

Grade 4 Mathematics

Number and Number Relations: Lesson 6

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 (\Rightarrow) by them.

Purpose of Lesson 6:

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

Equipment/Materials Needed:

- Copies of Student Sheets 16 – 20, 19 and 20 are optional.
- Paper and pencils

Preparations before beginning Lesson 6:

- Run off 1 copy of Student Sheets 16 – 20 for each student. (19 and 20 are optional.)
- Have paper and pencils available.

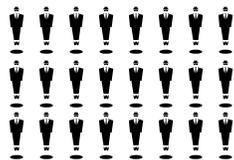
Lesson 6: Number and Number Relations

This lesson will show the connection between multiplication and division. While many students memorize the subtraction facts, most students do not memorize division facts. They use the related multiplication fact. Therefore, this relationship between multiplication and division becomes critical.

Say:

Remember in multiplication, we can think of 2×5 as 2 groups of 5. We know how many groups, 2; and we know how many are in each group, 5. What we need to find out is how many in all, or the total amount. Let's look at a problem.

(\Rightarrow) Draw 3 rows of 8 stick people on the board. Write the following:



$$\begin{array}{l} \underline{\hspace{2cm}} \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}} \\ \text{rows} \times \text{number in row} = \text{total} \\ 3 \text{ rows} \times 8 \text{ students} = ? \end{array}$$

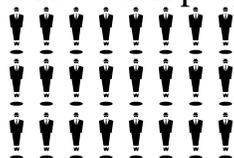
Say:

In the Mardi Gras parade, a band marched with 8 students in each row; there were 3 rows. How many students marched in this band? (3 rows of 8 students or 24 students.) In this problem, we knew how many rows or groups and how many in each row or group. What we didn't know is how many in all, or the total number.

Say:

In division there are two types of problems, but in both, we know the total amount. In the first kind of problem, we know how many groups or rows, but not how many in each group or row. In the second kind, we know how many in the group or row, but not how many groups or rows.

(\Rightarrow) Draw stick people on the board to represent the problem below.

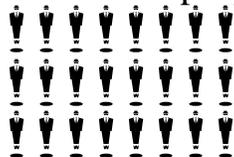


$$\begin{array}{l} 3 \text{ rows} \times \underline{\hspace{2cm}} = 24 \text{ students in all} \\ \text{number in row} \end{array}$$

Say:

There were 24 students in the band. They would march in 3 rows. How many students are in each row? What do you know in this problem? You know the total (24); you know the number of groups or rows (3); but you don't know how many in each group or row. **To solve this problem, you could share the number of students equally among the 3 rows. You could actually put one student in row 1, one student in row 2, one student in row 3, and then put a second student in row 1, and so on until you have placed all 24 students. You would have 8 in each row. This type of division is called *sharing*.**

⇒ Draw stick people on the board to represent the problem below.



_____ x 8 students = 24 students in all
number of rows

Say:

There were 24 students in the band. They can walk 8 to a row. How many rows will you have? What do you know in this problem? You know the total (24) and how many students can go in each row (8). **What do you need to find out?** (How many rows will you need?) **To solve this problem, you know you can put 8 students in Row 1, so take them out of the 24. Then take out 8 more for Row 2, etc. You will need 3 rows. Each time, you take out 8 students until you have 0 left. With this type, you measure out 8 students at a time, so this process is called *measuring*.**
Note: Students do not need to know the difference in the names, but need to be exposed to both types of problems.

⇒ Give Student Sheet 16 to help students see the connections between multiplication and division and the 2 types of division. Answers:

- 1) $12 \div 3 = 4$ or $12 \div 4 = 3$
- 2) $12 \div 3 = 4$ or $12 \div 4 = 3$
- 3) $15 \div 3 = 5$ or $15 \div 5 = 3$
- 4) $24 \div 6 = 4$ or $24 \div 4 = 6$
- 5) Each girl will get 5 leaves.
- 6) Shaun put 4 pencils in each group.
- 7) Monica will need 6 vases.

Answers will vary, but you should get something like these answers:

- 8) How many groups of elephants will walk?
- 9) How many desks are in each row?

Say:

Just as multiplication can be a shortcut for addition, division can be a shortcut for subtraction. Remember when we looked at measuring types of division. You knew the total and the number in a group, but you did not know how many groups were needed. This operation is a link to subtraction. To use division as a shortcut, the groups have to have the same amount in them. I am going to read a problem to you. I baked 10 cookies. If I put 2 in a bag, how many bags can I fill? If I think of subtraction, I can keep taking out 2 cookies over and over. How many times can I take out 2 cookies?

⇒ Draw cookies on the board. ○○○○○○○○○○○

$$10 - 2 = 8$$



$$8 - 2 = 6$$



$$6 - 2 = 4$$



$$4 - 2 = 2$$



$$2 - 2 = 0$$



Say:

I pulled out 5 groups of 2, so $10 \div 2 = 5$.

⇒ Give Student Sheet 17 to help students connect division and subtraction.

Answers:

1. $12 \div 4 = 3$ or $12 - 4 = 8$; $8 - 4 = 4$; $4 - 4 = 0$; I took out 3 fours.

2) $30 \div 6 = 5$ or $30 - 6 = 24$; $24 - 6 = 18$; $18 - 6 = 12$; $12 - 6 = 6$; $6 - 6 = 0$;
I took out 5 sixes.

3) $12 \div 2 = 6$ or $12 - 2 = 10$; $10 - 2 = 8$; $8 - 2 = 6$; $6 - 2 = 4$; $4 - 2 = 2$;
 $2 - 2 = 0$; I took out 6 twos.

4) $30 \div 10 = 3$ or $30 - 10 = 20$; $20 - 10 = 10$; $10 - 10 = 0$; I took out 3 tens.

5) $48 \div 8 = 6$ or $48 - 8 = 40$; $40 - 8 = 32$; $32 - 8 = 24$; $24 - 8 = 16$;

$16 - 8 = 8$; $8 - 8 = 0$; I took out 6 eight's.

6) B 7) B 8) A 9) B

⇒ Give Student Sheet 18. This activity is a look at all 4 operations. Students are asked to choose which operation will give them the right answer.

Answers:

1) B 2) B 3) D 4) C 5) B 6) B 7) C

⇒ Give students a target number such as **12**.

Say:

Write down things you know about 12. Be creative. (You should get things like a dozen, hours on a clock, number of inches in a foot, bigger than 11, a doubles fact, $4 + 8$, 3×4 , etc. It may take some hints, but usually they will come through with great answers.) **Did anyone write any multiplication facts?** (You should get 4×3 , 1×12 , 2×6 , 6×2 , and 12×1 .) **Did anyone write any addition facts that equal 12?** ($0 + 12$, $1 + 11$, etc.) **Did anyone write any subtraction facts that equal 12?** (Subtraction facts are harder, but you can try them. You are looking for something that equals 12, such as $14 - 2$ or $20 - 8$.) **Did anyone write any division facts that equal 12?** (Division would be facts $12 \div 1$, $24 \div 2$, etc.)

If students need more practice on the 4 operations, you can use Student Sheets 19 and 20.

⇒ Give Student Sheet 19. You need to have them talk about their answers.

Sample answers. There are others.

- | | | |
|-------------------------------------|--------------------------------|--|
| 1) $4 + 4$, $8 + 0$ | 2) $12 - 4$, $16 - 8$ | 3) 4×2 , 1×8 |
| 4) $16 \div 2$, $24 \div 3$ | 5) $9 + 9$, $17 + 1$ | 6) 9×2 , 6×3 |
| 7) $8 + 8$, $7 + 9$ | 8) 4×4 , 8×2 | 9) $1 + 5 = 6$; $5 + 6 = 11$ |
| 10) $10 - 5 = 5$; $6 - 4 = 2$ | | 11) $2 \times 5 = 10$; $1 \times 8 = 8$ |
| 12) $8 \div 4 = 2$; $9 \div 3 = 3$ | | |

⇒ Give Student sheet 20. This sheet reviews the basic facts for all operations.

Answers

- | | | | |
|-----------|-----------|-----------|-----------|
| 1) 15; 56 | 2) 16, 63 | 3) 11, 30 | 4) 10, 16 |
| 5) 13, 36 | 6) 18, 81 | 7) 9, 72 | 8) 8, 56 |
| 9) 7, 35 | 10) 9, 36 | 11) 3, 24 | 12) 5, 45 |
| 13) 10, 2 | 14) 13, 7 | 15) 10, 5 | 16) 10, 6 |
| 17) 15, 8 | 18) 17, 8 | 19) 5 | 20) 5 |
| 21) 0 | | | |

⇒ Have one student summarize today's lesson.

Student Sheet 16 (Number: Lesson 6)

Write 2 division sentences for each picture.

1. 

2. 

3. 

4. 

Work the following problems. Write each of your answers in a complete sentence.

5. Lisa and Wendy collected 10 leaves for their science project. If they share the leaves equally, how many will each girl get to use in her project?
6. Shaun placed 12 pencils into 3 equal groups. How many pencils did he put into each group?
7. Monica had 18 roses. She wanted to put 3 roses in each vase. How many vases will she need?

Write a division question for the given information. You do not need to solve your problem.

8. Circus elephants are trained to walk in groups of 2. There are 8 elephants.
9. Ms. Clark has 30 desks in her classroom. There are 6 rows.

Student Sheet 17 (Number: Lesson 6)

Work the following problems. Tell how you could use subtraction or division.

1. There are 12 students in the gym. They are sitting in groups of 4. How many groups are there?
2. Mr. Russell set up 30 chairs for the play. He put 6 chairs in each row. How many rows did he set up?
3. Tonia had 12 eggs. If each cake takes 2 eggs, how many cakes can she bake?
4. Karl scored 30 points on his turn at darts. If he scored 10 points on each dart, how many darts did he throw?
5. Tika has 48 beads. To make a bracelet, she uses 8 beads. How many bracelets can she make?

Choose the correct way to work each problem.

6. Justin bought 15 baseball cards. If there were 5 in each pack, how many packs did he buy?
A. $15 - 5 = 10$ B. $15 \div 5 = 3$
7. Emilio paid \$36 for 3 CD's. If each CD cost \$12, how many did he buy?
A. $36 - 12 = 24$ B. $36 \div 12 = 3$
8. Ellen had 25 Pokemon cards. She lost 5 of them. How many does she have now?
A. $25 - 5 = 20$ B. $25 \div 5 = 5$
9. Porter ran 42 miles last week. If he ran 6 miles a day, how many days did he run?
A. $42 - 6 = 36$ B. $42 \div 6 = 7$

Student Sheet 18 (Number: Lesson 6)

Choose the correct way to work the problem.

- Lotty and Trina collect Beanie Babies. Lotty has 10, Trina has 40. How many more Babies does Trina have than Lotty?
A. Add $10 + 40$ B. Subtract $40 - 10$
C. Multiply 10×40 D. Divide 40 by 10
- Jenny ran 4 miles on Saturday and 3 miles on Sunday. How many miles did she run on the 2 days?
A. Add $4 + 3 + 2$ B. Add $4 + 3$
C. Subtract $4 - 3$ D. Multiply 4 by 3
- Jessica has 30 Pokemon cards. She wants to arrange them in rows of 6 cards. How many rows can she make?
A. $30 + 6 = 36$ B. $30 - 6 = 24$
C. $30 \times 6 = 180$ D. $30 \div 6 = 5$
- Marilyn bought 6 pizzas and cut each one into 8 slices. How many slices of pizza does she have?
A. $6 + 8 = 14$ B. $8 - 6 = 2$
C. $6 \times 8 = 48$ D. $8 \div 6 = 1$ and some left over
- Mike has won 16 tennis trophies. Cindy has won 32 golf trophies. How many more trophies has Cindy won than Mike?
A. Add 32 and 16 B. Subtract 16 from 32
C. Multiply 32 by 16 D. Divide 32 by 16
- We need 10 dozen cookies for the fair tomorrow. We have baked only 2 dozen. How many more dozens do we need to bake?
A. Add 10 and 2 B. Subtract 2 from 10
C. Multiply 2 by 10 D. Divide 10 by 2
- Cody threw 3 touchdown passes. If each touchdown is worth 6 points, how many points did he score?
A. $6 + 3 = 9$ B. $6 - 3 = 3$
C. $6 \times 3 = 18$ D. $6 \div 3 = 2$

Student Sheet 19 (Number: Lesson 6)

This is your target number. 8

1. Write an addition fact that will give you 8. _____
2. Write a subtraction fact that will give you 8. _____
3. Write a multiplication fact that will give you 8. _____
4. Write a division fact that will give you 8. _____

This is your target number. 18

5. Write 2 addition facts that will give you 18. _____
6. Write 2 multiplication facts that will give you 18. _____

This is your target number. 16

7. Write 2 addition facts that will give you 16. _____
8. Write 2 multiplication facts that will give you 16. _____

1	6	3	9
2	5	4	
10	7	8	11

9. Use any 3 numbers from the box to write an addition sentence.

10. Use any 3 numbers from the box to write a subtraction sentence.

11. Use any 3 numbers from the box to write a multiplication sentence.

12. Use any 3 numbers from the box to write a division problem.

Student Sheet 20 (Number: Lesson 6)

In the following chart, you are given 2 parts. Use these parts to find the sum and then use them to find the product.

	Ex.	(1)	(2)	(3)	(4)	(5)	(6)
Sum	12						
Part	4	8	7	5	2	9	9
Part	8	7	9	6	8	4	9
Product	32						

In the following chart, you are given a part and the sum. Fill in the rest of the chart.

	Ex.	(7)	(8)	(9)	(10)	(11)	(12)
Sum	12	17	15	12	13	11	14
Part	7	8		5	4		9
Part	5		7			8	
Product	35						

In the following chart, you are given a part and the product. Fill in the rest of the chart.

	Ex.	(13)	(14)	(15)	(16)	(17)	(18)
Sum	12						
Part	8	8		5	4		9
Part	4		6			7	
Product	32	16	42	25	24	56	45

19. What does $5 + 0$ equal? _____

20. What does $5 - 0$ equal? _____

21. What does 5×0 equal? _____