Tell Me A Story
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Curriculum Links

Key Structural Points

- Recognise and represent multiplication as arrays
- Recognise and represent division as grouping into equal sets and solve simple problems using these representations
- Recall multiplication facts of two, three, five and ten and related division facts
- Recall multiplication facts up to $10 \times 10$ and related division facts
- Identify and understand the inverse relationship between multiplication and division.

Proficiencies

- Students build understanding when they connect related ideas, when they represent concepts in different ways, when they identify commonalities and differences between aspects of content, when they describe their thinking mathematically and when they interpret mathematical information.
- Students develop skills in recalling factual knowledge and concepts readily. Students are fluent when they calculate answers efficiently, and when they recognise robust ways of answering questions.
- Students are reasoning mathematically when they explain their thinking, when they prove that something is true or false, and when they compare and contrast related ideas and explain their choices.
Diagnostic Item 1-2

(a) What is the answer to 8 x 7? __________
(b) What do the eight and seven tell you?
(c) Make up a word problem or story problem about 8 x 7

Task Notes

Item 1-2 is designed to assess several aspects of multiplicative thinking. Initially, it assesses a child’s knowledge of the number fact. The second and third parts of the item assess a child’s understanding of what the number facts means in terms of the conventions for equal group situations. That is, it identifies if a child is aware of the convention that the first number in a multiplication sentence represents the number of groups and the second represents the number in each group. This is assessed further through the use of an appropriate word or story problem to reflect that convention.

Preferred responses for Parts (a) and (b)

What we are looking for:

Use of appropriate language

Indication that 8 is the number of iterations of a group of 7

- For the first part of the item, a correct answer of 56 would be expected.
- ‘It means there are eight lots of seven’.

Other possible preferred responses for Part (b)

- ‘They’re factors’
- ‘They are both factors so you times them to make the product’

Other responses for Part (b) showing partial understanding

- ‘Eight things times seven’
- ‘Eight lots of seven or seven lots of eight’
Inadequate or inappropriate responses for Part (b)

- ‘That you multiply the eight and the seven to make 56’.
- ‘Eight sevens’
- ‘They’re multiples of 56’.

Preferred responses for Part (c)

- ‘There are 8 boxes and each box holds seven apples. How many apples are there?’
- ‘There are 8 people and each person needs 7 pencils. How many pencils is that altogether?’

Showing other understanding for Part (c)

- ‘Jess had 56 sweets and she shared them among 7 people. How many did each person get?’ (Indicates some understanding of the inverse relationship but not necessarily of the equal group structure).
- ‘I have eight sweets and my friend has seven times as many as I have. How many sweets does he have?’ (Indicates some understanding of the ‘times as many’ structure but not necessarily the equal group structure).
- ‘Cory’s room is 8m long and 7m wide. How much space does he have to play in?’ (Indicates an understanding of area problems but not necessarily the equal group structure).

Inadequate or inappropriate responses for Part (c)

- ‘I have a pack of 8 sweets and I buy 7 more packs. How many do I have?’
- ‘There are 8 eggs in a box and the school needs 7 boxes. How many eggs do they need?’ (Confused the number of groups as 7).
- ‘What do you get if you times 8 by 7?’
- If you had 8 apples and 7 apples, you times them to get the answer’.

Teaching pointers

Children who gave responses other than the preferred responses would likely benefit from some explicit teaching about the convention for describing equal group structures. That is, the first number tells us the number of groups and the second number tells us the number in each group. This could be combined with writing stories to match number facts to reinforce the idea so that for $9 \times 6$, stories based on say, ‘nine bags of apples’ could be written.
Tell Me A Story

What the children do . . . a suggested progression

Materials needed

- Set of 24 square tiles (2cm × 2cm), preferably of the same colour.
- Copy of the Student Task

- Ask children to make an array to show 4 × 3. They can do this individually or in pairs. Discuss the arrays made to confirm the convention that the first number states the number of rows and the second number, the number in each row.
- Discuss a possible story/stories that could be made up about the array showing four rows (or groups) of three.
- Repeat the process for an array showing 3 × 6, making other stories.
- Now, ask them to make two arrays, one showing 3 × 7 and the other showing 7 × 3. Discuss how the two arrays are different.
- Ask them to refer to the following cards (which could be handed out or displayed on a screen).

If I had three bags each containing seven lollies, I would have twenty-one lollies altogether, that is 3 × 7 = 21

If I had seven bags each containing three lollies, I would have twenty-one altogether, that is 7 × 3 = 21
• Have them match each statement to one of their two arrays. Discuss.
• Repeat the process using the two division stories.

Twenty-one apples are put into seven bags. How many are there in each bag? Each bag contains three apples \(21 \div 7 = 3\)

Twenty-one apples are put into bags and each bag contains three apples. How many bags are there? There are three bags \(21 \div 3 = 7\)

Student Task Sheet

Use these stories as models and write four stories (2 division and 2 multiplication) for each number fact

\[8 \times 4 = 32\]
\[7 \times 6 = 42\]
The purpose of this task is for children to be able to make a link between a number sentence, an array, and a real-life context. As well, it highlights the differences between commutated number facts (e.g., $3 \times 7$ and $7 \times 3$) whilst acknowledging that the product remains the same. It also can be used to highlight the inverse relationship between multiplication and division. All of this can be achieved through contextualizing the number facts and having children making up a story about each one. Writing or telling a story about a number fact is a powerful way of developing an understanding of the concept of numbers of equal groups. Discussion should focus on the convention for naming arrays, that is, the first number indicates the number of groups and the second number indicates the number in each group. The language of factors and multiple enables children to explain the commutative property by saying that the factors are the same so therefore the product must be the same, even though the factors are in a different order. Children tend to explain the commutative property in terms of ‘switching the numbers around’ but the use of factor terminology is more precise and accurate. Suitable tasks include:

- **Tell Me a Story** (Writing stories and number sentences for commutated multiplication facts)
- **Tiles and Factors** (includes various associated ideas from Connections 1)
- **What’s the Number Sentence** (Writing number sentences to match problem semantics)
- **Marbles, Monkeys, and Chocolates** (identifying the components of number sentences – number of groups, number in each group, and total. Recording them in table form.)
- **Pencils-R-Us**
- **Array Pictures**
- **Moving Chairs**
- **Farms, Sheep, Cows, and Fruit Trees**