SCIENCE EXPERIMENT!

Penny Chemistry Magic!

The average U.S. coin is in circulation for 30 years, so it's no surprise that coins get dirty! Pennies, with their copper exterior, often look especially tarnished. How can we use chemistry to clean them and change their color?

CAN YOU CLEAN & THEN TURN A PENNY GREEN ?

Dr. Nicole Grimes

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PENNY CHALLENGE!

MATERIALS:

A few old (pennies (pre 1982)
White vinegar
Dish-washing or liquid soap
Table salt
2 Non-metal dishes or bowls
Paper towels

INSTRUCTIONS:

1. Pour liquid/dish-washing soap in one bowl and place 3-5 pennies in it.
2. In a second bowl, pour the vinegar into the bowl and add the salt. Stir it up. Put about 3-5 pennies into the bowl and count to 20 slowly.
3. Take out the pennies in both and rinse them out in some water.
4. Compare the difference! Which liquid mixture cleaned the pennies and made them shiny?

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PENNY CHALLENGE!

INSTRUCTIONS continued:

5. Clean the bowl that had the liquid soap to move on to the next color change.
6. Fold a paper towel so that it fits inside your dish.
7. Place a few different pennies on top of the paper towel.
8.. Pour vinegar over the pennies so that the paper towel is fully saturated.
9. Leave this experiment out for a few days, adding more vinegar as the paper towel begins to dry out and flipping the pennies over occasionally. The longer you wait, the more green they will become!

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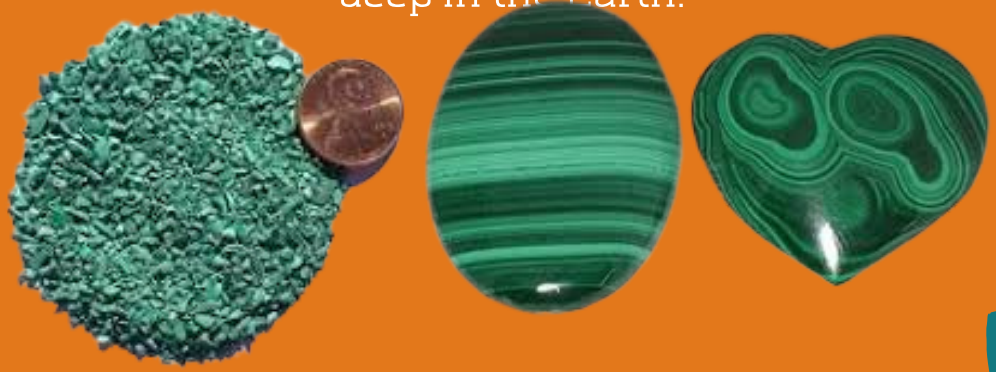
How does it Work?

Pre-1982 pennies are used in this experiment since they were made of pure copper. U.S. pennies made after 1982 are made of a mixture of copper and zinc. These pennies as they have less copper, wouldn't turn green as easily.

Here's why!

There is some pretty fancy chemistry going on in that little vinegar bowl of yours! Vinegar is an acid, and the acid in it reacts with the table salt to remove the outer coating of an old penny. This outer coating is copper oxide which was making your pennies "dull." It forms over time on the surface of a penny as it is exposed to air and reacts with it.

In the second part, when you place the pennies on the paper towel, over time, the pennies will turn greenish-blue A new substance (a chemical) called **malachite** forms on your pennies. Malachite is a popular mineral with an intense green color and beautiful bands/streaks It forms naturally deep in the Earth.



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Follow ups!

TRY THESE TOO!

1. Will other acids (like lemon juice or orange juice) work as well? Repeat the experiment and use lime or lemon juice instead to try "clean" your pennies. Compare the pennies cleaned using vinegar.

2. Save the vinegar used to clean your pennies. Place one or two nuts and bolts in the vinegar and watch! They may become COPPER in color!

HOW? The vinegar removed some of the copper from the pennies, if there is enough copper dissolved in the vinegar, the copper will become attracted by to the metal in the nuts and bolts and they will take on a new copper color!

VERY COOL!

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