

Teacher Prep

Because this activity is long, we suggest completing it over two days. To do this, perform the activity to the point where students have placed their eggshells in their drinks for testing. Then, 3-5 hours later, remove the egg shells from the drinks and dry them yourself. Leaving the egg shells for 5 hours will make the corrosion from the drinks more obvious. When you have students next, allow them to make their observations.

Follow the steps below to prepare for student testing on Day 1. You should use the same liquids for each group.

1. Choose 3-4 drinks for students to test. Each group should have the same drinks. Examples include liquids kids like to drink such as; cola, lemon-lime soda, fruit punch sports drinks.
2. Use a shallow bowl for each liquid.
3. Label the containers and pour 1/2 cup of each liquid into containers.
4. If you use soda, let containers sit for at least 30 minutes before class to allow carbonation to escape from sodas.



Examples of Acidic Drinks



Soda



Juice



Sports Drink



Lemonade

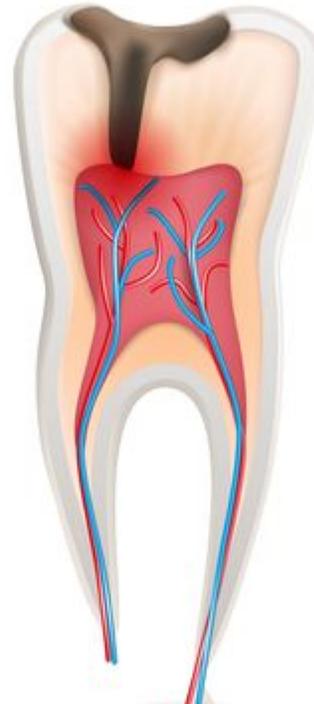
Tooth Decay



Healthy Tooth



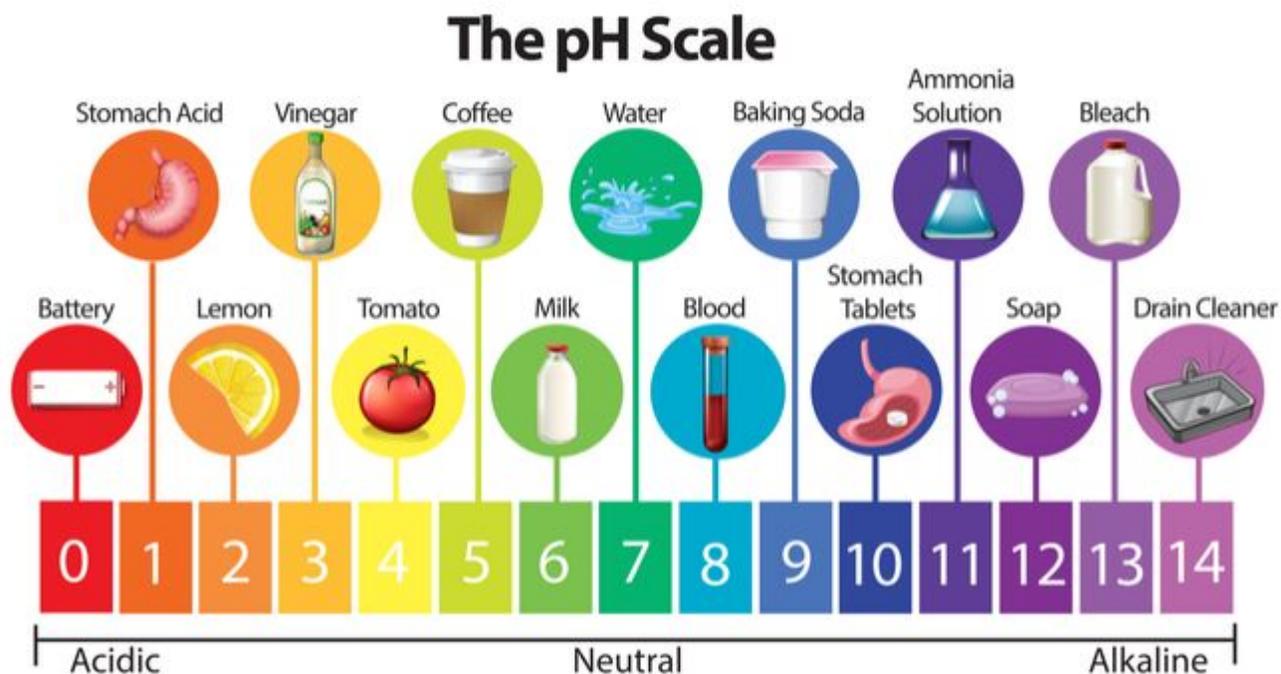
**Tooth with
early decay**



**Tooth with
severe decay**

pH

Your job is to think like a dentist and test different drinks to see which drinks are bad for your teeth. To do this, you are going to measure the pH of each drink! pH is a measure of how “acidic” something is. For example, pure water has a pH of 7. It is not acidic. Orange juice, which is acidic, has a pH of around 3. The lower the pH, the higher the acidity. Take a look at the pH scale below to see the pH of many common items.



Testing pH

Follow the steps below to test the pH of each sample provided by your teacher.

1. Obtain drinks and pH strips from your teachers.
2. Use one pH strip for each sample.
3. Quickly dip one pH strip into the first liquid for about 1/2 a second.
4. Blot any extra liquid on a paper towel.
5. Compare the pH strip to the chart that came with the pH strips to read the pH value of the liquid.
6. Record the name of the liquid and the pH in the table below.

Drink	pH

pH and Egg Shells

Follow the steps below to see how each liquid affects egg shells. Egg shells and tooth enamel are both composed of similar molecules.

Day 1:

- Based on your results of pH testing, predict which drinks you think will corrode the egg shells the most and why.

- Put half of an eggshell in each container of liquid. Gently set the egg shell in the liquid so that part of the egg shell is sticking out of the liquid. This will allow you to see the part of the egg shell that was in the liquid alongside the part of the egg shell that was not in the liquid.



- Write your initial observations in the data table on the next page. For example, did the egg shell bubble when you placed it in the liquid?
- Let the egg shells soak in the liquids for 3-5 hours. Your teacher will remove the egg shells from the liquid for you after that time.

Day 2:

- Observe each egg shell to see which ones had the most corrosion. Compare the part of each egg shell that was in the liquid to the part that was sticking out by:
 - Looking at the surface.
 - Feeling the surface with your fingers and fingernails.
 - Crushing the eggshell to see how easy it is to crush.
- Record your observations in the data table on the next page.

Data Table - Egg Shells

Record your results below:

Drink	Initial Observations	Observations after 3-5 hours soaking

Rank your results from least damaging to most damaging to teeth enamel:

Teacher Key

Record your results below:

Drink	Initial Observations	Observations after 3-5 hours soaking
Control	no reaction	no change
Cola	fizzes, white foam, small bubbles form on egg shell	part of egg that was in cola is smoother than the part that stuck out, turned brown and is easier to break apart when crushed with fingers
Lemon-Lime Soda	fizzes, white foam, small bubbles form on egg shell	part of egg that was in soda is smoother than the part that stuck out, and is a little easier to break apart when crushed with fingers, but not as easy as cola and sports drink
Fruit Punch Sports Drink	small bubbles form on egg shell	part of egg that was in sports drink is smoother than the part that stuck out, turned red and is easier to break apart when crushed with fingers

Rank your drinks from least to most damaging to teeth:

1. Water
2. Lemon-Lime Soda
3. Cola / Sports Drink