

Mindful SciEnceArt Studios, LLC

A Colorful Explosion- Acids vs Bases

Detailed Description of Workshop (Grade 3-5 and Middle School)

To conduct an investigation to determine whether the mixture of two or more substances results in a new substance Analyze and interpret the properties of a substance before and after the substances interact; determine if a chemical reaction has occurred. Using the same chemical reaction to create a cool piece of visual artwork.

Objective(s) and/or Standards:

Next Generation Science Standards (NGSS): 5-PSI-2; 5-PSI-4; MS-PSI-2

Student Learning Objectives:

- *Students will learn the difference between acids and bases found around the house.*
- *Students will begin to recognize cause and effect.*
- *Exploring chemical reactions.*
- *Mixing of colors; creating new ones.*
- *Fine motor skills*
- *Watch the Magic and Have Fun!*

Materials Needed:

Safety 1st- GOGGLE!!

DIY Litmus Strips	Session 1	Session 2	Session 3
Red Cabbage	Hydrogen Peroxide	Lemon	Food Coloring or liquid watercolor
Water	Borax Soap (KOH or NaOH)	Baking Soda (Table Spoon)	Vinegar
Blender or Pot	Baking Soda (NaHCO_3)	Cup or small bowl	Baking Soda
Strainer	Milk	Dish Liquid	Water
Bowl	Lemon and/or Lime juice	Craft Stick	Cardstock
	pipettes or eyedropper	Cookie Sheet	Paintbrush
	Ammonia		Dish Liquid
	Vinger		Cookie sheet or tin
	Water		

Creative

Learning

Rapid

Response



Students will be guided through a pre-recorded video session on how to prepare litmus strips.

** Litmus strips must be create a hour or more before Session #1.*

Litmus Strips (Indicators) allow us to see if a chemical reaction has occurred by changing a physical characteristic (color, smell, temperature, etc.). Red cabbage juice is a great indicator of changes in pH!

1. Chop up half a red cabbage and place it in a pot with 6-8 cups of water.
2. Heat the water and cabbage on a stove until the water is just about to boil.
3. Strain the cabbage from the water. You'll notice that the water has turned purple.
4. You'll need this purple water for the next steps. Taking a plain piece of white paper, dip in water.
5. Allow about an hour for paper to dry.
6. Cut in strips.

Red Cabbage Color changes with pH



SESSION OUTLINE (#1): [Compare & Contrast](#)

What do you know about PH levels?

What are acids and bases?

Objective of Session or Activity:

- Compare various household acids and bases.
 - Using previously made litmus strips students will test solutions, while trying to predict which will be an acid, neutral, or base (Alkaline). Students will also compare the PH level to the scale below.

SESSION OUTLINE (#2): Bubbling Lemon Lava

Reflection from Session #1 : 5 mins

What do you remember about acids and bases?

What are you excited about based on the theme?

What a chemical reaction?

Objective of Session: 20 min

- Understanding what a chemical reaction is.
 - Using a citric acid found in fruit juice (lemon, lime, or orange), dish liquid and baking soda students will make a mini eruption.
- ~ If time allows I will blow up a balloon using the same principal ~

SESSION OUTLINE (#3): Sodium Bicarbonate Visual Artwork

Reflection from Session #2: 5 min

What do you remember about chemical reactions?

What is Sodium Bicarbonate? What are you excited about based on the theme?

Objective of Session: 20 min

- Cause and effect of mixing a acid and base.
 - Students will explore mixing and creating new colors using base (baking soda), neutral (food color) and acid (vinger). This activity is meant to be calming, reflecting on what you have learned about chemical reactions, acids vs alkaline solutions.

Reflection/Closing:

After the last sessions, I would like to hold a Q&A to give the students the opportunity to give feedback.

Take Away!

Grow Crystal Instructions:

- ☐ 1/4 cup Baking Soda
- ☐ 2 cups Distilled Water (less impurities than tap water) Tap water okay tho!
- ☐ 2 8-Ounce Jars
- ☐ 1 ft of Yarn
- ☐ 2 Paper Clips
- ☐ Food Color (optional)

