Oreos were created in 1912 in New York City by Nabisco, which was created by merging different companies in 1898. Nabisco was originally famous for its Barnum Animal Crackers; however, it soon became even more popular with the creation of the Oreo. Oreos were originally created for the British cookie market for tea time; however, the Oreo cookie was not as popular in the United Kingdom because the heavy sugar consistency was not as appetizing with tea as is with milk. Thus began the trademark of eating the Oreo cookie with a large glass of milk. No one knows for sure where the name Oreo came from. There are many rumors that Oreo came from the Greek word for mountain because the original Oreos had round tops. Another rumor for the origin of the name Oreo came from the French word for gold, considering that the original Oreo packaging was a gold can. These ridiculous rumors have yet to be accepted or denied; however, many people accept the notion that the name just sounded good. Oreo's leading competition was the Hydrox cookie, created by Kellogg; however, the Hydrox cookie did not last and was quickly beat by the delectable Oreo cookie. Throughout time the Oreo cookie has become very famous and transformed into an international cookie for millions to enjoy. The DSRL (Double Stuff Racing League) has become a national competition between the tennis stars, Serena and Vanessa Williams, and the football stars Payton and Eli Manning; encouraging fans to eat more and more Oreos. Now there are many different types of Oreos. Grocery stores throughout the world are stocked with the Original Oreo, Double Stuff Oreo, Mint Oreo, Reduced Fat Oreo, Original Golden Oreo, Oreo Cakesters, Fudge Oreos, Halloween Oreos, Christmas Oreos; just to name a few. New desserts have been created from the Oreo as well; for example, the McDonalds Oreo McFlurry, dirt cake, Oreo Pie, Oreo Cheesecake, and even deep fried Oreos (which is the number one most unhealthy food sold at county fairs).

The purpose of my observational study was to decipher whether or not consumers are truly obtaining twice the amount of icing, or as Nabisco has deemed it, "stuffing" inside of the cookie as claimed in the Double Stuff Oreo, compared to the Original Oreo. I am a frequent buyer of the Double Stuff Oreo because I enjoy the scrumptious cookie and I believe the stuffing is the best part. The stuffing in the double Stuff Oreo truly makes a difference in the overall taste of the cookie, making a consumer's love for Oreos even greater. Nabisco is implying that a consumer will receive double the amount of stuffing in a Double Stuff Oreo than he or she would when eating a Regular Oreo. When a consumer looks at the packaging of the Original Oreo there are around 15 servings of Oreo cookies inside (three cookies is the equivalent to one serving) and there seem to be a multitude of fresh cookies awaiting a hungry tummy. When a consumer opens a package of Double Stuff Oreos there are about 18 servings inside (two cookies is the equivalent to one serving) and there also seems to be a multitude of fresh

cookies awaiting a hungry tummy. The packaging of the two types of Oreos is one way that Nabisco makes consumers believe they are receiving double the amount of stuffing in one package than the other.

To conduct my observational study I went to three different grocery stores to obtain Oreos to make sure that I was obtaining a simple random sample. I bought two packages of Regular Oreos and two packages of Double stuff Oreos from Food Lion. I then bought the same things at the local Target and Wal-Mart stores in the area. While I was buying the various Oreo products, I realized the difference in price in the different stores. The slogan for Food lion is Good Neighbors, Great Prices; however, they sold me the most expensive packages of Oreos. The Oreos from Food lion were $3.49 a package. I then ventured off to Wal-Mart; whose slogan is Always Low prices, Always. Wal-Mart did not have the cheapest Oreos either! The Oreo packages from Wal-Mart cost $2.99. Although $2.99 is a good price for Oreos considering the economic stress that the United States is in currently, the cheapest place to find Oreos is at the local Target. I was extremely surprised to find that Oreos at Target sell for $2.89 a package. I had mentally prepared myself to pay a considerable amount more for Oreos from Target than at the normal grocery store because target does not specialize in food products; but I was very delighted to find out they held the cheapest!

The next part of my observational study consisted of finding a concise measuring tool to weigh the stuffing of each Oreo. I decided to conduct my observational study at school which so happens to have a Chemistry Lab next door to the Statistics classroom. I promptly asked the Chemistry teacher if it would be alright to use a scale to measure the stuffing and offered her Oreos as payment; she quickly said yes. I then counted all the Oreos in all the packages. There were exactly 45 Oreos in all of the regular Oreo packages and exactly 36 Oreos in the double stuff Oreo packages. I used a knife from the school's kitchen to scrape the stuffing from each of the cookies used in the experiment so as to obtain all of the stuffing from the cookies and proceeded to weigh the stuffing. Although I was extremely careful in weighing all of the Oreos, there is a chance that the measurements are not exactly correct. Possible problems that may affect the end result rang from scrapping all of the stuffing off in one swoop versus scrapping and making a lot of pieces on the scale. Or maybe crumb residue from a previous cookie was on the scale and made some stuffing weigh more than it should have. The following is a table of the data; the weight of the regular stuffing, the expected/ supposed value of the amount of stuffing in the Double Stuff Oreo, and the actual weight of the stuffing in the Double Stuff Oreos.

Collection 1

	regular_stuffing	supposed_doubled_original_stuffing	actual_double_stuffing
1	3.45	6.9	6.13
2	3.32	6.64	6.48
3	3.36	6.72	6.29
4	2.96	5.92	5.65
5	3.04	6.08	6.13
6	3.37	6.74	6.47
7	3.17	6.34	6.44
8	3.28	6.56	6.23
9	3.32	6.64	6.33
10	3.12	6.24	6.33
11	3.16	6.32	5.56
12	3.19	6.38	6.32
13	3.35	6.7	6.43
14	3.40	6.8	6.03
15	3.26	6.52	5.16

Collection 1

	regular_stuffing	supposed_doubled_original_stuffing	actual_double_stuffing
16	3.45	6.9	5.68
17	3.23	6.46	6.23
18	3.34	6.68	6.31
19	3.31	6.62	6.10
20	3.32	6.64	6.10
21	3.28	6.56	6.00
22	3.12	6.24	5.85
23	3.30	6.6	5.90
24	3.37	6.74	6.05
25	3.37	6.74	6.03
26	3.26	6.52	6.00
27	3.24	6.48	5.79
28	3.52	7.04	5.72
29	3.30	6.6	6.20
30	3.40	6.8	6.07

Collection 1

	regular_stuffing	supposed_doubled_original_stuffing	actual_double_stuffing
31	3.53	7.06	6.25
32	3.52	7.04	5.98
33	3.50	7	6.36
34	3.49	6.98	5.91
35	3.57	7.14	6.32
36	3.37	6.74	6.22
37	3.37	6.74	6.30
38	3.32	6.64	6.28
39	3.52	7.04	6.34
40	3.45	6.9	6.22
41	3.58	7.16	5.96
42	3.55	7.1	6.77
43	3.53	7.06	6.27
44	3.52	7.04	6.18
45	3.38	6.76	6.32

The following shares the standard deviation and mean of the weight of the stuffing.

Collection 1

supposed_doubled_original_stuffing	6.70044
	5.92
	6.56
	6.72
	6.9
	7.16
	45
	0.28805
	0.0429399
	0

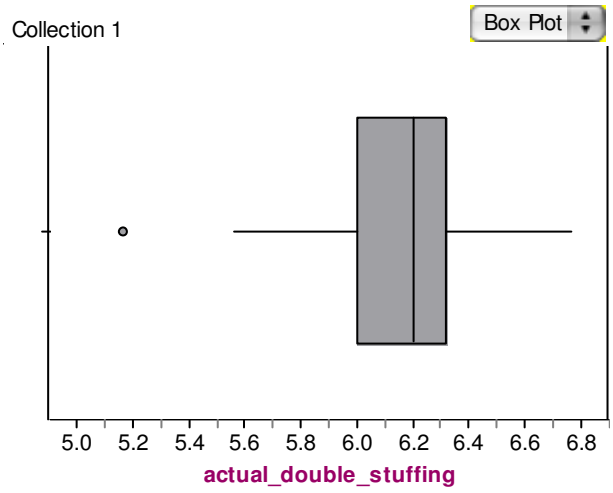
S1 = mean ( )
S2 = min ( )
S3 = Q1 ( )
S4 = median ( )
S5 = Q3 ( )
S6 = max ( )
S7 = count ( )
S8 = stdDev ( )
S9 = stdError ( )

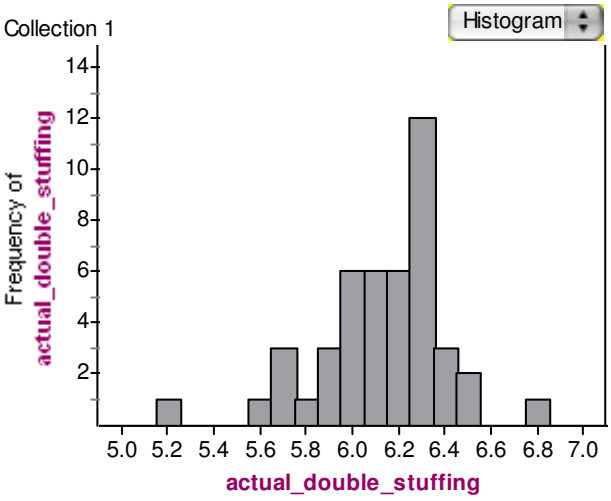
Collection 1

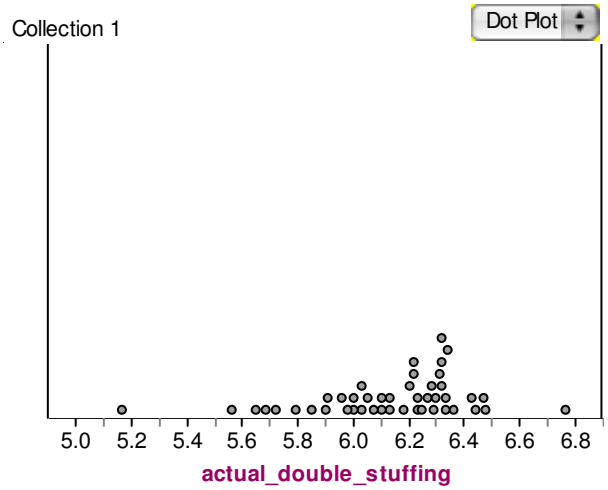
actual_double_stuffing	6.12644
	5.16
	6
	6.2
	6.32
	6.77
	45
	0.285428
	0.042549
	0

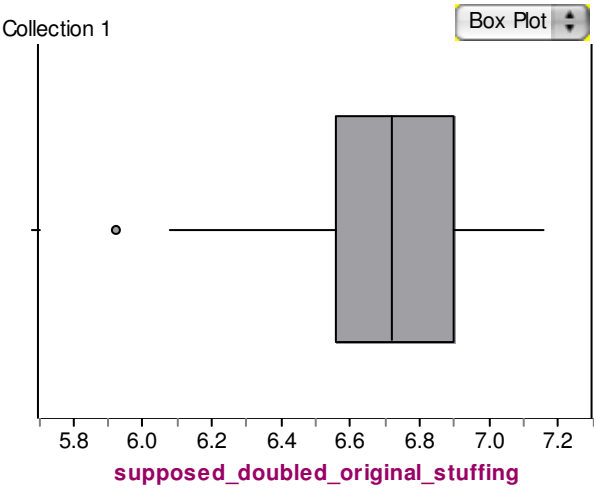
S1 = mean ( )
S2 = min ( )
S3 = Q1 ( )
S4 = median ( )
S5 = Q3 ( )
S6 = max ( )
S7 = count ( )
S8 = stdDev ( )
S9 = stdError ( )

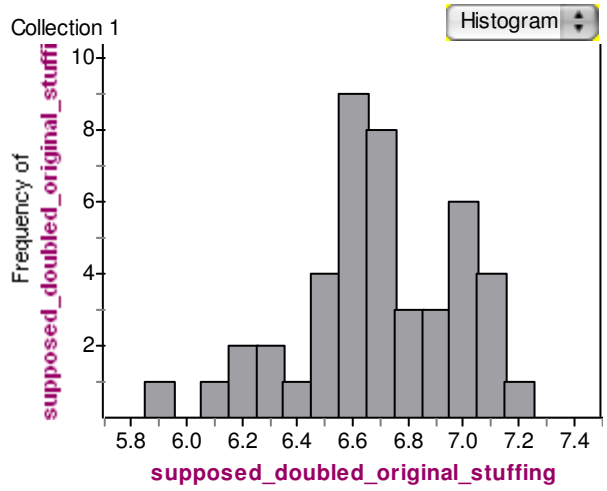
The scatter plot, box plots, and histograms below show that there was one outlier in the data. The graphs also show that the supposed weight of the stuffing is clearly more than the actual weight of the Double Stuffed Oreo's stuffing. The supposed weight of the stuffing peaks at 6.6 grams, while the actual weight of the Double stuff Oreo's stuffing peaks at around 6.3 grams.

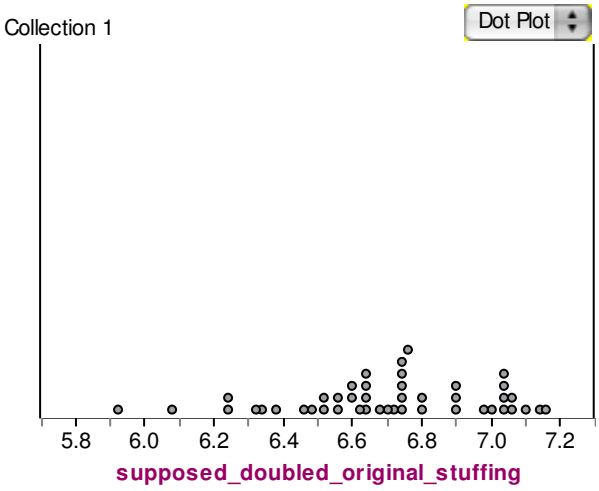












Ho: The supposed weight of the double stuffing is the same as the actual weight of the double stuff Oreo stuffing. Ha: Thesupposed weight of the double stuffing is not the same as the actual weight of the double stuff Oreo stuffing. This is an SRS because I bought 2 packages of each type of Oreo (Regular and

Double Stuff) from three different stores. The data also shows normality because the sample size is more than 30. My sample size was 45. The data also shows independence because my sample size of 45 is greater than 450 (supposing that there are more than 450 Oreos in the world. I know there are because there have been over 32 million Oreo cookies sold in the US alone). The information below explains that there is not doubled the amount of stuffing in the Double Stuff Oreos compared to the Regular Oreos. Based on my observation I conclude to reject the null hypothesis: The supposed doubled original stuffing is not equal to that of the actual Double Stuff Oreo stuffing. If the hypothesis were not true, someone would get results like mine .01% of the time. I came to this conclusion by using the test statistic given in Fathom (9.495) and plugging it into the following equation: P (t>9.495)= tcdf(9.495, 100000, 44)= .0001

Test of Collection 1 — Compare Means

First attribute (numeric): supposed_doubled_original_stuffing
Second attribute (numeric or categorical): actual_double_stuffing

Sample count of **supposed_doubled_original_stuffing**: **45**
Sample count of **actual_double_stuffing**: **45**
Sample mean of **supposed_doubled_original_stuffing**: **6.70044**
Sample mean of **actual_double_stuffing**: **6.12644**
Standard deviation of **supposed_doubled_original_stuffing**: **0.28805**
Standard deviation of **actual_double_stuffing**: **0.285428**
Standard error of the mean of **supposed_doubled_original_stuffing**: **0.0429399**
Standard error of the mean of **actual_double_stuffing**: **0.042549**
Alternative hypothesis: The population mean of **supposed_doubled_original_stuffing** **is not equal to** that of **actual_double_stuffing**

The test statistic, Student's t, using **unpooled variances** , is **9.495**. There are **87.9926** degrees of freedom.

If it were true that the population mean of **supposed_doubled_original_stuffing** were equal to that of **actual_double_stuffing** (the null hypothesis), and the sampling process were performed repeatedly, the probability of getting a value for Student's t **with an absolute value this great or greater** would be **< 0.0001**.

I have discovered that there is not exactly double the amount of stuffing in the Double Stuff Oreo as advertised by Nabisco. I think that I could have improved on my study by not conducting me observation in a room full of hungry teenagers who were ready to pounce on the Oreos at any given moment. My observational study may have gone better if greedy Pamantha (also known as Christine) had not been in such a rush to grab some cookies, the scale may have been a little more accurate and not jiggled so much. Although Pamantha may be the fault of the results of my observation, I am happy with the results and the knowledge of knowing how much stuffing I am eating when I devour my next

package of Double Stuff Oreos. Although I have not found any research like mine on the World Wide Web, I am sure that I am not the only person to have done such an outlandish observation. I think that more observations like mine would continue to prove that the Nabisco Company is cheating the Oreo lovers from their rightful share in cream filling, otherwise known as stuffing. This observation has made me question; if there really was double the stuffing on the Double Stuff Oreo, would it make the cookies taste different? The Double Stuff Oreos are without a doubt the best of the Oreo products. There is too little stuffing in the Regular Oreos, but would there be an overpowering sugar explosion if the Double Stuff Oreos were truly double the stuff? I also wonder, why Oreo has yet to make Double Stuff Golden Oreo or Double Stuff Uhoh Oreo. These would be equally tasty to the Original Double Stuff Oreo.

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Is it Really Double the Stuff?

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