

Grade 4 Mathematics

Number and Number Relations: Lesson 17

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 17:

- In this lesson, the tutor and the students will
 - ✓ recognize whether a number is divisible by another number,
 - ✓ find factors and of multiplies of numbers, and
 - ✓ practice multiplication and division facts.

Equipment/Materials Needed:

- Copies of Student Sheet 92
- Paper and pencils
- Chalkboard

Preparations before beginning Lesson 17:

- Run one copy of Student Sheet 92 for each student.
- Have paper and pencils available.

Lesson 17: Number and Number Relations

Say:

In Lesson 16 of Number Relations, you looked at multiples. When you skip count, you say the multiples of a number. In this lesson, you will work with *factors*. A *factor* is a whole number that divides evenly into another whole number. Let's look at how multiples and factors are related. Think of two numbers, such as 4 and 5. Multiply the two numbers. What product do you get? (20) *Twenty* is a multiple of 4 and 5. *Four* and *five* are factors of 20.

 Write the number 24 on the board.

Say:

Find two numbers that can be multiplied to give you 24. What two numbers did you find? (1×24 ; 2×12 ; 3×8 ; or 4×6) These numbers are called *factors* of 24. Let's list the factors of 24 in ascending order. (1, 2, 3, 4, 6, 8, 12, and 24) **Twenty-four is a multiple of 1, 2, 3, 4, 6, 8, 12, and 24. How do you know this fact? (If I skip count by any of these numbers, I will say 24.)**

 Write the number 18 on the board.

Say:

Find all of the factors of 18. List them in ascending order. (1, 2, 3, 6, 9, 18) **Eighteen is a multiple of which numbers? (1, 2, 3, 6, 9, 18) If students are having trouble with finding factors, give them a few other numbers to factor, such as 12, 16, 20, or 36. As you give the students other numbers, keep emphasizing the fact that factors and multiples are related.**

 Give students Student Sheet 92. Have the students work and discuss problems 1 – 4.

Answers:

- 16 is a multiple of 8. If I skip count by 8's, I say 16.
- 9 is a factor of 18. I can multiply 9×2 to get 18.
- Yes, a number can have many factors. $4 \times 3 = 12$ and $2 \times 6 = 12$
- Yes, a number can be a multiple of many numbers. If you skip count by 5 or 2, you say 10.

Say:

Suppose we had 30 students in this class. Could we divide the class evenly into 6 groups? (yes) How many would be in each group? (5) We can say that 30 is *divisible* by 6. A whole number is *divisible* by another whole number if the remainder is zero when you divide. By what other numbers is 30 divisible? (1, 2, 3, 5, 10, 15, 30) What is the relationship between these numbers and 30? (30 is a multiple of 1, 2, 3, 5, 6, 10, 15, and 30. 1, 2, 3, 5, 6, 10, 15, and 30 are factors of 30.) A multiple is always divisible by its factors.

 Write the number 81 on the board.

Say:

Is 81 divisible by 5? (No.) How do you know? (Possible answers: 81 is not a multiple of 5; five is not a factor of 81. All of the multiples of 5 end in 0 or 5, so 81 cannot be divisible by 5. If I divide 81 by 5, I get 16 R1.)

Note: I would not recommend teaching the divisibility rules. It is just one more thing that students have to memorize. Let them reason out the problems. If they are having trouble, give them a few problems, such as the following:

1. Is 320 divisible by 2? (yes)
2. Is 320 divisible by 3? (no)
3. Is 320 divisible by 4? (yes)
4. Is 320 divisible by 5? (yes)
5. Is 320 divisible by 6? (no)
6. Is 320 divisible by 7? (no)

 Have students work problems 5 – 10 on Student Sheet 92.

Answers:

5. Yes, 8 is a factor of 56, or 8 divides evenly into 56.
6. No, $92 \div 6 = 15 \text{ R}2$. Fifteen tables would be full, but one table would have only 2 students.
7. Yes, if he bought 5 packs, he would have 30 buns.
8. Yes, $28 \div 4 = 7$.
9. No, 30 does not divide evenly by 4.
10. No, 265 does not divide evenly by 6. Forty-four tables could be full, but there would be one person left over.

† Have one student summarize today's lesson. Understanding the relationship between multiples and factors is important in developing number sense.

Student Sheet 92 (Number Relations: Lesson 17)

Answer questions 1 – 10.

1. Is 16 a multiple or factor of 8? Explain.
 2. Is 9 a multiple or factor of 18? Explain.
 3. If 4 is a factor of 12, can 2 be a factor of 12 also? Explain.
 4. Can 10 be a multiple of both 5 and 2? Explain.
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5. A class of 56 students will be divided evenly into teams. Could each team have 8 students? Explain.
 6. In the cafeteria, the tables hold 6 students. If every table is full, could there be 92 students in the cafeteria? Explain.
 7. Hot dogs buns are packaged 6 to a pack. If Byron bought only full packs and has not eaten any, could he have 30 buns? Explain.
 8. Ms. Lehr's class has 28 students. Could she divide them evenly into 4 rows? Explain.
 9. Ms. Lehr enrolled two new students. If she wanted to divide the students evenly into rows, could she still use 4 rows? Explain.
 10. There will be 265 people at the awards ceremony. The tables seat 6. Will all of the tables be full? Explain.