

Copper Caper

AT A GLANCE:

Watch old pennies turn bright and shiny-right before your eyes!

STUDENTS WILL BE ABLE TO:

Observe the solution of vinegar and salt dissolve the copper-oxide layer from pennies.

BACKGROUND INFORMATION:

The pennies look dull and dirty because they are covered in copper oxide.



PRINCIPLES:

Everything around you is made of tiny particles called atoms. But sometimes atoms of different kinds join to make molecules. Copper atoms can combine with oxygen atoms from the air to make a molecule called copper oxide.

DETAILED EXPLANATION:

Copper oxide dissolves in a mixture of weak acid and table salt- and vinegar is an acid. You could also clean pennies with salt and lemon juice or orange juice, because those juices are acids, too.

When the pennies are left unrinsed after exposure to salt, the copper oxide layer quickly develops on the surface again.

MATERIALS:

- 20 dull, dirty pennies
- $\frac{1}{4}$ cup white vinegar
- 1 teaspoon salt
- A clear, shallow bowl (not metal)
- Paper towels
- Variety of cleaners to try, Hot Sauce, Ketchup, etc.



PROCEDURE:

1. Put salt and vinegar in bowl. Stir until salt dissolves.
2. Dip one penny halfway into the liquid. Hold it there for about 10 seconds, and then pull it out. What do you see?
3. Dump all the pennies into the liquid. You can watch them change for the first few seconds. After that you won't see anything happen.
4. After 5 minutes take half the pennies out of the liquid. Put them on a paper towel to dry.

5. Take the rest of the pennies out of the liquid. Rinse them really well under running water, and put them on a paper towel to dry. Write “rinsed” on the second paper towel.
6. Try letting different pennies sit in different kitchen material for a few seconds and see what cleaned best.

TRY THIS:

- Soak a steel nail in the salt and vinegar solution along with the pennies. Let it sit for about 10 minutes. What happens to the nail?
- Add more salt to the mixture. Does this change your results at all?

INTEGRATE:

- Have students practice their table-making and data-recording skills by having them design tables to keep track of their results.
- Have students time their experiments and compare results.

