LESSON MAKER PRO

Biodiversity by the Numbers

Compare Alabama field surveys fairly.

HIGH SCHOOL · ES.3.b

ES.3.b "Analyze and interpret data collected through geographic research and field investigations to describe Alabama's biodiversity by region."

NAME _____ DATE _____

COMPARE EQUAL PLOTS

In each equal-area plot, count the different native plant species found. Divide the sum of those counts by the number of plots to find the mean species per plot. When surveys use the same plot size and method, compare their means instead of their totals.

WORKED EXAMPLE

A school garden survey used 7 equal-area plots. The counts of native plant species in the plots added to 91. Find the mean species per plot.

1. Sum of plot counts = 91.
2. Number of plots = 7.
3. Mean = 91 / 7 = 13.

Answer: 13 native plant species per plot

PRACTICE 6 problems

1 Use the survey table. What is the mean number of native plant species per plot?

APPALACHIAN PLATEAU SURVEY

Region	Equal-area plots	Sum of species counts
Appalachian Plateau	4	32

ANSWER _____

2 Use the survey table. Which region has the higher mean species per plot, and by how much?

NATIVE PLANT SURVEYS

Region	Equal-area plots	Sum of species counts
Piedmont	3	30
Coastal Plain	4	36

ANSWER _____

3 Use the survey table. Find each region's mean species per plot. Which region has the higher mean?

NATIVE PLANT SURVEYS

Region	Equal-area plots	Sum of species counts
Valley and Ridge	8	64
Black Belt	4	40

ANSWER _____

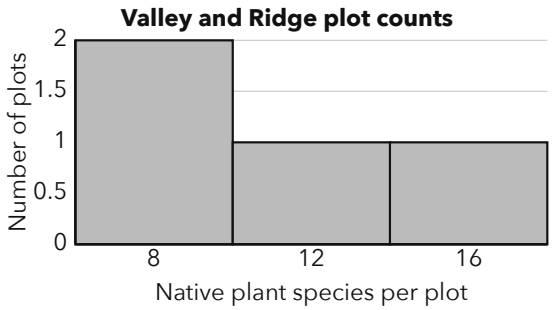
4 Use the survey table. How many more species per plot, on average, did the first site have?

TWO PIEDMONT SURVEY SITES

Site	Equal-area plots	Sum of species counts
First site	4	48
Second site	4	32

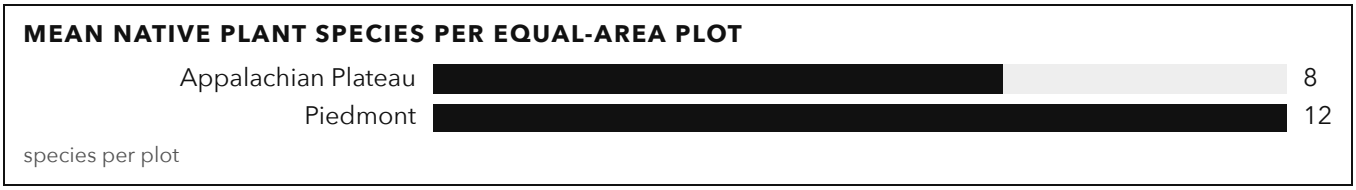
ANSWER _____

5 Use the graph. What is the mean number of native plant species per plot?



ANSWER _____

6 Use the graph. By what percent is the Piedmont mean greater than the Appalachian Plateau mean?



ANSWER _____

APPLY IT Show your work

1 A high school eco club is preparing a post about native plants at a Coastal Plain restoration site. It surveyed the same eight equal-area plots before planting and one year later, using the same method and season. What was the percent increase in mean species per plot?

RESTORATION SITE SURVEYS

Survey	Plots	Sum of species counts
Before planting	8	64
One year later	8	80

ANSWER _____

2 Students are making a map that ranks Alabama field-trip sites by mean native plant species per equal-area plot. Both surveys used the same method. Which region should rank higher, and by how many species per plot?

FIELD-TRIP SITE SURVEYS

Region	Plots	Sum of species counts
Piedmont	12	120
Coastal Plain	8	88

ANSWER _____

CHALLENGE One step up

A student says the mean across all the plots in this table is (12 + 8) / 2 = 10 species per plot. Find the actual mean across all plots and explain why the student's method does not work.

COMBINED NATIVE PLANT SURVEY

Region	Equal-area plots	Sum of species counts
Piedmont	4	48
Appalachian Plateau	8	64

WORK SPACE AND ANSWER

ANSWER KEY

Biodiversity by the Numbers

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Use the survey table. What is the mean number of native plant species per plot?	**8 species per plot**
2	Use the survey table. Which region has the higher mean species per plot, and by how much?	**Piedmont, by 1 species per plot (10 versus 9).**
3	Use the survey table. Find each region's mean species per plot. Which region has the higher mean?	**Valley and Ridge: 8 species per plot; Black Belt: 10 species per plot. Black Belt has the higher mean.**
4	Use the survey table. How many more species per plot, on average, did the first site have?	**4 more species per plot**
5	Use the graph. What is the mean number of native plant species per plot?	**11 species per plot**
6	Use the graph. By what percent is the Piedmont mean greater than the Appalachian Plateau mean?	**50%**

PART 2 · APPLY IT

1. **25% increase** The means are 64 / 8 = 8 and 80 / 8 = 10 species per plot. The increase relative to the earlier mean is (10 - 8) / 8 = 25%.
2. **Coastal Plain, by 1 species per plot.** Piedmont averages 120 / 12 = 10 species per plot, while Coastal Plain averages 88 / 8 = 11. The Coastal Plain site ranks higher despite its lower total.

CHALLENGE

The actual mean is (48 + 64) / (4 + 8) = 112 / 12 = 9 1/3 species per plot. Averaging the two regional means gives them equal weight, but the Appalachian Plateau survey has twice as many plots.

All survey data are illustrative. Accept equivalent fractions or decimals for the challenge mean; comparisons describe the sampled plots, not every habitat in a region.