QUARTER CARTONS: Sequence Overview

Summary of learning goals

Students use visualisation, algebra and proportional reasoning to investigate how changing the size of a paper rectangle affects the dimensions of a box folded from that paper.

Australian Curriculum: Mathematics (Year 8)

ACMNA191: Factorise algebraic expressions by identifying numerical factors.
ACMNA192: Simplify algebraic expressions involving the four operations.
ACMMG198: Develop formulas for volumes of rectangular and triangular prisms and prisms in general. Use formulas to solve problems involving volume.
ACMMG202: Establish properties of quadrilaterals using congruent triangles and angle properties, and solve related numerical problems using reasoning.

Summary of lessons

Who is this Sequence for?

This sequence is for students who can calculate volumes of rectangular prisms. Students should be familiar with relating nets to 3D solids and be able to recognise and work with fractions as part of a whole.

Lesson 1: Quarter Cartons

Students fold origami boxes from proportional paper rectangles, compare the dimensions of the boxes, and create an algebraic formula for the volume of a box folded from a paper rectangle of any dimensions.

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Reflection on this sequence

Rationale

In this sequence students apply knowledge about nets of 3D objects and explore proportional relationships through hands-on activities. The context of paper folding encourages students to physically manipulate the paper to investigate relationships and demonstrate their findings. In this way the sequence could serve as an introduction to geometric proofs.

reSolve Mathematics is Purposeful

- The sequence develops an early understanding of geometric proofs and requires students to reason proportionally and algebraically.

reSolve Tasks are Inclusive and Challenging

- Many ways for students to explore the relationship between the dimensions of the paper and the boxes, including algebra, geometry, and physical manipulation.
- Students engage in a hands-on task, with multiple methods of instruction for origami folding provided.
- Students are challenged to write a formula for the volume of a box for a paper rectangle of any dimensions, which requires them to draw on their understandings of algebra and geometry.

reSolve Classrooms Have a Knowledge Building Culture

- Students make different findings and compare across class.