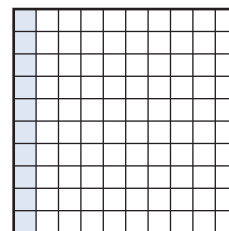


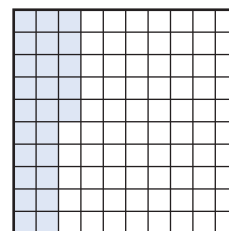
Dear Family,

This week your student is exploring percents. A **percent** is a rate that shows an amount per 100. You can represent a percent as a fraction or a decimal.

Percents are often written with the percent symbol, %. This model shows 10% because 10 out of 100 equal parts are shaded. This is the same as saying $\frac{10}{100}$, or $\frac{1}{10}$, of the grid is shaded. The decimal 0.1 also represents 10%.



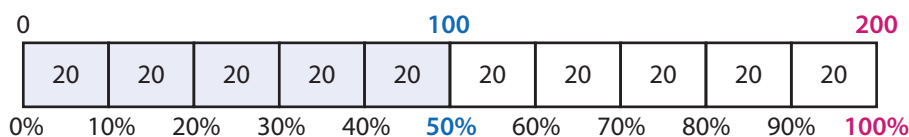
This model shows 25% because 25 out of 100 equal parts are shaded. This is the same as saying $\frac{25}{100}$, or $\frac{1}{4}$, of the grid is shaded. The decimal 0.25 also represents 25%.



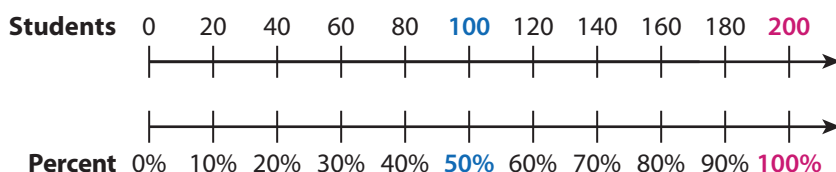
Your student will be modeling percents like the one below.

During a field trip to the science museum, 50% of 200 students decide to see the butterfly exhibit.

► **ONE WAY** to model a percent is to use a bar model.



► **ANOTHER WAY** is to use a double number line.



Both representations show that 50% of 200 students, or 100 students, decide to see the butterfly exhibit.



Use the next page to start a conversation about percents.

Activity Exploring Percents

- Do this activity together to look for patterns in percents.

Each set shows three statements about percents. What patterns do you notice in each set?



SET 1

10% of 100 is 10.
20% of 100 is 20.
30% of 100 is 30.

SET 2

50% of 100 is 50.
50% of 200 is 100.
50% of 300 is 150.

SET 3

10% of 200 is 20.
20% of 200 is 40.
30% of 200 is 60.



Do you notice any patterns between two of the sets?

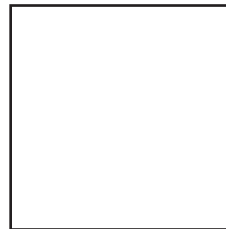
Explore Percents

Model It

► Complete the problems about fractions and percents.

1 Keith and his friends mow lawns to earn money.

a. The model represents a lawn that Keith is mowing. So far, he has mowed $\frac{1}{2}$ of the lawn. Shade the model to show how much of the lawn Keith has mowed.



b. You can write $\frac{1}{2}$ as an equivalent fraction with different denominators.

Write numerators to show three fractions that are equivalent to $\frac{1}{2}$.

$$\frac{\square}{8}$$

$$\frac{\square}{40}$$

$$\frac{\square}{100}$$

2 In problem 1b, you wrote the fraction of the lawn Keith has mowed as a number of equal parts out of 100. You can use a **percent** to represent an amount *per 100*. You can think of a percent as a rate, with the whole divided into 100 equal parts.

a. The fraction $\frac{50}{100}$ means 50 parts out of 100 equal parts, or 50 parts per 100 parts.

The fraction $\frac{50}{100}$ represents _____ percent.

b. When you write a percent, you can use the percent symbol (%) in place of the word *percent*. Look back at problem 1. Complete this sentence that uses a percent to describe how much of the lawn Keith has mowed so far.

Keith has mowed _____ % of the lawn.

DISCUSS IT

Ask: How would you change your model in problem 1 to show that Keith has mowed $\frac{50}{100}$ of the lawn?

Share: I think $\frac{50}{100}$ and $\frac{1}{2}$ both represent 50% because ...

Learning Targets SMP 2, SMP 3, SMP 7

Use ratio and rate reasoning to solve real-world mathematical problems.

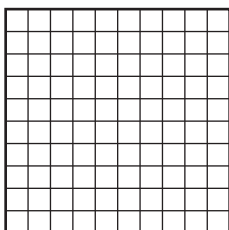
- Find a percent of a quantity as a rate per 100; solve problems involving finding the whole, given a part and the percent.

Model It

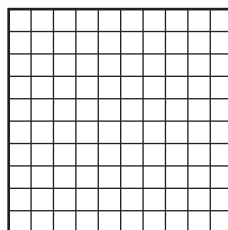
► Complete the problems about percents.

3 You can use a hundredths grid to show a percent.

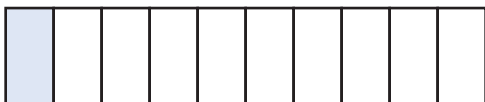
a. Esteban mows 50% of a lawn.
Shade the model to show 50%.



b. Emma mows 10% of a lawn.
Shade the model to show 10%.



c. Does this model also represent the percent of the lawn Emma has mowed? Explain how you know.



DISCUSS IT

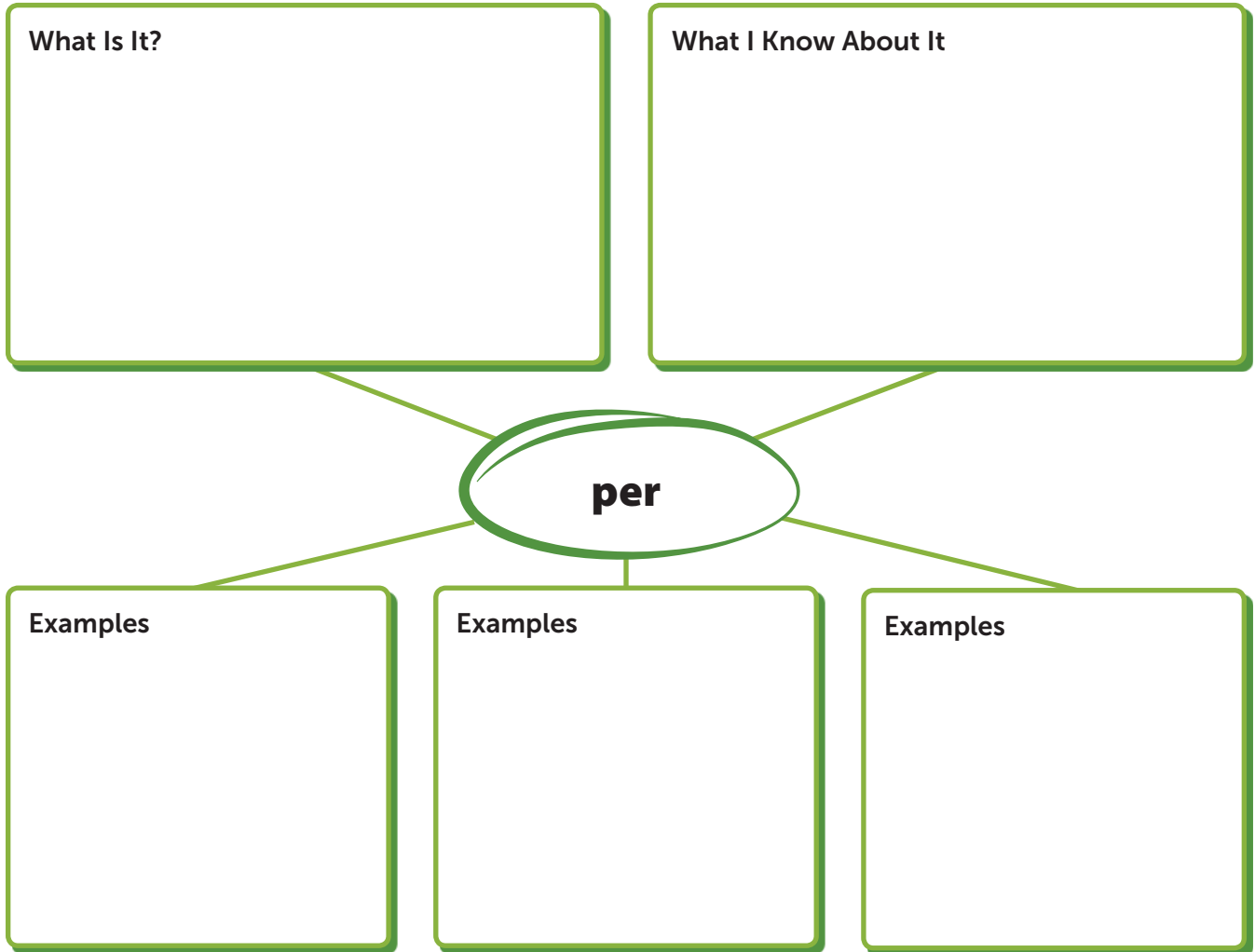
Ask: What is a different way you can shade the model in problem 3b to show 10%?

Share: I think I can represent 10% with the decimal 0.1 because . . .

4 **Reflect** How is using a model to show a percent similar to using a model to show a fraction? Use either 50% or 10% as an example in your explanation.

Prepare for Understanding Percents

- 1 Think about what you know about ratios, rates, and the word *per*. Fill in each box. Use words, numbers, and pictures. Show as many ideas as you can.



- 2 Tara makes two batches of purple food coloring. The table shows the number of drops of red and blue food coloring she uses for each batch. Do the two batches use the same number of drops of red per drop of blue? Explain.

Batch	Drops of Red	Drops of Blue
Batch 1	100	20
Batch 2	75	15



► Complete problems 3 and 4.

3 Kadeem made a rectangular pan of enchiladas for his family. So far, they have eaten $\frac{1}{5}$ of the enchiladas.

a. Shade the model to show $\frac{1}{5}$ of the pan.



b. You can write $\frac{1}{5}$ as an equivalent fraction with different denominators.

Write numerators to show three fractions that are equivalent to $\frac{1}{5}$.

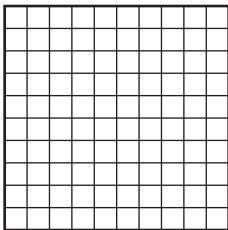
$$\frac{\square}{10}$$

$$\frac{\square}{40}$$

$$\frac{\square}{100}$$

4 a. The fraction $\frac{20}{100}$ means 20 out of 100 equal parts, or 20 parts per 100 parts. The fraction $\frac{20}{100}$ represents _____ percent.

b. Shade the hundredths grid to show 20%.



c. Why does your model in problem 3a represent the same percent as your model in problem 4b?

d. Kadeem's family has eaten _____ % of the enchiladas.

Vocabulary

percent

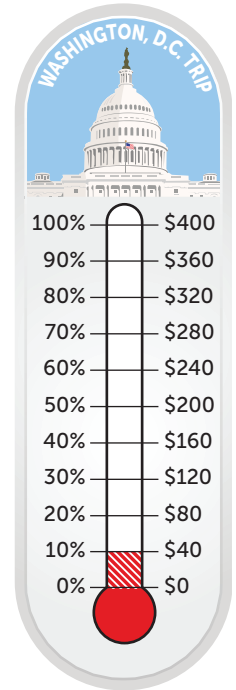
per 100. A percent is a rate per 100. A percent can be written using the percent symbol (%) and represented as a fraction or a decimal. For example, 15% can be represented as $\frac{15}{100}$ or as 0.15.

Develop Understanding of Percents

Model It: Bar Models

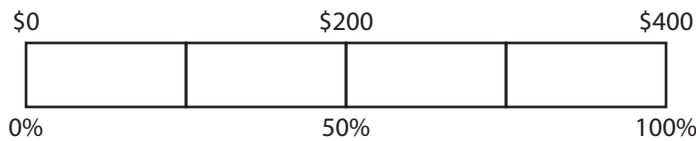
► Try these two problems involving percents.

- 1 A group of students is raising money for a trip to Washington, D.C. They use a model that looks like a thermometer to track their progress toward their goal.
 - a. The line at 100% represents the students' goal. What amount of money are the students trying to raise?
 - b. The shading between 0% and 10% shows that the students have reached 10% of their goal. How much money have the students raised so far?
 - c. After 1 week, the students reach 50% of their goal. Shade the model to show how much money the students have raised.
 - d. Use your model to complete this sentence.



50% of \$_____ is \$_____.

- 2 Another group of students is also raising \$400 for the trip.
 - a. On Monday, the students reach 25% of their goal. Label and shade the bar model to show their progress.



- b. How much money have the students raised so far? Justify your answer.
- c. What fraction of their goal have the students reached?

DISCUSS IT

Ask: How are the two models on this page alike? How are they different?

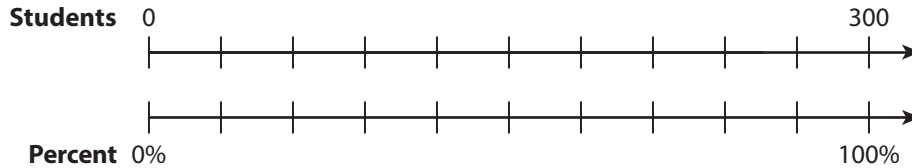
Share: The bar model is divided into four parts because...

Model It: Double Number Lines

► Try this problem using a double number line to show percents.

3 A total of 300 students go to Washington, D.C.

a. Label the tick marks on the double number line.

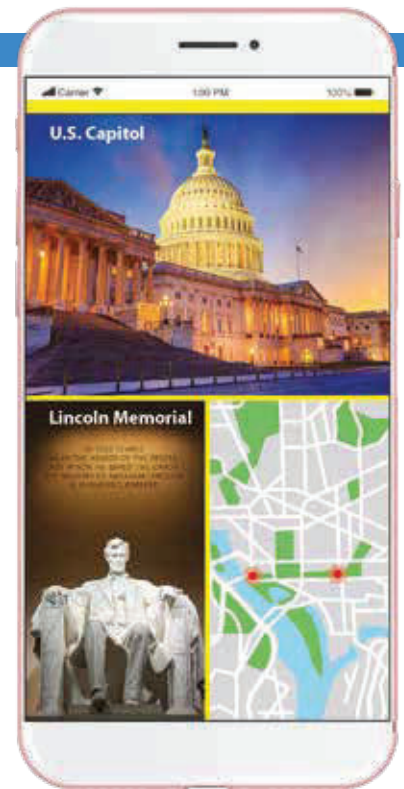


b. Ayana finds that 50% of the students visit the Capitol.

What number of students lines up with 50%?

This means _____ % of 300 students is _____ students.

c. Ayana finds that 0.1 of the students visit the Lincoln Memorial. Do more students visit the Capitol or the Lincoln Memorial? How do you know?



DISCUSS IT

Ask: How could you use a double number line to find 25% of 300?

Share: In this situation, 100% represents . . .

CONNECT IT

► Complete the problems below.

4 How do bar models and double number lines show percents in a similar way?

5 Heidi is driving 200 miles. She has finished 80% of the drive. Draw a model to show 80% of Heidi's drive.

Practice Modeling Percents

► Study how the Example shows modeling a percent. Then solve problems 1–5.

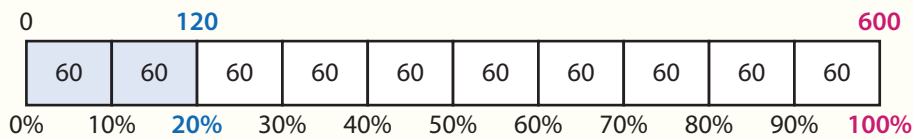
Example

The drama club hopes to sell 600 tickets for a school play. So far, they have sold 20% of the tickets. Use a model to show 20% of 600.

You can use a bar model.

The whole is 600. It lines up with 100%.

Divide the whole into 10 equal parts of 60. Each part is 10%. Shade two parts to show 20%.

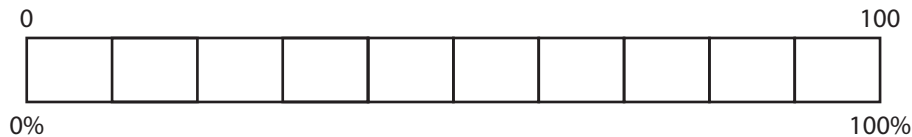


1 a. What amount lines up with 20% in the Example? What does this mean?

b. What fraction of the tickets have students sold so far? Explain how you know.

2 Tomás is reading a 100-page book. He has read 40% of the book so far.

a. Label and shade the model to show 40% of 100.



b. How many pages has Tomás read? What fraction of the pages has he read?

Vocabulary

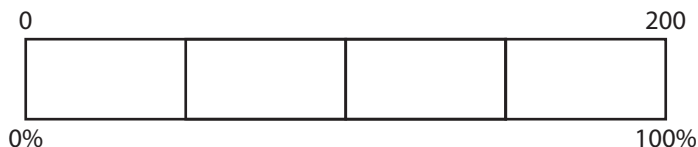
percent (%)

per 100. A percent is a rate per 100. A percent can be written using the percent symbol (%) and represented as a fraction or decimal. For example, 15% can be represented as $\frac{15}{100}$ or 0.15.



- 3 Mr. Aba’s class is making 200 origami cranes for an art project. So far, they have made $\frac{3}{4}$ of the cranes.

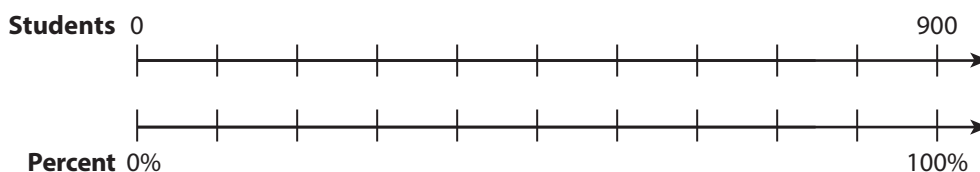
a. Label and shade the bar model to show their progress.



b. What percent of the cranes have they made? How many have they made? Explain.

- 4 On Monday, 30% of the 900 students at Maple Middle School walk to school.

a. Label the tick marks on the double number line.



b. How many students walk to school on Monday? What fraction of the 900 students walk to school?

- 5 Eduardo’s juice box contains 500 mL of juice. The juice box label says *Contains 10% real fruit juice*. How many mL of real fruit juice are in Eduardo’s juice box? Draw a model to show your work.

SOLUTION _____



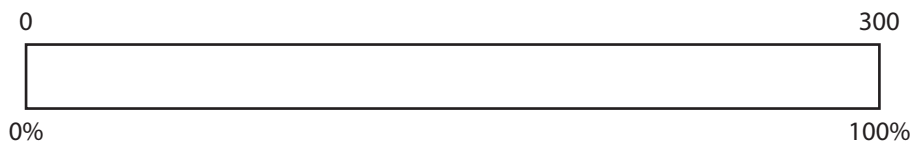
Refine Ideas About Percents

Apply It

► Complete problems 1–5.

1 Interpret Some students have a goal of collecting 200 leaves for a science project. What does 0% of the goal mean in this situation? What does 100% mean?

2 Analyze Maya is helping a gardener plant 300 bulbs. They plant 20% of the bulbs on Monday and 30% of the bulbs on Tuesday. Maya says this means they have planted 50 bulbs so far. Label and shade the model. Then use your model to explain why Maya's statement is not reasonable.



3 Apply Elizabeth buys a jar of 100 dog treats. In one month, she gives her dog 80 of the treats. What percent is this? What fraction is this? Draw a model to support your answers.



- 4 Ms. Duda's class is hanging 500 red lanterns around the school for Lunar New Year. Before lunch, the class hangs 100 of the lanterns.

PART A Draw a model to show what percent of 500 lanterns the class hangs before lunch.

PART B How many lanterns are left to hang? What percent of the lanterns are left to hang? Use your model in Part A to explain your answer.

- 5 **Math Journal** Choose one of the following percents: 25%, 40%, or 60%. Use a model and words to explain what that percent means. Write at least two fractions that represent your percent.

✓ End of Lesson Checklist

- INTERACTIVE GLOSSARY** Write a new entry for *symbol*. Give an example of using the percent symbol and show what the percent symbol means.