Algebra/Geometry Institute Summer 2005
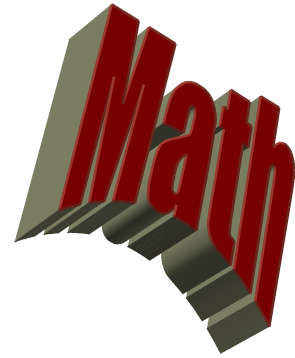
Lesson Plan Two: Patterns

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Grade Level: 5th

1.   Teaching objective(s)

Using the rules for addition and subtraction in
 basic math, the student will find patterns in number sequences.

2.   Instructional Activities

The teacher will remind the students of the previous chapter in which they identified number patterns. Write the following number sequence on the board and allow students to work the example. Once they are finished, discuss the problem. **5 minutes**

31, 34, 37, 35, 38, 41, 39, _____

Sequence (+3+3-2+3+3-2)   Answer **42**

Then say, "Today we are going to talk about finding patterns using the addition rule and subtraction rule.

Have students draw a horizontal line across their paper. This will be the base line. Instruct students to place one cube on the line. To the right of that, they place another cube. A second cube goes directly above it on the paper. Finally, place three cubes to the right. Ask students to describe the pattern and what comes next. After discussing the pattern, ask students to place four (4) cubes to the right (as shown in blue). Students will lay a ruler along the top edge of the cubes. (The top cubes all touch the ruler along the diagonal. **(Explanation: This shows a regular pattern; the number of cubes increases by the same amount each time).**
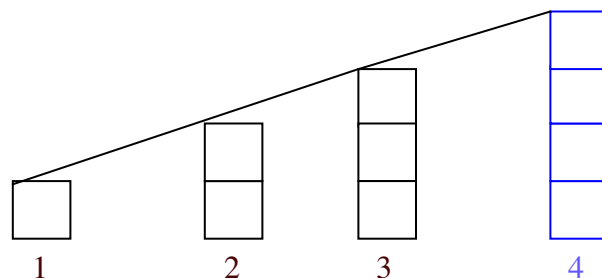
Next have students place cubes for the sequence 2, 3, 5, 6, 8
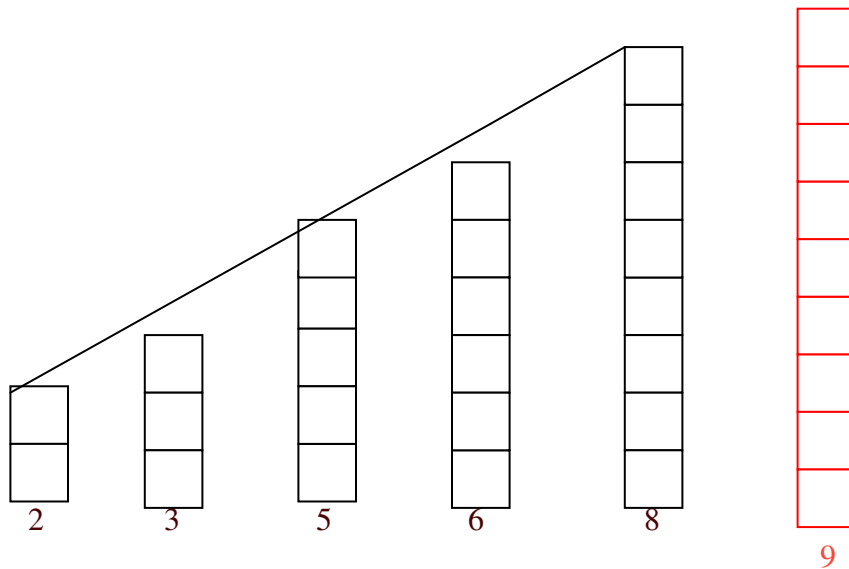
Have students lay their rulers along the top edges of the cubes. Have students notice that not all the top cubes touch the ruler.(**Explain that the columns of cubes will touch if they form a regular pattern**) Ask students the following questions: Which columns do not touch? **(every other one)** What would the next number of cubes be?
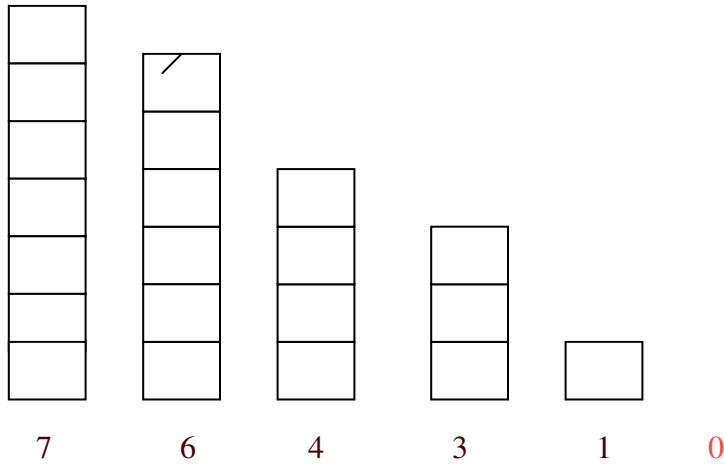
Sequence: (1+2+1+2)   Answer 9

Repeat the procedure, using subtraction sequences.

6, 5, 4, 3
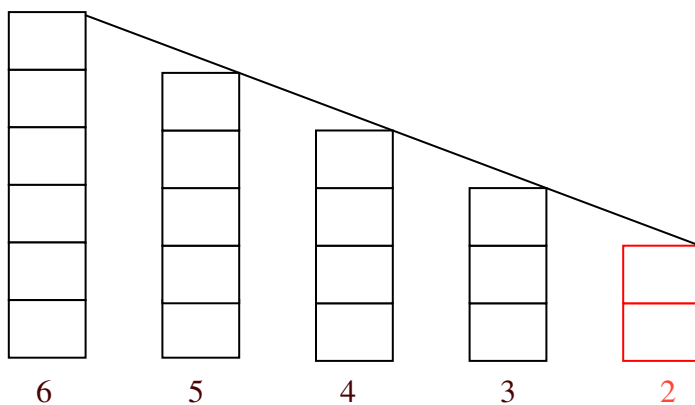
Repeat the procedure, using 7, 6, 4, 3, 1

7   6   4   3   1   0

Explain to students that the direction of the ruler is reversed in subtraction. As the sequence continues, the numbers used will be negative as the numbers decrease. **(35 minutes)**

After discussion, pass out Activity 3 (attachment). Tell the students to read the directions carefully and complete. This activity is timed. The students only have ten (10) minutes to complete. Turn in all work when the ten (10) minutes is up to be graded. **(10 minutes)**

3.   Materials and Resources

   1 cm cubes (approximately 20 per student)
    rulers
     paper
     pencils

   Resources:
   Addison-Wesley Publishing Company: <u>Activity Math:Using Manipulatives in the Classroom;</u> Copyright 1993

   "The Mathematical Art of M.C. Esher." (2002),
   http://www.teacherlink.org/content/math/activities/

4   Assessment
   ♦ Teacher - made Activity Sheet 4
   ♦ Students will go to the Learning Center for mastery and reinforcement. The Learning Center will consist of two tables with four chairs each. Directions for each student will be printed on activity sheet. All needed materials will be at the Center. (cubes, dominoes, counting circles, paper, pencil, etc). The students will complete Activity Sheet 4 and use the cubes, dominoes and counting circles to make patterns and

sequences for addition and subtraction. The teacher will monitor students as they work in the Learning Center. The activity sheet will be graded, recorded and given to students for corrections and explanations. Students will also explain their arrangement of cubes and dominoes.

The numbers 0,1,2,3, 5, and 8, all have something in common. If you start with 0 and add the number 1 next to it, you get 1 which is the third number in the pattern. If you add your answer (1) to the number to the left of it (1) you get 1+1=2. The number 2 is the next number in the pattern. Can you find what number comes after 8?

0+1=1

1+1=2

2+3=5

3+5=8

5+8=?

Activity 2: Fill in the missing numbers in the pattern.

Example: 1, 2, 3, 4, ____, ____, ____

Answer: 5, 6, 7

    A. 2, 4, 6, 8, ____, ____, ____

    B. 1, 3, 5, 7, ____, ____, ____

    C. 5, 10, 15, 20, ____, ____, ____

    D. 80, 70, 60, 50, ____. ____, ____

    E. 0, 2, 2, 4, 6, ____, ____, ____

Activity 3: Identify what number does not belong in each pattern.

    A. 3, 6, 9, 11, 15, 18

    B. 2, 4, 6, 8, 10, 12

    C. 100, 90, 85, 70, 60, 50,

    D. 5, 10, 15, 20, 25, 30