re(Solve) MATHS BY INQUIRY

reSolve Bakery

Y5

Summary of learning goals

- This sequence gives students a range of strategies for multidigit multiplication, highlighting strategies based on the distributive property and the associative property.
- The lessons develop the array as a tool for multiplication. Students move in a careful developmental sequence from an array with all items perceived, to a grid array, then on to an open array and area model for multiplication.

Australian Curriculum: Mathematics (Year 5)

ACMNA100: Solve problems involving multiplication of large numbers by one- or two-digit numbers using efficient mental, written strategies and appropriate digital technologies.

ACMMG109: Calculate perimeter and area of rectangles using familiar metric units.

ACMNA098: Identify and describe factors and multiples of whole numbers and use them to solve problems.

Summary of lessons

Who is this sequence for?

- These lessons are designed for students with prior knowledge of multiplication.
- The focus on understanding multiplication and its properties through arrays is intended both to support learning of new multiplication skills and to deepen students' appreciation of rules that they have learned.

Lesson 1: How Many Cupcakes?

Students calculate the number of cupcakes baked each day in a bakery. The cupcakes are cooked in 6×4 trays. Students solve the problem using their own strategies and illustrate the strategies using the array. As strategies are shared, students reflect on the efficiency and ease of strategies, as well as their suitability for the context.

Lesson 2: The Cupcake Order

This lesson generalises repeated doubling strategies. Students find the number of cupcakes in 40 trays by multiplying by the factors of 40. This is a practical use of the associative property.

Lesson 3: Cupcake Boxes

This lesson uses arrays to build an understanding of the distributive property and the way in which it relates to the multiplication of two-digit numbers. During an investigation comparing the areas of boxes for cupcakes, students observe the convenience of partitioning the array into tens and units, then using the distributive property to multiply. Students use open arrays and an area model for multiplication, and engage with equal group and rate problems.

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Australian Academy of Science

Reflection on this sequence

Rationale

This sequence of lessons strengthens prior learning about multiplication and prepares students to select and apply appropriate strategies for multidigit multiplication. An overarching goal is to develop the array as a tool for reasoning about multiplication. With this tool they will be able to deepen their understanding of earlier content. For example, they can explain the links between the number facts in the 6 times and the 3 times tables, and generalise these links. Looking forward, students can link partitioning principles to the multiplication of fractions and algebraic expressions.

reSolve mathematics is purposeful

- Students' flexibility with multiplication is developed.
- Students are required to explain their reasoning about multiplication, using an array.

reSolve tasks are inclusive and challenging

- Work samples are provided for teachers so that they can identify the level of students' understanding and assist students to move forward.
- The nature of the array model is carefully sequenced, moving from an array with all items perceived to the abstraction of a grid (which still represents all items), and on to the more abstract open arrays and area model for multiplication.

reSolve classrooms have a knowledge-building culture

- In this sequence there are many opportunities for students to learn from each other. In discussions, students will see work samples presented by other students and hear their reasoning.
- The teacher is encouraged to actively orchestrate discussion and to highlight connections between solution strategies, explore the efficiency of some strategies over others and allow opportunities for students to ask questions.