Name _____ Chem 163 Section: _____ Team Number: _____

Inquiry Questions for the Decomposition of H_2O_2 Computer Simulation

This simulation and the questions below serve as an introduction to some of the concepts you will need to consider and apply as you do lab 1, an independent research project involving the iodine clock reaction. Collaborate with your team to answer the following questions as your teacher does the simulation of the "Decomposition of Hydrogen Peroxide" found at the lab section of the Chem 163 website:

Trial No.	Volume (mL)				Concentration (mol/L) after mixing	
	3.0% H_2O_2 (m/v)	0.50 M KI	DI H_2O	Total Vol.	H_2O_2	KI
1	5.0	0.0	15.0	20.0		
2	5.0	2.0				
3	5.0	4.0				
4	10.0	2.0				

Key Questions

1. What volume of water do you suggest using for trials 2 – 5? Why? Record the volume of water for each trial in the table above.

2. Write the balanced chemical equation for the decomposition of H_2O_2 to produce oxygen gas and water.

   $\mathbf{H_2O_{2\,(aq)}} \rightarrow$

3. Make a rough sketch of what you think a plot of ***Volume O_2 vs. time*** would look like. What does the slope represent?

4. **Run trial 1**. Do the results support your hypothesis, above? Is the curve of the plot Volume of O_2 vs. time linear? Explain.

5. Make a rough sketch of what you think a plot of ***[H_2O_2] vs. time*** would look like.

6. Do the results support your hypothesis, above? How does the change in [H_2O_2] over time affect the rate of reaction? Why?

7. **Run trial 2**. How does the presence of KI affect the rate of the reaction?

8. If the [KI] stays the same throughout the reaction, what role does KI serve?

9. Which trial do you think will have a faster rate of reaction, trial 2 or 3? Why?

10. **Run trial 3**. Do the results support your hypothesis, above? Explain the results of trials 2 and 3.

11. Which trial do you think will have a faster rate of reaction, trial 2 or 4? Why?

12. **Run trial 4**. Do the results support your hypothesis, above? Explain the results of trials 2 and 4.

13. Calculate and enter in the table above the **molarity of H_2O_2 *after mixing* for trial 1** and **the molarity of KI *after mixing* for trial 2**. (H_2O_2 = 34.02 g/mol) Use these molarities to determine the concentrations for all other trials after mixing and enter the results in the table above. *Neatly show your work using dimensional analysis and sig figs on the back of this page.*