



## Chemistry: Pretty Penny Experiments!

### Included in this kit:

- ◆ One bottle of white vinegar
- ◆ 15 Salt Packets
- ◆ 6 Cotton Rounds
- ◆ One Small Non-Metal Bowl
- ◆ One Non-Metal Container with Lid
- ◆ 4 Pennies

### You will need:

- ◆ Measuring Cups
- ◆ Measuring Spoons
- ◆ Paper towels or napkins
- ◆ Water
- ◆ Spoon
- ◆ Pencil or Pen
- ◆ Aluminum Foil—*Optional*

### Experiment #1 Instructions-Make Lincoln Shine!

- ◆ Pour 1/4 cup white vinegar and 1 tsp. salt (1 packet) into the small bowl and stir gently until dissolved.
- ◆ Put 2-3 dirty or dull pennies into the bowl for up to 30 seconds.
  - ◆ If you don't have a timer, count to 30 slowly!
  - ◆ Save the vinegar and salt mixture for Experiments 2 & 3!
- ◆ Take the pennies out and rinse them with water.
- ◆ Place the pennies on a paper towel to dry.
- ◆ Record your observations!



### Explanation:

Pennies get dull over time because they are made of copper, and the copper in the pennies slowly reacts with air to form *copper oxide*, a new substance made from copper and oxygen. Pure copper metal is bright and shiny, but the oxide is dull and greenish. When you place the pennies in the salt and vinegar solution, the acid from the vinegar dissolves the copper oxide, leaving behind shiny clean pennies! The copper from the copper oxide stays in the liquid. Do you know of any other weak kitchen acids you could use, like lemon juice? Can you think of another famous American Statue that is has turned green from copper oxide?



### **Experiment #2 Instructions—It's not easy being Green!**

- ◆ Place a cotton round in the bottom of the container with the lid.
- ◆ Wet the cotton round with 1 tsp. vinegar
- ◆ Put a shiny penny on the wet pad and shut the lid. (This keeps the cotton round from drying out!)
- ◆ Put another shiny penny on a dry cotton round.
- ◆ Dip another, different shiny penny back in the salt/vinegar mixture from experiment 1 (or make fresh) for 30 seconds and place it on a dry cotton round. Label both pennies so you know which is which.
- ◆ Observe your 3 pennies at 1, 2, 3 & 8 hours.
- ◆ Record your observations!

### **Explanation:**

Shiny pennies have exposed copper to react with oxygen in the air to form copper oxide making the pennies look dirty again! As the pennies continue to react with the oxygen, a green-blue compound called malachite forms!

### **Optional Experiment #3—Fun with Aluminum Foil!**

- ◆ Submerge a small square of aluminum foil into the used salt & vinegar liquid. Lean another square of aluminum foil against the side of the bowl so that only part of it is in the liquid.
- ◆ After 15 minutes, what changes do you see? Record your observations!
- ◆ Wait a full hour, now what changes do you see? Record your observations!

### **Explanation:**

The dissolved blue copper ions from the pennies start reacting with the aluminum and return to their original color! These copper atoms were originally on the pennies — then they dissolved in the solution, and now they are being deposited on the aluminum foil! If you wait long enough, the aluminum foil starts to fall apart, because the aluminum atoms are being oxidized to aluminum (III) ions and dissolving in the water!





# Chemistry: Pretty Penny Experiments! Record your Observations!

## Experiment #1: Observations

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## Experiment #2: Observations

Hour 1

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Hour 2

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Hour 3

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Hour 8

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## Experiment #3: Observations

15 Minutes

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1 Hour

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