Geometry and Patterns

Content Area: **Math**
Course(s):
Time Period: **Full Year**
Length: **Full Year**
Status: **Published**

Unit Overview

Enduring Understandings

Kinesthetic learners find models extremely helpful in understanding math concepts; grids, fraction bars, pie charts, and number lines help students see the structure of the operations.

Multi-digit number operations are found in many careers and everyday life, and proficient knowledge of how to calculate them efficiently will help ensure a life-long skill.

Number line awareness helps student's perception as it relates to numbers on the coordinate plane in Quadrant I.

Real world math problems including traveling from one point to another can be calculated on a coordinate plane.

Coordinate planes are utilized to represent data on a graph through ordered pairs.

Information on a graph or coordinate plane can be interpreted and analyzed in real life situations.

Knowing the geometric shapes and their attributes, students can then identify missing points on a graph.

Essential Questions

What types of models, drawing or strategies are used to demonstrate the four operations as they relate to decimals?

Why is it important to be fluent in solving mathematical operations with multi-digit whole numbers?

How does the number line relate to the coordinate plane?

Why is the coordinate plane important in understanding real world math concepts?

How could you communicate the attributes of the coordinate plane?

When would you use the coordinate plane in a career?

How can you construct geometric figures in the first quadrant of a coordinate plane?

What types of data would best be shown on a line plot?

How can you find missing points in a geometric figure on a coordinate grid?

Learning Objectives

Identify and explain the Coordinate Plane.

Plot ordered pairs on the coordinate plane.

Explain that a coordinate system is defined by a pair of perpendicular lines called axes that intersect at 0 on each line (the origin).

Explain that a given point in the plane is located using an ordered pair of numbers (coordinates).
Understand that the first number in an ordered pair indicates how far to travel from the origin in the direction on the x-axis, and the second number indicates how far to travel in the direction on the y-axis.
Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane.
Interpret coordinate values of points in the context of the real world and mathematical problems.
Students will be able to classify triangles by their properties

Classify two-dimensional figures in a hierarchy based on properties.

Write, interpret, and evaluate numerical expressions. Write numerical expressions to compare their value without evaluating them.

Evaluate numerical expressions (including fractions and decimals) with parentheses, brackets, and braces.

Use parentheses, brackets, or braces to group parts of a numerical expression.

Identify numerical patterns. Identify relationships with corresponding terms in the generated pattern.

Use a table to arrange corresponding terms of two numerical patterns.

Identify and explain the relationship between corresponding terms in numerical patterns.

Graph ordered pairs.

Identify relationships between corresponding terms in a pattern.
Form ordered pairs consisting of corresponding terms from the two patterns.
Graph the ordered pairs on a coordinate plane.

Understand how different visualizations can highlight different aspects of data.
Interpret data visualizations to describe and analyze patterns.
Develop strategies to collect, organize and represent data of various types and from various sources.

Communicate results digitally through a data visual (e.g. chart, storyboard, video presentation).

Use appropriate visualizations (double line plots, double bar graphs,) to analyze data across samples.

Standards: Content

5.OA.A	Write and interpret numerical expressions
5.OA.A.1	Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
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.
5.OA.B	Analyze patterns and relationships
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.
5.DL.A	Understand and analyze data visualizations Analysis of data and visualizations at this grade excludes ratio, rate, proportion and percentages. These concepts are introduced in Grade 6
5.DL.A.1	Understand how different visualizations can highlight different aspects of data. Ask questions and interpret data visualizations to describe and analyze patterns.
5.DL.A.2	Develop strategies to collect, organize and represent data of various types and from various sources. Communicate results digitally through a data visual (e.g., chart, storyboard, video presentation).
5.DL.A.3	Collect and clean data to be analyzable (e.g., make sure each entry is formatted correctly, deal with missing or incomplete data).
5.DL.A.4	Using appropriate visualizations (i.e., double line plot, double bar graph), analyze data across samples.
5.G	Geometry
5.G.A	Graph points on the coordinate plane to solve real-world and mathematical problems
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., □-axis and □-coordinate, □-axis and □-coordinate).
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.
5.G.B	Classify two-dimensional figures into categories based on their properties
5.G.B.3	Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category.
5.G.B.4	Classify two-dimensional figures in a hierarchy based on properties.

Standards: Interdisciplinary

9.4.2.CT.1	Gather information about an issue, such as climate change, and collaboratively brainstorm

	ways to solve the problem (e.g., K-2-ETS1-1, 6.3.2.GeoGI.2).
9.4.2.CT.3	Use a variety of types of thinking to solve problems (e.g., inductive, deductive).
9.2.5.CAP.6	Compare the characteristics of a successful entrepreneur with the traits of successful employees.
9.2.5.CAP.7	Identify factors to consider before starting a business.
9.1.2.PB.1	Determine various ways to save and places in the local community that help people save and accumulate money over time.
9.1.2.PB.2	Explain why an individual would choose to save money.
8.1.5.DA.1	Collect, organize, and display data in order to highlight relationships or support a claim.
8.1.5.DA.5	Propose cause and effect relationships, predict outcomes, or communicate ideas using data.
9.4.2.IML.2	Represent data in a visual format to tell a story about the data (e.g., 2.MD.D.10).
9.4.2.IML.3	Use a variety of sources including multimedia sources to find information about topics such as climate change, with guidance and support from adults (e.g., 6.3.2.GeoGI.2, 6.1.2.HistorySE.3, W.2.6, 1-LSI-2).
8.2.5.ED.2	Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.
8.2.5.ED.3	Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.
8.2.5.ED.5	Describe how specifications and limitations impact the engineering design process.

Assessment Evidence

Formative	Collaborative Activities, Homework, Daily Classwork, Discussion, Independent Class Assignment, Informal Observations of Students, Games, Exit Slips, Questioning, Teacher Made Pages, Learning Centers, Problem of the Day, Reveal Workbooks, Fluency Checks, Curious, Activity Based Exploration, Guided Exploration, On My Own.
Summative	Tests, Mid-Chapter Checkpoint assessments, teacher generated assessments
Alternative & Benchmark	Alternative – Reteaching, One on One Conferencing, Learning Centers, student portfolio of assignments, Homework, Higher Order Thinking Problems, Additional leveled practice, orally administered assessments. Benchmark - LinkIt Benchmark Assessments, Totowa TPA
Assessment Evidence Resource	

Instructional Resources

Smartboard, Computers, websites and digital interactives/models, Multi-media presentations, video streaming, Brain Pop, Microsoft 365, Primary and Secondary Source Documents, Reveal Math Resources, manipulatives, post-it notes, markers, number lines, chart & graph paper, construction paper, glue, scissors, paperclips, crayons, envelopes, dot ink & cards, geo blocks, number cubes/dice.

Instructional Resource List

Curricular Mandates

Below are the curricular requirements as defined in NJ Administrative Code and Statute

	Amistad		Diversity, Equity, and Inclusion
	Holocaust		LGBT and Disabilities (Grades 6-12)
	Climate Change		Asian American & Pacific Islander

Social Emotional Learning (SEL) Competencies

NJ Social and Emotional Learning Competencies & Sub-Competencies

	Self-Awareness	X	Relationship Skills
X	Responsible Decision-Making		Social Awareness
	Self-Management		

21st Century Skills & Themes

	Global and Cultural Awareness	X	Technology Literacy		Planning and Budgeting
X	Creativity and Innovation		Financial Institutions		Risk Management and Insurance
	Information and Media Literacy		Digital Citizenship		Economic and Government Influences
X	Critical Thinking and Problem Solving		Credit Profile		Career Awareness and Planning
	Civic Financial Responsibility		Financial Psychology		