

Seymour Public Schools Math Grade 5 Unit 7

<p>Grade: 5</p> <p>Unit 7 –Operations and Algebraic Thinking Involving Patterns, Relationships and Coordinate Graphs</p>	<p>Subject: Math</p> <ul style="list-style-type: none"> ● Time Frame: 16 days ● Domains: Operations and Algebraic Thinking; Write and interpret numerical expressions. Analyze Patterns and relationships. ● Geometry; Graph points on the coordinate plane. 	
<p>Standards</p>	<p>Content Standards: 5.G.1, 5.G.2, 5.OA.1, 5.OA.2, 5.OA.3 http://www.corestandards.org/wp-content/uploads/Math_Standards.pdf</p>	<p>Practice Standards: MP 1, 2, 3, 4, 5, 6, 7, 8</p>
<p>Enduring Understandings</p>	<ol style="list-style-type: none"> 1. Coordinate systems allow us to place points in space and compare them to other points. 2. There is an order that every mathematician follows when evaluating expressions or solving equations. 3. Expressions represent quantities. 4. Numerical patterns follow rules and can be graphed. 5. We can plot points and graph patterns on a coordinate plane to show the relationship of patterns in numbers. 	
<p>Essential Questions</p>	<ol style="list-style-type: none"> 1. How we use coordinate when graphing? 2. What is an expression? 3. How do we use order of operations when evaluating expressions? 4. How do we use grouping symbols in an expression? 5. How can we show the relationship of patterns in numbers? 	
<p>Vocabulary</p>	<p>perpendicular, axis, intersect, coordinate system, origin, coordinate, x-axis, y-axis, x-coordinate, y-coordinate, ordered pair, parenthesis, expression, evaluate, bracket, variable, quadrant</p>	

Priority and Supporting CCSS	Explanations and Examples*
<p>5.OA.1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.</p>	<p>5.OA.1 This standard builds on the expectations of third grade where students are expected to start learning the conventional order. Students need experiences with multiple expressions that use grouping symbols throughout the year to develop understanding of when and how to use parentheses, brackets, and braces. First, students use these symbols with whole numbers. Then the symbols can be used as students add, subtract, multiply and divide decimals and fractions.</p> <p>Examples:</p> <ul style="list-style-type: none"> • $(26 + 18) 4$ Answer: 11 • $\{[2 \times (3+5)] - 9\} + [5 \times (23-18)]$ Answer: 32 • $12 - (0.4 \times 2)$ Answer: 11.2 • $(2 + 3) \times (1.5 - 0.5)$ Answer: 5 • $6 \left(\frac{11}{12} + \frac{21}{12} \right)$ Answer: 5 $\frac{1}{6}$ • $\{ 80 [2 \times (3 \frac{1}{2} + 1 \frac{1}{2})] \} + 100$ Answer: 108 <p>To further develop students' understanding of grouping symbols and facility with operations, students place grouping symbols in equations to make the equations true or they compare expressions that are grouped differently.</p> <p>Examples:</p> <ul style="list-style-type: none"> • $15 + 7 - 2 = 10 \rightarrow 15 + (7 - 2) = 10$ • $3 \times 125 \div 25 + 7 = 22 \rightarrow [3 \times (125 \div 25)] + 7 = 22$ • $24 \div 12 \div 6 \div 2 = 2 \times 9 + 3 \div \frac{1}{2} \rightarrow 24 \div [(12 \div 6) \div 2] = (2 \times 9) + (3 \div \frac{1}{2})$ • Compare $3 \times 2 + 5$ and $3 \times (2 + 5)$ • Compare $15 - 6 + 7$ and $15 - (6 + 7)$

*Source – Connecticut Core Standards for Mathematics as adapted from the Arizona Academic Content Standards

5.OA.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example, express the calculation “add 8 and 7, then multiply by 2” as $2 \times (8 + 7)$. Recognize that $3 \times (18932 + 921)$ is three times as large as $18932 + 921$, without having to calculate the indicated sum or product.*

5.OA.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. *For example, given the rule “Add 3” and the starting number 0, and given the rule “Add 6” and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.*

5.OA.2 Students use their understanding of operations and grouping symbols to write expressions and interpret the meaning of a numerical expression.

Examples:

- Students write an expression for calculations given in words such as “divide 144 by 12, and then subtract $7/8$.” They write $(144 \div 12) - 7/8$.

- Students recognize that $0.5 \times (300 \div 15)$ is $1/2$ of $(300 \div 15)$ without calculating the quotient.

5.OA.3 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 $6 + 6 + 6 = 2(3 + 3)$.

$$0, \quad +^3 3, \quad \quad +^3 6, \quad +^3 9, \quad +^3 12, \dots$$

$$0, \quad +^6 6, \quad +^6 12, \quad +^6 18, \quad +^6 24, \dots$$

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.

5.G.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

5.G.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).

5.G.2 Examples:

- Sara has saved \$20. She earns \$8 for each hour she works.
- If Sara saves all of her money, how much will she have after working 3 hours? 5 hours? 10 hours?
- Create a graph that shows the relationship between the hours Sara worked and the amount of money she has saved.
- What other information do you know from analyzing the graph?

5.G.1 Examples:

• Students can use a classroom size coordinate grid to physically locate the coordinate point (5, 3) by starting at the origin point (0,0), walking 5 units along the x axis to find the first number in the pair (5), and then walking up 3 units for the second number in the pair (3). The ordered pair names a point on the grid.

- Graph and label the points below on a coordinate plane.
 - A (0, 0)
 - B (2, -4)
 - C (5, 5)
 - D (-4, 1)
 - E (2.5, -6)
 - F (-3, -2)

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Resources

Math Expressions–Unit 7, Lessons 1-7 (Pages 557A – 605)
Soar to Success Math Intervention
Mega Math
Destination Math
Common Core Mathematics-Newmark Learning-
Xtramath.org
Connecticut State Department of Education <http://www.sde.ct.gov/sde/cwp/view.asp?a=2618&q=320872>

Unit Assessments

Unit Test
Formative Assessments from Math Expressions
Quick Quizzes
Performance Task
Formative Assessment: <http://3-5cctask.ncdpi.wikispaces.net/5.OA.1-5.OA.2>

Technology: Videos, Websites, Links

www.learnzillion.com
<https://grade5commoncoremath.wikispaces.hcpss.org/5.NBT.2>
<https://grade5commoncoremath.wikispaces.hcpss.org/5.NBT.3>
<https://grade5commoncoremath.wikispaces.hcpss.org/5.NBT.5>
<https://grade5commoncoremath.wikispaces.hcpss.org/5.NBT.6>
<https://grade5commoncoremath.wikispaces.hcpss.org/5.NBT.7>