Develop Making Inferences from Samples About Populations

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

There are 406 students at Destiny's school. Destiny chooses 20 students from her school at random and surveys them about how they get to school.

Based on the data from the sample, about how many students in the school should Destiny expect to take the subway?

Transportation Method	Frequency
Subway	8
Walk	4
Bus	4
Bike	2
Car	2

TRY IT

Math Toolkit double number lines, grid paper

Subway

$\frac{8 \times 5}{20 \times 5} = \frac{40}{100}$ 40% ride the subway

40% of 406

.40 · 406

162.4

Destiny should expect about 162 students taking the subway

DISCUSS IT

Ask: How do you know your answer is reasonable?

Share: I know my answer is reasonable because . . .

DISCUSS IT

continued

➤ **Explore different ways to use a random sample to make inferences about a population.**

There are 406 students at Destiny's school. Destiny chooses 20 students from her school at random and surveys them about how they get to school.

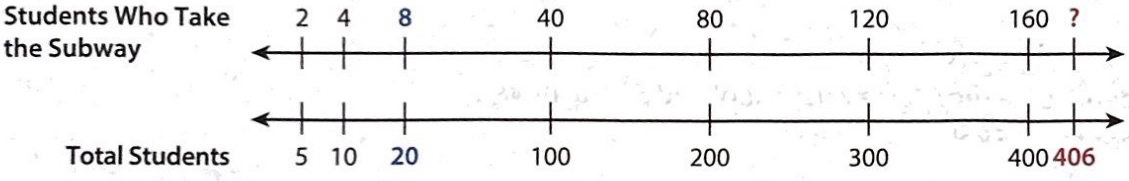
Based on the data from the sample, about how many students in the school should Destiny expect to take the subway?

Transportation Method	Frequency
Subway	8
Walk	4
Bus	4
Bike	2
Car	2

Model It

You can use a double number line to make an inference about the population.

The data come from a random sample, so you can expect them to be representative of the population.



Model It

You can use percents to make an inference about a population.

Find the percent of students in the sample who take the subway.

$\frac{8}{20} = 0.4$, or 40%

So, you can infer that about 40% of all the students in the population take the subway.

0.4(406)

CONNECT IT

➤ **Use this page to deepen your understanding of using a random sample to make inferences about a population.**

1 Talk About It

a. Look at the first **Model It**. What two quantities does it show a proportional relationship between?

The number of students who take the subway and the total number of students

b. Look at 0.4(406) in the second **Model It**. How is the random sample represented in the expression?

0.4 is the fraction/percent of students who take the subway

c. Why is the number of students Destiny can expect to take the subway not the same as the result of finding 40% of 406?

The result was 162.4, you can't have a partial person so it is rounded to the nearest whole number

2 Show What You Know

a. Destiny's friends Xavier and Sierra also each survey 20 students selected at random from the school. Based on their samples, Xavier infers that about 142 students take the subway to school and Sierra infers that about 183 students do. Explain why both of their inferences are reasonable.

Both inferences are based on random samples of 20 students, so both are reasonable. Random samples from the same population will not always be exactly the same, so they might lead to different inferences

b. How can you use proportional reasoning to make an inference about a population from a random sample of that population?

The percent of the random sample should be about the same as the population, so you can make inferences using the precent from the random sample

3 Reflect

Think about all the models and strategies you have discussed today. Describe how one of them helped you better understand how to use a random sample to make inferences about a population.

Apply It

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

4 A random sample of Grade 8 students at a school are asked whether they plan to take computer science in high school. Of those asked, 15 students plan to take computer science, 5 do not, and 7 are unsure. There are 326 Grade 8 students in the school plan to take computer science in high school? Show your work.

15
5
+ 7
27

$\frac{15}{27} = \frac{x}{326}$

$4890 \div 27 = 181.\overline{1}$

SOLUTION About 181 students plan to take computer science

5 Yolanda asks a random sample of 50 students at her school what they do after school. Of the 50 students, 30 say they play a sport. Based on the sample, about what percent of students at Yolanda's school play a sport after school?

A 15%

B 30%

$\frac{30}{50} = \frac{60}{100}$

C 50%

D 60%

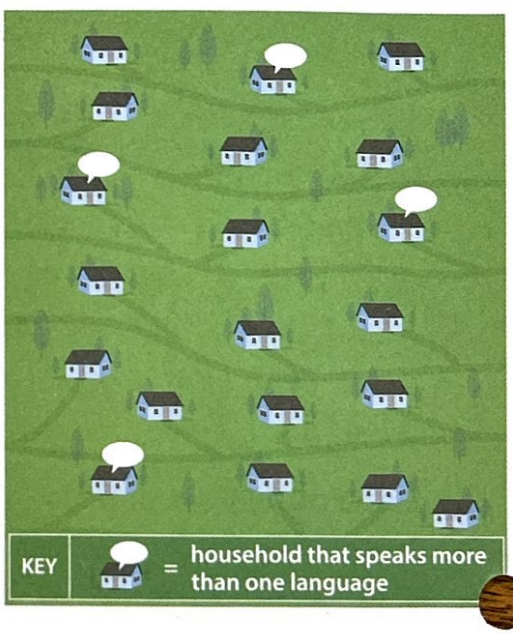
6 There are 5,119 households in Salvador's town. Salvador surveys a random sample of 20 households from his town. He finds that more than one language is spoken in 4 of the households. Based on the sample, in about how many households in the town should Salvador expect more than one language to be spoken? Show your work.

$\frac{4}{20} = \frac{20}{100}$

20% · 5119

.20 · 5119

1023.8



SOLUTION Salvador should expect about 1024 households to speak more than one language