

Lesson 16: Population Problems

Classwork

Opening Exercise

Number of girls in classroom:	Number of boys in classroom:	Total number of students in classroom:
Percent of the total number of students that are girls:	Percent of the total number of students that are boys:	Percent of boys and girls in the classroom:
Number of girls whose names start with a vowel:	Number of boys whose names start with a vowel:	Number of students whose names start with a vowel:
Percent of girls whose names start with a vowel:	Percent of boys whose names start with a vowel:	
Percent of the total number of students that are girls whose names start with a vowel:	Percent of the total number of students that are boys whose names start with a vowel:	Percent of students whose names start with a vowel:

Example 1

A school has 60% girls and 40% boys. If 20% of the girls wear glasses and 40% of the boys wear glasses, what percent of all students wears glasses?

Exercise 1

How does the percent of students who wear glasses change if the percent of girls and boys remains the same (that is, 60% girls and 40% boys), but 20% of the boys wear glasses and 40% of the girls wear glasses?

Exercise 2

How would the percent of students who wear glasses change if the percent of girls is 40% of the school and the percent of boys is 60% of the school, and 40% of the girls wear glasses and 20% of the boys wear glasses? Why?

Example 2

The weight of the first of three containers is 12% more than the second, and the third container is 20% lighter than the second. By what percent is the first container heavier than the third container?

Exercise 3

Matthew's pet dog is 7% heavier than Harrison's pet dog, and Janice's pet dog is 20% lighter than Harrison's. By what percent is Matthew's dog heavier than Janice's?

Example 3

In one year's time, 20% of Ms. McElroy's investments increased by 5%, 30% of her investments decreased by 5%, and 50% of her investments increased by 3%. By what percent did the total of her investments increase?

Exercise 4

A concert had 6,000 audience members in attendance on the first night and the same on the second night. On the first night, the concert exceeded expected attendance by 20%, while the second night was below the expected attendance by 20%. What was the difference in percent of concert attendees and expected attendees for both nights combined?

Lesson Summary

When solving a percent population problem, you must first define the variable. This gives a reference of what the whole is. Then, multiply the sub-populations (such as girls and boys) by the given category (total students wearing glasses) to find the percent in the whole population.

Problem Set

1. One container is filled with a mixture that is 30% acid. A second container is filled with a mixture that is 50% acid. The second container is 50% larger than the first, and the two containers are emptied into a third container. What percent of acid is the third container?
2. The store's markup on a wholesale item is 40%. The store is currently having a sale, and the item sells for 25% off the retail price. What is the percent of profit made by the store?
3. During lunch hour at a local restaurant, 90% of customers order a meat entrée and 10% order a vegetarian entrée. Of the customers who order a meat entrée, 80% order a drink. Of the customers who order a vegetarian entrée, 40% order a drink. What is the percent of customers who order a drink with their entrée?
4. Last year's spell-a-thon spelling test for a first grade class had 15% more words with four or more letters than this year's spelling test. Next year, there will be 5% less than this year. What percent more words have four or more letters in last year's test than next year's?
5. An ice cream shop sells 75% less ice cream in December than in June. Twenty percent more ice cream is sold in July than in June. By what percent did ice cream sales increase from December to July?
6. The livestock on a small farm the prior year consisted of 40% goats, 10% cows, and 50% chickens. This year, there is a 5% decrease in goats, 9% increase in cows, and 15% increase in chickens. What is the percent increase or decrease of livestock this year?
7. In a pet shelter that is occupied by 55% dogs and 45% cats, 60% of the animals are brought in by concerned people who found these animals in the streets. If 90% of the dogs are brought in by concerned people, what is the percent of cats that are brought in by concerned people?
8. An artist wants to make a particular teal color paint by mixing a 75% blue hue and 25% yellow hue. He mixes a blue hue that has 85% pure blue pigment and a yellow hue that has 60% of pure yellow pigment. What is the percent of pure pigment that is in the resulting teal color paint?
9. On Mina's block, 65% of her neighbors do not have any pets, and 35% of her neighbors own at least one pet. If 25% of the neighbors have children but no pets, and 60% of the neighbors who have pets also have children, what percent of the neighbors have children?