Lesson 2: Part of a Whole as a Percent

Opening Exercise

a.   What is the whole unit in each scenario?

Scenario	Whole Unit
15 is what percent of 90?	
What number is 10% of 56?	
90% of a number is 180.	
A bag of candy contains 300 pieces and 25% of the pieces in the bag are red.	
Seventy percent (70%) of the students earned a B on the test.	
The 20 girls in the class represented 55% of the students in the class.	

b.   Read each problem, and complete the table to record what you know.

Problem	Part	Percent	Whole
40% of the students on the field trip love the museum. If there are 20 students on the field trip, how many love the museum?			
40% of the students on the field trip love the museum. If 20 students love the museum, how many are on the field trip?			
20 students on the field trip love the museum. If there are 40 students on the field trip, what percent love the museum?			

Example 1: Visual Approaches to Finding a Part, Given a Percent of the Whole

In Ty's math class, 20% of students earned an A on a test. If there were 30 students in the class, how many got an A?

Exercise 1

In Ty's art class, 12% of the Flag Day art projects received a perfect score. There were 25 art projects turned in by Ty's class. How many of the art projects earned a perfect score? (Identify the whole.)

Example 2: A Numeric Approach to Finding a Part, Given a Percent of the Whole

In Ty's English class, 70% of the students completed an essay by the due date. There are 30 students in Ty's English class. How many completed the essay by the due date?

Example 3: An Algebraic Approach to Finding a Part, Given a Percent of the Whole

A bag of candy contains 300 pieces of which 28% are red. How many pieces are red?

Which quantity represents the whole?

Which of the terms in the percent equation is unknown? Define a letter (variable) to represent the unknown quantity.

Write an expression using the percent and the whole to represent the number of pieces of red candy.

Write and solve an equation to find the unknown quantity.

Exercise 2

A bag of candy contains 300 pieces of which 28% are red. How many pieces are not red?

    a.   Write an equation to represent the number of pieces that are not red, n.

    b.   Use your equation to find the number of pieces of candy that are not red.

    c.   Jah-Lil told his math teacher that he could use the answer from Example 3 and mental math to find the number of pieces of candy that are not red. Explain what Jah-Lil meant by that.

Example 4: Comparing Part of a Whole to the Whole with the Percent Formula

Zoey inflated 24 balloons for decorations at the middle school dance. If Zoey inflated 15% of the total number of balloons inflated for the dance, how many balloons are there total? Solve the problem using the percent formula, and verify your answer using a visual model.

Example 5: Finding the Percent Given a Part of the Whole and the Whole

Haley is making admission tickets to the middle school dance. So far she has made 112 tickets, and her plan is to make 320 tickets. What percent of the admission tickets has Haley produced so far? Solve the problem using the percent formula, and verify your answer using a visual model.

Lesson Summary

- Visual models or numeric methods can be used to solve percent problems.
- An equation can be used to solve percent problems:

$$\text{Part} = \text{Percent} \times \text{Whole}.$$

Problem Set

1. Represent each situation using an equation. Check your answer with a visual model or numeric method.
   a. What number is 40% of 90?
   b. What number is 45% of 90?
   c. 27 is 30% of what number?
   d. 18 is 30% of what number?
   e. 25.5 is what percent of 85?
   f. 21 is what percent of 60?

2. 40% of the students on a field trip love the museum. If there are 20 students on the field trip, how many love the museum?

3. Maya spent 40% of her savings to pay for a bicycle that cost her $85.
   a. How much money was in her savings to begin with?
   b. How much money does she have left in her savings after buying the bicycle?

4. Curtis threw 15 darts at a dartboard. 40% of his darts hit the bull's-eye. How many darts did not hit the bull's-eye?

5. A tool set is on sale for $424.15. The original price of the tool set was $499.00. What percent of the original price is the sale price?

6. Matthew scored a total of 168 points in basketball this season. He scored 147 of those points in the regular season, and the rest were scored in his only playoff game. What percent of his total points did he score in the playoff game?

7. Brad put 10 crickets in his pet lizard's cage. After one day, Brad's lizard had eaten 20% of the crickets he had put in the cage. By the end of the next day, the lizard had eaten 25% of the remaining crickets. How many crickets were left in the cage at the end of the second day?

8. A furnace used 40% of the fuel in its tank in the month of March and then used 25% of the remaining fuel in the month of April. At the beginning of March, there were 240 gallons of fuel in the tank. How much fuel (in gallons) was left at the end of April?

9. In Lewis County, there were 2,277 student athletes competing in spring sports in 2014. That was 110% of the number from 2013, which was 90% of the number from the year before. How many student athletes signed up for a spring sport in 2012?

10. Write a real-world word problem that could be modeled by the equation below. Identify the elements of the percent equation and where they appear in your word problem, and then solve the problem.

$$57.5 = p(250)$$