

# Understanding Percent

## Coloring Creations

**SUGGESTED LEARNING STRATEGIES:** Create Representations, Think/Pair/Share, Quickwrite, Vocabulary Organizer

1. Color the grid. The table at the right tells how many squares to fill with each color. Make any design you want.


### My Notes

Color	Squares
Red	40
Orange	8
Yellow	13
Green	17
Blue	22

2. For each color use a colon to write a ratio of the number of squares of that color to the total number of squares. Then write each ratio in fraction, decimal, and word form.

	Red	Orange	Yellow	Green	Blue
<b>Ratio (:)</b>					
<b>Fraction</b>					
<b>Decimal</b>					
<b>Word Form</b>					

3. Another way to represent a part to whole relationship is by using another type of ratio called a **percent**. A percent is a ratio that is always a number out of 100.

- a. Consider the parts of the word *percent*. Why do you think a number out of 100 is called a percent?
- b. The symbol % is used to represent the term *percent*. Make a connection between the symbol and its meaning.

### ACADEMIC VOCABULARY

**Percent** means parts per hundred. It can be expressed as a fraction, such as  $\frac{87}{100}$ , or with a percent sign, 87%.

**SUGGESTED LEARNING STRATEGIES:** Quickwrite, Debriefing, Create Representations, Look for a Pattern, Discussion Group

My Notes

**MATH TIP**

Fractions, decimals, and percents all represent parts of a whole figure, therefore we can convert between them.

4. Use the grid in Question 1 to answer the following questions.
  - a. How many squares out of 100 are red? \_\_\_\_\_ out of 100
  - b. Replace “out of 100” with the word percent: \_\_\_\_\_
  - c. Replace “percent” with its symbol: \_\_\_\_\_
5. Explain why the fraction and the decimal representing the ratio for red both also represent a number out of 100.

6. In the table below, write the percent of the grid that is covered by each color.

	Red	Orange	Yellow	Green	Blue
Percent of Grid					

7. Use the tables from Questions 2 and 6 to answer each question.
  - a. What is the sum of the percents?
  - b. What is the sum of the fractions?
  - c. What is the sum of the decimals?
  - d. What relationships do you find among your answers to Parts a–c?
8. Consider the colors you used in the grid.
  - a. List the colors and percents from Question 6 in order from the color most used to the color least used.
  - b. What representations other than the percents could you have used to order the colors?

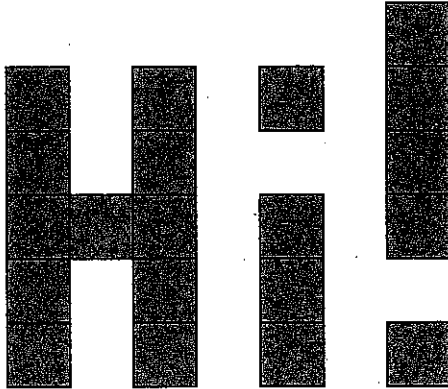
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## Coloring Creations

### ACTIVITY 4.3

**SUGGESTED LEARNING STRATEGIES:** Quickwrite, Simplify the Problem, Think/Pair/Share, Self Revision/Peer Revision

9. What about the grid in Question 1 made it easy to find percents?



10. How many tiles make up the message, *Hi!*?

11. To find the percent of the tiles in *Hi!* that are in the *H*, first find either a fraction or a decimal.

a. Which is easier to find in this situation, a decimal or a fraction? Explain and write your answer.

b. Write your answer in hundredths, since percent is a number out of 100. Then convert the hundredths to a percent.

c. Write this percent as a decimal.

12. Consider the tiles that are in the letter *i*.

a. What percent of the tiles in *Hi!* are in the *i*?

b. Write this percent as a decimal.

My Notes

My Notes

**SUGGESTED LEARNING STRATEGIES:** Quickwrite, Group Presentation, Summarize/Paraphrase/Retell, Create Representations, Think/Pair/Share, Self Revision/Peer Revision

**13.** Use your answers to Questions 11 and 12 to determine what percent of the tiles in *Hi!* are in the *!*. Explain how you found your answer.

**14.** Write the percent from Question 13 as a decimal and a fraction.

**15.** To write percents, you need a fraction or a decimal written in hundredths. Convert each fraction, decimal, or ratio to a percent. If not already in hundredths, first convert to hundredths and then write as a percent.

a. 0.45

b.  $\frac{34}{100}$

c. 0.9

d.  $\frac{7}{10}$

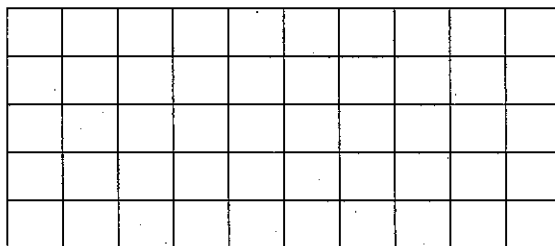
e.  $\frac{11}{25}$

f. 15 blue dots:50 total dots

**MATH TIP**

Recall from Unit 1 that one way to convert a fraction to a decimal is by dividing. For example,  $\frac{3}{4}$  is 3 divided by 4, which gives 0.75. This can now be written as a percent: 75%. This gives the same answer as using equivalent fractions:  $\frac{3}{4} = \frac{75}{100} = 0.75 = 75\%$ .

Use the grid below to answer Questions 16–21.



**16.** What percent of the grid is shaded? Explain.

**17.** Color 36% of the grid blue.

a. What fraction of the grid is now blue?

b. Write a decimal to represent the blue boxes.

# Understanding Percent

## Coloring Creations

### ACTIVITY 4.3

**SUGGESTED LEARNING STRATEGIES:** Create Representations, Look for a Pattern, Discussion Group, Debriefing, Quickwrite

### My Notes

#### MATH TIP

For Questions 18 and 19, do not color a square that has already been colored.

18. Color  $\frac{2}{5}$  of the grid red.

- Write a decimal to represent the number of red boxes.
- Write this decimal as a percent.

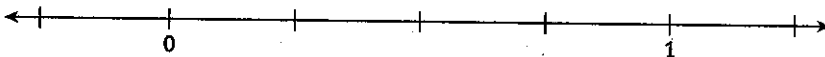
19. Color 0.16 of the grid yellow.

- Write this amount as a fraction.
- Convert your fraction to a percent.

20. What percent of the grid is now shaded? Write this percent as a decimal and a fraction.

21. Use the grid to order  $36\%$ ,  $\frac{2}{5}$ , and  $0.16$  from least to greatest.

22. If you did not have a shaded model to look at, you could use a number line to compare percents, fractions, and decimals. Place  $36\%$ ,  $\frac{2}{5}$ , and  $0.16$  on the number line.



23. Consider your answers to Parts a and b of Question 8.

- Why were the amounts so easy to order?
- Show how you could order the amounts from Question 21 without using a model or a number line.

24. Consider the figure: ●○○○○○○○

What percent of the figure is shaded? Explain how you determined your answer.

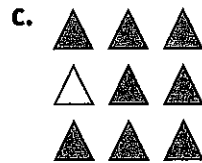
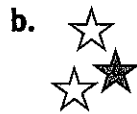
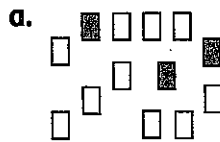
#### MATH TIP

Recall that *percent* means a number out of a hundred. For example, think about how many hundredths are in the decimal  $0.485$ . This should help you see that  $0.485 = 48.5\%$ .

SUGGESTED LEARNING STRATEGIES: Identify a Subtask, Think/Pair/Share, Self Revision/Peer Revision

My Notes

25. Find what percent of each figure is shaded. Write your answer to the nearest tenth of a percent.



26. Compare each amount.

a.  $\frac{5}{7}$   71%

b. 0.5625  56.4%

c. 27%  0.3

d. 10%  0.01

27. Other than creating designs, name at least three real world uses of percent.

**SUGGESTED LEARNING STRATEGIES:** Quickwrite, Group Presentation

My Notes

**28.** Percents are commonly used in trivia or fun facts. Convert each percentage in the facts below to decimals and fractions.

- About 50.8% of the U.S. population is female.
- More than 90% of plane crashes have survivors.
- In the U.S., 32.4% of households own a cat.

**29.** Use the figures below to answer Parts a and b.

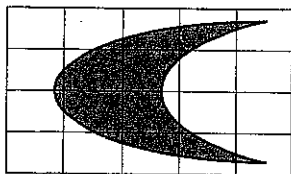


Figure 1

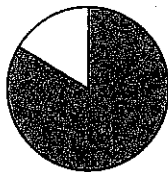


Figure 2

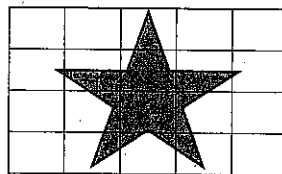


Figure 3

**a.** Estimate what percent of each figure is shaded. Give reasons for your estimates.

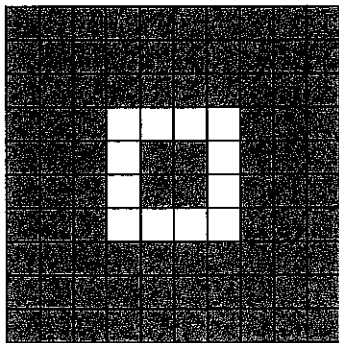
**b.** Why is it difficult to write a percent to represent the shaded amounts of each figure? Explain your reasoning.

**CHECK YOUR UNDERSTANDING**

Write your answers on notebook paper. Show your work.

1. Write the shaded part of each figure as a fraction, decimal, and percent.

a.



b.



2. Write each amount as a percent.

a. 0.37      b.  $\frac{21}{100}$       c. 79 out of 100

3. Write each percent in the form specified.

a. 48%; ratio  
b. 1%; decimal  
c. 99%; fraction

4. Abby spelled  $\frac{8}{10}$  of the words correct on her quiz. What percentage was that?

5. Kate shot 25 free throws at basketball practice and scored on 13 of them. What percent of free throws did she make?

6. Put the following amounts in order from greatest to least: 60%,  $\frac{2}{3}$ , 0.599. Explain your reasoning.

7. Write each amount as a percent. If necessary, round to the nearest tenth of a percent.

a.  $\frac{5}{8}$

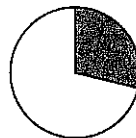
b. 0.2189

c.  $\frac{6}{7}$

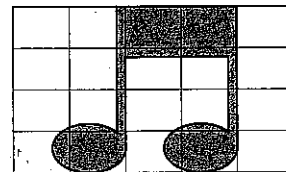
d.  $\frac{13}{15}$

8. Estimate the percentage of each figure that is shaded.

a.



b.



9. **MATHEMATICAL** Explain why a percent is a type of ratio, and how percents relate to decimals and fractions.