LESSON 2

Converting Fractions, Decimals, and Percentages

Objective

Convert fractions into decimals and percentages.

Common Core State Standards

- **7.EE.3** Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.*

In previous grades, students learned that the set of rational numbers consists of all numbers of the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$. Students should also be familiar with reducing fractions. In this lesson, students will use their previous knowledge of fractions to convert fractions to both decimals and percentages.

Try It! *Perform the Try It! activity on the next page.*

Talk About It

Discuss the Try It! activity.

- **Ask:** *What is a percentage?* Elicit from students that it is the ratio of some number to 100. **Ask:** *How do you change a fraction to a percentage?*
- **Ask:** *To change a decimal to a percentage, how many places should you move the decimal point?* Then have students explain how to change a percentage to a decimal.

Solve It

Reread the problem with students. Have students generate three reduced fractions from the story problem. Have them convert each fraction to a decimal and then each decimal to a percentage.

More Ideas

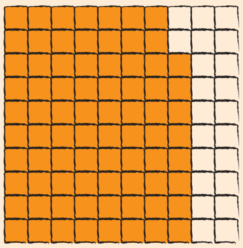
For other ways to teach about fractions, decimals, and percentages—

- Give students about 200 Centimeter Cubes in five colors. Have students randomly select 100 cubes, note the number of cubes of each color, express each color as a fraction of 100, reduce all fractions that are not in lowest terms, and convert each fraction to a decimal and to a percentage.
- Have students use Fraction Tower® Equivalency Cubes to solve similar problems. Any combination of cubes that can be stacked to the same height as the red cube will be equal to 100% $\left(\text{e.g., } \frac{1}{8}, \frac{1}{8}, \frac{1}{4}, \frac{1}{6}, \text{ and } \frac{1}{3}\right)$. The other sides of the cubes show decimal and percent equivalents.

Formative Assessment

Have students try the following problem.

Which of the following sets of fractions, decimals, and percentages is represented by the shaded area of the 10 × 10 grid shown here?



A. $\frac{88}{100}$, 0.88, 88% **B.** $\frac{78}{100}$, 0.39, 78%

C. $\frac{39}{50}$, 0.78, 78% **D.** $\frac{22}{25}$, 0.88, 88%

Try It! 20 minutes | Groups of 4

Here is a problem about fractions, decimals, and percentages.

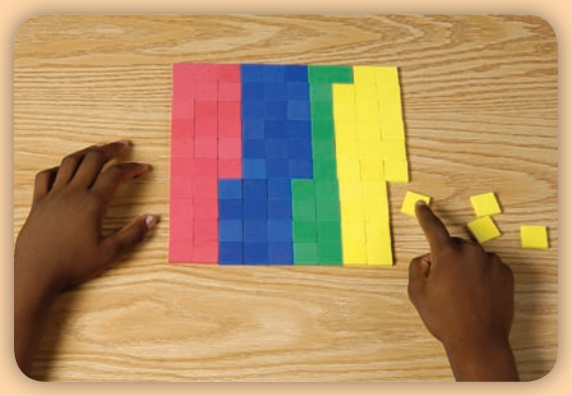
A marketing company conducted a survey of one hundred 13- to 18-year-olds asking them to name their favorite type of movie. The results were as follows:

Action: 26	*Romance: 15*
Science Fiction: 30	*Comedy: 29*

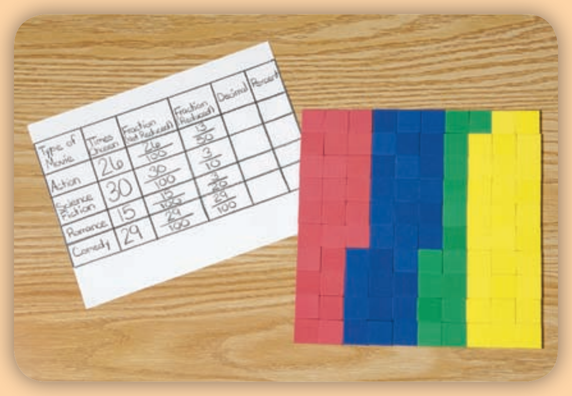
Introduce the problem. Then have students do the activity to solve the problem. Distribute the materials.

Materials
- Color Tiles (33 of each color)

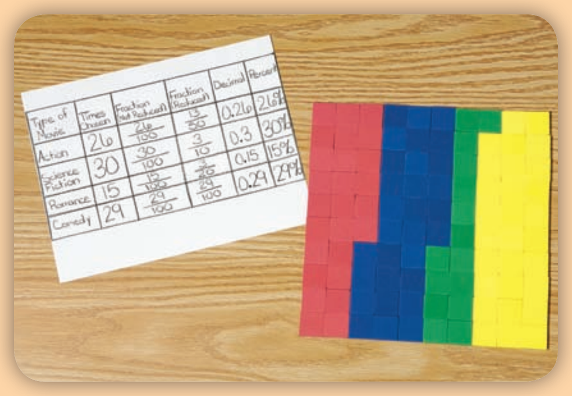
1. Have students form single-color groups of color tiles to reflect the number of responses to each survey category. Use the following color key:
Action = red; Science Fiction = blue;
Romance = green; Comedy = yellow.



2. Have students form a 10-by-10 array with the tiles, grouping the colors to reflect the survey results.



3. Have students make a table with six columns: Type of Movie, Times Chosen, Fraction (Not Reduced), Fraction (Reduced), Decimal, and Percent. Tell students to fill in the first two columns based on information from the problem and to fill in the fractions in the Not Reduced column by writing the number of times that type of film was chosen over 100. Finally, have students reduce the fractions.



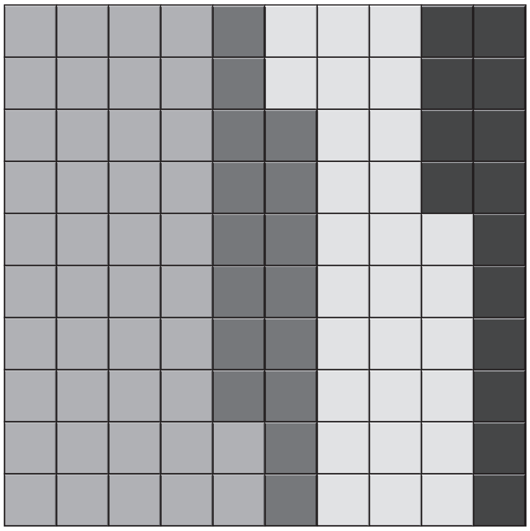
4. Have students write the decimal form for each result by looking at the numerator of the fractions that have not been reduced. Since 100 is the denominator, the decimal point should be put in front of any two-digit number (e.g., $\frac{22}{100}$ would be written as 0.22). Students can convert the decimal to a percentage by moving the decimal point two places to the right and writing a percent sign after the numeral.

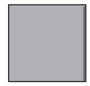
Answer Key

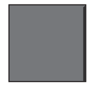
Use Color Tiles in a 10 × 10 array to model the fraction shown. Write the fraction for each color. Then write the decimal and percent for each color.

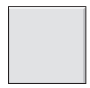
(Check students' work.)

1.



 $\frac{42}{100}$; 0.42; 42%

 $\frac{16}{100}$; 0.16; 16%

 $\frac{28}{100}$; 0.28; 28%

 $\frac{14}{100}$; 0.14; 14%

Using Color Tiles, model a 10 × 10 array for the fractions given. Sketch the model. Write the decimal and percent for each color.

2.

Red: $\frac{35}{100}$ 0.35; 35%

Blue: $\frac{12}{100}$ 0.12; 12%

Yellow: $\frac{32}{100}$ 0.32; 32%

Green: $\frac{21}{100}$ 0.21; 21%

Write each fraction as a decimal and as a percent.

3. $\frac{18}{100}$ 0.18; 18%

4. $\frac{33}{100}$ 0.33; 33%

5. $\frac{72}{100}$ 0.72; 72%

6. $\frac{25}{100}$ 0.25; 25%

7. $\frac{16}{100}$ 0.16; 16%

8. $\frac{40}{100}$ 0.40; 40%

Answer Key

Challenge! Why can you use a 10 × 10 array to convert a part of a total to a percent?

Challenge: (Sample) A 10 × 10 array has 100 units. Percent means per one hundred.

Name ____________________________

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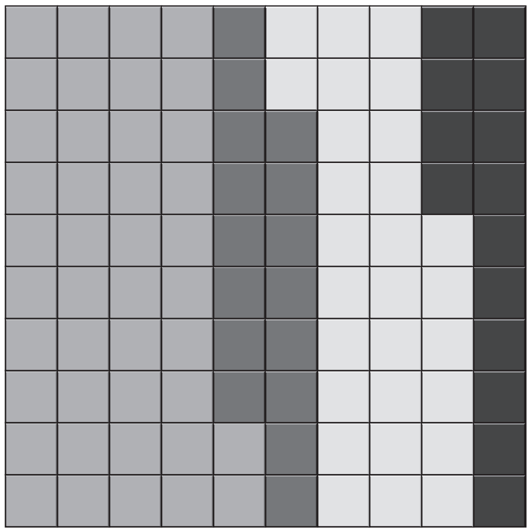

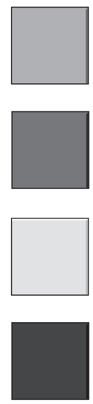

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Name ___________________________________

Challenge! Why can you use a 10 × 10 array to convert a part of a total to a percent?