Grade 4 Fraction Unit of Instruction

This is a progressive unit of instruction using the Concrete-Representational-Abstract (CRA) Instructional Model. CRA is a three-part instructional model that begins by using concrete materials, then progresses to representational pictures, and finally abstract notation. This unit is not intended to replace your district's curriculum, but rather it serves to support the teaching and learning of the grade four fraction standards. In this unit, students will begin by investigating the standards while using manipulatives to explore the concepts. Then, students will represent their learning through pictures, visuals and drawings. Finally, students will demonstrate their understanding through abstract notation and algorithms. This unit of study will cover the fourth grade fraction standards MAFS.4.NF.1.1, MAFS.4.NF.1.2, MAFS.4.NF.2.3, and MAFS.4.NF.2.4.

The unit begins with a list of review lessons and tools to assist in teaching fractions to fourth grade students. Then, each of the four fourth grade fraction standards is listed along with aligned instructional resources and formative assessments. The component of CRA is identified for each of the resources and formative assessments. The resources presented in this document may only cover portions of the aligned standard and represent only a small sample of those available on CPALMS.

The Mathematical Practices are habits of mind that describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. The Mathematical Practices should be infused during the course and will be assessed throughout the Grade 4 Mathematics FSA. More information about each Mathematical Practice can be found by clicking on the links below.

MAFS.K12.MP.1.1 Make sense of problems and persevere in solving them.
MAFS.K12.MP.2.1 Reason abstractly and quantitatively.
MAFS.K12.MP.3.1 Construct viable arguments and critique the reasoning of others.
MAFS.K12.MP.4.1 Model with mathematics.
MAFS.K12.MP.5.1 Use appropriate tools strategically.
MAFS.K12.MP.6.1 Attend to precision.
MAFS.K12.MP.7.1 Look for and make use of structure.
MAFS.K12.MP.8.1 Look for and express regularity in repeated reasoning.

Number and Operations- Fractions

A bibliography of children's literature with a focus on fractions is provided. These books and articles can be integrated into the fraction lessons to connect mathematics and literature.	1. *Fraction Fun,* David Adler 2. *Gator Pie,* Louise Mathews 3. *Icebergs and Glaciers,* Seymour Simon 4. *Little Numbers and Pictures That Show Just How Little They Are*, Edward Packard 5. *One Riddle One Answer,* Lauren Thompson 6. *Pythagoras and the Ratios,* Julie Ellis 7. *Time for Kids, "Get Your Healthy Lunches",* Alexandria Sifferlin 8. *Time for Kids, "Obesity Rates Falling",* Cameron Keady 9. *Surviving the Applewhites,* Stephanie Tolan 10. *What's Smaller Than a Pigmy Shrew?,* Robert E. Wells
4th Grade Mathematics Course Description	Course descriptions provide an overview for a course and designate which standards are in that course. The course description includes resources for all 44 standards within the 4th grade mathematics course.
Fun with Fractions- Review *Lesson Plan* Concrete-Representational-Abstract	In this five lesson unit, students will explore relationships among fractions through work with pattern blocks as concrete representations. This early work with fraction relationships helps students make sense of basic fraction concepts. The lessons in this unit incorporate the use of physical and virtual manipulatives.
Test Item Specifications	The Test Item Specifications indicate the alignment of items with the Florida Standards. Assessment limits are included in the specifications, which define the range of content knowledge in the assessment items for the standard. Sample items for each standard are also included in the specifications document.
Test Design Summary and Blueprint	The Test Design Summary and Blueprint shows the reporting categories with a corresponding weight for the 4th Grade Mathematics FSA.
Florida Students	Resources specifically designed with students in mind are available on Florida Students. Florida Students is an interactive site that provides educational resources aligned to the Florida Standards.
4th Grade Mathematics Parent Guide	The parent guide will support parents and families with children in Grade 4 Mathematics.

Instructional Resources

MAFS.4.NF.1.1 Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

The Brownie Breakdown *Lesson Plan* Concrete-Representational	This lesson demonstrates the relationships between equivalent fractions and the size of the pieces that represent the fractions. The lesson moves from concrete activities to pictorial representations. The lesson begins by using a pan of brownies to represent equivalent fractions. The brownies will assist students in understanding that the larger the denominator; the smaller the pieces become.
Create a Quilt *Lesson Plan* Concrete-Representational	In this lesson, students will work in cooperative pairs to design and construct quilts according to specified instructions. They will obtain the knowledge that fractions can be equivalent even though they may look different and are made up of different numbers. Students develop skills in reasoning as they defend and justify why two fractions are equivalent.
What's the part? What's the Whole? *Lesson Plan* Concrete-Representational	In this lesson, students will correctly model and discover fractions and their whole relationships by using a variety of manipulatives.
Fraction Land *Lesson Plan* Concrete-Representational	This lesson has students investigate equivalent fractions through manipulatives and models. Students will use fraction circles and bars to identify equivalent fractions.
Fraction Land II *Lesson Plan* Representational-Abstract	This lesson focuses on creating equivalent fractions through multiplication. Students will also be asked to explain how and why they created equivalent fractions using visual models and written explanation.
Equivalent Fraction Dominoes *Lesson Plan* Representational-Abstract	Students will identify equivalent fractions using an area model. They will reinforce their learning by playing equivalent fraction dominoes.

Explaining Fraction Equivalence with Pictures *Problem-Solving Task* Representational-Abstract	The purpose of this task is to provide students with an opportunity to explain fraction equivalence through visual models in a particular example.
The Alternative Recipe *Lesson Plan* *Concrete-Representational-Abstract*	This Lesson, "The Alternative Recipe," develops students' understanding that there are other ways to express fractions, especially as equivalent fractions. The students use concrete models of fractions to create equivalent fractions, and then develop the algorithm for creating equivalent fractions.
Are You My Equal? *Lesson Plan* Concrete-Representational-Abstract	This lesson gives students the opportunity to identify and model equivalent fractions by making fraction strips, solving situational problems, and creating a model representation of equivalent fractions.
Chocolate Fractions *Lesson Plan* Concrete-Representational-Abstract	Chocolate bars will be used to introduce equivalent fractions. Students will find patterns for equivalent fractions through the concrete-representational-abstract process.

Formative Assessments

Are the Fractions Equivalent Representational-Abstract	Students partition squares to model two fractions and then determine if the fractions are equivalent.
Eating Cake Representational-Abstract	Students draw a visual fraction model to determine whether two fractions are equivalent.
Equivalence Using a Number Line Representational-Abstract	Students use a number line to explain that one-half is equivalent to two-fourths.
Equivalent Fractions on a Number Line Representational-Abstract	Students scale number lines to locate given fractions, find equivalent fractions, and explain the relationship between equivalent fractions.

Instructional Resources

MAFS.4.NF.1.2 Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

Out of Order? *Lesson Plan* Representational-Abstract	This lesson is a way for students to use benchmark fractions to get a conceptual understanding of comparing and ordering fractions.
Fraction Line-Up! *Lesson Plan* Representational-Abstract	In this lesson, students will correctly model and compare fraction pairs and place on the inequality mat attached to this lesson.
Ordering Fractions *Lesson Plan* Representational-Abstract	Students work in groups to arrange sets of fraction cards from least to greatest using benchmark fractions and pieces/parts comparisons.
Fractions: Let's Compare *Lesson Plan* Representational-Abstract	In this lesson students use area models, number lines, and the benchmark fraction of 1/2 to compare fractions that are less than one and have different numerators and denominators to solve real-world problems.
Getting Fancy with Fractions *Lesson Plan* Representational-Abstract	In this lesson, students engage in problem solving, a fraction sort activity and play the game "Fraction War" to practice and demonstrate understanding of using benchmark fractions when comparing fractions with different numerators and denominators.
Fraction War *Lesson Plan* Abstract	This lesson is meant to be utilized as a means to enhance previous instruction of fractions that are greater than, or less than one. It is best utilized to build fluency, as this is meant to be a fast paced game to make learning interactive and engaging.

Listing Fractions in Increasing Size *Problem-Solving Task* Abstract	The first solution judiciously uses each of the following strategies when appropriate: comparing to benchmark fractions, finding a common denominator, finding a common numerator. The second and third solution shown use only either common denominators or numerators. Teachers should encourage multiple approaches to solving the problem.
Using Benchmarks to Compare Fractions *Problem-Solving Task* Abstract	The goal of this task is to provide examples for comparing two fractions, 1/5 and 2/7 in this case, by finding a benchmark fraction which lies in between the two. In Melissa's example, she chooses 1/4 as being larger than 1/5 and smaller than 2/7. Students examine Melissa's reasoning, and then complete their own problems.

Formative Assessments

Comparing Four-Fifths and Three-Fourths Representational-Abstract	Students consider the correctness of a model for comparing four-fifths to three-fourths.
Comparing Fractions Using Benchmark Fractions Representational-Abstract	Students compare two fractions using benchmark fractions on a number line and record the comparison using the less than or greater than symbol.
Compare Fractions Abstract	Students are given three sets of fractions to compare and are asked to record the comparisons using the less than, greater than, or equal to symbols.
Corn Farms Abstract	Students compare two fractions with unlike denominators in the context of a word problem and record the comparison using an inequality symbol.

Instructional Resources

MAFS.4.NF.2.3 Understand a fraction a/b with a > 1 as a sum of fractions 1/b.

a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.*
c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.
d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.

Adding and Subtracting with Unit Fractions *Lesson Plan* Concrete-Representational	Students will use begin the lesson by using fraction tiles or bars to add and subtract with unit fractions. Then students will use counting on or back by unit fractions, to solve addition and subtraction real-world problems.
Figuring Out How Much of a Pizza is Left *Tutorial* Representational-Abstract	This Khan Academy video tutorial solves two word problems using visual fraction models.
Relay Races *Lesson Plan* Representational-Abstract	In this lesson, students solve word problems related to races to determine addends of fractions with like denominators. The focus is on addition, decomposing a fraction into a sum of fractions in more than one way, drawing linear models, and writing equations to represent the problems.
Decomposing Fractions *Lesson Plan* Concrete-Representational-Abstract	Using circle fraction manipulatives, students will investigate adding fractions by decomposing them into their smallest parts.
Learning to Love Like Denominators *Lesson Plan* Concrete-Representational-Abstract	Students make sense of the structure of addition and subtraction equations with like denominators and make generalizations to move from using manipulatives, pictures and number lines to simply adding or subtracting the numerator.

Making 22 Seventeenths in Different Ways *Problem-Solving Task* Abstract	This task is a straightforward task related to adding fractions with the same denominator. The main purpose is to emphasize that there are many ways to decompose a fraction as a sum of fractions.
Peaches *Problem-Solving Task* Abstract	This task provides a context where it is appropriate for students to subtract fractions with a common denominator. For this particular task, teachers should anticipate two types of solution approaches: one where students subtract the whole numbers and the fractions separately and one where students convert the mixed numbers to improper fractions and then proceed to subtract.

Formative Assessments

Decomposing Three-Fifths Representational-Abstract	Students are asked to use a visual fraction model to decompose three-fifths in two different ways.
Anna Marie and the Pizza Abstract	Students are asked to solve a word problem that involves adding fractions with like denominators. Students then analyze a word problem involving addition of unlike unit quantities.
Adding and Subtracting Mixed Numbers Abstract	Students are given pairs of mixed numbers to either add or subtract.
Fraction Word Problems Abstract	Students are asked to solve a word problem that involves subtracting fractions with like denominators. Students then analyze a word problem involving subtraction of unlike unit quantities.

Instructional Resources

MAFS.4.NF.2.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.

a. Understand a fraction a/b as a multiple of 1/b. *For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).*
b. Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)*
c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*

Exploring Fraction Multiplication *Lesson Plan* Concrete-Representational	Students will be exploring repeated addition with circle fractions as it pertains to whole numbers multiplied by fractions. Then, students will be asked to use visual models to demonstrate the multiplication of whole numbers and fractions.
Multiply Fractions and Whole Numbers with Models *Lesson Plan* Representational-Abstract	Students will multiply fractions and whole numbers through set models and problem solving.
Modeling Multiple Groups of Fractions *Lesson Plan* Representational-Abstract	In this inquiry lesson students will use a situational story to explore ways to find the total quantity of a fraction multiplied by a whole number using various models.
Sugar in Six Cans of Soda *Problem-Solving Task* Representational-Abstract	This task provides a familiar context allowing students to visualize multiplication of a fraction by a whole number. This task asks students to solve the problem using a visual model.
Modeling Multiplication with Fractions *Lesson Plan* Concrete-Representational-Abstract	Students will relate multiplication strategies with fractions through problem solving situations. This lesson connects prior understanding of multiplication and equal groups to multiplication of fractions.

Multiple Bake Sale Cookie Recipes Part 1 *Lesson Plan* Concrete-Representational-Abstract	In this lesson students are guided through the process of multiplying a whole number and a fraction in a real-world situation.
Multiple Bake Sale Cookie Recipes Part 2 *Lesson Plan* Concrete-Representational-Abstract	In this lesson students will explore ways to find the total quantity of mixed numbers multiplied by a whole number using a real-world situation.

Formative Assessments

How Many One-Fourths? Representational-Abstract	Students are asked to multiply a fraction by a whole number and to represent the product with a visual fraction model.
Fractions and Multiples Representational-Abstract	Students use a visual fraction model to explain how many one sixths are in a given fraction and record their work with an equation.
How Much Sugar? Representational-Abstract	Students are asked to multiply a fraction by a whole number to solve a word problem and to represent the product with a visual fraction model.
Training for a Race Representational-Abstract	Students are asked to multiply an improper fraction by a whole number to solve a word problem and use a visual model or equation to represent the problem.