Measurement, Graphing, and Data

Content Area: **Math**
Course(s):
Time Period: **MP4**
Length: **45**
Status: **Published**

Unit Overview

Unit Summary	Unit Rationale
The focus of Unit 4 is defining a coordinate system and understanding the relationship between coordinates and axes. Learners define the first quadrant of the coordinate system and represent real world and mathematical problems by graphing points in that quadrant. Learners also form ordered pairs that they have generated using two given rules to generate two numerical patterns using two given rules. They analyze and identify apparent relationships between corresponding terms. After revisiting their earlier work writing simple numerical expressions, learners extend their understanding of classifying figures into categories to understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. They use this new understanding of categories and subcategories to classify two-dimensional figures in a hierarchy based on their properties.	Measurement of lengths and the understanding of shapes are foundational to working with real-world 2-D and 3-D projects, and future study of geometry, Graphing provides a visual model of real-world data and allows for analysis of data trends. Being able to reason about data displays and trends is key to understanding data as presented in various media and scholarly resources and making informed real-world decisions.

NJSLS

MATH.5.NBT.A.2	Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
MATH.5.NBT.A.4	Use place value understanding to round decimals to any place.
MATH.5.NBT.B.5	With accuracy and efficiency, multiply multi-digit whole numbers using the standard algorithm.
MATH.5.NBT.B.6	Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
MATH.5.M.A.1	Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.
MATH.5.DL.B.5	Make a line plot to display a data set of measurements in fractions of a unit (½, ¼, ⅛). Use operations on fractions for this grade to solve problems involving information presented in line plots.
MATH.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).
MATH.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.
MATH.5.G.B.3	Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category.
MATH.5.G.B.4	Classify two-dimensional figures in a hierarchy based on properties.

Standards for Mathematical Practice

MATH.K-12.1	Make sense of problems and persevere in solving them
MATH.K-12.2	Reason abstractly and quantitatively
MATH.K-12.3	Construct viable arguments and critique the reasoning of others
MATH.K-12.4	Model with mathematics
MATH.K-12.5	Use appropriate tools strategically
MATH.K-12.6	Attend to precision
MATH.K-12.7	Look for and make use of structure
MATH.K-12.8	Look for and express regularity in repeated reasoning

Unit Focus

Enduring Understandings	Essential Questions
• Multiplication and division are used to	• How do you change from one unit of length

convert among different units of length. • Multiplication and division are used to convert among different metric units of length. • The coordinate system uses two perpendicular number lines intersecting at 0 to name the location of points in the plane. • A coordinate grid has an x-axis and a y-axis that can be used to locate points in two dimensions. • Points that lie on a line can be connected and extended to solve problems. • Good math thinkers know how to think about words and numbers to solve problems. • Line plots are one way to organize and represent numerical data collected in a survey. • Line plots are one way to organize and represent numerical data. You can use a line plot to see how data are distributed. • You can use line plots to solve problems that involve data. • Good math thinkers use math to explain why they are right. They can talk about the math that others do, too. • Triangles are classified by their sides and their angles. • Quadrilaterals are classified by their sides and by their angles. • Quadrilaterals are classified by their sides and by their angles. • Good math thinkers use math to explain why they are right. They can talk about the math that others do, too.	to another? • How do you convert metric units of length? • How do you name a point on a coordinate grid? • How do you graph a point on a coordinate grid? • How can you use ordered pairs to solve problems? • How can you use reasoning to solve mathematical problems? • How can you analyze data displayed in a line plot? • How can you use a line plot to organize and represent measurement data? • How can you use measurement data organized in a line plot to solve problems? • How can you critique the reasoning of others? • How can you classify triangles? • What are some properties of quadrilaterals? • How are special quadrilaterals related to each other? • How can you construct arguments?

Instructional Focus

Learning Targets

- multiply multi-digit whole numbers with accuracy and efficiency.
- convert from one measurement unit to another within a given measurement system (e.g., convert 5 cm to 0.05 m, convert minutes to hours).
- solve multi-step, real world problems that require conversions.
- graph points defined by whole number coordinates in the first quadrant of the coordinate plane in order to represent real world and mathematical problems.
- interpret coordinates in context.
- use two rules to create two numerical patterns.
- compare corresponding terms (e.g. compare the first terms in each list, compare the second terms in each list, etc).
- identify the relationship between corresponding terms and write ordered pairs.
- graph the ordered pairs.
- classify two-dimensional figures (triangles, quadrilaterals) based on shared attributes (e.g. parallel sides, number of sides, angle size, side length, etc.).
- arrange the categories/subcategories of figures (e.g. squares, rectangles, trapezoids, etc) in a hierarchy based on attributes.
- identify attributes of a two-dimensional shape based on attributes of the categories to which it belongs.
- use measurement information to create a line plot.
- using measurement information presented in line plots, add, subtract, multiply and divide fractions in order to solve problems.
- add and subtract decimals to hundredths using concrete models and drawings.
- multiply and divide decimals to hundredths using concrete models and drawings.
- add, subtract, multiply, and divide decimals to hundredths using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
- relate the strategy to the written method and explain the reasoning used.
- use a story context to interpret division of a unit fraction by a whole number.
- use a story context to interpret division of a whole number by a unit fraction.
- divide unit fractions by whole numbers to solve real world problems, using visual fraction models and equations to represent the problem.
- divide whole numbers by unit fractions to solve real world problems, using visual fraction models

and equations to represent the problem.
Prerequisite Skills
Understanding scaling and units of fractions on a number line Generate a number or pattern with a given rule Classify two-dimensional figures based on properties Place value to hundredths.
Common Misconceptions
Students may think the order, right and then up, does not matter. Giving two coordinates with the values switched, (3,4) and (4,3) will aid in addressing this misconceptions. When describing geometric shapes and placing them in subcategories, learners may think that the most specific subcategory is the only classification. Students may believe that multiplication always results in a larger number.

Spiraling For Mastery

Current Unit Content/Skills	Spiral Focus	Activity
• multiply and divide using conversion factors to change from one unit of length to another • multiply or divide by a power of ten to change from one metric unit of length to another metric unit of length. • name a point on a coordinate grid • graph a point on a coordinate grid • use ordered pairs to solve problems • use reasoning to solve mathematical problems with graphed data. • *analyze data in a line plot* • *organize data on a line plot* • *use data on a line plot to solve problems.* • classify triangles by side	• convert larger customary units of length to smaller customary units of length • identify patterns in multiplying and dividing by powers of 10. • read data from a line plot • display data on a line plot • analyze data in a line plot • use a line plot to solve problems. • *read line plots* • *make line plots* • *use data form line plots to add or subtract fractions and mixed numbers.* • classify angles (right, acute, obtuse, straight) • analyze triangles (right, acute, obtuse, equilateral, isosceles, and scalene) • analyze quadrilaterals (parallelograms, rectangles,	• Math Diagnostic and Intervention System Activities • IXL

length and angle measure • classify quadrilaterals • show the relationships between different types of quadrilaterals • construct arguments about triangles and quadrilaterals.	squares, rhombuses, and trapezoids) • understand angle measure and graphing polygons on the coordinate plane	

Assessment

Formative Assessment	Summative Assessment
• Homework • Lesson Checks • MathXL • Quizzes • Exit Tickets • Lesson Reflections • Performance Tasks	• Topic Tests (Common Assessments) • Unit 4 Benchmark (Link-It)

Resources

Key Resources	Supplemental Resources
• Savvas EnVision Grade 5 • Pacing Guide	• IXL • Delta Math • Desmos • Khan Academy

Career Readiness, Life Literacies, and Key Skills

TECH.9.4.2.CI.1	Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2).
TECH.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).
TECH.9.4.2.CT.2	Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3).

TECH.9.4.2.TL.1	Identify the basic features of a digital tool and explain the purpose of the tool (e.g., 8.2.2.ED.1).

Interdisciplinary Connections

ELA.L.RF.5.4.A	Read grade-level text with purpose and understanding.
ELA.L.KL.5.1.A	Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases.
	Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume.
	Support an argument with evidence, data, or a model.
ELA.W.AW.5.1.B	Provide logically ordered reasons that are supported by facts and details from text(s), quote directly from text when appropriate.
ELA.W.AW.5.1.C	Link opinion and reasons using words, phrases, and clauses (e.g., consequently, specifically).
ELA.W.IW.5.2.D	Use precise language and domain-specific vocabulary to inform about or explain the topic.
SCI.5-ESS1	Earth's Place in the Universe
SCI.5-ESS1-1	Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.
	Support an argument with evidence, data, or a model.
	Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships.