the fabric, where we will be ready to work across the entire piece. In this way we do two short rows just in the left and right borders of garter stitch, while we have worked only one full row of the central fabric.

Using Short Rows on Garter-Stitch Side Borders

Since we get two extra rows every time we do short rows, how can we use them on the left and right edges of a project, like the basket-weave hot pad?

Using my numbers for the basket-weave hot pad, where I had 7.5 pattern rows per inch while the garter stitch had 9.33 rows per inch, we can say that the difference, 1.83 rows, is close enough to two rows per inch that we won't bother doing any more arithmetic.

So we need to tweak the basket-weave hot-pad chart to put two extra rows in the left and right borders for every 7.5 rows of the basket-weave pattern. Note that we don't have to start thinking about short rows until after we start the basket-weave rows, since the garter-stitch left- and right-border rows are next to the garter-stitch bottom border before that point.

And of course we have to do the short rows either after seven or after eight basket-weave rows.

The First Set of Short Rows

Since the basket-weave starts in row seven, we'll work seven basket-weave rows, then add short rows just in the left and right borders. Note that the short rows are not numbered, because the row numbers indicate the basket-weave pattern's rows.

Let's use a slightly different method than the chart above.

| | | |
|-----------|--|-----------|
| | | 15 |
| 14 | | |
| | | |
| | | 13 |
| 12 | | |
| | | 11 |
| 10 | | |
| | | 9 |
| 8 | | |
| | | 7 |
| | 40 39 38 37 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 | |

Now, it looks like we've made the whole project two rows taller, but remember, that's

not what’s happening here. Since there are no pattern stitches between the left and right borders in the short rows between rows thirteen and fourteen, the basket-weave isn’t getting taller, just the garter stitch. The way we would work the chart is

1. Work the complete row twelve, and turn.
2. Work the first four stitches of row thirteen, then turn the work.
3. Work back across those four stitches, and turn the work.
4. Work all the way across row thirteen, all the way to stitch forty at the end of the row. Turn the work.
5. Work the first four stitches, and turn the work.
6. Work the same four stitches again, and turn.
7. Work all the way across, completing row fourteen as charted.

If we charted it the way we actually worked it, it would look like this:

| | | |
|-----------|--|-----------|
| 14 | | |
| | | |
| | | |
| | | 13 |
| | | |
| | | |
| 12 | | |
| | | 11 |
| 10 | | |
| | | 9 |
| 8 | | |
| | | 7 |
| | 40\|39\|38\|37\|36\|35\|34\|33\|32\|31\|30\|29\|28\|27\|26\|25\|24\|23\|22\|21\|20\|19\|18\|17\|16\|15\|14\|13\|12\|11\|10\|9\|8\|7\|6\|5\|4\|3\|2\|1 | |

Note that the row numbers shown in the chart still reflect only the basket-weave pattern rows of the project chart. We could, if we wanted to, assign some kind of numbers to the project chart’s row numbers where the short rows of the left and right borders are, but we would **not** want to do something like this:

| | | |
|-----------|--|-----------|
| 18 | | |
| | | 17 |
| 16 | | |
| | | 15 |
| 14 | | |
| | | 13 |
| 12 | | |

That would almost certainly get us into trouble at some point. If, for example, we had to

| | | |
|---|-------|--------------|
| 36 | ..... | short row |
| | | |
| 34 | ..... | 35 |
| | | 33 |
| 32 | ..... | 31 |
| | | |
| 30 | ..... | 29 |
| | | |
| 28 | ..... | short row |
| | | 27 |
| 26 | ..... | 25 |
| | | |
| 24 | ..... | 23 |
| | | |
| 22 | ..... | 21 short row |
| | | |
| 20 | ..... | 19 |
| | | |
| 18 | ..... | 17 |
| | | |
| 16 | ..... | 15 |
| | | |
| 14 | ..... | 13 short row |
| | | |
| 12 | ..... | 11 |
| | | |
| 10 | ..... | 9 |
| | | |
| 8 | ..... | 7 |
| | | |
| 40393837363534333231302928272625242322212019181716151413121110987654321 | | |

Those reminders were enough to prompt me to make short rows on the first four stitches of the public-side row, work the entire row, turn, make short rows on the first four stitches of the private-side row, then work the entire return row. (And yes, simplifying the process by doing them only every seventh row or only every eighth row would probably have been fine, instead of doing them after seven, then eight, then seven, then eight basket-weave rows. I alternated seven and eight rows partly to see what would happen and partly because I'm a perfectionist.)



In the photo, there are loops of contrast yarn put through the short rows' ridges. If you compare this photo with the one in chapter 220, it's clear that the side borders are quite a bit taller and the sides aren't pulling the corners out of shape.

Other Row-Gauge Examples

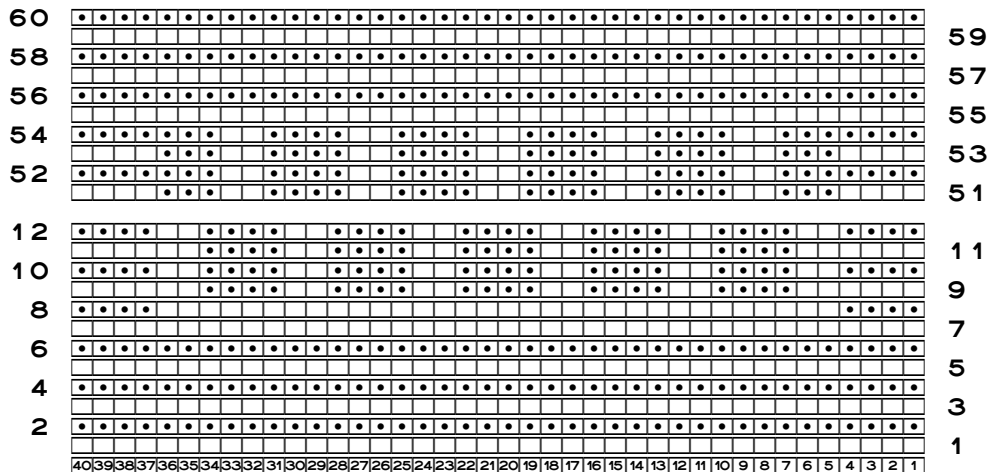
In the basket-weave hot pad, my gauge numbers worked out pretty nicely. For every inch of basket-weave, I needed to add a pair of short rows in the side borders. Technically, I needed to add only 1.83 garter rows every 7.5 basket-weave rows, but knitting is stretchy and squashy, and the numbers worked out close enough.

Suppose your main fabric has nine rows per inch and your garter stitch has twelve rows per inch. You can't do three extra rows of garter stitch per nine rows of your main fabric, because you only get two short rows at a time. But if you multiple both row gauges by two, you have eighteen and twenty-four rows per two inches. Since the difference is now six rows, you'll need to do short rows three times in every eighteen rows of the main pattern. You would therefore work short rows in the left and right garter-stitch borders for every six rows of the main pattern.

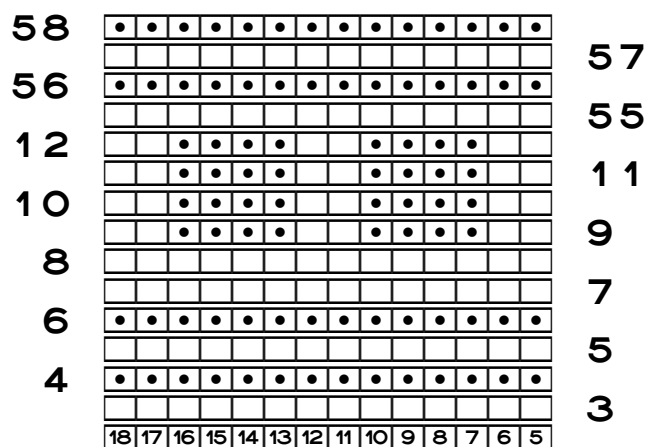
Suppose you have gauges of seven pattern rows and twelve garter rows per inch. The difference is five, and again, we can't get an odd number of short rows. Multiply both row gauges by two: fourteen and twenty-four. The difference is now ten, so we need to do ten short rows to make up for the tighter garter-stitch row gauge. Five sets of short rows will give us the extra ten rows of garter. How frequently do we make a pair of short rows? Five times in fourteen rows, so every three pattern rows we do short rows in the left and right borders. (Yes, five doesn't go into fourteen evenly, but again, knitting is forgiving and so the proportions will probably work out fine.)

Garter-Stitch Top Borders

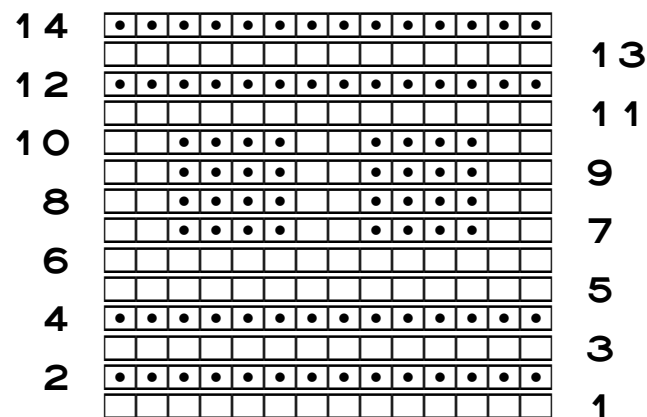
Staying with the basket-weave hot pad in chapter 230, the bottom and top of the original chart looked like this:



Let's cut this chart down, so we can concentrate on how the top and bottom borders butt up against the rows of stockinette fabric below and above the purl blocks. We'll keep only two purl blocks from a single row of blocks in the center of the chart. Let's also cut the top and bottom borders to just two ridges instead of three (even one ridge would be sufficient for demonstration purposes), just so the charts, swatches, and photos can be smaller.



We'll now renumber the rows for clarity, and we'll delete the stitch numbers, since we don't need them for this discussion.



In essentials, this smaller chart is the same as the full chart from chapter 230: we have a garter-stitch bottom border, two rows of stockinette, a row of purl blocks, and the same problematic single row of stockinette below a garter-stitch top border.

Our Intentions

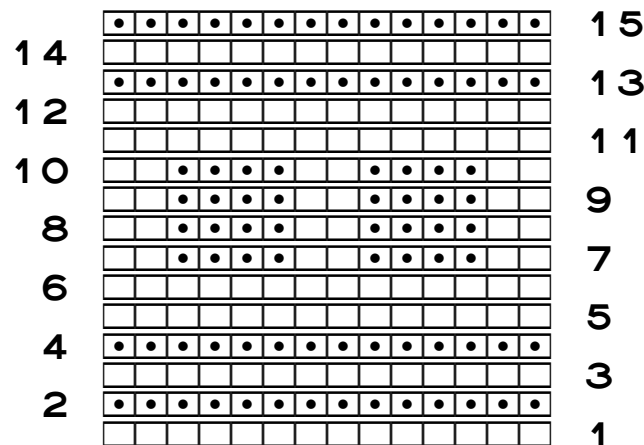
We **intend** the last public-side knit row, now row eleven, to be the last row of stockinette

stitch, but what actually happens **in yarn** is that the last public-side knit row will be hidden by the first purl ridge of the garter-stitch top border (now row twelve).

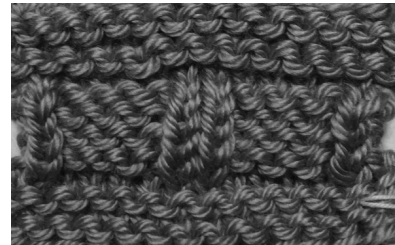
If we make this swatch, we see the same issues that we saw with the full-size basket-weave hot pad. The distance between the bottom border and the bottom of the blocks is a bit bigger than the distance between the top of the blocks and the top border. So let's add a second stockinette row above the blocks.



In the next chart, I copied and pasted row eleven, then fixed the row numbers. If you'll remember from chapter 230, we could not add this second row of stockinette *and* make the left and right borders mesh perfectly with the top border.³ There's one other thing to note about this modified chart. The top border is now made by **purling** rows twelve through fifteen, not knitting them.⁴ That's what caused the right and left borders to not mesh with the top border in chapter 230.

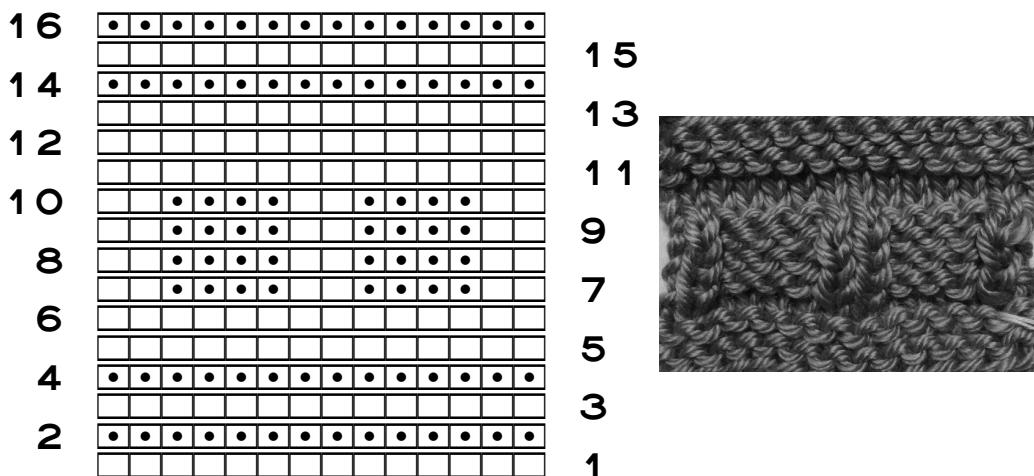


The photo shows what the chart looks like worked up. In this swatch, the gap between the blocks and the borders looks like it's the same size, which is good. But again, we wouldn't have been able to make the left and right borders mesh properly with the top border (because we have to make the top border by **purling** every row while the left and right borders would still be knitting every row).



³ Since we've removed the left and right borders to focus on the top and bottom borders, we aren't dealing with that problem here.
⁴ Remember from chapter 110 that we can make garter stitch by knitting every stitch of every row or by purling every stitch of every row.

Let's do one more experiment, adding a third row of stockinette above the blocks.



Now the top gap looks bigger than the bottom one.

Emphasize What's Happening with a Second Color

Let's work these three charts again, using a different color for the basket-weave in rows five through eleven of the first chart, rows five through twelve of the second chart, and rows five through thirteen of the third chart.

| One Row of Stockinette | Two Rows of Stockinette | Three Rows of Stockinette |
|------------------------|-------------------------|---------------------------|
| | | |

Normally we make garter stitch by starting on the public side with a knit row, then knit back on the private side, which makes a purl ridge on the public side. As we see in all three of the two-color swatches, the first row of stockinette in row five looks just as we expect it to. We clearly see two blue ridges of garter stitch below it, and both rows below the purl blocks are visible, though as with the single-color swatches, the purl stitches partly hide the stockinette row below them.

When we look at the top border, though, what happens in a single color is highlighted and magnified by working the border in a different color from the basket-weave.

For the first chart, we see the single white stockinette row above the blocks has almost disappeared. The purl ridge, row twelve, has hidden the V shapes of the public-side knit stitches on row eleven. For the second chart, we see about a row and a half of the two rows of stockinette above the purl blocks. The third swatch shows about two and a half rows below the top border.

The Takeaway

The thing we have to learn from these charts and swatches is that the first private-side knit row of a garter-stitch top border is going to hide the public-side knit row below it. The two-color swatches make that quite clear.

Even though it looks like we extended the **stockinette** portion of the chart by adding rows above the purl blocks, what happens **in yarn** is that the row before the first public-side purl ridge winds up being the first row of the garter-stitch top border.

If we have only one knit row between two purl rows, it will be almost invisible. That's the essence of garter stitch as a fabric; all we see are the purl ridges (unless we vertically stretch the fabric a bit).

To however many knit rows we want to be visible between purl ridges, we must add one extra public-side knit row, because the knit row immediately below a purl ridge will be hidden by the purl ridge.

If our flat project has a central area of stockinette (or any fabric more or less based on stockinette) surrounded by garter-stitch borders, then we may need an extra row between the top of the central area and the top border, compared to what we need between the bottom border and the beginning of the central area. We also know that, depending on the exact pattern of the central fabric, the gaps between the pattern area and the top and bottom borders may not match by about half a row.

Lessons Learned

Borders on flat items don't always act the way we think they will.

- ☉ Left and right seed-stitch borders can use the stitch gauge to make them a certain width, but top and bottom seed-stitch borders must be designed with the row gauge to be the same measurement as the left and right borders.
- ☉ Left and right garter-stitch borders will almost certainly need short rows if the main fabric is not also garter stitch.
- ☉ A public-side knit row **above** a purl ridge will show in its entirety.

☻ A public-side knit row *below* a purl ridge will be almost invisible.