Strategies for Comparing Fractions

In order to compare fractions, there are many strategies that can be used. Some of the most effective ones are described in this document.

It is not necessary that every student master every strategy; however, the teacher should be familiar with as many strategies as possible in order to:

- recognize if a student-created strategy is mathematically correct
- have a "toolkit" of strategies that can be used by students

It is essential for students to remember that the fractions being compared MUST refer to the same whole.

These strategies include:

- Comparing Area Models
- Points on a Number Line
- Reasoning Strategies (same numerator; same denominator; benchmark fractions)
- Finding Equivalent Fractions

Comparing Area Models

Students can compare area models to compare fractions either by using physical fraction manipulatives or by drawing pictures. In an area model, the model that represents the larger area is the larger fraction.



Which is larger... 3/4 or 4/5? (Fraction circles)

Which is larger... 3/4 or 5/6? (Fraction strips)



Which is larger... 2/3 or 5/6? (Fraction squares)





2/3

5/6

Points on a Number Line

Students can use number lines to compare fractions by plotting the points on one or on two number lines. The point further to the right represents the larger fraction.

Which is greater... 2/3 or 5/8? (Two different number lines)



Which is greater... 1/2 or 3/8? (One number line)

NOTE: this strategy may be harder for some students to visualize; depending on the fractions it could require partitioning, as demonstrated below.



In order to show eighths I have to partition this number line differently. Think: I have 2 pieces; I need 8... how can I partition my number line to get 8 pieces? Each half needs to be partitioned into 4 pieces so that I have 8 pieces in all. Now I can show 3/8.



The point 1/2 is to the right of the point 3/8, so it is larger.

Reasoning Strategies

Fractions that have the same denominator: Different number of same size pieces

Two fractions with the same denominator have a DIFFERENT NUMBER of the SAME SIZE pieces.

For example, 2/3 and 1/3... thirds of the same size whole are the same size; if I have 2 pieces that's more than 1 piece (a different number (2 or 1) of the same size pieces (thirds)).



Fractions that have the same numerator: Same number of different size pieces

Two fractions with the same numerator have the SAME NUMBER of DIFFERENT SIZE pieces.

For example, 3/4 and 3/5 ... fourths are bigger than fifths; if I have three fourths I have MORE than if I have three fifths (the same number (3) of different size pieces (fourths and fifths)).



Benchmark fractions: closeness to 1/2 and 1 whole

Some fractions can be compared by thinking about them in reference to ½ or 1 whole. This is called using "benchmark fractions."

Using a benchmark of 1/2: To compare 3/8 and 5/6...

- I know that 3/8 is *smaller* than 1/2 because half of 8 is 4.
- I know that 5/6 is *larger* than 1/2 because half of 6 is 3.
- If 3/8 is smaller than 1/2 and 5/6 is larger than 1/2 then 5/6 > 3/8.



Using a benchmark of 1: To compare 6/7 and 7/8...

- I know that 6/7 is 1/7 away from 1 and
- 7/8 is 1/8 away from 1.
- I know that 1/8 is smaller than 1/7,
- so 7/8 must be closer to one (and therefore larger).



Finding Equivalent Fractions

I can compare fractions by finding equivalent fractions using partitioning strategies; this strategy connects to the traditional algorithm, but it is important for students to understand the partitioning concept BEFORE they memorize the algorithm.

To compare 2/3 and 5/6...





I can find out how many sixths I have in 2/3 by partitioning each 1/3 section into 2 more sections to get sixths.

The connection to the algorithm is shown below (the partitioning is represented by the multiplier in the algorithm).

