re(Solve) MATHS BY INQUIRY Directed Number

Y6

Summary of learning goals

- These lessons introduce negative numbers through real-world contexts. Students build a strong mental model that they can use to understand what negative numbers are and how they work. The intention is that they will be able to draw on this mental model as they work with negative numbers in later years.

Australian Curriculum: Mathematics (Year 6)

ACMNA124: Investigate everyday situations that use integers. Locate and represent these numbers on a number line.

Summary of lessons

Who is this sequence for?

- These lessons assume no previous experience of directed number.
- At the simplest level, students need to be able to count up and back with positive whole numbers, including using a number line.

Lesson 1: Elevator Challenge

Students play a game that involves moving an elevator up and down in a hotel. Through playing the game they develop a strong mental model of negative integers.

Lesson 2: Solar Temperatures

Students explore the temperatures of the different planets in the solar system. Using a thermometer that models a vertical number line, students read off average temperatures for the planets. They then determine and graph the maximum and minimum temperature ranges for each planet.

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Australian Academy of Science

Reflection on this sequence

Rationale

This sequence aims to provide a firm foundation for conceptual understanding of negative numbers (i.e. that they indicate directed quantities), and for understanding the meaning of a limited range of calculations with them. This is done using familiar situations as mental models, from which students build the abstract numbers. The focus is on conceptual development and everyday applications. Students use a number line to support any calculation that is required.

reSolve mathematics is purposeful

- Students start with a real-world situation, from which they abstract directed numbers. They use the real-world situation to reason about number properties.
- Students build reasoning skills using a vertical number line as a mental model.

reSolve tasks are inclusive and challenging

- Inclusivity in this sequence arises from use of the real-world situation to develop a firm mental model. Transition from relying fully on the real-world situation to using the somewhat more abstract number line occurs at a pace set by the student.

reSolve classrooms have a knowledge-building culture

- Lesson 1 is presented in a game format, enabling discussion between students.
- Through this sequence students build a deeper knowledge of directed number, as well as a deeper understanding of fractions and decimals.
- The teacher is central to the development of a knowledge-building environment in promoting the positive attitudes of curiosity and independence.