

Transforming Mathematics and Chemistry into Knitted Art According to Alexander Crum Brown

Alexander Crum-Brown (1838-1922), chemist, mathematician and knitter was born and raised in Edinburgh. He studied chemistry and medicine at the University of Edinburgh, continued with his study of chemistry in Germany and eventually came back to Edinburgh as a lecturer and later professor of Chemistry. He also made significant contributions to pharmacology, mathematics and physiology.

Crum-Brown is credited with inventing the stick and ball molecular models, used knitting needles and red and blue yarn to construct a structural model of sodium chloride. This model is on display at the Museum of the School of Chemistry, University of Edinburgh. He also made other knitted models of mathematical surfaces to explain concepts and research.

Making a knitted model of sodium chloride

You will need 14 knitted balls representing chloride ions and 13 balls representing sodium ions.

Materials needed

- Knitting needles (size appropriate for yarn being used)
- Yarn in colour A (larger ball representing chloride ion) – 168g in total (around 12 g needed for each ball)
- Yarn in colour B (smaller ball representing sodium ion) – 78g in total (around 6 g needed for each ball)
- Tapestry needle
- Tape measure or ruler
- Polyester craft filling for stuffing balls
- 27 Wooden skewers, 20-30cm long

Instructions

You will need to knit a rectangle where the length of the piece is twice as long as the width.

To knit a Chloride ion: Cast on enough stitches so you have a width of **8cm**. Knit rows until your rectangle measures **16cm**.



Cast off all stitches and cut the yarn leaving a tail of around 30cm. Use this to sew the shorter sides of the rectangle together.

Using a tapestry needle, run the yarn through the stitches, pull tight and sew to seal it shut. Stuff the ball with the polyester filling and seal the ball shut by running yarn through stitches as before.



To knit a Sodium ion:

Start by knitting a rectangle measuring **6 x 12 cm**, repeat the same process as for the chloride ion.

Once you have knitted all 27 balls, use the skewers to assemble the sodium chloride lattice as shown in the picture below.

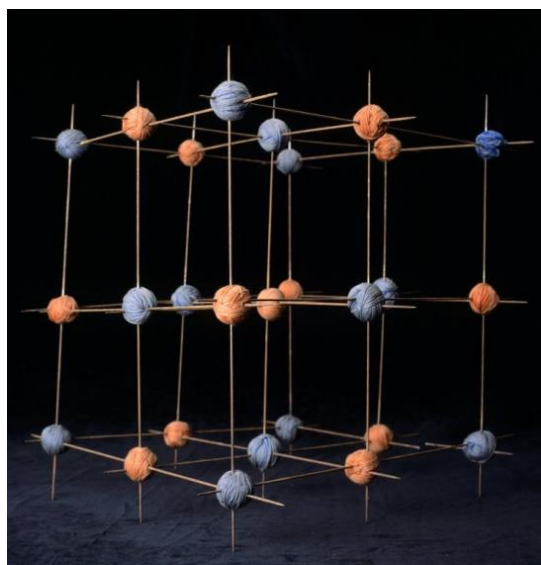


Image from <https://blog.nms.ac.uk/2017/11/15/alexander-crum-browns-mathematical-models-interpenetrating-models-of-beknottedness/>

Pattern inspired by <https://www.liebseeligkeiten.de/baelle-stricken-einfache-strickanleitung/>