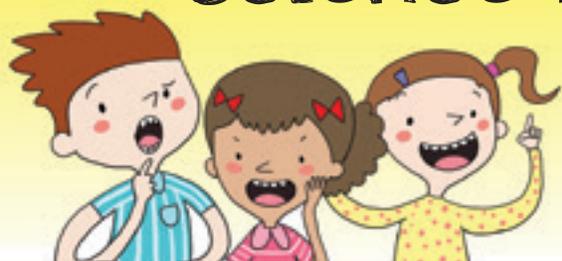


Science Kids Explore



COPPER!®

MAKING COPPER-COLORED NAILS AND SHINY PENNIES

What You Need

- One glass jar, such as a mason jar.
- 25 dirty pennies
- 1 nail with iron in it
- $\frac{1}{4}$ tsp salt
- $\frac{1}{2}$ c vinegar
- Baking soda

If you want, you can substitute a screw for the nail as long as the screw has iron. Steel nails and screws will work, because steel is an alloy made primarily of iron.

The Procedure

1. Pour vinegar into the glass jar.
2. Add salt and mix the two together.
3. Add the pennies to the vinegar and salt solution.
4. Let the pennies soak in the solution.
5. While the pennies are soaking, put some baking soda on a sponge or a cloth and then clean the nail.
6. Rinse the nail thoroughly after you have cleaned it.
7. Put the clean nail into the solution.
8. Soak the pennies and the nail for 15 minutes.
9. Remove the pennies and the nail from the solution.

What You Should See

- The pennies should look like new.
- The iron nail should have a coating of copper on it.

What Happened

The vinegar and salt solution strips some copper from the pennies, and the copper is transferred to the surface of the nail.

Why This Experiment Works

- When you put the pennies in the salt and vinegar solution, positively charged copper ions come off the pennies and into the solution.
- When you put the nail in the salt and vinegar solution, the solution dissolves some positively charged iron and oxides on the nail's surface. What's left is a negative charge on the nail's surface.
- Opposite charges attract, but the solution has two different kinds of positive ions: copper ones and iron ones. The charge on the copper ions is stronger than the charge on the iron ions, so they bond with the nail and form a coating made of copper.
- The vinegar has hydrogen ions in it, which reacts with the metal ions and the oxides to produce hydrogen gas. The gas bubbles up from the surface of the nail. ■

