

Big Teeth

Purpose:

The purpose of this activity is to engage students in using a non-standard unit to give a measurement involving fractions.

Achievement Objectives:

NA2-1: Use simple additive strategies with whole numbers and fractions.

NA2-5: Know simple fractions in everyday use.

GM2-1: Create and use appropriate units and devices to measure length, area, volume and capacity, weight (mass), turn (angle), temperature, and time.

GM2-2: Partition and/or combine like measures and communicate them, using numbers and units.

Description of mathematics:

In readiness for this problem, the students should have familiarity with each of the following components of mathematics. The problem may be solved with different combinations of these components.

- length
- units of length (cm, m)
- using non-standard units for measurement
- fractions
- addition of basic fractions ($\frac{1}{2}$, $\frac{1}{4}$)

This activity may be carried out with guidance, or by allowing the student to follow their own method of solution. The approach should be chosen in sympathy with students' skills and depth of understanding.

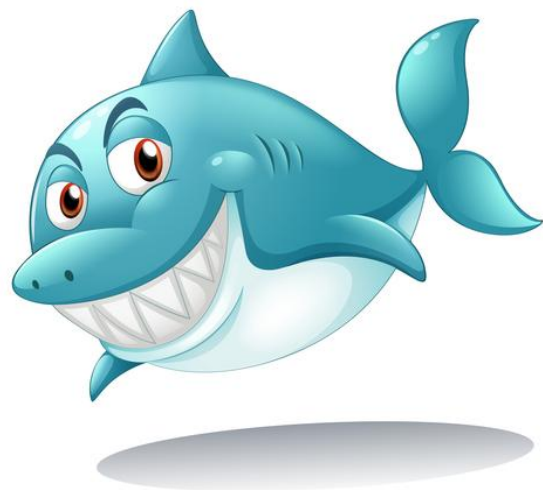
Activity:

On average the teeth of:

an adult human are $1\frac{1}{2}$ cm long.

a great white shark are $7\frac{1}{2}$ cm long.

How many adult teeth, stacked end to end, would be needed to make the same length as the great white shark's tooth?



The arithmetic approach

The student is able to solve a problem using a non-standard units of measurement involving fractions.

Prompts from the teacher could be:

1. Estimate the number of adult teeth that would be needed to make the length of on shark's tooth.
2. How many lots of $1\frac{1}{2}$ would you need to add together to make $7\frac{1}{2}$?
3. How many adult teeth are needed to make the length of one shark's tooth?

The image shows a student's handwritten work on a piece of paper. At the top, there is a simple drawing of a smile with two rows of teeth. The top row has two teeth, each labeled $1\frac{1}{2}$. The bottom row has four teeth, each labeled 1 . A bracket underneath the bottom row is labeled with the number 3. Below the drawing, the student has written the following text and calculations:

2 teeth make 3 cm
4 teeth make 6 cm
 $7 - 6 = 1$
 $7\frac{1}{2} - 6 = 1\frac{1}{2} = 1\text{ tooth}$
1 shark tooth = 5 teeth

T: Tell me about the maths you are using here.

S: I'm kind of adding teeth by adding $1\frac{1}{2}$ s until I get to $7\frac{1}{2}$.

T: And you've split the 1 and the $\frac{1}{2}$.

S: Yeah 'cos I can add the 1s and I can add $\frac{1}{2}$ s but not all mixed up.

The visual approach

The student is able to represent a problem using a non-standard units of measurement involving fractions, leading to a solution.

Prompts from the teacher could be:

1. How can you represent the length of an adult tooth?
2. How can you represent the length on a shark's tooth using the same scale?
3. How many adult teeth are needed to make the length of one shark's tooth?

Shark's tooth 7 and a half cm Adult tooth 1 and a half cm

T: Well done on your result. I see you've used the paper with squares marked in.
S: Yeah and they are 1cm each square so I drew the adult teeth in until I got to $7\frac{1}{2}$ squares and then counted up my teeth and came to 5.

-	2	3	+	5
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The image shows a student's handwritten work on a grid background. At the top, two measurements are written: 'Shark's tooth 7 and a half cm' and 'Adult tooth 1 and a half cm'. A horizontal line is drawn below these. Below the line is a red speech bubble containing a teacher's prompt and a student's response. The student's response states that they used 1cm squares and counted 5 adult teeth to match the length of the shark's tooth. At the bottom, a simple addition problem is written in a box: '- 2 3 + 5'.