

MATHEMATICS COMMON CORE CURRICULUM UNIT #1 Grade 5

North Smithfield School Department

TITLE OF UNIT: Understanding the Place Value System

GRADE: 5

DATE PRESENTED: _____ **DATE DUE:** _____ **LENGTH OF TIME:** Several Weeks

OVERVIEW OF UNIT:

In this unit, students will compute, apply, and extend their previous understanding of numbers and operations. Students will also write, interpret, and evaluate numerical expressions.

ESSENTIAL QUESTIONS

How does a digit's position affect its value?

Do we need a conventional order for working with parentheses, brackets, and braces? Why or why not? Support your position with evidence.

STANDARDS: Common Core Math Standards – Grade level domains K-5

| Counting and Cardinality CC | Operations and Algebraic Thinking OA | Number and Operations in Base Ten NBT | Number and Operations – Fractions NF | Measurement and Data MD | Geometry G |
|------------------------------------|---|--|---|--------------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> 5.OA.1,2 | <input type="checkbox"/> 5.NBT.1, 2, 3 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> 5.NBT.5, 6 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | | | | |
| <input type="checkbox"/> | <input type="checkbox"/> | | | | |

STANDARDS: Mathematical Practices grades K-12

- | | | | | |
|---|--|--|---------------------------------------|--|
| 1. Make sense of problems and persevere in solving them | 3. Construct viable arguments and critique the reasoning of others | 5. Use appropriate tools strategically | 7. Look for and make use of structure | 8. Look for and express regularity in repeated reasoning |
| 2. Reason abstractly and quantitatively | 4. Model with mathematics ★ | 6. Attend to precision | | |

FOCUS MATHEMATICS STANDARDS:

- Understand the place value system. 5.NBT.1, 2, 3
- Perform operations with multi-digit whole numbers and with decimals to the hundredths. 5.NBT.5, 6
- Write and interpret numerical expressions. 5.OA.1, 2

Applied Learning Standards:

problem solving communication critical thinking research reflection/ evaluation

Expectations for Student Learning (High School only):

ENDURING UNDERSTANDING:

The position of a digit affects its value. A digit in the ones place represents 10 times the unit in the place to its right and 1/10 of the unit in the place to its left. We need a conventional order for working with parentheses, brackets, and braces in order to evaluate expressions accurately.

PRIOR KNOWLEDGE:

- Read whole numbers to the thousands place.
- State the value of the digit in the ones, tens, hundreds, and thousands place.
- Know that as we move to the left from one place to the next, the values increase ten times as much. For example: In the number 555, the 5 in the hundreds place is ten times as much as the 5 in the tens place (50 x 10 = 500)
- Know how to compare numbers using <, >, or =

STUDENT OBJECTIVES, SKILLS and/or NEW KNOWLEDGE:

- NBT.1:** A digit in one place represents 10 times the unit in the place to its right and 1/10 of the unit in the place to its left. The base-ten system extends to decimal fractions (1/10 = 0.1).
- NBT.3:** Exponents express powers of a given number (e.g., 104 means 10 x 10 x 10 x 10. (Note: Grade 5 focuses on powers of 10 only.)
- NBT.2:** Multiplying by 10 shifts each digit of the number being multiplied one place to the left, so the product's value is 10 times as large.

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- **NBT.2:** Dividing by 10 shifts each digit of the number being divided (dividend) 1 place to right in quotient, so the quotient's value is 10 times as small.
- **NBT.5:** An efficient strategy for multiplying multi-digit numbers is the standard algorithm.
- **NBT.6:** Place value understanding is the foundation for being able to estimate numbers; estimation helps determine reasonableness.
- **NBT.6:** The use of strategies and concrete models for the operations helps to demonstrate understanding and to clarify the connections between models, numbers, and the verbal explanations of reasoning.

- **OA.1 and 2:** There is a difference between mathematical expressions and equations; an expression is a mathematical phrase containing one or more terms linked by operation symbols, and an equation is a mathematical statement divided by an equal symbol that states that two values or expressions have the same value.
- **OA.1 and 2:** Expressions inside a grouping symbol are computed before the rest of the equation—first parentheses, then brackets, and then braces.
- **OA.1 and 2:** How does the placement of grouping symbols affect the answer?
- **OA.1 and 2:** What is an expression for the following: (say e.g., "write an expression that is 5 times as large as $3487 + 7432$.")
- **OA.1 and 2:** What is an equivalent expression for $4 \times (75 + 32) \div 4$?

SUGGESTED PROBLEMS:

- 5.NBT.1 Basic**
- <http://www.p12.nysed.gov/assessment/common-core-sample-questions/math-grade-5.pdf> (#2)
- 5.NBT.2 Basic**
- <http://www.p12.nysed.gov/assessment/common-core-sample-questions/math-grade-5.pdf> (#4)
- 5.NBT.3 Basic**
- <http://www.p12.nysed.gov/assessment/common-core-sample-questions/math-grade-5.pdf> (#3)
- 5.NBT.5 Basic**
- www.nj.gov (#24-26)
- 5.NBT.6 Basic**
- www.nj.gov (# 27-28)
- 5.NBT.6 Advanced)**
- www.nj.gov (# 29)
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- 5.OA.1 Basic**
- http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/000/969/original/illustrative_mathematics_969.pdf?1353941566
- 5.OA.1 Advanced**
- http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/000/555/original/illustrative_mathematics_555.pdf?1346083776
- 5.OA.2 Basic**
- http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/000/139/original/illustrative_mathematics_139.pdf?1343856918
- 5.OA.2 Advanced**
- http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/001/222/original/illustrative_mathematics_1222.pdf?1356990134
 - http://s3.amazonaws.com/illustrativemathematics/illustration_pdfs/000/000/590/original/illustrative_mathematics_590.pdf?1343856919

ACTIVITIES, PRODUCTS, PERFORMANCE, and ASSESSMENTS: see curriculum introduction

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|---------------------------------------|----------------------------|--|---|
| 1. Application to real world problems | 6. Graphic organizers | 14. Problem/Performance based/common tasks | 18. Technology |
| 2. Creating charts/collecting data | 7. Graphing | 15. Real-life applications involving graphing | 19. Summarizing and note-taking |
| 3. Collaboration - interpersonal | 8. Interviews | 16. Represent numbers | 20. Tests and quizzes |
| 4. Conferencing | 9. Journals | 17. Rubrics/checklists (mathematical practice, modeling) | 21. Writing genres Arguments/ opinion Informative |
| 5. Exhibits | 10. KWL charts | | |
| | 11. Mathematical Practices | | |
| | 12. Modeling ★ | | |
| | 13. Oral presentations | | |

- **NBT.1:** Students will use models to represent numbers.

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- **NBT.2:** Students will use whole number exponents to denote powers on 10.
- **NBT.2:** Explain patterns in numbers
- **NBT.3:** Read, write and compare decimal to the thousandths.
- **NBT.5:** Multiply multi-digit whole numbers using the standard algorithm.
- **NBT.6:** Divide whole numbers
- **NBT.6:** Illustrate and explain calculations using models.
- **OA.1:** Use parentheses, brackets, or braces in numerical expressions and evaluate the expressions.
- **OA.1:** Write simple expressions and interpret numerical expressions

HIGHER ORDER THINKING SKILLS: Web's Depth of Knowledge 2 – 4 or Bloom's Taxonomy

Web's Depth of Knowledge

- skill/conceptual understanding
- strategic reasoning
- extended reasoning

Bloom's Taxonomy

- apply
- analyze
- synthesize/create
- evaluate

ADDITIONAL RESOURCES: see curriculum for specifics

- [*enVisionMath*](#)

VOCABULARY

NBT

- Base exponent
- Base ten number system
- Decimal (read as "and"0)
- Digit
- Division – equal parts
- Fraction (1/10, 1/100, 0.1, 0.01)
- Hundredths
- Place value
- Powers of ten
- Standard form
- Tenths
- Thousands
- Whole number
- Word form

OA

- Algebraic expression
- Braces
- Brackets
- Equation
- Equivalent expression
- Evaluate
- Expression
- Parentheses
- PEMDAS

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LESSON PLAN for UNIT _____

LESSONS

- Lesson # 1 Summary:

- Lesson #2 Summary:

- Lesson #3 Summary:

OBJECTIVES for LESSON # _____

- Materials/Resources:**

- Procedures:**
 - Lead -in

 - Step by step

 - Closure

- Instructional strategies:** see curriculum introduction

- Assessments:** see curriculum introduction
 - **Formative**

 - **Summative**