

Experimenting with Acids and Bases

Experiment Activity

Materials (per group)

10 plastic medicine cups, 1 oz	safety goggles
baking soda (to make baking soda solution)	marker
white vinegar	masking tape
plastic dropper	red cabbage juice
9 plastic stirrers	distilled water
milk of magnesia	lemon juice
Epsom salt (to make Epsom salt solution)	clear cleaning solution
clear cleaning solution	carbonated water
	tap water

Material Substitutions

Other household substances that are clear, and clear carbonated soft drinks may be used in addition to the materials listed.

Advance Prep

- Make baking soda solution by adding five heaping spoonfuls of baking soda to 100 mL of water.
- Next, prepare the Epsom Salt solution by adding one heaping spoonful of Epsom Salt to 100 mL of water.
- The cabbage juice is prepared by cooking 1/2 head of red cabbage in 2 quarts of water. Cook the cabbage in a stainless steel pan. Be sure there is no soap residue in the pan.
- The color of the cabbage juice may vary from reddish-purple to blue, but will still work.

Safety Note

Remind students not to taste any of the test materials.

Activity Rubrics

Scoring Key

4 correct, complete, detailed

3 partially correct, complete, detailed

2 partially correct, partially complete, lacks some detail

1 incorrect or incomplete, needs assistance

Experiment Activity

Experimenting with Acids and Bases

Scoring Criteria

Student made a hypothesis about using an indicator to identify acids and bases.

Student followed instructions to find out which substances are acids and which are bases.

Student identified and controlled variables.

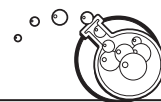
Student collected data in a chart and interpreted the results to determine which substances are acids and which are bases.

Student communicated by stating conclusion.

Score

total points

% equivalent



Experimenting with Acids and Bases

State the Problem

Which household substances are acids and which are bases?

Formulate Your Hypothesis

If you add red cabbage juice to different household substances, which substances will change cabbage juice to a color that indicates an acid? Which will change to a color that indicates a base? Write your **hypothesis**.

Identify and Control the Variables

The distilled water is your control. It is not acidic or basic. The kind of substance you test is the variable you can change.

Test Your Hypothesis

4–10. Record your observations in the chart.

Collect Your Data

Test substance	Color after adding indicator	Acid or base?
Baking soda solution		base
Vinegar		acid
Distilled water		neutral
Lemon juice		
Carbonated water		
Milk of magnesia		
Epsom salt solution		
Cleaning solution		
Tap water		

Interpret Your Data

Complete your chart by filling in the last column.

Compare Your Results and Hypothesis

Describe how you were able to tell which substances were acids and which were bases. How do your results compare with your hypothesis for each substance?

State Your Conclusion

Explain how you used the color change of the indicator in a known acid, base, and a neutral substance to determine whether other substances were acids or bases. Tell which variables you controlled during the experiment. How would you change the experiment if you were going to repeat it?

Inquire Further

How can you use cabbage juice to develop a pH scale? Develop a plan to answer this or other questions you may have.

Self-Assessment Checklist	
I made a hypothesis about using an indicator to identify acids and bases.	_____
I followed instructions to find out which substances are acids and which are bases.	_____
I identified and controlled variables .	_____
I collected my data in a chart and interpreted the results to determine which substances are acids and which are bases.	_____
I communicated by stating my conclusion.	_____



Notes for Home Your child **experimented** to see which household substances are acids and bases.

Home Activity: Examine the ingredients of different substances in your home and ask your child to make a hypothesis about whether they are acids or bases.