

Operation ESPIONAGE



Today, your mission is to write with invisible ink and figure out the best way to reveal a secret message.

1 Get what You need.

- 1 tsp. of baking soda • Water • 3 bowls, filled halfway with purple grape juice, grape juice concentrate, and cranberry juice, each labeled
- 1 bowl filled halfway with water and a drop of red and blue food coloring, labeled “colored water” • 1 spoon • Cotton swabs • Cotton balls
- Cup • Paper • Pencil • Paper towels

2 Mix the ingredients.

Combine 1 tsp. of baking soda and 1 tsp. of water in a cup and stir. You’ve just made invisible ink!

3 Write with invisible ink.

- Fold a sheet of paper into four equal parts. Then unfold.
- Dip a cotton swab into the invisible ink mixture and use it like a pen to write a secret message on each of the four sections. Write something short (like your initials or “RUFF”), since there’s not much room.
- Let the paper dry completely, which takes about 10 minutes. You may need to fan it in the air to help it along. What happens to your messages as they dry?

4 Reveal the secret message!

- While your paper dries, line up the bowls filled with different kinds of liquids.
- On each section of paper, test a different liquid. Starting with one section, dip your cotton ball in one of the juices. Squeeze out the excess juice. Gently pat (don’t rub) the cotton over one of the sections of paper.
- Did your message appear?
- Test each liquid on the three remaining sections of your paper. Use a new cotton ball each time. Does one liquid work better than the others to reveal the hidden message? What color is the message?

chew on This!

When you patted the juice on the dried baking soda, you caused a chemical reaction! Baking soda is what chemists call a base. The juices are acids. When a base and an acid come in contact, a chemical reaction can occur. Some chemical reactions result in a change in color, which is what happened here. The chemical reaction turned the invisible message bluish-green, and that’s why you could read it!

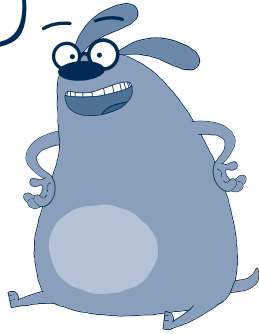


Cool science Jobs!

Like causing chemical reactions? Then you might love one of these jobs.

Pyrotechnical Chemist

How about a flashy career that involves playing with fire? A pyrotechnical chemist has the job of creating fireworks. It takes just the right combination of chemicals to make these dazzling bursts of color. Pyrotechnical chemists also create stunning special effects for rock concerts and movies.



Pharmaceutical Chemist

What would it be like to have a job that saves lives and cures diseases? That's what pharmaceutical chemists do—they develop medicines that help people live healthier, happier, longer lives. Vaccines and miracle drugs like penicillin fight deadly diseases and have changed the world for the better. Chemists are the heroes behind these amazing advances.



Watch the related FETCH! episode, "Mission Improbable," on PBS KIDS GO! (check local listings) or visit the FETCH! Web site at pbskidsgo.org/fetch.



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Fold

Fetch!

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Secret agents from Washington just gave me the bad news! My missing dog collar has fallen into the clutches of a notorious canine spy named Kennelkov, who's smuggling secret messages inside the collar! A double agent intercepted one of the messages—but it's blank. Could it be written with invisible ink? See if you can figure out how to make the hidden message appear. National security—and the fate of my dog collar—depend on it!

