



Acid/Base Pre-Chemistry Lesson

Acid/Base

Grade Span	3-5 Grade
Time Span	50 minute class
Standards	<p>5th grade standards:</p> <ul style="list-style-type: none"> ● 5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment. ● 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. ● 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
Focus Question	What is an acid/base?
Overview	Students will do a simple experiment to become more familiar with what an acid is and what is a base?
Objectives	<p>Students will be able to:</p> <ul style="list-style-type: none"> ● Tell if a tested liquid is an acid. ● Tell if a tested liquid is a base.



<p>Materials Needed</p>	<p>Data Sheet (see at end of lesson plan) Safety goggles Clear container for cabbage juice Pan to boil cabbage in Clear container for each of your liquids pH scale for students to use (one for each group)</p> <p>RED Cabbage Water Household items, possible suggestions, but does not have to be limited to: Milk Vinegar Baking soda dissolved in water Tums dissolved in water Ammonia Soda Liquid soap (dissolved with a little water) Lemon juice</p>
<p>Vocabulary</p>	<p>Acid: are molecules that split apart in water and release hydrogen ions</p> <p>Base: are molecules that split when put in water and release hydroxide ions</p> <p>Indicator: af substances used to find out whether a substance is acidic or basic in nature</p>



<p>Teacher Prep</p>	<p>Acids and Bases Paperback – Rebecca Woodbury PH D (Author) (Book to read option)</p> <p>Teaching Children About Acid and Bases : Very good link with multiple acid/base ideas.</p> <p>Cabbage Juice Indicator : Very good link to show how to use an indicator.</p> <p>pH and Water USGS site</p> <p>The pH scale with some common examples NOAA</p> <p>pH scale for students to use</p> <p>Boil red cabbage and water for 30 minutes. Place in a container. Let cool.</p> <p>Find household liquid items. Place liquid items in containers.</p>
<p>Background</p>	<p>How to Explain Acids and Bases to Kids: 10 Steps (with Pictures)</p> <p>Red Cabbage Indicator Colors: Chemistry Experiments for Kids to do at Home</p> <p>What are Acids and Bases?</p> <p>Acids and Bases - Chemistry for Kids/ Mocomi</p>



Procedure

Engage:

Teacher demonstration:

Place vinegar in one clear container and bleach in another. Pour a bit of cabbage juice into each of the containers and observe. Have the students work in groups to discuss what they think happened. When finished, come back together and talk.

Cabbage juice is an indicator. Explain that one liquid was vinegar and the other was ammonia. The vinegar turned the cabbage juice a pink color which is on the acidic side of the pH scale. Show students the pH scale. Explain that the ammonia turned a greenish color and is on the basic side. Again show on the pH scale.

Explore:

Break students into groups of 2-4. Have students put on their safety glasses. Give each group of liquids, some cabbage juice for their indicator, a pH scale, and a data sheet for students to fill in.(see below) Have students pour their cabbage juice into each of their containers and have students fill out the chart as to whether the liquid is an acid or a base.

Explanation:

Come back together and discuss what students found out.

You could show this video:

[*Acid and Base/Acids, Bases & pH*](#)

Extension:

[*pH Scale: Basics phet Simulations*](#)



Wrap-Up

Evaluate:

Formative Assessment: (Possible Answers)

Data Table For Students

Liquid Being Tested	What color did it turn?	Acid or Base?
milk	pink	acid
Baking soda	green	basic
tums	green	basic
soda	pink	acid
Liquid soap	green/blue	basic
Lemon juice	pink	acid



Data Table

Liquid Being Tested	What color did it turn?	Acid or Base?



pH	Examples of solutions
0	Battery acid, strong hydrofluoric acid
1	Hydrochloric acid secreted by stomach lining
2	Lemon juice, gastric acid, vinegar
3	Grapefruit juice, orange juice, soda
4	Tomato juice, acid rain
5	Soft drinking water, black coffee
6	Urine, saliva
7	"Pure" water
8	Sea water
9	Baking soda
10	Great Salt Lake, milk of magnesia
11	Ammonia solution
12	Soapy water
13	Bleach, oven cleaner
14	Liquid drain cleaner