

# Classroom Experiment: Oxidation

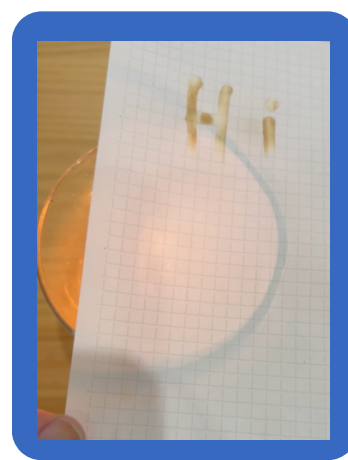
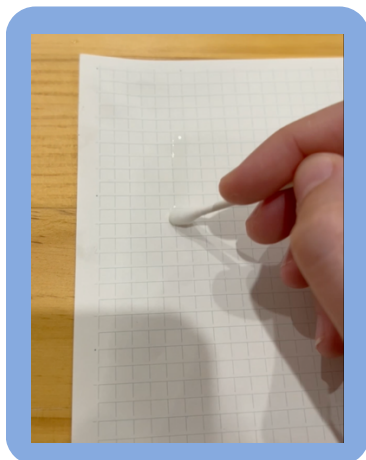
**Objective:** Introduce students to oxidation using **action-focused language** to increase their engagement and persistence, and confidence in doing science.

**Materials needed to do science:**

- 1 lemon or lemon juice
- Small container (jar, bowl, glass etc.)
- Cotton swab or paintbrush
- Paper
- Candle

**\*IMPORTANT NOTE\***

Students will benefit most if action focused language is repeated throughout the science lesson. Introduce each step by saying "We're going to do science and..." and explain to students that "Doing science means learning about the world." You can incorporate action focused language into any science lesson, so feel free to change the experiment as you see fit. Have fun doing science!



Introduce new concept "**Today we will be doing science!**"

Explain to the class that they will be "**doing science to learn about oxidation.**" Define the concept: "Oxidation is a chemical reaction that takes place when a substance comes into contact with oxygen or another oxidizing substance. An example of this is rust. When certain types of metal come in contact with oxygen rust is produced. This is why the statue of liberty is green; it is covered in rust because of oxidation! We can do science and learn about oxidation by making our own invisible ink."

### Have students do science by **observing**

Explain to students that "**part of doing science is observing!**" Gather the class in a circle and squeeze the lemon into your container. Then get your q tip or paintbrush ready. Have the class observe the materials. What do they know about lemon juice? Explain that lemon juice is made up of 90% water and other molecules including citric acid, sugar and carbon compounds.

### Have students do science by **predicting**

Explain to students that "**part of doing science is predicting!**" Explain to the students that you're going to use the candle to heat the paper evenly. Ask them to predict what will happen. Then, evenly heat the paper for around 30 seconds to 1 minute and your message will be revealed.

### Have students do science by **checking their guesses**

Explain to students that "**part of doing science is checking your guesses!**" Have your students consider whether their predictions were correct. Then, explain how this is related to oxidation. When you write a message with lemon juice the water dries, evaporating into the air. What's left behind are the sugar, acid, and carbon. When these things are heated, they begin to interact with the oxygen in the air in a process called oxidation which turns the carbon compounds to a brown. So when you heat up paper with dried lemon juice on it the what was an invisible message becomes visible!

Our research has found that action focused language can increase science engagement, persistence, and confidence in kids from diverse backgrounds. It is our goal to increase the amount of action focused language children hear about science to reduce disparities in STEM. We know how hard teachers work, so we wanted to ensure that implementing action focused language in the classroom was as easy as possible. If you have any questions, comments, or concerns, please contact us at [www.kidconcepts.org](http://www.kidconcepts.org). Thank you for reading!

Best,  
NYU Science Initiative

#### ACTION-FOCUSED LANGUAGE EXAMPLES

- "Today, we're going to do science"
- "Doing science is the process of discovering new things"
- "If we practice, we will get better at doing science."



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