Grade 4 Mathematics
Number and Number Relations: Lesson 7

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 7:

- In this lesson, the tutor and the students will
  - ✓ add and subtract 2 and 3 digit numbers.

Equipment/Materials Needed:

- Copies of Student Sheets 21 – 23
- Number cards from Lesson 2, Student Sheet 6
- Paper and pencils
- Place value or base ten materials to demonstrate (Optional)

Preparations before beginning Lesson 7:

- Run off 1 copy of Student Sheets 21 – 23 for each student.
- Have paper and pencils available.
- Have the number cards available from Student Sheet 6.
- Gather the base ten or place value materials if you are going to use them.

Lesson 7: Number and Number Relations

Say:

In this lesson, we will focus on adding and subtracting larger numbers. Remember that we can write numbers in different ways. 12 ones is the same as 1 ten + 2 ones. How else could we write 13 tens? (1 hundred + 3 tens or 130) **How else could we write 15 hundreds?** (1 thousand + 5 hundreds or 1500) **Knowing that you can write numbers in different ways can help you in addition.**

⇨ Write the following numbers on the board and have the students write them in different ways:
15 tens (1 hundred + 5 tens or 150) 25 ones (2 tens + 5 ones or 25)
56 hundreds (5 thousands + 6 hundreds or 5600)

Note: You may need to go through the processes of addition and subtraction. There are a few methods for addition that do not look like the standard way of adding, but they can be very effective for students who do not understand the standard method. They may take a little longer, but they are still good methods. With any of the methods, it will help to use place value materials or draw pictures.

Say:

I am going to read you a problem. There are 27 students in the 4th grade class and 45 in the 3rd grade class; how many students are in both classes? How would we solve the problem? (Add 27 and 45.)

⇨ Show this on the board.

```
  2 7 students   =   ||  : : : .
+ 4 5 students   =   |||| : : .
-----------------    -----------
                     |||||| : : : : : =  ||||||| :
```

Say:

I can draw pictures of 27 and 45. 27 has 2 tens and 7 ones. 45 has 4 tens and 5 ones. What do you get when you add 7 ones and 5 ones? (12 ones) **What is this answer the same as?** (1 ten and 2 ones) **When you add 2 tens and 4 tens, what do you get?** (6 tens) **So you have 6 tens + 1 ten + 2 ones, which equals 7 tens + 2 ones, or 72.**

⇨ Show this example on the board.

```
  2 7 students     =     20 + 7
+ 4 5 students     =     40 + 5
-------------------      ----------
                         60 + 12   = 72
```

Say:

In this method, we break apart the numbers. 27 can be written as 20 + 7, and 45 can be written as 40 + 5. What do you get when you add the ones? (12 ones) **What do you get when you add the tens?** (60) **If you add 60 + 12, you get 72.** Note: This method is a legitimate way of adding. You can use this method for larger numbers, columns of numbers, etc. If the students cannot follow the process of carrying, they can do the problems this way.

⇨ Show this example on the board.

```
                    1
  2 7 students     =   2 7          7 + 5 = 12 or 1 ten + 2 ones
+ 4 5 students     = + 4 5
-------------------    ----------
                       7 2
```

Say:

Let's look at another method for adding numbers. We will call it the standard method. This time when we add the ones, we get 12 ones. We can't write 12 in the ones place because there is room for only 1 number. So what can we do? We could think of 12 ones as 1 ten and 2 ones. We could write the 2 ones in the ones column. But we can't forget about that 1 ten. We could write it above the 2 tens so that we remember to add it when we add the tens column. Now we have 2 tens + 4 tens + 1 ten, or 7 tens. Our answer is 7 tens + 2 ones, or 72.

Say:

I am going to give you another problem. On Monday, 446 tickets were sold for the concert. On Tuesday, 685 tickets were sold for the same concert. How many tickets were sold on the 2 days? What do you need to do to solve the problem? (Add 446 + 685.) **I want you to take a few minutes and add these numbers. You can use any of the methods that we have been using so far, but be ready to explain what you did.**

⇨ Show this on the board.

```
  446 tickets      ? ? ? ?          ||||     : : :
+ 685 tickets    + ? ? ? ? ? ? ?    |||||||  : : .
---------        -------------------------------
```

Say:

Did anyone draw a picture? Explain what you did. (If no one used a picture, you might want to go through the process.) **In 446, there are 4 hundreds, 4 tens, and 6 ones. In 685, there are 6 hundreds, 8 tens and 5 ones. I will draw each of these.**

```
  ? ? ? ?          ||||     : : :
+ ? ? ? ? ? ?      |||||||  : : .
-----------------------------------
  ? ? ? ? ?        |||||  ||  : : : : :
  ? ? ? ? ?        |||||       .          □    ?  |||  .
```

If I add 6 ones and 5 ones, I get 11 ones.
If I add 4 tens and 8 tens, I get 12 tens.
If I add 4 hundreds and 6 hundreds, I get 10 hundreds.
What is 11 ones the same as? (1 ten + 1 one.)
Put the 1 one on the side. Add the 1 ten to the 12 tens. You get 13 tens.
What is 13 tens the same as? (1 hundred and 3 tens) **Put the 3 tens on the side and add the 1 hundred to the 10 hundreds. You get 11 hundreds.**
What is 11 hundreds the same as? (1 thousand and 1 hundred)
So now you have 1 thousand + 1 hundred + 3 tens + 1 one or 1131.

⇨ Show this on the board.

```
  446 tickets          446 = 400 + 40 + 6
+ 685 tickets        + 685 = 600 + 80 + 5
----------------     -------------------------
                     1000 + 120 + 11 = 1131
```

Say:

Did anyone use the break-apart method? (See whether the students can explain what they did; if they cannot, lead them through the process.) In this method, you would write 446 as 400 + 40 + 6 and 685 as 600 + 80 + 5. Add the ones; you get 11. Add the tens; you get 120. Add the hundreds; you get 1000. Add 1000 + 120 + 1. You get 1131.

⇨ Show this on the board.

	1	1 1	1 1
446	446	446	446
+ 685	+ 685	+ 685	+ 685
---	---	---	---
	1	31	1131

Say:

Did anyone use the standard method? Can you explain what you did? If no one explains, lead the students through the process. **Add the ones first. You get 11 ones. This answer is the same as 1 ten and 1 one. Write the 1 one in the ones column; but you can't forget the 1 ten, so write a little 1 above the tens column.**
Next add the tens. You have 4 tens + 8 tens + that 1 ten. You get 13 tens, or 1 hundred and 3 tens. Write 3 tens in the tens column; but you can't forget the 1 hundred, so write a little 1 above the hundreds column.
Next add the hundreds. You have 4 hundreds + 6 hundreds + that 1 hundred. You have 11 hundreds or 1 thousand and 1 hundred. This total equals 1,131.

⇨ Give Student Sheet 21. This activity will be a check to see whether they understand the standard or carrying method. Answers:
1) She added 8 ones and 7 ones and got 15 ones. This answer is the same as 1 ten and 5 ones, so the little 1 represents 1 ten.
2) 5 hundreds and 6 hundreds give 11 hundreds, which is the same as 1 thousand + 1 hundred.
3) 4 ones plus 6 ones do give 10 ones; but you can't write a 2-digit number in the ones place, so you have to think of this amount as 1 ten and 0 ones.
4) Forgot to add 1 ten to the tens from the 12 ones
6) Put the 1 ten from the 14 ones in the wrong place.

⇨ If the students need more practice on addition, use the cards from Student Sheet 6.

Say:

Turn up 4 cards each. Make two 2-digit numbers that will give the largest sum. (Answers will vary depending on the cards they turn up.) **Make the smallest sum**. Do this activity a few times. **This time turn up 6 cards and make two 3-digit numbers that will give the largest sum.**

Make the smallest sum. When you want to make the largest sum, which numbers did you put in the tens column? (larger numbers) **Which numbers did you put in the ones column?** (smaller ones) **Is there more than one way to get the largest sum?** (Yes, you can switch the top and bottom addends.)

Say:

Remember that we can write numbers in different ways. 34 could be written as 3 tens + 4 ones. It could also be written as 24 + 14 ones. How could we write 62 in different ways? (6 tens + 2 ones, 5 tens + 12 ones, 4 tens + 22 ones, etc.) **How could we write 57 in different ways?** (5 tens + 7 ones, 4 tens + 17 ones, 3 tens + 27 ones, etc.) This idea will help in regrouping or borrowing in subtraction.

Say:

We are going to look at subtraction now. It is like addition in that you subtract ones, then tens, etc. I am going to read you a problem. There are 45 students in the 5th grade. Tomorrow, 27 are going on the field trip. How many are not going on the field trip? How would we solve this problem? (Subtract 27 from 45.) **Let's look at the same types of methods that we used in addition. Let's draw pictures first.**

⇨ Write this on the board.

```
  45 students  =  ||||  ::.     =   |||  |  ::. =  |||  ::.
– 27 students                                        :::::
----------------------  ---------------
```

||| :::: (Subtract the 7 ones.)

| ::: (Subtract the 2 tens.)

Say:

Draw a picture of the 45 students. You should show 4 tens and 5 ones. To subtract 27, first you need to subtract or remove 7 ones. Since you only have 5 ones, you need to borrow 1 ten from the tens. You now have 3 tens and 15 ones. Subtract 7 ones. You now have 3 tens and 8 ones. Subtract the 2 tens in 27, and you are left with 18.

⇨ Write this on the board.

45 students =	40 + 5 =	30 + 15
– 27 students =	– 20 – 7 =	– 20 – 7
---	---	---
		10 + 8 = 18

Say:

In our break-apart method, we write 45 as 40 + 5 and 27 as 20 + 7. Why do you think I wrote – 20 – 7? (because both numbers have to be subtracted) **I need to subtract 7 ones from 5 ones, but I am going to need to borrow some ones from the tens column. So I take 1 ten (Think of it as 10 ones.) and add it to the 5 ones. Now I can subtract 7 ones from 15 ones. I get 8 ones. Subtract the 20 from the 30 and you are left with 10 + 8 or 18.**

⇨ Write this on the board.

	3 15	3 15
45 students =	4 5	4 5
– 27 students =	– 2 7	– 2 7
---	---	---
	8	1 8

Say:

We need to subtract 7 ones, but we have only 5 ones. So what can we do? We could look at the tens. We have 45. We could write that as 3 tens and 15 ones. Then we would have enough ones. To help us remember that we changed the tens or borrowed one ten, we write a small 3 above the 4 tens and a small 15 above the 5 ones. Now we can subtract.
15 ones – 7 ones is 8 ones. 3 tens – 2 tens is 1 ten. The answer is
1 ten + 8 ones, or 18.

Say:

These processes work for larger numbers also. I am going to read you a problem. Todo's had a sale on Razor Scooters. They had 636 scooters at the start of the sale and sold 489. How many did they have left at the end of the sale? How can we solve this problem? (Subtract 489 from 636.)

⇨ Write this on the board.

```
  636 scooters  =  ? ? ? ? ? ?  |||  : : :
– 489 scooters
--------------------  ------------------------------

? ? ? ? ? ?  ||  +  |  : : :  =  ? ? ? ? ? ?  ||  : : :
                                                 : : : : :
-------------------------------------------------------------------------
? ? ? ? ? ?  ||: : :.  =  ? ? ? ? ? +?  ||: : :. =

                          ? ? ? ? ? + |||||||||  ||: : :.
-------------------------------------------------------------------------
? ? ? ? ?  ||||: : :.
?  ||||: : :.
```

Say:

Draw a picture of the 636 scooters. You should show 6 hundreds, 3 tens and 6 ones. To subtract 489, first you need to subtract or remove 9 ones. Since you only have 6 ones, you need to borrow 1 ten from the tens. You now have 6 hundreds, 2 tens, and 16 ones. Subtract 9 ones. You now have 6, hundreds, 2 tens, and 7 ones.
To subtract the 8 tens from the 2 tens, you need to borrow 1 hundred or 10 tens. You now have 5 hundreds, 12 tens, and 7 ones. Subtract the 8 tens. You now have 5 hundreds, 4 tens, and 7 ones. Subtract the 4 hundreds; you now have 1 hundred, 4 tens, and 7 ones, or 147.

⇨ Write this on the board.

```
  636 =   600 + 30 + 6  =  600 + 20 + 16  =   500 + 120 + 16
– 489 = – 400 – 80 – 9  = – 400 – 80 – 9     – 400 –  80 –  9
  ------  ------------------  ------------------  ----------------------
                                          7        100  + 40   + 7 = 147
```

Say:

In the break-apart method, 636 is written as 600 + 30 + 6 and 489 is written as – 400 – 80 – 9. Why are there 3 minus signs? (We need to subtract each number.) **You need to subtract 9 ones from 6 ones.**

If you borrow I ten from the 3 tens, you have 20 + 16. Subtract 9 ones from 16 ones. You now need to subtract 80 from 20. If you borrow 100 from the 600, you have 500 + 120. Subtract 80 from the 120. You get 40. Subtract 400 from 500. You now have 100 + 40 + 7, or 147.

⇨ Write this on the board.

	2 16	12 5 2 16	12 5 2 16
636 scooters =	6 3 6	6 3 6	6 3 6
– 489 scooters =	– 4 8 9	– 4 8 9	– 4 8 9
	7	4 7	1 4 7

Say:

Let's look at the last method. Start with the ones place. You need to subtract 9 ones, but you only have 6 ones. You can think of 36 as 2 tens and 16 ones. So that you don't forget, write a small 2 above the 3 tens: you know that you now have 2 tens. Write a small 16 above the 6 ones so that you know that you have 16 ones. Subtract the ones. You get 7 ones. Next look at the tens column. You have to subtract 8 tens from 2 tens. (Ask why not 3 tens?) **Now you need more tens. Remember that 62 tens can be written as 5 hundreds and 12 tens, so write a small 5 above the 6 hundreds and a small 12 above the tens.** (Ask why you used 12 tens rather than 13 tens.) **Now subtract your tens. 12 tens – 8 tens is 4 tens. Finally, subtract your hundreds. 5 hundreds – 4 hundreds is 1 hundred. The answer is 147.**

⇨ Give Student Sheet 22. This activity will show you whether the students understand the standard method for subtraction. Possible answers:
1) He traded 1 ten for 10 ones, so the 8 ones became 18 ones and the 5 tens became 4 tens.
2) He wrote 15 as 15 ones. Then 1 ten – 1 ten = 0, and 6 hundreds – 6 hundreds = 0. We normally don't write the 0's if they are the first numbers.
3) He did not need to show that 6 ones – 6 ones = 0.
4) He had no tens to rewrite, so he thought of 5 hundred as 4 hundreds and 10 tens. Then he thought of 10 tens as 9 tens + 10 ones.
5) He subtracted 4 from 8, rather than 8 from 4.
6) He borrowed 1 ten but forgot to change the 4 tens to 3 tens.

7) He made the 6 hundreds into 5 hundreds + 10 ones instead of 5 hundreds + 10 tens.

⇨ If the students need more practice on subtraction, use the cards from Student Sheet 6.

Say:

Turn up 4 cards each. Make two 2-digit numbers that will give the largest difference. (Answers will vary depending on the cards they turn up.) **Make the smallest difference**. Do this activity a few times. **This time turn up 6 cards and make two 3-digit numbers that will give the largest difference. Make the smallest difference.**

⇨ Give Student Sheet 23. Students are asked to answer questions involving addition and subtraction from a chart. Answers:

1) 1998; 2000	2) 117 students	3) 229 students
4) 25 students	5) 293 students	6) 103 students
7) 496 students	8) 402 students	9) 221 students

10) Yes

11) Answers will vary, but every year and every grade the number of students increased, so it seems that the number would increase in 2000.

⇨ Have one student summarize today's lesson.

Student Sheet 21 (Number: Lesson 7)

You have been asked to look over your friend's paper and try to explain what she did on the following problems.

1.
```
   1
   4 5 8
 + 1 2 7
 -------
   5 8 5
```
Why did she write a small 1 above the 5 tens?

2.
```
   1
   5 3 8
 + 6 2 7
 -------
 1 1 6 5
```
Why did she write a 1 in the thousands place in the answer?

3.
```
   1
   6 5 4
 + 2 2 6
 -------
   8 8 0
```
Why did she put a 0 in the ones place? Doesn't 4 ones + 6 ones = 10 ones?

Your friend worked these problems incorrectly. What did she do wrong?

4.
```
   5 4
 + 2 8
 -----
   7 2
```

5.
```
   4 9
 + 1 5
 -----
 5 1 4
```

Student Sheet 22 (Number: Lesson 7)

You have been asked to look over your friend's paper and try to explain what he did on the following problems.

1.
```
    4 18
    4 5 8
  – 2 3 9
  -------
    5 8 5
```
Why did he write a small 4 above the 5 hundreds and a small 18 above the 8 ones?

2.
```
    0 15
    6 1 5
  – 6 0 7
  -------
      8
```
If 8 is the answer, why are there no hundreds or tens in the answer?

3.
```
    5 15
    6 5 6
  – 2 8 6
  -------
    3 7 0
```
Why did he not write a small 16 above the 6 in the ones place?

4.
```
      9
    4 10 13
    5 0 3
  – 2 3 9
  -------
    2 6 4
```
Why did he write a small 10 above the 0 in the tens place and then a small 9 above the small 10?

Your friend worked these problems incorrectly. What did he do wrong?

5.
```
    5 4
  – 2 8
  -----
    3 4
```

6.
```
    6 0 1
  – 2 0 8
  -------
    3 0 3
```

Student Sheet 23 (Number: Lesson 7)

Use the chart to answer the questions that follow.

Number of students attending mathematics contests				
		1998	**1999**	**2000**
Third-graders		62	167	173
Fourth-graders		158	159	184
Fifth-graders		55	170	238

1. In which year did the fewest number of students attend mathematics contests? _____; the largest number? _____

2. How many 3rd and 5th graders attended contests in 1998? _____

3. How many 3rd graders attended contests in 1998 and 1999? _____

4. How many more 4th graders attended contests in 2000 than in 1999? _____

5. How many 5th graders attended contests in 1998 and 2000? _____

6. How many more 4th graders attended contests in 1998 than 5th graders? _____

7. How many students in all levels attended contests in 1999? _____

8. How many 3rd graders attended contests in the 3 years? _____

9. How many more students in all 3 grades attended contests in 1999 than in 1998? _____

10. Did more 5th graders attend contests in 2000 than in 1998 and 1999 combined? _____

11. What do you predict will happen in 2001? Will the number of students in each grade go up or down? Explain why you think your prediction will happen. _____

_____