re(Solve) MATHS BY INQUIRY

Think of a Number – Linear Equations

Y8

Summary of learning goals

- Students come to appreciate the power of algebra for generalising results from arithmetic. They connect arithmetic operations with algebraic notation and visualisations. The lesson begins with an observation made using arithmetic that students then justify and extend using algebra.

Australian Curriculum: Mathematics (Year 8)

ACMNA190: Extend and apply the distributive law to the expansion of algebraic expressions.

ACMNA191: Factorise algebraic expressions by identifying numerical factors.

ACMNA192: Simplify algebraic expressions involving the four operations.

Summary of lessons

Who is this sequence for?

- This lesson is designed to consolidate skills in algebra, including collecting like terms and expanding and factorising using the distributive law. It emphasises the importance of algebra for generalising and justifying arithmetic results. It is assumed that students have some familiarity with algebraic notation.

Lesson 1: Think of a Number (THOAN) – Linear Equations

- Think of a number (THOAN) activities show how algebraic reasoning can be used to explain and formulate problems in which chains of operations always result in the same outcome regardless of the number chosen. Students are introduced to THOANs involving simple linear operations, and use algebraic simplification to explain why the THOAN works. They are then asked to complete a THOAN when given some starting operations and, finally, to make and test their own.

Australian Academy of Science

Reflection on this sequence

Rationale

Approaching algebra as generalised arithmetic shows students the power of algebra for abstracting number. This focus on algebra as generalised arithmetic is typically under-represented in secondary mathematics in favour of more time spent on functions and equations.

reSolve mathematics is purposeful

- This task supports a rich interpretation and enactment of the Australian Curriculum: Mathematics, providing fun and engaging ways to understand the algebraic content of the Curriculum. The lesson explores mathematics as a creative and imaginative endeavour, emphasising the entertaining applications of mathematics and the understanding of the mathematical foundation beneath common 'tricks' that students are likely to have encountered before.

reSolve tasks are inclusive and challenging

- The task in this sequence activates existing knowledge, develops new knowledge and explores relationships between key ideas in the Australian Curriculum. The lesson allows students to determine the complexity of their problems themselves, which allows for a low floor and a high ceiling.

reSolve classrooms have a knowledge-building culture

- The task begins by inspiring curiosity and intrigue through a shared classroom experience that promotes higher-order thinking through the role of both teacher and student. Students build understanding through collaborative inquiry, action and reflection. The sequence encourages students to challenge their existing conceptions and to use their mistakes as a vehicle for further learning.