

Summary of learning goals

- The sequence introduces the key idea of multiplication as a Cartesian product, using the language of ‘for each’. In the first task, students learn to use a tree diagram to find the number of possible combinations that can be made in an animal mix-and-match book.
- Students learn how a simpler problem can be used to help solve a larger, more complex problem. In the second task, students design an avatar that has two or three different features and work as a class to find the total number of possible avatars. They look at how all combinations can be represented as an array and then they learn how to create a tree diagram.

Australian Curriculum: Mathematics (Year 4)

ACMNA075: Recall multiplication facts up to 10×10 and related division facts.

ACMNA076: Develop efficient mental and written strategies and use appropriate digital technologies for multiplication and for division where there is no remainder.

Summary of lessons

Who is this sequence for?

- It is assumed that students have previously used arrays to help solve multiplication problems and that they are building their recall of multiplication facts up to 10×10 . It would also be helpful if students have worked on multiplication problems that involve multiplying three or four numbers together and questions that use at least one multidigit number.

Lesson 1: What is a Plocoroo?

Students explore the number of animals it is possible to make using a mix-and-match book. The book contains 10 different animals that have each been divided into three parts: head, body and tail. To help solve the larger problem, students are encouraged to use a simpler problem. They use a tree diagram in their working.

Lesson 2: Making Avatars

Students design their own avatar by choosing options from a set of features. The class is asked to consider if all possible avatars have been made, given the different features that can be selected. Students use an array and are then introduced to a tree diagram to explore the Cartesian product for multiplication.

Reflection on this sequence

Rationale

Multiplication is a central element of number in the primary years of school. Much time is spent building the concepts of rate and equal groups, particularly through the array representation. Another important concept, yet often overlooked, is that of 'for each'. This sequence uses Cartesian product to explore this idea. The sequence focuses on developing this idea through representation rather than symbolisation. A tree diagram is used as a means to model all possible combinations and, through this diagram, students learn that the number of features in each category are multiplied to find the total number of combinations that can be made.



reSolve mathematics is purposeful

- The sequence focuses on the important multiplicative concept of 'for each'.
- Uses playful contexts for Cartesian product that can be easily imagined by students.



reSolve tasks are inclusive and challenging

- Students learn that a large problem can be made more accessible by using a smaller, simpler problem.
- Students can vary the magnitude of numbers they are working with to challenge themselves appropriately.



reSolve classrooms have a knowledge-building culture

- Students create their own avatars and animals to compile a class collection.
- Students work collaboratively to model the problem.