



Black Bean Indicator

Use a natural indicator to test acids and bases!

Activity Guide

Try This!

1. Using a pipette, put a few drops of the acid in a well of your well plate.
2. Add a few drops of black bean indicator. What color does the indicator turn?
3. Now try the base and the water. Does the indicator change color?

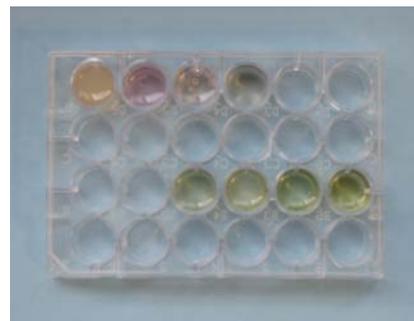
What's Going On?

Black beans are a natural pH indicator. An *indicator* is a chemical that turns different colors when it comes into contact with an acid or a base.

Black bean indicator starts out a grayish-purple color. It turns pink when it comes into contact with an acid, and green when it comes into contact with a base. It stays purple when it comes into contact with water, because water is neutral.

Now Try This!

1. Now you can try other household chemicals, and find out whether they're acids or bases. Choose a test product and predict (guess) if it's an acid or base.
2. Use a pipette to put a few drops of the solution in a well.
3. Add a few drops of black bean indicator. What color did it turn? Did you guess correctly?
4. Keep trying different chemicals. Does the indicator always turn the same color pink or green?



What's Going On?

The black bean indicator lets you compare how strong or weak different acids and bases are. It turns a deeper color for stronger chemicals, and a paler color for weaker chemicals.

	Lemon juice	Vinegar	Seltzer	Water	Baking soda	Detergent	Washing soda	Ammonia cleaner
Black bean indicator	pink	pink	pale pink	purple	pale green	pale green	green	green
pH	2	3	5	7	8	10	12	13

Learning Objectives

- An indicator is a chemical that turns different colors when it comes into contact with an acid or a base.
- The deeper the color of the black bean indicator, the stronger the household chemical.

Materials

- Black bean indicator (*Requires advance preparation; see below*)
- 24-well plates
- Transfer pipettes or eyedroppers
- Labeled cups of known chemicals:
 - Acid: white vinegar
 - Base: saturated solution of washing soda in water
 - Water
- Labeled cups of test solutions:
 - Seltzer
 - Lemon juice
 - Saturated solution of baking soda
 - Saturated solution of dishwashing detergent
 - Ammonia-based cleaner
 - Light-colored sports drink, like Gatorade
 - Other clear, light-colored liquids
- Safety glasses



Advance preparation:

- Dry black beans
 - Bowl
 - Isopropyl alcohol
 - Hot water
1. Soak black beans in a 50-50 mixture of hot water and isopropyl alcohol for 30-60 minutes. (The alcohol prevents the bean mixture from spoiling. If you don't plan to keep it, you can soak the beans in plain hot water.)
 2. Drain into a container, saving the liquid and discarding the beans. The liquid is your indicator.

Credits

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