

Teacher: Nicole Remington

School: Bernon Heights

Grade Level: Fifth

Instructional Areas: Math

Unit of Study: Fractions, Decimals & Percents

Duration: Approx. 60 minutes

Knowledge of Students (1b, 1d, 1e)

The class consists of 25 students (10 boys and 15 girls). None of the students currently have an IEP, however 9 out of the 25 students currently have a PLP and 5 out of the 25 students currently have a PMP. 3 out of the 25 students currently receive service from the TIME teacher for either, Reading, Math or both. 1 student suffers from Tourettes Syndrome and at times does have audible ticks. 1 student has been diagnosed with ODD and ADD and is under the supervision of the school psychologist. 1 student is a repeater of grade 5.

Knowledge of Content and Pedagogy (1a, 1c)

Prior Knowledge:

In grade 4, students learned to demonstrate a conceptual understanding of rational numbers 0-999,999. They identified, described, and represented benchmark fractions ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{5}$, $\frac{1}{6}$, $\frac{1}{8}$, $\frac{1}{10}$) through area, set, and linear models. They also identified multiples and factors of the denominator, and recognized decimals as hundredths in relation to money and tenths in regards to metric measurement. They ordered and compared up to 999,999 and identified equivalent, proper positive fractions or decimals.

In grade 4, students described and illustrated the connection between repeated subtraction and division, the inverse of multiplication, dividing using whole numbers, and adding and subtracting fractions with like denominators. Fourth-grade students were able to solve problems using order of operations, including addition and subtraction with decimals and fractions.

Grade 5 GLE's:

Unit of Study 3.1: Understanding, Ordering, and Comparing Fractions, Decimals, and Percents, 15 days

M(N&O)-5-1 **Demonstrates conceptual understanding of rational numbers with respect to: whole numbers** from 0 to 9,999,999 through equivalency, composition, decomposition, or place value **using**

models, explanations, or other representations; and **positive fractional numbers** (proper, mixed number, and improper) (halves, fourths, eighths, thirds, sixths, twelfths, fifths, or powers of ten (10, 100, 1000)), **decimals** (to thousandths), or **benchmark percents** (10%, 25%, 50%, 75% or 100%) as a part to whole relationship in area, set, or linear models **using models, explanations, or other representations.**(State)

M(N&O)–5–2 **Demonstrates understanding of the relative magnitude of numbers** by ordering, comparing, or identifying equivalent positive fractional numbers, decimals, or benchmark percents within number formats (fractions to fractions, decimals to decimals, or percents to percents); or integers in context using models or number lines. (State)

Unit of Study 3.2: Adding and Subtracting Fractions, 8 days

M(N&O)–5–3 **Demonstrates conceptual understanding of mathematical operations** by adding and subtracting decimals and positive proper fractions with unlike denominators. (Local)

M(N&O)–5–4 **Accurately solves problems involving** multiple operations on whole numbers or the use of the properties of factors, multiples, prime, or composite numbers; and addition or subtraction of fractions (proper) and decimals to the hundredths place. (Division of whole numbers by up to a two-digit divisor.) (State)

(IMPORTANT: *Applies the conventions of order of operations with and without parentheses.*)

Future Learning:

In sixth grade, students will compare ratios and rates. They will order and compare whole-number bases with whole number exponents. They will also order and compare across number formats.

Students in sixth grade will add and subtract positive fractions, no longer limited to proper fractions. Students will multiply and divide fractions and decimals. They will also solve problems that involve improper fractions, mixed fractions, and decimals. Sixth-grade students will subtract integers and percents of a whole. They will also solve problems involving greatest common factor and least common multiple. Order of operations is now at the reinforcement level.

Establishing Instructional Outcomes (1c)

The goal of this lesson is to move students away from thinking of the = sign as a prompt to calculate something and to an understanding that it means both expressions or objects are the same value.

Equality is defined as joining two expressions.

Students will apply the knowledge that they have previously learned about fractions (adding, subtracting, equivalent fractions) and determine whether each set of expressions share or = the same value, providing evidence to back up their decision.

Additional Learning Objective(s):

This lesson is intended to help clarify the following common misconceptions that students have:

- Students believe that they must calculate whenever they reach an = sign.
- Students believe that the numerator and denominator are two separate numbers. They are one number. $\frac{1}{2}$ is one number, just like 5 is a number and can be plotted on a number line.
- Students do not understand that the whole must be the same for the fractions to be equivalent.

Essential Question:

What does equivalent mean?

Extension Question:

Tell me what you know about $\frac{1}{2}$?

21st Century Skills:

This is a student driven lesson, in that they will have to apply their own knowledge about fractions in order to determine whether each set of expressions share the same value, and provide evidence/reasoning to back up their decisions. The teacher is there to facilitate discussion, and pass out materials, but it is up to the students to determine where on the chart paper to place each set of expressions. Teacher will walk around and discuss misconceptions as I see them, but I DO NOT GIVE ANSWERS.

Assessment for and of Learning (1f):

Students were given two pre-assessment probes in order to see what they already knew about equality or the = sign, and addition & subtraction of fractions. In addition, my daily math lessons have focused on the daily Essential questions of units 3.1 and 3.2 of the DANA math program.

Assessment Guidelines:

- **Formative:** Collectively: presentation of each group's chart paper with expressions placed in columns. Individually: Math notebooks with evidence that supports/backs up their decisions about each expression. Observation of students participating, discussion of guiding questions.
- **Summative:** End of unit Dana Assessment; Return of the pre-assessment probes – students will be asked to go back and make changes to their work with a different color pen, or a new blank sheet.

Knowledge of Resources (1d, 1e)

One sheet of chart paper with True/Think/False

Student made fraction strips

One glue stick

Math Notebooks

Scratch Paper

Plastic baggies containing fractional expressions

Instructional Procedures (1c, 1e)

Components of the lesson:

Essential Question: What does equivalent mean?

Extension question: Tell me what you know about the number $\frac{1}{2}$?

Pre- lesson activities:

- Give each child strips of white paper (all the same length)
- Ask the students to fold one paper in half, one in fourths, and one in eighths. ($\frac{1}{6}$ is an option)
- Label one side of the paper as you would for a number line. That is, write the fraction near the top. You could also have the students make a number line across the paper and fill in the fractions where the creases are.

- Have the students label the back of the paper in area model form. ($\frac{1}{4}$, $\frac{1}{4}$, $\frac{1}{4}$, $\frac{1}{4}$). You would write these in the middle of each section instead of on the creases.
- Line the papers up – using the number line side. Can the students tell you some equivalent fractions?
- What does equivalent mean?
- What do they notice as they go through this process? (ex: denominator getting smaller as there are more pieces)

Mini-lesson:

- Show the essential question: What does = mean?

Discuss. Record some responses.

- Use an elmo, overhead, or whiteboard
- Progress through the following statements...encouraging discussion on whether or not these statements are true or false:

$$3+5=8$$

$$8=3+5$$

$$8=8$$

$$\frac{1}{4} = \frac{2}{8}$$

Are they true or false.

Activity:

- Homogenous grouping: Instructional groups were chosen by the teacher based on the following criteria:
 - Academic abilities: High Average, Middle Average, Low Average – 1 of each per group
 - Social Intelligence – Student Behavior: Both independent and with peers
 - Overall work habits/motivation
- Make a sheet that has a column for TRUE/Think/False
- Hand out small baggies. One baggie to each pair at a time.
- Not everyone is expected to finish this activity.

- Walk around and discuss misconceptions as I see them. DO NOT GIVE ANSWERS.

Use sticky notes to extend the lesson for the students who finish early.

Reporting Out:

- Teacher discretion on how – stand up and present, share from tables, students move around from table to table

Summary – quick summary by teacher.

Probe: Return of the probe. Students are asked to go back and make changes to their work with a different color pen or by giving the students a fresh sheet – but they should still have access to their original work. This part of the lesson will occur the next day.