

How to never lose a game of yarn chicken

An introduction to the mathematics of crochet

What is yarn chicken?

When a crocheter attempts to crochet a project with a limited amount of yarn they may find themselves playing a game of yarn chicken. If they are able to finish the project without running out of yarn then they win but if they run out of yarn mid-project, then they lose. Nobody wants to lose as this means a trip to the store to try and colour match yarns or a scavenger hunt for discontinued yarns.

How to find the length of yarn needed

The main goal is to not run out of yarns so we must find how much yarn the project will take. In order to do this we should break down the pattern of the project to find how many stitches there are and find the length of yarn needed to create each stitch. Sounds simple, however, every crocheter has different tension in their stitches and different yarns have different thicknesses and need different hook sizes all which would vary the length of yarn necessary for each stitch. Luckily as these variables should be constant for all stitches in the project we can think of them as having a multiplier effect on each stitch when comparing the stitches to a standard stitch length. The table below shows a test on 3 different yarns to find an average for the length of each stitch type using 4mm hook and double knit yarn (the most commonly used sizes of hook and yarn). Note the purple yarn was stretched out and thinner so I found the multiplier by dividing the purple yarn stitch lengths by the green and orange yarn stitch lengths.

Length per Stitch (cm)							
	Slip Knot (Sk)	Chain (Ch)	Slip Stitch (Sl)	Single Crochet (Sc)	Half-doub le Crochet (Hdc)	Double Crochet (Dc)	Multiplier (M)
Purple	3.4	2.3	2.3	4	6	8.2	0.96
Green	3.5	2.4	2.4	4.2	6.2	8.5	1
Orange	3.5	2.4	2.4	4.2	6.2	8.5	1

In order to maintain even tension at the beginning and the end of each section of each piece we should allow for 10cm of extra yarn at the start and end. The slip knot starts each section of the project so is only needed once per section. The chain and slip knot both use the same amount of yarn so the total number of chains and slip stitches can be put equal to 'y' in order to create the following equation:

$$\text{Total length of yarn used} = M(3.5 + 2.4y + 4.2(\text{Sc}) + 6.2(\text{Hdc}) + 8.5(\text{Dc})) + 20 \text{ cm}$$

Why use an equation?

Since the invention of crochet many hundreds of years ago, a gauge was used to estimate if your tension was correct so that you could create a piece of fabric with the correct proportion of stiffness. If your gauging is correct you can roughly estimate how much yarn is required to complete your project. This is where our equation makes our creation much more accurate. You won't find that you're 4 stitches off of finishing the project as your estimation was slightly off.

That game of yarn chicken is now yours to win!

While it's all well and good using this equation to win a simple game against your yarn it could also be used by business owners to save them time and therefore money on incomplete pieces. The business owner will know their own multiplier and pattern as they should be creating the same product each time. With this information they can determine whether or not they would have enough yarn to complete each size and find the maximum size they could create with the yarn they have remaining without having to frog (unravel in non crocheter terms) the product. Similarly with the help of AI or an advanced computer program to interpret the written patterns we could create a program to quickly identify how much yarn a project will need so the casual hobbyist can save their own sanity.

And just like that, you will never lose a game of yarn chicken when crocheting ever again! Now to do the same for knitting...