Instructional Design

5th Grade Math

 Fractions

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EdTL 7100 Summer 09

Rational

 5th Grade math can be a turning point for a student’s interest or disinterest in math, as well as their future success in Math courses and everyday math concepts. The subunit on fractions is a very intricate part of 5th grade math and if the base is laid as a solid foundation then they are better able to build on that knowledge. I have noticed that many times students cannot make connections with fraction concepts because they do not see fractions used often and fractions are not shown on a calculator. Since they cannot use a calculator they cannot see the connections for real life use of fractions. Understanding this problem then has forced me to challenge myself and my classroom to become more contextualized. This sub-unit will be comprised of both behaviorist and constructivist models but will emphasize a more constructivist model (Chiarelott, 2006). Although my class is usually more traditional because of the basic facts of math and practice or repetition is needed, it is my goal to involve the students more in their education. Students need to be able to practice new skill in order to master them (Marzano,2001) but my goal will be to add more contextualized practices instead of just worksheets. It is the goal of this unit to make connections with fractions, their operations and their existence in everyday life.

 The portion of the unit I will focus my lesson plans on, will be the addition of fractions. There will be three lessons prior to the three I have written in this design but the assessment will encompass all 6 lessons.

Unit Outcomes

* Students will demonstrate their understanding of fractions by using models. (Knowledge)
* Students will compare fractions by placing them in order from least to greatest or vice versa. (Analysis and Evaluation)
* Students will reduce fractions to simplest form. (Application)
* Students will add fraction with like denominators. (Application)
* Students will convert improper fractions to mixed numbers. (Application)
* Students will add fractions with unlike denominators. (Application)
* Students will relate addition of fractions to subtraction of fractions by demonstrating the opposite. (Synthesis)
* Students will subtract fractions with like and unlike denominators. (Application)
* Students will relate fractions to mixed numbers using improper fractions. (Analysis)
* Students will add and subtract mixed numbers. (Application)
* Students will calculate the product of fractions and mixed numbers. (Application)
* Students will calculate the quotient of fractions and mixed numbers. (Application)
* Students will convert fractions to decimals and decimals to fractions. (Application)

Pre-Assessment

In the beginning of the year the students do a math inventory test from my text book so I have some idea of how much they know of this year’s information. Due to the fact that the fraction unit is during the second semester; I will use a KWL chart with a partner or small group dependant on the size of the class. Generally the class size is between 10-19 students, so with under 12 students I will use partners whereas with more students we would use 3-4 people to a group. I will give the students 10 minutes to fill out with their partner or group everything they know about fractions along with some uses of fractions in everyday use. We will use a bulletin board to list all the things they come up with. We will then list the things we want to learn during this unit and as we learn something or correct a misunderstanding we will add that to the KWL bulletin board.

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|  **Fractions**  |
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| **K****What I *Know*** | **W****What I *Want* To Learn** | **L****What I Have *Learned*** |
|                |                |                |

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Lesson 1 – Adding Fractions with like denominators

Objectives: Students will add fraction with like denominators. (Application)

 Students will reduce fractions to simplest form. (Application)

Materials:

 1. White Board, marker and erasers

 2. Student whiteboards, markers and sock erasers (located in the desk

cubbies and caddies)

 3. Students need portfolios and pencils.

 4. Copies of homework practice sheet.

Procedures:

 Introduction Activity (15 min.) – on the white board make two columns and list the following problems on board – correct problems on the right side and wrong problems on the left side of the board.

 1/4 + 1/4 = 2/4 1/4 + 1/4 = 2/8

 2/5 + 2/5 = 4/5 1/5 + 2/5 = 3/10

 2/6 + 3/6 = 5/6 2/6 + 1/6 = 3/12

 5/12 + 4/12 = 9/12 3/11 + 4/11 = 7/22

1. Once all examples on board allow students 2 minutes to think about the commonalities and see if they understand the process to add fraction.

2. Give students 2 minutes to discuss their findings with a partner (the person sitting next to them).

3. Allow each team to explain their ideas on how to add fractions. Put all ideas on whiteboard. If ideas come up that do not keep the denominator the same please direct them to the wrong side of the board. If understanding from discussion seems to flow then move to next step. If little understanding is evident see if you can get a student pair that seems to understand to help those who are struggling.

 Development Activity (15 min) – have students take out their whiteboards, markers and erasers. Have each student write and solve a problem on adding fractions with like denominators and solve it. Have them share theirs with partner and have them evaluate the problem. If there are any disagreements or issues help them work through to the correct answer. Now remind students that all answers need to be in simplest form as taught in yesterday’s lesson. Give the students a couple of the following problems to do on their whiteboard and hold up the answer for you to see when they have computed the correct answer and simplified it.

2/6 + 2/6 (4/6=2/3) 7/14 +1/14 (8/14 =4/7)

5/20 + 5/20 (10/20 = 1/2) 2/8 + 1/8 (3/8)

Read the following word problems for the students or write them on the board so they can see the way that adding fractions is done in the “real world”.

1. Joshua is making his Grandma some chocolate chip cookies, but he also wants to take some to school for his class. So he will make two batches of cookies. The recipe says he needs 1/4 cup of butter. How much butter will he need for his double batch of cookies?

2. Kathy is making a new birdhouse and she needs a piece of wood for the back that is 5/16 long and a piece for the front that is 3/16, how long of a board will she need to cut?

Concluding Activity (10 min) – have students get out their portfolio and together with students write on the board the rules they discovered on adding fractions with like denominator. Also have them put two examples in their notes - either have them generate the examples or give them two examples. Pass out their practice problems for homework.

**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Class \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Adding Fractions with like denominators**

**Directions : add the following fractions, answers must be in simplest form
( SHOW ALL WORK ON THIS PAPER)**

**1. \_\_\_\_\_\_\_\_\_\_\_ 2. \_\_\_\_\_\_\_\_**

**3. \_\_\_\_\_\_\_\_\_ 4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**5. \_\_\_\_\_\_\_\_\_\_\_\_ 6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**7. \_\_\_\_\_\_\_\_\_\_\_\_ 8. \_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**9.** Debbie helps her mother with the laundry. She did of it on Monday and another of it on Tuesday. What fraction of the laundry has she done?

Lesson 2 Improper Fractions

Objectives: Students will convert improper fractions to mixed numbers.

 (Application)

Materials:

 1. Berenstein Bears Book “Inside Outside Upside Down.”

 2. White Board, marker and erasers

 3. Student whiteboards, markers and sock erasers (located in the desk

cubbies and caddies)

 4. Students need portfolios and pencils.

 5. Copies of homework practice sheet.

Procedures:

 Introductory Activity (20 min) - Discuss how the previous lessons homework had answers that did not look right for example number 5. Look at the problem and discuss why it looks funny. (the numerator is larger than the denominator) What words do you think might name this type of fraction? (Improper) There is a way to make this fraction “proper” or not so funny and we will use the Berenstain Bears to help us remember how to do that. Read the story aloud with enthusiasm (making sure you share the pictures). Relate the book back to improper fractions – show them how to change an improper fraction to a mixed number and see if they know why the book helps them remember. (The book states inside, outside this is the order in which the fractions so in the division sign) Problem #5 from last assignment –

 2/3 + 2/3 = 4/3  “The four goes inside and the 3 goes outside because the fraction is upside down.”

 Development Activity (15 min) – Do two or more problems on the board as a class then do a few on the students white boards.

    

Concluding Activity (10 min) – have students get out their portfolio and together with students write on the board the rules they discovered on converting improper fractions to mixed numbers. Also have them put two examples in their notes –

either have them generate the examples or give them two examples. Pass out their practice problems for homework.

**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Class \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Convert improper fractions to mixed numbers.

Directions change each improper fraction to a mixed number. All answers need to be in simplest form. (**Show all work on this paper**).

1.  2. 

3.  4. 

5.  6. 

7.  8. 

9. Sally is making a new flag and will use  yards of blue material and yards of red material. How much material will she use altogether?

Lesson 3: Adding fractions with unlike denominators

Objectives: Students will add fractions with unlike denominators. (Application)

Materials:

 1. Fraction bar pack for each person.

 1. White Board, marker and erasers

 2. Student whiteboards, markers and sock erasers (located in the desk

cubbies and caddies)

 3. Students need portfolios and pencils.

 4. Copies of homework practice sheet.

Procedures:

 Introductory/Discovery Activity – (25 min) – Table Group Discovery – With each person having their fraction bars, place the following problems on the board and see if they can come up with the correct answers by showing their models. Progress through the problems and see if the class can come up with the process that works every time on paper as to how to add fractions with unlike denominators.

 Sample Problems

 **2/4 + 1/2** = 2/4 + 2/4 = 4/4 = 1 **1/3 + 1/6** = 2/6 + 1/6 = 3/6 = 1/2

 **1/5 + 1/3** = 3/15 + 5/15 = 8/15 **5/12 + 5/8** = 10/24 + 15/24 = 25/24 = 1 1/24

Development Activity – (10 min) Come together as a class and write the procedure on the board and have the students put the process with examples in their portfolio.

Conclusion – (10 min) Have students each generate a problem, copy it to the main whiteboard and each student needs to copy all problems and do them for their homework activity. Make sure to stress directions to change improper to mixed and all answers in simplest form.

Assessment

1. Student portfolio – using the following checklist

**PORTFOLIO**

ASSESSMENT SHEET

**(5 points for each unless stated)**

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Points **/** TOTAL

|  |  |
| --- | --- |
| **PAGE****DESCRIPTION** | **check** |
| **Classroom Notes** |  |
| **Classroom Examples** |  |
| **Practice Worksheets** |  |
| **Homework** |  |
| **Quizzes** |  |
| **Test/Project** |  |
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| **IceCream Parlor Menu (1 pt)** |  |
| **Scantron Objectives (1 pt)** |  |
| **Enrichment Puzzle (1 pt)** |  |
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2. Students will be evaluated at learning centers. The students will be given 3 different locations within the classroom to demonstrate their knowledge about fractions. They will have interactive computer time on the following web sites. A paper and pencil center, where they will use book generated worksheets from their textbooks. And finally an interactive smartboard with the teacher so they can demonstrate their skills directly in front of the teacher and get assistance if there are still areas they are not strong enough in.

 Websites : Fishy Fractions - <http://www.iknowthat.com/com/L3?Area=FractionGame>

Fraction Practice - <http://www.kidsolr.com/math/fractions.html>

On-line math games - <http://classroom.jc-schools.net/basic/math.html>

3. Students will be given small quizzes – the one on adding fractions follows. Because the unit of fractions takes a great deal of time, small quizzes are more advantages, because it allows for checking the students progress, before moving on to the next section. This quiz would encompass the two lessons prior to my outlined lessons and the three I outlined.

Quiz #1 Fractions Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Place a <,>, or = symbol in the following equations to make them true.

1.   2.  

3.   4.  

Place the following fractions in order from least to greatest.

5.  , ,  6. , ,  7. , , 

Convert the following improper fractions to mixed number.

8.  9.  10. 

Add the following fractions. All answers must be in simplest terms.

11. **** 12. ****

13.  **** 14. ****

References

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