Taking the Measure of Handspun Yarn

with Rita Buchanan



Collected Articles from Spin·off

The primary joy of spinning for many of us is in the act itself. But there is also great pleasure and satisfaction in taking the yarns we create to their conclusion in well-designed, well-made fabrics. More often than not, this means understanding the properties of our yarns – their twist, their grist, their yards per pound – and how these relate to the finished objects we have in mind.

In this important collection of articles from out-of-print issues of *Spin·Off*, Rita Buchanan provides the methods, tools, and rationale we need to understand our yarns in the way any fine craftsman seeks to understand his or her materials. They bring together the hand and mind in ways that can only help us be better spinners.

Linda Ligon
Founder, Interweave Press

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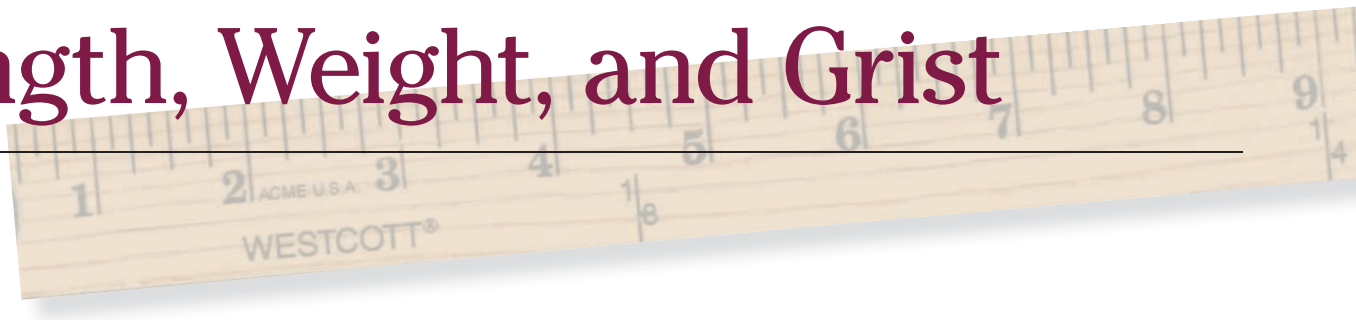
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PHOTOS BY JOE COCA, STEVE BUCHANAN AND COURTESY OF RITA BUCHANAN.

Length, Weight, and Grist



I used to spin happily without ever counting or measuring anything, and my yarns hung together anyway. Of course, they did! For thousands of years, beautiful yarns have been spun by spinners who couldn't count and didn't have rulers or scales. The lovely textiles in museum collections prove that you can spin perfectly well without fussing about wraps per inch or yards per pound. Tradition, experience, and intuition have guided many spinners toward exactly the right yarns for their fibers and prelects.

But now I do measure my yarn, and I have to acknowledge how much measuring has improved my spinning. Measuring helps me compare and evaluate and understand different yarns. It feeds my curiosity. And measuring helps me plan knitting or weaving projects. Before starting something big, I measure to estimate how much yarn I will need and to check how much I have.

Measuring is also a tool for communication. Once upon a time, spinners lived in communities where everyone spun the same kinds of fibers into the same kinds of yarns, for generation after generation. It was easy for these spinners to agree on the meaning of terms like *fine yarn* or *tight twist*. By contrast, most contemporary spinners work in relative isolation. We don't often see and handle each other's skeins. Some of us meet now and then at guild meetings and conferences, but much of our communication is through publications like newsletters and *Spin·Off*. Because we're separated from each other, and also because we're working with many different fibers and making many different yarns, modern spinners don't share a common vocabulary. Terms like *fine yarn* and *tight twist* mean different things to different spinners.

Where words are imprecise, numbers can clarify. Measuring yarn and using numbers can help spinners share their ideas and experiences, *if* we can agree on what measurements are important and how to take them. My impression from talking to spinners around the country is that there's a lot of confusion and frustration about why and how to measure yarn. I don't have the final word on all this, but I'd like to discuss some of the problems and opportunities as I explain how measuring fits into my spinning routines.

A PLEA FOR COMMON SENSE

First, let's all remember the nature of yarn. Yarn is not like wood or metal. Yarn is stretchy, shrinky, squishy, springy, squiggly stuff. Two carpenters can measure a board to the sixteenth of an inch and get the same answer. Two machinists can measure a metal fitting to the thousandth of an inch and get the same answer. But if two spinners measure the same piece of yarn, their answers may differ by an inch or more. Try this at a guild meeting: take a piece of yarn that you measure to be one yard long. Have everyone else measure it, and see what they think.

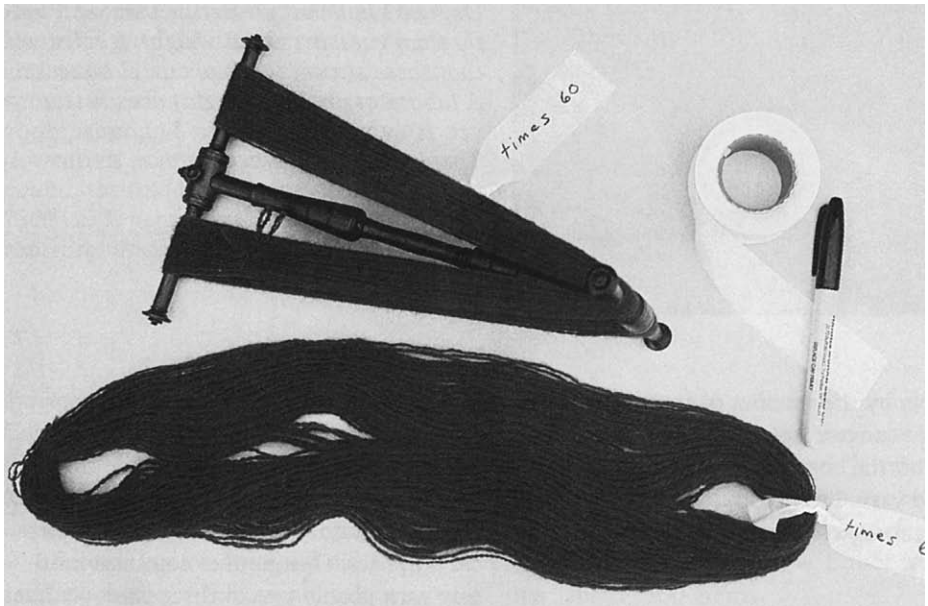
When measuring yarn, I think it's best to say "about" or "between" and to use rounded-off numbers. You just can't be precise when you're measuring something changeable. Remember this when using pocket calculators. Calculators don't have any common sense and don't know a thing about yarn. When a calculator gives you a silly number with too many digits, it's up to you to use your good judgment and round off

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How long is a skein of yarn? That depends on when and how you measure it. These are two skeins of the same yarn, and both have 60 strands.

The skein under tension on the niddy-noddy is 45 inches around; that figures out to 75 yards. Just removed from the niddy-noddy, the relaxed skein is about 38 inches around; that figures out to about 63 yards. After washing, these skeins shrank to about 35 inches around, or about 58 yards long.

Skeins usually get shorter when you take them off the niddy-noddy or reel, so it's a good idea to wait and/or wash them before you make a final measurement. The washable plastic tape used to label these skeins is called flagging tape, and is sold at lumberyards or building suppliers.



that number into something that makes sense. Don't believe your calculator if it says you have exactly 128.963 yards of yarn. If you were to roll that yarn down the sidewalk and measure it with a yardstick, there's no way you'd come out with a measurement like 128.963 yards. You might say it's "about 130 yards," or "between 125 and 130 yards." That's as accurately as you can measure yarn. The right answer isn't the number with the most digits, it's the number that most honestly describes what you're measuring.[1]

HOW LONG IS YOUR YARN?

I usually measure the length of a skein of yarn by counting the number of strands and multiplying by the skein's circumference. Counting the strands is easy. You can pick through a skein and count up to several hundred strands in a few minutes, or you can count the number of turns while winding the yarn onto a reel or niddy-noddy. Some skein reels have built-in counters. I usually try to count while I'm winding a skein, and before I forget, I write that number down. I use waterproof magic marker on plastic tape to make skein labels that can go through a washing.

Measuring the circumference of a skein is tricky. One approach is to measure the circumference of your reel or niddy-noddy. This is especially tempting if it measures exactly 1 or 2 yards. You'll want to jump to the conclusion that any skein you measure on that reel measures 1 or 2 yards. Indeed it does, while the yarn is still under tension on the reel. But what happens when you remove the skein? It relaxes and gets shorter. How much shorter? That depends on the yarn. It might get a little shorter, or it might get a lot shorter. Do this yourself: the next time you take a skein off the reel or niddy-noddy, wait a few minutes and try to put it back on again. Tight fit, isn't it? In fact, you may he unable to replace it.

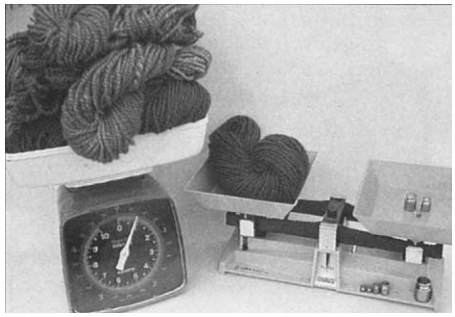
And what happens when you wash the yarn? Chances are it will get shorter yet. It's not uncommon for a skein to shrink 20 percent with washing. Even if you stretch or block a skein as it dries, it will probably end up shorter than the circumference of the reel.

So the length of a skein of yarn depends on when and how you measure it. For the purposes of communication, it would help if more spinners stated whether they measure length under tension or relaxed, and before or after washing. Otherwise, who knows what you're talking about?

I can't tell you how many times I've made vests instead of sweaters, or afghans instead of blankets, because I used

[1] My college statistics professor was adamant on this point. He would score an answer wrong if it wasn't rounded off appropriately.

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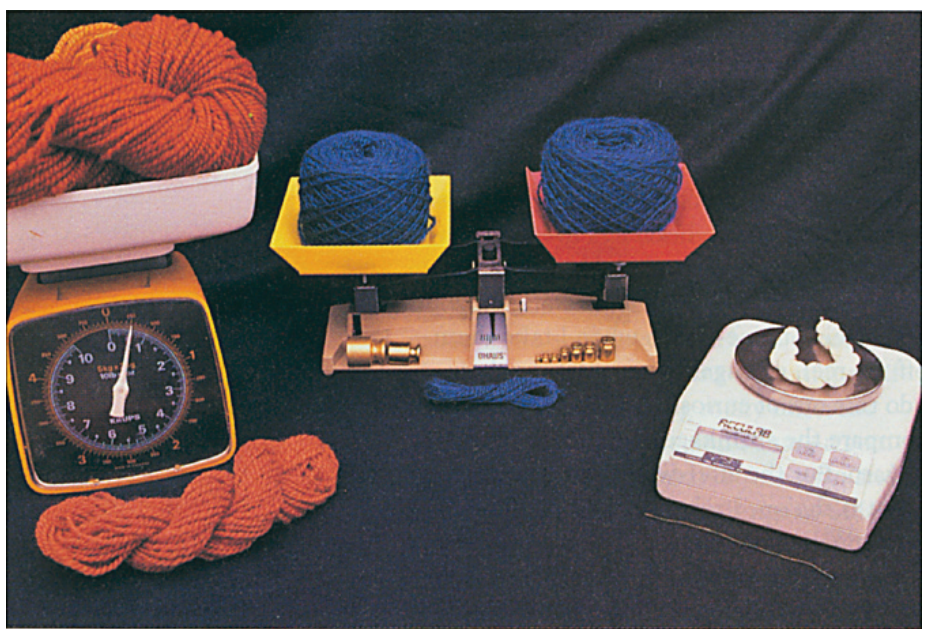
Using a kitchen scale (right) works a lot better than guessing about weight. It tells that these skeins weigh about 13 ounces. A laboratory balance (below) does better yet. It weighs this skein at 31 grams. There are 28 grams in an ounce, so the equivalent is 1.1 ounces.

to measure my yarn on the reel and base my planning on that yardage. Now I usually measure skeins twice—once when I take them off the reel, and again after washing them. I do this out of curiosity, to observe and compare the shrinkage of different kinds of yarn. But the after-washing measurement is the one I rely on when I figure how much yarn I have and plan a project. After washing and drying a skein, I measure its circumference to the nearest inch, multiply by the number of strands, divide by 36 to convert from inches to yards, and round off the answer. By measuring washed yarn, I'm not fooled into thinking I have more yards than I really do.

WHAT DOES YOUR YARN WEIGH?

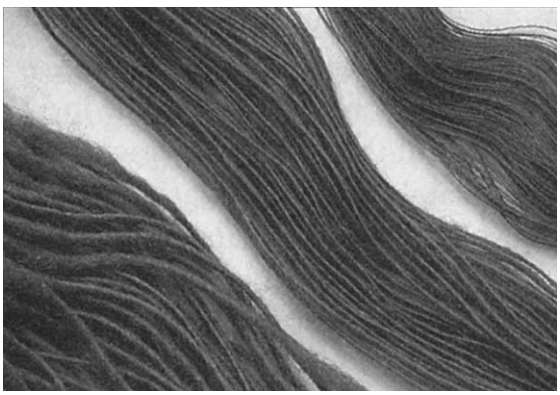
As tricky as it is to decide on the length of a skein of yarn, its weight is even more elusive. This is partly a matter of having the right tool. When I first started weighing my yarn, I used a kitchen scale calibrated in ounces and pounds. Weighing small quantities of yarn on a scale like that is a judgment call—it's hard to tell if you've got 5 ounces or 6, or maybe just 4.

An ounce of yarn is no trif ing amount; it's actually quite a handful. It's okay to have that much yarn left over from a project, but I wouldn't want to run short by so much. To measure more confidently, I bought a laboratory balance that is calibrated in grams. There are 28 grams per ounce (454 grams per pound), so measuring in grams is much more precise than measuring in ounces. Measuring to the gram is certainly close enough for practical purposes. One gram of common knitting yarn is only two to three yards—a fraction of what you need to make any project.



How accurate are different scales? The kitchen scale (left) can miss by as much as an ounce, the weight of the large skein shown beside it. The gram balance (center) can miss by a gram, the weight of the smaller skein. The electronic balance (right) is accurate to 1/100 gram, the weight of the short piece of thread.

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Any fiber, like this green wool, can be spun into yarns of different grists. In general, thicker yarn means fewer yards per pound, and thinner yarn means more yards per pound. Here the thicker yarn (lower left) measures about 900 yards per pound, the middle yarn measures about 2300 yards per pound, and the finer yarn measures about 8300 yards per pound.

I'll interrupt here to say that a gram balance is one of the handiest tools a spinner can have. I use mine many times a week—to weigh out fibers I'll blend by carding together, to divide fiber in halves or thirds for spinning 2 or 3 plies, to weigh dyestuffs and fiber for dyeing, to see how much yarn I've spun in an evening, to compare how much fiber or yarn I have in different colors, to divide yarn in half for knitting two sleeves or socks the same, or to weigh a finished article and estimate how much fiber or yarn I'd need to make something similar. A balance can cost $100 or more, but it's worth every penny. To shop for one, check the Yellow Pages under "Laboratory Equipment and Supplies" or send for a catalog from the Edmund Scientific Company, 101 E. Gloucester Pike/ Barrington, New Jersey 08007. I've also heard you can get great deals at police auctions on used balances confiscated in drug raids.

Last year I got serious and talked myself into buying an electronic balance that's calibrated to 1/100 of a gram. Now I could measure yarn with real precision! But the joke is on me. It's fascinating, but utterly impractical, to weigh skeins of yarn this precisely. What I have learned is that wool, cotton, silk, and other natural-fiber yarns can gain or lose a few percent of their weight from one hour to the next, because of changes in the weather. In foggy or rainy weather, yarn absorbs moisture and gets heavier. On bright, sunny days, it dries out and gets lighter. Of course, I knew that fibers are absorbent. But if I hadn't weighed the same skeins time after time, I never would have believed that yarn could gain or lose so much, so fast. Using the more precise tool just pointed out the difficulties of measuring something that continually changes.

The moral of all this, as I said earlier, is to use the words "about" and "between" and to round off your numbers. A skein of yarn that weighed 98 grams yesterday may weigh 102 grams tomorrow. Either way, it's "about" 100 grams.

Two common questions: (1) How much weight does raw fiber—wool fleece, rabbit combings, dog brushings, ginned cotton, unbleached flax/ and so on—lose when you scour away the dirt, dust, grease, wax, and other unusables? That depends on the fiber. Weight loss in scouring can be less than 5 percent or more than 30 percent. (2) Does dyeing yarn add appreciably to its weight? Not really. Dyeing with natural or synthetic dyes can add a few percent to the weight of yarn, but it's almost impossible to distinguish this amount from normal variation due to moisture uptake.

And one tip: after washing or dyeing yarn, be sure it is thoroughly dry before weighing it. Wool, in particular, *feels* dry before it *is* dry. Test for dryness by sealing the yarn in a clear plastic bag and putting it in the sun. Excess moisture will show up right away as condensation on the inside of the bag. If this happens, remove the yarn immediately and let it continue to dry.

MEASURING GRIST IN YARDS PER POUND

Grist is a measure of how far you've elongated a mass of fibers. Most contemporary American spinners, knitters, and weavers figure grist in yards per pound. To understand grist, imagine starting

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with a pound of wool. You could spin it into 100 yards of very thick yarn, or 1000 yards of medium yarn, or 10,000 yards of finer yarn. The grists of these yarns would be 100 yards per pound, 1000 yards per pound, and 10,000 yards per pound.

The numbers become more meaningful by comparison with other examples. It's uncommon to find yarn as thick as 100 yards per pound; mill-prepared slivers or tops of wool, mohair, silk, cotton, and so forth, generally measure between 40 and 120 yards per pound. Most of the knitting yarns described in a recent issue of *Knitter's* magazine have between 1000 and 1500 yards per pound; the lowest has about 600 and the highest about 2000 yards per pound. The weaving yarns described in a recent issue of *Handwoven* range from 480 yards per pound (for a rug) to 8400 yards per pound (for a summer blouse). Common sewing thread has about 14,000 to 15,000 yards per pound. Record-setting fine handspun yarns have come close to 100,000 yards per pound. There are 1760 yards in a mile.

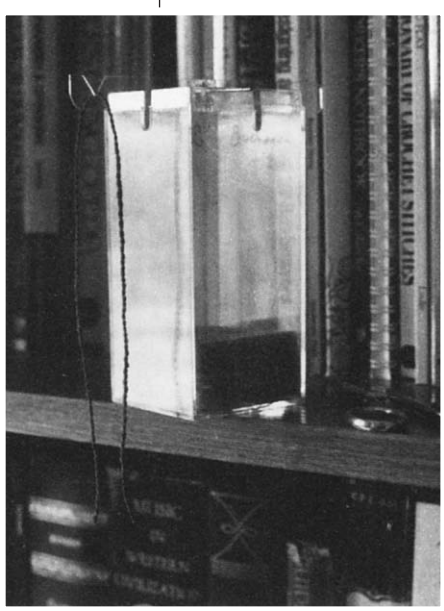
Fortunately, you don't need to spin a whole pound of yarn before you can measure its grist. You can calculate grist on the basis of a single skein, or by measuring a small sample with a nifty tool called a McMorran balance. (McMorran balances cost less than $20 and are available from most spinning and weaving suppliers.) Weavers, in particular, often use the McMorran as a shortcut to figure the yardage of unlabeled cones, balls, or skeins. They determine the grist of a sample, weigh all the yarn, and multiply grist by weight to find the total yardage. For example, if the sampled grist is 1200 yards per pound and you have about 1½ pounds, you have a total of about 1800 yards.

As a spinner, I most often use the McMorran when I'm starting a project. I measure a sample of yarn, and use that to estimate how many yards I would end up with if I spun all my fiber at that grist. As I spin, I may measure samples from

Using a McMorran balance

A McMorran balance comes in a clear plastic box that serves as its base. Set the box on the edge of a table or shelf. The balance bar is the notched plastic piece with a metal pin through it; it is stored in the box when not in use. Position the balance bar on top of the base, with the ends of the pin resting in the small notches in the base. Be sure that the balance bar pivots freely, and that the notched end extends over the edge of the table.

The McMorran balance works with any kind of yarn, and the process and goal are always the same—to determine what length piece of yarn will bring the balance bar to rest in a horizontal position. To do this, cut a sample of yarn and hang it over the notch. It's a good idea to start with a sample long enough to pull down the notched end—if your first sample isn't long enough, try a longer one.Then use scissors to trim away the bottom ends of the yarn, snipping evenly off both ends of the strand, and keep trimming until the bar levels up to a horizontal position.

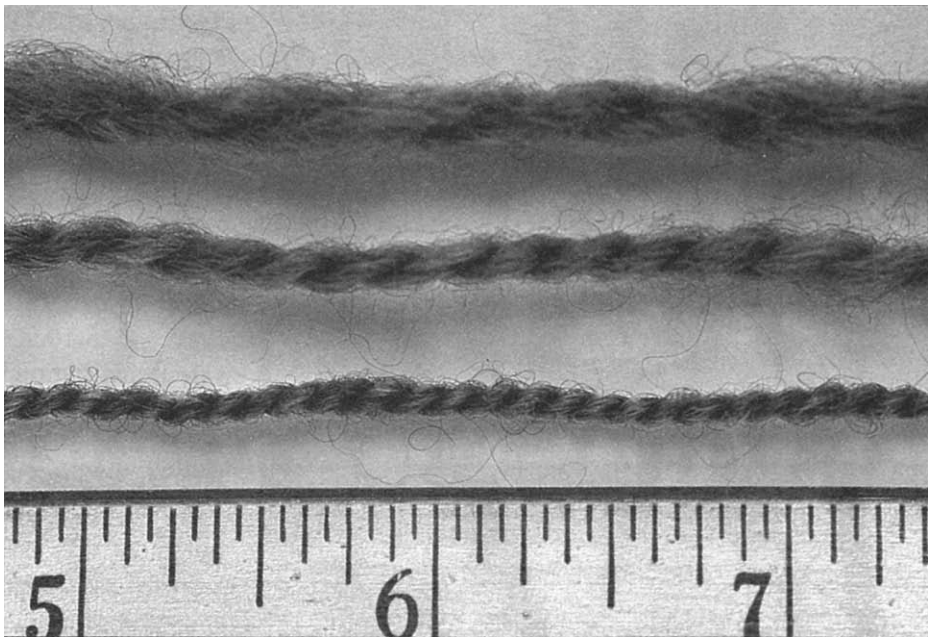


Take the trimmed sample and lay it against a ruler or yardstick to measure its length in inches. That number, multiplied by 100, equals the number of yards per pound. For example, 7.5 inches would be 750 yards per pound, 16 inches would be 1600 yards per pound, 22.5 inches would be 2250 yards per pound. (If you are more comfortable with-metrics, McMorran balances gauged to work with metric measurements are available.)

The balance is most useful for common yarn sizes. It's tricky to balance very short pieces of yarn in the notch, so the bottom limit is about 300 to 400 yards per pound. At grists higher than 10,000 yards per pound, you think twice about sacrificing so much yarn (100 inches or more) to the measuring process. (But if you do decide to measure fine yarn, you don't have to go to the roof of the tallest building in town—you can fold the yarn back and forth over the notch.)

Deciding on the length of the sample is usually a judgment call. Do your best and round off. And it's always a good idea to take samples from different parts of the yarn and average the numbers to determine the average overall grist.

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It's risky to compare yarns solely on the basis of grist. For example, all three samples of this wool yarn measure about 500 yards per pound. But the top sample is thicker because it is very loosely twisted and plied. The middle sample is intermediate. The bottom sample is thinner because it is twisted and plied tightly enough to pack the fibers firmly together.

time to time to make sure I'm keeping on track. How close is close enough? I'm delighted it I can stay within 10 percent, more or less, of the target grist. Usually I don't do that well.

Variation from yard to yard within a skein is less of a concern than variation from one skein to the next. After spinning several skeins for one project, I almost always take the time to determine the length and weight of each skein and compare their grists. Again, 1 hope to be within 10 percent, more or less, of the target. I recently spun and plied five skeins for a vest, and took them to a workshop to see if other spinners could arrange them in order of grist. Not one spinner in the group could sort out skeins that ranged from about 1350 to 1600 yards per pound. They couldn't tell which was which.

But does variation of that degree show up as thin or thick areas in the knitting? Yes, if you know what you're looking for and the knitted fabric is solid-color stockinette stitch. Where the knitting is complicated by color variation or textured stitches, 10 percent variation in the yarn's grist is virtually imperceptible.

In a general way, knowing a yarn's grist tells you something about its size. Fewer yards per pound means thicker yarn. More yards per pound means thinner yarn. But stating the number of yards per pound doesn't tell you whether a yarn is wool or cotton, dense or puffy, singles or plied, or anything else—and all those factors make a big difference in how a yarn looks, feels, and performs. It's risky to compare different yarns solely on the basis of grist. I have measured the grist of hundreds of different yarns, handspun and commercial, and I still get surprised by yarn's diversity.

You can't determine grist just by looking at a yarn. You have to measure it. Spinners (myself included) often err by hoping that two yarns have similar grist just because they look about the same. For example, you might spin a two-ply silk yarn at 1000 yards per pound, and use 4 ounces of that yarn to knit a scarf. So then you buy 4 ounces of alpaca and spin what looks like similar yarn, to knit another scarf.

Chances are the alpaca scarf will come out short, because—even though it looks like the silk yarn and knits at the same gauge—the alpaca yarn may yield only 750 yards per pound.

On the other hand, especially with crimpy wool, two or more yarns can have the same grist but look and feel quite different, depending on how much they have been twisted. The less twist, the thicker and puffier the yarn. The more twist, the thinner and denser the yarn. Looking at twist and yarn diameter gives us two more ways to measure and describe our yarns. But we've got enough to think about now, and I'll write about those measurements in another article. ❁

Figuring the grist of yarn in a skein

First determine the length of the skein and weigh it.

Then, if you weigh in ounces, use this formula:

(length in yards ÷ weight in ounces) x 16 = grist in yards per pound.

If you weigh in grams, use this formula:

(length in yards ÷ weight in grams) x 454 = grist in yards per pound.

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Thickness

What could be easier than looking at a skein and describing the yarn as thick or thin? Even a nonspinner can judge yarn thickness at a glance. But here's the problem, and the point of this article. It's easy to say that yarn is thick or thin, but can you take a sample of yarn and say how thick it is? How can a spinner measure thickness, and why would you want to?

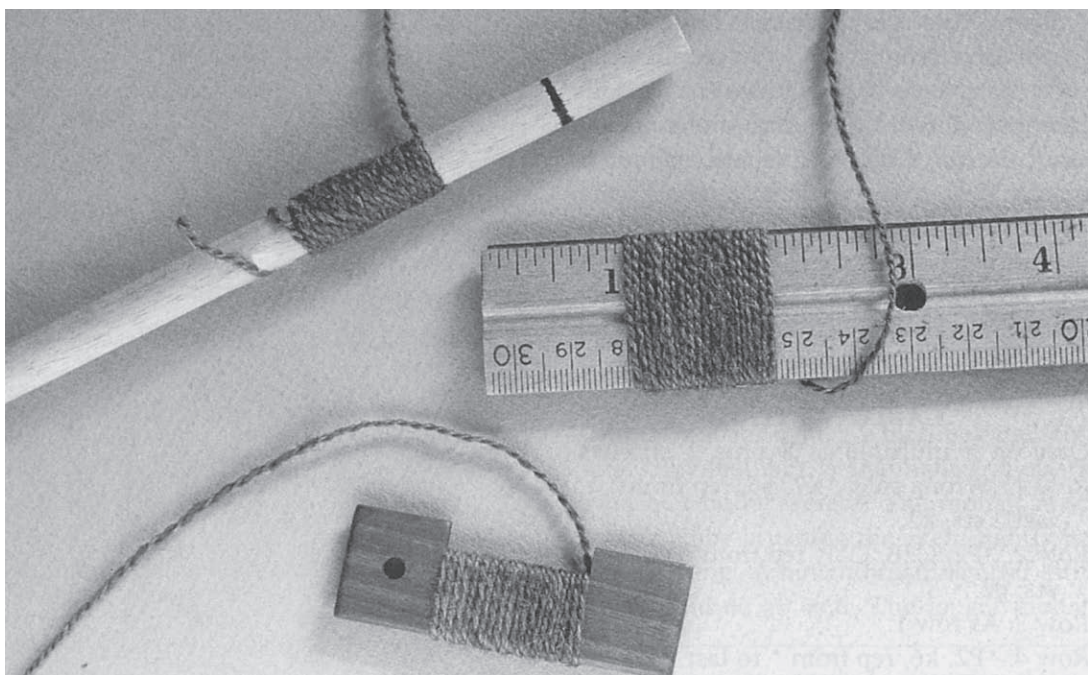
Personally, I have two reasons for measuring yarn thickness: the information helps me maintain consistency as I spin, and it helps me plan back and forth between making yarn and using it for a project.

But measuring yarn is no straightforward task; in fact, the more you think about it, the more questions arise. I'll address the ambiguities as well as the opportunities in this article.

WHAT ARE WE MEASURING HERE?

Imagine holding a piece of yarn in your hands. It can be any kind of yarn—wool or not wool, singles or plied. What determines the thickness of that yarn?

One obvious answer is how much fiber is included. The more fiber, the thicker the yarn. The less fiber, the thinner the yarn. But how are those fibers arranged? If you look closely with a magnifying glass, you'll see air spaces between the fibers. The



The most common way of measuring yarn thickness is by counting "wraps per inch." To do this, wrap some yarn around a ruler, marked dowel, or notched gauge, and count how many strands of yarn fit side by side in the space of an inch. Better yet, to account for variation in the yarn, it's a good idea to count over a two-inch (5 cm) space and then divide by two, as shown in the other photos.

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more air, the thicker the yarn. The less air, the thinner the yarn. This complicates the measuring, but there's no getting away from the fact: all yarn, even yarn that feels dense, is a mixture of fiber and air. Should you try to squeeze out the air, and measure just the fiber content? Good question.

Fuzzy or fluffy yarns, from fibers such as angora or mohair, dramatize this issue. These yarns usually have a dense core where the fibers are twisted together, surrounded by a loose halo where the fiber ends stick out. Should you measure just the core, or core plus halo? The more you handle the yarn, the bigger that halo gets. Should you measure now or later?

What if the yarn is stretchy? Pull on it, and it gets skinnier. Let it relax, and it puffs out. Should you measure under tension or not? This can sometimes make a big difference. Likewise, many yarns shrink—they get shorter—when you wash them. But as they get shorter, they get thicker. So thickness can be affected by whether or not the yarn has been washed (and then, whether it dried under tension or not).

Finally, there's the matter of inconsistency. All yarn—even when mill-spun—has thick spots and thin spots. Sometimes the variation is conspicuous; at other times it's scarcely detectable. But it's always there.

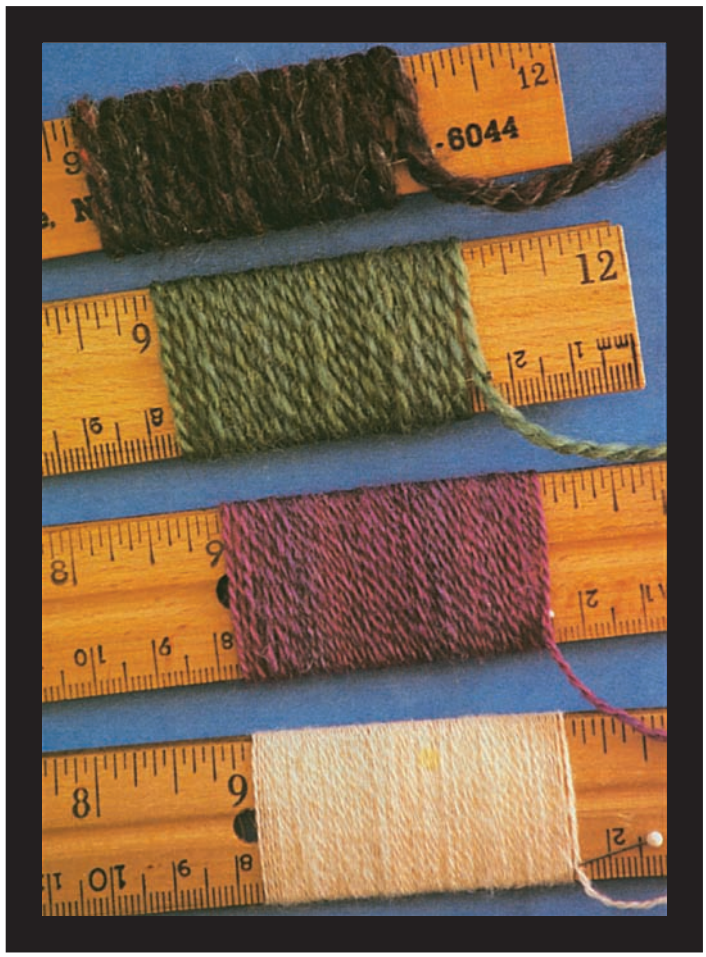
All these considerations lead to one conclusion. When you measure the thickness of yarn, the answer you get depends on when, where, and how you do the measuring. Therefore it's best to measure a few times, take the average, and qualify your answer by saying "about" or "more or less" whatever number you end up with.

COUNTING WRAPS PER INCH

The most common approach to measuring the thickness of yarn is to wrap some around a ruler, dowel, or notched gauge and count the number of strands that will fit side by side in the space of an inch. The thicker the yarn, the fewer wraps per inch; the thinner the yarn, the more wraps per inch.

The problem is, you will get different answers depending on how you wrap the yarn. In workshops, I often have all participants measure the same kind of yarn with the same kind of rulers; the individual answers will vary as much as fifty percent. Some people pull the yarn tight, while others leave it relaxed. Some squeeze the wraps as close together as possible, and others leave so much space that you can see through to the ruler. If there's that much variation in how people measure the same yarn, counting wraps per inch isn't currently helping us communicate with each other. It *could* help, though, if we all used the same approach.

Here's the method I use and recommend. With tape, I secure one end of the yarn on the back side of a smooth ruler, keeping it lined up with an inch mark. I hold the yarn with my right hand, and wrap clockwise if the yarn is Z-twist (most of my singles) and counterclockwise if it's S-twist (most of my plied yarns).[1] I don't stretch the yarn tight, but I don't leave it slack, either. After several wraps, I stop and push the strands so they lie side by side in full contact, but are not crammed together. I count as I go, and keep wrapping until I've filled two inches; then I divide by two to get the number of wraps per inch. I repeat the whole process using a different sam-



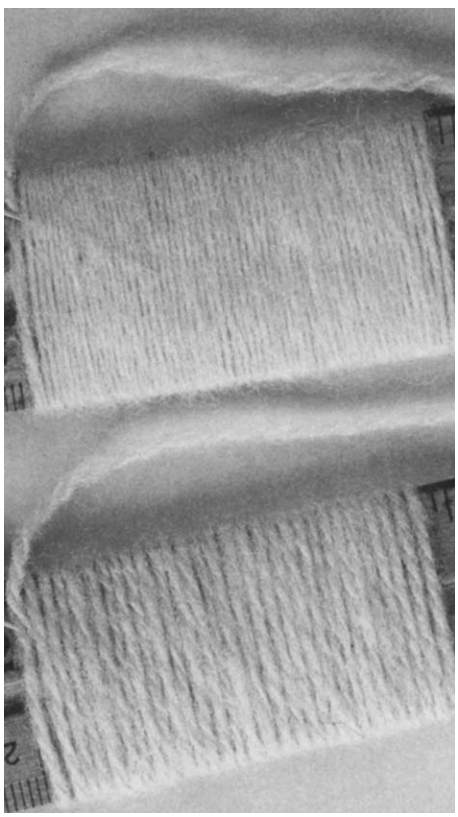
Spinners produce a variety of yarns. Measuring thickness is one way to describe the diversity. These two-ply yarns were all spun from Romney wool. The thick yarn (top; about 7 wraps per inch) knitted into warm house slippers. The second yarn (at 14 wraps) made sturdy mittens. The third yarn (at 23 wraps) made a light sweater for summer evenings. The bottom yarn (at 45 wraps) was just fine enough to weave shirt fabric.

[1] The direction of wrapping is a minor point, observed to keep the yarn from untwisting.

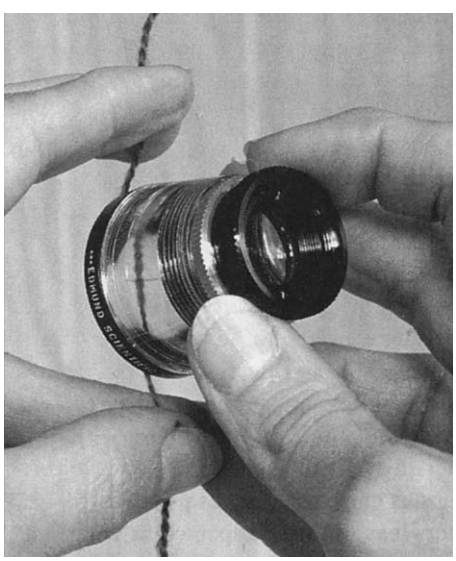
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ple of the yarn, and take an average of the two counts.

Some spinners wrap more loosely than I do, but I find it very hard to be consistent about leaving space between wraps. Other spinners pack the wraps as close as possible, squeezing out the air and measuring just the fiber content of the yarn. That offers the advantage of more consistent measuring, but it doesn't always reflect the true nature of the yarn. I don't try to compress puffy or fluffy yarn. I just push the strands close enough together that I can't see the ruler between them.



What you wrap around doesn't matter as much as how you do the wrapping, especially in the case of puffy or elastic yarns. When this three-ply wool yarn is pulled tightly around a ruler, it averages 30 wraps per inch (top). If wrapped gently, it averages only 20 wraps per inch (bottom). Which is the "right" answer? I recommend the gentle wrapping, because it preserves the character of the yarn.



Faster than counting wraps, especially for fine yarns, is measuring the yarn directly. This magnifier has a built-in ruler and measures to 0.1 mm (about 1/250 inch) see picture on the right. It's very handy for making frequent spot checks to maintain consistency as you spin.

MONITORING YARN THICKNESS AS YOU SPIN

I think most spinners habitually spin the same size yarn and could do it in their sleep, but when you want to spin thinner or thicker than your customary strand, counting wraps can help you stay on track. Set a goal, and stop every ten or fifteen minutes to wrap a sample and check yourself. This kind of monitoring really improves your consistency, especially if you're spinning over a period of time to accumulate enough yarn for a project. You don't have to be perfect; staying within ten percent is good enough. If your goal is 20 wraps, for example, try to stay between 18 and 22 wraps.

I used to count wraps as I spun, but I don't any more. Now I have a gizmo that's faster and more fun to use, especially when I'm spinning yarns finer than about 40 wraps per inch. It's a little magnifier with a built-in ruler. You hold it directly against whatever you're measuring and look through the lens to make a reading. It's intended for people in publishing who need to look closely at printed type and illustrations, but it's also great for looking at yarn and cloth. I keep it by my wheel as I spin, and stop frequently to unwind some yarn from the bobbin and check its thickness.

I bought this tool from Edmund Scientific Co. (101 E. Gloucester Pike, Barrington, New Jersey 08007) for about $60. That may seem expensive, but it's a great tool. Anyone who borrows mine wants one. Mine has 12× magnification and is graduated in 0.1 mm increments (about 1/250 inch). Other magnifications and scales are available.

Edmund also offers a variety of "linen testers"—pocket magnifiers designed for counting the threads in woven fabric. They only cost about $15, but they aren't very helpful for measuring fine yarn, since they're ruled at ⅛-inch intervals.

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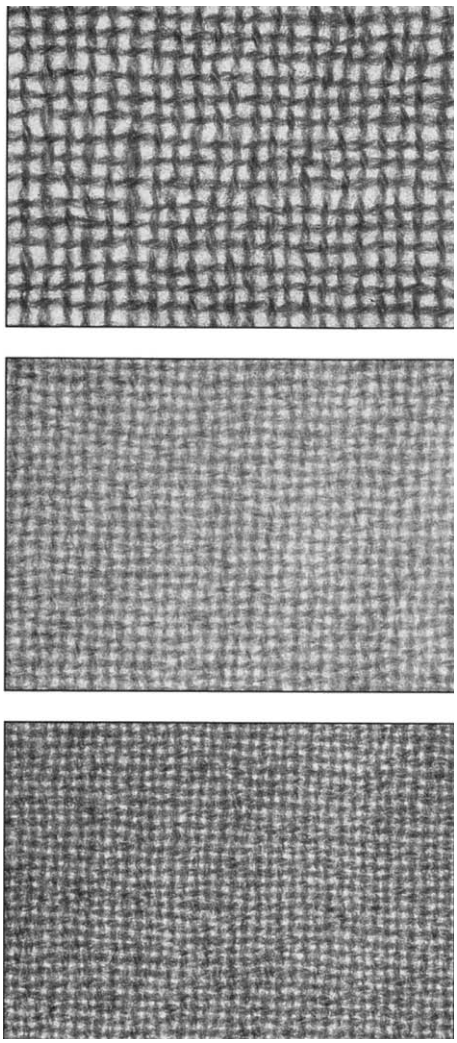
THINKING AHEAD FROM YARN TO FABRIC

It's easy enough to generalize that thick yarn makes thick cloth, and thin yarn makes thin cloth, but counting wraps per inch allows you to make more specific predictions. Whether I'm weaving or knitting, measuring the thickness of my yarn is a helpful step in planning a project. Here's how I proceed.

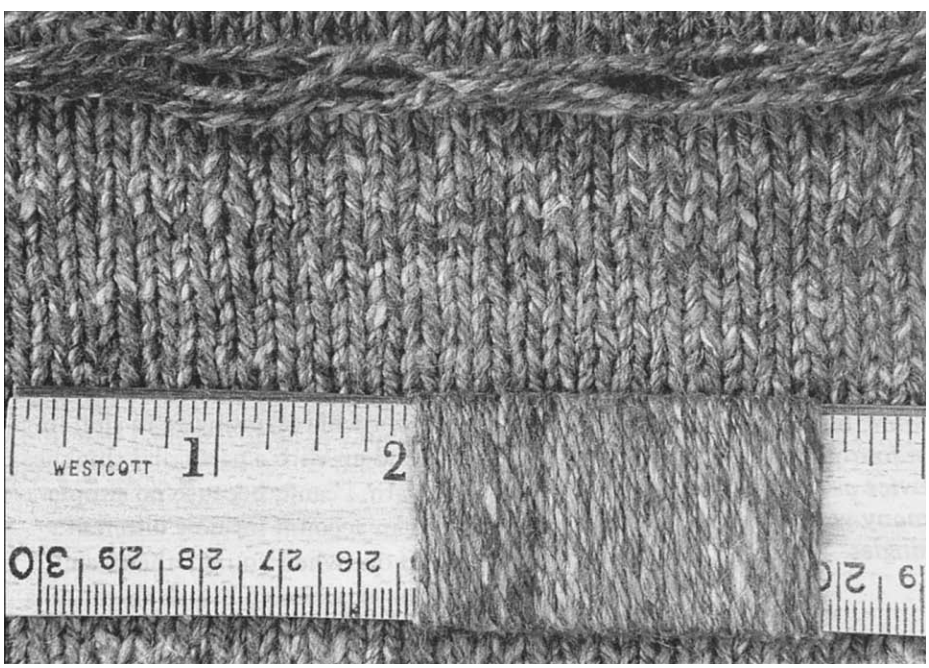
First, I wash and dry the yarn, or at least a sample of it, and count the wraps. Then, for weaving, I take one-half the number of wraps per inch as the sett for balanced plain weave, or two-thirds of that number as the sett for balanced 2/2 twill. For example, if the yarn measures 24 wraps per inch, I would use 12 ends per inch in plain weave and 16 ends per inch in twill. These setts make medium-density fabrics, suitable for most garments. I trust the formulas well enough to go straight from the ruler to the loom, without weaving samples. Of course, if you want to weave more open or dense cloth, you can adjust the setts.

I expect cloth woven from fine crimpy wool, silk, or cotton to draw in considerably when I wash it (even if I prewashed the yarn), but cloth woven from not-very-crimpy wool, mohair, ramie, or flax usually doesn't draw in enough to fill any gaps. In wrapping the ruler, I pack the wraps a little bit more loosely or tightly, respectively, to adjust for these different fibers.

For knitting, I've found that dividing wraps per inch by three gives the number of stockinette stitches per inch for a firm fabric that won't sag or pull out of shape. Try different needles until you achieve that gauge and see how the cloth feels. This gauge represents a good goal for anything knitted from cotton, flax, silk, or alpaca. Because of their resiliency, wool and wool blends can be knitted a bit more loosely, with slightly fewer than one-third as many stockinette stitches as wraps per inch. (Again, these are just starting points—any yarn can be knitted on larger needles to make looser cloth, or on smaller needles to make firmer cloth.)

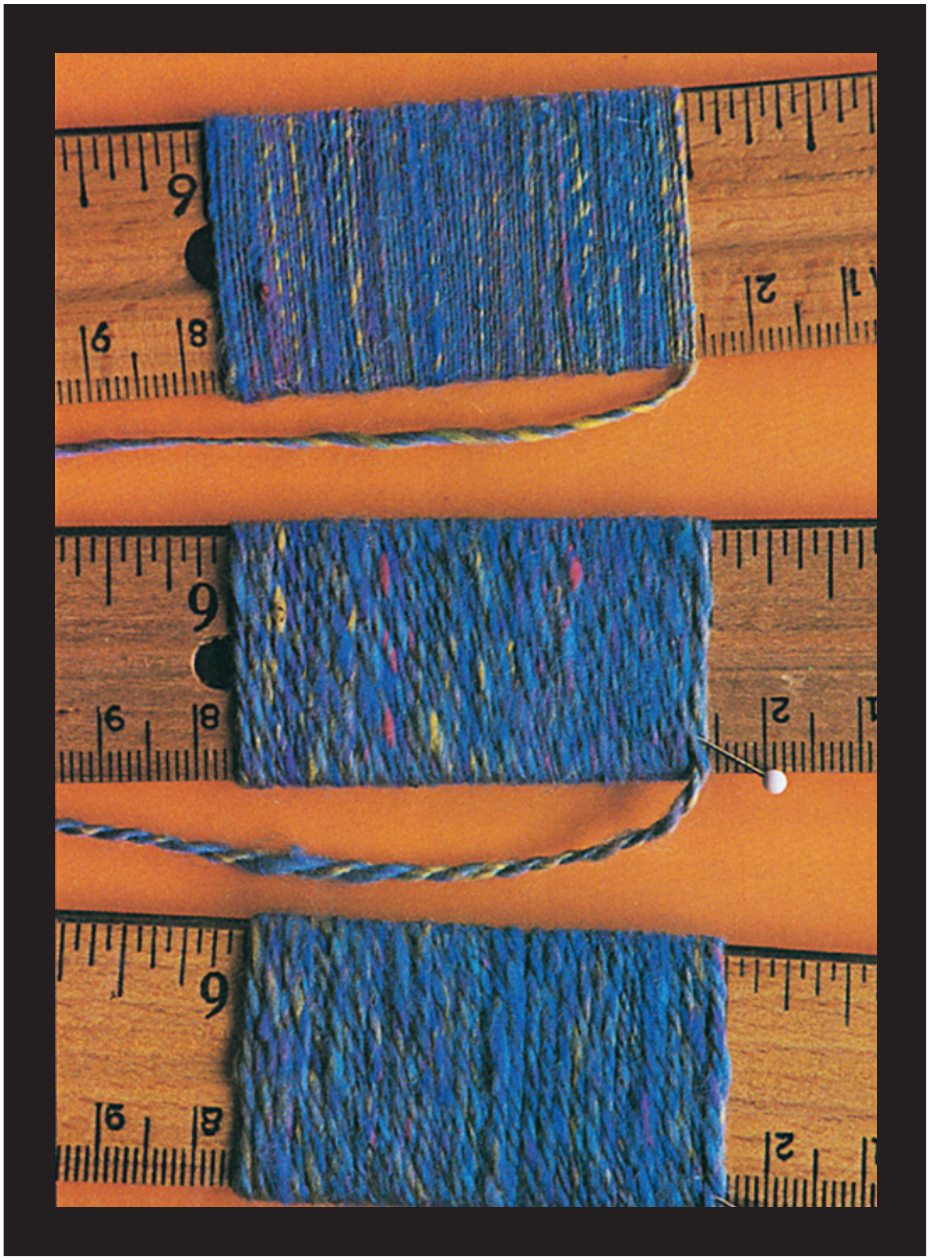


Dividing wraps by two gives the sett for medium-density plain weave, but the same yarn can be used to weave much looser or firmer cloth if you choose. These swatches were woven at 9 (top), 12, and at 15 ends and picks per inch, from two-ply wool yarn measuring 24 wraps per inch. The open-weave cloth would be good for a scarf, and the firm for a stuffed cushion or pillow. A medium-density fabric, at about 12 ends and picks per inch, would be appropriate for a soft garment.



Below: Dividing the number of wraps per inch by three gives the approximate number of stockinette stitches per inch in medium to firm knitting. This yarn measures about 17 wraps per inch; the knitting has 5½ stitches per inch. Loose knitting has fewer than one-third as many stitches as wraps.

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How thick is the plied, washed, ready-to-use yarn, when compared to the original, on-the-bobbin singles? In this cotton/silk blend, the singles (top) measures about 36 wraps per inch, while the two-ply (center) comes in at about 23 wraps, and the three-ply (bottom) at about 17 wraps. No two yarns behave quite the same, but in general, three-ply or four-ply yarns end up about twice as thick (that's half as many wraps) as the original singles.

Now let's turn this around. Let's say you've found a blouse in *Handwoven* magazine and want to make something like it from handspun yarn. The blouse is woven in plain weave on a warp sett at 24 ends per inch. To make a similar blouse, you would need to weave with yarn that measures about 48 wraps per inch. Or perhaps you've found a sweater pattern that specifies a gauge of 6 stockinette stitches per inch. For that, you would want yarn that measures about 18 wraps per inch.

Note that I said "weave with" and "knit with"—I didn't say "spin." Having gotten this far, I wish I could offer some handy formulas for what size singles to spin in order to end up with a particular thickness of plied yarn. I can't, because no simple formula can account for how different yarns puff out when you ply them, and even more so, when you wash them. As a ballpark estimate, you can expect a two-ply yarn to have about two-thirds as many wraps per inch as the singles it was made from, and three-ply or four-ply yarns to have about half as many wraps per inch as the singles that went into them. But don't be surprised when the actual numbers vary.

By far the best way to proceed is to spin, ply, wash, and dry a few short samples of yarn. Keep and label unwashed samples of the singles, as records of what you started with. Decide which plied, washed sample meets your requirements, then go back and spin to match that kind of singles. This may sound bothersome, but it's a lot less trouble than spinning up all your fiber and realizing, too late, that your yarn isn't the right size for the pattern you love.

COUNTING WRAPS DOESN'T TELL YOU HOW THE YARN FEELS

Figuring from wraps to fabric is handy, but it overlooks an important point. Two yarns—even two yarns spun from the same wool—can measure the same thickness and knit or weave at the same gauge or sett, but make fabrics that feel completely different. How can this be?

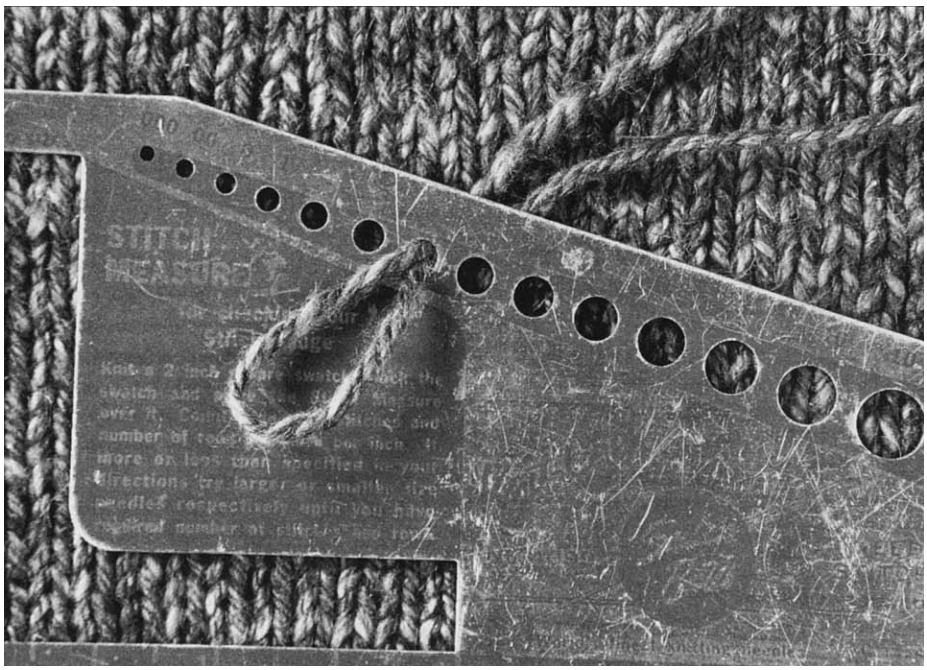
Remember that yarn is a mixture of fiber and air. The more fiber, the denser the yarn, and the heavier the fabric. The more air, the puffier the yarn, and the lighter the fabric. Counting wraps measures the thickness of the yarn, but it doesn't indicate whether that yarn is dense or puffy.

This is most likely to cause trouble when you want to follow a published knitting pattern. Even if your yarn has the specified number of wraps per inch and it knits to the right gauge, your project may weigh more or less than the original. When you're comparing or trying to match yarns, you need to know both the thickness and the grist, measured in yards per

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pound (see "Length, Weight, and Grist," pages 3-8). Using both measurements will give you a much closer match than relying on either one alone. And finally, you can measure and compare twist, but I'll have to save that topic for another time. ❁

Originally produced in Spin.Off, Fall 1993, pp. 54–59.



Here's a tip for knitters: pull a loop of yarn through the holes in your needle gauge and choose which hole is the best fit, so the two strands lie side by side, neither sloppy nor squeezed. That needle size should give you a medium stockinette stitch. Try other sizes for other stitches, or for looser or denser knitting.

Some Approximations for Plain Yarns

These numbers are compiled from a variety of sources, from experience, and from patterns, none of which precisely agree! Use them as rough estimates only.

Yarn Style	Yds/lb	Approx. wraps/inch	Typical gauge	Approx. American needle size
lace	2600+	18+	8+	00-2
fingering	1900–2400	16	6–8	2–4
sport	1200–1800	14	5–6½	4–6
worsted	900–1200	12	4–5	7–9
bulky	600–800	10	3–4	10–11
very bulky	400–500	8 or fewer	2–3	13–15

From *Homespun, Handknit: Caps, Socks, Mittens and Gloves,* edited by Linda Ligon (Loveland, Colorado: Interweave, 1987).

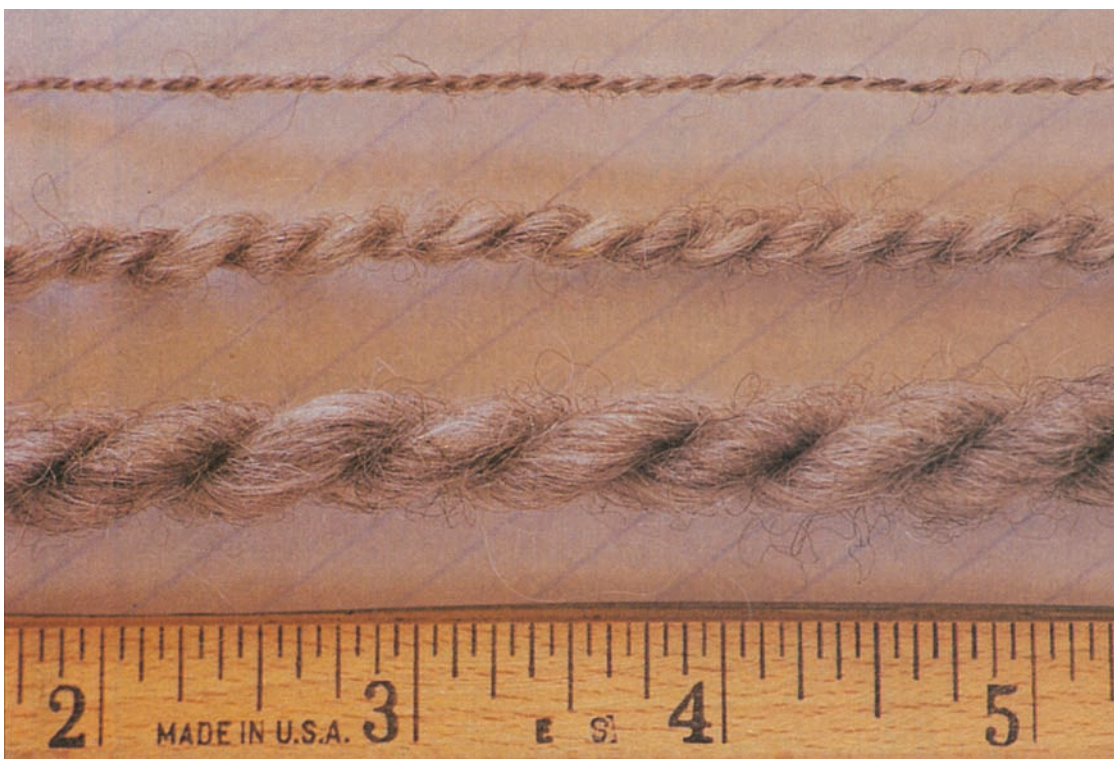
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Twist

Beginning spinners quickly learn to distinguish three categories of twist. Too little twist is when the yarn pulls apart and the end disappears—*oops!*—through the orifice. Too much twist is when the yarn kinks into snarls that catch on the hooks—*darnit!*—and won't wind onto the bobbin. Anything in between means you can relax and spin a while—*whew!* As soon as possible, you stop spinning *oops!*-yarn and *darnit!*-yarn, and settle into a period of spinning *whew!*-yarn.

You've crossed a threshold when you notice that the category of *whew!*-yarn (yarn that's twisted enough to hold together, but not so much that it's hard to manage) actually encompasses quite a range. This enlightenment might strike when you see a display or exhibit of yarns or projects made by different spinners, especially spinners who learned from a different teacher or belong to a different guild. All of a sudden, you realize that the kind of yarn you're used to making is just one of several options, and that the amount of twist makes a big difference in how yarn looks and feels.

The next step is a big one: taking responsibility. Instead of letting chance and habit determine how much you twist your yarn, you start paying attention to what's happening as you draft and treadle. You realize that it's not your spinning wheel, it's you that controls the amount of twist in your yarn. Now you can make whatever kind of yarn you want to make!



These three samples of balanced two-ply yarns feel equally twisted—not too loose, not too tight—because they all have the same angle of twist. To confirm that, see how the plies line up with the stripes on the paper background.

Counting against the ruler, you can see that the yarns have different numbers of twists per inch (t.p.i.). The thick yarn is plied at 1 t.p.i., the medium at 2½ t.p.i., the thin at 6 t.p.i. A thin yarn always requires more twists per inch than a thick yarn to achieve the same angle of twist.

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In order to talk about all this (even if you're just talking to yourself), a spinner needs some way of describing and measuring twist. There are two methods, both helpful. You can measure the *angle of twist,* or you can count the number of *twists per inch*. But even if you never get out a protractor or ruler and do the actual measuring or counting, just *thinking about* these concepts will increase your understanding of twist and your mastery of spinning.

MEASURING THE ANGLE OF TWIST

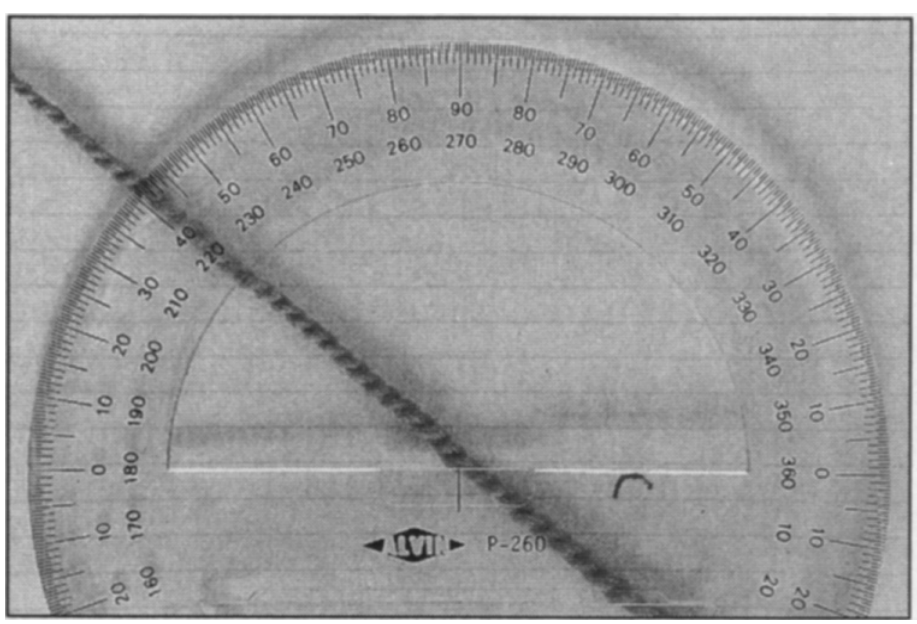
Try this: break off a piece of sliver or top (any fiber will do), hold it straight between your hands, and watch closely as you start to twist one end. Can you see how the fibers start to angle sideways as you twist? Keep twisting, and watch how the angle changes. That angle is called the angle of twist, and it's measured in degrees, starting at 0° for untwisted fibers. The more you twist, the higher the number, up to a maximum of about 45°. Most of the yarn that we make and use is twisted between 10° and 35°. Below 10°, you risk making *oops!*-yarn. Above 35°, you get into the *darnit!*-yarn category.

Measuring the angle of twist is a wonderfully versatile way to describe yarn, because it doesn't matter whether the yarn is thick or thin. If the angle of twist is the same, any two or more yarns spun from the same fiber will have similar luster, texture, and hand. I think anyone who works much with yarn is likely to develop an intuitive feeling for this. Just by looking at the angle of twist, you automatically predict that yarn will feel and behave a certain way, and generally your predictions are right.

The trickiest part is the measuring itself. If you just hold the yarn up to a protractor and choose some number of degrees, you'll find that no two people ever get the same answer that way. Here's a more reliable method.

Get a sheet of ruled notebook paper, and tape down one end of the yarn. Now move the other end around until the twist lines up with the lines on the page. This is easier said than done. You'll soon notice that the twist angle varies from place to place in the yarn (more about that later). Do the best you can to average out the differences. You'll also notice that the angle of twist changes if you stretch or relax the yarn. You may have to stretch the yarn a little bit in order to hold it straight, but try not to overstretch it.

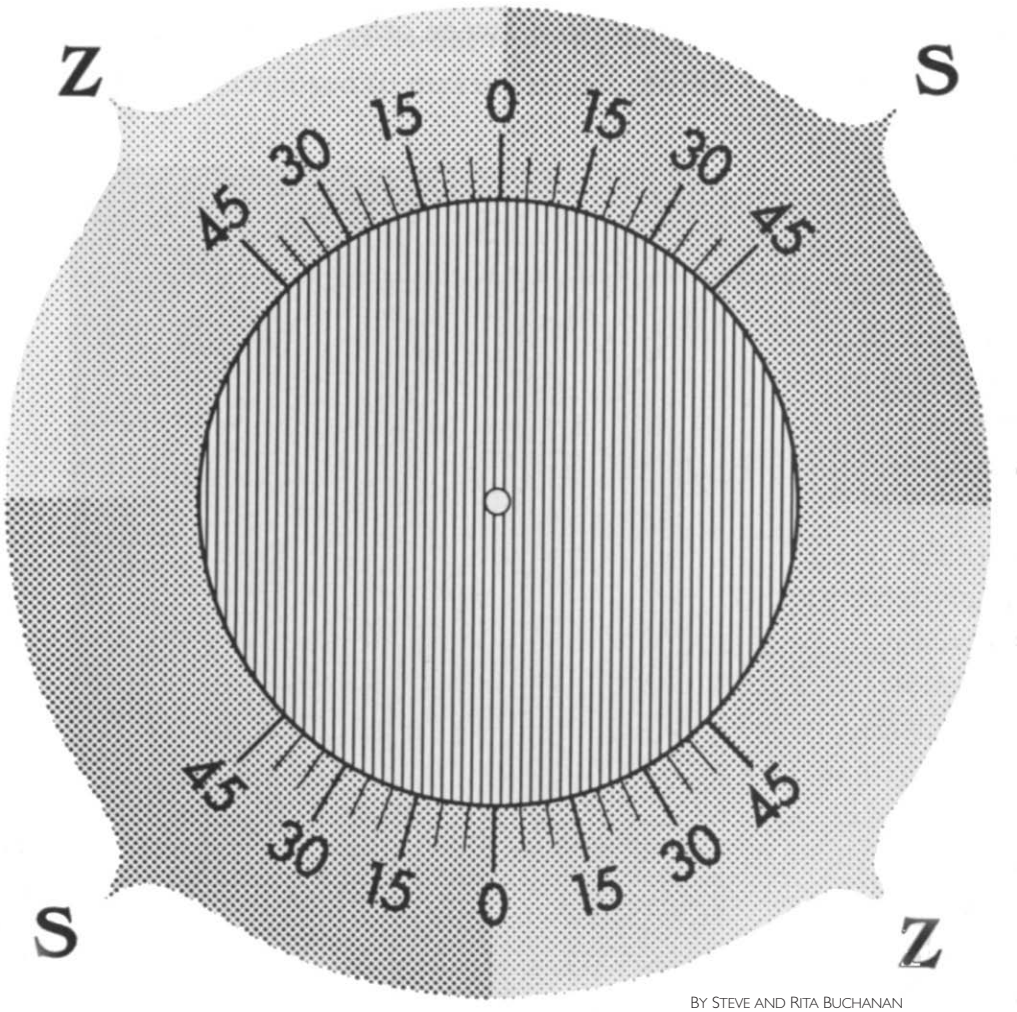
When you think you've got the yarn positioned right, tape down the other end. Then set the base of a protractor on one line, centered on the yarn, and follow the yarn out to the edge of the protractor to read the angle. As a shortcut, my husband, Steve, and I designed the sim-



Here's one way to measure the angle of twist. Tape one end of the yarn to a sheet of ruled notebook paper. Move the other end around until the twist lines up with the lines on the page. When you think you've got the yarn positioned right, tape down the other end. Set the base of a protractor on one line, centered on the yarn, and follow the yarn out to the edge of the protractor to read the angle.

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TWIST GAUGE



To use the Buchanan twist gauge, hold a strand of yarn so it crosses the center dot and the twist lines up with the background stripes, then read the angle.

By Steve and Rita Buchanan

ple gauge shown in the picture. To use it, we hold the yarn so it crosses the center dot and the twist lines up with the background stripes, then read the angle.

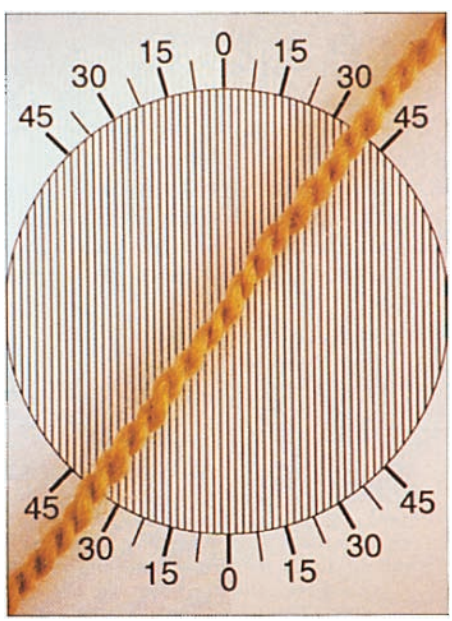
For thin or solid-color yarns, it's hard to even see the angle of twist, let alone measure it, unless you use a magnifier and a bright light. Sometimes two hands aren't enough and you need help holding the yarn. Try using tape or clips to fasten it across a U-shaped cardboard frame, then position it against the ruled background.

How precise will your measurement be? If there's a problem with measuring angle of twist, it's that protractors have too many numbers. There's no way anybody, much less any two people, can decide whether a piece of yarn is twisted one degree more or less. When I have workshop participants practice measuring twist, they're uncomfortable with anything more precise than 5° intervals, and say things like "about 15°" or "between 20° and 25°." Don't worry; that's accurate enough to distinguish between otherwise similar yarns.

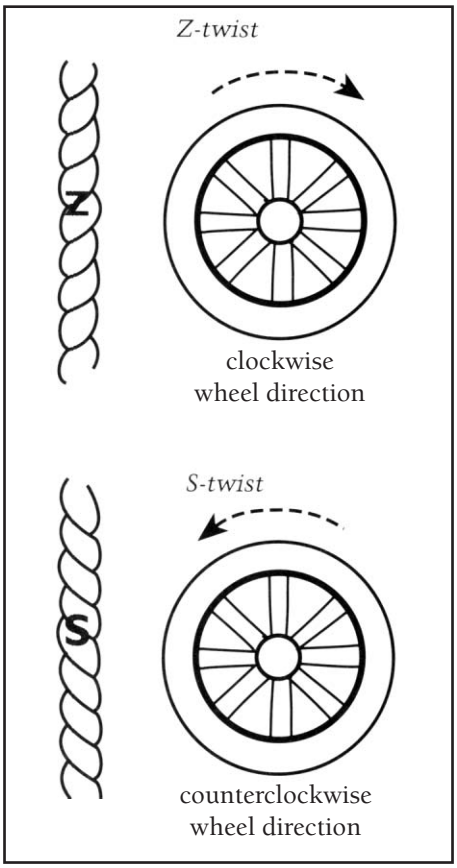
WHAT ABOUT PLIED YARNS?

It's relatively easy to measure the angle of twist used in plying. Just look at how the plies slant, line them up with the background, and choose a number. But is that enough? Or should you first measure the twist in the singles yarn, and then also measure the plying twist? Well, it depends.

First let's consider a special case, which is *balanced* yarn. There's a lot of confusion



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about how and why to spin a balanced yarn—that's an article in itself. For now, it's enough to say that balanced yarn has two or more plies that were spun (twisted) in one direction and then plied (which untwists them) in the opposite direction, so that the fibers end up approximately straight again. You can see this by looking closely with a magnifier—in a balanced yarn, the fibers themselves have zero angle of twist. I think it's enough to describe a balanced yarn by saying, for example, "A balanced two-ply yarn plied at about 25°." But it never hurts to go the extra mile and say something like, "A balanced two-ply yarn spun at 30° to 35°, and plied at 20° to 25°." In a balanced yarn, the angle of twist in the singles is always higher than the angle of plying.

Not all plied yarn is balanced. By accident or design, spinners often make yarn with less or more plying twist than would balance the original twist of the singles. In that case, a full description of the yarn describes the angle of twist in the singles (in complex yarns, there may be two or more different singles) and in the plying. Need I say that it's easier if you measure the singles before you do the plying?

NAMING THE DIRECTION OF TWIST

There are only two options here: you can twist yarn one way, or you can twist it the other way. Some spinners describe this as clockwise or counterclockwise, referring to the way the spinning wheel turns. You can also describe a yarn by looking at its angle of twist, and comparing the direction with the slanting crossbars in the letters Z and S.

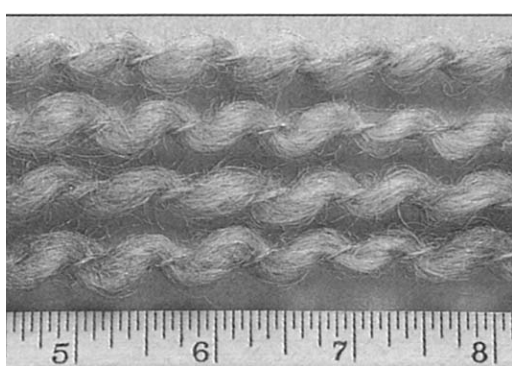
Most spinners turn the wheel clockwise, which makes Z twist, as they spin singles. Then they turn the wheel counterclockwise, making S twist, as they ply. Some people can glance at a strand of yarn and immediately identify it as Z or S, but lots of folks have to stare a while before they can decide. Practice helps, and it's a skill worth developing if you want to focus on the fine points of plying.

COUNTING TWISTS PER INCH

I've saved this for last because it's a more difficult topic, with many pros and cons. On the positive side, thinking about twists per inch can definitely improve your spinning. This measurement offers such a straightforward way of describing what's happening.

For example, if you draft and wind on 12 inches while your treadling turns the flyer some 60 times, the result is 5 twists per inch (60 twists divided by 12 inches). Draft more or treadle less, and the yarn receives fewer twists per inch. Draft less or treadle more, and the yarn packs in more twists per inch. The concept applies to any spinner, using any wheel. Master this, and twist is under your control.

It's not hard to figure how many twists per inch you're putting into a singles *as you spin*. Determine your flyer ratio, count your treadling, hold a ruler on your lap, then use your calculator. Oh, but it's a real pain to count twists per inch in a singles *after it's spun*. There's no shortcut; you have to measure out exactly one or more inches and hold the yarn somehow, then untwist the measured section, counting revolutions carefully until the fibers are completely straightened out again.



When counting twists per inch in plied yarn, remember that for each plying twist, every single ply has to go all the way around the yarn. It's easiest to see how this works if the plies are of different sizes or colors. For example, this two-ply thick-and-thin yarn has about 2 plying twists per inch.

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Counting twists per inch in plied yarn is easy if you remember that for each plying twist, every single ply has to go all the way around the yarn. This is obvious when the plies are different colors or different sizes, but you might get confused when the plies all look the same. Anyway, to count plying twists, lay the yarn against a ruler and count the number of strands or "bumps" along one edge, then divide by the number of plies.

It's a good idea to do this over a distance of several inches and take an average. For example, imagine holding a two-ply yarn and counting 30 bumps over a distance of 5 inches. Dividing 30 by 2 tells you there are 15 plying twists in 5 inches. Dividing 15 by 5 tells you there are 3 plying twists per inch.

To make a balanced yarn, you always use fewer twists per inch in the plying than you did to spin the singles. Some spinners use formulas to calculate their plying; I find it a lot faster and easier to achieve balance by sampling. Either way, it's a good idea to make a note of how many twists per inch you put in the singles as you spin, and then count the plying twists in the finished yarn. You'll appreciate those notes if you need to spin similar yarn later.

Now for the drawbacks of counting twists per inch. For example, when and how are you going to measure an inch: with the yarn under tension or relaxed, before or after washing? Yarn that averages 5 twists per inch when you ply it under tension can measure 6 or more twists per inch when it's washed and relaxed. As yarn gets shorter, its twists squeeze closer together.

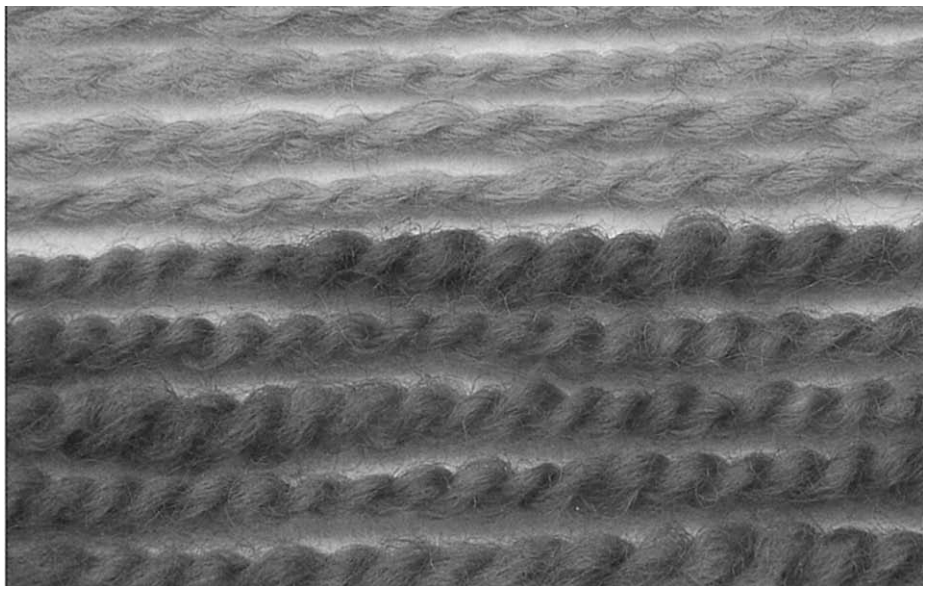
Which inch are you going to measure? One of the basic truths of spinning is that twist doesn't distribute itself evenly[1] along the yarn. It always avoids the thick spots and gathers in the thin spots. Since there can easily be three or four times as many twists per inch in a skinny section as there are in a fat section, count the twists over a span of several inches and take an average.

The most serious drawback is that twists per inch, unlike angle of twist, doesn't tell how any particular yarn looks or feels. For that, you also need to know how thick or thin the yarn is, since the same number of twists per inch produces completely different effects in yarns of different sizes. Five twists per inch turns a bulky yarn into clothesline, but a very fine yarn with only five twists per inch will slip apart before it gets to the orifice. If you're spinning to match a yarn that's specified in a pattern, or if two or more spinners are spinning yarn to combine in a single project (for example, at a sheep-to-shawl event), you need to monitor both the thickness and the number of twists per inch as you spin.

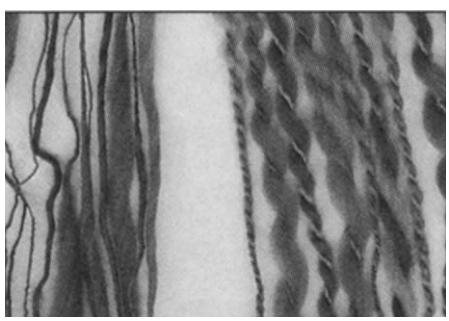
Understanding these concepts is basic to spinning the yarn you want. Working along, I constantly judge and monitor the yarn to make sure the twist is appropriate, attractive, and consistent. I apply the concepts of twists per inch and twist angle as I talk to myself about what I'm doing, but I don't bother with the actual counting and measuring. In a future article, we'll look at how to get the benefits of analysis without constantly stopping to do it. ❁

[1]There's no getting away from this; it happens with singles yarn, although you may not notice it at that stage, and it happens with plied yarn, where you're sure to notice it, probably with surprise and dismay. The only cure is prevention, and that requires skillful, deliberate drafting from a perfectly prepared fiber supply.

Originally produced in *Spin·Off*, Winter 1993, pp. 56–60.



Wool yarn, especially, can change dramatically when you wash it. The gray yarn, top, came off the bobbin with 8 to 9 wraps per inch thickness, 1 1/2 plying twists per inch, and 30° angle of plying twist. It was dyed in a simmering pot, then washed and dried. It ended up, below, with 6 to 7 wraps per inch thickness, more than 2 plying twists per inch, and a 40° angle of plying twist. When wool yarn relaxes and shortens, it gets thicker and the twists get closer together.



Twist doesn't distribute itself evenly along a yarn. It always avoids thick spots and gathers in thin spots. This happens in both singles and plied yarns.

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How much yarn is enough?

Estimating yarn requirements for knitting projects

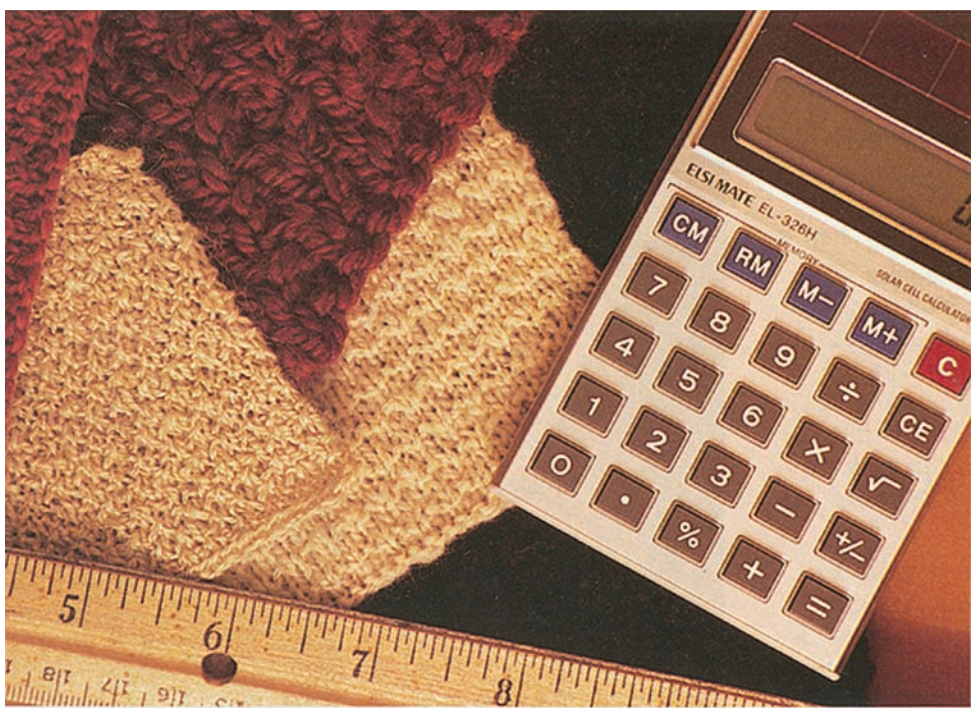
Imagine yourself holding several skeins of yarn and wondering if you have enough to knit a sweater. Or perhaps reaching into a bag of lovely fiber that you'd like to spin and knit, and wondering how much yarn it takes to make a scarf. These are common situations; indeed, I think spinners spend a lot of time wondering if they have enough yarn to make what they want.

One way to proceed is just to start knitting and hope for the best. Sometimes things turn out fine. Other times you end up with quite a lot of yarn left over, but you can always save it for the future. Now and then, you run out of yarn before you finish the project, and have to do some creative problem-solving.

But perhaps you'd like to know in advance that your yarn supply is adequate for the project you have in mind. You don't have to wait until you're done knitting. Before you start, you can make rough estimates of yarn requirements by weight. Or you can make more specific estimates by measuring a sample swatch. Measuring and figuring does take a little more thought and time at the beginning of a project, but you're rewarded by the confidence you feel as you begin to knit.

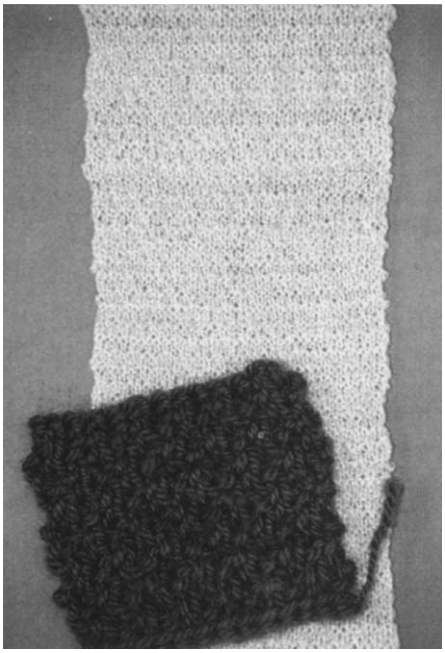
USING WEIGHT TO MAKE ROUGH ESTIMATES

The quickest way to estimate yarn requirements for a project is by weight. Find something similar to the article you want to make—a sweater, a scarf, mittens, an afghan, or whatever—and weigh it. (Or find one described in a magazine or book and look for information on how much it weighs.) That weight is a rough estimate of how much yarn you will need. For example, if you want to knit a size 12 long-sleeve cardigan sweater, you might pull one out of the closet and



By calculating the area of a swatch knitted from a measured sample of yarn, you can determine the amount of yarn per square inch of knitting.

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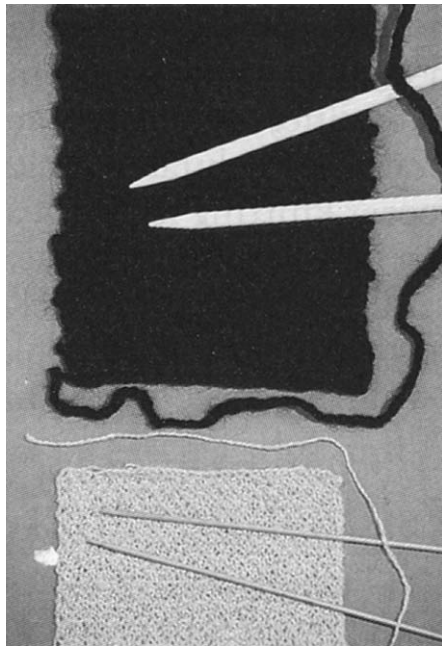
Estimating by weight:

These two swatches include the same weight—10 grams—of yarn.

The thin white yarn, knit on size 2 (2.75–3 mm) needles, made a swatch about 4 inches wide by 10 inches long, or about 40 square inches. Dividing 10 grams by 40 square inches gives about 0.25 grams per square inch.

The thick dark yarn, knit on size 10½ (6.5–7 mm) needles, made a swatch 4 inches wide by 3.5 inches long, or 14 square inches. Dividing 10 grams by 14 square inches gives about 0.7 grams per square inch.

Measuring by weight, thin yarn goes farther than thick yarn.



Estimating by length:

These two swatches were knit from the same length—20 yards—of yarn.

The thick dark yarn, knit on size 10 (6-6.5 mm) needles, made a swatch 5 inches wide by 6.5 inches long, or about 33 square inches. Dividing 20 yards by 33 square inches gives about 0.6 yards per square inch.

The thin white yarn, knit on size 1 (2.5 mm) needles, made a swatch 4.5 inches wide by 2.75 inches long, or about 12 square inches. Dividing 20 yards by 12 square inches gives about 1.7 yards per square inch.

Measuring by length, thick yarn goes farther than thin yarn.

find that it weighs about 24 ounces. To knit a similar sweater, you'd need about 24 ounces of yarn.

The key word here is *similar*. Even if they're the same size, sweaters knitted from thinner or thicker yarns require different weights of yarn. The thinner the yarn, the lighter the knitted article. The thicker the yarn, the heavier the knitting. Knitted from yam that measures 30 wraps per inch (12 wraps/cm), a size 12 sweater might use as little as 12 ounces of yarn/the same size sweater might require 36 ounces of yarn that measures 10 wraps per inch (4 wraps/cm).

Compare the diameter of the yarn in your skeins with that in the sample article that you're weighing, and adjust your weight estimate up or down accordingly.

Other factors affect weight, too. Some fibers are denser, hence heavier, than others. A sportweight-sizeyarn of alpaca or mohair is usually a little heavier than the same size yarn of wool. Some yarns are denser than others. A tightly twisted worsted yarn is heavier than the same size of soft woolen yarn.

And this is very important: think about the knitting itself. Packing stitches close together (by knitting tightly or using small needles) uses more yarn, and thus makes a heavier product, than leaving some air space between the stitches |by knitting loosely or using large needles). Knitting in a pattern stitch that makes a thickly textured three-dimensional surface uses more yarn than knitting in smooth, flat stockinette stitch. Fair Isle or patterned knitting, where extra colors are carried along inside the work, uses more yarn than solid-color knitting.

Now you see why going by weight only gives a rough estimate of how much yarn is enough! However, it's better than no estimate at all, and it only takes a minute to get out the scales and compare the weight of yarn you have with the weight of something you'd like to make.

CHOOSING THE RIGHT SIZE NEEDLES

I'm going to detour here and tell you about something that caught my attention recently. I used to be lazy about sampling. I'd spin some yarn, try knitting on whatever seemed like the "right" size needles, and pretty much accept the results. Oh, sometimes, if the knitting felt way too tight or too loose, I'd try needles one or two sizes larger or smaller than I'd started with, but that's all.

I had a way of rationalizing this careless attitude, too. It came from reading the labels of millspun knitting yarns and patterns for using those yarns, and learning to equate certain yarn sizes with certain knitting gauges. For example, I thought of worsted-weight yarn as giving 5 stitches to the inch (19 stitches/10 cm). Indeed it can, but it can also knit up at 4 stitches/inch or 6 stitches/inch (16 or 24 stitches/10 cm), or any fraction in be-

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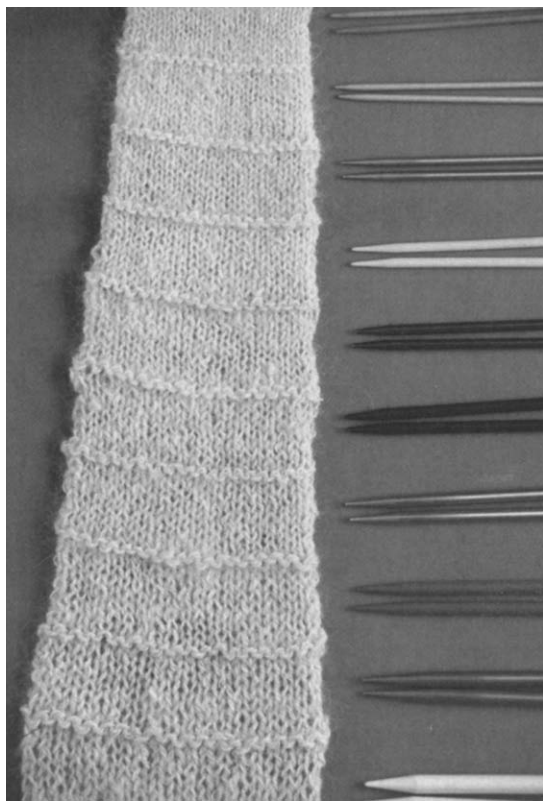
tween, depending on what size needles you use. From any yarn you choose, you can knit fabrics that are loose, "normal" or tight. Gauge depends on the needles as much as on the yarn.

This is important, so I'll keep going. More than once, back when I thought I was so smart that I didn't have to sample (ha!), I threw good-as-new, unworn, handspun and handknit sweaters into the Goodwill box, because I was frustrated with how they had turned out. Some were loose and saggy (knitted on too-big needles), others were tight and unyielding (knitted on too-small needles). In either case, I blamed the yarn, or even the fiber, for the sweater's shortcomings, instead of blaming myself for not taking time to choose the right size knitting needles. Now wasn't that wasteful? Instead of "A stitch in time saves nine," I needed to realize that "A swatch in time saves the sweater."

At least I know I'm not alone. Looking at other spinners' handknit articles, one of my most frequent observations is that the knitting is a little too tight or too loose; that is, that the needle size wasn't just right. Here's an area where we can all make some progress!

Now let me recommend an exercise that will convert even the most stubborn anti-sampler. Get a ball of your handspun yarn, and get out all your knitting needles. Start with what you think of as big thick needles; I use size 10 (6-6.5 mm), but you might use size 13 (8-8.5 mm) or whatever. Cast on about 30 stitches and knit an inch in stockinette stitch (or the pattern stitch of your choice). Change to the next smaller size needles (I use a row of purling to mark the transition) and knit another inch. Change again, and keep going until you've gotten to the skinniest needles you can bear using; I go down to size 1 or 0 (2.5 or 2.25 mm), but you might stop at size 4 (3.5 mm). Cast off and block your swatch. (If it's wool, just press it lightly with the steam iron.)

Now look at what you've done. See how much wider the swatch is at the cast-on end (knit on big needles) than on the cast-off end (knit on small needles)? But it's the same number of stitches throughout, right? Obviously the gauge changes with needle size. Now feel each section of the swatch, and notice how it varies from one end to the other. Perhaps different sections suggest different uses: tighter knitting for durable socks or windproof mittens, or looser knitting for a sweater that drapes nicely. Knowing that you create these different effects with the same yarn gives you welcome flexibility: if you don't have enough yarn to make a sweater, you might knit on smaller needles and make socks, instead.



This swatch shows the effect of needle size on knitting gauge. The wide end was done on size 10 needles; the narrow end was done on size 1 needles. Each purl row marks a change to the next size needles.

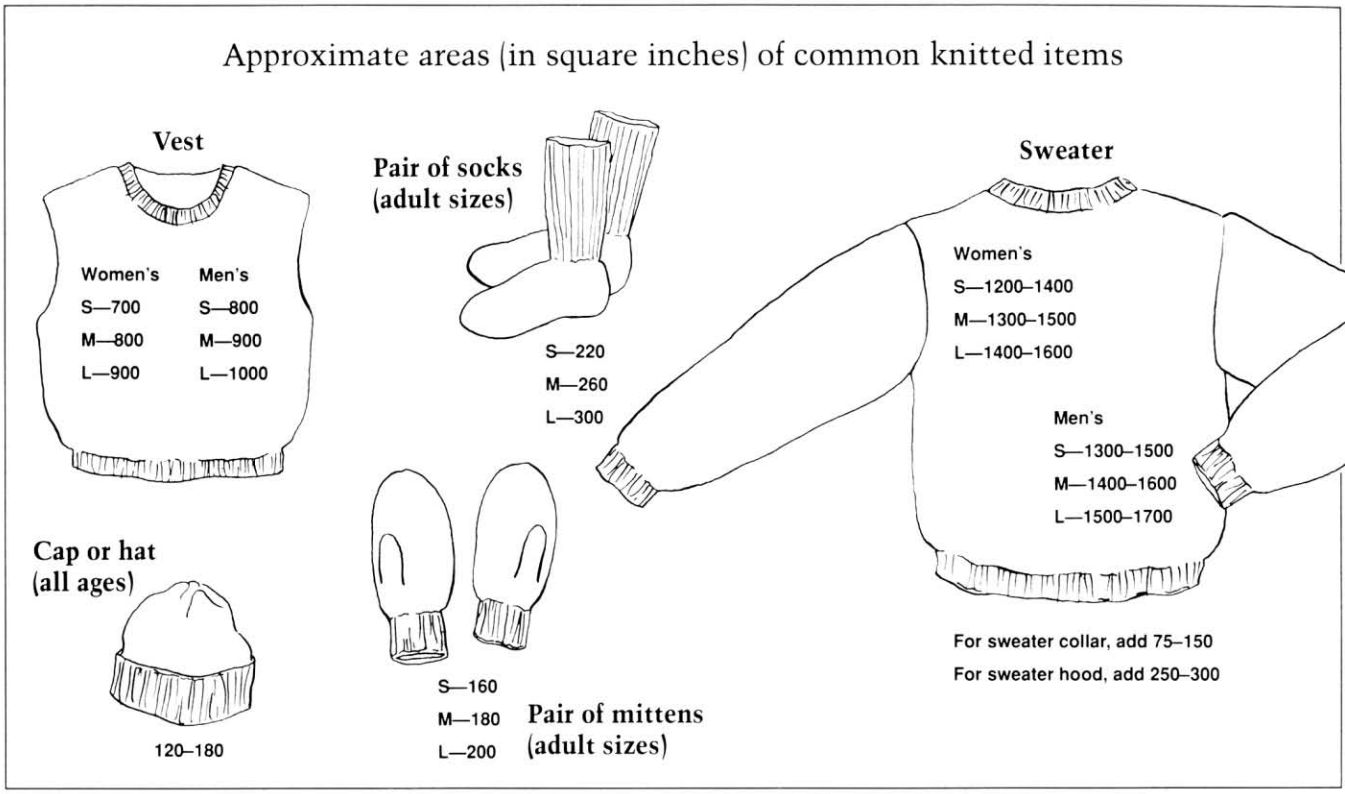
ESTIMATING YARN REQUIREMENTS BY AREA

This method of estimating yarn requirements takes longer, but it gives more accurate estimates than a simple comparison of weights. Although carrying this method through may take an evening, I think it's worthwhile insurance for projects that will require several weeks' knitting. To estimate yarn use by area, you figure the approximate area of your intended project in square inches, measure a sample swatch to determine the number of yards or grams of yarn per square inch of knitting, and multiply to find the total yardage or weight required.

It's easy to figure the area of a project if you're making something rectangular: just multiply the length times the width. For example, a scarf 10 inches wide by 60 inches long has 600 square inches. It's a little more trouble to estimate the area of curved and fitted garments, but if you have something similar to what you want to make, you can measure and multiply and total up the requirements for front, back, sleeves, etc. To make it easier for folks who fear math, I compiled this chart of approximate areas (in square inches) for common knitted items.

You can figure yarn use per square inch at the same time that you're knitting sample swatches to confirm your gauge or to test different stitch patterns. The

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trick is to start with a known amount of yarn, measured by length or by weight.

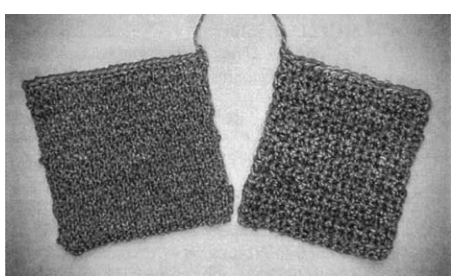
To work by length, start with 20 yards of yarn. Knit a swatch and block it, measure its length and width, and multiply to find its are in square inches. Divide 20 yards by the area to determine yards per square inch. Multiply this number by the project area to determine length of yarn required.

To estimate by weight, you'll need a scale or balance that accurately measures fractions of an ounce or grams. I usually start with 10 grams of yarn. Knit a swatch and block it, measure its length and width, and multiply to find its area. Divide 10 grams by the area to determine grams per square inch. Multiply this number by the project area to determine weight of yarn required.

Now you've figured the amount of yarn it would take to knit your intended project. The final questions are, "How much yarn do you have?"and, of course, "Is that enough?"

Again, you can work by weight or by length. To determine how many grams or ounces you have, simply weigh the yarn. Use the best scale you have access to, since a few ounces more or less can mean the difference between a sweater that's all one color and a sweater with pieced-on collar and cuffs. If you doubt the accuracy of the scales you have at home, take your yarn to the post office or the grocery store and ask a friendly clerk to weigh it for you.

To determine how many yards of yarn you have, count the number of turns as you wind it onto a skein reel or niddy=noddy, then multiply by the circumference of the skein *after* you've removed it from the reel and let it relax and draw in. If you have a McMorran balance, use it to determine the yarn's grist in yards per pound, and multiply by the yarn's weight in pounds to find how many yards you have. I hope it's enough, and wish you happy knitting.



Knitting vs. crochet: These swatches were made from the same length—20 yards—of yarn. The swatch knitted in seed stitch (left) is slightly larger than the swatch made in single crochet (right).

A NOTE TO CROCHETERS

All these methods can be applied to crocheting as well as to knitting. Try using different size hooks and different stitches. Choose the one you like best, make a sample swatch from a measured amount of yarn, figure yarn use per square inch, and multiply by the area of your intended project to find total yarn requirements. Depending on your gauge and choice of stitches, crocheting may require 5% to 20% more yarn than knitting to make the same size project.

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