Design Document: **Basic Fractions**

Learning Goals: By integrating fractions into language arts, P.E., art, and cooking, along with math, students will identify, define, write, read, create, participate in, and solve tasks that will help them explore and understand the basic fractions. According to the core standards, third grade is limited to fractions with denominators of 2, 4, 6, and 8.

Learner Attitudes and Characteristics: I started off this unit by administering a general math attitude survey. Then I asked more detailed questions about fractions. When surveying my class of 22 students, only 3 knew anything about fractions. Some even responded with, "I think fractions are like a multiplication table." Although most students had a vague idea of what fractions were, they couldn't explain it.

Prerequisites: When teaching the division unit, the students were introduced to the phrase, "shared equally," as another way to describe the process. This is helpful when discussing fractions. It is also advantageous if they understand the concept that there are numbers that represent "less than one." This unit explains the very basics of fractions, step by step.

Brief Outline or Scope and Sequence of Unit: Starting with the definitions of terms, this unit then answers the question of, "What are equal parts?" Next, the students are introduced to whole regions and sets, in which they will identify the unit fractions – 1 whole, 1/2, 1/4, 1/6, and 1/8. Benchmark fractions or commonly used fractions, (1/3, 2/3, 1/2, 3/4,) are taught to help the student estimate an unlabeled fractional part. To help cement what fractions are and why they are important, fractions will be integrated into language arts through reading and writing stories about fractions, art projects, P.E. activities and cooking easy recipes.

Objectives:

Every third grade student will <u>develop an understanding of fractions as numbers</u> by completing the objectives, and participating in the following activities in all the listed subject areas

Days	Objectives/Core	Practice Activities	Informal Evaluation
DAY 1 **Math -** definitions: Fractions Denominator Numerator Whole Region Sets Equal Parts	Develop an understanding of the meaning of fractional terms by: • Discussing and defining the term, • Writing the definition in the step book and on the board.	Construct a step book out of 5 colors of folded ditto paper for fraction terms and definitions. (To save time, books can be prepared ahead. See step book picture.)	Check their step books

Unit fractions Benchmark Fractions Mixed Numbers	• Drawing pictures of the word's meaning • Presenting the term's definition to the class (Each person will pick one of the 4 jobs listed above to complete and present for his/her team.)	After watching the teacher model what to do in the 4 jobs and how to give the presentation, each of the 6 teams of 3-4 students will be given 5 minutes to explore the specified term. When completed, 1-2 minute presentations will be given to the whole class on their findings. Teacher can make a Wordle picture.	Team presentations Play matching game with the teams' picture and definition cards. (See def. game picture)
DAY 2 **Reading -**	Practice listening skills	Listen to the story, Friends and Fractions (See fraction story and characters pic.)	Observation
Math - whole region, equal parts	Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts.	Teacher gives examples and non-examples of equal parts as she tells the story. During the story, students will demonstrate knowledge of benchmark unit fractions by identifying the appropriate fraction circle piece (1/2, 1/3, 1/4, 1/6, 1/8). (See picture)	Pick the appropriate unit fraction circles.
Unit fractions: 1/2, 1/3, 1/4, 1/6, 1/8	Demonstrate understanding of unit fractions by drawing and labeling the appropriate unit fraction.	After instructions are given on how to divide a circle into equal parts, the student will draw pictures of the unit fractions on individual worksheets. Homework – enVision 12-1	Draw and label the unit fractions (See story circle wksht) Quick Check enVision 12-1
Art – Fractions and overlapping	Using fraction pieces, (both circles and squares) the students will create a design with overlapping.	Given colored shapes, the students will cut out the shapes, (same fractions will be same color) and create a design.	Add up all the fractions to see how many whole regions (See samples)
DAY 3 **Reading -**	Practice listening skills	Read The HERSHEY'S Milk Chocolate Fractions Book	Observation
Math – whole region, fractions with	Understand a fraction *a/b* as the quantity formed by parts of size *1/b.*	Given a paper Hershey Candy Bar, the student will manipulate the 12 pieces to	Properly fill in worksheet that goes with

numerator greater than 1 **Writing (Publishing Company)** fraction stories	• Combining unit fractions together to make larger fraction • Representing the numerator with numbers greater than one Name and write fractions Develop writing skills and understanding of fractions by writing a story using half, third, fourth, sixth	make the correct fraction (3/12, 6/12, etc.) as listed in the book. Then record the information on the worksheet. Homewk- enVision 12-2A Or worksht - Naming & Writing Fractions After listening to several stories dealing with fractions, the students will write their own stories	the book. (See Hershey wksheet) Quick Check 12-2A Share their stories with partners or tables.
DAY 4 **Reading -** **Math -** Fractions of Sets **P.E.-** Dividing the class into fractions	Practice listening skills Understand the fractions of a set of objects. • Given a small group of objects, the student will properly write a fraction that represents a part of the set (What fraction is red? Large? Round? etc.) Given a fraction, students divide themselves into that fraction. Given a topic, they will divide into those groups and figure out what fraction their group represents.	<u>Jump, Kangaroo, Jump</u> Observe and listen as teacher explains and models the meaning of sets and fractions of the sets by using several objects (magnets, crayons, etc.) After dividing into teams (tables), each team will be given a small package of fruit snacks, skittles or m&m's. Count contents of package. Divide into colors. Record information of each color on worksheet. Figure what fraction represents each color. Hmwk – enVision 12-3 Students figure out the fraction of the class according to the fraction shown or the topic given. What fraction of class is wearing red? Girls? Blond?	Observation Pair – share information Correctly fill out the worksheet as a team. (See set wksheets) Quick Check enVision 12-3 Observation

Day 5 **Math –** Estimating Fractions by using benchmark fractions	Given a whole region with part of it shaded, the student will estimate the fraction shaded by comparing it to a benchmark fraction and explain their reasoning.	When shown a picture, the students will estimate the fraction and write it on the white boards. Then explain their answer to their partner. Hmwk – enVision 12-4	Pair - Share Get 80% or higher on 1st Part of Unit Test
Cooking	Given their own recipe, students will call out in unison the correct fraction and say which measuring cup should be used and how many.	Using a simple recipe, the students will help the teacher make the cookies by calling out the correct fraction and measuring cup that is needed.	Observe and taste the results

Instructor Materials: To teach this unit, there are some basic materials that are needed. The following three books are read and referred to in the lessons: Friends and Fractions, The HERSHEY'S Milk Chocolate Fractions Book, (book, paper HERSHEY bars, worksheet) and Jump, Kangaroo, Jump. These books, along with the samples, worksheets, and pictures, are located in plastic Ziploc bags in my fraction file. The enVision Math Teacher's Edition, Topic 12 Understanding Fractions, will also be used. The homework and quick checks come from this program.

Other materials include:

Day 1: Introduction of Terms

Math

- The enVision Math Teacher's Edition, Topic 12 Understanding Fractions,
- List of definitions and words -
- Stepbook - 5 Colors of ditto paper to make definition book,
- Stapler
- Matching Game and Presentation - 9 Half sheets of yellow, blue, and pink, cardstock for presentations and later matching game. Definitions (yellow), pictures (blue), and words (pink). The teacher will demonstrate on three terms (mixed numbers, benchmark fractions, and equal parts)
- Pencils and Crayons to write and draw with
- Magnets to hold up cardstock halves to play game

Day 2: Equal Parts and Unit Fractions of a Whole Region

Reading - Friends and Fractions (book with 6 character pictures)

Math -

- Fraction circles (large for board, small for students)
- Worksheet – original
- Homework – enVision 12-1 and Quick Check 12-1

Art Project -

- A variety of colored paper fraction circles and squares to make design
- Glue
- Black or dark blue for background (8 ½ x 11)

Day 3: Fractions with Larger Numerators

Reading – The HERSHEY'S Milk Chocolate Fractions Book

Math -

- Worksheet – original
- Paper Hershey Bar for each student and one for teacher to demonstrate with
- Homework – enVision 12-2A and Quick Check 12-2A

Writing or Publishing Company:

- Writing sheets for story – located in writing center (half blank on top for picture and half with lines for written story on bottom.)
- Crayons and pencils

Day 4: Fractions of Sets

Reading - Jump, Kangaroo, Jump

Math –

- Original worksheet – Fruit Snack or m&m's worksheets
- 6 Individual packages of fruit snacks, or m&m's
- About 10 items of something to demonstrate sets – magnets, crayons, markers, etc.
- Homework – enVision 12-3 and Quick Check 12-3

P.E. –

- List of topics and fractions of how to divide the class at P.E.
- List of different exercises for each group to do. (Each group does a different exercise, then comes back together and repeats.)

Day 5: Estimating with Benchmark Fractions

Math

- Dry erase markers, erasers, white boards
- Real or drawn pictures of things that show part of a whole.
- Homework – enVision – 12-4 and Quick Check 12-4

Cooking

- Ingredients for no-bake recipe – sugar, butter, milk, cocoa powder, oats, vanilla
- Large saucepan and spoon
- Heating element or stove
- Wax paper
- Measuring cups 1/2, 1/4, 3/4, 2/3, and 1 cup; 1/4 and 1 teaspoons
- Recipe for each student

Introductory Presentations: A few days prior to beginning this unit the children will take a short pretest on fractions. They will also make their step books as this can take away from the allotted lesson time. To help introduce the nine vocabulary words of this fraction unit, the students will give a 2-minute class presentation. First they will observe the teacher as she models how to do the presentations with three words. Then as tables, or 4-member teams, they will blindly pick which word their group will be presenting. Each student has a job to do. The leader (youngest, or determined by roll of dice) will read the definition and discuss the word with the group. The leader also chooses what the other members will do. One will write the word neatly in large dark letters on a half sheet of pink cardstock. Another will draw a picture that represents the word on the blue half sheet, and the third person in the group will take the yellow half sheet and write the meaning of the word from the definition card. After about 5 minutes of work time, the teams will present their word. The other members of the class will write the information down in their step books. Each team will have a turn to present. When all words have been introduced, the class will then play a matching game with the colored paper. The papers will be turned over and held on the board with magnets. It can be grouped by colors or mixed up. In order to get a match, the teams need to pick the word, the meaning, and the picture that go together.

There will be a new introductory activity to motivate the children and get them excited about the concepts being taught that day. Reading fun fraction books, asking intriguing questions, acting out stories, baking cookies in the teacher's lounge, are some of the anticipatory examples I will be using.

Motivational Strategies: It is important that each child is motivated to participate in the activities; otherwise they will not get the full impact of the lessons. This year I have several children who have a hard time joining in. One little girl hardly talks at all unless she is extremely comfortable, and a couple of other boys lose focus quite easily. When given an assignment, if they are paired up, or in a team where they are working with someone who can help, they do much better. Also for at least three of the practice activities, candy or

food is involved in which the children will be able to eat upon completing the tasks. This is always a great motivator. Using manipulatives where the children can have a hands-on-experience with actual fraction pieces is also very fascinating and engaging for the students.

Practice Activities: Each day there is an opportunity for the students to practice what they are learning either in groups or individually. These activities have been carefully selected. A variety of methods and materials are used to capture the students' interest. Each is modeled first by the teacher to show the expectations.

As part of the teacher instruction, examples and non-examples will be given to provide a clear picture of the concept. For instance; when first introducing fractions with the story Friends and Fractions, the teacher will draw a pizza showing the circle cut into two unequal pieces. Then she asks the questions, "Would this be fair? Why? Which piece would you choose?" This illustrates the point of what equal parts are.

Testing and Evaluation: There will be some type of evaluation given daily to see if the students are understanding the concepts taught. As indicated in the charts above, most evaluations are informal, where they are being observed or sharing information with their partner or group. Some evaluations will be based on the homework assignments and/or a quick check that will be given on the concept taught that day. Quick checks usually consist of 3 or 4 questions. Any student missing more than 1 question will have additional review of that concept.

At the end of this part of the unit, there will a formal test given to the students. A passing score will be 80% and above. Those students not obtaining this score will be retaught the information while the others participate in centers or extra activities.

Feedback: As I walk around to observe the students working together or individually, I will ask them to explain their thinking and what they are doing? Then I can see if they are on the right track or if I need to give additional information. On assignments handed in, I will write brief comments, always more positive remarks than negative ones. After the formal test is given and corrected, we will discuss it in class. Each student will have their own test to see where they made mistakes. Then as homework, students will not only find the correct answers, but will explain why they missed the problems. For an example: "I missed this problem because I added instead of subtracting. Or I forgot to do this step first." The students will be able to see their growth from the pretest at the beginning of the unit to the formal test at its completion.