10 000 What does it look like? - Michael Ymer Investigation

Victorian Curriculum Links
Year 4 students:
- Recognise, represent and order numbers to at least tens of thousands (VCMNA152)
- Apply place value to partition, rearrange and regroup numbers to at least tens of thousands to assist calculations and solve problems (VCMNA153)

Big Mathematical Idea

The place value system helps us keep track of, and organise large numbers.

Introduction

Through experience and opportunity, students learn to conceptualise large numbers. A growing understanding of the place value system can help students understand how numbers are connected. The challenge given to students to represent 10 000 is quite daunting at first. By the end of the lesson, students will have seen multiple representations of the number and have a new-found appreciation for the place value system and how it helps us keep track of, and organise large numbers.

Materials

➔ Students to source their own materials.

Sequence

➔ Ask: Where might you see 10 000 of something? e.g. spectators at a soccer match, leaves on the ground at school during May, a packet of hundreds and thousands. What is something more than 10 000? What is something less? Describe how 10 000 is a difficult number for the human brain to account for. What could we collect to show what 10,000 looks like? Brainstorm ideas and then invite students to pursue an idea to demonstrate how big 10 000 is.
➔ Explain that the students either need to actually use 10 000 items or use a sample then represent how far, long or wide the area that 10 000 occupies. Creative thinkers might consider using time or other divergent ideas…
➔ A key requirement of success in this task is for the students to actually have evidence or proof of their conception of 10 000. This must be written or visually represented and clearly communicated. Crucial to this is conveying their understanding of how they have ordered their items. *e.g. I have collected 100 leaves in 10 rows of 10. I know that 10 of*

these is 1000 and 100 of these is 10 000. If I were to collect 10 000 i would need x amount of time and x amount of space.

➔ Jo Boaler's notion of 3 levels of convincing works well. <u>Level 1 = you have convinced yourself that you have found 10 000. Level 2 = convinced a friend. Level 3 = A skeptic.</u>
➔ Each group presents their work to the class and writes a report showing the method used, and numerical representation to justify how they knew that they had used 10 000 items.

Enabling Prompts
1. What does 1000 of your item look like? (reduce the complexity of numbers)

Extending Prompts
➔ How much space, time, would your 10 000 take-up to organise and represent? How do you know?
➔ What might 100 000 of your item look like?

Considerations
➔ You may want to make a larger outdoor/indoor space available.
➔ Be clear with the students about the time you are making available. It works well over two lessons but this is not always possible. The time available will help the students decide what is feasible for their representation.
➔ Materials could include sheets of paper, library books, seconds, students, cm, counters, etc.