Unit 5: Expressions and Patterns

Content Area: **Mathematics**
Course(s): **Math - Grade 5**
Time Period: **4th Marking Period**
Length: **2 weeks**
Status: **Published**

Unit Overview

Students will learn to use patterns and graphing to solve problems. Students will graph ordered pairs on the coordinate plane.

Benchmark:

This unit is ongoing throughout the school year. Students should be completing coordinate graphing activities as a classwork assignment each month.

By the end of the year, students will complete the third and final benchmark assessment (LinkIt Form C SGO) covering all units. Use these scores to measure student growth from beginning to end of year. Data used for final SGO.

Transfer

Students will be able to independently use their learning to...

Write and interpret numerical expressions.

Graph points on the coordinate plane to solve real-world and mathematical problems.

Analyze patterns and relationships

For more information, read the following article by Grant Wiggins.

http://www.authenticeducation.org/ae_bigideas/article.lasso?artid=60

Meaning

Understandings

Students will understand...

- That expressions are often used to represent patterns and to solve problems arising in everyday life.
- How to create and interpret a graph to answer questions, anazlyze relationships, and draw conclusions.

Essential Questions

Students will keep considering...

-How are patterns used to solve problems?

Application of Knowledge and Skill

Students will know...

Students will know...

- How to write and interpret numerical expressions
- How to graph on the coordinate plane
- How to anazlye patterns and relationships

Students will be skilled at...

Students will be skilled at...

- Writing and interpreting numerical expressions
- Generating a numerical pattern(s) when given a rule
- Identifying and plotting coordinate pairs on a graph
- Writing a rule to describe a pattern

Academic Vocabulary

numerical expression

evaluate

sequence

term

coordinate plane

origin

ordered pair

x-coordinate

y-coordinate

LEARNING GOAL 1: Expressions and Patterns

Students will be able to write and interpret numerical expressions and analyze patterns and relationships.

Students will be able to graph points on the coordinate plane to solve real world and mathematics.

## Daily Targets- Expressions, Patterns & Graphing

SWBAT:

- Write and evaluate numerical expressions. Use numbers and operation symbols to write verbal phrases as numerical expressions. **(Chapter 7, Lesson 1 & 3) (DOK 3)**
- Solve problems by working backward. **(Chapter 1, Lesson 4/ "Power Up!" resource) (DOK 4)**
- Generate numerical patterns and identify pattern relationships. Identify and extend patterns and sequences. **(Chapter 7, Lessons 5- 6) (DOK 3)**
- Plot points on a grid to solve real-world problems. Graph points on a coordinate plane to solve real-world and mathematical problems. **(Chapter 7, Lesson 7- 8) (DOK 3)**
- Graph ordered pairs on a coordinate plane to solve problems involving two numerical patterns. **(Chapter 7, Lesson 9) (DOK 2)**

Examples:

1. Phrase: subtract 2 from 8, then divide by 3 = (8-2) / 3

2. 72, 67, 62, 57, 47, ___. The next number in the pattern is 47 - 5, or 42.

3. Connect these points in order on the coordinate grid below:

(2, 2) (2, 4) (2, 6) (2, 8) (4, 5) (6, 8) (6, 6) (6, 4) and (6, 2).

Coordinate Grid

What letter is formed on the grid?

Solution: "M" is formed.
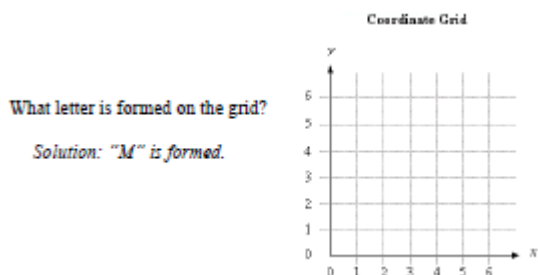
4. Plot these points on a coordinate grid.

Point A: (2,6)

Point B: (4,6)

Point C: (6,3)

Point D: (2,3)

Connect the points in order. Make sure to connect Point D back to Point A.

1. What geometric figure is formed? What attributes did you use to identify it?

2. What line segments in this figure are parallel?

3. What line segments in this figure are perpendicular?

Solutions: trapezoid, line segments AB and DC are parallel, segments AD and DC are perpendicular

5. 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?

MA.5.OA.A	Write and interpret numerical expressions.
MA.5.OA.A.1	Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
MA.5.OA.A.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 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.
MA.5.OA.B	Analyze patterns and relationships.

MA.K-12.4	Model with mathematics.
MA.5.OA.B.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.
	Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.
MA.5.G.A	Graph points on the coordinate plane to solve real-world and mathematical problems.
MA.5.G.A.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).
MA.5.G.A.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.

Formative Assessment and Performance Opportunities

- Teacher observation
- Classwork activities and games (Coordinate graphing once a month)
- Center work/ small group work
- Group work activities
- Homework
- ALEKS
- Google Classroom questions
- Google Forms common quick checks
- Leveled Readers
- Chapter 7 Project Based Learning- Recycling Rules (Student workbook page 472)
- Chapter 7 Performance Task- *Planting Community Gardens* (Student workbook pages 540PT1-PT2)

Summative Assessment

- Quizzes
- Tests/Common Assessment
- Projects (paper and technology based)
- Short & Extended Constructed Response
- ALEKS test or quiz
- Power up for state assessment

21st Century Life and Careers & Technology

CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP11	Use technology to enhance productivity.
CAEP.9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.
TECH.8.1.5	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.5.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.5.A.1	Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.
TECH.8.1.5.A.CS1	Understand and use technology systems
TECH.8.1.5.A.CS2	Select and use applications effectively and productively.
TECH.8.1.5.C.CS1	Interact, collaborate, and publish with peers, experts, or others by employing a variety of digital environments and media
TECH.8.1.5.C.CS2	Communicate information and ideas to multiple audiences using a variety of media and formats.
TECH.8.1.5.D.CS1	Advocate and practice safe, legal, and responsible use of information and technology.
TECH.8.1.5.D.CS2	Demonstrate personal responsibility for lifelong learning
TECH.8.1.5.E	Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
TECH.8.2.5.D.3	Follow step by step directions to assemble a product or solve a problem.

Accommodations and Modifications

- IEP modifications

- 504 accomodations
- BSI support
- ELL vocabulary/ word webs
- English Learner Support Interactive Guide/ Tiered Questions: *Inside a Science Museum* **Spanish Reader and Real- World Problem Solving Spanish Reader**
- Leveled Readers: *Inside a Science Museum* **is available in 3 lexile reader levels**
- Interactive Guide: Scaffolded differentiated activities (emergenging, expanding, bridging levels)
- Leveled learning centers
- Use of manipulatives/ models: **coordinate plane**
- Performance Tasks
- Reteach lesson pages: **Chapter 7**
- Enrich lesson pages: **Chapter 7**
- Co-teach environment
- Small group instuction
- Various forms of assessments
- Advanced Learners: **Project Based Learning**

Unit Resources

MyMath Grade 5, Vol. 1 Teacher Edition, Chapters 7 Student Workbook: 2014 McGraw-Hill Education

[My Math Online Portal](#)

Teacher Made assessments

- http://bealearninghero.org/

- http://forstudentsuccess.org/

- https://www.illustrativemathematics.org/

- The Link It Learning Library (Use the reporting dashboard to pull up a test, click on the blue bar for the class you wish to examine, click on standards tab when student data appears, and double click on the color coded percentage mastery box to open the learning library)

- Desmos is a fun site that can be used as a graphing calculator but also has lessons already created

  o https://www.desmos.com/

  o https://teacher.desmos.com/

Coherence Map to enhance student learning

- http://achievethecore.org/coherence-map/#4/17/160/214/1

o https://student.desmos.com/

You Cubed math games and activities

- https://www.youcubed.org/

Proficiency Scale

Unit 5 -- Proficiency Scale - Operations and Algebraic Thinking --Chapter
Topic: Write and interpret numerical expressions. Use parentheses, brackets, and or braces in numerical ex Analyze patterns and relationships a coordinate grid
Grade: 5 • **(5.OA.A) Write and evaluate numerical expressions.** • **(5.OA.A.1)? Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbol** • **(5.OA.A.1) Use the order of operations (PEMDAS) to evaluate expressions .** • **(5.OA.A.2) Use numbers and operation symbols to write verbal phrases as numerical expressions without actually solvir** • **(5. OA.A.3) Find and create patterns** • **(5.G.1) Graph points on a coordinate plane to solve real-world and mathematical problems.** • **(5.G.1) Graph ordered pairs on a coordinate plane to solve problems involving two numerical patterns**

Score 4	**I can develop a problem to match the strategy.**	
Score 3 (Learning Goal) What students will be able to do	**I am able to interpret and create numerical expressions..** **I can also analyze patterns and relationships and graph the patterns on a coordinate grid.**	
Score 2 What students will know	**I can:** • **Solve numerical expressions that don't involve using the order of operations** • **Find patterns in adding, subtracting, multiplying, and dividing** • **Identify coordinates on a graph**	
Score 1	**I can do some of the foundational knowledge found in level two with help.**	

Interdisciplinary Connections

The *Inside a Science Museum* Real-World Problem Solving Reader gives students an opportunity to read informational text and answer mathematical questions relating to the text. Some of the real-world problems in this text related to this unit include: writing expressions to represent the atomic number for a given element, writing a number sentence to show how many more days Earth has in a year compared to Mercury, and writing a number sentence to represent how much deeper the Atlantic Ocean is than the Arctic Ocean.

MA.5.OA.A.1	Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
MA.5.OA.A.2	Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.
SCI.5-ESS2-2	Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.