TIMSS

NAEP

Standard Indicator
**4.2.8**

# Adding with Unlike Denominators



## Purpose

Students will use fraction bars to add fractions with different denominators.

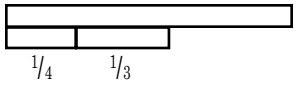
## Materials

*For the teacher:* overhead projector, overhead markers, overhead circle fraction pieces, overhead transparency of Black Line Master (BLM) *Fraction Bars*
*For each student:* copy of BLM *Fraction Bars* copied on lightweight card or construction paper, crayons or markers, pencils

## Activity

### A. Introduction

1. Tell students that they will be working to solve a different kind of problem with fractions. They will be adding fractions when the parts (denominators) are not the same size.
2. Show $\frac{1}{4}$ and $\frac{1}{3}$ fraction pieces from a circle. Put them together and ask: "What fraction do we have when we add $\frac{1}{4} + \frac{1}{3}$?" The class should come to the conclusion that it cannot be decided.
3. Say: "In order to add or subtract fractions we must first find parts (or denominators) that are the same. To do this we will be using what we know about equivalent fractions."
4. Model the problem $\frac{1}{4} + \frac{1}{3}$ by putting a whole fraction bar on the overhead. Below it place a fourth and a third side-by-side.




5. Say: "I need fraction pieces that are of the same kind before I can add. To do this we need to find a number that both 4 and 3 can divide into. This number is called the *common denominator*."
6. Use a "go-by" (in this case, a list of multiples of 3 and 4) to find this number:

| 4 | 3 |
|---|---|
| 4 | 3 |
| 8 | 6 |
| 12 | 9 |
| 16 | 12 |

12 is the number that both 4 and 3 can divide into. Therefore, 12 is the *common denominator*.

*(continued)*

**EXTENDING THE ACTIVITY**

Give students fraction additions that produce improper fractions (e.g., $\frac{3}{4} + \frac{1}{2}$ ) and ask them how to complete these.

**Standards Link**
**4.1.7**

## Activity (continued)

7. By comparing lengths, find that three twelfths pieces is equivalent to the $^1/_4$ and that four twelfths pieces is equivalent to the $^1/_3$.
8. Say: "$^1/_4 + ^1/_3$ is the same as $^3/_{12} + ^4/_{12} = ^7/_{12}$."

### B. Student Activity: Addition

1. Hand out the BLM *Fraction Bars.*
2. Instruct students to color the bars. Each fraction should be a different color (i.e., whole red, halves blue, etc.).
3. Have students cut the fraction bars along the solid lines.
4. Give students the following problems, one at a time. For each problem, students will follow the procedure modeled above using their fraction bars to find common pieces (denominators) to make equivalent fractions to add together.
   $^3/_4 + ^1/_8 =$ $^1/_2 + ^1/_3 =$ $^2/_5 + ^3/_{10} =$ $^1/_6 + ^3/_4 =$
5. For each problem students should use "go-bys" to find the common denominator.
6. Direct the students to write the number sentence (i.e., $^3/_4 + ^1/_8 = ^6/_8 + ^1/_8 = ^7/_8$).

### C. Student Activity: Subtraction

1. Ask students if they can figure out how they could use what they have just learned about adding fractions with unlike denominators to subtract fractions with unlike denominators.
2. Students should determine that they must first find the common denominator of the two fractions in the subtraction problem. Example: In $^3/_4 - ^2/_3$ , students would first find 12 as the common denominator, use three of the fourths from the fraction bars and find how many twelfth pieces would be the same [9]. They would then find the number of twelfths in $^2/_3$ [8] and take that many, so that: $^3/_4 - ^2/_3 = ^9/_{12} - ^8/_{12} = ^1/_{12}$.
3. Have the students work the following subtraction problems one at a time following the above procedure:
   $^5/_6 - ^5/_{12} =$ $^1/_2 - ^1/_3 =$ $^4/_5 - ^3/_{10} =$

## Questions for Review

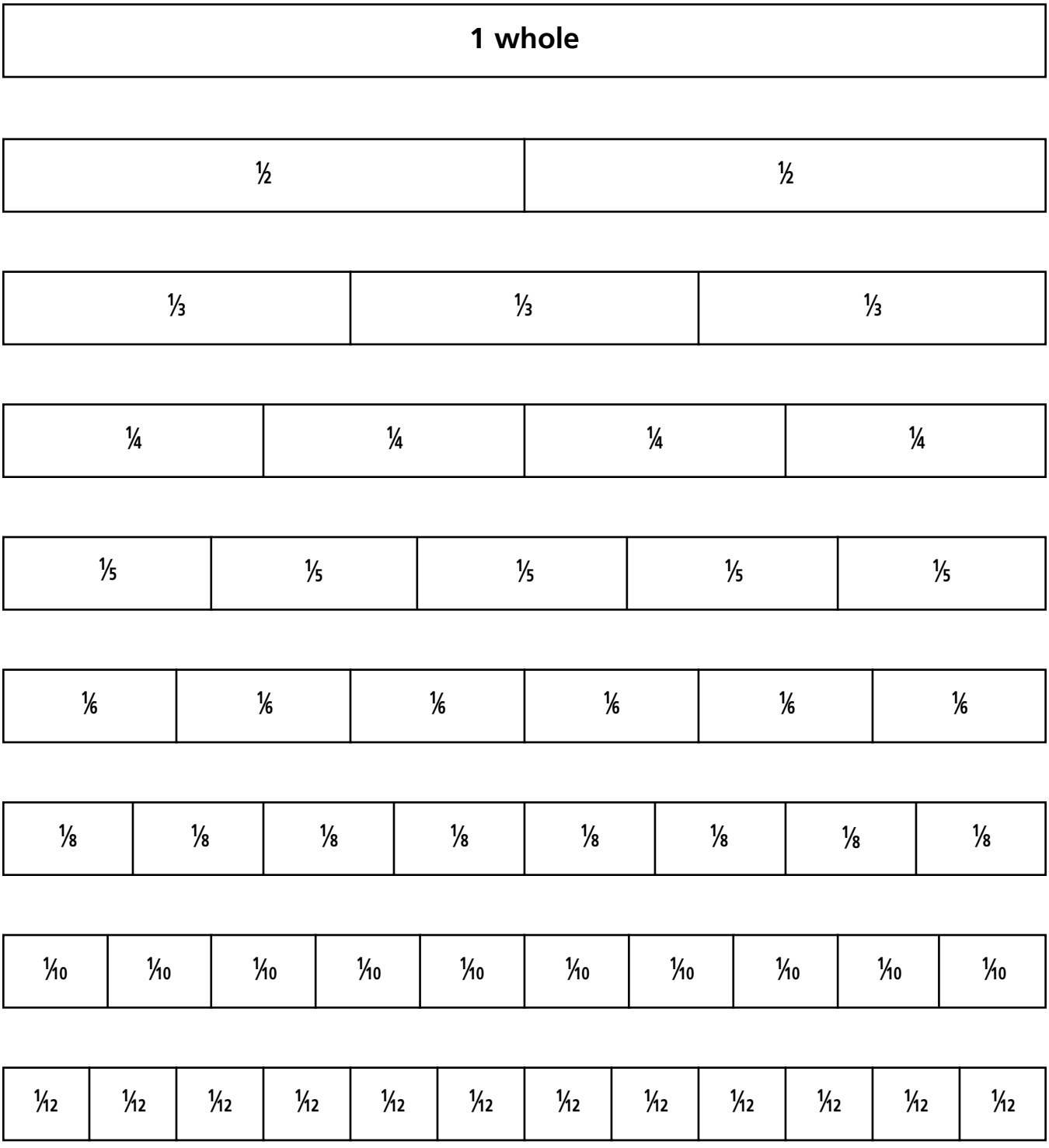
### Basic Concepts and Processes

During the activity, discuss the following questions with students to gauge their understanding of the indicator:

I have $^1/_2$ of a pie in one pan and $^1/_3$ in another. If I put these pieces together what fraction would I use to tell how much pie I have now?

What did you need to find before you could add these pieces?

# Fraction Bars



# Fraction Bars

## Teacher Directions

Have students color the fraction bars, using a different color for each bar. Students will use their fraction bars to solve problems in the activity.

## Answer Key

Not applicable.