

Introduction to Fractions, Equivalent and Simplifying (1-2 days)

Vocabulary:

1. Fraction
2. Numerator
3. Denominator
4. Equivalent
5. Simplest form

Real World Examples:

1. Fractions in general, why and where we use them
2. What are some application to using fractions

Conceptual:

1. During lesson use fraction circles or have them draw rectangles. Have them mimic what the teacher is doing on the board or overhead. They need to be able to visualize why two fractions are the same and recognize it is the area of the objects they are comparing.
2. Include examples of what fractions are NOT equivalent and ask them if they understand why.
3. Write examples on the board of just pictures and just fractions and have them figure out which are equivalent and which are not.
4. Lead them into a discussion on how mathematics isn't only conceptual but you will need some type of algorithm or procedure to show two fractions are equivalent.

Computational:

1. After the conceptual part is done and there has been some discussion start drilling them with practice questions. Have them look at two fractions and computationally see if they are the same.
2. I have seen different ways but I like these two specifically:
 - a. Have them write the prime factorization of the numbers and see how they can cancel the "ones"
 - b. Have then find common multiples and reduce.
3. Make a note that you are in fact simplifying and this is another thing they must recognize.
4. Give them a real world problem like with a survey or something.
5. Finish with word problems.

Activities:

Comparing, ordering and Rounding fractions (1-2 days)

Vocabulary:

1. Least common denominator
2. Review of $<$, $>$, $=$ signs.

Real World Example:

Give this question: According to a survey done, here is what people think of the U.S. penny:

8/25 say we should get rid of it

3/100 are undecided

13/20 say keep the penny

How can we tell which opinion is the majority?

This is a good introduction because it shows the students why they might want to order and compare fractions.

Conceptual:

1. This really stems from what we did with equivalent fractions. We will look at areas of fractions circles or rectangles to see the difference in the sizes of fractions. The nice part about this is you do not need to find a common denominator (most of the time) to see why a fraction would be bigger than another.
2. They must realize that they will have to find the LCD to actually compare them computationally.

Computational:

1. To compare two fractions they must be able to:
 - a. Find the least common denominator
 - b. Rewrite each fraction as an equivalent fraction using LCD
 - c. Compare numerators.
2. For practice and part of the lesson the teacher could:
 - a. Basic drills of comparing and order
 - b. List a group of fractions from greatest to smallest
 - c. Big fractions such as $100/150$.
 - d. Surveys
3. For rounding: We will start with talking about 0, $1/2$ and 1. Most people in general say things like oh it's about a half because people can recognize $1/2$ more often. Have practice a bit with you and see if they can understand the relationship between the numerators and denominators to tell what the fraction is closest to!
4. End with talking about estimating sums and differences.

Activities:

Adding and Subtracting Fractions (1-2 days)

Vocabulary:

1. LCD
2. Like fractions

Real world examples and the beginning of the lesson:

1. Talk about estimating sums and differences and how estimation can really help you know if your answer is correct and will also give you a sense of what the answer will be.
2. Find a real world problem.

Conceptual:

1. Start with the basics. Show them pictures of fractions with the same equal parts or denominators and show them how we can add them.
2. Have a few practice with the pictures then ask them what they represent numerically. They now should be able to see $\frac{1}{4} + \frac{1}{4} = \frac{2}{4}$ and actually write it down. Give them a couple on their own to see if they are getting it.
3. Now give them a picture where they are adding objects with a different number of equal parts.
4. The idea will be to have them see what is needed pictorially get them to transfer that numerically.

Computational:

1. Once they have this concept down they can start doing examples and practice.
2. They will also need to do problems like $1 + \frac{1}{2}$ (this will be a lead into mixed numbers which is next). Same idea of finding a common denominator.
3. Of course we need to include story problems and open ended questions.

Activities:

1. Fraction Rummy (pg 233 of Fayette's book)
2. Pennies and Nickels (235 of Fayette's book)
3. Good problem for them to do (239)

Mixed Numbers and Improper Fractions (1 day)

Vocabulary:

1. Mixed Number
2. Improper Fraction

Real World and introduction to the lesson:

1. Talk about what you found when you added $1 + 1/2$.
2. Show how you can write this as $1 \frac{1}{2}$ and discuss the definitions.
3. Give a real world example.

Conceptual:

1. We once again return to a visualization of these numbers.
2. Ask how you can represent the numbers pictorially like $10/5$.
3. Show the relationship between mixed numbers and improper fractions.
4. Use the number line example to talk about the 0, $1/2$, 1, $1 \frac{1}{2}$ and 2 points using an example like: 0, $1/4$, $2/4$, $3/4$, $4/4$, $5/4$, $6/4$
5. We have to try to get them to the point where they can numerically describe what is happening to go from improper to mixed.

Computational:

1. Hopefully they can see the conceptual part and move on to the procedure of the conversion.
2. Again need real world problems and open questions.

NOTE: We should probably focus some on rounding, estimating, adding and subtracting mixed numbers which might extend the day?

Activities:

Decimals and Fractions (2 days)

Vocabulary:

1. Decimal
2. Terminating decimal
3. Repeating decimal
4. Place value

Real World and introduction to the lesson:

1. We can talk about how we can represent fractions with decimals.
2. Ask them why we would want to use decimals instead of fractions.
3. Make sure they know that sometimes a decimal is an estimate and that a fraction is the true representation.

Conceptual:

1. This may not be conceptual but we will need to review and go over the place values.

Computational:

1. Going from fractions to decimals
2. Going from decimals to fractions
3. I had this for two days because I think they will just need to practice it.
4. We can do an activity or game on the second day to close out what they have learned up till now and also maybe a quiz.

Activities:

Decimal war (pg 115)

Multiplying Fractions (1 day)

Vocabulary:

1. Compatible numbers

Real World and introduction to the lesson:

1. We will talk about estimating products using compatible numbers.
2. We can touch on mixed numbers.
3. Real world problem on why we would need to multiply fractions.

Conceptual:

1. We can use models as usual to see it visually.
2. Need to lead them into a discussion on how to see the multiplication numerically.

Computational:

1. Multiplying fractions
2. Multiplying fractions and whole numbers
3. Simplifying before multiplying
4. Multiplying mixed numbers and improper fractions. The need to convert to improper.
5. Open ended questions
6. Number sense questions: Natalie multiplied $\frac{2}{3}$ and 22 and got 33.. does this make sense, why or why not. Give two numbers and ask whether their product will be a mixed number or an improper fraction or a regular fraction or not even a fraction??
7. Drills.

Activities:

Multiplication Chaos

Dividing Fractions (2 days)

Vocabulary:

1. Reciprocal

Real World and introduction to the lesson:

1. There are 8 cookies and I want to give it to 16 people, how do I do it?

NOTE: I think this might take some time to rely due to the definition of reciprocal and the inversion technique for dividing fractions so I gave it two days. Again we can have some time to catch up or even play some games depending.

Conceptual:

1. We start with a basic example of 1 divided by $\frac{1}{5}$. You make a model of 1 (dividend) and think how many $\frac{1}{5}$ s go into 1? We will need to rename 1 as $\frac{5}{5}$. This is an important concept that they must understand... why $\frac{5}{5} = 1$ that I know many people to not get.
2. We can do more practice with whole numbers then move to both being fractions.
3. We have maybe $\frac{3}{4}$ divided by $\frac{3}{8}$. We can rename the fractions to have a common denominator so we can see the pictures better. But we can show both easily. here they will have to see that you do not need to have a common denominator to do this problem.
4. Talk about the relationship between the dividend and the divisor and how the compare. This will help with knowing what the answer should be.
5. We will need to practice more then move on to the development of the reciprocal rule. I do not think we should state this but have them work to finding it themselves.

Computational:

1. Using the reciprocal rule
2. Divide by whole numbers
3. Divide to solve problems.
4. Number sense questions
5. Open ended questions
6. Practice
7. Critically thinking and solving mentally.
8. Mixed numbers and improper fractions.

Activities: