Common Multiplication and Division Situations

	Unknown Product **3 x 6 = ?**	**Group Size Unknown** (How many in each group" Division) **3 x ? = 18, and 18 ÷ 3 = ?**	**Number of Groups Unknown** ("How many groups?" Division) **? x 6 = 18, and 18 ÷ 6 = ?**
Equal Groups	Bethany is teaching 3 groups of students with 6 students in each group. How many students are there in all?	If Beckie shared 18 pencils equally into 3 bags, then how many pencils will be in each bag?	If Bethany had 18 markers that need to be packed 6 to a box, then how many boxes are needed?
Arrays Area	Beckie planted 3 rows of flowers with 6 flowers in each row. How many flowers are there?	If 18 flowers are arranged into 3 equal rows, how many flowers will be in each row?	If 18 flowers are arranged into equal rows of 6 flowers, how many rows will there be?
Compare	Beckie has $6. Bethany has 3 times as much as Beckie. How much does Bethany have?	Beckie has $18 and that is 3 times as much as Bethany. How much does Bethany have?	Beckie has $18 and Bethany has $6. How many times as much does Beckie have than Bethany?
General	*a x b = ?*	*a x ? = p, and p ÷ a = ?*	*? x b = p, and p ÷ b = ?*

Table 3: Multiplication and division situations

	A × B = □	A × □ = C and C ÷ A = □	□ × B = C and C ÷ B = □
Equal Groups of Objects	Unknown Product There are A bags with B plums in each bag. How many plums are there in all?	Group Size Unknown If C plums are shared equally into A bags, then how many plums will be in each bag?	Number of Groups Unknown If C plums are to be packed B to a bag, then how many bags are needed?
Arrays of Objects	*Equal groups language* Unknown Product There are A rows of apples with B apples in each row. How many apples are there?	Unknown Factor If C apples are arranged into A equal rows, how many apples will be in each row?	Unknown Factor If C apples are arranged into equal rows of B apples, how many rows will there be?
	Row and column language Unknown Product The apples in the grocery window are in A rows and B columns. How many apples are there?	Unknown Factor If C apples are arranged into an array with A rows, how many columns of apples are there?	Unknown Factor If C apples are arranged into an array with B columns, how many rows are there?
Compare	A > 1 Larger Unknown A blue hat costs \$$B$. A red hat costs A times as much as the blue hat. How much does the red hat cost?	Smaller Unknown A red hat costs \$$C$ and that is A times as much as a blue hat costs. How much does a blue hat cost?	Multiplier Unknown A red hat costs \$$C$ and a blue hat costs \$$B$. How many times as much does the red hat cost as the blue hat?
	A < 1 Smaller Unknown A blue hat costs \$$B$. A red hat costs A as much as the blue hat. How much does the red hat cost?	Larger Unknown A red hat costs \$$C$ and that is A of the cost of a blue hat. How much does a blue hat cost?	Multiplier Unknown A red hat costs \$$C$ and a blue hat costs \$$B$. What fraction of the cost of the blue hat is the cost of the red hat?

Adapted from box 2–4 of *Mathematics Learning in Early Childhood: Paths Toward Excellence and Equity*, National Research Council, 2009, pp. 32–33.

Notes

Equal groups problems can also be stated in terms of columns, exchanging the order of A and B, so that the same array is described. For example: There are B columns of apples with A apples in each column. How many apples are there?

In the row and column situations (as with their area analogues), number of groups and group size are not distinguished.

Multiplicative Compare problems appear first in Grade 4, with whole-number values for A, B, and C, and with the "times as much" language in the table. In Grade 5, unit fractions language such as "one third as much" may be used. Multiplying and unit fraction language change the subject of the comparing sentence, e.g., "A red hat costs A times as much as the blue hat" results in the same comparison as "A blue hat costs $1/A$ times as much as the red hat," but has a different subject.