Krazy Kupcakes For Kids

Who says you can’t have your cake and eat it too? These cupcakes incorporate fruits and vegetables to make a healthy dessert.

Tag words: childhood obesity; children; healthy alternatives; cupcakes; recipes

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Summary:

Childhood obesity has more than tripled in the past 30 years but healthy eating can lower the risk of becoming obese. Since kids love sugar and sweets, we have come up with a recipe for a healthier inexpensive cupcake that kids will love. Currently, schools have stopped selling junk food and soda in their vending machines and as fundraisers but a recent study by an online health magazine, The Blaze, states that the elimination of the junk food is not helping the obesity epidemic. Our new cupcakes are not only delicious but have nutritional value as well. We conducted a taste test with our new recipes and store bought vanilla and chocolate cupcakes and found that the healthier cupcakes were preferred. (SA)

Video Link:
http://www.youtube.com/watch?v=Ms8bzO5F1XQ&list=UUts4_1WypXMyDFu9ZffstA&index=3&feature=plcp
**Poor Eating Habits leading to Childhood Obesity**

**The History of Childhood Obesity**

There is a crisis in America. Across the US, obesity rates are rising. Childhood obesity has more than tripled in the past 30 years and has become a major public health problem. The percentage of children aged 6-11 years in the United States who were obese increased from 7% in 1980 to nearly 20% in 2008. Similarly, the percentage of adolescents aged 12–19 years who were obese increased from 5% to 18% over the same period (CDC). According to healthychildren.org, nearly 1 in 3 children in America are overweight or obese. This increase in childhood obesity has been observed primarily in the United States due to the great number of fatty foods and sedentary lifestyles that many families and children currently live. It is important to note that genetic factors, metabolism, culture, socioeconomic status and the environment can also greatly influence obesity in children; however, most cases are results of lifestyle and food decisions. Consequently, childhood obesity can have serious health effects such as; high cholesterol, type 2 diabetes, stroke, heart disease, high blood pressure and cancer (CDC).

**Who is really to blame?**

A mother’s diet before and during pregnancy can greatly influence the health and weight of their new born baby. Women who exercise and eat right tend to deliver healthier babies with less health problems. Once a baby is born it is very important that the mother maintains a healthy diet for the baby. It has been proven that breastfeeding provides optimum nutritional benefits for the newborn. Parents play a large role in childhood obesity. Since children are very innocent and naïve they may not always know what is best for them. So it is up to the parents and leaders of the household to make sure that they are eating the right kinds of food and getting enough exercise. ABC News conducted an obesity poll along with Time magazine to assess the obesity epidemic in America. After analyzing the data from the poll, we noticed that a parent’s lifestyle and food decisions can have an impact on their children. From a young age, children see their parents as role models and in many cases mimic their behaviors. Parents are supposed to help their children distinguish good from bad in every aspect of their life. It is essential for parents to understand what different types of foods are composed of so they can make the right choices when developing a meal plan for their children. It is an easy mistake to overestimate how much food to give to a child but weighing children occasionally is a good way to monitor their weight. Around most ages boys require more calories than girls because they generally have a larger body size but their appetites can change occasionally depending on what activities they are engaged in. For example a child who is involved in different sports would need a higher intake of calories than a child who sits and does homework and watches TV as soon as they get home from school. From the obesity data set, we can conclude that there is a strong correlation between the BMI of the parents and the BMI of their children. As the parent’s BMI increased, so did their children.
How do I know if my child is obese?

Children are divided into different weight categories according to their Body Mass Index (BMI). A person’s BMI measures a person’s body fat levels based on their height and weight. BMI’s are recommended to use to assess children 2 years and older and according to the CDC, healthy BMI levels differ in boys and girls. On a more general basis, children’s BMI are considered underweight, normal, overweight or obese according to what percentile they fall under. Doctors use a growth chart to evaluate where a child’s BMI falls in relation to other children. The percentiles on the growth charts indicate “the relative position of the child’s BMI number among children of the same sex and age.” (CDC, 1) For example, a child who falls under the 5th percentile is considered underweight, falling between the 5th and the 85th percentile classifies a child’s weight as healthy, from the 85th to 95th percentile is considered overweight and falling equal or greater to the 95th percentile is considered obese.

The amount of body fat in a child changes with age and although the BMI for children and adults are calculated the same way, they are interpreted differently. Since the BMI is not a diagnostic tool, a child could have a high BMI and still be healthy. Usually children who are more muscular have higher BMIs. If a child did have a BMI that classified him as overweight or obese, further assessment would be needed to determine if the child had excess fat (CDC). The ethnic backgrounds of different children also affect their BMI levels. Children of African-American descent tend to have a more muscular tone and less body fat than Caucasian children, causing them to have a higher BMI (HealthyChildren.org). There are a variety of factors that play a role in gaining excess fat and becoming obese. The main cause of obesity is when a person consumes more calories than their body uses over time. Even a small amount of excess calories can set weight problems into motion. “A calorie is defined as a unit of energy supplied by food” (CDC, 1). Every type of food contains calories whether they are carbohydrates, sugars, proteins or dairy products; they all contain calories. In order for a child to maintain a healthy diet and body weight the amount of calories they consume should equal the amount of calories their body uses during everyday activity. When a child is obese or overweight, they are taking in an excess amount of calories that is being stored in their body as fat, causing them to gain weight. Although genetics, the environment and a child’s metabolism play a role in their weight, the main factor is how much time they spend doing physical activity, what they choose to eat and how much they eat.

More food please?

Portion sizes and servings have been increasing over the years. The quantity and quality of the foods that children are eating is very important. Overweight and obese children usually eat an excess of food during one sitting and children unintentionally consume a larger amount of calories when they eat larger portions. To help curb overeating, the CDC recommends serving food on individual plates instead of leaving bowls of food on the table so children can help themselves. This will help children control their portion sizes when they are eating. They also recommend pouring snacks in bowls while children are watching TV or movies. When children engage in these activities, they are more likely to keep snacking if the food is right in front of them. Keeping the excess food out of reach of children may discourage overeating. The CDC also encourages children to eat healthy snacks in between their meals to avoid overeating during
lunch or dinner. Healthy snacks could include small salads, oranges, apples, grapes and other fruit. Foods like chips, cookies, and ice cream should be stored in places that are out of reach of children. Storing them on high shelves or in hidden places in the freezer will make it less likely that children will get their hands on it. Parents should make the healthier foods like fruits in places that children can easily reach.

**Let’s eat the right way!**

Fatty foods are the main contributor to obesity. People that eat more foods with fat in them have a higher tendency to have a high BMI. There are different types of fats that can be found in food. Saturated fats are the unhealthiest but they are the type of fat that people like eating the most because they taste good. A nutritionist at the University of Burgundy in France found that within the 10,000 taste buds on our tongue, there are some that specifically respond to the flavor of fat. Therefore we tend to enjoy foods like fried chicken, ice cream and burgers that contain saturated fats. Saturated fats are unhealthy because they normally do not have a double bond in their hydrocarbon chain and are solid at room temperature. The lack of a double bond causes them to have a stronger link between their lipids and they are more likely to clog your arteries. Saturated fats usually make up the fats on meat and they are also found in butter, cream, cheeses and other dairy products made from whole milk. Many fried foods also contain high levels of saturated fats. Unsaturated fats on the other hand are liquid at room temperature and are found in olive oil, canola oil, low fat milk, olives, peanut butter and fishes. Unsaturated fats are much healthier and contribute less to obesity. Making small changes like switching whole milk to fat free or 1% milk can make a big difference in a person’s diet. Fat free and 1% milk have the same amount of calcium and essential nutrients as whole milk but it has less saturated fat which is better for your body.

Other healthy changes that can be made to a child’s diet include eating more whole grain. Foods made from whole grain have a better source of fiber, B vitamins, trace minerals, antioxidants and phytonutrients. The B vitamins found in whole grain can help support a healthy nervous system and vital body functions. Whole grain can be found in wheat bread, oats and brown rice. White rice, white flour and white bread contain refined grains that have gone through a milling process. This process removes the fiber in the food as well as other nutrients so they are less healthy than food products made from whole grains. Vitamins like folic acid, niacin thiamin and riboflavin are put back into the grains. Some cereals like Cheerios make an intentional effort to include whole grain in all of their cereal. Cheerios also come in a variety of flavors that children can enjoy like Banana Nut Cheerios, Frosted Cheerios, Chocolate Cheerios and their newest flavor, Dulce de Leche Cheerios. It has been shown that people who tend to eat more whole grain weigh less than those who don’t. A diet high in whole grain has also been shown to manage diabetes. According to healthychildren.org, “the amount of fiber in a food is not a good indicator of the amount of whole grain” because different grains contain different amounts of fiber. The only way to ensure that a food product contains whole grain is if the label says so. The government recommends that all Americans consume three 1-oz servings of whole grain every day.

Vegetables also provide minerals, vitamins and essential nutrients for children’s bodies. They are also an excellent source of potassium which helps maintain a healthy blood pressure. If
parents chose to have more vegetables that are rich in color they may be more appealing to young children. Vegetables like red and green peppers and baby carrots are a great start. Vegetables are high in fiber and polyunsaturated fat. They also contain a low amount of cholesterol and calories. During elementary and middle school, some children may choose to follow a vegetarian diet because at this age they figure out that animals need to be killed in order to make chicken fingers, bacon and hamburgers. It is hard for a child to get all the essential nutrients he or she needs on a vegetarian diet so parents have to be cautious if they allow their children to choose this lifestyle. Since children would not be eating meat on a vegetarian diet, they could suffer from iron deficiencies as well as a zinc and B vitamin deficiency. They could also experience complications with their normal growth and weight gain. Vegetarian children may also be deficient in their protein intake. Therefore parents need to supply them with supplemental foods such as peas, wheat, rice and other legume food products (healthychildren.org).

Fruits are a good way to transition your child into eating solid foods. They contain dietary fiber which many reduce the risk of heart disease, type 2 diabetes and obesity. No fruits contain cholesterol and most fruits are naturally low in fat, sodium and calories. Keeping a bowl of fruits in the home is a good visible reminder for children. They will be more prone to eat the fruits if they see them on a daily basis. Fruits can be used as a sugar substitute to sweeten a recipe for some muffins or banana bread for example. When fruits are used instead of sugar, children are not risking health problems that deal with excess sugar in the body and they are getting added nutrients to their snack. It is always smart to pack fruit along with your child’s lunch. Whether it be a banana, tangerines, grapes or even a convenient pack of raisins. Parents can make eating fruits more enjoyable for children by blending them into a smoothies or providing them with some yogurt to dip it in. Homemade trail mix is also a great way to get children to eat dried fruits while also getting protein from an assortment of nuts.

Let’s Get Physical!

Being active is another great way to curb obesity. Children who are engaged in physical activity tend to sleep better at night and have stronger bones and muscles. Being active helps children maintain or get to a healthy weight. Getting your children involved in sports is a great way to make sure they are staying active. This also gives them a chance to meet new people and make new friends. When children are getting daily physical activity, they are less likely to develop chronic problems down the line like heart disease, type 2 diabetes, high blood pressure, high cholesterol or have a stroke. Children should be engaged in 60 minutes of either moderate or vigorous physical activity or more each day for at least 3 days a week.

The Sweet Tooth

Children are not the only victims of having a sweet tooth. Adults and teens naturally enjoy a cupcake or a cookie from time to time but sweets should be given in moderation to children. First off an abundance of sweets can give children a bad start to having good dental health. Studies have been shown that the more sugar and sweets a child eats, the more prone he or she is to developing cavities. Sugary foods such as sticky caramel, lollipops, soda and gum can have serious effects on children’s dental hygiene. Children should be sure to always brush
their teeth twice a day to reduce the risk of developing cavities. Children’s diets should consist of foods that are more geared toward them growing at a healthy rate, not foods that will contribute to their tooth decay. Television commercials during children’s’ programs play a vital role in influencing children to want sugary foods like ice cream and cake. “Some studies show that children who watch over twenty-two hours of TV per week (over three hours of screen time a day) have a greater tendency to become obese. Children are extremely receptive to ads for sugary cereals and sweets, especially after they’ve visited other homes where these foods are served” (HealthyChildren.org). Because of the negative eating habits television can have on children, television should also be limited in the home. If parents take the initiative and monitor their children’s diets, there will be less of a chance that their children will become obese or overweight. Healthy eating habits start in the home and stocking up on food products that are low-fat, low-sugar and low sodium will train children to become accustomed to these foods and they will be less likely to eat unhealthy foods when they are outside of the home.

Current Solutions

(CT) Because childhood obesity has become an epidemic in the US, many solutions have been thought up in order to get children back in shape. The first place the government looked at was the school systems, since that is where children spend many hours of their day. Switching out the old lunch food with healthier alternatives is the solution, with the addition of nutrition education and physical education. While getting rid of junk food and educating the students about nutrition seem like a good action plan, what if it was already too late and the students are not able to switch old food habits? As provided in the examples below, simply taking away food will not solve the problem.

The first solution is one that has been happening for a while in middle schools and high schools all across America: the banning of sugary snacks and drinks. This junk food ban at first glance seems like a good idea that would actually work. The idea was that if the students had less access to high calorie junk food, the less they would buy and eat it. According to a recent longitudinal study in 2011, weight gain in children had nothing to do with the junk food and soda being sold in the vending machines in school cafeteria, but from poor eating habits learned in early childhood (Van Hook, Altman 2011). The authors focused their attention on “competitive foods” which are the snacks and drinks which are sold alongside the National School Lunch Program and Breakfast Program. Even though these snack foods are readily available, the authors make good points.

One point the authors mention is that the students at school do not have enough time to eat snacks during school, when compared to the time they spend outside of school (Van Hook, Altman 2011). When they are at home they have more time to eat plenty of unhealthy food which would ultimately cause the child’s weight gain. Also that if the students do not buy these food items, how could they possibly make them gain weight? Many students would not pay the expensive vending machine price when they could possibly buy it cheaper somewhere else. The other major point the authors found out is that it is not necessarily the availability of junk food’s fault for their weight gain, but in reality it is the parents’ fault. Most students make bad food choices because of the habits and dietary preferences they acquired from home (Van Hook, Altman 2011). So the problem here is not the junk food itself, but unhealthy influences learned
during early childhood. Even if the school districts remove these fatty foods from the cafeteria, the obesity problem will still linger. A better plan of action is needed.

Another solution to potentially cure this childhood obesity epidemic is getting the United States Department of Agriculture (USDA) involved with school lunches. They host a voluntarily program called “HealthierUS School Challenge” (http://teamnutrition.usda.gov). These are schools that change to a healthier school lunch and more physical education. The program influences schools to have these programs and requires feedback from the schools. Schools get monetary incentive awards according to levels of rewards, by providing more information about their lunches. This award is quite small, the highest being about $2000, so it seems that the schools are truly devoted for healthier students. It is a good thing that the schools now serve a healthier meal at lunch, but that doesn’t control what the student eats at home, for dinner, breakfast and snacks. Educating students through a nutrition class may influence the students to eat better, but they might not be as willing to give up their old eating habits. Again, eating habits usually come from their house hold and most likely will not be easily changed (Van Hook, Altman 2011). Eating one healthy meal will not be sufficient enough for a healthy lifestyle. This program would be best in an elementary school since children need to start having healthy habits so they know how to make healthy food choices. For an even better result, getting the parents involved would make a great influence.

Our Solution

There are many ways to fight childhood obesity, whether it be getting more physical activity every day or being exposed to healthier foods. The more popular solution is to take away all the sweets and junk food that children would eat. The fact that the parents are saying “no” is not a good way of going about this problem. The child will react negatively to this rejection, since they are looking to satisfy their appetite for sweets and usually do not know how to take “no” for an answer. Instead of denying children sweets, our solution is to make dessert more nutritious and can fit into a regular diet. We want to transform the fatty calorie packed cupcake into a cupcake that is nutritious and contains at least a serving of fruits and vegetables and whole grains. These will be called Krazy Kupcakes. Krazy Kupcakes will be readily available in supermarkets, or easy enough to bake at home. They are a quick, guilt-free, nutritious snack or dessert. Children will love them and so will the parents. The following topics are the reasons why we choose to make a healthy alternative of a cupcake, rather than to abandon the treat itself all together.

For the Love of Sugar

Nowadays, sugar seems like a profane word and should be avoided at all costs, especially when reared towards children. This is not necessarily the case, since sugar is a carbohydrate, a source of energy for our body. Children cannot help their irresistible urge for sweets, like soda and candy. It is not entirely the children’s fault for liking sweets; they are naturally more inclined to prefer this taste (Brown, 2008). Babies are born with much more sweet taste buds than any other, which will get developed over time. This is so babies will be willing to drink breast milk, which is full of all the nutrients a newborn baby needs (Kedjidjian, 2012). Hence this is why younger children often opt out for foods that are not as sweet, like vegetables. Even older
children suffer from this fate too. Parents cannot take away everything that is sweetened to meet a child’s sweet needs, as most of the foods they eat with the sugar have many nutrients that are necessary. This is usually to make the food more appealing to the child to eat. There are ways, however, to balance out the sugar intake with not as sugary foods, which will make both the child and parents happy.

There can be healthier switches that can be done in the child’s diet to satisfy their sweet tooth (Kedjidjian, 2012). For example, offer only 100% fruit juices instead of fruit drinks, offer actual fruits instead of candy, have an occasional sweet, and mix half of a high sugared product, say cereal, and mix it with a lower sugar cereal for the other half. The key here is to have some splurges, but have them balanced out to become more nutritious. This is the same plan of action for the cupcakes; we take out most of the bad stuff and replace it with a healthier, lower- fat substitute. There will be no guilt when parents serve them to their children (or even when they eat the cupcakes themselves). Overall, with just a bit of tweaking and moderation, children can have healthy desserts after dinner or as a snack, instead of having to be denied a nice treat.

**The Need for Rewards**

A child’s need for sweets is not the only reason they have cravings; some children (and even adults) see cakes and desserts as a form of a reward. Older children (13-17) are more sensitive to rewards and situations than adults (Landau, 2011). This is because the limbic system, the part of the brain associated with motivation and emotion, has fully developed more so than that of the prefrontal cortex, which is the part of the brain associated with decision making and judgment (McMahan, 2009). The limbic system needs more hormones for homeostasis, and it gets that by doing more risky behavior. The teen’s prefrontal cortex is not fully developed enough to tell the teen to make better judgments about risky behaviors. They usually do what will give them more rewards and look over the costs of the consequences.

Overeating and poor food choices may not be the riskiest action a child or teen does in his life, but seeking the rewards from food for a good day’s work is linked to this development during adolescence. Their brains could link sweets with a pleasurable experience which gives them the reward they seek (Landau, 2011). When a child or an adult sees a food they feel is “rewarding,” their levels of the neurotransmitter dopamine rises, giving them that happy feeling (Verbeken, et. al., 2011). In their study, Verbeken et al, studied children ages 10-15 and their reward sensitivity (RS) versus their body weight. Their results show that RS vs. body weight had a quadratic relationship. It showed that the heavier the child, the more RS the child showed. This shows that individuals with high RS are more likely to take pleasure from natural rewards, like food. In places where food is abundant, this could lead the problems. However, when the line got to the obese children, their RS went down in a negative slope. The overweight children have the highest RS, which could potentially lead overeating, which will then lead to obesity. By the time these children reach obesity, perhaps food will not seem much of a reward to them, which could explain the low RS in obese children. For older children between ages 16-17, RS increased with age and independent of body weight (Verbeken, et. al., 2011).
In conclusion, parents must keep in mind their child’s RS and moderate their sugary food intake, not necessarily banish it completely. If the children do not get the rewards they naturally seek from adolescence, they might not be able to handle it and find rewards somewhere else. Having a nice, delicious cupcake that is secretly filled with the nutrition they need is a good way of having the child being “tricked” into having a reward. They will be tricked in a good way, of course.

**Dietary Recommended Servings**

As previously mentioned, children are less inclined to eat foods that do not taste sweet. This means that they stay clear from vegetables, which is packed with the essential nutrients needed for the body. The only way to the vitamins and minerals needed for a good diet is through plant-originated foods. According to the American Heart Association, children between the ages of 9 and 13 need 1.5 cups of fruits and up to 2.5 cups of veggies in a 1600 kcal diet, or 1800 for a male child. These requirements will not be fulfilled if the child eats junk food all day, rather than having some fruit as a snack. Less than 20% of children in America eat about 5 servings per day with the majority of the other youth eating about 2.5 servings per day (Cullen et al. 2000). According to many studies, children’s fruit, juice and vegetable (FJV) intake does not meet the recommended guidelines. Fat intake also does not meet the guidelines, as too much is eaten. This is why our Krazy Kupcakes are being designed; to provide children with fruit and veggies in a fun way.

Why do children form these bad eating habits? Cullen explains that children usually model their food habits from their parents and friends at lunch. There are not many studies that show the influence of the parents’ eating habits, but they do however influence the food that is provided at home and encourage certain eating behaviors (Cullen et al, 2000). Ultimately, if this is the case, the parents need to learn basic nutrition needs so they can influence their children better. However, in her study, Cullen found that many parents made vegetables in an unappetizing way which discouraged the children to eat them. Also they found that whatever the parents eat, the children eat, which is most likely not fruit. Even the media has some influence on food choices, eating what celebrities are advertising on the television. (Cullen et al, 2000). These children are being influenced from many different angles. Parents have to make the initiative to have a better influence on their child’s eating habits. If the children refuse to eat their veggies, the parents need to be creative to hide them in foods that the children will eat. This is where the Krazy Kupcakes come in. Parents can give their child one of these cupcakes which will give them the benefits of vegetables and fruits.

**Krazy Kupcake Recipes**

Our novel solution to childhood obesity is to transform a unhealthy food item into a healthier alternative. In this case, we will create two cupcake recipes that have less fat and calories and packed with more fruits, vegetables, and whole grains. Our goal is to have the healthier option be just as appealing at the unhealthy version. The cupcakes will be sweet enough for the children to enjoy, as well as have a good bold flavor adults will enjoy too. The recipes will be easy to follow and inexpensive to make. Portion control will also be a factor in the recipes, so many of the recipes will only be for 12 cupcakes or less. A smaller amount of batter
will make less cupcakes, and the less tempted to eat more than a serving. We will also include many frosting alternatives to go along with the cupcakes to give them extra flavor. There will also be a healthier frosting recipe too for those less adventurous. We will also include total calories and fat in one serving and how they compare to the older, unhealthier version. The possibilities are endless when there is creativity. All recipes mentioned here will be located in Appendix A.

The first cupcake we will transform is the vanilla cupcake. Vanilla is a very basic flavor and most flavors overpower it. In order to have any fruits in the cupcake, we have to transform it to a completely different flavor, looking at the vanilla cupcake as a blank slate. We decided that making a Lemon Blueberry cupcake with a Lemon frosting would do the trick. First, lemons are a great source of Vitamin C and Vitamin B6 (Self, 2012). The zest itself is where the concentration of the essential oils are located, so this is a cheap and efficient way of getting a lemon flavor. Next are the blueberries, which are very healthy. They are relatively low in calories and a good source of Vitamin C, Manganese and dietary fiber. Their best nutritional fact is that they are one of the best antioxidants in fruits. They are on the top of the list of Oxygen Radical Absorbance Capacity (ORAC) (USDA, 1999). Applesauce is also used in the cake batter, which gives the batter content less cholesterol and some added Iron, Vitamin C, and Vitamin A. The whole wheat flour adds to the cake batter whole grains which we all need to add more of in our everyday diet. This light and more flavorful alternative to a vanilla cupcake will sure bring a smile to anyone who eats it.

The second transformed cupcake will be chocolate. We wanted to go a different route with this cupcake, to show different ways to play around with a cupcake. This cupcake will have a surprise filling inside, with a light dusting of powdered sugar on top. The filling will be a low carbohydrate and low fat Strawberry Rhubarb flavor. Rhubarb is low in calories and high in dietary fiber. Its peel is where all the nutrients are, so one must keep the peel on in order to get all the potential nutrients. Rhubarb is also a good source of Magnesium, Vitamin C, Vitamin K and Manganese (Self, 2012). The strawberries are a good pair with rhubarb. Rhubarb is somewhat tart and the sweetness of the strawberries balances that out. Strawberries are a good source of folate, Potassium, Vitamin C and Manganese (Self, 2012). The use of melted chocolate chips gave the cake a nice flavor while also being good for you. Dark chocolate, or in this case semisweet, is full of antioxidants and helps lower blood pressure (WebMD, 2003). Also, these cupcakes were made fully of white wheat flour for the added whole grains and applesauce to make the recipe less fatty. Hopefully these cupcakes will even make chocoholics satisfied!

Conclusion

(CT/SA) Children are generally typecasts of their parents and tend to mimic their behaviors. If children see their parents eating in a healthy way they may be more inclined to also eat healthy. Parents should encourage physical activity from their children and should limit their time in front of the TV so their children will also do the same. Keeping healthy foods in the home will make it easier for children to make smart decisions about food when they are outside of the home. It is okay to have a little bit of every type of food as long as it is consumed in moderation and combined with physical activity. The obesity epidemic in America can be
stopped but all parents and role models need to make a conscious effort to help curb the problem. One child at a time we can all help the children in America live healthier lives.

In the end, children just love sugar. They love having rewards and being rewarded with sweet desserts. Even adults feel the same way, too. Despite all the negative influences a child may face when dealing with food choices, the better choices are out there, they just need to have the ability to make them. This first needs to start from home, with parents making more nutritious food choices and habits that their children will potentially model after. Parents need to buy healthier food so access for the children to eat better is easier. These habits must start from early children so the habits stick. To help aid parents store healthier snacks, they can make or buy our Krazy Kupcakes, which are made with wholesome ingredients.

Krazy Kupcakes are proof that healthy eating is an easy choice! It is a cupcake that is lower in fat, lower in calories and packed with addition fruits and vegetables and whole wheat grains. Dessert can now be part of a balanced diet and help fulfill the recommended 5 cups of fruits and vegetable servings, as well as the whole grain servings. Abandoning desserts all together will end badly; most of the time in binge eating to satisfy cravings. Having a cupcake every now and then is not a bad thing. It is all about moderation. Making a better choice, like a Krazy Kupcake, would be the best choice! Hopefully, parents who enjoy baking and sharing fun times with their children will bake or buy our products. When they do, we hope that our cupcakes help influence a more nutritional diet for their children and themselves.
Renovated Cupcake Recipes and Taste Test

Vanilla Cupcakes

For our service project we decided to come up with two cupcake recipes, one chocolate and one vanilla, that would be healthier alternatives to the store bought cupcake mixes people normally buy in the stores. We wanted to make our own vanilla cupcake recipe and our control for this cupcake was a store bought box of Betty Crocker vanilla cupcake mix. We used many healthy substitutions in our healthy recipe. First we substituted unsweetened apple sauce and baking powder for eggs. Eggs in cake recipes help emulsify the ingredients together for a smooth texture and also help the cupcakes to rise. Since applesauce contains pectin, it also helps emulsify all the ingredients and the baking powder helped the cupcakes to rise. Instead of using all-purpose flour, we used half whole wheat and half all purpose flour. The whole wheat flour is healthier because it contains more fiber and has germs that contain more nutrients. We also used Earth Balance Buttery Spread instead of butter in the cupcake recipes. The Earth Balance is lactose and gluten free and contains 0 grams of Trans Fat.

The first recipe we tried was adapted from Handle the Heat and Koko’s Kitchen. It included whole wheat and regular flour, baking powder and soda, salt, Earth Balance Buttery Spread, vanilla extract, unsweetened applesauce, bananas and cornstarch. This cupcake had only 113 kcal per cupcake compared to the 280 kcal in the Betty Crocker cupcakes. The healthy frosting contained Earth Balance Buttery Spread, powdered sugar, soy milk and salt. When we made the first batch of cupcakes, they tasted exactly like banana bread. Even though these cupcakes were a healthy alternative because it contained bananas and applesauce, we wanted to create a recipe that was out of the ordinary and different from any other cake they sold in the stores. The frosting from this recipe was also very liquid and dripped off of the cupcakes. We wanted to make a more solid frosting that looked more appealing to children. So it was back to the drawing board.

One Sunday night Stephanie was watching an episode of Cupcake Wars on the Food Network channel and they were doing an episode about healthy vegan cupcakes. She decided to take notes because she thought it would come in handy with the service project. The cupcake that caught her eye was a Lemon Blueberry cupcake with Lemon cream cheese frosting. She thought this recipe was perfect because it contained blueberries and lemons which were two fruits that she did not normally see in cupcakes. Blueberries are very healthy because they don’t contain any cholesterol or fat. About a cup of blueberries provide 4 grams of dietary fiber which should be an essential part of a child’s diet. Blueberries also contain antioxidants that can help protect you from chronic diseases. Lemons are also good for you because they contain Vitamin C and have a high potassium content.

In the recipe for the Lemon Blueberry cupcakes, we substituted half of the all purpose flour for whole wheat flour, applesauce and baking powder for the eggs, Earth Balance Buttery Spread for the butter, and light Daisy sour cream for regular sour cream. For the lemon cream cheese frosting we used 1/3 reduced fat cream cheese instead of regular cream cheese and Earth Balance Buttery Spread instead of regular butter. This healthier cupcake came out to be 135 kcal per cupcake. Even though this cupcake had more kcal than the first recipe we tried, we believed...
this one had more of a nutritional value because it contained three different types of fruits (Apples from the applesauce, blueberries and lemons). The whole point of our service project is to get kids eating more fruits and vegetable so they can maintain a healthy weight and we believed this cupcake would aid in doing so. We baked a dozen of these cupcakes and gave them to residents living in New Gibbons on the Douglass campus at Rutgers to taste them. All of the residents enjoyed the cupcakes and thought that children would also like them; although some were not a fan of the frosting because they did not like cream cheese. We could try substituting fat free yogurt for the cream cheese but it would probably have the same liquid consistency as the first frosting we made.

**Chocolate Cupcakes**

(CT) Next was the chocolate cupcake. This cupcake needed several testings of different recipes and ingredient combinations to get the right palatability a chocolate cupcake should have. We first wanted to incorporate squash into the cupcake, since we have heard good things about chocolate zucchini bread. The first recipe also had pumpkin puree, but that cupcake would not cook all the way, even being in the oven for 30 minutes. It had a mushy texture. 2 different recipes were tested, both tasting not so good. The flavor of the zucchini was not what we were looking for. One recipe had Splenda instead of sugar for its no calorie content, but that left an awful chemically aftertaste. Anything that is processed like that cannot be healthy, so we figured using plain sugar would be the better alternative. So, we looked for recipes that had lower amounts of sugar in them and even might take some out if possible. Our next substitute was using half wheat flour and half all purpose flour. After more test baking, the taste of the whole wheat flour could be detected even with the chocolate. With one more test run, it was narrowed down that it was the whole wheat flour giving the cupcake a weird taste. In response to this problem, it was decided to try white whole wheat flour, which claimed to have a lighter taste than whole wheat, but with the same benefits. This was also made without any added vegetable. The texture was not the same as a normal cupcake, which should be light and moist. This was dense and needed more chocolate flavor. We tried one last recipe, added chocolate chips, but it still did not have the right texture and tasted like cardboard. Finally, one more test run of a newer recipe from America’s Test Kitchen worked and the end product will be seen in the test in class. For the fruit part, it was decided for the fruit part to make a strawberry rhubarb filling to pipe into the cupcakes. The filling tasted good and will be used for this cupcake. Overall, we had done about six trial runs before we found the right combination.

To go along with the healthy theme, we wanted to make sure there was some vegetable a child would not normally eat incorporated into the chocolate cupcake. So the thought of strawberry and rhubarb was to be used, since the combination was unique. The taste would be sweet enough from the strawberries for any child to enjoy, yet packed with an abundance of fiber from the rhubarb. Also, we thought that having a surprise filling would appeal to the children. Another substitute we made was using applesauce instead of the oil, and we substituted all the all purpose with white whole wheat flour. This added more whole grains to the cupcake. Chocolate chips were used for the melted chocolate part, because they are less expensive as other chocolate and readily available. Chocolate itself has antioxidants, which adds to the health factor. We also used just egg whites instead of the whole egg to reduce the cholesterol in the recipe. This recipe was adapted from the America’s Test Kitchen website. The cupcake had the right cupcake
texture than previous trials and actually had a nice chocolaty taste. Previous taste testers liked the strawberry rhubarb filling along with it and also liked its texture. After totaling the calories, this cupcake had about 128 calories a cupcake, and that is with the filling.

**Substitutions**

Applesauce is a good substitute for oil in some baked items, like cakes, brownies and quick breads (Seasoned Advice, 2010). This is because the applesauce acts similar to oil in a cake batter. The purpose of oil in the cake batter is to coat the starch (flour) to prevent it from combining with the wet ingredients and developing gluten. Gluten is what causes the batter to rise and gives it the batter elasticity, which is the chewiness of the final product. When cooking a cake, one would want to limit gluten formation, since cupcakes are not associated with the chewiness mouth-feel (Seasoned Advice, 2010). Cupcakes are light, fluffy and moist. In other words, a lower amount of gluten is better for cupcakes.

However, in applesauce there is pectin. Pectin is a polysaccharide found in the cell walls of fruits. It is a good gelling agent and a good source of dietary fiber. To an extent, pectin can act the same way as oil, but has a different mechanism (Seasoned Advice, 2010). Oil is hydrophobic and creates a great waterproof shield around the flour molecules. Pectin is not hydrophobic and does not actually coat the flour molecules. Pectin and flour are both polysaccharides, which mean that they are both in competition for the water in the batter. Therefore there will be less water reaching the flour, which leads to less gluten development (Seasoned Advice, 2010). The ratio for the substitution is 1:1, but always bake a test-run to make sure that works. Applesauce or any fruit puree could also be used instead of eggs in a recipe. This would be good if the recipe did not call for oil. Since applesauce will cause the batter to be dense, adding some baking powder will give the batter some lift. Applesauce will not be as great as an ingredient like oil, but it does cut out most of the fat in the recipe.

For those who have a gluten intolerance, a simple substitution can be made; use gluten free wheat flour, or any other flour that is not made from wheat, like rice or even almonds. Wheat flour is the only flour that contains gluten, so any other flour will do. However, there is gluten-free wheat flour available in the markets, to keep that wheat taste in the recipe. In order to get some rise, xanthan gum is added. Xanthan gum is made from the microorganism Xanthomonas campestris, which is dried and ground to a powder (Ellen’s Kitchen, 2008). This will replace the gluten to trap the air bubbles inside the batter and give it a similar texture. The ratio of substitution is 1:1 with 1-2 teaspoons of xanthan gum added to the recipe.

**Results**

To see if people actually liked the taste of our cupcakes, we held a taste test where Rutgers students had the opportunity to taste them. Before the taste test, we had several people taste our cupcakes and we recorded their responses in our video. The results of our recordings show that they enjoyed our cupcakes and thought that children would enjoy them too. Many of them were shocked to hear that these cupcakes were healthy! To put our recipes to the real test, we had the students in our class taste both the control cupcakes made from a box mix and our cupcakes. The participants were given half of each of the 4 cupcakes. Each cupcake had a
different colored toothpick to distinguish which cupcake was which. The yellow toothpick represented the vanilla box mix, green represented the lemon blueberry, blue represented the chocolate box mix, and red represented the Strawberry Rhubarb Chocolate cupcake. We asked the participants of the taste test to answer 4 questions and the results of each question are shown in Figures 1, 2, 3 and 4 in Appendix B. The Lemon Blueberry cupcake received the best reviews and beat its control, the vanilla box mix, by a large amount of votes. The chocolate box mix cupcake had more votes than the Strawberry Rhubarb cupcake, but many participants actually commented that they enjoyed cupcake red too. The majority of the participants would bake these recipes. The healthier lemon blueberry cupcake, containing 135 calories, received 56 out of 64 votes (87.5%) while the store bought vanilla cupcake, containing 350 calories, received only 8 out of 64 votes (12.5%). The healthier strawberry rhubarb chocolate cupcake, containing 125 calories, received 38 out of 64 votes (59.4%) while the store bought chocolate cupcake, containing 350 calories, received 26 out of 64 votes (40.6%). Some comments stated they liked the fruity flavors and that made the cupcakes more interesting than the plain box mix cupcakes. Lastly, knowing which cupcake was the healthier cupcake influenced the participant’s choice of which one they would eat even if they thought the non-healthy cupcake tasted better.

Conclusion

(SA/CT) Overall we love the idea of this service project. We think we are making a positive impact on society by trying to reduce the prevalence of childhood obesity. We believe childhood obesity a huge public health issue in America. If we are able to change the way our children eat, we could reduce the prevalence of a number of childhood diseases.

It is normal for people to have cravings for sweets and pastries every once in awhile so we wanted to create a sweet treat that had a low calorie count so people could have dessert every day without feeling guilty. We especially wanted to show how easy it is to make some healthy substitutions for ingredients whenever people are baking. We would also like to encourage parents to bake with their children. Children are more likely to enjoy the things that they eat and understand the importance of eating healthy when they are involved in the preparation. We made our cupcake recipes even healthier with our own additions of fruits and vegetables. Cupcakes are now able to fit into anyone’s diet, whether they are counting calories or eating gluten free foods. We enjoyed baking the cupcakes and we hope children everywhere will also have an opportunity to enjoy them.
References


Appendix A

Strawberry Rhubarb Chocolate Cupcakes:
(Adapted from America’s Test Kitchen and EatingWell.com)
Makes 12 cupcakes

Ingredients:

**Chocolate cupcakes:**

- 3 ounces of semi sweet chocolate chips
- 1/3 cup of natural unsweetened cocoa
- ¼ cup hot water (or coffee for more intense chocolate flavor)
- ¼ cup white whole wheat flour
- ¼ cup raw cane sugar
- ½ teaspoon salt
- ½ teaspoon baking soda
- 6 tablespoons of applesauce
- 2 egg whites
- 2 teaspoons of white vinegar
- 1 teaspoon vanilla extract

**Strawberry Rhubarb filling:**

- ¼ cup orange juice
- 3 tablespoons cornstarch
- 3 cups rhubarb, either fresh or frozen
- 2 cups strawberries, either fresh or frozen
- ¼ cup sugar

Directions:

For the cupcakes:

Pre-heat oven to 350 degrees F. Line muffin pan with paper liners. In a medium bowl, add the chocolate chips, cocoa and pour the hot water over and whisk until smooth. Place in the refrigerator until cooled completely. In another bowl, mix together flour, sugar, salt, and baking soda and set aside. Whisk together the applesauce, egg whites, vinegar, and vanilla into the cooled chocolate mixture. Slowly add in the flour mixture until smooth. Divide into the muffin pan and bake until the cupcakes are firm to the touch, about 17-19 minutes. Let cool completely.
For the filling:

Mix the cornstarch with 2 tablespoons of the orange juice in a small bowl. In a saucepan, add the rhubarb, strawberries, sugar and remaining orange juice. Bring to a simmer over medium heat. Cook until the rhubarb is tender, about 5 minutes. Add the cornstarch mixture and cook until thickened, stirring constantly.

To add filling in cupcake:

Place filling tip into a pastry bag. Fill bag with cooled filling. Place tip into the center of the cupcake and gently squeeze filling into the cupcake.

**Comparison:**

Healthy Cupcake:
- Per Cupcake: 108 kcal

Strawberry Rhubarb Filling:
- Per serving: 20 kcal

**Total: 128 kcal**

Unhealthy cupcake:
- Per Cupcake: 250 (Pillsbury)

Chocolate Butter Cream:
- Per Serving: 130 kcal

**Total: 380 kcal.**
Blueberry Lemon Cupcakes with “Healthy” Frosting:
(Adapted from Foodnetwork.com)
Makes 24 cupcakes

Ingredients:
Cupcakes:
1 ¾ cup whole wheat flour
1 ¾ cup all purpose flour
1 Teaspoon baking soda
½ Teaspoon salt
1 cup of Earth Balance buttery spread
2 cups sugar
¾ cup of applesauce + 1 ½ teaspoon of baking powder (egg substitute)
1 teaspoon vanilla extract
Zest of 1 lemon
2 cups light daisy sour cream
1 1/2 cups fresh blueberries

Frosting:
2 (8 ounce) packages of ⅓ reduced fat Philadelphia cream cheese, softened
1/2 cup , softened earth balance buttery spread
2 cups sifted confectioners' sugar
1 teaspoon vanilla extract

Directions:
For the cupcakes: Preheat the oven to 350 degrees. Line cupcake tins with 24 paper liners. Mix the flour, soda and salt together in a bowl. Set aside. Add the butter and sugar to a mixing bowl and cream until light and fluffy. Add the eggs 1 at a time and mix thoroughly. Add the vanilla and lemon zest and mix to combine. Add the dry mixture in 3 parts alternating with the sour cream, ending with dry mixture. Stir in the blueberries. Fill the prepared tins two-thirds full and bake 16 to 20 minutes. Cool.

For the icing: Cream the butter and cream cheese until smooth. Add the vanilla, lemon zest and juice and blend until combined. Add the powdered sugar gradually until combined. Frost the cooled cupcakes with the cream cheese frosting.
Comparison:
Healthy Cupcake:
    Per Cupcake: 135 kcal
Healthy Frosting:
    Per Cupcake: 93 cal per cupcake (24 servings)
**Total: 228 kcal**
Pillsbury Vanilla Frosting:
    Per Cupcake: 185 kcal (24 servings)
Betty Crocker box mix:
    Per Cupcake: 280 kcal
**Total: 465 kcal**

Appendix B

Figure 1. The healthier version of the vanilla cupcake (lemon blueberry) was preferred in the blind taste test. The store bought chocolate cupcake came in second, the healthier chocolate cupcake (strawberry rhubarb) came in third and the store bought vanilla cupcake came in last.

Figure 2. If participants had the cupcake recipes at home, 53 out of 66 (80.3%) stated they would bake them, 10 out of 66 (15.2%) stated they wouldn’t and 3 out of 66 (4.5%) stated maybe.
Figure 3. The healthier lemon blueberry cupcake, containing 135 calories, (green toothpick) received 56 votes while the store bought vanilla cupcake, containing 350 calories, (yellow toothpick) received only 8 votes.

Figure 4. The healthier strawberry rhubarb chocolate cupcake, containing 125 calories, (red toothpick) received 38 votes while the store bought chocolate cupcake, containing 350 calories, (blue toothpick) received 26 votes.
Letters to the Editor:

To the Star Ledger (CT)

Krazy Kupcakes for Kids

No one can say “no” to a cupcake, especially kids who crave sugar. We want the best nutrition for our children, so we usually have to deny them a tasty treat. Even adults like to cave in once in a while to have a delicious sweet treat, even if it throws off our diet. So I wanted to come up with a solution to keep the cupcake in a diet that doesn’t add inches to the waist. With that, my partner and I came up with Krazy Kupcakes for Kids, taking old recipes and switching out some ingredients for healthier ones.

Some examples of substitutions were white whole wheat flour instead of all purpose flour, applesauce for oil, fat-free yogurt instead of milk, using just the egg whites and using fat free sour cream to keep the moisture. Now, you may wonder, “what about the sugar?” I feel that using sugar substitutes is unnatural, because after all, most are just chemicals. Plus they leave a chemical-after taste. So, I feel reducing the amount of normal sugar is fine and sugar is needed for volume. To make these cupcakes more nutritious, my partner and I have decided to add fruits and vegetables into each cupcakes in some way. One cupcake has lemons and blueberries in the mix, while another will have strawberry rhubarb filling in the middle. Our overall message is that by switching out some ingredients for more nutritious ones, you can make you cake, and eat it too! So go ahead, enjoy yourself.
To the Editor:

Who says you can’t have your cake and eat it too? I’m up to the challenge to show you that you can! According to the CDC, childhood obesity has more than tripled in the past 30 years. The percentage of children just ages 6-11 who are obese has risen from 7% in 1980 to 20% in 2008 (CDC). Some schools have already taken an initiative to tackle the obesity issue by banning sugary snacks and drinks but according to a recent study, weight gain in children had nothing to do with the junk food they were eating but was in fact due to the poor eating habits the children developed at a young age. Most of these children make bad choices when it comes to food because they are used to eating these high calorie, fatty foods at home. Parents are enabling bad eating habits in their children without even knowing it.

Obesity in children can lead to many risk factors for cardiovascular disease, and type 2 diabetes but there are steps children can take to reduce their risk. Eating healthier and becoming more active are options but children are still going to have cravings for sweet treats that are unhealthy for them. So instead of denying a child of cupcakes and pastries, why not transform the high calorie, fatty cupcake into a healthy cupcake filled with nutritious ingredients? In my Science and Ethics Colloquium class, taught by Julie Fagan, my partner and I have been given the challenge of coming up with healthy cupcake recipes that will be appealing to children. Our new recipes would not only be delicious but they would have hidden fruits, vegetables and whole grain in them to add nutritional value so parents won’t feel guilty feeding them to their children. We believe we can transform the eating habits of children and our goal is to have bakeries, schools and supermarkets start selling our cupcakes.

Childhood obesity is a crisis in America and eating more fruits and vegetables can help stop the cycle. We are doing this service project because we want the 25% of childhood dreams that fall to obesity to become a reality. We will be conducting a taste test for our cupcakes and we would love for anyone that is going to be in the area to stop by and tell us what you think! The taste test will take place on Thursday, April 19, 2012 at 4:30PM in the Alexander Library (F1 Lecture Hall). Student generated videos, project presentations and a book signing by a student author will also take place at the taste test. Help children make the right decisions about food and take a stand against childhood obesity.

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