

The Disappearing Egg

Concept/Topic: Science, Health and Wellness

General Goals:

- Students will compare the acidic effect of liquids on an egg's shell
- Students will rank the acidity of the liquids
- Students will predict the effect of acidic beverages on teeth

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:

- Cooler or refrigerator
- Resource card (Provided in kit or as available as pdf)
- Lab sheet (Provided in kit or as available as pdf)
- For each group of students:
 - 5 hard boiled eggs
 - ½ cup (118 ml) 4% white vinegar
 - ½ cup (118 ml) milk
 - ½ cup (118 ml) sport drink – any variety
 - ½ cup (118 ml) soft drink – any variety
 - ½ cup (118 ml) water
 - Measuring cup
 - 5 glass or plastic containers
 - 1 sturdy paper plate
 - Marker or tape to label containers
 - Paper towels

Procedures:

1. Place students in small groups.
2. Have each group observe one of the eggs and record their observations. Students should include the color, texture, and mass (if possible) of the egg.
3. Students should also include the hardness of the egg. To do this, have students scrape the surface of the egg with their thumbnail. (CAUTION: Students do not want to BREAK the shell!) Student should record which one they think is harder – their nail or the shell.
4. Label the cups. Measure each liquid and pour it into the correct cup.
5. Place one egg in each cup.
6. Label the paper plate per group and place the cups on the plate. Store in the cooler or refrigerator for 24 hours.
7. Return the eggs to each group.
8. Have students observe each egg and record their findings. They should again include the color, texture, mass, and hardness of each egg.

Concluding the lesson:

1. Have students read “Drinks Destroy Teeth.” Discuss the effects of acid on the egg shells. Have student rank the liquids from most acidic to least acidic based on their observations.
2. Compare the egg shell to the enamel of a tooth. Have students predict how each drink might affect their teeth. (Remind students that vinegar is NOT a drink)
3. Have students choose which drinks are most beneficial for their teeth and explain why.

Variations:

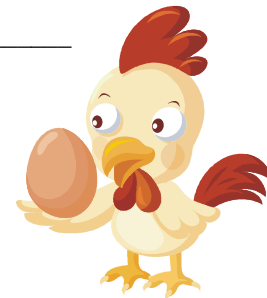
- Soak one egg in a fluoride solution (ACT or another fluoride rinse) to compare
- Using only vinegar, observe and record the effects on the egg at 10 minutes, 30 minutes, 2 hours, 4 hours, and 24 hours
- Measure the volume of the egg using the displacement method.

Resources:

- Visit www.drinksdestroyteeth.com for websites and downloads

NAME: _____

The Disappearing Egg



Observations of egg at beginning of experiment:

Draw a picture of your egg here.

Color:
Texture (What does it feel like?):
Hardness: The shell IS IS NOT harder than my fingernail. (Circle one)
Mass (Optional):
Other observations:

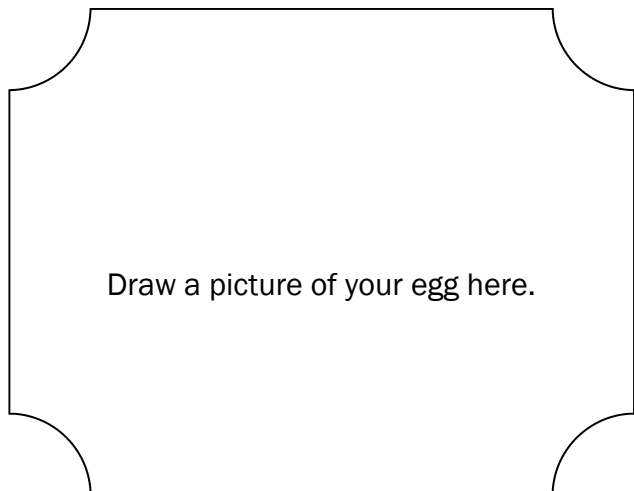
Observations of egg soaked in vinegar:

Color:
Texture (What does it feel like?):
Hardness: The shell IS IS NOT harder than my fingernail. (Circle one)
Mass (Optional):
Other observations:

Observations of egg soaked in milk:

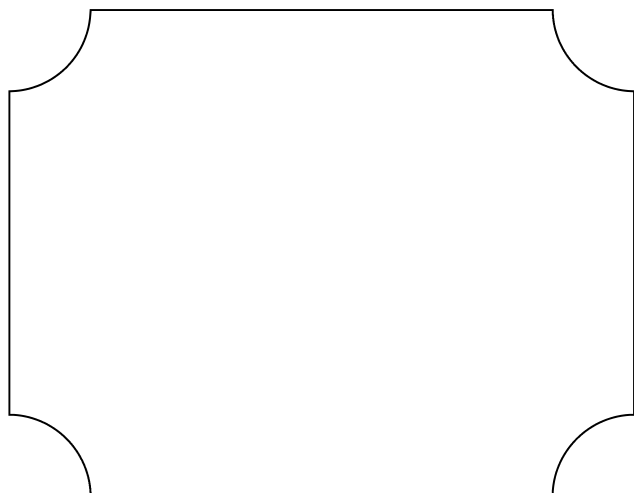
Color:
Texture (What does it feel like?):
Hardness: The shell IS IS NOT harder than my fingernail. (Circle one)
Mass (Optional):
Other observations:

Observations of egg soaked in sport drink:



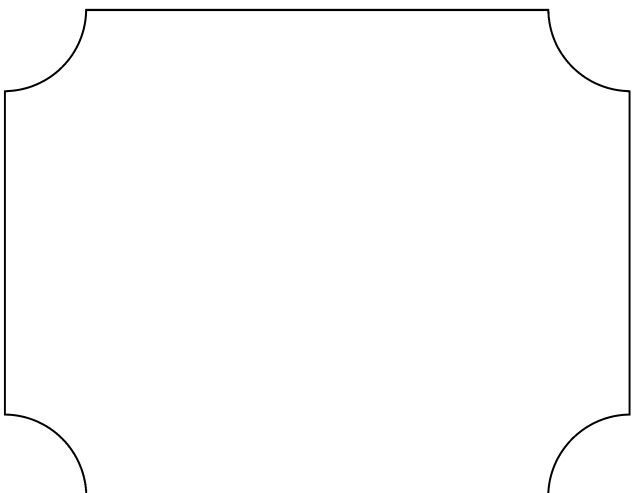
Color:
Texture (What does it feel like?):
Hardness: The shell IS IS NOT harder than my fingernail. (Circle one)
Mass (Optional):
Other observations:

Observations of egg soaked in soft drink:



Color:
Texture (What does it feel like?):
Hardness: The shell IS IS NOT harder than my fingernail. (Circle one)
Mass (Optional):
Other observations:

Observations of egg soaked in water:



Color:
Texture (What does it feel like?):
Hardness: The shell IS IS NOT harder than my fingernail. (Circle one)
Mass (Optional):
Other observations:



The Disappearing Egg

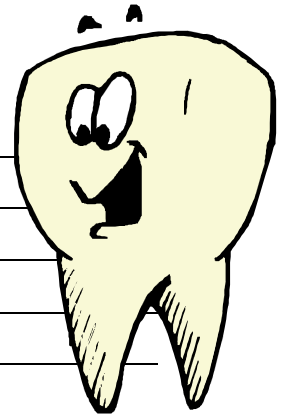
Conclusions...

1. Acids in liquids work to soften, or weaken, hard surfaces like eggshells. The stronger the acid, the softer the eggshell becomes.

Based on your observations, put the liquids in order from the MOST acidic to the LEAST acidic.

MOST:
LEAST:

2. The enamel of your tooth is similar to the egg's shell. What do you think happens to your teeth when you drink liquids that are acidic? Why?



3. Based on what happened to the eggshells in your experiment, which drinks do you think are BEST for your teeth? Why?

