

Math Topic- Fractions

Grade Level(s): 6 and 7

Learning Outcomes:

Grade 6

A4: Relate improper fractions to mixed numbers can be written

Grade 7

A5: Demonstrate an understanding adding and subtracting fractions and mixed numbers

A7: Compare and order positive fractions

Context of Lesson within the unit:

We started this fraction unit using pattern blocks to make equivalent fractions for both grades. Then we went deeper with equivalent fractions with the grade 6's and moved to adding and subtracting with the grade 7's. The last part of the unit was mixed numbers and improper fractions.

Throughout the unit we have used Math Makes Sense as a source of questions, support materials and games (fraction train Math Makes Sense grade 6). We also used Kim Sutton (race track fractions), and First Steps (story/think board).

Story Board- The story board was introduced after the first lesson on ordering and comparing fractions. I presented a story problem and together we completed the picture, fractions and statement of comparison. We brainstormed the types of problems that would demonstrate the learning intention. The students went ahead and completed their story boards. The activity is open ended leaving room for some to elaborate and some to keep their problems simple. **See sample.**

We used the story board again when I introduced mixed numbers and improper fractions. Before we started we looked back at the feedback on their completed story boards. We brainstormed what a student who fully understand mixed numbers and fractions would be able to do. They wrote some criteria on the bottom of their story board.

The third time we used the story board I used some student examples to get us started. We again generated criteria and added/subtracted from the criteria I had typed on the bottom of their story board sheets.

The last lesson in the series had students demonstrating their understanding of the learning intention in a math cartoon. We brainstormed what the cartoon should look like and how that was different from their story problems. They we asked to use one of their previous problems, or add to one or use a fresh idea. The criteria were printed on a sheet, which they had to fill out when they handed in their math cartoon.

We found good support material on <http://illuminations.nctm.org>, for using pattern blocks.

We also used <http://nlvm.usu.edu/> for virtual pattern blocks.

Materials: 10 X 10 grid (overhead, tablet or smart board), Cuisenaire rods, Story Problem work sheet

Lesson Idea:

1. Share Learning Intention:

Grade 6- ordering and sorting fractions, mixed numbers and improper fractions

Grade 7- adding and subtracting fractions, mixed numbers and improper fractions

2. Warm-up or review of concepts:

Overhead or Tablet- 10X10 grid and overlays. Use the overlays (I use coloured transparencies cut to fit) to partition the grid into fractions. If the grid has a value of 1, What is the value of this piece (ie. $\frac{1}{4}$ or 25 squares)? Use various overlays to 'subitize' orally with the entire class.

Cuisenaire rods-

Give each student 10 rods, all the colours

Ask: If the value of the orange rod is 1, make a mixed number. In your math book write down the mixed number and its equivalent improper fraction. Make 4 different mixed numbers.

If students understand this concept, change the value of the orange rod to 2 and continue to make mixed numbers.

As a class we discussed the differences between mixed numbers and improper fractions and some of the 'ways' you go switch back and forth.

3. **Activity with many levels of entry introduced and practiced**

The story board- The beginnings of the activity looked similar to the story board I presented for comparing and ordering fractions (adding for the grade 7's). But after I introduced mixed numbers and improper fractions we generated criteria for their story board. I used my story example and the class completed the picture, fractions and statement or equation columns. I casually put the criteria at the bottom of the overhead story board, but referred to them several times during the lesson. I also reminded them several times on what the intention of their problems should be.

Next lesson: I reviewed each story board and gave feedback related to the criteria. The criteria are now typed on the bottom of a blank story board sheet. The students were then asked to create or fix up 3 story problems that demonstrated the learning outcome. I used some 'student' samples as examples to get us going.

Last lesson: Their 'job' was to pick the story problem that best demonstrates their learning and create a comic strip. We reviewed what the criteria should be. They got started on their 'comic' using the criteria on the overhead. When they were finishing their cartoon the next day, I had typed the criteria up and has them to complete the bottom of the rubric where they were to self assess.

4. Establish Criteria for success- This process took several steps. What does a 3 look like? It was essential to review the criteria in several successive lessons and have the students work with it before I used it as an assessment piece. They really needed to be comfortable and know what to do before they used the criteria successfully. The students read their story problems to a peer and got PQS (praise, questions and suggestions).
5. Reflection: Self assessment based on criteria and learning intention.

6. Ticket out the door: Question that links to the learning intention

a) $\frac{1}{2} > \frac{1}{3} > ? > \frac{1}{5} > \frac{1}{6} > ?$

b) $\frac{1}{2} < \underline{?} < \frac{7}{8} < ?/10$

c) Which is greater $\frac{4}{7}$ or $\frac{7}{4}$? Why?

d) Show me a mixed number with the Cuisenaire Rods and then tell me what it is as an improper fraction.

e) Put these fractions in order- $\frac{11}{3}$, **2** $\frac{1}{6}$, $\frac{9}{5}$, **1** $\frac{4}{5}$

Lesson Review:

- ✓ Did I connect the concept to previous experiences?
- ✓ Did I provide individual choice?
- ✓ Was there an open-ended task?
- ✓ Was it possible to enter the task from a variety of levels?
- ✓ Was time provided for 'Turn and Talk' for sharing of strategies and perspectives?

Fraction Cartoon Criteria – created by one class

Note: An important step is to have the students generate this criteria rather than providing it for them.

Learning intention:

To use a cartoon to demonstrate your understanding of

Grade 6- comparing and ordering mixed numbers and improper fractions

Grade 7- adding and subtracting mixed numbers and improper fractions

Pictures	Fractions	Story	Equations	art
-the pictures demonstrate the problem part of the story - are detailed - have labels - are neat and clear - pictures reflect accurate fractions	-all numbers are accurate - the learning intention is demonstrated - uses improper fractions and mixed numbers -fractions don't have the same denominator - more than 2 fractions is a 4	-demonstrates an understanding of learning intention -understandable -a clear story that makes sense -explanation of what the characters are doing- their math thinking - detail, voice -creative	- shows the math part of the problem clearly -uses accurate numbers -has an accurate answer -shows math thinking -has a backup statement -answers in simplest form	- neat -colourful - uses entire cartoon frame

Give yourself a mark for each column and explain your thinking:

Pictures: _____

Fractions: _____

Story: _____

Equations/Math: _____

Art: _____