[This is ok. It has all of the required components, but there needs to be more explanation in some areas. It would be nice to have graphs showing the data - maybe three bar graphs? The conclusion needs to be rewritten - rejecting the null hypothesis does not mean failure, and more concluding remarks would be helpful.]

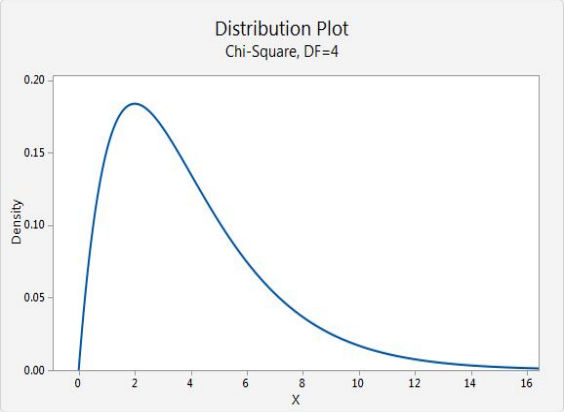
Introduction:

Santa Rosa has a wide variety of birds in its ecosystem, but in which trees do certain birds like to nest in the most? I am interested in observing birds because they are an important biotic factor that contribute to the life on this planet. They help with pollination as well as with seed dispersal, but I would like understand if there is an association between which type of bird nests in a particular types of trees. I will decide to conduct my test upon the blue jay, brewer's blackbird, and song sparrow as they are the most abundant in my area. The three different types of trees I will be looking at for these birds are oak, pine, and maple trees as they are native trees in the Sonoma County area.

Data:

	Pine	Oak	Maple	Total
Blue Jays	100	30	25	155
Brewer's Blackbird	35	40	70	145
Song Sparrow	76	49	75	200
Total	211	119	170	500

Graph:



Sampling Method: Randomly sample/ observe 500 birds in a local park and for all 500 birds, I will figure out what bird species it is and the type of tree they are in. I might have recounted some birds once or twice so it might not be completely perfect. There were a lot of birds and some look alike so it might not have been the right birds either, but I did my best.

The population of interest are three species of birds in a park in Sonoma County. The parameter we wish to test a claim about is the association between bird species and tree type.

Null Hypothesis: There is no association between bird species and which tree they decide to live in.

Alternative Hypothesis: There is an association between bird species and which type of tree they decide to live in.

Because we wish to test a claim about association between two categorical variables, we will conduct a Chi-Squared test for association/independence. This is a simple random sample, so our results will generalize to the population of interest. There are more than 10 (500) birds in the forest, so our results will be independent. All expected counts are at least 5, so our calculations should be accurate.

Expected counts for the birds in trees: $\frac{(Row\ total)(Column\ total)}{Overall\ total}$

(155)(211)/500

Chi-Squared Test Formula: $\frac{(Observed - Expected)^2}{Expected}$

(100-65.4)^2/65.4

Expected Counts Table (in parenthesis)

	Pine	Oak	Maple	Total (ignore)
Blue Jays	100 (65.4)	30 (36.8)	25 (52.7)	155
Brewer's Blackbird	35 (61.1)	40 (34.5)	70 (49.3)	145
Song Sparrow	76 (84.4)	49 (47.6)	75 (68)	200
Total	211	119	170	500

DF: 2 P-value: about 0

If my null hypothesis were true, we would get sample results like this almost never by chance variation. Therefore, we reject the null hypothesis as we have convincing evidence that there is an association between bird species and type of tree.

To conclude, the reason as to why I failed so miserably could be due to my sampling methods and how I might have recounted some birds or included birds that weren't supposed to be in my sample. Another reason as to why this might have not worked could be that there really is no association between any birds.