

Unit 6: Coherence

Handout 1: Commutativity

Briefly recap the commutative property of multiplication (exemplified below) as:

‘one interpretation, two equations’ (see segment 2.3 *Times tables: groups of 2 and commutativity (part 1)*, Teaching point 5)

‘one equation, two interpretations’ (see segment 2.5 *Commutativity (part 2)*, doubling and halving, Teaching point 1).

Also, ensure that children can work with abstract expressions alone (in the absence of a grouping context), by identifying expressions that have the same product. Use the stem sentence:

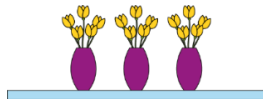
‘The product of ___ and ___ is equal to the product of ___ and ___.’

This can then be simplified to: **‘___ times ___ is equal to ___ times ___.’**

Encourage children to explain the relationships by making or drawing arrays.

Commutativity of multiplication – ‘one interpretation, two equations’:

‘Write two multiplication equations to represent this picture.’



- $3 \times 5 = 15$

- ‘Three groups of five are equal to fifteen.’

- $5 \times 3 = 15$

- ‘Five, three times is equal to fifteen.’

- ‘Three groups of five can be written as three times five, or as five times three.’

- ‘What’s the same?’

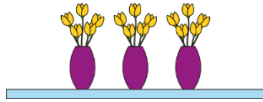
- ‘In both equations “3” and “5” are factors and “15” is the product.’

- ‘What’s different?’

- ‘The factors are written in a different order.’

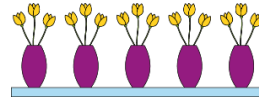
‘Draw another picture of vases of flowers that could be represented by this equation.’
 $3 \times 5 = 15$

A: original picture



‘Three groups of five are equal to fifteen.’

B: new picture



‘Five groups of three are equal to fifteen.’
‘Three, five times is equal to fifteen.’

‘Three groups of five is equal to five groups of three.’

‘What’s the same?’

‘Both pictures show fifteen flowers.’

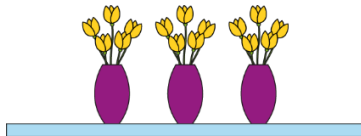
‘What’s different?’

‘Picture A shows three groups of five flowers.’

‘Picture B shows five groups of three flowers (or three flowers, five times).’

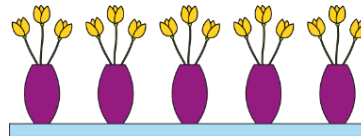
‘Could both pictures also be represented by this equation?’ $5 \times 3 = 15$

A



- *‘Three groups of five are equal to fifteen.’*
- *‘Five, three times is equal to fifteen.’*

B



- *‘Five groups of three are equal to fifteen.’*
- *‘Three, five times is equal to fifteen.’*

‘Three groups of five is equal to five groups of three.’