

Standards Based Lesson Design

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<u>Purpose/Objective/ Guiding Question</u>	This lesson will take students from looking at a simple pattern question to connecting to slope intercept form and the rate of change.
<u>P.Es/Strands</u>	5.4.A Describe and create a rule for numerical and geometric patterns and extend the patterns. (Activity 1) 5.4.D Graph ordered pairs in the coordinate plane for two sets for data related by a linear rule and draw the line they determine. (Activity 1) 8.1.C Represent a linear function with a verbal description, table, graph, or symbolic expression, and make connections among these representations. 8.1.D Determine the slope and y-intercept of a linear function described by a symbolic expression, table, or graph.
<u>Key Academic Vocabulary</u>	Pattern, sequence, rule, slope, linear equation, slope intercept form, ordered pair, coordinate plane, and quadrant. These vocabulary words have been introduced in the earlier lessons.
<u>Portfolio Evidence</u>	Students put the button packet and screen shots from calculator in the portfolio.
<u>Assessment</u> <input type="checkbox"/> Formative <input type="checkbox"/> Summative	Formative assessment will be conducted during activity one. A short summative assessment will be given on the calculator at the end of the period.
<u>Tools</u> <input checked="" type="checkbox"/> Text <input checked="" type="checkbox"/> Graphic Organizer(s) <input checked="" type="checkbox"/> Artifact	Vocabulary poster from previous lessons. Buttons packet Projector and document camera. TI-Nspire for activity 2.
<u>Do Now</u> Bloom's Taxonomy <input checked="" type="checkbox"/> Knowledge <input type="checkbox"/> Comprehension <input type="checkbox"/> Application	Think-pair-share Complete the sequence individually then share with a partner. 1, 4, 9, 16, 25, ____, ____, ____.
<u>Learning Activities</u> Bloom's Taxonomy <input type="checkbox"/> Comprehension <input type="checkbox"/> Application <input type="checkbox"/> Analysis <input type="checkbox"/> Synthesis Practice <input type="checkbox"/> Collaborative <input type="checkbox"/> Independent Lesson Sequence <input type="checkbox"/> Before <input type="checkbox"/> During <input type="checkbox"/> After	Marzano's strategies used: <ul style="list-style-type: none"> • Nonlinguistic Representations • Identifying Similarities and Differences • Cooperative learning • Homework and practice Activity 1: Part of this activity is below grade level standards. However, it is a good formative assessment to see if students understand basic concept of pattern. In pairs: <ul style="list-style-type: none"> • Read the first 3 sentences of the Buttons handout aloud to each other • Recreate Pattern #3 with the buttons provided • Now use the buttons to create Pattern #4 Individually: <ul style="list-style-type: none"> • Draw Pattern 4 in the box provided on your paper • Answer question #2 for Pattern 5 and Pattern 6—use buttons and/or drawings as needed to help. • Then explain in writing how you figured this out. • Answer question #3 and explain in writing (note: question

refers to ALL buttons, not just white buttons)

In pairs:

- Discuss your answers for questions #2 & #3. What strategies did you use to extend the initial pattern?

Whole group:

- A random student will be chosen from select pairs to show work (under document camera) and explain reasoning. (Teacher will have monitored work to select a variety of strategies to show the class)

Individually:

- Answer question #4. This question require a higher level of cognitive demand (analysis), students are asked to defend their answers.

Whole group:

- Students share explanations under document camera.
- When appropriate ask the questions: “What stays the same?” and “What changes?” to help students develop the ability to form generalizations.

Individually:

- Complete T-Chart using data from questions 1-4.
- Complete question 6-7. Pair share first. Students have the prior knowledge to graph on a coordinate grid using ordered pairs and writing rules using two sets of data. Monitor student work and select a few students to share. Discuss the importance of the title, labels, and appropriate scale for the graph. Students often miss the title, labels and scale on the WASL.

Activity 2: Guess My Rule. This activity is similar to **activity 1**. However, it incorporates technology in the lesson which offers a fresh look to the problem and opportunity for students to learn how to use a graphing calculator. (Assumption: Students have used these graphing calculators before and understand basic functions and stroke keys)

Whole group:

- The calculator screen will be projected on the whiteboard.
- Students select 5 integers from $[-8,8]$ as teacher enters the number into the calculator. Calculator will plot these points on the coordinate grid.
- As a class, students will try to find a rule that will fit these points. (Slope intercept form $y = mx + b$ is previously introduced. This will be a good opportunity to formatively assess students’ prior knowledge on slope and ability to apply to a different situation. Teacher will enter students’ guesses on the calculator to start discussion about what each part of the equation does to the line.) This portion could take longer depending on student responses.

Independent: (Summative assessment)

- Students will receive another question to practice on. The question is pre-written in TI-Nspire with variations from student to student or students can all work on the same

	question. Save file under student names on the calculator.
Debrief Bloom's Taxonomy □ Evaluation	What mathematical connections did you make? How did the calculator help you understand today's lesson?
Homework	Write a scenario to describe $y = 2x + 1$ What does it mean when the slope is negative? Come up with an example in slope intercept form. How do you represent negative slope on a graph?