

Drinks That Destroy Teeth

Concept/Topic: Science, Math

General Goals:

- Students will determine the pH of various liquids using pH paper
- Students will compare the sugar content in drinks to the acidity of the drinks

Indiana State Standards:

Science:

- 4.2.5 - Write descriptions of investigations, using observations and other evidence as support for explanations.
- 4.2.7 - Identify better reasons for believing something than “Everybody knows that ...” or “I just know,” and discount such reasons when given by others.
- 5.2.4 - Keep a notebook to record observations and be able to distinguish inferences* from actual observations.
- 5.5.1 - Make precise and varied measurements and specify the appropriate units.

Health and Wellness:

- 4.1.1/5.11 – Explain the connection between behaviors and personal health.
- 4.1.4/5.14 - Explain ways to prevent common health problems.

Materials:

- Lab sheet (Provided in kit or as available as pdf)
- Copy of *Acidity or pH Scale of Common Drinks* (Provided in kit or as available as pdf)
- For each group of 4 or 5 students:
 - Granulated sugar
 - Measuring spoon
 - Empty soda bottles
 - water
 - milk
 - sport drink
 - regular soft drink
 - diet soft drink
 - 5 glass or plastic containers
 - Marker or tape to label containers
 - pH strips and pH color table

Procedures:

Part 1- Sugar Content:

1. Assign each group of students one or two of the drinks being used in the lab.
2. Have the students determine how much sugar is in the drink(s) they have been assigned.
3. Provide each group with one empty soda bottle for each drink they are assigned. Have students label the bottle with the drink name (milk, Gatorade, root beer, etc).
4. Have each team measure out the sugar contained in their assigned drink(s) and place that sugar in the labeled container(s).
5. Have students graph the sugar content of ALL the drinks.

Part 2 - Acidity:

1. Provide each group with one container for each drink being tested. Students should label the cups with the name of each drink.
2. Have students measure each liquid and pour it into the correct cup.
3. Dip a pH strip into a liquid then quickly compare it to the color chart. (Students will need one pH test strip per drink)
4. Record the pH on the lab sheet. Repeat until all liquids have been tested.
5. Have students graph the pH of the drinks

Concluding the activity:

1. As a class, arrange the drinks in order from greatest to least sugar content. Ask students what effect sugar has on teeth. (Leads to cavities) Arrange drinks in order from MOST acidic to LEAST acidic. (Remind students that a LOW pH means HIGH acidity)
2. Review what students observed in the "Disappearing Egg" lab. Were their acidity predictions correct? Have them discuss/predict what the effect of each type of drink may have on an egg shell. What type of effect would it have on teeth? (Softens, erodes enamel. Refer to Disappearing Egg lab)
3. Compare the sugar content in drinks to the acidity. Rank drinks according to the amount of damage they can do to teeth – most damage to least damage.
4. Discuss how to reduce the damage done to teeth by sugary/acidic drinks. (Use a straw, use fluoride rinse after brushing, rinse with water after finishing acidic drink, drink tap water vs bottled water)
5. Have students record their observations / predictions on their lab sheets.

Variations:

- Have students design a display showing the amount of sugar in common drinks and display in the cafeteria or enter in contest. See www.drinksdestroyteeth.com for contest details.

Resources:

- Visit www.drinksdestroyteeth.com for websites and downloads

NAME: _____



Drinks That Destroy Teeth



Part 1: Sugar Content

1. List the drinks your class is using in this lab. Complete the table with the sugar content of each drink.



Drink	Sugar Content

2. Create a bar graph that compares how much sugar is in each type of drink.



Drinks



3. List the drinks in order from the greatest amount of sugar to the least amount of sugar.

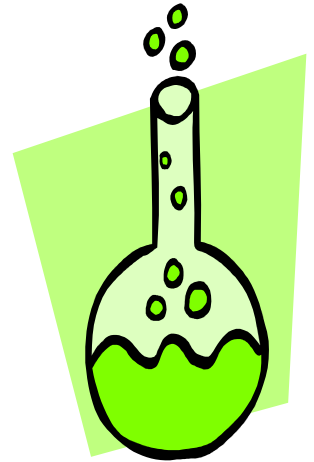
*Most
sugar*

*Least
sugar*

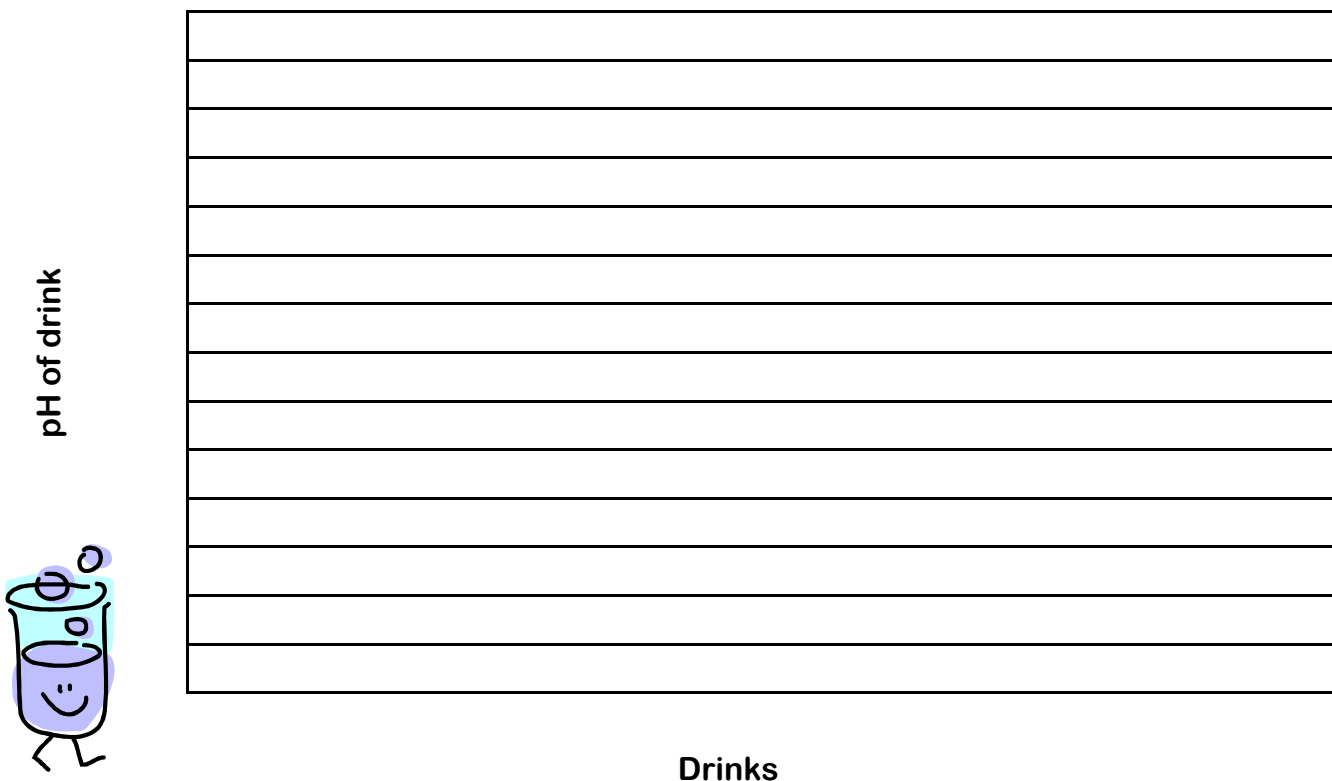
Part 2: pH of drinks

4. Test each drink using the pH indicator paper. Complete the table with the pH of each drink.

Drink	pH



5. Create a bar graph that compares the pH level of each drink.



6. List the drinks in order from the lowest pH to the highest pH. (Explanation: a LOW pH level indicates a HIGH acidity.)

*Lowest pH
(most acidic)*

*Highest pH
(least acidic)*

NAME: _____



Drinks That Destroy Teeth



Conclusions

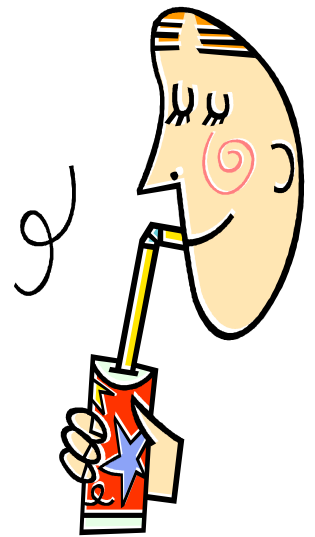


1. Which drink had the most sugar? _____
2. Which one had the least? _____
3. What effect does sugar have on your teeth? _____

4. Which drink was the MOST acidic? (Had the LOWEST pH)

5. Which one had was the LEAST acidic? (Had the HIGHEST pH)

6. What effect does acid have on your teeth? (HINT: What happened to the eggshell in the Disappearing Egg lab?)



7. Out of all the drinks tested, which one do you think will do the most damage to your teeth? _____ Explain why. _____

8. Which one do you think will do the least damage? _____
Explain why. _____

9. List at least three ways you could reduce the damage done to your teeth by the sugar and acid in drinks. _____ , _____
_____ , _____

