

INEQUALITY

STEP 2 Determining Inequalities using the $\frac{1}{2}$ Benchmark

Purpose: To compare fractions using the $\frac{1}{2}$ benchmark

Materials: Fraction Bars and Fraction Playing Cards

TEACHER MODELING/STUDENT COMMUNICATION

Activity 1 Finding bars whose fractions are equal to $\frac{1}{2}$

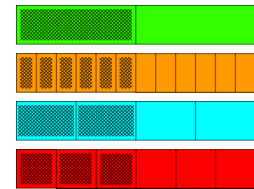
Fraction
Bars

paper and
pencils

1. Each group will need a deck of bars and students will need paper and pencils. Ask students to find the green $\frac{1}{2}$ bar.

➤ Find all the other bars that are half shaded and line them up to compare their shaded amounts.

➤ Write a chain of equalities for these fractions.
($\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{6}{12}$) Select a student to write this chain on the board.



2. List the these fractions for students to compare: $\frac{1}{2}$ $\frac{2}{4}$ $\frac{3}{6}$ $\frac{6}{12}$

➤ What patterns do you notice for these fractions? (The denominators are even numbers but the numerators are both odd and even.) If no one notices that the numerator is half the denominator, ask the following question:

➤ What do you notice about the top number and the bottom number for these fractions? (The top number is half the bottom number.)

➤ Will this always be true for a fraction if its bar is half shaded? (Yes.)

➤ Describe the bars for each of the following fractions: $\frac{4}{8}$, $\frac{5}{10}$ and $\frac{8}{16}$. Are these fractions equal to $\frac{1}{2}$? Explain (Yes. Their bars are half shaded.)

Activity 2 Finding bars for fractions less than or greater than $\frac{1}{2}$

Fraction
Bars

Ask each student to find a bar that is less than half shaded or more than half shaded. Ask a few students to describe their bar and say its fraction. For example, "a blue bar with one part shaded and its fraction is one-fourth."

Write some of their fractions on the board.

$$\frac{1}{4} \quad \frac{5}{12} \quad \frac{2}{3} \quad \frac{5}{6} \quad \frac{3}{4} \quad \frac{11}{12} \quad \frac{1}{3} \quad \frac{0}{6} \quad \frac{7}{12} \quad \frac{2}{6}$$

Discuss each fraction one by one, asking such questions as the following:

- Is this fraction less than or greater than $\frac{1}{2}$? Explain your reason. (For example, $\frac{1}{4}$ is less than $\frac{1}{2}$ because its bar is less than half shaded. Or, some students may say its numerator is less than half its denominator.)

Activity 3 Comparisons to $\frac{1}{2}$ to determine the greater fraction

1. Write the following two fractions, $\frac{4}{7}$ and $\frac{5}{12}$

- Which is greater? Explain your reasoning and write an inequality statement for these fractions. ($\frac{4}{7} > \frac{5}{12}$ because the bar for $\frac{4}{7}$ is more than half shaded and the bar for $\frac{5}{12}$ is less than half shaded. Or, the reasoning might be: 4 is more than half of 7 and 5 is less than half of 12.)

paper and pencils

2. Repeat this activity for these pairs of fractions: $\frac{4}{10}$ and $\frac{2}{3}$; $\frac{5}{8}$ and $\frac{2}{5}$; $\frac{2}{6}$ and $\frac{3}{4}$. Ask students to write an inequality for each pair of fractions. Select a few students to explain and illustrate their reasoning.

The activities in this lesson show how easy it is to compare fractions to $\frac{1}{2}$. NCTM's Standards 2000 emphasizes the importance of comparing fractions to 0, $\frac{1}{2}$, and 1 and refers to these numbers as **important benchmarks**.

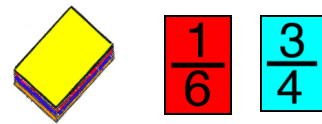
Activity 4 Determining inequalities of fractions from the cards

1. Each group will need a deck of Fraction Playing Cards.

- Spread the cards face down and select any two. Write inequalities comparing your two fractions to $\frac{1}{2}$. Ask for a show of hands for the following situations and select a few students to recite their inequalities or write them on the board.
- How many of you have both fractions less than $\frac{1}{2}$? Both greater than $\frac{1}{2}$? One less than $\frac{1}{2}$ and one greater? One or both fractions equal to $\frac{1}{2}$?

Fraction Playing Cards

2. Optional: Students play **Take A Chance** (page 99) with the Fraction Playing Cards. This game involves comparing fractions to $\frac{1}{2}$. It can be played as a two-person game or as a solitaire game with a single player "beating the deck" if they win 24 or more cards.



INDEPENDENT PRACTICE and ASSESSMENT

Worksheets 30-32 from the *Teacher Resource Package*



fractionbars.com Set 1 **Take A Chance** (Comparing fractions to $\frac{1}{2}$ to win fraction cards)
Set 2 **Hitting Asteroids - Benchmark $\frac{1}{2}$** (Determining inequalities and aiming laser beams at asteroids)