

# Crum Brown Interleaving knitting technique

## by Ruth Churchman

This technique is derived from knitted scientific models made by Alexander Crum Brown (1838-1922), an Edinburgh scientist. He used the process of making these models to explore about how interleaving layers work together. I discovered two of these models in the collections of the National Museums Scotland (not currently on display) and endeavoured to replicate his technique.

Find out more on my blog: <https://creatingruth.wordpress.com/2017/11/08/interpenetrating-knitting>, and on the National Museums Scotland blog posts: <http://blog.nms.ac.uk/2017/11/15/alexander-crum-browns-mathematical-models-interpenetrating-models-of-beknottedness/>

<http://blog.nms.ac.uk/2017/11/15/alexander-crum-browns-mathematical-models-developing-new-knitting-techniques/>

His models are three layers of garter stitch knitting in 3 colours, all three colours appear on each layers. The edges do not join. The three layers only interleave when the colour changes on a layer. The colours are pulled through the layers between the stitches.



I have investigated and produced a process that can be followed to work this three layered colour-work technique:

- It is worked using 3 pairs of straight needles
- The same colour stitch is knitted onto the same colour stitch throughout, the layers are just moved to a different position to work the stitches
- The working yarn is kept behind each right needle throughout

## Crum Brown Interleaving knitting technique

I have designed this circle motif to demonstrate the technique:

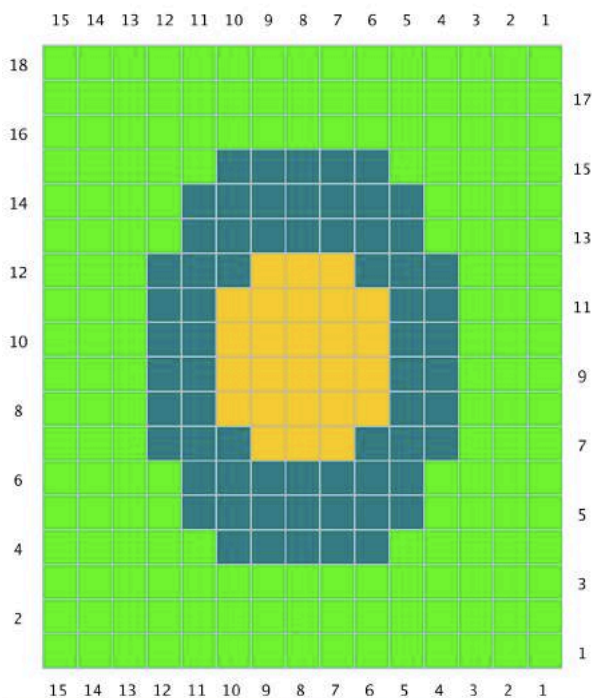




# Crum Brown Interleaving knitting technique



1

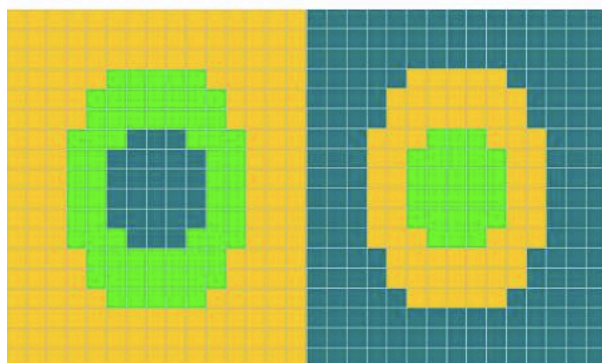


## Materials/Equipment needed

15g yarn in any weight, in 3 colours  
 3 pairs straight knitting needles in 2 sizes smaller than recommended for yarn  
 e.g 4 mm is the recommended needle size for double knitting yarn, use 3.50 mm for this technique.

## Chart Instructions

Work from the large motif layer 1, using motif 2 and 3 as a guide to the different colours on layers 2 and 3. Follow odd number rows from right to left, follow even number rows from left to right.



2

3

## Chart Key

- Orange
- Teal
- Green

## Crum Brown Interleaving knitting technique

### Technique Instructions

Cast on and knit in garter stitch for Rows 1-3 in each colour onto 3 different needles. Row 1 is a wrong side row.

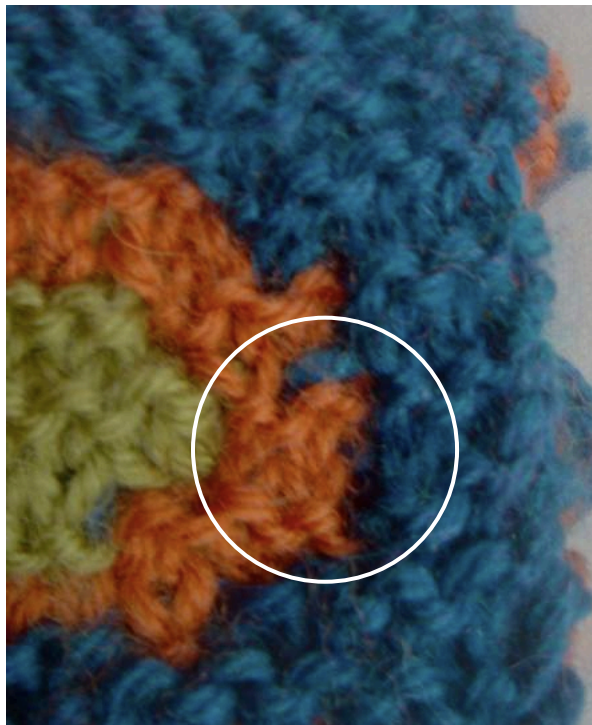
Stack layers 1, 2 and 3 on top of each other on left side, ready to knit.

There are 4 different working positions/scenarios that appear as the chart is worked, and there are 4 methods as a response to them. The table below lists these. I have produced 3 videos to demonstrate.

Working position	Working method	Shorthand
<b>a.</b> Working yarn is in the <b>correct</b> position by the right needle, and stitch on corresponding left needle is <b>correct</b> colour for next colour stitch needed	Knit from each left needle until in the position for the next colour change, (work from front left needle first, then middle and back.)	<b>a.</b>  Front left Middle left Back left
<b>b.</b> Working yarn is in the <b>wrong</b> position by the right needle, and stitch on corresponding left needle is <b>wrong</b> colour for next colour stitch needed	Move each working yarn to the correct position behind each right hand needle.  Working one stitch on each needle, (from front left needle, then back left needle, then middle needle), knit the correct colour stitch onto right needles by crossing them in the middle.  (Worked in this order to prevent middle colour showing at front or back*.)	<b>b.</b>  Move working yarn  Front left Back left Middle left
<b>c.</b> Working yarn is in the <b>correct</b> position by the right needle, and stitch on corresponding left needle is <b>wrong</b> colour for next colour stitch needed	Working one stitch on each needle, (from front left needle, then back left needle, then middle needle), knit the correct colour stitch onto right needles by crossing them in the middle.  (Worked in this order to prevent middle colour showing at front or back*.)	<b>c.</b>  Front left Back left Middle left
<b>d.</b> Working yarn is in the <b>wrong</b> position by the right needle, and stitch on corresponding left needle is <b>correct</b> colour for next colour stitch needed	Move each working yarn to the correct position behind each right hand needle, (work from front left needle first then middle and back).	<b>d.</b>  Move working yarn  Front left Middle left Back left

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\* The layers need to be worked in this specific order to prevent the middle colour wrapping around the front or back stitches, and showing like this:



Always return the working yarn back to its correct position at the right needle after working a stitch.

### Example

#### Videos

Working positions a, b and c (3:11 mins) <https://youtu.be/QEEem7d3MdmE>

Working position a and d (1:43 mins) [https://youtu.be/t\\_t9SQJXpdU](https://youtu.be/t_t9SQJXpdU)

Working position a, b, c and d (2:56 mins) <https://youtu.be/tTT1mDQ3g5I>

#### Photo Tutorial

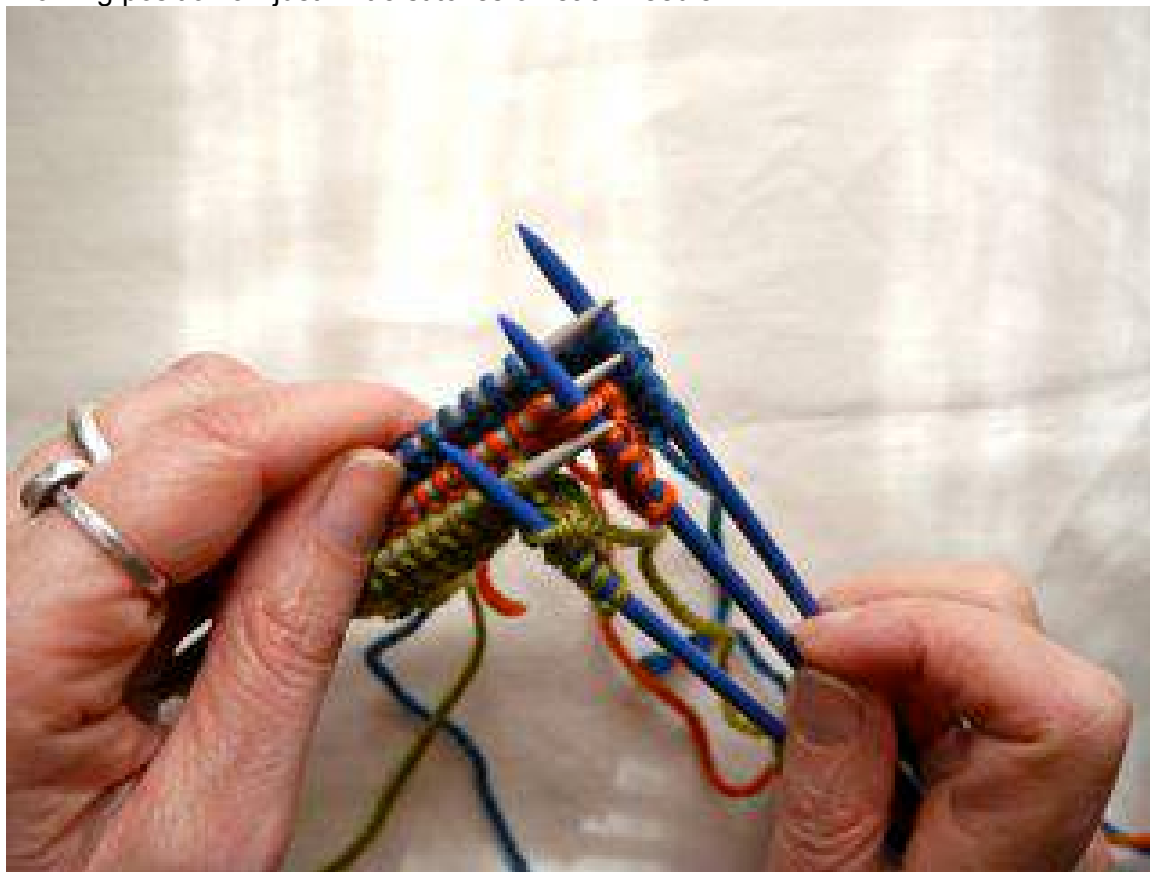
Working Row 4 (RS)

Work set up on the needles ready to begin knitting Row 4:



## Crum Brown Interleaving knitting technique

Working position a - just knit 5 stitches on each needle:

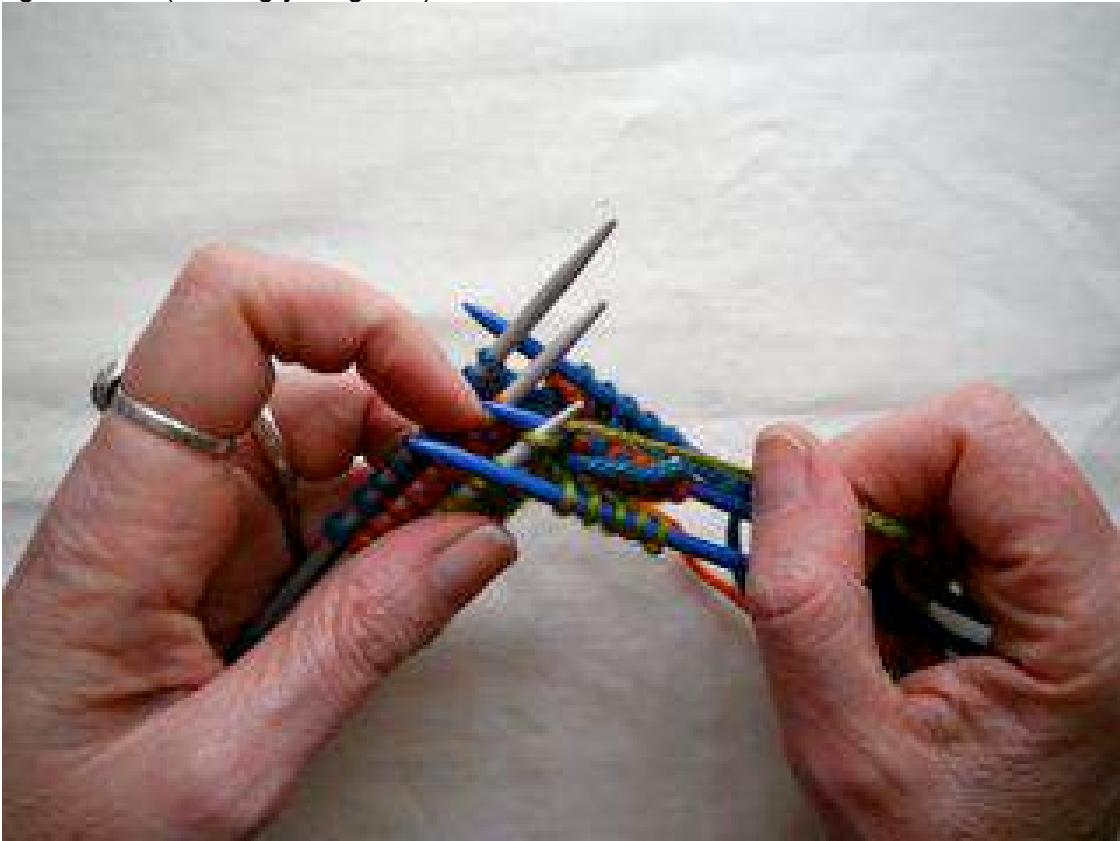


Row 4, Stitch 6, working position b – move the working yarn to the correct position at each needle for the colour of the next stitch, e.g teal to front, green to middle, orange to back:



## Crum Brown Interleaving knitting technique

Continuing working position b – knitting from the front left needle (green stitch), with the middle right needle (working yarn green):

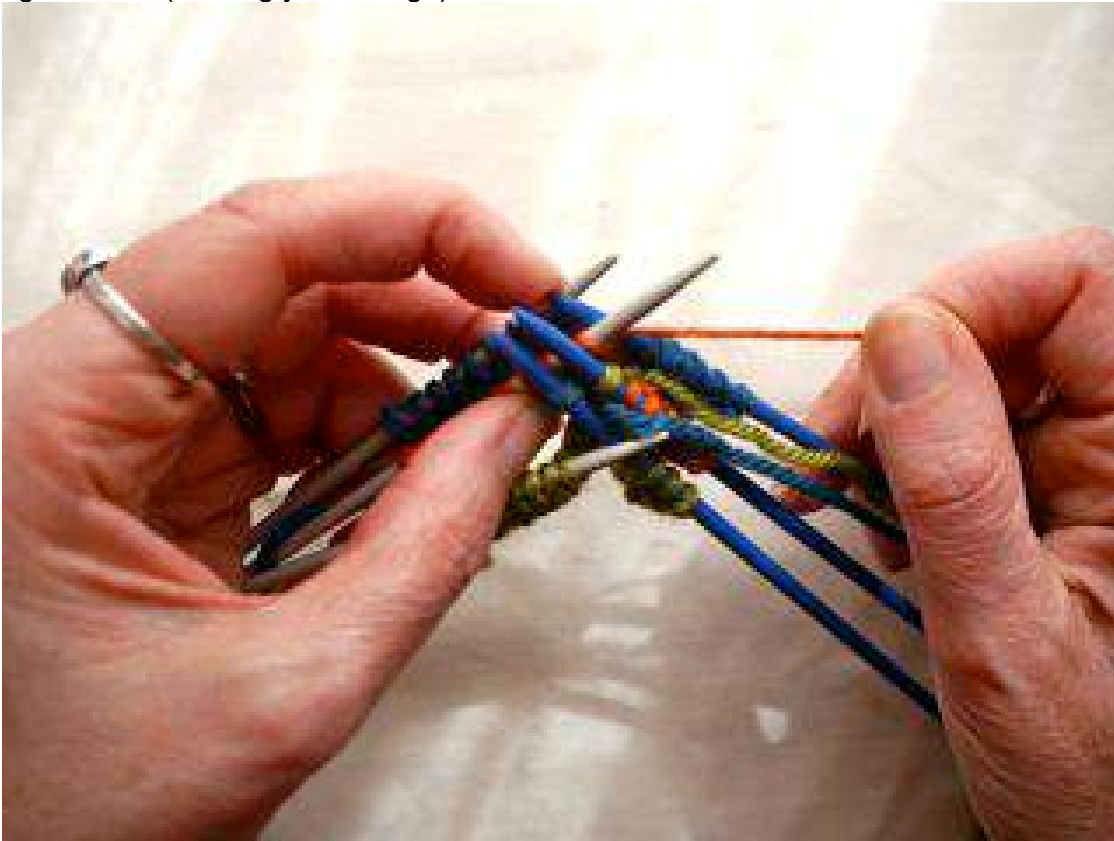


Continuing working position b – knitting from the back left needle (teal stitch), with the front right needle (working yarn teal):

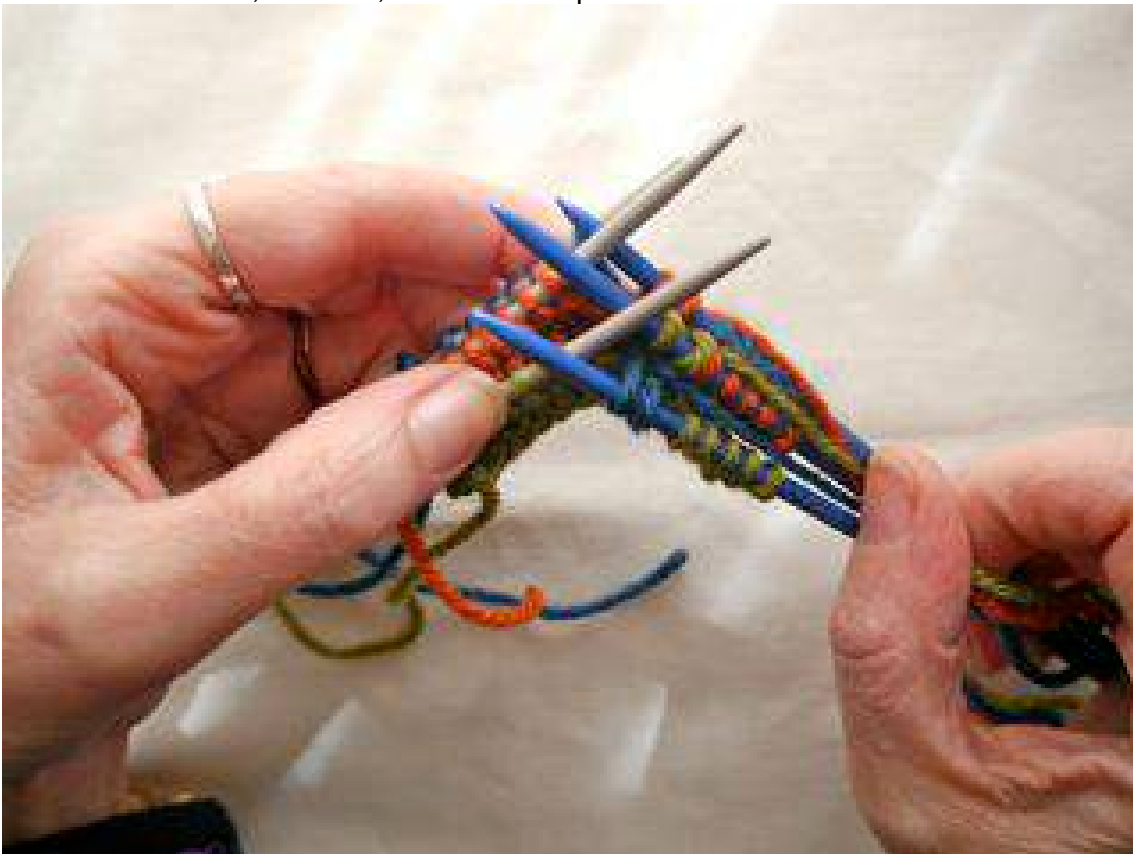


## Crum Brown Interleaving knitting technique

Continuing working position b – knitting from the middle left needle (orange stitch), with the back right needle (working yarn orange):



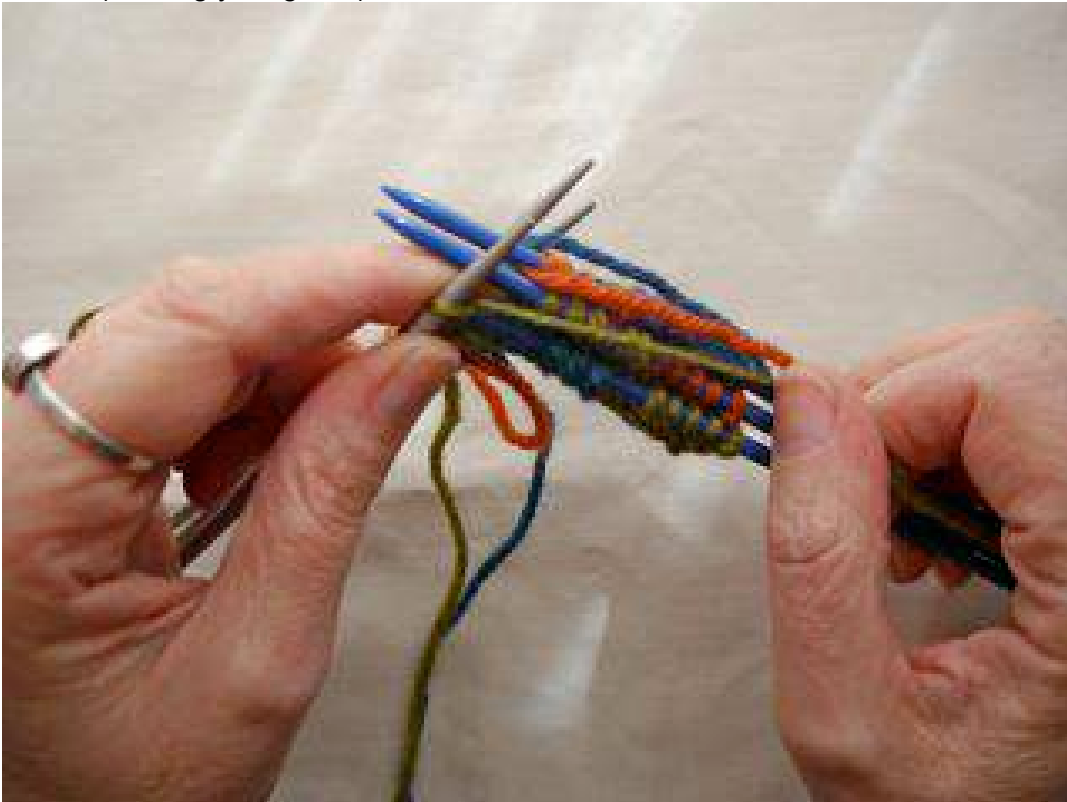
Row 4, Stitch 7, 8, 9, 10, working position c continue as for stitch 6, working 1 needle, 1 stitch at a time in the front left, back left, middle left sequence:





## Crum Brown Interleaving knitting technique

Row 4, Stitch 11, working position d – move the working yarn to the correct position at each needle for the colour of the next stitch; knit from the front left needle (green stitch), with the front right needle (working yarn green):



You are now in working position a, and can knit all the front left stitches to the end of the row. The same working positions apply to the other 2 needles, knit to the end of the row on each needle.



## Crum Brown Interleaving knitting technique

Row 5 (WS)

Working position a - just knit 4 stitches on each needle.

Row 5, Stitch 5, working position b – move the working yarn to the correct position at each needle for the colour of the next stitch; knit from the front left needle (teal stitch), with the back right needle (working yarn teal):

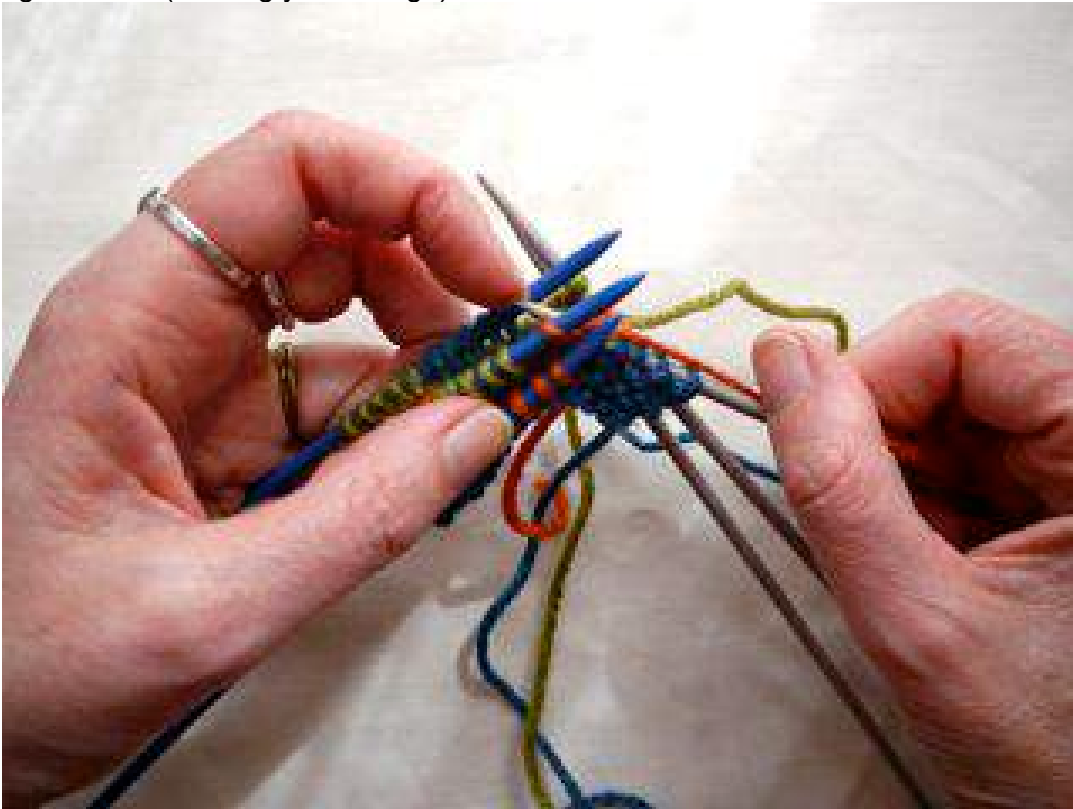


Continuing working position b – knitting from the back left needle (green stitch), with the middle right needle (working yarn green):



## Crum Brown Interleaving knitting technique

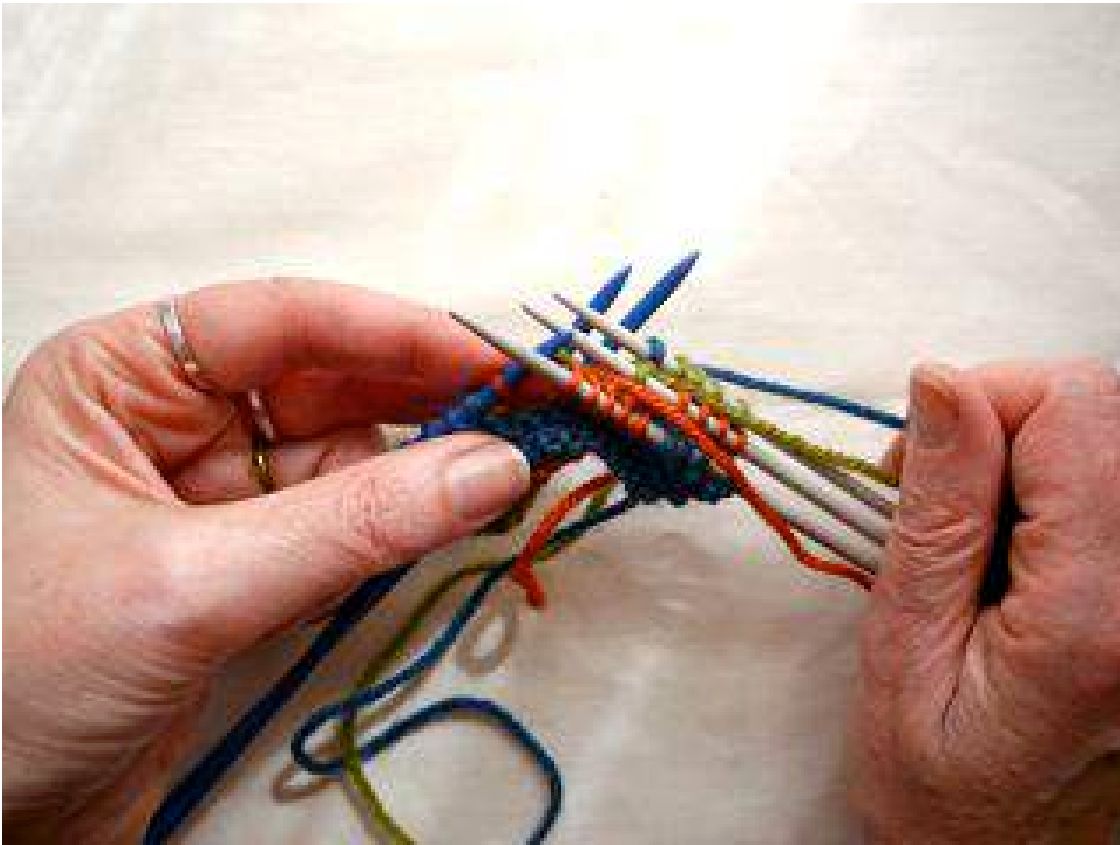
Continuing working position b – knitting from the middle left needle (orange stitch), with the front right needle (working yarn orange):



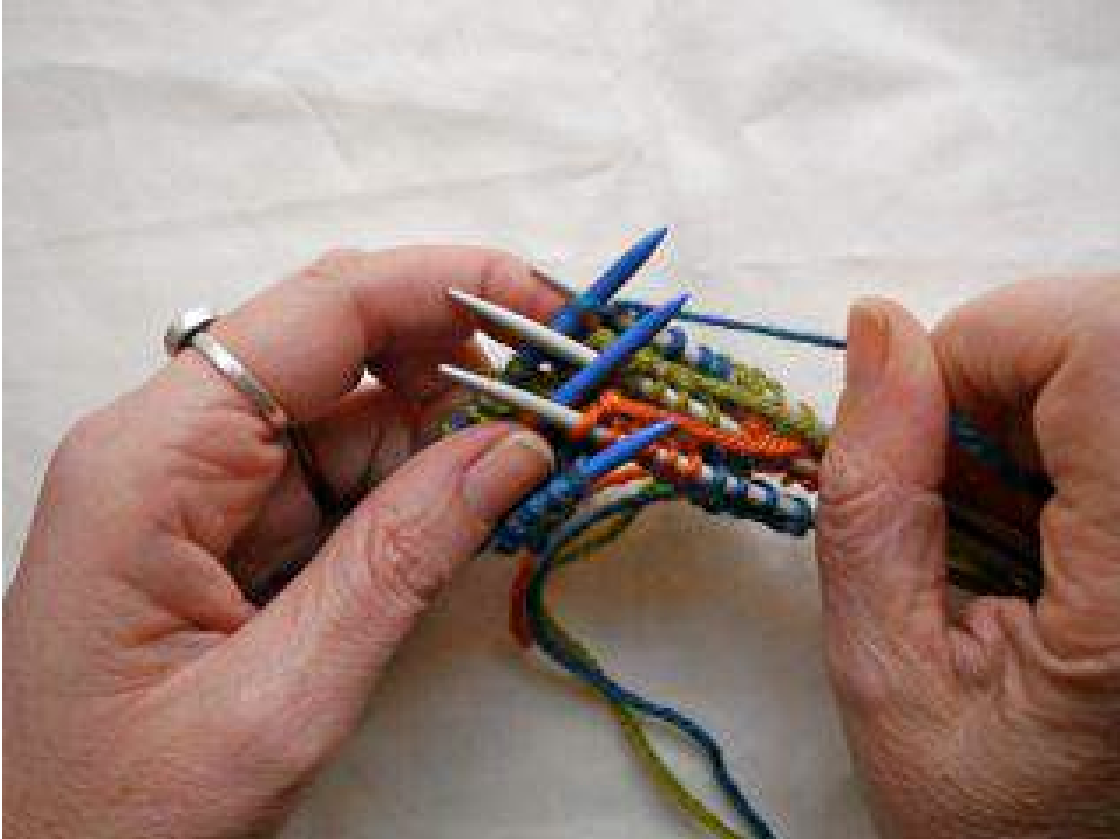
Row 5, Stitch 6. You are now in working position a, the working yarn is in the correct position, and can knit the front left stitches to stitch 11 where the colour changes on the previous row.



## Crum Brown Interleaving knitting technique



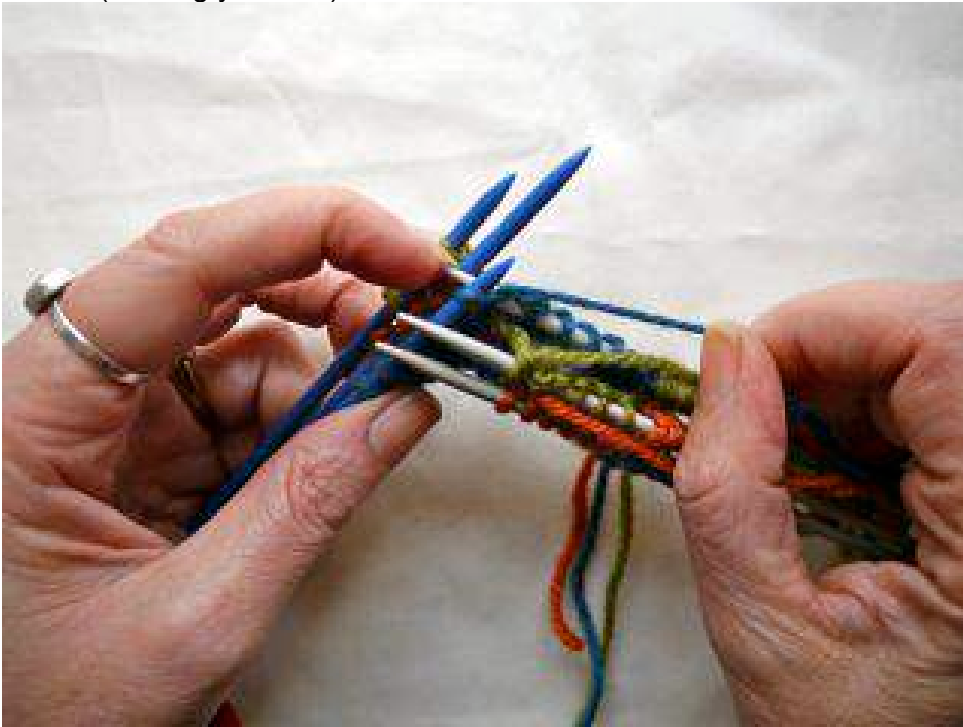
The same working positions apply to the other 2 needles, knit to stitch 11 on each needle.





## Crum Brown Interleaving knitting technique

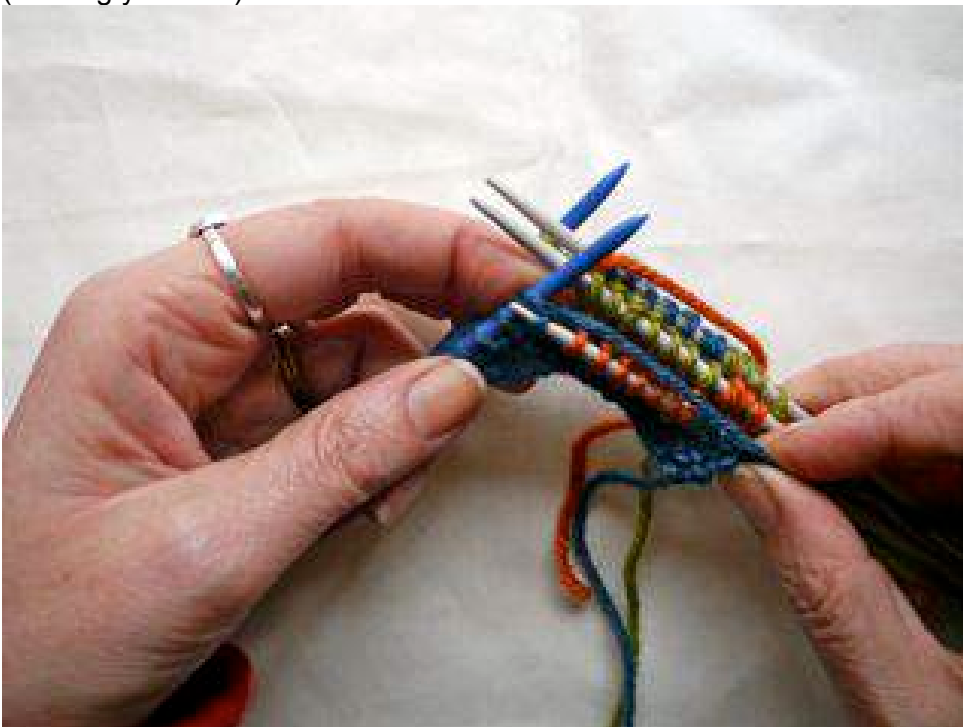
Row 5, Stitch 11, working position c – knit from the front left needle (teal stitch), with the back right needle (working yarn teal).



Row 5, Stitch 11, working position c – knit from the back left needle (green stitch), with the middle right needle (working yarn green).

Row 5, Stitch 11, working position c – knit from the middle left needle (orange stitch), with the front right needle (working yarn orange).

Row 5, Stitch 12, working position d – move the working yarn to the correct position at each needle for the colour of the next stitch; knit from the front left needle (teal stitch), with the front right needle (working yarn teal).



## Crum Brown Interleaving knitting technique

You are now in working position a, and can knit the front left stitches to the end of the row. needle (working yarn orange).



Photo: Row 5 front left 4 cont

The same working positions apply to the other 2 needles, knit to the end of the row on each needle.

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Photos credit: Ruth Churchman

Ravelry ID: <http://www.ravelry.com/people/Nightwood>  
Website: <http://creatingruth.wordpress.com/>

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