

Probability Distributions

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1. How could you define an *event* in your sampling scheme? Explain your reasoning.

An event would be the number of sample sites where birds are present. It does not matter how many birds are found, or in which sites they are found, so the event is just presence and absence in each plot. In this case, the event would be finding birds present in two of the six plots.

2. What is the *sample space* of your bird sampling scheme?

The sample space is $n+1 = 7$.

3. You observed two presences and 4 absences in your daily survey. How many ways are there to arrange the two presences in your grid of six plots? Explain how you found your answer.

15, $n!/(k!(n-k)!)$

If your first plot has a bird present, then you have 5 possible presences. If the second plot has a bird present, you have 4 possible presences after that and so on.

4. Given that the probability of observing a brown creeper presence in a given forest plot is about 50%, do you think that observing *exactly 2 presences* is an unusual event? Explain your reasoning.

I think it is less usual, but not unusual. Two presences is close to the observed mean of 3 presences. An observation of 0 presences would be unusual.

5. Consider the scenario in which you pick up two acorns at the same time in one hand without looking.

- Enumerate the events in this sample space. **Six events: BB, RR, WW, BR, RW, WB**
- Are these events *combinations*, or *permutations*? **Combination**
- Make sure you explain your reasoning. **The order does not matter.**

6. Consider the scenario in which you pick up one acorn, place it in your left pocket, walk a short distance, then pick up a second acorn and place it in your right pocket.

- Enumerate the possible events in this sample space. **Nine events: BB, RR, WW, BR, RB, WR, RW, WB, BW**
- Are these events *combinations*, or *permutations*? **Permutations**
- Make sure you explain your reasoning. **The order matters.**