Develop Solving Problems Involving Percent Error

> **Read and try to solve the problem below.**

Marcus and his dad plan to bake bread. They buy a bag of flour labeled as weighing 5 lb. Marcus weighs the unopened bag and finds that its actual weight is 4.5 lb. What is the percent error between the labeled weight and the actual weight of the bag of flour?

Baker's
BREAD
FLOUR
5 lb

4.5 lb

TRY IT

Math Toolkit double number lines, grid paper

$5 - 4.5 = 0.5$ lb = error

$$\frac{0.5}{5} = 0.1$$

The percent of error is 10%

DISCUSS IT

Ask: How did you use the labeled weight and the actual weight in your strategy?

**Share:** In my strategy . . .

DISCUSS IT *continued*

➤ **Explore different ways to find percent error.**

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Model It

You can use a double number line to make sense of the problem.

Amount of error in weight: $5 - 4.5 = 0.5$

Weight (lb) 0   0.5   1   2   3   4   5

Percent 0% 10% 20%   40%   60%   80%   100%
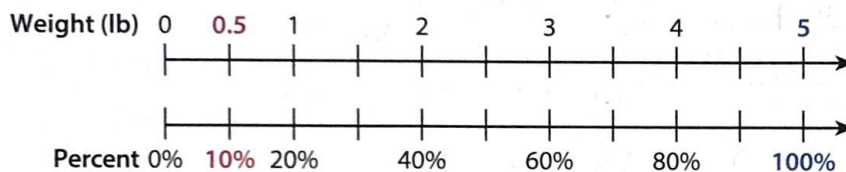
Model It

You can use a formula to find the percent error.

$$\text{Percent error} = \frac{\text{amount of error}}{\text{correct amount}} \times 100$$

$$= \frac{5 - 4.5}{5} \times 100$$

$$= \frac{0.5}{5} \times 100$$

➤ **Use this page to deepen your understanding of finding percent error.**

1 Talk About It

a. Why is the correct amount 5 lb and not 4.5 lb?

The bag is labeled 5lb so that should be the correct amount.

b. Look at the **Model Its**. Where does each one show the amount of error? Where does each one show the correct amount?

2 Show What You Know

a. A bag of flour labeled 3 lb actually weighs 3.5 lb. What is the percent error for this bag? Explain.

$3.5 - 3 = 0.5$

$\dfrac{0.5}{3} = 0.1\overline{6}$

The percent of error is $16.\overline{6}\%$ or $16\frac{2}{3}\%$

b. The 3-lb bag of flour and the 5-lb bag of flour both have an amount of error of 0.5 lb. Why are the percent errors different even though the amount of error is the same?

The size of the bags are different. A 0.5 pound difference will impact the 3 lb bag more than the 5 lb bag.

3 Reflect Think about all the models and strategies you have discussed today. Describe how one of them helped you better understand how to solve the **Try It** problem.

Apply It

▶ **Use what you learned to solve these problems.**

4 The proper air pressure for the front tire of Kimi's handcycle is 150 pounds per square inch (psi). The percent error in the front tire's current air pressure is 15%. What are the possible amounts that the front tire's current air pressure could be? Show your work.

$$\frac{e}{150} = \frac{15}{100}$$

$$2250 \div 100 = 22.5$$

$$150 + 22.5 = 172.5$$

$$150 - 22.5 = 127.5$$

SOLUTION The tire could be 172.5 psi or 127.5 psi

5 Jaylen estimates that she will take 8.5 h to read a book. It actually takes Jaylen 10 h to read the book. What is the percent error in Jaylen's estimate? Show your work.

$$10 - 8.5 = 1.5$$

$$\frac{1.5}{10} = 0.15 = 15$$

SOLUTION The percent error is 15%

6 A speed tracking device measures the speed of a car at 41 miles per hour. The actual speed of the car is 40 miles per hour. What is the percent error in the reading of the speed tracking device? Show your work.

$$41 - 40 = 1 \qquad \frac{1}{40} = 0.025$$

SOLUTION The percent error is 2.5%