

04. Decimal Concepts; Coordinate Grid

Content Area: **Math**
Course(s):
Time Period: **Full Year**
Length: **5 weeks**
Status: **Published**

General Overview, Course Description or Course Philosophy

In Grade 5, instructional time should focus on three critical areas:

1. Developing fluency with addition and subtraction of fractions, and developing understanding of the multiplication of fractions and of division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions)
2. Extending division to 2-digit divisors, integrating decimal fractions into the place value system and developing understanding of operations with decimals to hundredths, and developing fluency with whole number and decimal operations
3. Developing understanding of volume

In this unit, students will understand that the base- 10 number system, that decimals can be represented in multiple modalities, whole number algorithms are applied to add and subtract decimals, and use the coordinate plane to naming and locating specific points in space.

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Students will understand that:

- The base-10 number system is extended to include decimals, representing numbers between whole numbers, up to the thousandths place.
- Decimals can be represented using manipulatives and pictorial models, compared, ordered and rounded.
- Whole-number algorithms are applied to add and subtract decimals.
- The coordinate plane gives an organized, scaled system for naming and locating specific points in space.

Essential Questions:

- How does extending the base-10 number system to include decimals expand our understanding of numbers and their positions on the number line?
- In what ways can manipulatives and pictorial models aid in visualizing and understanding decimals?
- How do these models represent numbers between whole numbers up to the thousandths place?
- What strategies and techniques can be used to effectively compare, order, and round decimals?
- How are the algorithms for addition and subtraction of whole numbers applied and adapted to add and subtract decimals? What are the key differences in these processes?

- In what real-world contexts are decimals used extensively? How do decimals help in measurements, finances, or scientific calculations?
- How does the coordinate plane provide an organized and scaled system for locating specific points in space?
- How can the coordinate plane be utilized to map out shapes, locations, or pathways? How does the coordinate system aid in navigation or mapping real-life scenarios?
- How are decimals and coordinates interconnected? Can decimals be represented or interpreted within the context of the coordinate plane?

STUDENT LEARNING TARGETS

Refer to the 'Declarative Knowledge' and 'Procedural Knowledge' sections.

Declarative Knowledge

Students will know:

- Decimals, like fractions, are used to represent values between whole numbers.
- Decimals, unlike fractions, follow the place-value rules and patterns of the base-10 number system.
- Algorithms for decimal addition and subtraction build on the concept of adding and subtracting digits in like place-value positions.
- A coordinate grid is formed by two number lines, called axes, which intersect at their zero points, forming right angles

Procedural Knowledge

Students will be able to:

- Apply place-value concepts in write decimals using numerals and words
- Generate multiple names for decimals and represent decimals by shading thousandths grids.
- Read and write decimals in expanded form.
- Compare decimals to thousandths using place-value strategies
- Round decimals to a given place

- Plot and label points on a coordinate grid
- Plot points and use clues to find the location of a hidden point on a coordinate grid
- Represent problems by graphing points on a coordinate grid and interpret coordinate values in context
- Create and apply a rule to enlarge a picture on a coordinate grid
- Find decimal sums and differences by shading grids
- Use an algorithm to add and subtract decimals, including money.

CONTENT AREA STANDARDS

5.NF

A. Use equivalent fractions as a strategy to add and subtract fractions

B. Apply and extend previous understandings of multiplication and division to multiply and divide fractions

5.M

A. Convert like measurement units within a given measurement system

B. Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition

5.DL

A. Understand and analyze data visualizations

5.G

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

B. Classify two-dimensional figures into categories based on their properties

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.

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.

MA.5.NBT.A.1	Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and $1/10$ of what it represents in the place to its left.
MA.5.NBT.A.3	Read, write, and compare decimals to thousandths.
MA.5.NBT.A.4	Use place value understanding to round decimals to any place.
MA.5.NBT.A.3a	Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.
MA.5.NBT.A.3b	Compare two decimals to thousandths based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.
MA.5.NBT.B.7	Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

INTERDISCIPLINARY CONNECTIONS

Geography and Mathematics:

- Students will explore map reading skills by utilizing coordinates and decimals to locate specific landmarks or cities on a map.

Environmental Studies and Mathematics:

- Students will analyze data related to environmental measurements (e.g., temperature, rainfall) using decimals and the coordinate plane to plot trends or changes over time.

RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)

CS.K-12.2.d	Evaluate and select technological tools that can be used to collaborate on a project.
CS.K-12.7.a	Select, organize, and interpret large data sets from multiple sources to support a claim.
WRK.K-12.P.4	Demonstrate creativity and innovation.
WRK.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
TECH.K-12.P.4	Demonstrate creativity and innovation.
TECH.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
TECH.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.

RESOURCES (Instructional, Supplemental, Intervention Materials)

Core Materials:

- Everyday Math Unit 4 Resources (Math Masters, Student Journal Volume 1) / ConnectED
- Calendar Math

Supplemental Materials:

- Illustrative Math Tasks
- IXL
- Games
 - Fraction Of (Lessons 4-1, 4-12): Solving fraction-of problems
 - Fraction Capture (Lesson 4-3): Finding fractions that add to a given sum
 - Decimal Top-It (Lessons 4-4, 4-8): Comparing decimals
 - Rename That Mixed Number (Lesson 4-5): Renaming mixed numbers
 - Over and Up Squares (Lessons 4-6, 4-11): Plotting points on a coordinate grid
 - Hidden Treasure (Lesson 4-7): Plotting points on a coordinate grid and reasoning about the location of a hidden points
 - High-Number Toss (Lesson 4-9): Reading, writing, and comparing numbers in standard and exponential notations
 - Decimal Top-It: Addition (Lesson 4-12): Adding and comparing decimals
 - Prism Pile-Up (Lesson 4-13): Finding volumes of rectangular prisms
 - Decimal Top-It: Subtraction Variation (Lesson 4-13): Comparing and subtracting decimals
 - Spend and Save (Lesson 4-14): Adding and subtracting amounts of money
- Manipulatives
 - Counters
 - Base-10 blocks
 - Number card sets 0-9, 0-10
 - Fraction circles
 - Meter sticks
 - 6-sided dice
 - Stopwatch
 - Rulers

Intervention Materials:

- Number Worlds
- Touch Math Now

EVIDENCE OF LEARNING

Refer to the 'Formative, Summative, and Benchmark Assessments' sections.

Alternative Assessments

- Portfolios

- Verbal Assessment (instead of written)
- Multiple choice
- Modified Rubrics
- Performance Based Assessments

Formative Assessments

- Journal Pages
- Homelinks
- Math Boxes
- Observations
- Classwork
- Homework Assignments
- Do Now Questions
- Exit Tickets
- Self Assessment Questions

Summative Assessments

- Check Points
- Unit 4 Assessment
- Graded Assignments
- Project-based assessments

Benchmark Assessments

- IXL Screener / Diagnostic Snapshot BOY
- Trimester 1 Benchmark Assessment
- IXL Diagnostic Snapshot MOY
- Trimester 2 Benchmark Assessment
- IXL Diagnostic Snapshot EOY
- Trimester 3 Benchmark Assessment

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.