

Cindy Phillips 3/11/2025

Art Form: provide a description of the art form you plan to use and why you chose to use it.

Lesson Enhancement: Describe how the art form enhances a topic that you currently teach or plan to teach. Include a 1 paragraph statement about your personal feelings regarding integrating the arts and the specific art form you chose to use.

Interdisciplinary context: How can this art form (and/or art in general) be used to create interdisciplinary lessons, discussions or activities in your classroom? How can you connect to multiple content areas?

I am a knitter and crocheter, and often I find myself wondering if I have missed a stitch or not. Knitting is weaving with two needles and crocheting is knotting with one hook. In both cases, the working row gets larger and narrower using certain stitches called “increases” and “decreases” performed in various manners.

I have always seen this as a practical application of the Algebra2 topic of arithmetic sequences and series.

Arithmetic SEQUENCES are LISTS of numbers that are created by recursively adding the same constant (called a common difference) to the previous number.

An Arithmetic SERIES is a SUM of all of the terms of an arithmetics sequence.

Students often confuse the two concepts and terminology because (a) they are similar and (b) often students don't see the importance of using proper language to explain mathematical concepts.

The difference between the two can be easily distinguished with knitting: a sequence counts the number of stitches in each row; a series counts the sum total of all of the stitches in all of the rows.

The topic of sequences/series is also generally a student's first experience with recursion; a concept essential in computer programming. The recursion notation is also very confusing to students even though the idea of conjuring up a recursion rule is much more natural than conjuring up an explicit rule.

Example:

x	y
2	1
3	5
4	9
5	13
6	17
7	???

Look at the table and try to come up with the y-value for an x-value of 7. Even the weakest budding mathematicians will conclude it must be “21” because each y-value is 4 more than the previous. This is recursive reasoning.

(an explicit formula relates any given y-value with the given x-value of that row and this is much more difficult. In this case, it is $y=4x-7$ and is found by either recognizing that a recursive arithmetic sequence means an explicit equation that is linear... or by recognizing that the first differences in y-values are constant, also indicating that the explicit formula is linear where that difference is equal to the line's slope.)

At the university level, crocheting was used to illustrate properties of multiple-dimension topology: <https://www.youtube.com/watch?v=w1TBZhd-sN0>
(fast forward to 15:00 for her discussion of math and art)

More on this: <https://pi.math.cornell.edu/~dtaimina/crochet/hplane.htm>

And can model coral reefs
<https://crochetcoralreef.org/exhibitions/>

So at the most basic and most complex of levels, this art form is very mathematical!

The only problem is... it takes TIME to teach the art of knitting and crocheting, and it would be very difficult to engage most kids in learning how to do this.