

Teacher Notes to accompany the worksheet on Array Models for Multiplication

Question 1: Solve the following problem using a diagram, arithmetic sentence and words.

4 students have 3 balloons each. How many balloons do they have between them in total?

Note to teachers: The purpose of this task is to establish the array model as a means of making sense of the operation of multiplication.

1. Story: 4 students have 3 balloons each. How many balloons do they have between them in total?
Please use 3 different ways to represent your answer – *Diagram, Arithmetic Sentence and Words.*

Diagram	
Arithmetic Sentence (ex. 5×8)	Words
4×3	I have four groups of 3 balloons

They are “*accumulating groups of equal size*” to represent the situation. It is a valid representation and learners can easily see the 4 “lots of” or “sets of” 3 balloons and can represent the situation with the arithmetic sentence

$$4 \times 3 = 12$$

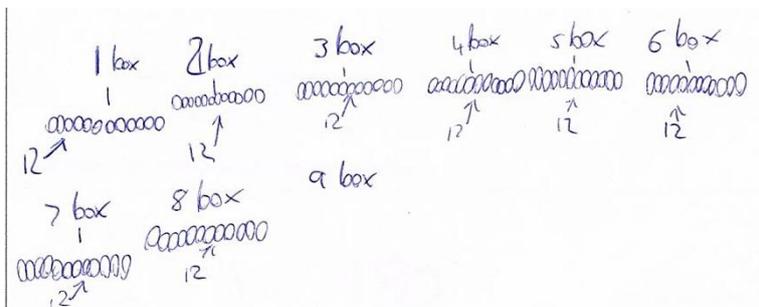
Before doing question 2, bring the students attention to a more organised way of representing groups. If we line up the elements in a straight line, this is called an Array. Note: The student may have done this from the outset.

	Diagram

Question 2: Solve the following problem using a diagram.

15 chefs each bought a dozen eggs to make desserts for a wedding meal. How many eggs were there in total?

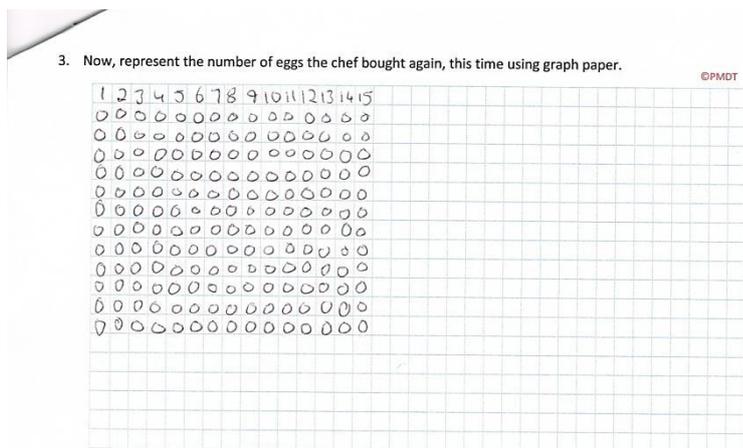
This task presents the learners with a challenge; they are now moving from single digit to two digit multiplication. How will their model change?



The next question (question 3), asks the student to do the same question using graph paper. This is to encourage the students to formalise the arrays into an area of 15 x 12.

Question 3 : Now, represent the number of eggs the chef bought again, this time using graph paper.

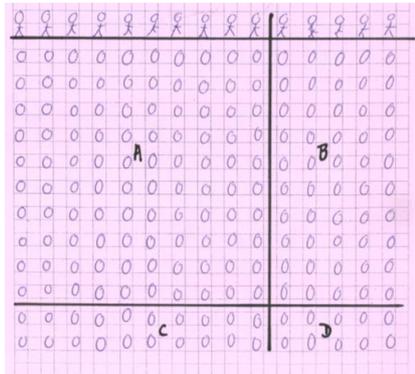
Using graph paper helps the students draw the arrays quicker and become more abstract.



A diagram made using arrays like the one above is called an Array Model.

Question 4: By drawing lines on the array model the teacher can ask questions such as

- How many eggs are in the section marked A on the diagram?
- How many eggs are in the section marked B on the diagram?
- How many eggs are in the section marked C on the diagram?
- How many eggs are in the section marked D on the diagram?



Question 5: Add the 4 areas A, B, C and D.

This is a gentle lead into the distributive law that will eventually help them see that

$(x + 5)(x + 2)$ has 4 terms in the expansion.

Question 6:

By using questions 4 and 5, fill in the following:

$$15 \times 12 = (10 + 5)(10 + 2) = (10 \times 10) + (___ \times 10) + (___ \times ___) + (___ \times 2) = ______$$

Students do their first expansion using the distributive law.