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Week 5 Questions

**Q1: What is the size of the sample space?**

The sample size is 6. There are three different species and two acorns picked at the same time so 6 is the set of all possible values the acorns could occupy.

**Q2: Given the scenario description, how many ways are to there to collect two acorns of the *same species*?**

There are 3 ways to collect sets of the same species.

**Q3: Given the scenario description, how many ways can you collect two acorns of *different species*?**

The answer would also be 3.

#### Q4: What is the probability that the acorn in your left pocket is Q. alba?

#### The probability is 1/3.

#### Q5: What is the probability that the acorn in your right pocket is Q. macrocarpa?

#### The probability is also 1/3.

#### Q6: If you already know that the acorn in your left pocket is Q. alba, what is the probability that the acorn in your right pocket is also Q. alba?

#### The probability is 1/3. Since you already know your left pocket, I’m thinking that the right pocket is another independent event, so the probability is still 1/3.

#### Q7: What is the probability that both acorns are Q rubra?

#### The probability is 1/9 because order matters so each component event is 1/3, so 1/3 \* 1/3.

#### Q8: What is the probability that you collected exactly one each of Q. alba and Q. rubra?

#### The probability is 2/9. Order doesn’t matter but you consider both possibilities. There are two combinations available since order matters.

#### Q9: What is the probability that the acorn in your left pocket is Q. alba and you have an acorn of Q. rubra in your right pocket?

The probability is 1/9.

**Q10: Which of the following is the size of the sample space of this distribution?**

The sample space for a poisson distribution is infinite.

**Q11: Which of the following is the size of the sample space of this distribution?**

The sample space of a binomial distribution is *n* + 1. So, the sample space for this distribution is 11.

**Q12: Which common characteristics of the Binomial and Poisson distributions make them good models for counts?**

Both the binomial and poisson distributions are discrete distributions used commonly in environmental science and they are easy to understand.

**Q13: Describe a scenario in which a Binomial distribution may be a better count model than a Poisson distribution.**

A good example is presence/ absence data. For my thesis data for example, I would like to know if a certain invasive species in present in an area or not. There are only one of two possible outcomes available: present or absent. Binomial distributions are good when there is a fixed number of outcomes while the Poisson distribution has no limit. So be cause of this, in this example a binomial distribution would be a better model.