CHICKEN BOXES: Sequence Overview

Australian Curriculum: Mathematics (Year 6)

ACMNA133: Continue and create sequences involving whole numbers, fractions and decimals. Describe the rule used to create the sequence.

Who is this Sequence for?

This unit is designed to develop some of the basic elements of algebraic thinking, before students encounter formal algebra. The unit requires very little background knowledge, and only simple whole number calculation. Some upper primary students may use this unit as a scaffolded introduction to the use of letters to stand for varying quantities.

Lesson 1: A Single Row of Bird Boxes

Students model, develop and describe rules for the number of panels needed to build a row of chicken boxes for a poultry show. Students are guided to move from recursive thinking to the relational thinking of functions. Through class discussion, students see that there is more than one correct rule for describing a particular pattern.

Lesson 2: Box Designs with Other Shapes

Students apply and test their understandings from the previous lesson by finding similar relationships for rows of triangular and hexagonal prism based bird boxes.

Lesson 3: Modelling an Array of Chicken Boxes

Students consider patterns arising from the number of components in an array of boxes. Students first look at patterns in additional rows, and then combine these rules with the rules for the first row to calculate quantities of components for the entire array. Students are then challenged to find other patterns in the whole array.

Lesson 4: Modelling Chicken Boxes in 3D

Students are set the open task of finding the number of sticks required to make a three dimensional model of an array of chicken boxes of any size. They build a 4 x 4 array to test their ideas and generalise to create a formula.

We value your feedback after these lessons via our website.

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Reflection on this sequence

Rationale

The four lessons present increasingly complex aspects of one real situation. Students see how the geometric construction of the chicken boxes is reflected in the number patterns, and how a careful description of the number pattern enables predictions to be made about the numbers of components needed for displays of any number of chickens. Students learn to interpret the mathematical rules in terms of the features of the arrays of chicken boxes, so that the symbols in the rule make sense. Students work towards the idea of function in a concrete way. The underlying ideas of all lessons are that the number of components of any one type (e.g. the number of side panels) required for a show is a function of the number of chickens to be housed; that the function rule can be found by analysing number patterns; and that there are often multiple correct ways to describe a function.

reSolve Mathematics is purposeful

- The context of making 'flat pack' chicken boxes for a show is slightly quirky and broadly intriguing.
- The context provides a purposeful anchor point for the sequence of increasingly complex tasks.
- Students' understanding of the usefulness of function rules over simper descriptions of pattern (and perhaps some very early algebra) is made possible by the carefully sequences and scaffolded nature of the inquiry.

reSolve Tasks are inclusive and challenging

- Several teachers who trialled this unit commented that prior to teaching the material they thought that it would be too difficult for their students. However, after teaching the unit they found that all students had success. They attribute this success to the fact that the sequence is structured to support students throughout.
- The gradually increasing complexity of the tasks provides many opportunities for consolidation of earlier ideas, alongside various opportunities for extension.

reSolve Classrooms have a knowledge building culture

- The teacher is central to supporting and scaffolding the connections students make between the context of the Chicken Boxes, the models and the more abstract mathematical understanding of function and rules for patterns.
- Students engage in collaborative group work when constructing their boxes and analysing the numerical patterns within them.
- The discussion that students have with each other supports the knowledge building culture of the classroom.

Further Reading

More about pattern spotting and mathematics:

Hewitt, D. (1992) Train Spotters' Paradise. *Mathematics Teaching*, 140, p 6 – 8. https://nrich.maths.org/9071

Acknowledgements

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