Grade 4 Mathematics
Number and Number Relations: Lesson 4

Read aloud to the students the material that is printed in **boldface type** inside the boxes. Information in regular type inside the boxes and all information outside the boxes should **not** be read to students. Possible student responses are included in parentheses after the questions.

NOTE: The directions read to students may depend on the available materials. Read only those parts of the lesson that apply to the materials you are using.

Any directions that ask you to do something, such as to turn to a page or to hand out materials to students, will have an arrow symbol (⇨) by them.

Purpose of Lesson 4:

- In this lesson, the tutor and the students will
  - ✓ practice basic addition and subtraction facts,
  - ✓ see the relationship between addition and multiplication, and
  - ✓ determine which operation is needed to solve a problem.

Equipment/Materials Needed:

- About 30 counters, beans, cubes, etc. If possible, party favor places have cute little animals or toys that are great to have the students use as counters. Barbie doll clothes also work, anything to make the activity more interesting.
- Copies of Student Sheets 12 and 13
- Number cards used in Lesson 2, Student Sheet 6
- Paper and pencils

Preparations before beginning Lesson 4:

- Gather 30 counters.
- Run off 1 copy of Students Sheets 12 and 13 for each student.
- Have paper and pencils available.
- Have the number cards available from Student Sheet 6, Lesson 2.

Lesson 4: Number and Number Relations

Say:

Today we are going to talk about addition, subtraction, and multiplication. Let's start with addition. In addition, there are some words that you need to know. *Addends* are the numbers to be added; *sum* is the answer. Remember that *and* and *plus* mean the same thing and that *is* and *equals* mean the same thing.

You may want to spend a little time giving students hints or strategies on memorizing basic addition facts. Counters can help show what is happening in each of the problems. Notice there are labels (cookies, dogs, etc.) on all of the problems. It is important to make the problems real to the students.
Here are some of the strategies.

❖ It is usually easier to start with the larger number.

Say:

I am going to tell you a story problem. Tene had 2 cookies. Tommy gave her 8 cookies. How many cookies does she have now? What do you need to do in this problem? (Add) **Which numbers would you add?** (2 + 8) **How would you add these 2 numbers?** (For most students, it is easier to start with the larger number.) **I am going to give you a few problems to add. Tell me how you add each one.** 1 cookie + 9 cookies; 3 cookies + 7 cookies; 2 cookies + 6 cookies. See whether they start with the larger number.

❖ If one of the addends is 1 or 2, counting on is a very effective strategy.

Say:

There are 5 dogs in the kennel; 2 dogs came in today. How many dogs are in the kennel now? (7 dogs) **How did you add these 2 numbers?** (Start with 5 and count on 2, so 5, 6, 7.) Give some problems such as 6 dogs + 1 dog; 5 dogs + 2 dogs; 1 dog + 6 dogs, etc. See whether students start with the larger number and count on.

❖ Adding a zero does not change the number.

Say:

Suppose I have 5 pizzas. The pizza place said that they could not deliver any more pizzas today. So I will get 0 more pizzas. What happens to the 5 pizzas I already have? (Nothing) **Does the number or amount change?** (No, you still have 5 pizzas.) **When you add 0 to a number, the number stays the same. Adding nothing or zero to an amount does not change the amount.** Give a few problems such as 8 pizzas + 0 pizzas and 0 pizzas + 4 pizzas.

❖ Patterns in adding 9's.

Say:

Do any of you know a short way of adding 9's? (Some will say, add 10 and subtract 1.) **If they don't, say 8 + 9 is the same as 8 + 10 – 1.** (Some will tell you that the answer is 1 ten and 7 ones or one less than the number added to 9. They may be seeing a pattern in the addition of 9.)

⇨ Write the following problems on a sheet of paper.

Examples:	9 cats	9 cats	9 cats	9 cats
	+ 3 cats	+ 4 cats	+ 5 cats	+ 6 cats
	---	---	---	---
	12 cats	13 cats	14 cats	15 cats

Say:

Does anyone see a pattern? (Some may see that the ones digit is one less than the number added and that there is now a tens digit.)

❖ Double facts.

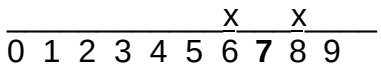
Say:

Do you know any of the double facts? (Some children may be able to say some of them.) **The doubles are facts like 4 + 4 (legs on a spider); 5 + 5 (fingers on 2 hands); 6 + 6 (egg cartons); 7 + 7 (days in 2 weeks); 8 + 8 (2 rows in a large crayon box); 9 + 9 (an 18 - wheeler).**

❖ Near neighbors:

Say:

"Near neighbors" are facts that have 1 number in between.



Say:

For example, House 8 and House 6 are near neighbors. To find the answer, double the number between them. So for House 8 + House 6, double House 7. (14) Give them a few facts such as House 9 + House 7; House 5 + House 7; House 4 + House 6.

❖ **Making tens:**

Say:

Making tens is a good habit for you to develop. If we had 6 cars, what would add to make 10 cars? (4 cars) Do this activity with a few numbers. This strategy really helps in adding a column of numbers and in mental math activities.

⇨ Give Student Sheet 12, problems 1 – 12 here, or you can wait and do the whole sheet after you have talked about subtraction. Have the students discuss how they found the answers. Ask the students whether they used doubles, counting on, etc. The important part is to get the students to think and talk about what they are thinking.

Answers:

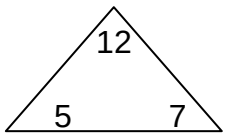
1) 12 dogs 2) 14 cats 3) 16 cards – probably doubles
4) 17 ducks 5) 15 chips 6) 11 cars – Some may think of the doubles fact and add one. Some may think of a doubles fact and subtract 1.
7) 10 stars 8) 12 CD's 9) 14 pears – Some may think of near neighbors. You double the number in between.
10) 11 doors 11) 9 monkeys 12) 8 nickels – Some may think of counting on.

Say:

Let's now take a look at subtraction facts. What is meant by the term *difference*? (The difference is the answer in a subtraction problem.) **If one number is bigger than another, we can find out how much bigger it is (the difference) by subtracting.** Note: We will not use the terms *subtrahend* and *minuend.*

Did you know that all subtraction facts can be thought of as related addition facts. For example, 12 – 7 = ? You could think 7 + what number gives you 12.

⇨ You may want to draw a triangle to show the students how the facts are related.



7 + 5 = 12
5 + 7 = 12
12 – 5 = 7
12 – 7 = 5

Say:

Just as in addition, there are some hints or strategies that can help you memorize the subtraction facts. Let's look at some of those.

❖ Counting back:

Say:

Just as you used counting on in addition, if you are subtracting 1 or 2 from a number, you can count back. Subtract 2 apples from 11 apples. How did you do this subtraction? (Many will think, "Start at 11 and count back 2, so 10, 9.") Give a few problems, such as 9 apples – 2 apples; 8 apples – 4 apples; 5 apples – 2 apples, etc.

❖ Counting up:

Say:

The shop had 9 T V's and sold 7 of them. How many TV's are left in the store? How would you subtract in this problem? (Many will use a counting up strategy.) **Counting up is an effective strategy for numbers that are close together or that differ by 1 or 2. You might think, start at 7 and count up 2, so 8, 9.** Give a few problems such as 11 TV's – 9 TV's; 7 TV's – 6TV's; 9 TV's – 8 TV's.

❖ Subtracting 0 or subtracting all:

Say:

I have 5 pizzas. No one ate any pizza. How many pizzas do I have left? (They should see that subtracting nothing does not change the number.) Give them 5 pizzas – 0 pizzas; 11 pizzas – 0 pizzas.

I have those 5 pizzas again. This time, all are eaten. How many are left? (They should see that taking it **all** away leaves nothing.) Give them problems such as 6 pizzas – 6 pizzas; 20 pizzas – 20 pizzas.

❖ Subtracting 9's:

Say:

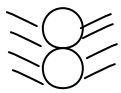
Do you know a quick way to subtract 9? (Some will say, "Subtract 10 and add 1 back in.") **You took out 1 too many, so you need to put it back. So for 17 trucks – 9 trucks, think 17 trucks – 10 trucks + 1 truck or 8 trucks.** Give them the following:
12 trucks – 9 trucks; and 18 trucks – 9 trucks.

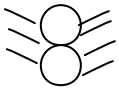
⇨ Give problems13 – 21 on Student Sheet 12, again asking them to talk about what they are thinking. Answers:
13) 0 hot dogs 14) 0 cats
15) 18 cards – Subtracting all or subtracting nothing
16) 1 duck 17) 1 chip 18) 2 cars – possibly count up
19) 9 pigs 20) 8 pennies 21) 7 doors – subtracting 10 and adding 1 back in
Note – It is important to allow them to talk about different ways to add and subtract numbers. What works for one child may not work for another, but they need to hear what others are thinking.

Say:

What do you think it means to multiply? (They will probably say put things together or count groups of things.) **Multiplication does mean to put things together, as does addition; but in multiplication, you have to have the same sized groups. When you have same sized groups, you are just adding the same amount over and over. Let me give you an example. A spider has 4 legs on both sides of its body. How many legs does it have in all? I could say 4 + 4 or I could think 2 sets of 4 legs.**

⇨ Draw 4 legs on each side of a spider. Something like this picture will do.





Say:

If the spider lost a leg on one side, I could add 3 + 4, but I don't have equal groups so I could not think 2 sets of 4 legs or 2 sets of 3 legs. There are not the same number of legs.

Say:

Let's look at another example. There are 5 bicycles in a rack. How many wheels are there? 

We could think: **2 + 2 + 2 + 2 + 2**

or we could think: **5 groups of 2 wheels**

or we could think: **5 x 2**

Multiplication is just a shorthand method of adding. Note: This problem could be easily shown with counters or drawings.

Say:

Think of 5 cups with no counters in them. How many counters do you have? (0) 

What if you had 5 mailboxes with no mail. How much mail is in the 5 mailboxes? (0) 

0 + 0 + 0 + 0 + 0 = 0 5 x 0 = 0

⇨ Use Student Sheet 13 to help students see the relationship between addition and multiplication. Students should understand that multiplication can be a shortcut for some additions and that both methods will give the same answer. Answers

1) 3 + 3 + 3 + 3 = 12 or 4 x 3 = 12 2) 6 + 6 = 12 or 2 x 6 = 12
3) 2 + 2 + 2 + 2 + 2 + 2 = 12 or 6 x 2 = 12
4) 3 + 3 + 3 + 3 = 12 or 4 x 3 = 12 or 4 + 4+ 4 = 12 or 3 x 4 = 12
5) 3 + 3 + 3 + 3 + 3 + 3 = 18 or 6 x 3 = 18 or 6 + 6 + 6 = 18 or 3 x 6 = 18
6) 2 + 2 + 2 + 2 + 2 = 10 or 5 x 2 = 10 or 5 + 5 = 10 or 2 x 5 = 10
7) 5 + 5 + 5 + 5 + 5 + 5 + 5 = 35 or 7 x 5 = 35
8) 20 + 20 + 20 = 60 or 3 x 20 = 60
9) 10 + 10 + 10 + 10 + 10 = 50 or 5 x 10 = 50 10) B 11) A

This idea of multiplication as the same as repeated addition is critical to the students with whom you are working. A number of the problems on LEAP can be worked by multiplication, but some of these problems involve money. Many of your students will not know how to multiply decimals, yet they could find the answer by addition. Please do not discourage using addition. It is a good method, but not always the most efficient.

⇨ Have one student summarize today's lesson.

Student Sheet 12 (Number: Lesson 4)

Work the following problems. Be ready to explain how you worked them.

1) 6 hot dogs
+ 6 hot dogs
---

2) 7 cats
+ 7 cats
---

3) 8 cards
+ 8 cards
---

4) 9 ducks
+ 8 ducks
---

5) 7 chips
+ 8 chips
---

6) 5 cars
+ 6 cars
---

7) 4 stars
+ 6 stars
---

8) 7 CD's
+ 5 CD's
---

9) 6 pears
+ 8 pears
---

10) 9 doors
+ 2 doors
---

11) 1 monkey
+ 8 monkeys
---

12) 2 nickels
+ 6 nickels
---

13) 6 hot dogs
– 6 hot dogs
---

14) 17 cats
– 17 cats
---

15) 18 cards
– 0 cards
---

16) 9 ducks
– 8 ducks
---

17) 8 chips
– 7 chips
---

18) 6 cars
– 4 cars
---

19) 18 pigs
– 9 pigs
---

20) 17 pennies
– 9 pennies
---

21) 16 doors
– 9 doors

Student Sheet 13 (Number: Lesson 4)

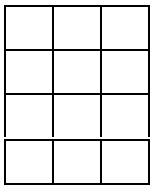
Write an addition sentence and a multiplication sentence for each problem.

1. 

2. 

3. 

4.



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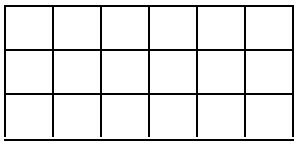

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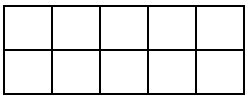

Work the following problems. Show how you could use addition or multiplication.

7. Megan has 7 nickels. What is the value of the 7 nickels?

8. Each class in the fourth grade has 20 students. There are 3 classes. How many students are in the 4^{th} grade?

9. Moesha swims 10 laps per day? If she swims everyday of the school week, how many laps does she swim in a week?

Choose the correct way to work the following problems.

10. The flag team lined up in 7 rows with 3 students in each row. How many students lined up?
    A. 7 + 3 = 10 B. 7 x 3 = 21

11. At her birthday party, Marta served 8 ham sandwiches and 7 egg salad sandwiches. How many sandwiches did she serve?
    A. 8 + 7 = 15 B. 8 x 7 = 56