Unit Title: **"Bits and Pieces I"**

Course: **Middle School Mathematics**

Subject Area: **Mathematics**

Time Frame: **20 days**

Standards

Middle School Mathematics Standards	**Sunshine State Standards Benchmarks**	**NCEE New Standards**
The student will: 4.1 Model situations involving fractions, decimals, and percents. 4.2 Develop an understanding of the relationships between fractions, decimals, and percents. 4.3 Compare and order fractions. 4.4 Use equivalent fractions to reason about situations. 4.5 Use benchmarks that relate different forms of representations of rational numbers. (50% is the same as $\frac{1}{2}$ and 0.5) 4.6 Move flexibly between fraction, decimal, and percent representations.	MA.A.1.3.1 The student associates verbal names, written word names, and standard numerals with integers, fractions, decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratio. *Expectations* The student: • Knows word names and standard numerals for whole numbers, fractions, decimals (through hundred-thousandths), and percents. • Reads and writes whole numbers and decimals in expanded form. MA.A.1.3.2 The student understands the relative size of integers, fractions, and decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratio.	The student: M7a Uses mathematical language and representations with appropriate accuracy, including numerical tables and equations, simple algebraic equations and formulas, charts, graphs, and diagrams. M1c Consistently and accurately applies and converts the different kinds and forms of rational numbers. M1e Interprets percent as part of 100 and as a means of comparing quantities of different sizes or changing sizes. M1f Uses ratio and rates to express "part-to-part" and "whole-to-whole" relationships, and reasons proportionally to solve problems involving equivalent fractions, equal ratios, or constant rates, recognizing the multiplicative nature of these

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	Expectations The student : • Compares and orders fractions and decimals using graphic models, number lines, and symbols. • Compares and orders fractions, decimals, and common percents. MA.A.1.3.3 The student understands concrete and symbolic representations of rational numbers and irrational numbers in real-world situations. *Expectations* The student: • Knows examples of positive rational numbers in real-world situation. • Describes the meanings of positive rational numbers using part/whole relationships and relative size comparisons in real-world situations. • Constructs models to represent positive rational numbers. MA.A.1.3.4 The student understands that numbers can be represented in a variety of equivalent forms, including integers, fractions, decimals, percents, scientific notation, exponents, radicals, and absolute value.	problems in the constant factor of change. M1g Orders numbers with the > and < relationships and by location on a number line; estimates and compares rational numbers using sense of magnitudes and relative magnitudes of numbers and of base-ten place value. M6a Computes accurately with arithmetic operations on rational numbers. M6b Knows and uses the correct order of operations for arithmetic computations.

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	Expectations The student: • Knows the relationships among fractions, decimals, and percents. • Expresses a given quantity in a variety of ways, such as fractions, decimals, or numbers expressed as percents. • Knows whether numbers expressed in different forms are equal. • Converts a number expressed in one form to its equivalent in another form. MA.A.3.3.1 The student understands and explains the effects of addition, subtraction, multiplication, and division on whole numbers, fraction, including mixed numbers, and decimals, including the inverse relationships of positive and negative numbers. *Expectations* The student: • Knows the effects of the four basic operations on whole numbers, fractions, mixed numbers, and decimals. • Uses models or pictures to show the effects of addition, subtraction, multiplication, and division, on whole numbers, decimals, fractions, and mixed numbers. • Knows and applies the commutative, associative, and distributive properties in the addition and multiplication of rational numbers.	

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	• Uses concrete models and real-world examples to explore the inverse relationships of positive and negative numbers. MA.A.3.3.2 The student selects the appropriate operation to solve problems involving addition, subtraction, multiplication, and division of rational numbers, ratios, proportions, and percents, including the appropriate application of the algebraic order of operations. *Expectations* The student: • Knows the appropriate operations to solve real-world problems involving whole numbers, decimals, and fractions. • Solves real-world problems involving whole numbers, fractions, decimals, and common percents using one or two-step problems. • Applies order of operations when solving problems. • Knows proportional relationships and describes such relationships in words, tables, or graphs.	

Desired Results

Enduring Understanding	Essential Questions	Knowledge and Skills
Students will understand • Fractions may be interpreted as: o Parts of a whole; o Measures or quantities; o Indicated division o Decimals; and o Percents.	• Why do we need to consider amounts that do not represent whole numbers? • How can we represent concepts such as parts of a whole? • Why can there be different fraction names for the same quantity? • How can we tell when two names refer to the same quantity? • How can we tell which of two fractions is greater? Or smaller? • What are some situations where fractions are commonly used? • What value is there in having decimal names for fractional quantities? • How can one change from a fractional name to a decimal name? • How is a percent like a fraction? • What techniques are there for finding fractional, decimal, or percent names for the same quantity?	Students will know • Key terms (e.g., decimal, denominator, equivalent fraction, fraction, numerator, percent). • Rational numbers may be modeled by the use of area or the number line.. Students will be able to • Use equivalent fractions. • Compare and order fractions. • Move flexibly between fraction, decimal, and percent representations. • Develop and use benchmarks that relate different forms of representations of rational numbers. • Use physical models and drawings to help reason about given situations.

Acceptable Evidence

Performance Tasks	Quizzes, Test, and Work Samples	Observations and Dialogues
• **Fund-Raising Fractions** Students explore three components of understanding fractions: the visual model (fraction strips), word names for fractions, and symbols for fractions.	Check-Up 1 Quiz A Check-Up 2 Quiz B	Teacher observations of students during work on performance tasks. Accountable talk during work on performance tasks.

• **Comparing Fractions** The context of comparing fractions strips is used to motivate an investigation of equivalence and the creation of a number line that contains all of the information of the individual fraction strips. The idea of using benchmarks to estimate the size of fractions and to make comparisons is introduced. • **Cooking with fractions** Students are introduce to different kinds of area models for fractions. The square and the rectangle are particularly useful areas because they are easy to subdivide and to shade. The circle is explored because of its use in data analysis and probability. • **From Fractions to Decimals** Students are introduced to decimal representations of fractions and explore the place-value interpretation of decimals. Students investigate a 100-square grid and explore how it could continue to be subdivided to show 1000 parts or 10,000 parts. The process is to help students understand equivalence of fractions and equivalence of decimals as well as to see the connections between fractions and decimals. • **Moving Between Fractions and Decimals** Students find decimal estimates for fractions using the visual model. Sharing is used as a context to motivate the division interpretation of fractions, leading to a strategy for changing a fraction into a decimal. • **Out of One Hundred** Percents are introduced as another form of representation for fractions and decimals. A database of information about cats is used as a context for understanding percent. Students are engaged in activities requiring them to move among fractions, decimals, and percents.	Unit Test	