

Intended for Grades: 5-6 **Estimated Time:**

Lesson Title: TOO SWEET - SUGAR AND HEALTH (How much sugar do I drink?)

Lesson Purpose: Students will:

- Better understand the health risks associated with excess sugar consumption.
- Assess their personal consumption of sugar that they drink

Materials & Preparation:

- 2 Boxes of sugar cubes; small plates; various drink containers, such as soda, Arizona green tea, Sobe, chocolate milk, milk, juices, Gatorade, and water, etc.
- Data to share (see below):
 - * "Sugar" report
 - * Hawaiian health statistics report
- Set up your "sugar" demo ahead of time to pique curiosity. Place each drink container on a small plate.

Steps:

1. Introduce this lesson by asking students: *How many of you have a relative or family member suffering or who died from diabetes, cancer, or heart disease?*
2. Project or share the Hawaiian Health Stats (see below) and go over each statistic. Ask students to identify the statistics that are extremely high and brainstorm why these statistics might be so high in Hawaii.
3. Ask students: *How you can help prevent this from happening to you?*
(Eat more fruits and vegetables; get enough exercise, and avoid excess sugar.)
4. Ask students: *Can you tell me why processed, white sugar so bad for you?*
Share the "Sugar" report below, explaining that this is a list of 77 ways sugar can ruin your health. Read some of those highlighted, as examples.
5. Share the following fact:
The average amount of sugar consumed every year per American is 156 pounds!! That is about 36 teaspoons per day, per person!
6. Perform the sugar demo by first giving them the conversion that 4 grams of sugar is equal to 1 teaspoon of sugar. Have the haumana form groups. The total number of groups should be the number of drink containers, less the water. Give each group a drink container and paper plate and ask them to write the number of grams and teaspoons of sugar are in each drink. Remind them that they have to first look at the serving size, which may cause them to have to increase the sugar amount. As they figure the answers, write the amount of grams and teaspoons directly on each plate. As each group completes their assignment, double-check their math, then issue one sugar cube for each teaspoon and have the group stack the cubes. When each group is done, go over each one, asking haumana if they drink this regularly. You will display the water plate last.

Reflection Questions:

After learning about how many ways sugar can ruin your health, and seeing how much sugar is in each drink, what are some changes you may need to make when feeling thirsty?

Resources:

* “The Hidden Ingredient that can Sabotage Your Health” by John Casey (Sugar report)

* “Hawaiian Health Statistics report from:

http://www.cdc.gov/dhdsp/programs/nhdsp_program/hi.htm

Hawaii's Health Statistics

- Nearly 1 of 4 deaths in Hawai'i due to heart disease
- 2,244 Hawaiians died from heart disease in 2006
(23.8% of deaths in Hawai'i)
- 665 Hawaiians died from stroke in 2006
(7.1% of deaths in Hawai'i.)

- Survey in 2007: Adults in Hawai'i reported the following risk factors for heart disease and stroke:
 - a. 28.8% had high blood pressure
 - b. 36.3% had high blood cholesterol
 - c. 7.7% had diabetes
 - d. 17% were current smokers
 - e. 56.8% were overweight or obese
(Body Mass Index (BMI) greater than or equal to 25.0)
 - f. 49% reported *No Exercise* in prior 30 days
 - g. 71.3% ate fruit & vegetables *less than 5 x a day*

(Source: *National Vital Statistics Report, 2009.*)

“SUGAR”

Compiled by Nancy Appleton, PhD

This is an extensive list of the many ways sugar can ruin your health from a vast number of medical journals and other scientific publications.

1. **Sugar can suppress your immune system** and impair your defenses against infectious disease.[\[6\]](#)[\[7\]](#)
2. Sugar upsets the mineral relationships in your body: causes chromium and copper deficiencies and interferes with absorption of calcium and magnesium.[\[8\]](#)[\[9\]](#)[\[10\]](#)[\[11\]](#)
3. Sugar can cause a rapid rise of adrenaline, hyperactivity, anxiety, difficulty concentrating, and crankiness in children.[\[12\]](#)[\[13\]](#)
4. Sugar can produce a significant rise in total cholesterol, triglycerides and bad cholesterol and a decrease in good cholesterol.[\[14\]](#)[\[15\]](#)[\[16\]](#)[\[17\]](#)
5. Sugar causes a loss of tissue elasticity and function.[\[18\]](#)
6. **Sugar feeds cancer cells** and has been connected with the development of cancer of the breast, ovaries, prostate, rectum, pancreas, biliary tract, lung, gallbladder and stomach.[\[19\]](#)[\[20\]](#)[\[21\]](#)[\[22\]](#)[\[23\]](#)[\[24\]](#)[\[25\]](#)
7. Sugar can increase fasting levels of glucose and can cause reactive hypoglycemia.[\[26\]](#)[\[27\]](#)
8. Sugar can weaken eyesight.[\[28\]](#) 1
9. Sugar can cause many problems with the gastrointestinal tract including: an acidic digestive tract, indigestion, mal-absorption in patients with functional bowel disease, increased risk of Crohn’s disease, and ulcerative colitis.[\[29\]](#)[\[30\]](#)[\[31\]](#)[\[32\]](#)[\[33\]](#)
10. Sugar can cause premature aging.[\[34\]](#) In fact, the single most important factor that accelerates aging is insulin, which is triggered by sugar. 1
11. Sugar can lead to alcoholism.[\[35\]](#)
12. Sugar can cause your saliva to become acidic, cavities, and periodontal disease.[\[36\]](#)[\[37\]](#)[\[38\]](#)
13. Sugar contributes to obesity. [\[39\]](#) 1
14. Sugar can cause autoimmune diseases such as: arthritis, asthma, and multiple sclerosis.[\[40\]](#)[\[41\]](#)[\[42\]](#)
15. Sugar greatly assists the uncontrolled growth of Candida Albicans (yeast infections) [\[43\]](#)
16. Sugar can cause gallstones.[\[44\]](#)
17. Sugar can cause appendicitis.[\[45\]](#)
18. Sugar can cause hemorrhoids.[\[46\]](#)
19. Sugar can cause varicose veins.[\[47\]](#)
20. Sugar can elevate glucose and insulin responses in oral contraceptive users.[\[48\]](#)
21. Sugar can contribute to osteoporosis.[\[49\]](#)
22. Sugar can cause a decrease in your insulin sensitivity thereby causing an abnormally high insulin levels and eventually diabetes.[\[50\]](#)[\[51\]](#)[\[52\]](#)
23. Sugar can lower your Vitamin E levels.[\[53\]](#)
24. Sugar can **increase your systolic blood pressure.**[\[54\]](#)
25. **Sugar can cause drowsiness and decreased activity in children.**[\[55\]](#)

26. High sugar intake increases advanced glycation end products (AGEs), which are sugar molecules that attach to and damage proteins in your body. AGEs speed up the aging of cells, which may contribute to a variety of chronic and fatal diseases. [\[56\]](#) 1
27. Sugar can interfere with your absorption of protein. [\[57\]](#)
28. Sugar causes food allergies. [\[58\]](#)
29. Sugar can cause toxemia during pregnancy. [\[59\]](#)
30. Sugar can contribute to eczema in children. [\[60\]](#)
31. Sugar can cause atherosclerosis and cardiovascular disease. [\[61\]](#)[\[62\]](#)
32. Sugar can impair the structure of your DNA. [\[63\]](#)
33. Sugar can change the structure of protein and cause a permanent alteration of the way the proteins act in your body. [\[64\]](#)[\[65\]](#)
34. Sugar can make your skin age by changing the structure of collagen. [\[66\]](#)
35. Sugar can cause cataracts and nearsightedness. [\[67\]](#)[\[68\]](#)
36. Sugar can cause emphysema. [\[69\]](#)
37. High sugar intake can impair the physiological homeostasis of many systems in your body. [\[70\]](#)
38. Sugar lowers the ability of enzymes to function. [\[71\]](#)
39. Sugar intake is higher in people with Parkinson's disease. [\[72\]](#)
40. Sugar can increase the size of your liver by making your liver cells divide, and it can increase the amount of fat in your liver, leading to fatty liver disease. [\[73\]](#)[\[74\]](#)
41. Sugar can increase kidney size and produce pathological changes in the kidney such as the formation of kidney stones. [\[75\]](#)[\[76\]](#) Fructose is helping to drive up rates of kidney disease. 1
42. Sugar can damage your pancreas. [\[77\]](#)
43. Sugar can increase your body's fluid retention. [\[78\]](#)
44. Sugar is enemy #1 of your bowel movement. [\[79\]](#)
45. Sugar can compromise the lining of your capillaries. [\[80\]](#)
46. Sugar can make your tendons more brittle. [\[81\]](#)
47. Sugar can cause headaches, including migraines. [\[82\]](#)
48. Sugar can reduce the learning capacity, drop your children's grades and cause learning disorders. [\[83\]](#)[\[84\]](#)
49. Sugar can cause an increase in delta, alpha, and theta brain waves, which can alter your ability to think clearly. [\[85\]](#)
50. Sugar can cause depression. [\[86\]](#)
51. Sugar can increase your risk of gout. [\[87\]](#)
52. Sugar can increase your risk of Alzheimer's disease. [\[88\]](#) MRI studies show that adults 60 and older who have high uric acid are four to five times more likely to have vascular dementia, the second most common form of dementia after Alzheimer's. 1
53. Sugar can cause hormonal imbalances such as: increasing estrogen in men, exacerbating PMS, and decreasing growth hormone. [\[89\]](#)[\[90\]](#)[\[91\]](#)[\[92\]](#)
54. Sugar can lead to dizziness. [\[93\]](#)
55. Diets high in sugar will increase free radicals and oxidative stress. [\[94\]](#)
56. A high sucrose diet of subjects with peripheral vascular disease significantly increases platelet adhesion. [\[95\]](#)

57. High sugar consumption by pregnant adolescents can lead to a substantial decrease in gestation duration and is associated with a twofold-increased risk for delivering a small-for-gestational-age (SGA) infant. [\[96\]](#)[\[97\]](#)
58. **Sugar is an addictive substance.** [\[98\]](#)
59. Sugar can be intoxicating, similar to alcohol. [\[99\]](#)
60. Sugar given to premature babies can affect the amount of carbon dioxide they produce. [\[100\]](#)
61. Decrease in sugar intake can increase emotional stability. [\[101\]](#)
62. Your body changes sugar into 2 to 5 times more fat in the bloodstream than it does starch. [\[102\]](#)
63. The rapid absorption of sugar promotes excessive food intake in obese subjects. [\[103\]](#)
64. Sugar can worsen the symptoms of children with attention deficit hyperactivity disorder (ADHD). [\[104\]](#)
65. Sugar adversely affects urinary electrolyte composition. [\[105\]](#)
66. Sugar can impair the function of your adrenal glands. [\[106\]](#)
67. Sugar has the potential of inducing abnormal metabolic processes in normal, healthy individuals, thereby promoting chronic degenerative diseases. [\[107\]](#)
68. Intravenous feedings (IVs) of sugar water can cut off oxygen to your brain. [\[108\]](#)
69. Sugar increases your risk of polio. [\[109\]](#)
70. High sugar intake can cause epileptic seizures. [\[110\]](#)
71. **Sugar causes high blood pressure in obese people.** [\[111\]](#)
72. In intensive care units, limiting sugar saves lives. [\[112\]](#)
73. Sugar may induce cell death. [\[113\]](#)
74. In juvenile rehabilitation centers, when children were put on low sugar diets, there was a 44 percent drop in antisocial behavior. [\[114\]](#)
75. Sugar dehydrates newborns. [\[115\]](#)
76. Sugar can cause gum disease. [\[116\]](#)