Developing fluency with multiplying facts to 12×12

Calculatina



Educational context

This activity group is about revising all the multiplying structures that were introduced in Number, Pattern and Calculating 3, and continuing to develop children's fluency in calculating. The children will meet a range of multiplying problems in a variety of contexts, including correspondence problems where *n* objects are connected to *m* objects. A variety of imagery is used to support children's understanding, and to support them memorizing times tables facts. Key connections are made to everyday contexts (including measuring) in which multiplying is used. The activities in this group can be adapted with any of the times tables as a focus, according to children's abilities, in order to help them consolidate and learn multiples to 12×12 off by heart, both in sequence and at random.

Learning opportunities

- To interpret an array as a model of multiplying.
- To know that multiplying is what we do instead of adding repeated groups.
- To record sequences of multiples systematically in a table, and read products.
- To find products on multiplying squares.
- To know the effects of multiplying by 0 and by 1.
- To learn and improve fluency with the times tables up to 12×12 .
- To know that we multiply to find the area of rectangles.
- To recognize that we multiply by numbers greater than 1 to scale up an amount.

Words and terms for use in conversation

multiply, times, lots of, groups of, sets, array, product, multiplying sentences, multiplication tables, times tables, times tables square, commutative, multiplying facts, multiples, dimension, length, width, rectangle, square, area, multiplied by, scaling, scaled up by

Assessment opportunities

Look and listen for children who can:

- Use the words and terms for use in conversation effectively.
- Write multiplying sentences for problems involving repeated amounts.
- Find products of two numbers on multiplying squares.
- Write two multiplying sentences for an array and notice that, e.g. 4×6 and 6×4 give the same product.
- Recall multiplying facts to 12 × 12.
- Explain the effects of multiplying by 0 and by 1.
- Illustrate a scaling problem with apparatus and a multiplying sentence.

Explorer Progress Book 4a, pp. 20–23

After completing work on this activity group, give small focus groups of children their Explorer Progress Books and ask them to work through the challenges on the pages. As children complete the pages, assess what progress they are making with the central ideas from the activity group. Refer to the assessment opportunities for assistance.

Children will also have the opportunity to complete their Learning Log (p22–23) where they can reflect on the mathematics they have done so far.

Explore More Copymaster 21: Multiply Game

After completing work on Activity 5, give children Explore More Copymaster 21: Multiplying Game (enlarged to A3) to take home.

Focus activities

Activity 1: Exploring a multiplying context

Have ready: Numicon Coloured Counters, Numicon 10s Number Line, Numicon Shapes

Step 1

Talk to children about games where players need a certain number of, e.g. cards or counters. Say that, e.g. each player of a board game needs 4 counters. Ask children to show how many counters are needed if they play with two others. Look and listen for children organizing their Counters into aroups or arrays, and for those limited to counting in ones.

Step 2

Compare children's arrangements. Agree an array (see Fig. 1) allows us to see without counting that we have 3 sets of 4 Counters. Look and listen for children counting in groups or using number facts to find three 'times' or 'lots of' 4. Encourage children to discuss how the array shows there are three sets of 4 Counters, rather than four sets of 3 Counters.

Step 3

Work with children to write a number sentence for the number of Counters. Listen for children using the language 'times', 'sets', 'groups' or 'lots of', and linking to 3 people with 4 objects each. Wait for children to suggest repeated adding or multiplying. Agree these are written, e.g. 4 + 4 + 4 = 12 and $3 \times 4 = 12$, recalling the action and symbol for multiplying (see Fig. 2). Encourage children to see that the multiplying sentence is more succinct.

Step 4

Encourage children to use Shapes on the 10s Number Line to illustrate the problem. Look and listen for children placing a 4-shape (for 4 counters) three 'times' (see Fig. 3). Agree that this shows '3 times 4' is equal to 12. Remind children that when multiplying the total is called the 'product'.

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Step 5

Repeat Steps 1–4 for a different number of players.

Step 6

Introduce a different game and number of objects per player, e.g. a hoopla game where each player needs 3 hoops. Ask how many hoops would be needed for 2, 3, 4, ... turns. Each time, ask children to illustrate with Counters or Shapes, and to write a multiplying sentence before finding the product.



Step 7

Show children a list of objects per player for other games, e.g. 4 cards, 3 marbles, 5 dominoes, 6 counters, 2 dice. Ask about the number of items needed for different numbers of players. Look and listen for children working confidently to write multiplying sentences and find products.

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Step 8

For one of the contexts, ask children how many objects are needed for zero players. Encourage them to agree no items. Then ask about zero items and 5 players. Agree that, again, zero items are needed. Use Shapes to help children understand the effect of multiplying by zero: ask them to pick up zero Shapes 'five times' or to pick up the 5-shape 'zero times'. Write the multiplying sentences for this: $0 \times 5 = 0$ and $5 \times 0 = 0$.

Activity 2: Writing multiplying sentences

Have ready: Numicon 10–100 cm Number Rod Track, number rods

Step 1

Work with children to create words, pictures or patterns using several same-size rods, e.g. Fig. 4.

Step 2

Ask children to write multiplying sentences for each creation, e.g. (for Fig. 4) $10 \times 4 = 40$. Support children who need help to find the product by placing the rods used in the Number Rod Track.

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Step 3

2

Repeat for other suggestions, e.g. Fig. 5.

Next, allow children to use a mix of rods, e.g. Fig. 6 gives $5 \times 10 = 50$, $3 \times 6 = 18$ and $1 \times 2 = 2$.

