Mathematics Public Lesson Grade 4 Mathematics Instruction Plan

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Research Theme:
Examining instruction that focuses on "viewing a number in relationship to other numbers, such as a product of other numbers."

1. Title   Prime and composite numbers

2. About research theme

(1) Fostering rich sense of numbers

The current (2000) revision of the National Course of Study (2000) stresses that the goal of "fostering rich sense of numbers, quantities and geometric figures" is to be considered carefully. Since multiplication is introduced in Grade 2, a specific goal, "to view numbers as products of other numbers," has been included. However, this is only one specific instance of developing "number sense" that must be addressed all the way though upper elementary school. Therefore, we must constantly address number sense intentionally. Today's lesson proposes the treatment of numbers sense using the topic of "prime and composite numbers."

On p. 75 of Commentary on the Elementary School Mathematics Course of Study, you see a statement, "the goal is to develop an understanding of the multiplicative structure of numbers through an activity of counting objects by grouping." Within the context of the introductory treatment of multiplication in Grade 2, this statement means that students should understand that a number can be viewed as a product of other numbers. For example, 12 can be thought of as 2×6 or 3×4.

In today's lesson, we would like to further this perspective so that students can consider, for example, 12 as $2 \times 3 \times 3$.

(2) Prime and composite numbers

In this lesson, we will pictorially represent the fact that all whole numbers are either prime numbers or composite numbers, which are products of prime numbers.

The following designs will be shown, and students are expected to identify rules the govern them. Then, using those rules, students will be developing designs for larger numbers.
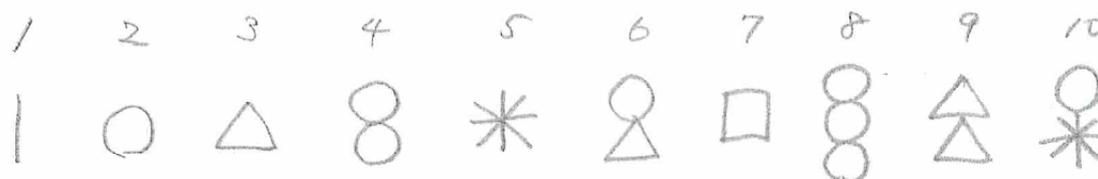
If students truly understand the ideas behind this lesson, they are more likely to understand the meanings of "least common multiples" and "greatest common divisors" to be studied in Grade 6.

3.   Goals
To be able to view a number as a product of other numbers.

4.   Instruction plan (2 lessons total)
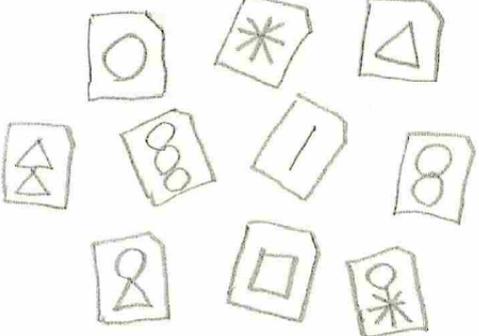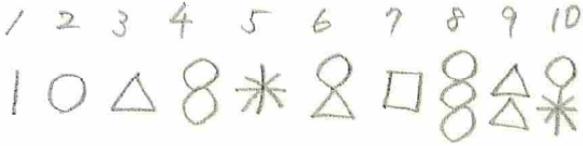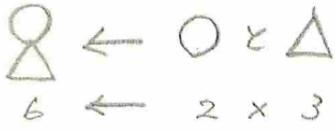Understanding prime and composite numbers …… 1 lesson (this lesson)
prime and composite numbers up to 100 ………… 1 lesson

5. Instruction of the lesson
   (1) Goals
   To notice that whole numbers are made up of prime numbers and their products.

   (2) Flow of the lesson

Instructional Activity	Points of Considerations
1. Observe the ten designs shown on cards and determine what they represent. 	(1) Post the ten cards on the blackboard at random. Ask students what they notice. • If an idea that relates to numbers is raised, ask for the reasons.
2. Order the cards and identify "rules." 	(2) Guide the students to look at how the 6th design is composed.
3. Using the discovered "rules," think how 11 and 12 can be represented. 	(3) Confirm that these designs represent numbers, then have them think about other numbers. • Discuss and check the ideas for 11 and 12. • Confirm that 11 must be represented by a new design while 12 can be represented by combining 2, 2, and 3. (4) Using the pattern they discovered, have students make the designs up to 20.
4. Make a chart of number designs up to 20.	