

Identity Property of Multiplication

Student Probe

There are 3875 trees in the forest. Each tree has 1 bird nest. How many bird nests are there in all in the forest?

Answer: 3875

Lesson Description

This lesson helps develop the concept that if you have 1 group with x objects, there are always x objects in all. Also, if there are x groups with 1 object in each group, there are always x objects in all.

Rationale

Understanding the Identity Property of Multiplication is very beneficial in solving problems and will also help students when they begin work with fractions and more advanced algebraic ideas. It is much better to give a student word problems to help develop this idea instead of giving arbitrary rules such as “any number times 1 is always that number”.

Preparation

None

Lesson

At a Glance

What: Identity property of multiplication

Common Core State Standard:

CC.3.OA.5. Apply properties of operations as strategies to multiply and divide.

Mathematical Practices:

Make sense of problems and persevere in solving them.

Model with mathematics.

Look for and make use of structure.

Look for and express regularity in repeated reasoning.

Who: Students who do not know and/or cannot apply the idea that any number multiplied by 1 gives that number.

Grade Level: 3

Prerequisite Vocabulary: multiply, array, equal

Prerequisite Skills: multiplication, solve open number sentences

Delivery Format: individual, small group

Lesson Length: 20 minutes

Materials, Resources, Technology: color tiles, number line

Student Worksheets: None

The teacher says or does...	Expect students to say or do...	If students do not, then the teacher says or does...
1. Give student the following word problem: There are 8 dogs. Each dog has 1 flea. How many fleas are there in all? Ask student to solve the problem and explain his thinking.	There are 8 fleas because there are 8 dogs and each dog has 1 flea. Student may draw a picture to represent 8 dogs with 1 flea on each dog then count the fleas, etc.	Reread the problem and model how to solve.

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<p>2. Ask student to write a number sentence to show his work.</p>	<p>$8 \times 1 = 8$</p> <p>or</p> <p>$1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 = 8$</p> <p>If the student writes an addition sentence, ask him to write it as a multiplication sentence.</p>	<p>Model how to write the number sentence.</p> <p>If the student cannot write the multiplication sentence, refer to Representing Multiplication.</p>
<p>3. Ask student to tell what each number in the multiplication sentence represents.</p>	<p>The 8 tells how many groups of fleas. The 1 tells how many fleas there are in each group. The product 8 tells how many fleas there are in all.</p>	<p>Read the multiplication sentence as follows:</p> <p>$8 \times 1 = 8$ means 8 groups of 1 flea is the same as 8 fleas.</p>
<p>4. Ask student the following question: What if there were <input type="text"/> dogs and each dog had 1 flea? How many fleas would there be then?</p>	<p>There will be <input type="text"/> fleas. The box tells how many dogs there are and if each dog has one flea, the number of fleas will be the same as the number of dogs which is <input type="text"/>.</p> <p>.</p>	<p>Substitute a number for the box and ask the question again. Then take a piece of paper and cover the number. Tell student that the number of dogs is <input type="text"/>. In other words, we don't know how many there are. There will be the same number of fleas as there are dogs, which is represented by the box. If the student does not understand this concept, refer to Solve Open Sentences With Multiplication and Division.</p>

The teacher says or does...	Expect students to say or do...	If students do not, then the teacher says or does...
<p>5. Ask student the following question: If there is 1 dog and he has 8 fleas, then how many fleas are there in all? Solve the problem and write a multiplication number sentence to match.</p>	<p>There are 8 fleas.</p> $1 \times 8 = 8$ <p>1 group of 8 fleas equals 8 fleas.</p>	<p>Model how to write the number sentence.</p> <p>If the student cannot write the multiplication sentence, refer to Representing Multiplication.</p>
<p>6. Ask student how this problem compares to the first problem.</p>	<p>In the first problem there were 8 dogs with 1 flea each. In the second problem there was 1 dog with 8 fleas.</p>	<p>Ask student how many dogs there were in each problem. (8 in the first and 1 in the second.) Ask student how many fleas there were on each dog in each problem. (1 on each dog in the first and 8 on each dog in the second.)</p>
<p>7. Give student the following problem: Sandy made an array with color tiles that had 1 row. There were 12 color tiles in the row. How many color tiles did she use in all?</p>	<p>12</p>	<p>If student does not know the answer, give him color tiles to model the problem.</p>
<p>8. Ask student to write a multiplication sentence that matches the array and to explain what the numbers represent.</p>	$1 \times 12 = 12$ <p>There is 1 row of color tiles. The row has 12 color tiles so there are 12 color tiles in all.</p>	<p>Count the rows (1) and how many are in each row (12). Say "1 row of 12 is the same as 12."</p>
<p>9. Ask student the following question: If Sandy made an array with color tiles that had 12 rows and each row has 1 color tile, how many color tiles will she use in all?</p>	<p>12</p>	<p>Let student model with color tiles and count them.</p>

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10. Ask student to write a multiplication sentence that matches the array and to explain what the numbers represent.	$12 \times 1 = 12$ There are 12 rows of color tiles. Each row has 1 color tile so there are 12 color tiles in all.	
11. Ask student how this problem compares to the first problem.	In the first problem there was 1 row with 12 color tiles in the row. In the second problem there were 12 rows with 1 color tile in each row.	Ask student how many rows there were in each problem. (1 in the first and 12 in the second.) Ask student how many color tiles there were in each row for each problem. (12 on each row in the first and 1 on each row in the second.)
12. Ask student if he has 1 row of color tiles that has <input type="text"/> color tiles in it, how many color tiles are there in all.	There will be <input type="text"/> color tiles.	See Step 4 above.
13. Ask student the following question: If Jessie Frog begins at 0 on a number line and takes one jump of 25, on what number will he land? Write a multiplication number sentence to match.	25 $1 \times 25 = 25$ 1 jump of 25 = 25	Model on the number line.
14. Ask student: What if he starts at 0 and takes 25 jumps of 1? Then on what number will he land?	25 $25 \times 1 = 25$ 25 jumps of 1 = 25	Model on the number line.
15. Ask student how this problem compares to the first problem.	In the first, the frog jumped 1 jump of 25. In the second, he jumped 25 jumps of 1.	Reread the problem and model.

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16. Ask student: What if he starts at 0 and takes <input type="text"/> jumps of 1? On what number will he land?	The number in the box.	See Step 4.
17. Give repeated problems as needed for each problem type (word problems, arrays, and number line).		

Teacher Notes

None

Variations

None

Formative Assessment

Solve the following:

$$1 \times \square = 4,801$$

$$725 \times \square = 725$$

There are elephants at the zoo. Each elephant has 1 trunk. How many trunks are there in all on the elephants at the zoo?

References

Russell Gersten, P. (n.d.). *RTI and Mathematics IES Practice Guide - Response to Intervention in Mathematics*. Retrieved Feb. 25, 2011, from rti4success

Van de Walle, John A., Karp, Karen S., and Bay-Williams, Jennifer M., (2010), *Elementary and Middle School Mathematics: Teaching Developmentally*, Boston, Allyn & Bacon