

# Polishing Pennies

How can you make an old penny shine again?

## What You Need

- 6 old, dull pennies
- 5 paper cups
- lemon juice
- milk
- cola
- apple juice
- water
- 5 plastic spoons
- paper towel



## Engineering Scoop

A new penny is partly made from bright, shiny **copper**. But after a while, it loses its shine. Why? Because the **copper mixes with oxygen** in the air and makes a coating of **copper oxide**. When you put a penny in **lemon juice**, the dull coating of copper oxide goes away. That's because lemon juice is an **acid**. Acids can **dissolve** copper oxide. Which other **liquids** did you find make a penny shiny?

**1 Put** a penny in each cup.

**2 Pour** some lemon juice into the first cup. Make sure that the penny is completely **covered**.

**3 Wait** a few minutes. Then use a spoon to **remove** the penny. What does it **look** like? **Record** your observations on the chart in the box under "lemon juice."

**4 Rub** the penny on a paper towel. **What happens?**

**5 Try it again** using the other liquids! To one cup add **milk**. To the next cup add **cola**. To the next cup add **apple juice**, and to the last cup add **water**. Use the **same amount** of each liquid.

**6 Wait** about 5 minutes. Then take a **look**. Which pennies are **shiny**? Which liquids make the pennies shine the **most**?

Sent in by Adriana F.  
of Prescott, AZ



**Keep experimenting** to find the best way to polish a penny! What happens if you use a **different liquid**, like soap or vinegar? (Ask an adult to help you choose a liquid to test.) Or, what happens if you put a penny in a liquid for a **longer period of time**, like a day or a week? Choose one thing to change (that's the **variable**) and make a **prediction**. Then **test it** and **send** your results to ZOOM at [pbskids.org/zoom/sendit](http://pbskids.org/zoom/sendit)

## OBSERVATIONS

Lemon juice	Milk	Cola	Apple juice	Water
⋮	⋮	⋮	⋮	⋮

# Polishing Pennies

Engineer's Notebook

## My Prediction

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## Engineers Wanted!

When a huge tanker runs aground and spills oil, you've got a real mess. Oil spreads out over the water and onto nearby beaches. How do you **clean it up**? Chemical engineers have designed one way. They developed chemicals that break oil into small droplets. This prevents the oil from reaching the shore. More work needs to be done to improve these chemicals and make sure that they are safe for the environment. Engineers like **you** could design new ways to clean up oil spills of the future.

## What Happened

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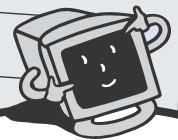
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