Grade 2: Park Animals

2.MD.D.10 - Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.

Faith went to the park. The picture graph shows all of the animals Faith saw.
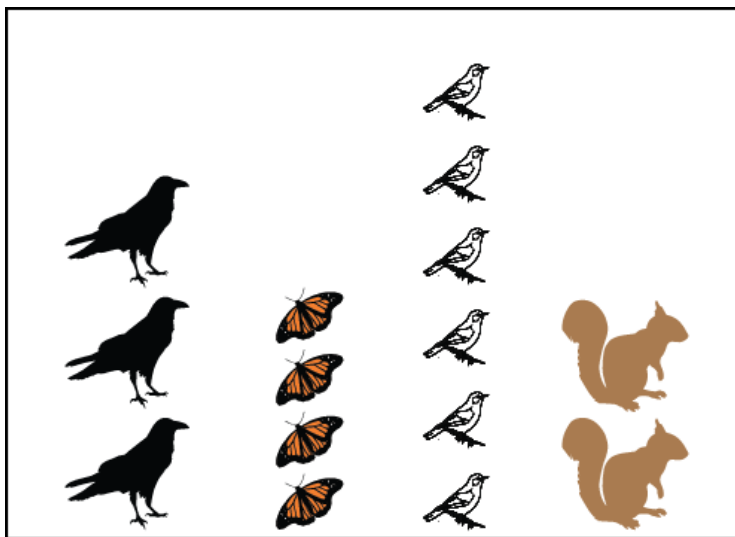
Faith saw more birds than butterflies. How many more?

Answer: ☐ more birds than butterflies

Solution

Correct if student writes 5.

This problem includes a picture graph, in which the number of observations in each category is shown by small pictures. Sometimes in a picture graph, one picture represents more than one observation. In this picture graph, one picture represents one observation (for example, each crow picture represents 1 crow).

The problem asks us to compare the number of birds to the number of butterflies. But the picture graph shows *two* kinds of birds; we have to combine these two groups before we can compare the number of birds to the number of butterflies.

Faith saw 3 crows and 6 sparrows, or 9 birds in all. Faith saw 4 butterflies. The number of birds is 5 more than the number of butterflies. The answer is 5.

(The number of squirrels doesn't enter into the problem.)

If the student got this problem wrong, it might be because they didn't group together the different kinds of birds. Or perhaps they miscounted the sparrows, or made a mistake in adding and subtracting mentally.

Extension

To extend this problem, you could ask such questions as, "How many animals did Faith see altogether?" You might also ask, "Did Faith see more crows or more butterflies?" The answer is "more butterflies," even though the stack of crow cartoons is taller than the stack of butterfly cartoons. In a picture graph, the quantities are represented by how many pictures there are, not the height of the stacks of pictures.

Elaboration on Alignment

The underlying situation type is a combination of "Put Together with Total Unknown" followed by "Compare with Difference Unknown" found in the addition and subtraction situations by grade level table. The first situation type is a focus in Kindergarten; the second situation type is a focus in grade 1. Strategically combining the situation types is appropriate for grade 2, which is also the grade when picture graphs are introduced.

The answer to the problem is 5, and by design there are no category totals that equal 5. This makes it somewhat less likely that a student would get the answer right for the wrong reason.

Having the crow column be taller than the butterfly column might be, on balance, a graphic design flaw, but what it achieves educationally is to insist that the meaning *of the graph is dictated by the legend of the graph*. This is appropriate from a graph comprehension standpoint. That the height of a picture graph isn't informative is, after all, one of the reasons why bar graphs are superior.

The animals are intended to be common in many urban, suburban, or semi-rural settings across the country (no hummingbirds, for example).
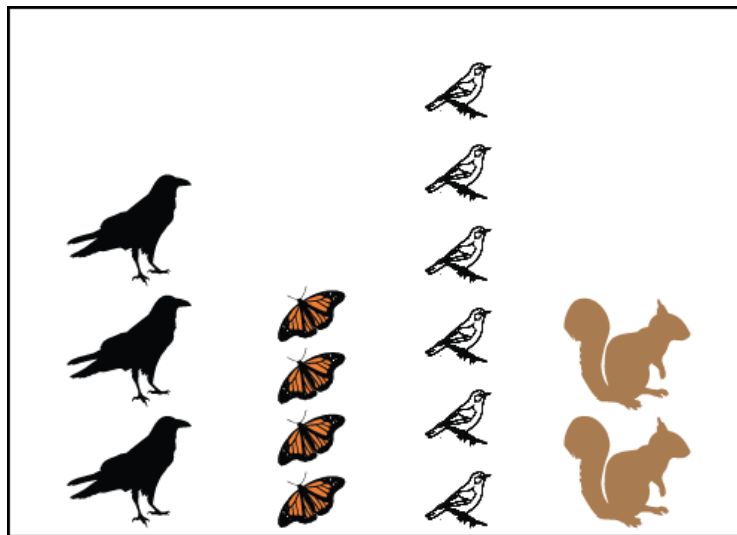
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Name: _____

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