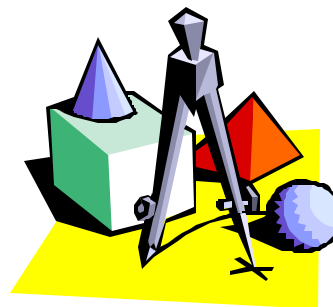# Algebra/Geometry Institute Summer 2003

Lesson Plan Two

Faculty Name: Joanna Dickison
School: Olive Branch Middle School
City: Olive Branch, MS
Grade Level: 8th Grade Math

1 Teaching objective(s)

  The students will recognize the difference between arithmetic and geometric patterns, and create a rule about the sequences.

2 Instructional Activities

❖ The students will begin class by completing a problem of the day in their journals, where they will solve the problem and write a paragraph describing the steps they took to find the solution. Because my school's schedule is based on a modified block schedule, I always choose problems that reinforce what the students learned the last time they were in my classroom (which is 48 hours).

    Write on the board (or overhead) the following problem: "Evaluate the following expression using order of operations, in your journals, then write a paragraph describing each step and <u>why</u> it was taken." : $4+2^3/2$

Once the students have wrapped up their thoughts, two may volunteer to share their findings with the rest of the class.   (The correct answer is 8.) (8-10 minutes)

❖ Begin with the following monologue (or something close to it). "Some people say that mathematics is the science of patterns. That's not a bad description. Not only do patterns take many forms over the range of school mathematics, they are also a unifying theme. Number patterns—such as 3, 6, 9, 12—are familiar to us since they are among the patterns we first learn as young students. As we advance, we experience number patterns again through the huge concept of functions in mathematics. Today we will be exploring arithmetic and geometric patterns." (1-2 minutes)

❖ First, the teacher must explain the difference between arithmetic and geometric patterns. Arithmetic means we are either adding or subtracting in each sequence, and geometric means we are either multiplying or dividing in the patterns. (2-3 minutes)

❖ Then provide 8 examples of sequences on the overhead (like 1,6,11,16,21… or 1,2,4,8,16,32…). One by one, ask the class if each pattern is arithmetic or geometric. Allow volunteers to answer. Then ask if anyone would like to tell what exactly the sequence is doing. (For example, the first sequence is +5, and the second sequence is $\times 2$.) Allow students to volunteer. Finally, on each problem ask students to predict the next 2 numbers, and again allow volunteers to answer. (8 minutes)

❖ Have six work stations available for students to circulate through in groups of three, recording their answers on a piece of paper on a clipboard.   At each station, there should be a problem for the students to work. (See example below.) The students should observe a pattern, decide if it is arithmetic or geometric, and label what each pattern is specifically doing. Finally, they should predict the next two numbers in the sequence. (20-24 minutes)

❖ Have students return to their seats and discuss their results before turning them in.

❖ Assign an activity sheet (either copied from a resource you may already have, from your textbook, or a sheet you created yourself) with approximately 8 patterns for the students to analyze in the same manner. I would do four arithmetic and four geometric patterns. The problems should be in the same format as the ones the students already have experience with.

3   Materials and Resources

Materials: Pencil
              Paper
              Overhead/transparencies
              Overhead marker
              6 problems for workstations (see attached)
              Activity sheet described above (enough for each student to have one)
              Clipboard for each group

Resources:

http://askeric.org/cgi-bin/printlessons.cgi/Virtual/Lessons/Mathematics/Patterns/
Various colleagues who modestly chose not to be credited

4   Assessment

The students will complete the activity sheet on their own with at least 70 % accuracy.

Coffee Shop

Jack and Jill have opened up a new coffee shop, which has a growing reputation for their wonderful beverages. In fact, 24 customers came in on Monday, 32 customers came in on Tuesday, and 40 customers came in on Wednesday.

1) Is the pattern of customers arithmetic or geometric?
2) What is the pattern specifically doing?
3) What will the next two numbers in the sequence of customers be?

New Students

Mrs. Sacco in the Counseling Office noticed a pattern in the number of new students that came to our school from month to month. See if you can answer the following questions if the following is true.

August	2 new students
September	4 new students
October	8 new students
November	16 new students

1) Is the pattern of new students arithmetic or geometric?
2) What is the pattern specifically doing?
3) What will the next two numbers in the sequence of new students be?

Price of Skateboards

Matt was doing some research on the internet about the price of skateboards from a certain company, and he noticed a pattern. He found that Model A costs $99.50, Model B costs $124.50, and Model C costs 149.50. Answer the following questions about the pattern Matt found.

1) Is the pattern of skateboard prices arithmetic or geometric?
2) What is the pattern specifically doing?
3) What will the next two numbers in the sequence of skateboard prices be?

Gumballs

Ian filled a jar with 60 gumballs, and he and his family helped themselves to them whenever they liked. Ian counted the second day and found 53 gumballs, and on the third day, there where 46 gumballs.

1) Is the pattern of gumballs arithmetic or geometric?
2) What is the pattern specifically doing?
3) How many gumballs will be in the jar on the fourth and fifth days?

Football Scores

The Warriors have really been improving their record over the past 5 years! Five years ago, they won only 3 games. The next year, they won 6 games, and the next year, they won 18 games!

    1) Is the pattern of winning games arithmetic or geometric?
    2) What is the pattern specifically doing?
    3) How many games did the Warriors win the next year? How about the next year?

Music

What a shame! My favorite singer, Bill Taylor, has really suffered some losses in the past albums he has recorded.   Look at the chart and use the information to answer the following questions.

    Album 1   256 million albums sold

    Album 2   64 million albums sold

    Album 3   16 million albums sold

    1) Is the pattern of album sales arithmetic or geometric?
    2) What is the pattern specifically doing?
    3) How many albums do you think Album 4 will sell? What about Album 5?