

NAME

DATE

PERIOD

# Unit 4, Lesson 14: Percent Error

Let's use percentages to describe other situations that involve error.

5 mins.

## 14.1: Number Talk: Estimating a Percentage of a Number

Estimate.

$\approx 16$   
25% of 15.8  $\approx 4$

$\approx 10\%$   
9% of 38  $\approx 3.8$

$\approx 1\%$   
1.2% of 127  $\approx 1.5$

$\approx 0.5\%$   
0.53% of 6  $\approx 0.03$

$\approx 0.05\%$   
0.06% of 202  $\approx 0.1$

• one @ a time

• 30 secs think, then discussion as class

Q: Which benchmark percentages did you use?

Q: Was your estimate more or less than actual?

## 14.2: Plants, Bicycles, and Crowds

10 mins.

1. Instructions to care for a plant say to water it with  $\frac{3}{4}$  cup of water every day. The plant has been getting 25% too much water. How much water has the plant been getting?

$\frac{15}{16}$  of a cup.

$\frac{1}{4} + \frac{3}{4} = \frac{3}{16} + \frac{3}{4} = \frac{15}{16}$

Q: How much more water was the plant been getting? How do we calculate that?  
Q: what info is given? what do we need to find?

2. The pressure on a bicycle tire is 63 psi. This is 5% higher than what the manual says is the correct pressure. What is the correct pressure?

60 psi

correct pressure + 5% more = 63 psi

$\frac{63}{1.05} = 60$

$1p + 0.05p = 63$

$1.05p = 63$

3. The crowd at a sporting event is estimated to be 2,500 people. The exact attendance is 2,486 people. What is the percent error?

$\approx 0.6\%$

The estimate is 14 more than the exact.

$\frac{14}{2,486} \approx 0.0056$

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1. A student estimated that it would take 3 hours to write a book report, but it actually took her 5 hours. What is the percent error for her estimate?

40%

$$5 - 3 = 2$$

$$\frac{2}{5} = 0.4 = 40\%$$

2. A radar gun measured the speed of a baseball at 103 miles per hour. If the baseball was actually going 102.8 miles per hour, what was the percent error in this measurement?

0.19%

$$103 - 102.8 = 0.2$$

$$\frac{0.2}{102.8} \approx 0.0019$$

3. It took 48 minutes to drive downtown. An app estimated it would be less than that. If the error was 20%, what was the app's estimate?

40 mins

$$\frac{48}{1.20} = 40$$

4. A farmer estimated that there were 25 gallons of water left in a tank. If this is an underestimate by 16%, how much water was actually in the tank?

29.8 gallons

$$\frac{25}{0.84} \approx 29.8$$

5. For each story, write an equation that describes the relationship between the two quantities.

- a. Diego collected  $x$  kg of recycling. Lin collected  $\frac{2}{5}$  more than that.

$$y = \frac{7}{5}x$$

- b. Lin biked  $x$  km. Diego biked  $\frac{3}{10}$  less than that.

$$y = \frac{7}{10}x$$

- c. Diego read for  $x$  minutes. Lin read  $\frac{4}{7}$  of that.

$$y = \frac{4}{7}x$$

(from Unit 4, Lesson 4)

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### 14.3: Measuring in the Heat 10 mins.

A metal measuring tape expands when the temperature goes above 50°F. For every degree Fahrenheit above 50, its length increases by 0.00064%.

*3 mins. work 3 mins. partner 3 mins. class*

*Q: What would happen if the tape was used to measure 10 ft? How much longer is that? Can you show the diff. between 2 fingers? No. width of hair*

1. The temperature is 100 degrees Fahrenheit. How much longer is a 30-foot measuring tape than its correct length?

*0.0096 ft.*

*50 degrees above ideal*  
 $100 - 50 = 50$

$50 \cdot (0.000064)$   
 $= 0.0032$

$0.00032 \times 30 = 0.0096$

2. What is the percent error?

*0.032%*

$\frac{0.0096}{30} = 0.00032$

### Lesson 14 Summary

**Percent error** can be used to describe any situation where there is a correct value and an incorrect value, and we want to describe the relative difference between them. For example, if a milk carton is supposed to contain 16 fluid ounces and it only contains 15 fluid ounces:

- the measurement error is 1 oz, and
- the percent error is 6.25% because  $1 \div 16 = 0.0625$ .

We can also use percent error when talking about estimates. For example, a teacher estimates there are about 600 students at their school. If there are actually 625 students, then the percent error for this estimate was 4%, because  $625 - 600 = 25$  and  $25 \div 625 = 0.04$ .

### Lesson 14 Glossary Terms

- percent error - difference between the correct value & the incorrect value, expressed as a percentage of a correct value.