Unit 05: Extending the Number Line

Content Area: **TEMPLATE**
Course(s):
Time Period: **Full Year**
Length: **3 weeks**
Status: **Published**

General Overview, Course Description or Course Philosophy

In this unit, students will develop an understanding of the concepts of opposite numbers, negative numbers, and absolute value. They will also compare and order integers and rational numbers. In addition, they will graph points in the four-quadrant coordinate plane as well as reflect points over the axes and find the distance between two points.

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Essential Questions:

- How are opposites and negative numbers used in real-world contexts?
- What is the difference between an integer and a rational number?
- What is the coordinate plane and what does an ordered pair represent?

Enduring Understandings:

- More than integers are necessary to solve real-world applications. Example: negative, opposite, and rational numbers.

CONTENT AREA STANDARDS

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.4	Model with mathematics.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.6.NS.C	Apply and extend previous understandings of numbers to the system of rational numbers.
MA.6.NS.C.5	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
MA.6.NS.C.6	Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.

MA.6.NS.C.6a	Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite.
MA.6.NS.C.6b	Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
MA.6.NS.C.6c	Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.
MA.6.NS.C.7	Understand ordering and absolute value of rational numbers.
MA.6.NS.C.7a	Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.
MA.6.NS.C.7b	Write, interpret, and explain statements of order for rational numbers in real-world contexts.
MA.6.NS.C.7c	Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.
MA.6.NS.C.7d	Distinguish comparisons of absolute value from statements about order.
MA.6.NS.C.8	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

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

LA.K-12.NJSLSA.R7	Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
LA.K-12.NJSLSA.L1	Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
CS.K-12.3	Recognizing and Defining Computational Problems
CS.K-12.5	Creating Computational Artifacts
WRK.K-12.P.2	Attend to financial well-being.
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.

STUDENT LEARNING TARGETS

Declarative Knowledge

Students will understand:

- That positive and negative numbers are used together to describe quantities having opposite directions or values.
- The absolute value of a rational number as its distance from 0 on the number line.

- Signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane.

Procedural Knowledge

Students will be able to:

- Use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
- Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line.
- Recognize that the opposite of the opposite of a number is the number itself.
- Recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
- Find and position integers and other rational numbers on a horizontal or vertical number line diagram.
- Find and position pairs of integers and other rational numbers on a coordinate plane.
- Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.
- Write, interpret, and explain statements of order for rational numbers in real-world contexts.
- Interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.
- Distinguish comparisons of absolute value from statements about order.
- Use coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.
- Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane.

EVIDENCE OF LEARNING

Formative Assessments

- Observations/Checklists
- Classwork
- Do Now Questions/Exit Tickets
- Self Assessment Questions
- Journal: How can you decide whether a given fraction is closest to 0, ½, or 1?
- Illustrative Math Performance Tasks:
  - 6.NS.C.7a Fractions on the Number Line
  - 6.NS.C.7b Comparing Temperatures
  - 6.NS.C.8 Distance Between Points
- IXL Skills Practice
- Student Proficiency Scale

Summative Assessments

- Portfolio Artifacts

Averages are based upon participation/preparation, classwork, and quizzes. Student marking period grades are either O (outstanding), S (satisfactory), or U (unsatisfactory).

RESOURCES (Instructional, Supplemental, Intervention Materials)

- *CMP3 Comparing Bits & Pieces*
- *enVision Math 2.0 Grade 6*
- Savvas Realize (teacher and student resources)
- Khan Academy
- IXL- Recommended Skills Practice
    - P.1 Rational Numbers on Number Lines
    - P.4 Compare Rational Numbers
    - P.5 Put Rational Numbers in Order
    - P.7 Opposites of Rational Numbers
    - P.8 Absolute Value of Rational Numbers
    - X.2 Graph Points on the Coordinate Plane
    - X.3 Quadrants
    - X.4 Reflect a Point Over an Axis
    - X.6 Distance Between Two Points
- Desmos Activities:
    - The (Awesome) Coordinate Plane Activity
    - Mini Golf Marbleslides Activity
- MathXL for School
- Illustrative Mathematics Performance Tasks
- NCTM Illuminations
- Quiz Review Sheet (see classroom teacher)

INTERDISCIPLINARY CONNECTIONS

- Computations
- Financial/Economic/Business/Entrepenerial Literacy

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.