

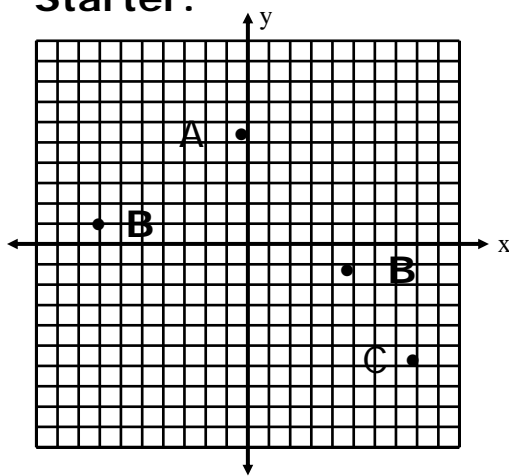
LESSON PLAN (Linda Bolin)

Lesson Title: Patterns and Sequences	
Course: Math 7	Date: Nov Lesson 6
Utah State Core Content and Process Standards: 2.1a,b,c , 2.3a Problem solving, connections, communication, representation, reasoning	
Lesson Objective(s): Identify and describe a pattern. Write the rule for a sequence and extend the sequence	
Enduring Understanding (Big Ideas): Patterns can be described with mathematical rules and expressions	Essential Questions: <ul style="list-style-type: none">• Where are patterns and sequences found in our world?• How can patterns and sequences be extended?• Why are variables useful in describing patterns?• How can a pattern be represented by a variable expression?
Skill Focus: Create and extend patterns and sequences.	Vocabulary Focus: sequence, terms of a sequence, pattern, rule, variable, algebraic expression
Materials: "Writing the Rule" cards for students, Patterns and Sequences In Our World	
Assessment (Traditional/Authentic): observation, questions, task performance	
Ways to Gain/Maintain Attention (Primacy): Game, patterns, calculators, cooperative activities, connections to real world	
Written Assignment: Patterns and Sequences In Our World, Writing the rule game (Can be written on the back of the worksheet)	

Content Chunks

Post vocabulary and refer to the words during the lesson

Starter:



1. Give the coordinates for each point
2. Find the product, sum, difference and quotient of -8 and 2

Lesson Segment 1: What real-world patterns can be modeled by a sequence of terms? How can patterns and sequences be extended?

Patterns and sequences are all around us. Finding patterns and sequences helps pharmacists develop medicines, builders build structures, farmers plant crops, helps you go know when to go to classes (every 85 min a bell rings).

Do Team List where a Round Robin is used to have team members suggest anywhere they might see a pattern or a sequence of numbers. Scribe writes list. Team with longest after 2 minutes wins. Have that team scribe read their list. Other scribes read one idea that hasn't been mentioned yet.

Explain to students that in order to describe a pattern or a sequence, we use a description sometimes called a rule. Have them a person from each team describe one of their patterns or sequences from the list.

Do Four Corners where a student from each team goes to a corner to meet with others to 1) finish the next terms of the pattern or sequence shown in one of the problems on the "Patterns and Sequences in Our World" worksheet (attached) and to 2) write a rule for the pattern they found to help them. Each person then returns to their team and teaches the team about their one problem, so all four problems get discussed. Students are all accountable to write the next two terms and the description of the pattern on their own worksheet.

Lesson segment 2: Why are variables useful in explaining the rule for a pattern? How can an algebraic expression be used to model the rule for the sequence or to model a pattern?

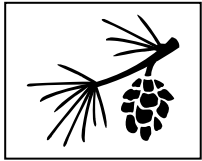
All patterns and sequences can be modeled using operations in a mathematical. That is why mathematics is such a powerful language.

Q. Think-Team-Share For example, in this sequence: 1, 2, 3, 4, 5, 6..., what is the beginning term in the sequence? What operation must happen to find the next term? We can write the rule for finding the next term using math symbols. Let X be a number in the sequence. To find the next number, we need a number one more than X . $X + 1$ would be the rule to help us find the next term in the sequence.

Demonstrate using the graphing calculator to find terms of a sequence and write the rule (algebraic expression) for finding the next term. Then play "Writing The Rule". Instructions are attached. Students should record all sequences, and rules on their assignment paper.

Lesson Segment 3: Practice

Assign any appropriate text practice for extending patterns and sequences. Note, identifying whether the sequence is geometric or arithmetic is not part of the basic core for 7th grade.

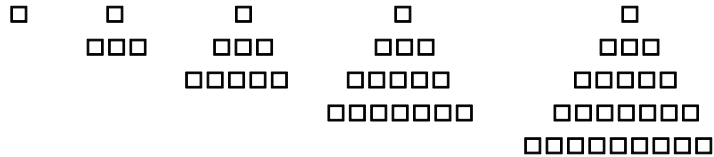


Patterns and Sequences In Our World

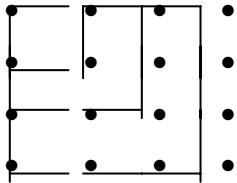
Name _____

Patterns and Sequences can be found all around you. Sketch the next two terms in the sequences or patterns below, then describe the pattern that helped you.

1. A pattern that occurs in building is called a triangular pattern. Here's what this pattern looks like:



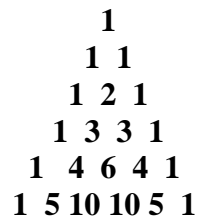
2. Some Native American designs include square patterns that look like this



3. The number pieces on a pinecone or sections around a pineapple increase in a sequence known as a Fibonacci Sequence named for the mathematician who discovered it. If the sections were unwound and laid in rows, they would look like this:



4. A game where a ball moves through a maze to an end point can have several paths the ball could follow to get there. The number of paths can often be modeled by another famous sequence known as Pascal's Sequence, named for the mathematician who discovered it.



5. On the back of this paper, sketch a pattern of your own. Explain how you know what each step of the pattern will be.

“Writing The Rule”

Hand several students a card. See examples below. Each card has a beginning number and a rule written on the card. The person getting the card starts with the beginning number and applies the rule to generate three more numbers in the sequence. That person then tells the class the beginning number and the next three numbers in the sequence. Class members are given time to guess a rule by writing that rule on their calculator and on their paper. The person with the card then reads the next number in the sequence and gives the class time to change or refine the rule they had originally written. This process continues until someone in the class is ready to guess the rule. The guesser using the teacher’s overhead screen types the rule and shows the sequence. Then next person with a card then challenges the class in the same manner.

Calculator steps: Press original number, then the STO→ X ENTER keys. Next, type the rule algebraically (ex. $x + 1$). Then, press the STO→ X ENTER keys again to store that as the next term. Continue pushing the ENTER key to generate 3 more terms of the sequence.

<p>Begin with: 1.5</p> <p>Rule: add 2 to each term</p>	<p>Begin with: 10</p> <p>Rule: add - 2 to each term</p>	<p>Begin with: $\frac{1}{2}$</p> <p>Rule: Multiply each term by 3</p>
<p>Begin with: 24</p> <p>Rule: Multiply each term by $\frac{1}{4}$</p>	<p>Begin with: 2</p> <p>Rule: square each term</p>	<p>Begin with: 3</p> <p>Rule: Multiply each number by 3</p>
<p>Begin with: 1.12</p> <p>Rule: Add 0.03 to each term</p>	<p>Begin with: 4</p> <p>Rule: subtract 0.25 from each term</p>	<p>Begin with: 6.45</p> <p>Rule: subtract 0.15 from each term</p>