

## Sports Tops

### Purpose:

The purpose of this activity is to engage students in using mathematical strategies to find an unknown.

### Achievement Objectives:

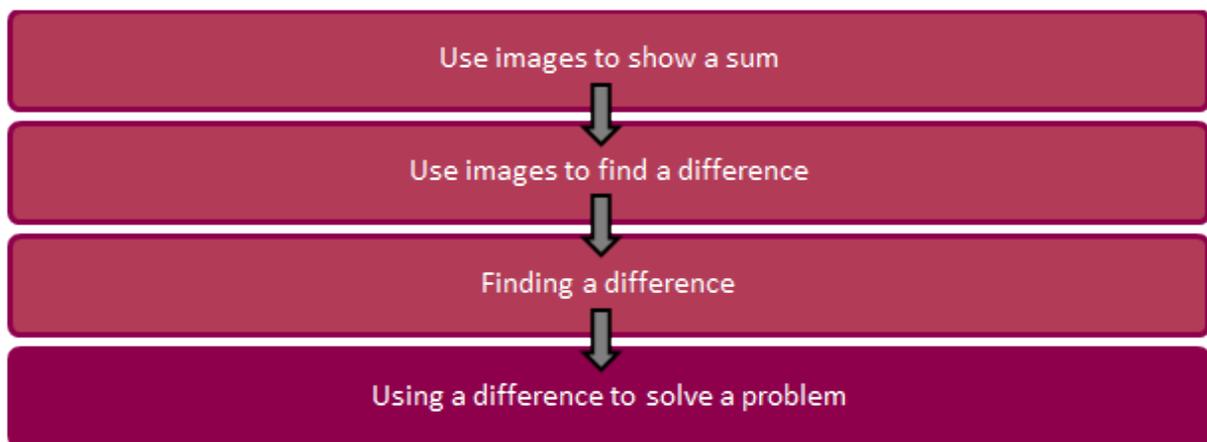
NA3-7: Generalise the properties of addition and subtraction with whole numbers.

NA3-3: Know counting sequences for whole numbers.

NA3-8: Connect members of sequential patterns with their ordinal position and use tables, graphs, and diagrams to find relationships between successive elements of number and spatial patterns.

### Description of mathematics:

The background knowledge and skills that should be established before and/or during this activity are outlined in the diagram below:



#### Use images to show a sum

In my purse I have three \$10 notes and two \$2 coins. In my piggy bank I have seven \$2 coins. Use images to show the sum of my savings.

#### Use images to find a difference

In my purse I have three \$10 notes and two \$2 coins. In my piggy bank I have seven \$2 coins. Use images to show how much more money I have in my purse than my piggy bank.

#### Finding a difference

In my purse I have three \$10 notes and two \$2 coins. In my piggy bank I have seven \$2 coins. How much more money I have in my purse than my piggy bank.

#### Using a difference to solve a problem

In my purse I have some \$10 notes and two \$2 coins. In my piggy bank I have seven \$2 coins. My purse has \$18 more than there is my piggy bank. How many \$10 notes do I have?

This activity may be carried out with step by step 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:**

A sports team shirt with your name printed on the back costs \$30 if your name has six letters.

If your name has ten letters, the same shirt will cost you \$38.

The cost is worked out on the price of a plain shirt plus a standard amount added on for each letter.

What is the price of a plain shirt (with no name printed)?



## The procedural approach

The student is able to use mathematical strategies given, including imaging, to find an unknown.

Prompts from the teacher could be:

1. Use images to show a shirt plus six letters printed (\$30).
2. Use images to show a shirt plus ten letters printed (\$38).
3. Show how the difference in the price can be found.
4. What is the cost of each letter?
5. What must be the cost of a shirt with no letters?

The image shows handwritten mathematical work. At the top left, there is a drawing of a shirt followed by a plus sign and six small circles representing letters. Below the circles are the numbers '2 2 2 2 2 2' and '\$12'. To the right of this is a vertical line and the text '= \$30'. Below this, there is another drawing of a shirt followed by a plus sign and ten small circles. To the right of this is another vertical line and the text '= \$38'. Below these are two equations: four circles followed by '= \$8' and one circle followed by '= \$2'. At the bottom, there is a calculation: '\$30 - 12 = 28 - 10 = \$18 plain shirt'. A red speech bubble on the right contains a dialogue between a teacher and a student.

T: Talk me through this last line of working.  
S: Well, if I know that it's \$2 for one letter, it must be \$12 for six letters. I showed that on the picture of the \$30 shirt.  
T: So then you used that fact...?  
S: Yeah, to work out the cost of the shirt without letters.

$\$30 - 12 = 28 - 10 = \$18$  plain shirt

## The conceptual approach

The student is able to use mathematical strategies to find an unknown.

Prompts from the teacher could be:

1. Think about the difference in price for ten letters than for six letters to be printed.
2. Use this information to work out what part of the prices quoted (\$38 for 10 letters, and \$30 for 6 letters) is for letters.
3. What must be left over, in the quoted prices? What is the cost of just one shirt?

10 letters + a shirt = \$38    6 letters + a shirt = \$30

so 4 extra letters is \$8

$4 + 4 + 1/2 \text{ of } 4 = 10$

$\$8 + \$8 + \$4 = \$20$

$\$38 - \$20 = \$18$

T: I'm interested in these big arrows you've drawn.

S: They are like my speech bubbles, so I can say what that bit of my equation means. What ten letters is made up of and what the shirt must be.