

# Chemistry Valentines

## Favorite Holiday Demonstrations



### Introduction

Chemistry is for all seasons. Encourage creativity and you will be richly rewarded.

### Concept

- Creative classroom review

### Materials

Art supplies

### Safety Precautions

Please read the instructions included with the art supplies. Follow all standard classroom safety guidelines.

### Procedure

1. Create chemistry valentines using art supplies. They don't have to rhyme, but they must contain 2–5 chemistry terms. Your valentine should be original and you may decorate it if you choose. Have fun designing your cards and reviewing some chemistry. Be creative.

Ideas: Some sample valentines are typed below. These are just examples.

### Tip

• A great demonstration relating to Valentine's Day is *The Vanishing Valentine*. The procedure for this demonstration will be included.

### Discussion

Students may ask for some examples. Here are a few.

1. A poem for my valentine  
C hemicals for all the experiments we do;  
U nits to measure our data too.  
P eriodic Table for all the elements we use;  
I ons, ions; so many to choose.  
D ouble bonds, dots, lone pairs, and more;  
If You Don't Love Me I'll Sure Be Sore!
2. For a Group I Valentine  
You Always Give Me A Positive Charge
3. 4930 has three significant figures, but I simply have one  
You're the only significant figure in my life and that's all that counts.
4. I can't mix barium and beryllium  
But I Got You Babe  
Happy Valentine's Day
5. Valentine—I Love You  
Love is like an atom, untangible,

But everywhere, love is like a  
Chemical bond —essential to keep  
Things together. Love is like an  
Ionic bond—a little give and take.  
Love is like a covalent, bond—  
Sharing. Love is like entrophy,  
Without it, we feel a bit chaotic.  
Love is like a paramagnetic element  
We are all looking for someone else  
To fill our shell and make us whole!  
Happy Valentine's Day!

HAPPY VALENTINE'S DAY!

6. To My Chemistry Valentine

My love is like an atom  
So small, but everywhere.  
You cannot see it,  
But you know it must be there.  
The love that I give to you  
Is like a bonding pair.

7. You are like Fluorine, Iodine, and Neon

FINE  
HAPPY VALENTINE'S DAY

8. Hey Copper

I Cu IN MY DREAMS

## Acknowledgment

Sherry Berman-Robinson, Carl Sandburg High School

## Flinn Scientific—Teaching Chemistry™ eLearning Video Series

A video of the *Chemistry Valentines* activity, presented by John Mauch, is available in *Favorite Holiday Demonstrations*, part of the Flinn Scientific—Teaching Chemistry eLearning Video Series.

# The Vanishing Valentine

## Oxidation and Reduction of Resazurin

### Introduction

If you like to perform holiday demonstrations, this one's for you! In this demonstration, a flask containing a clear solution is shaken, turning the solution into a pink valentine solution. Then, by allowing the solution to sit undisturbed, it will fade back to colorless. The cycle can be repeated many times.

### Concepts

- Oxidation–reduction
- Indicators

### Materials

Dextrose solution, 0.133 M, C <sub>6</sub> H <sub>12</sub> O <sub>6</sub> , 100 mL	Erlenmeyer flask, 250-mL or 500-mL
Sodium hydroxide solution, 1.0 M, NaOH, 100 mL	Medicine dropper or Beral-type pipet
Resazurin solution, 0.1%, 1 mL	Stopper, to fit the flask

### Safety Precautions

*The dextrose and resazurin solutions are not considered hazardous. Sodium hydroxide solution is a corrosive liquid; skin burns are possible; it is very dangerous to eyes. Wear chemical splash goggles, chemical-resistant gloves, and a chemical-resistant apron. Please review current Material Safety Data Sheets for additional safety, handling, and disposal information.*

### Preparation

1. Prepare the 0.1% resazurin solution by dissolving 0.1 g of resazurin in enough distilled or deionized water to make 100 mL of solution.
2. Prepare the 0.133 M dextrose solution by dissolving 2.4 g of dextrose in enough distilled or deionized water to make 100 mL of solution.
3. Prepare the 1.0 M sodium hydroxide solution by dissolving 4.0 g of sodium hydroxide in enough distilled or deionized water to make 100 mL of solution.

### Procedure

1. Place 100 mL of the dextrose solution and 100 mL of the sodium hydroxide solution into the Erlenmeyer flask.
2. Add 8 drops of the resazurin solution to the flask. Stopper well and swirl the solution to mix. The solution will be blue.
3. Let the solution sit and become fully reduced (colorless) and then it can be shaken to obtain the pink valentine color.

### Disposal

Please consult your current *Flinn Scientific Catalog/Reference Manual* for general guidelines and specific procedures governing the disposal of laboratory waste. Neutralize and dispose of the Vanishing Valentine solution according to Flinn Suggested Disposal Method #10.

## Tips

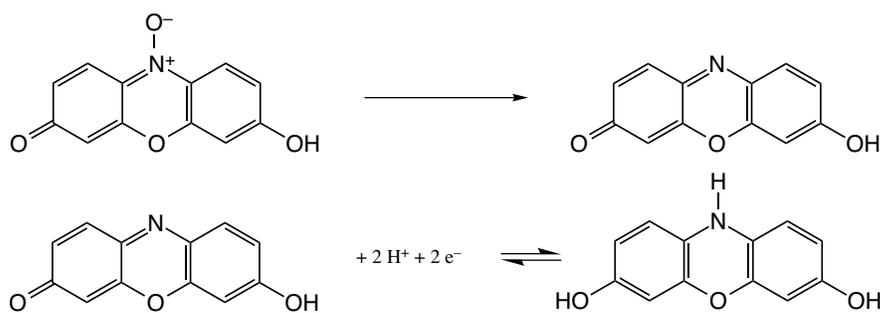
- The solution will be blue initially and will change to a pink color shortly. Allow the solution to sit undisturbed until it becomes colorless. This may take as long as 10 minutes. Show the colorless solution to the class and then place it behind your back and shake it gently. Show the students that it is now pink. The Vanishing Valentine solution will last 1 hour or so, depending on how often it is shaken and how much oxygen is reintroduced by opening the bottle. The color will become less vivid with time. The resazurin solution may have a limited shelf life (6 to 12 months). A freshly-made solution is a deep blue color. The reaction may not work if the color of the solution has changed.
- If available, perform this demonstration in a separatory funnel since its shape resembles a heart. Clear, square PETG plastic bottles also work well for this demonstration.

## Discussion

Dextrose first reduces resazurin to resorufin. (This is an irreversible reduction.)

The red resorufin molecule is then further reduced (reversibly, this time) to the colorless compound, dihydroresorufin.

The colorless, fully-reduced dihydroresorufin is easily oxidized back to resorufin. A gentle shake of the flask will introduce enough atmospheric oxygen into the solution to oxidize the dihydroresorufin back to the red resorufin solution.



## Connecting to the National Standards

This laboratory activity relates to the following National Science Education Standards (1996):

**Unifying Concepts and Processes: Grades K–12**

Evidence, models, and explanation

**Content Standards: Grades 5–8**

Content Standard B: Physical Science, properties and changes of properties in matter

**Content Standards: Grades 9–12**

Content Standard B: Structure and properties of matter, chemical reactions

## Acknowledgment

Special thanks to Mike Shaw, Chestnut Grove Middle School, King, NC, for providing the instructions for this activity.

## Reference

Shakashiri, B. Z. *Chemical Demonstrations: A Handbook for Teachers in Chemistry*; University of Wisconsin: Madison, WI; 1989; Vol. 2, pp 142–146.

**Materials for *The Vanishing Valentine* are available from Flinn Scientific, Inc.**

Catalog No.	Description
AP5929	Vanishing Valentine—Chemical Demonstration Kit
R0012	Resazurin, 1 g
S0074	Sodium Hydroxide, 100 g
D0002	Dextrose, 500 g
AP8963	Bottle, square, PETG, 500-mL

Consult your *Flinn Scientific Catalog/Reference Manual* for current prices.