Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 5* / Grade 5 (Math Regional Curriculum)

Wednesday, October 31, 2012, 11:28AM

Standard/Module: Proficiency in Operations & Algebra 5.OA.3 (Week 32, 8 Weeks)

Stage 1: Desired Results

Standards Focus

- Additional (10%)

5th Grade Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 5th Grade , Operations & Algebraic Thinking

5.OA Analyze patterns and relationships.

- 3. Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.

Enduring Understandings

1. Relationships can be described and generalizations made for mathematical situations that have numbers or objects that repeat in predictable ways. For some relationships, mathematical expressions and equations can be used to describe how members of one set are related members of a second set.
2. Patterns can sometimes be used to identify a relationship between two quantities. Some real-world quantities have a mathematical relationship; the value of one quantity can be found if you know the value of the other quantity.
3. Patterns that repeat in predictable ways may be used to identify relationships.

Essential Questions

1. How can you find a rule and write an addition and subtraction expression?
2. How can you find a rule and write a multiplication and division expression?
3. How can you find the relationship between two sequences?

Critical Content

Algebra

-addition/subtraction expressions

-multiplication/division expressions

-sequences

-patterns

Skills	Vocabulary
1. Students will complete tables to determine a rule and write an expression. 2. Students will read completed tables to determine a rule and write an expression. 3. Students will extend patterns in a table using given rules and will then record relationships between corresponding terms in the sequences.	Tier 2- relationships, patterns, generalizations, identify, predictable Tier 3- difference, quotient, product, sum, variable, algebraic expression, corresponding, sequence, term, order of operations

Stage 2: Assessment Evidence

Assessments

Representing a Rule on the Coordinate Plane
Formative: Test: Written

Students are given a problem where they are to state the rule or pattern between two corresponding terms and graph the ordered pairs on a coordinate plane.

Stage 3: Learning Plan

Learning Activities	Resources
This standard extends the work from Fourth Grade, where students generate numerical patterns when they are given one rule. In Fifth Grade, students are given two rules and generate two numerical patterns. The graphs that are created should be line graphs to represent the pattern. This is a linear function which is why we get the straight lines. **Example:** Make a chart (table) to represent the number of fish that Joe and Melisa catch. **DAYS Melisa's Total Joe's Total** **Number of Fish Number of Fish**	www.illustrativemathematics.org www.illuminations.nctm.org

0	0	0
1	2	4
2	4	8
3	6	12
4	8	16
5	10	20

The Days are the independent variable, Fish are the dependent variables, and the constant rate is what the rule identifies in the table.

Describe the pattern:

Since Joe catches 4 fish each day, and Melisa catches 2 fish, the amount of Joe's fish is always greater. Joe's fish is also always twice as much as Melisa's fish. Today, both Melisa and Joe have no fish. They both go fishing each day. Melisa catches 2 fish each day. Joe catches 4 fish each day. How many fish do they have after each of the five days? Make a graph of the number of fish.

Plot the points on a coordinate plane and make a line graph, and then interpret the graph.

The graph shows that Joe always has more fish than Melisa. Joe's fish increases at a higher rate since he catches 4 fish every day. Melisa only catches 2 fish every day, so her number of fish increases at a smaller rate than Joe's.

Important to note as well that the lines become increasingly further apart. Identify apparent relationships between corresponding terms. Additional relationships: The two

lines will never intersect; there will not be a day in which Melisa and Joe have the same total of fish, explain the relationship between the number of days that has passed and the number of fish each person

has (2n or 4n, n being the number of days). **Example**: Use the rule "add 3" to write a sequence of numbers. Starting with a 0, students write 0, 3, 6, 9, 12, . . . Use the rule "add 6" to write a sequence of numbers. Starting with 0, students write 0, 6, 12,18, 24, . . . After comparing these two sequences, the students notice that each term in the second sequence is twice the corresponding terms of the first sequence. One way they justify this is by describing the patterns of the terms. Their justification may include some mathematical notation (See example below). A student may explain that both sequences start with zero and to generate each term of the second sequence he/she added 6, which is twice as much as was added to produce the terms in the first sequence. Students may also use the distributive property to describe the relationship between the two numerical patterns by reasoning that 6 + 6 + 6 = 2 (3 + 3 + 3). Once students can describe that the second sequence of numbers is twice the corresponding terms of the first sequence, the terms can be written in ordered pairs and then graphed on a coordinate grid. They should recognize that each point on the graph represents two quantities in which the second quantity is twice the first quantity. Students should have experienced generating and analyzing numerical patterns using a given rule in Grade 4. Given two rules with an apparent relationship, students should be able to identify the relationship between the resulting sequences of the terms in one sequence to the corresponding terms in the other	

sequence. For example, starting with 0, multiply by 4 and starting with 0, multiply by 8 and generate each sequence of numbers (0, 4, 8, 12, 16, …) and (0, 8, 16, 24, 32,…). Students should see that the terms in the second sequence are double the terms in the first sequence, or that the terms in the first sequence are half the terms in the second sequence. Have students form ordered pairs and graph them on a coordinate plane. Patterns can be also discerned in graphs. Graphing ordered pairs on a coordinate plane (as show above) is introduced to students in the Geometry domain where students solve real-world and mathematical problems. For the purpose of this cluster, only use the first quadrant of the coordinate plane, which contains positive numbers only. Provide coordinate grids for the students, but also have them make coordinate grids. In Grade 6, students will position pairs of integers on a coordinate plane. The graph of both sequences of numbers is a visual representation that will show the relationship between the two sequences of numbers. Encourage students to represent the sequences in T-Charts so they can see a connection between the graph and the sequences.	

Differentiation Opportunities

Students often reverse the points when plotting them on a coordinate plane. They count up

first on the y-axis and then count over on the x-axis. The location of every point in the

plane has a specific place. Have students plot points where the numbers are reversed

such as (4, 5) and (5, 4). Begin with students providing a verbal description of how to

plot each point. Then, have them follow the verbal description and plot each point.

Mnemonic devices like, "Remember to run before you jump!" or "x is before y in the alphabet, so graph x before y" can help students to remember the correct procedure.

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