

Name: _____ Date: _____

Title: Successful Solutions

Introduction: Learning how to do molarity calculations is essential to the practicing chemist. In this activity you will prepare several solutions, mix them and produce a chemical reaction. You will also vary the solutions slightly and notice the affect on the reaction. A small mistake in your work will make a big difference in your outcome. It is very important to correctly calculate the quantities needed to make the solutions and correctly prepare them.

Materials:

- malonic acid ($\text{CH}_2(\text{COOH})_2$),
- manganese sulfate ($\text{MnSO}_4 \cdot \text{H}_2\text{O}$)
- 2.0 M sulfuric acid.
- potassium iodate (KIO_3)
- 3.6 M hydrogen peroxide (H_2O_2) (previously prepared by teacher)
- 3% [w/v] starch in a dropper bottle (previously prepared by teacher)
- glassware-beakers, graduated cylinders

Procedures:

1. Prepare the following solutions. Show your caluculations for each:

- 100.00 mL of 0.150 M malonic acid ($\text{CH}_2(\text{COOH})_2$) and 0.0200 M manganese sulfate (MnSO_4) (solution 1)

- 100.00 mL 0.20 M potassium iodate (KIO_3) in 0.0800 M sulfuric acid. (solution 2)

2. You will be provided with 50.0 mL of 3.6 M hydrogen peroxide (H_2O_2) (solution 3) and 3% [w/v] starch in a dropper bottle.

3. Use a stopwatch or clock with a second hand to time the reaction. If you have prepared your solutions correctly, when you mix 20.0 mL (a graduated cylinder can be used) of each of the solutions (1,2, 3) along with several drops of starch – a most fascinating reaction should result. Keep track of the time it takes for the reaction to occur. Remember that observations are also data.

4. Slightly alter the concentration of one of your solutions and redo the experiment. Record all data, including the concentration change that you made. Be prepared to describe the affect of your change to your class.

Data:

From your classmates results, how did changing the solutions affect the time?

Solution changed:

how was it changed?

What was the result:

Conclusion: (discuss the common mistakes made when making solutions and why is it important to be as precise as possible when making them)