



**CALIFORNIA SCIENCE & ENGINEERING FAIR
2019 PROJECT SUMMARY**

Name(s) Carissa Freeman	Project Number S0506
Project Title An Investigation of Tooth Decay Caused by Various Sodas	
Abstract Objectives To investigate which soda has the most decay over a three week period. Methods Sodas: Coke, Diet Coke, A&W Root Beer, Diet A&W Root Beer, Mountain Dew, Diet Mountain Dew, Pepsi, Diet Pepsi, Sprite,Sprite Zero, Sunkist, and Diet Sunkist Water 14 Coyote teeth 14 18 oz. Plastic cups 1 Flinn Scientific, Inc. electric balance 1 Vernier pH probe 1 Vernier LabQuest 2 1 100 mL graduated cylinder Results After my experiment, I was able to determine that most of the sodas cause tooth decay except for the controls. Even though three of the sodas had a positive increase in mass, an inspection visual states otherwise. It is possible that the tooth is compromised and soda has entered the tooth. This is because there are stains on the teeth with the Sprite Zero and Diet Pepsi starting to eat away at the enamel. The Diet A&W Root Beer was the only soda that didn t have an impact on the teeth. All except one of the sodas stained the teeth and started to eat away the enamel, but some almost went through the enamel. Conclusions I came to the conclusion after collecting my data that the high acidity and sugar contents of the sodas caused decay in the coyote teeth. I hypothesized that Coke would have the most decay, but it only had a decrease of 14.79 percent of its original mass. After making a one tail t-test, the Coke p-value was 0.064. However, the Diet Mountain Dew caused the most decay with a 20.07 decrease in its original mass. That caused a p-value of 0.013. If the p-value is less than 0.05 there is 95% confidence that the soda caused decay in the teeth. All of the teeth except for Coke and A&W Root Beer were lower than 0.05. The controls and Diet A&W Root Beer resulted in a zero on the t-test which means the liquids didn t cause any decay. The A&W Root Beer caused decay though and increased in acidity overtime because of the evaporation of the water in the soda. This soda was behind Diet Mountain Dew and Pepsi in decay which was not expected. There was also a strong negative correlation of -0.74 that concludes that as sugar increases, that mass decreases causing more	
Summary Statement I measured the mass of the different teeth daily for three weeks, and found that the sodas caused decay in the teeth.	
Help Received My mentor Riccardo Magni taught me I to use excel, probability tests, and overlook my lab write ups.	