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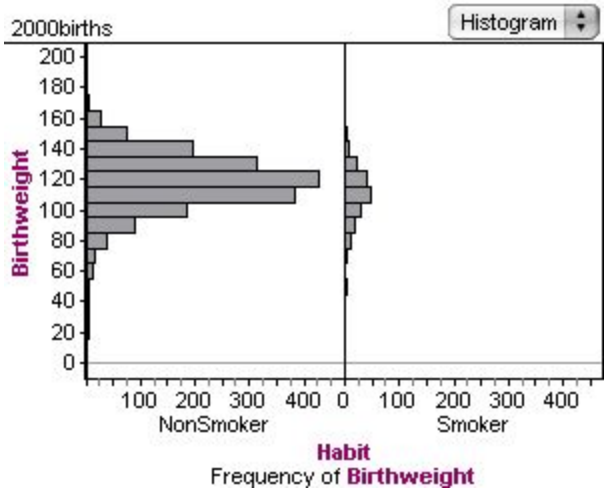
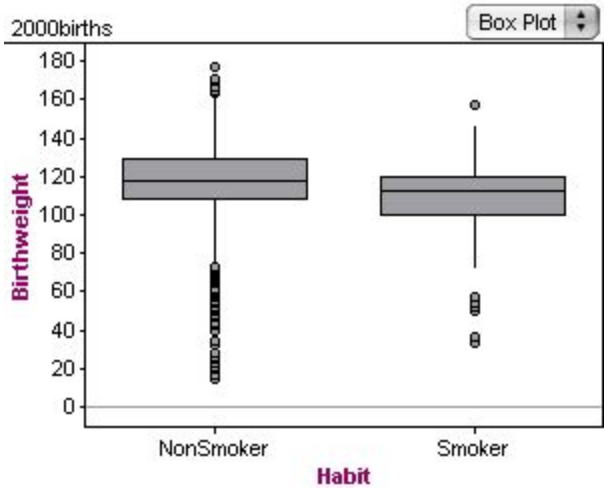
Lab 4

1) Based on the Box Plot, the median for babies birth weight for smoking mothers is lower in comparison to that of babies born from non smoking mothers. The birth weight median is 118 ounces for non smoker mothers and 112 ounces for smoking mothers. Additionally, the mean for the numerical summary suggests that the median weight for a baby born from a non smoker mother is higher than a baby born from a smoker mother(118 ounces compared to 112 ounces). Additionally, based on the histogram, the center of weight of babies born from mothers who don't smoke is higher than the center of weight of babies born from mothers who do smoke.



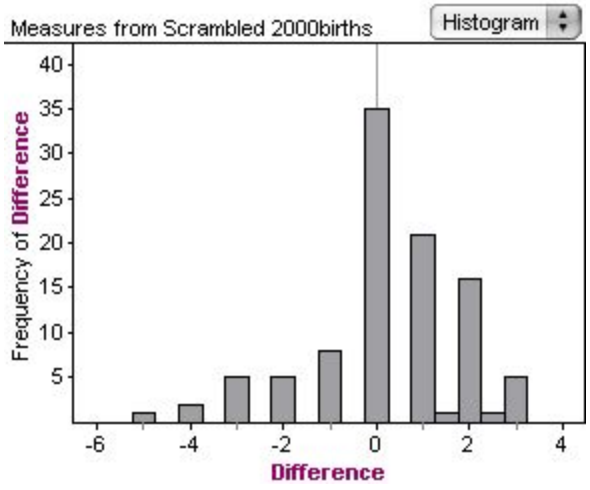


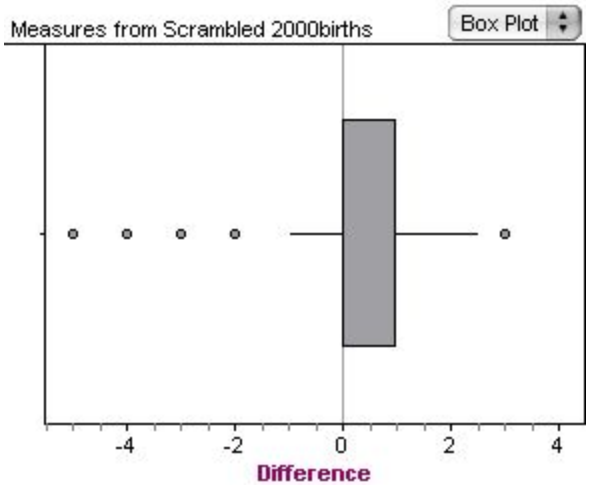
2000births

		Birthweight
Habit	NonSmoker	116.851
		1805
		14
		107
		118
		129
		177
	Smoker	108.422
		187
		33
		99
		112
		120
		157
Column Summary		116.06
		1992
		14
		106
		117
		129
		177

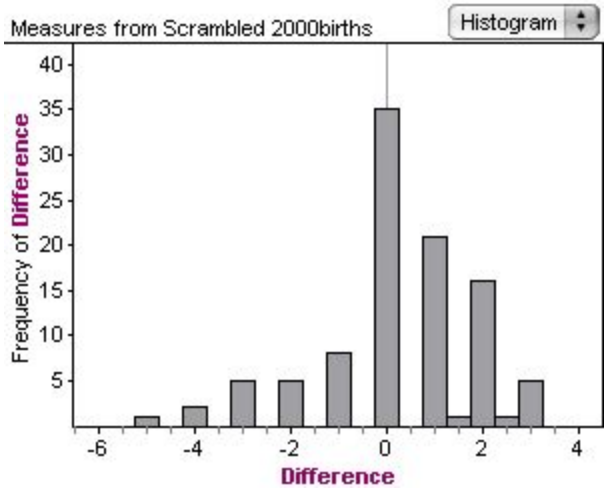
S1 = mean( )
S2 = count( )
S3 = min( )
S4 = Q1( )
S5 = median( )
S6 = Q3( )
S7 = max( )

2) Based on the chance model and 100 simulations, my estimate for the typical differences in medians between the two groups is 1. Also, based on the chance model histogram, I estimate that an unusually large value is -5 for the difference in birth weights of babies born from smoking vs non smoking mothers. Also. According to the box plot of the chance model, I would consider any values less than -1 or greater than 2.5 an unusually large difference as they are 1.5 IQR away from the median, making them unusual





3) **Never**. Based on my 100 simulations, it never produced a difference that was -6 or more extreme. The center is around the value 0, which means that there is no difference between the weights of babies born from smoking mothers vs non smoking mothers. See Graph Below



4) The correct explanation is that smoking mothers really do have babies with lower birth weight and that the chance model only reveals the distribution of weights for babies born from smoking vs non smoking mothers if the difference between birth weights was 0. Because the chance model doesn't have a difference in birth weight of -6 or more extreme, it's very unlikely that chance model is true and that there is no difference between the birth weight of babies born from smoking vs non smoking mothers.
5) The original data is an observational study as the experiment gathers data from a lab instead of placing individuals randomly into each group. Thus, even if we were to see a real difference in weight between babies born from smokers vs non smokers, we **cannot** conclude smoking causes low birth weight due to the fact that this is a observational study.