

COPPER cleanup



In this crazy cleaning experiment, can you make pennies sparkle with . . . ketchup? . . . baking soda? . . . or cola?

1 Get what You need.

- 7 dull pennies • 6 cups • a spoon • 3 spoonfuls of vinegar • 3 spoonfuls of cola • 3 spoonfuls of lemon juice • 2 spoonfuls of baking soda and some water • 3 spoonfuls of household cleaner with ammonia • 3 spoonfuls of ketchup • paper towels • bowl or cup of water for rinsing • 6 strips of pH paper • data sheet (see below)

2 Add Pennies.

Line up the cups in front of the data sheet and put a penny in each cup. Place the extra penny on the sheet—it's known as a "control." You'll use it later to compare with the others.

3 Add liquids.

In each cup, put enough of each liquid to cover the penny: household cleaner, baking soda and water, vinegar, lemon juice, cola, and ketchup.

4 Make a Prediction.

Let the pennies sit for at least five minutes. Which liquids do you think will shine the pennies the best?

5 Test for more information.

While you wait, find out more about your liquids. Using pH paper, discover if each is an acid or a base.

- Dip one end of a pH paper strip in the first cup: If it turns reddish, it's an acid; if it turns bluish-green, it's a base.
- Place the strip on your data sheet and write down whether the liquid is an acid or a base.
- Repeat these steps with each liquid and a fresh strip of pH paper.

6 Check Pennies.

Use a spoon to remove the penny from the first cup. Rinse it in water and dry it. Then place it on the data sheet. Repeat with the other pennies. Keep your hands as clean as possible.

7 Draw conclusions.

Look at your control penny and compare it to the others. How do the other pennies look in comparison? Which liquids shined the pennies the best? Can you tell if one type of liquid—acid or base—did the best job?

Chew on This!

Pennies are made with copper. After they've been exposed to air for a while, a dull coating of copper and oxygen, called copper oxide, forms on them. When some acids (like the ones you used) come in contact with copper, there's a chemical reaction that dissolves the copper oxide, making the penny shiny again. But the bases you tested left the pennies looking dull. Bases don't cause a chemical reaction with copper (or any metal), so they can't dissolve copper oxide.

safety Tip

Keep mixtures away from clothes, eyes, and mouth. No tasting!

	Control	Vinegar	Cola	Lemon Juice	Baking Soda	Household Cleaner	Ketchup
pH of liquid							
Add to Pennies							
Penny Look After							

Data sheet

Use separate data sheet to record your observations.

Dig Deeper

Speed cleaning. Want to shine your pennies even faster? Add a spoonful of salt to vinegar or lemon juice. Swirl a penny around in the mix and watch it shine up before your eyes.

Copper coating. Use copper from pennies to coat another object. Put about ten dull pennies in a cup with a vinegar and salt mix. After a few minutes, remove the pennies, but keep the liquid. Add a steel nail or paper clip. Wait about 10 minutes to a half hour. The copper oxide from the pennies will transfer to the nail or paper clip, changing its color.

Did You Know?

Pennies haven't been made of pure copper since 1857. Today, most are made of zinc with a copper coating. Since 2007, it has cost more than a penny to make a penny—\$1.00 in pennies is now made from \$1.67 in metals.



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Fold

Fetch!

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Ahoy, mateys! I be wantin' to play pirate, but alas, me only treasure is a handful o' dull, pitiful pennies—an insult to a swashbuckling seadog like meself! Yer cap'n commands ye to shine 'em up to look like gold doubloons. Make haste, or I'll have ye walkin' the plank!

GOOO
FETCH!





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Name: _____

	Vinegar	Baking Soda & Water	Cola	Lemon Juice	Household Cleaner	Ketchup
pH strip (put here)						
Acid or Base?						
Penny (put here)						

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Place dull penny here for comparison.
This is called the control.