

Title - **Food Chemistry (Acid/Base)**

By - Summer

Primary Subject - Science

Secondary Subjects -

Grade Level - 3-5

Science Concept: Food Chemistry (Introduction to Biochemistry) and Taste

Science Content Standards:

(MST standards)

- Standard 1: The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process.

- Standard 4: Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.

(Performance Standards) S1a, S5c, S8a

(Process Skills)

- observing,

- predicting

(Content Standards)

- Properties of objects and materials

- Chemical reactions

- Unifying Concepts

- Processes Science as Inquiry

Objectives:

- SWBAT (Students will be able to) compare different household items and distinguish their chemical properties

- SWBAT record their findings in a chart

- SWBAT compare their results to their predictions

- SWBAT classify chemicals into acid/base/neutral

- Students test various food chemicals found in the kitchen

- Students will be able to relate taste to a chemical's acid/base/neutral property

Water

Baking soda

Lemon Juice

Antacid

Salt

Aspirin

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Materials: CHEM tray/ egg carton, paper towel, plastic spoon, red cabbage juice or grape juice, eyedroppers/straws, ammonia, vinegar, water, vinegar, baking soda, lemon juice, antacid, salt, aspirin

Motivation:

- Students taste candy (Taste: Sour).
- Teacher relates it chemical property

Acids are usually sour; Bases usually bitter. But tasting is not a safe or accurate method to determine the presence of an acid or a base.

- Go over pH scale
- Teacher tells them the name of the activity is hidden in a secret message. Reveal message. And tell the students that red cabbage is an indicator. Have them guess what the message was written in.
- Then ask: How does an indicator help us figure out what is an acid, base or neutral?

Procedure:

- List the materials that they are going to test ask them for predictions as far as if they are acid, bases or neutral.
- Show how the indicator works. Putting vinegar in one and ammonia in other. No color change means (neutral). Display chart.
- Ask students why we bother testing water. (This is called a control)
- Give job assignments and distribute materials

Closure:

- Go over results.
- Ask why should we replicate experiments (more accuracy, substance might be contaminated)
- Point out this is the first step. Next would be identifying how much is present (concentration). Finally we would need to test its health effects.

Suggested Additional Activities: Taste, Neutralization reaction, Cooking in Class

Teacher Information:

Acids and Bases

Every chemical can be classified as an acid, base, neutral. Acids and bases are often food in foods, either naturally or artificially, but are usually very dilute and will not harm most people. Foods that are sour often contain one or more acids; those that taste bitter often contain bases.

Indicators

There are many chemicals called indicators whose color depends on the presence and strength of an acid or base. There are natural indicators such as red cabbage juice. Scientists often use a mixture of indicators in water and/or alcohol (called universal indicators) or indicators absorbed into paper, such as pH or litmus paper.

Color of Cabbage Juice

Acid/Base/ Neutral

Red/ Pink

Acid

Purple:

Neutral

Green/ Blue:

Base

Literature Integration:

- Children need Food by H. Undy
- Mmmm, Cookies by R. Munsch
- What happens to a hamburger by P. showers
- The food book by Goodheart-Wilcox
- Incredible Edible Science by N. Babbitt
- The Edible Pyramid by L. Leedy
- Slumps, Grunts, Snicker doodles: What colonial America ate and why? By L. Perl
- Ask About the world of food by A. Rocard
- We're making breakfast for mother by S. Neitzel
- Looking at Senses by D. Suzuki
- Gregory, the Terrible Eater by M. Shartmat
- My 5 Senses by Aki
- How do your senses work? By J. Tatchell

References: 50 Nifty Science Fair Projects by Carol Amato and Eric Ladizinsky (Cabbage Chemistry)

Biology Experiments for Children by Ethel Hanauer (Taste and areas of the tongue)

Chemicals, Health, Environment and Me (CHEM) by (Chemicals in the Kitchen)

Science Fun by D. Nevins

Looking at Senses by D. Suzuki

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