01_Number Sense & Operations

Content Area: **Math**
Course(s):
Time Period: **Full Year**
Length: **4 Weeks**
Status: **Published**

General Overview, Course Description or Course Philosophy

The middle school Guided Study Program is a two-pronged program. It parallels the grade-level math curriculum to reinforce and/or preview concepts taught in the grade-level math class and prepares students for success on state-mandated assessments by targeting individual student mathematical deficiencies. Guided Study marking period grades are based upon participation/preparation, classwork, and summative assessments and are reported as: O (Outstanding), S (Satisfactory), or U (Unsatisfactory).

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Objectives:

- Develop a deep understanding of the properties and relationships of numbers.
- Strengthen computational fluency and accuracy in operations involving whole numbers, fractions, and decimals.
- Apply number sense skills to solve real-world problems and make informed decisions.
- Explore various strategies for mental calculations and estimation.
- Develop critical thinking skills through analyzing patterns and relationships within number systems.

Essential Questions:

- How do the properties of numbers (e.g., commutative, associative, distributive) affect arithmetic operations?
- How can we use number sense to make reasonable estimations and mental calculations?
- In what ways can fractions and decimals be used to represent parts of a whole, and how do they relate to each other?
- How can we apply the order of operations to solve complex mathematical expressions?
- What strategies can we use to solve real-life problems involving money, measurement, and proportions?
- How do prime numbers, factors, and multiples play a role in understanding number relationships?
- How does understanding ratios and proportions help us solve problems in various contexts?

Enduring Understandings:

- Numbers have properties that affect how operations are performed, and these properties can be used to simplify calculations.
- Estimation and mental calculation strategies are valuable tools for making quick and reasonable approximations in various situations.
- Fractions, decimals, and percentages are different ways of representing parts of a whole, and they can be converted and compared to solve problems.
- The order of operations provides a consistent framework for solving mathematical expressions.

- Mathematical skills can be applied to solve real-world problems involving money, measurement, and scaling.
- Patterns in numbers, such as prime numbers and multiples, contribute to a deeper understanding of the number system.
- Ratios and proportions are fundamental concepts that help us solve problems involving comparison and scaling.

CONTENT AREA STANDARDS

MA.7.RP.A.1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.
MA.7.RP.A.3	Use proportional relationships to solve multistep ratio and percent problems.
MA.7.NS.A.1	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.
MA.7.NS.A.2	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.

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.RST.6-8.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
CS.K-12.2.d	Evaluate and select technological tools that can be used to collaborate on a project.
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.

STUDENT LEARNING TARGETS

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

Declarative Knowledge

Students will understand that:

- Numeric reasoning requires fluency.

- Numeric reasoning involves facility with numbers.
- Numerical operations are essential in the real world.
- The "order" of operations states which mathematical operations take precedence (are taken care of) before which other operations. The order of operations is universal across all mathematical applications.

Procedural Knowledge

Students will be able to:

- Add, subtract, multiply, and divide fractions, decimals, whole numbers, and integers.
- Construct meaning for integers using real-life experience and physical materials and manipulatives.
- Apply order of operations and recognize inverse operations.
- Apply proportional relationships to solve multistep and percent problems.
- Add and subtract rational numbers.
- Represent addition and subtraction on a horizontal or vertical line diagram.
- Multiply and divide rational numbers.
- Evaluate unit rates associated with unit fractions.
- Determine ratios of lengths, areas, and other quantities measured in like or different units.

EVIDENCE OF LEARNING

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

Formative Assessments

- Do Now before each lesson
- Exit tickets at the end of each lesson and/or series of chunks of learning

Summative Assessments

This course allows students flexibility in the demonstration of their understanding at the conclusion of the unit:

- traditional/standardized assessments
- performance tasks
- project

RESOURCES (Instructional, Supplemental, Intervention Materials)

- IXL
- Math Playground
- CMP3: Comparing and Scaling

INTERDISCIPLINARY CONNECTIONS

- Computations
- Financial/Economic/Business/Entrepreneurial Literacy

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.