# Unit 01: Number Theory

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

## General Overview, Course Description or Course Philosophy

The New Jersey Student Learning Standards (NJSLS) are rigorous and robust. The standards emphasize not only procedural skill but also conceptual understanding to ensure students are learning and absorbing the critical information needed to succeed mathematically now and in the future.

Due to the spiraling within and the articulation across grade levels and courses, students will learn concepts in a more organized and fluent structure. The standards encourage students to solve real-world problems and define what students should understand and be able to do in their study of mathematics. Mastery of the standards requires students to justify, in a way that is appropriate to the student's mathematical maturity, why a particular mathematical statement is true or where a mathematical rule comes from. Mathematical understanding and procedural skill are equally important, and both are assessable using mathematical tasks of sufficient richness.

Guided Study Math offers repeated practice with and strategies to help support success with NJSLA. Additionally, the program reinforces skills taught in the regular mathematics classroom.

In this unit, students understand relationships among factors, multiples, divisors, and products. Students will also learn how the Distributive Property relates multiplication and addition.

## OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

***Essential Questions:***

- How can you decide when finding common factors or common multiples is useful in solving a problem?
- How is the Distributive Property used to create equivalent expressions?

***Enduring Understandings:***

- Numeric fluency includes both the understanding of and the ability to appropriately use numbers.

## CONTENT AREA STANDARDS

| | |
|---|---|
| MA.6.NS.B.4 | Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. |
| MA.6.EE.A.1 | Write and evaluate numerical expressions involving whole-number exponents. |
| MA.6.EE.A.2a | Write expressions that record operations with numbers and with letters standing for numbers. |
| MA.6.EE.A.2b | Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. |
| MA.6.EE.A.2c | Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). |
| MA.6.EE.A.3 | Apply the properties of operations to generate equivalent expressions. |
| MA.6.EE.A.4 | Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). |

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

| | |
|---|---|
| LA.K-12.NJSLSA.R1 | Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text. |
| LA.K-12.NJSLSA.SL1 | Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively. |
| LA.K-12.NJSLSA.SL4 | Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience. |
| CS.K-12.3 | Recognizing and Defining Computational Problems |
| CS.K-12.5 | Creating Computational Artifacts |
| CS.K-12.6 | Testing and Refining Computational Artifacts |
| WRK.K-12.P.3 | Consider the environmental, social and economic impacts of decisions. |
| 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:***

- Whole numbers are categorized into primes and composites.

- Whole numbers have factors and multiples.
- Multiplication and division distribute over addition and subtraction; meaning, the distributive property allows for an expression to be written equivalently with factors divided out or multiplied into an expression.
- Arithmetic operations are performed in the conventional order when there are no parentheses to specify a particular order (Order of Operations).

## Procedural Knowledge

***Students will be able to:***

- Apply the divisibility rules.
- Find the greatest common factor of two whole numbers less than or equal to 100.
- Find the least common multiple of two whole numbers less than or equal to 12.
- Use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor.
- Find the prime factorization of any number.
- Evaluate numerical expressions involving whole-number exponents.
- Write numerical expressions involving whole-number exponents.
- Evaluate expression by applying the Order of Operations.

## EVIDENCE OF LEARNING

## Formative Assessments

- Observations/Checklists
- Classwork
- Do Now Questions/Exit Tickets
- Self Assessment Questions
- Mini Lab:  Students use square tiles to form rectangles to discover that prime numbers can only form one rectangle.
- Illustrative Math Performance Tasks:
    - 6.NS.B.4 Factors and Common Factors
    - 6.NS.B.4 Multiples and Common Multiples
- 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 Prime Time*
- Savvas Realize (teacher and student resources)
- Khan Academy
- IXL- Recommended Skills Practice
    - E.3 Prime or Composite
    - E.4 Identify factors
    - E.6 Prime Factorization
    - E.7 Prime Factorization with Exponents
    - E.8 Greatest Common Factor
    - E.10 Least Common Multiple
    - E.12 GCF and LCM: Word Problems
    - O.3 Evaluate Numerical Expressions Involving Whole-Numbers
- 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.