



Who says all the fun has to happen at The Tech Interactive? This fun chemistry activity can be run with basic household chemicals and opens the door to all kinds of exploration and experimentation.

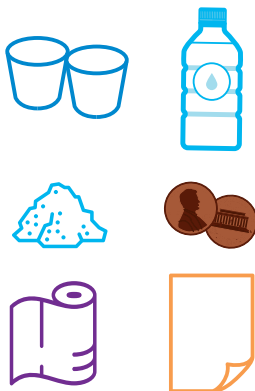


Introduction

This activity is a great introduction to basic chemical reactions, experiments, and the scientific process. We love this activity because there is so much to explore and discuss, and additional experiments to keep the fun going!

Materials

- 10 small paper or plastic cups, Dixie cups work great!
- Water
- White vinegar
- Salt
- 10 pennies (pre-1982 work best)
- Paper or fabric towels for accidental spills
- [Drying worksheet](#) (page 4)
- [Observation worksheet](#) (page 5)



Subject:
Chemistry

Ages:
8-13

Time:
30 minutes of set-up; five days of observation

Key concepts:
Chemical reaction,
oxidation reaction, acids



Lab Connection:
[Chemicals](#)
[of Innovation](#)

Set up

Your 'science lab' will be any flat space that won't mind a little vinegar being spilled on it — kitchen tables and counters work great! The experiment then needs to be left out for five days.

Label 5 of your small cups:

- vinegar + no salt
- vinegar + $\frac{1}{4}$ tsp. salt
- vinegar + $\frac{1}{2}$ tsp. salt
- vinegar + $\frac{3}{4}$ tsp. salt
- vinegar + 1 tsp salt

Add 1 tablespoon of vinegar and the labeled amount of salt to each cup. Gently stir to dissolve.

Label the other 5 cups H₂O, and add 2 tablespoons of water (to be used for rinsing).

All set, let's go! Initial Experiment

1. Add two pennies to each vinegar/salt cup and let them soak for 5 minutes.
2. While soaking, make initial hypotheses — what do you think will happen? Then observe the pennies and record or discuss your observations.
3. After 5 minutes, take **one** penny out of **each** cup and put it on the Drying Worksheet in the corresponding square (not rinsed).
4. Take the remaining penny out of each vinegar cup and place in its own cup of rinse water. You may want to keep the vinegar cups for the nail experiment below.
5. Rinse for 30 seconds, then place each penny on the [Drying Worksheet](#) in the corresponding square (rinsed with water). **All done! For now...**
6. Let the pennies sit for at least 5 days. What might happen? What do you think will be the difference between the rinsed pennies and the unrinsed pennies over time? Each day, check back and record your observations on your [Observation Worksheet](#).

Reflect

- What did you notice happening to the pennies?
- When did you start to notice this?
- Which pennies show more evidence of oxidation? Why might that be?



Lab Connection

Visiting the Tech on a Field Trip? Sign up for one of our Science or Innovation Labs. This activity works well before or after our Chemicals of Innovation Lab. Learn more at thetech.org/sciencelabs.



The Statue of Liberty is made of copper, but why does it look green?

Copper changes color when it is oxidized. Oxidized means that the copper atoms in the object react with oxygen atoms in the air. The oxygen atoms bond with the copper atoms and the copper atoms lose some of their electrons to the oxygen when they bond.

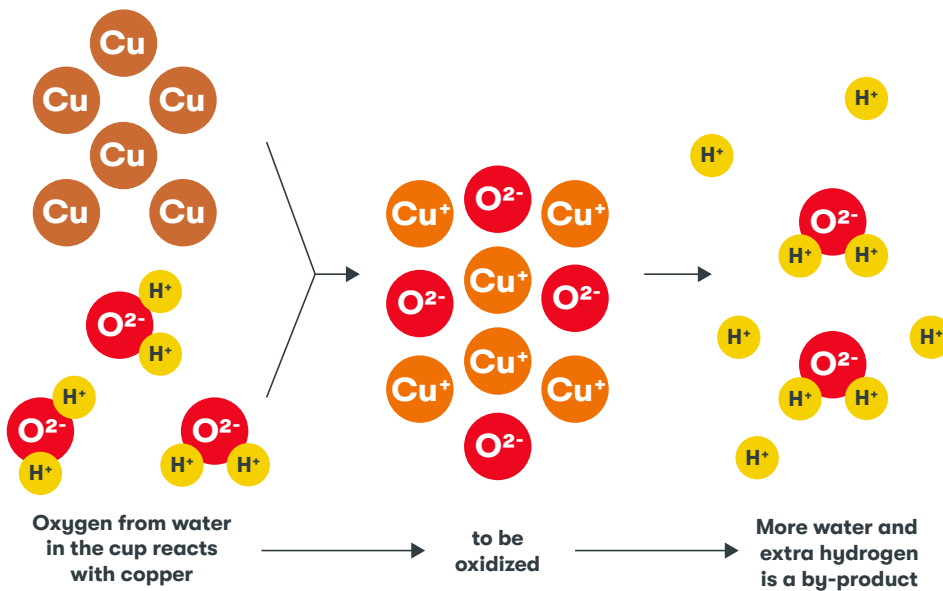
What's happening?

Copper can change to two colors when oxidized. Oxidized means that the copper atoms in the object react with oxygen atoms in the air.

- When copper turns dark-brown or dirty looking, that means the copper was oxidized by just oxygen.
- When copper turns green-blue, that means the copper was oxidized by oxygen and chlorine (often found in salt). This oxidation reaction creates a different compound called malachite, which is green-blue in color.

Oxidation reaction:

A chemical reaction that results in a compound losing electrons and bonding with oxygen.



Want more activities?

Create Copper Coated Nails

Grab those used vinegar solutions and 5 steel nails. Add a steel nail into each cup and wait about 15 to 20 minutes. What do you observe happening? Why?

Cleaning Oxidized Pennies

Now that the pennies are oxidized, try experimenting with removing the patina, the oxidized layer you just created. Can you reverse the reaction?











- Grab another set of cups or rinse out the old ones.
- Select several different combinations of salt and acid solutions such as cola, lemon juice, vinegar, or orange juice. Get creative! What other liquids around the house could you try?
- Try running the experiment just like you did with the vinegar solutions, with two pennies in each cup and rinse cups of water. Which solution is best at cleaning the pennies? What happens if you don't rinse the solution again? What do you observe? What do you think is happening?



The Tech
Interactive
at Home

thetech.org/athome



	Vinegar + no salt	Vinegar + ¼ tsp. salt	Vinegar + ½ tsp. salt	Vinegar + ¾ tsp. salt	Vinegar + 1 tsp. salt
Rinsed with water					
Not rinsed					

		Day 1	Day 2	Day 3	Day 4	Day 5
Vinegar + no salt	Rinsed					
	Not rinsed					
Vinegar + ¼ tsp. salt	Rinsed					
	Not rinsed					
Vinegar + ½ tsp. salt	Rinsed					
	Not rinsed					
Vinegar + ¾ tsp. salt	Rinsed					
	Not rinsed					
Vinegar + 1 tsp. salt	Rinsed					
	Not rinsed					